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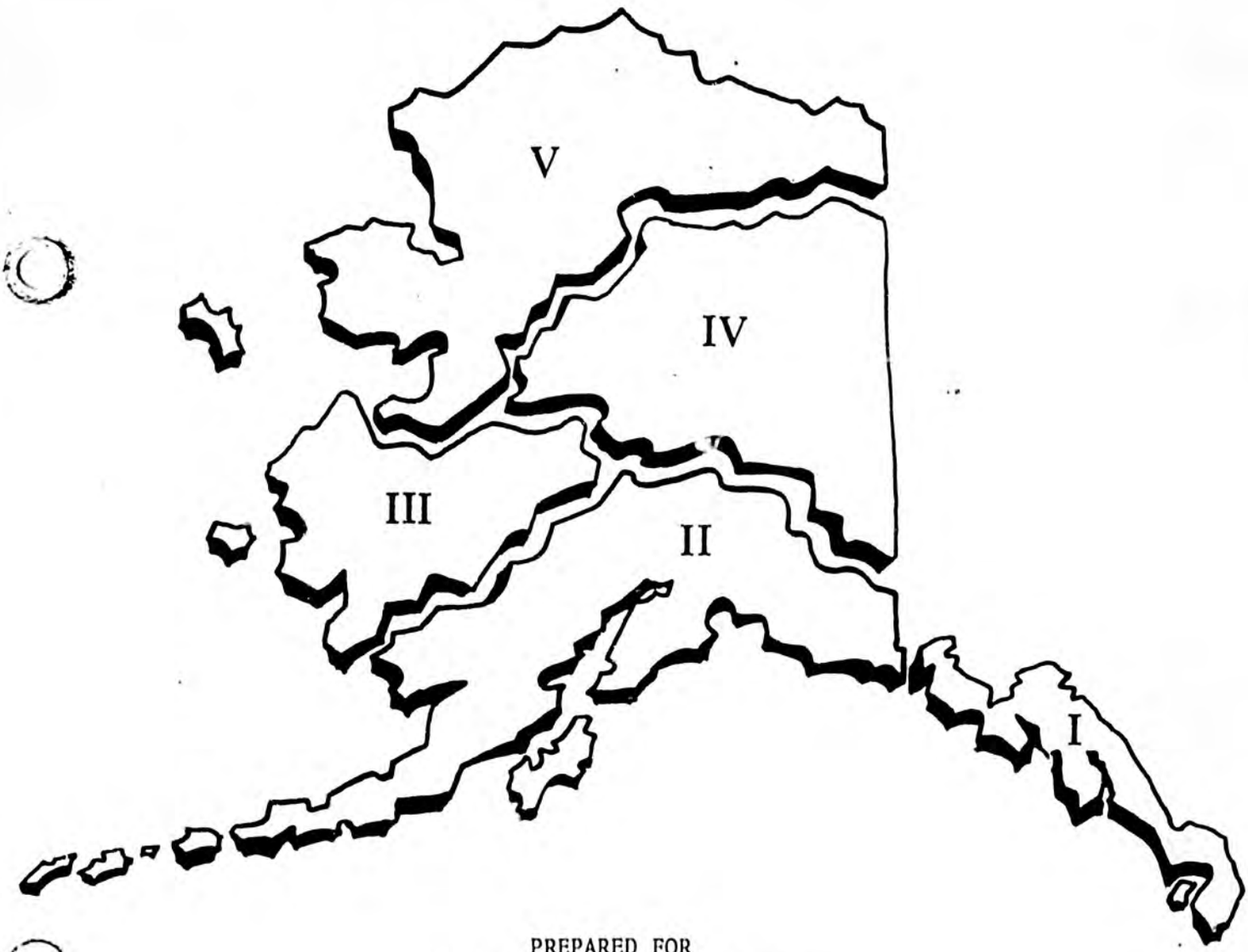
A SUBREGIONAL ECONOMIC ANALYSIS OF ALASKA



PREPARED FOR
THE FEDERAL FIELD COMMITTEE
FOR DEVELOPMENT PLANNING IN ALASKA
1968

E R R A T A
for
A SUBREGIONAL ECONOMIC ANALYSIS OF ALASKA

These lines replace the last 2 paragraphs on p. 28 and the 1st line on p. 29:

An amendment which was introduced by Senator Morse, and passed by the Congress, to the last foreign aid appropriation bill placed a maximum limit on the export of round logs harvested from federal lands in the western states. The legislation would not affect the Forest Service's current requirement for primary manufacturing of timber harvested from National Forest lands in Alaska. The legislation does require that proposals for the export of round logs harvested from other federal lands in Alaska be evaluated within the context of the amendment.

The limitation on round log export is effective for three years; the relative economic benefits of unrestricted round log export and the primary manufacturing requirement will be subject to further study and debate. The merits of each approach will receive attention particularly in relation tothe more marginal, remote, forests in Alaska

In the principal development in the Southeastern forest products industry, U. S. Plywood-Champion Papers, Inc., has signed a contract with the Forest Service (USDA) for the long-term harvest of 8.75 billion board feet of timber in the Juneau and Yakutat Working Circles. The contract call for the construction of a third pulp mill in southeast Alaska, but the exact location of the mill has yet to be announced by the company. It can be presumed that the manufacturing facilities will eventually be an integrated complex producing pulp, lumber, green veneer, and perhaps plywood. In the long run, more than 1,000 jobs may be created in this manufacturing complex and its supporting logging activities.[9]

These lines replace the 3rd paragraph on p. 300:

A transport mode that could be of significance for interior Alaska in selective cases in the future is the military pipeline from Haines used to supply aviation fuel and petroleum products to bases in the Fairbanks area. A report by the Federal Field Committee recommends that consideration be given to sharing this line with commercial interests if the normal utilization rate experienced and anticipated for this pipeline is low and the demand for and price of aviation fuels and other petroleum products in the civilian market continue to be high. The DOD policy generally favors commercial use of the pipeline when this usage does not interfere with military requirements.[13]

PREFACE

The present project grew out of an awareness by the Federal Field Committee that in the course of its study effort a fairly definitive economic analysis had to be made at a subregional--that is to say, less than a statewide aggregate--level. To be most useful it was seen that the study should forecast the economic future of the several regions of the state for a period roughly comparable to the time horizon of most agency plans and programs. In order to be as precise as possible, the study was cast in the typical measures of economic growth which are subject to quantification--income, employment, and investment. Therefore, to the extent governmental agencies care to tie to this analysis in shaping their Alaska activities, it should be especially helpful in policy formulation: unlike most previous Field Committee studies, it is not recommendatory in character. It also provides an important step toward a comprehensive development plan for Alaska.

Begun March 1, 1968, with funding from the Economic Development Administration of the U. S. Department of Commerce, this study is a composite product of a number of researchers and writers who performed in team fashion over a five-month period. Arlon R. Tussing was responsible for Chapters 4 and 6; Hubert J. Gellert prepared Chapters 2 and 5. Chapter 3 was the joint product of Clyde S. Courtnage, Gerald L. Allen, Thomas J. Smythe, Bradford H. Tuck, Donald E. Hazen, and myself. The chapter on Native protest and economic development was prepared by the full team; and the chapters on the public finance and science and technology aspects were my responsibility, as was the task of final editing.

Particular portions of the full study drew freely on recent publications of the Field Committee and others, as one or another study was unusually relevant to the analysis. Important in these last were George W. Rogers' *Alaska Regional Population and Employment*; Cresap, McCormick and Paget's *A Program for Increasing the Contribution of Tourism to the Alaska Economy*; and the Federal Power Commission's and Alaska Power Administration's unpublished draft studies. Federal (and some state and local agencies) provided especially valuable information inputs--these included the Forest Service, the Bureau of Commercial Fisheries, and the Department of Defense. In the private sector, a number of businesses in the forest products, oil and gas, fisheries, and transportation industries supplied helpful information in interviews and correspondence.

The analyses and conclusions are, of course, those of the authors and do not necessarily represent those of the Field Committee.

Douglas N. Jones, Economist
Federal Field Committee for Development
Planning in Alaska
Anchorage, Alaska
August 1968

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CHAPTER 1

INTRODUCTION

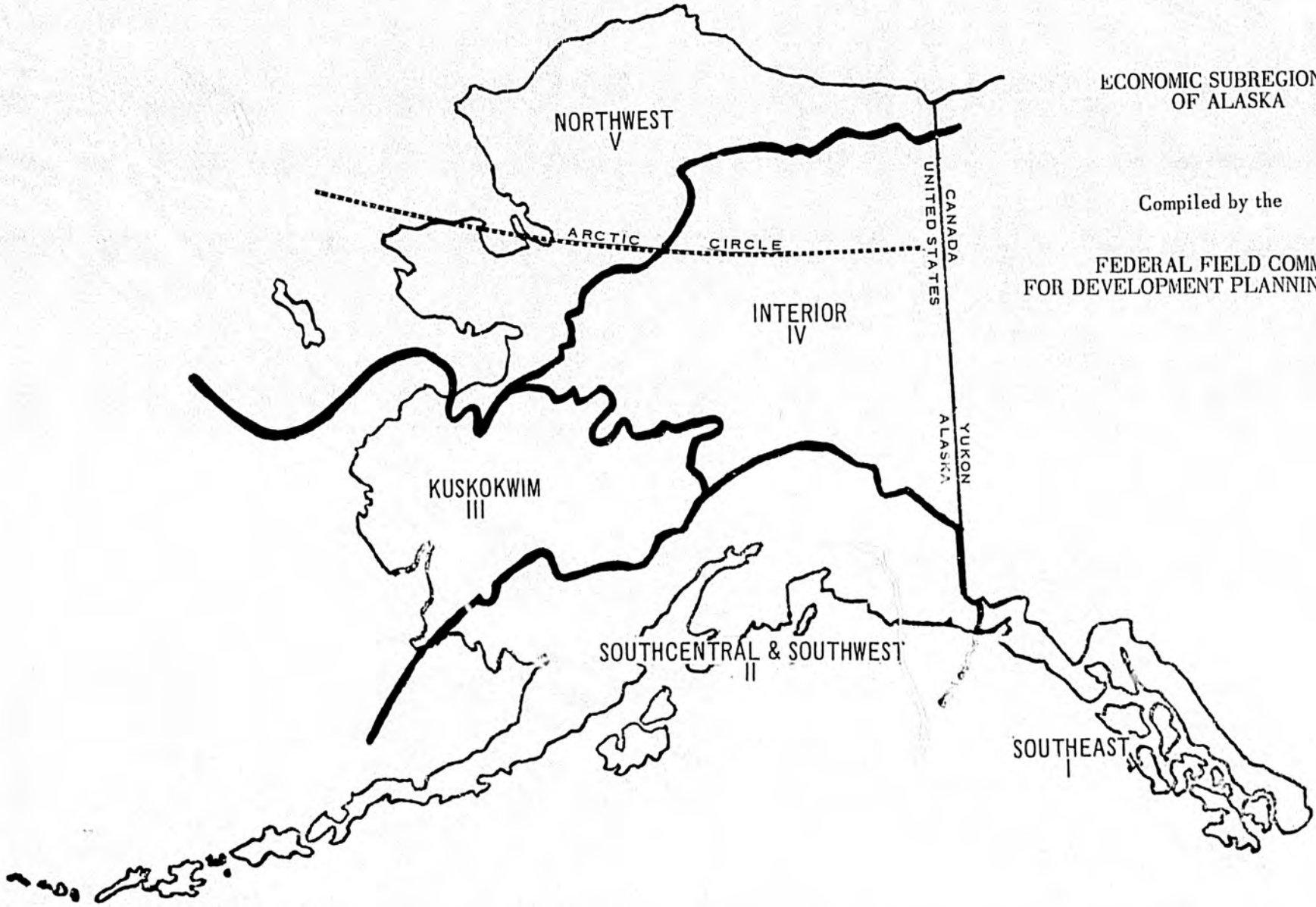
Previous studies of Alaska's economy have largely dealt with the state as a single unit organized by common goals and a single governmental body to meet the collective needs of the Alaskan people. Such an approach has a great deal of merit, but it masks the great diversity that lies within the State of Alaska.

There is, strictly speaking, not one but many economies within the state. Most Alaskans function within the framework of a money economy and engage in economic activities similar to those of an "average" U.S. citizen; but a considerable number of Alaskans spend most of their life in a subsistence economy that resembles more a way of life of the past than of the present; and, finally, a large percentage of Alaskans are employed in the realm of national defense, whose activities, while not without some economic impact, are not economic in nature. The heterogeneity that exists among the people is also present in the land, the climate, and the economic structure and institutions. The mild-climated southeastern region of the state, with its important commodity-producing industries, is linked very closely in its trading relations with Japan. The south-central region of Alaska, with Anchorage as its geographical center, acts as the economic hub for the whole state. The northernmost region of Alaska, by contrast, is an area of sparsely populated, scattered communities living in an inhospitable climate with only the most primitive surface transportation.

1. DELINEATIONS

In response to this great diversity, this study has separated the state into five geographic regions. The location of each of the regions is indicated on the map on the following page. Several delineations of subregions could be made and certainly no single division is going to be entirely satisfactory. The delineation used in this study was guided by a desire to work with regions that are approximately homogeneous with respect to social, demographic, economic, and geographic variables. The election district became the basic building block because much of the regional data for Alaska is available by election district and not otherwise available. In most cases, major economic centers in Alaska are fairly distinct. Hence, the "nodality principle" could be used in constructing a region by grouping the election districts about major economic centers. The following brief description of each region should serve to indicate why each was classed as a region.

FIGURE 1-1



ECONOMIC SUBREGIONS
OF ALASKA

Compiled by the

FEDERAL FIELD COMMITTEE
FOR DEVELOPMENT PLANNING IN ALASKA

Region I, the Alaska Panhandle, is set off geographically from the rest of the state by the Malaspina Glacier, the St. Elias Range, and the Canadian border. The geographical location of this southeastern region coupled with the topography of the land gives the area a number of characteristics that differentiate it from the rest of the state. The warm ocean currents and the coastal mountains contribute to its mild but rainy climate. The climatological conditions and the soil characteristics have produced the largest stands of hemlock and Sitka spruce in the whole state. And, finally, the geographic location of the region has guided the development of a transportation system that ties the region economically to Canada and the western U.S.

Region I is made up of a number of small towns of 5,000 to 15,000 people. The indigenous Native population differs from the rest of the state in that it is made up primarily of Tlingit, Haida, and Tsimshian Indians. Juneau, the capital of the state,is the nodal point of activity for the region; and Yakutat is the northernmost point of significant settlement.

Region II, the southcentral and southwestern area of the state, extends from the Malaspina Glacier on the west to the Attu Islands, the easternmost point on the Aleutian Chain. Region II contains the primary concentration of economic activity for the whole state. It constitutes the banking, insurance, wholesaling, and transportation hub of the state; and it houses the majority of the state's oil and fisheries industries. Anchorage, the state's only metropolitan area with over 100,000 people, is the focal point of this region; but the cities of Kenai and Kodiak are also areas of significant concentrations of people and economic activity. Relative to the rest of Alaska, Region II has the largest percentage of non-Natives, the lowest unemployment rate, and the largest percentage of people engaged in market-oriented work.

The Aleutian Chain, with its sparsely populated Aleut settlements and its strategically important military bases; and the Bristol Bay area, with its remote villages and harsh climate, have been included in Region II even though they do not share all of the characteristics of the rest of Region II. The differing qualities of these two districts require special attention, and they have been handled accordingly in the text. But, in general, these two districts are best handled by including them in Region II rather than in some other region. These two districts share with the rest of the region a common coastline and mountain range. They are linked to Anchorage by an air transportation corridor. They sustain a part of the livestock industry in the state that stretches from Kenai and Kodiak to the Aleutians. The fishing in Bristol Bay and the Aleutians is primarily commercial (as in the rest of Region II) and not subsistence (as in other regions). Finally, the prospect of oil and mineral discoveries in Bristol Bay suggest that in the future Bristol Bay may become even more closely

linked with the rest of Region II.

Region III contains the three election districts of Bethel, Kuskokwim, and Wade Hampton. The broad ethnic classification of which the Native inhabitants are members is the single factor that best helps to define this region. The Native population in this region is primarily made up of *Yupik*-speaking Eskimos as opposed to the *Inupiat*-speaking Eskimos in the northern districts of Nome, Kobuk, and Barrow (Region V). The economy of these people is basically subsistence hunting and fishing, though the advent of cooperatives is gradually turning fishing into more of a commercial venture. The commercial elements of Region III's economy are linked to the trade and financial services of Region II by an air transportation route between Anchorage and Bethel.

Region IV extends from the Canadian border to the Yukon and Koyukuk Rivers. The Native residents are primarily Athapascan Indians. The major area of activity is, of course, Fairbanks, where the University of Alaska is located. Fairbanks is linked to Anchorage by a highway, railway, and airway system. Region IV, like Region III, has a subarctic climate.

Region V, the northernmost part of the state, includes the Seward Peninsula and the Brooks Range. The Arctic climate subjects this region to intense and prolonged winters and strong winds. The large masses of permafrost that cover most of the region heavily influence the type of economy that exists in this region. Region V's Native population, composed of *Inupiat*-speaking Eskimos, the greatest number of which are located in the townsites of Nome, Barrow, and Kotzebue, rely on whale, walrus, and seals for much of their subsistence living.

In all but one case, the regions correspond to groupings of election districts so that the wealth of material that has previously been gathered on election districts by various state and federal agencies could be utilized. Each region has been treated separately and predictions made as to its probable growth. In order that a useful picture can emerge for the whole state, growth has been treated as a function of resource development within each region and economic activity in outside areas that are linked to the particular region. In other words, forecasts in each region can be added together to build a picture of growth for the whole state.

2. SCOPE AND METHODOLOGY

The scope and emphasis of the study is primarily economic in character. Noneconomic aspects of the subregions--health, education, housing, ethnic and social organization--have been incorporated in the study only where one or another bears directly on economic variables. The

dichotomy between the economic and noneconomic is in some respects, of course, an artificial one since the goal of economic growth is an improvement in the general welfare of the people measured by both economic and noneconomic variables. In the final analysis, regardless of how a particular policy question or economic prediction is phrased, the real meaning of the answer lies in how the general well being of the people concerned is altered.

The proper focus of a regional analysis, then, should be centered on a region's health and well being as measured by (a) per capita personal income, (b) basic economic stability, (c) economic growth, and (d) the amenities of life (educational, recreational, and cultural facilities; working conditions; and the general civic spirit). This study concentrates on only the first three of these dimensions. In part, these three were chosen for purposes of manageable analysis but more so because in the majority of instances the process of economic growth is complementary with an improvement in the amenities of life--an increase in personal income carries with it an improvement in cultural, recreational facilities.

In the few cases where economic growth can be achieved only at the expense of some deterioration in the amenities of life, a rational choice between the two goals can be made only if the community knows precisely what it is achieving (or giving up) in economic terms at the expense (or reward) of the aesthetic or cultural. A careful treatment of what the future values of economic variables might be is designed to permit the individuals in a community to decide in which cases the economic aspects should take precedence over noneconomic aspects.

The three dimensions of per capita income, employment stability, and economic growth are used extensively in this study; and the following few paragraphs contain an elaboration of certain aspects of these dimensions.

Per capita personal income is fairly widely accepted as one of the best single estimators of economic well being. The measure has several shortcomings, however, which make its application to the Alaskan experience difficult. A major drawback of this measure is that it says nothing about the distribution of income. As a measure of economic welfare over time and among regions in a developing area like Alaska, this is a serious weakness. If per capita income grows over time but the distribution of income becomes more unequal (say between Natives and non-Natives), the community may feel that economic welfare has deteriorated. Secondly, per capita income does not measure income derived from nonmarket sources. In many regions of Alaska, fish and game consumption is an important element in the real income of residents. Failure to account for nonmarket sources understates real income, and attempts to account for it have not been altogether satisfactory. Finally, real personal income can be obtained by

deflating money income to compensate for Alaska's above-average price level. Consumer price indexes for major cities have been computed and included in this study, but the problem of determining how these indexes will behave over time and what index should be used for areas that are not adjacent to major cities remains unresolved. On the other hand, the major component of personal income, wage and salary payments, is available by election district, thus permitting estimates on a regional basis of personal income, however crude, to be made.

Basic employment stability is of more than normal interest in the Alaska case since wide swings in seasonal unemployment are a major factor in variations in the level of economic activity throughout the state. The swings are even more pronounced in several of the regions. The two dimensions of employment instability that are of most concern--duration and variance--have received careful attention in this analysis. Both the duration and variance of instability will continue to loom large in the total Alaska picture, for in some *industries* growth can be achieved only at the expense of instability. Some *regions*, then, will be faced with the choice between stability and moderate growth or relative instability and more rapid growth.

Economic growth has become accepted rather generally as something "good" *per se*. The attachment to this concept stems from the fact that, if other things remain the same (for instance, income distribution), per capita income growth generally represents an increase in economic welfare. Since the various elements in a community's pattern of living seldom remain the same in a period of rapid growth, the effects of growth on the general well being deserve careful consideration. This is particularly true on the regional level where the economic growth of one region can impose external costs or diseconomies on another; e.g., pollution of one city's water supply resulting from the upriver development of a paper industry in another city. Such conflicts that arise between regions as well as similar ones within a region require some assessment by the community or communities involved as to whether the total costs of such developments are more than matched by the benefits that accrue.

Economic growth, then, has its costs as well as its benefits. An analysis of growth involves the two-fold problem of deciding where to go and how to get there.

This study includes an assessment of the existing patterns of activity in the form of a precise descriptive and statistical profile of each region and an analysis of how the existing pattern relates to the future. Simple time-series and regression analyses have been used for quantitative growth extrapolations. The nature of probable growth and development has been treated as to where it will take place (i.e., where the valuable resources are located within the state and where the growth centers are in each region), in which sectors (e.g., oil, gas, fisheries,

and forestry), and in which time spans (short, intermediate, and long). For purposes of this study, the short run is defined to be one to three years; intermediate, four to six; and long run, over seven years.

An attempt has been made throughout to indicate the appropriate connecting links between each of the regions and how the existing (and future) transport, power, and communication facilities affect the directional flow of commerce and economic ties between the regions. Following the five chapters devoted to the subregions of the state are chapters treating statewide and topically the relation of public finance, science and technology, and Native protest matters to growth and development generally.

3. USEFULNESS OF RESULTS

The broad goal of this study is to provide government agencies at every level a forecast of the economic future of the several subregions of Alaska in the reasonably proximate time period. As such, it does not make recommendations for policy but rather takes into account what the known and likely public and private sector activities will be and incorporates these into the estimates. Ideally, this study allows federal and state agencies (and to some extent, local governments and private enterprise) to design or reshape their investment projects and operating programs in accordance with the economic futures of the several subregions of the state within their purview.

SUBREGION I
Southeastern Alaska

CHAPTER 2

SOUTHEAST ALASKA--REGION I

1. DIAGNOSTIC CHARACTERISTICS OF THE REGION

A. Population, Employment and Income

Population, employment, and income data are key guides to the economic landscape of Southeast Alaska. Compared to all Alaska in the 1960s, Southeast Alaska has grown faster in population but slightly slower in employment and income. The population of the Southeastern region grew 18 percent, from approximately 37,000 to 44,000 persons, between 1961 and 1967, thereby increasing its share of Alaska's population from 12 percent to 16 percent (Figure 2-1). Employment increased 11.5 percent, compared to 12.4 percent for the state as a whole.

During the same period total employment in Southeast Alaska increased approximately the same as the total civilian workforce (Figure 2-2). The slower growth of the workforce and employment relative to population reveals a significant fact about Southeast Alaska. The population of the region is continuing its change from the rugged frontier dominated by the single miner and fisherman to a family society with increased numbers of dependents. This continuing change is borne out by statistics on the age of Southeastern's populace. Those 14 years of age and under made up 21.5 percent of the 1960 population; and although complete data are not available, there are indications that the proportion of young people increased rapidly in the 1960s. For instance, analysis of school enrollment data for the Greater Juneau area indicates that persons under 18 composed 45 percent of the 1965 population, compared to 39 percent in 1960.[1] The participation rate--the labor force as a percentage of the total population--is another measure of the increasing youthfulness of Southeast Alaska's population. This indicator declined very slightly from 41 percent in 1961 to 40 percent in 1966.

The importance of young people in the population picture of Southeast Alaska is a sign of the relatively heavier weight of natural increase--the difference between births and deaths--against migration as causes of population growth. Figure 2-3 indicates that about 62 percent of the increase in Southeastern's population between 1961 and 1966 was due to natural increase. Even so, the dependence on natural increase in Southeastern was considerably less than in the rest of the state. Only 8 percent of the state's population growth in the 1961-66 period was derived from in-migration. In part, the greater influence of migration in

FIGURE 2-1

TOTAL SOUTHEAST ALASKA POPULATION AND TOTAL ALASKA POPULATION, 1961-1967

Year	Southeast Alaska Population	Total Alaska Population	Southeast Alaska As A Percent Of Total Population
1961	37,363	236,669	15.1
1962	38,036	242,817	15.7
1963	38,683	249,904	15.5
1964	40,922	253,204	16.2
1965	42,290	265,192	15.9
1966	42,805	271,505	15.8
1967	44,030	278,820	15.8

Source: State of Alaska, Department of Labor, Employment Security Division, *Current Population Estimates--Alaska, By Election District*, 1961-1966, Unpublished data.

FIGURE 2-2

SOUTHEAST ALASKA AVERAGE MONTHLY CIVILIAN EMPLOYMENT,* 1961-1966

	1961	1962	1963	1964	1965	1966
Total Civilian Workforce	15,449	14,867	15,829	16,504	16,900	17,133
Total Unemployment	1,586	1,254	1,282	1,243	1,306	1,303
Percent of Workforce	10.3	8.4	8.1	7.5	7.7	7.6
Total Employment	13,715	13,583	14,547	15,261	15,594	15,830
Self-employed, Agricultural workers, etc.	1,706	1,619	1,666	1,746	1,807	1,638
Government	4,590	4,442	4,908	5,110	5,265	5,425
Employment of Persons In Private Industry	7,419	7,522	7,973	8,405	8,522	8,757
Commodity Producing Industries	3,006	3,220	3,485	3,749	3,[illegible]7	3,774
Mining	62	52	65	53	18	8
Contract Construction	633	515	628	741	754	577
Manufacturing	2,311	2,653	2,792	2,955	2,945	3,184
Distributive Industries	4,413	4,302	4,488	4,656	4,805	4,983
Trade	1,389	1,405	1,498	1,512	1,580	1,723
Finance, Insurance and Real Estate	230	241	244	286	301	319
Transportation, Communications and Public Utilities	1,635	1,562	1,644	1,713	1,738	1,691
Services & Miscellaneous	1,159	1,094	1,102	1,145	1,186	1,250

*Certain data, mostly in Mining and Finance, Insurance & Real Estate, estimated.

Source: State of Alaska, Department of Labor, Employment Security Division, *Workforce Estimates by Industry and Area*, 1961-1966.

FIGURE 2-3

SOUTHEAST ALASKA COMPONENTS OF POPULATION CHANGE, 1961-1966

Year	Natural Increase	Net Total Migration	Net Change
1961	929	1,031	1,960
1962	782	(109)	673
1963	782	(135)	647
1964	751	1,488	2,239
1965	708	660	1,368
1966	639	(124)	515
Total	4,591	2,811	7,402

Source: State of Alaska, Department of Labor, Employment Security Division, *Current Population Estimates--Alaska, By Election District*, 1961-1966, Unpublished data.

Southeast Alaska reflects the region's lower birth and higher death rates, that, in turn, are a sign of the population structure of the longest-settled region of the state. It also accompanied the statistical fact that regional data reflect interregional migration while figures for the state as a whole, of course, do not. The inflow of persons from other parts of Alaska, attracted mostly by government employment, has been an important factor together with the wood products industry, which has brought in loggers and mill workers mostly from outside Alaska.

Also important for understanding the economy of Southeast Alaska is the proportion of Native population. The number of Natives totalled 10,500 in 1967, a small increase from 1960 (Figure 2-4). But the percentage of the total Southeastern population that was Native declined slightly from 26 percent in 1960 to 24 percent in 1967. The 1967 Native percentage was, however, above the statewide average of 19 percent. The higher proportion of Natives in Southeastern indicates the presence of a high-unemployment, low-income group; although the Natives of Southeastern are considerably better off than those in other parts of Alaska in terms of the two indicators.

Analysis of a region's employment typically furnishes one of the best indicators of the state of its economy. Out of the total Southeast Alaska workforce of 17,133, 7.6 percent were unemployed in 1966--a significant decline from the 10.3 percent of 1961 and somewhat lower than the state average for the same year of 9.1 percent. The greater development of commodity-producing industries, chiefly manufacturing, in Southeastern is clearly marked. In Southeastern, basic industries made up 24 percent of total employment in 1966 compared to slightly less than 17 percent in all Alaska. The principal manufacturing activity is pulp and cant production with pulp mills at Ketchikan and Sitka and sawmills at Ketchikan, Wrangell, Petersburg, and Haines. The decline of fish processing can be followed through the statistics for such places as Juneau, where employment in canning and freezing has declined in the 1960's. Also, the decline of persons in the self-employed category reflects the decline of commercial fishermen.

Although commodity-producing industries are more important in Southeastern than elsewhere in Alaska and have shown the most rapid rate of increase in the 1960s, the most important category is government employment, 34 percent of the region's total employment. State employees are most numerous, followed closely by federal and, at a far distance, local government employment which nevertheless is the fastest-growing sector. Despite a dip in 1962, when both federal and state payrolls were reduced, government employment has increased 18 percent, considerably faster than distributive industries which showed a 13 percent employment rise. Of the major distributive sectors, employment in trade has increased fastest, with most of the increase in retail trade. The result has been

FIGURE 2-4

NATIVE AND NON-NATIVE POPULATION OF SOUTHEAST ALASKA
1960 and 1967

	1960	1967
Native		
Number	9,242	10,500
Percent	26	24
White & Other		
Number	26,161	33,530
Percent	74	76
Total	35,403	44,030

Source: State of Alaska, Office of the Governor, Division of State Planning, *Alaska's Population and Economy*, by Dr. George W. Rogers and Dr. Richard A. Cooley, 1962, Vol. II, p.28, and U. S. Department of the Interior, Bureau of Indian Affairs, Unpublished Data.

that trade has passed transportation, communications and public utilities as the largest distributive segment (Figure 2-2).

The greater proportion of natural resource-based industry in Southeast Alaska compared to other areas of the state is reflected in the seasonality factor. Although seasonality in employment is not as big a problem in Southeastern as in the far northern parts of the state, the problem is more extreme than in, say, the Anchorage area. In the 1960s there has been a swing of approximately 37 percent between high-month and low-month employment in Southeast (Figure 2-5) compared to 17 percent in the Anchorage area.

Southeast Alaska's total personal income has increased far more rapidly than employment. Total personal income has grown from $95 million in 1960 to $144,300,000 in 1966, a rise of some 52 percent (Figure 2-6). As expected from the employment picture, the government is the leading income producer. However, income from commodity-producing industries exceeds that from distributive and service industries, although the latter has greater employment. The main reason is the lower wage scale in the distributive sector, especially in wholesale and retail trade. Significantly, commodity-producing industries have surpassed the distributive sector since 1960, due largely to the rapid growth of the wood products industry.

Figure 2-7 indicates that the residents of Southeast Alaska have increased individual incomes in the early 1960s faster than persons in the state as a whole but not at the same rate as persons in the country as a whole. The per capita income of Southeastern increased 26 percent from $2,683 in 1960 to $3,371 in 1966 while per capita income increased 20 percent in Alaska and 34 percent in the United States. Southeastern's per capita income is still slightly below the state average.

One important qualification to these generalizations on income is the case of the Natives, whose economic conditions are well below those of the non-Natives. A measure of Native economic problems is their unemployment, which at 21 percent for the region, is nearly three times higher than for the workforce as a whole.[2]

The high cost of living must be mentioned as a factor reducing the relative well-being of Southeast Alaskans. Figure 2-8 indicates that virtually no change has occurred in relative living costs since 1961. Juneau now exceeds Anchorage. Transport charges and retail markups are the principal causes of Southeastern's cost problem.

FIGURE 2-5

SEASONALITY IN TOTAL EMPLOYMENT IN SOUTHEAST ALASKA

High Month and Low Month Employment
as A Percentage of Average Monthly Employment
1961-1966

	1961 %	1962 %	1963 %	1964 %	1965 %	1966 %
Total Employment						
High Month	120.8	120.0	123.7	119.8	116.6	120.0
Low Month	82.9	82.5	80.2	82.9	82.7	83.3

Source: State of Alaska, Department of Labor, Employment Security Division, *Workforce Estimates, Alaska*, 1961-1966.

FIGURE 2-6

DISTRIBUTION OF PERSONAL INCOME IN SOUTHEAST ALASKA, BY MAJOR SOURCES, 1960 and 1966
(In Thousands Dollars)

	1960	1966
Total Personal Income	$95,000	$144,200
Less: Personal Contributions for Social Insurance[a]	2,200	7,800
	$92,800	$136,400
Wage and Salary Disbursement	$72,700	$114,100
Government	26,000	46,100
Federal--Civilian	12,700	18,000
Federal--Military	2,300	3,100
State and Local	11,000	25,000
Earnings of Persons in Private Industry	46,700	68,000
Commodity-Producing Industries	20,100	36,500
Mining	400	b
Contract Construction	4,000	6,600
Manufacturing	15,700	29,900
Distributive and Service Industries	26,600	31,500
Wholesale and Retail Trade	6,000	10,200
Finance, Insurance and Real Estate	1,100	2,100
Transportation, Communications and Public Utilities	11,500	11,900
Services	5,800	5,900
Other Industries	2,200	1,400
Property Income, Proprietors' Income, Transfer Payments and Other Income	22,300	30,200

[a]2.3 percent in 1960; 5.44 percent in 1966.

[b]Not shown to avoid disclosure of data for individual firms.

Source: State of Alaska, Department of Labor, Employment Security Division, *Statistical Quarterlies*, 1966, and Transportation Consultants and Wilbur Smith & Associates, *Alaska HIghway Study*, 1965 Working Papers.

FIGURE 2-7

PERSONAL AND PER CAPITA INCOME,
SOUTHEAST ALASKA, ALASKA, AND THE UNITED STATES
1960 and 1966

	Southeast Alaska		Alaska		United States	
	1960	1966	1960	1966	1960	1966
Total Personal Income ($ Million)	95.0	144.3	649.0	907.0	398.7	580.5
Per Capita Income (Dollars)	2,683	3,371	2,846	3,421	2,215	2,963

Source: State of Alaska, Department of Labor, Employment Security Division, *Statistical Quarterlies*, 1966, and Transportation Consultants and Wilbur Smith & Associates, *Alaska Highway Study*, 1965, Working Papers.

FIGURE 2-8

INDEXES OF INTERCITY DIFFERENCES IN THE COST OF EQUIVALENT GOODS AND SERVICES

JUNEAU AND KETCHIKAN, ALASKA, COMPARED WITH SEATTLE, WASHINGTON
(Costs in Seattle = 100)

	Juneau							Ketchikan						
	1961[1]	1962	1963	1964[2]	1965	1966	1967	1961	1962	1963	1964	1965	1966	1967
All Items[3]	123	122	122	124	124	125	127	119	117	117	119	117	118	118
Food	125	123	122	123	126	127	132	121	120	119	118	119	122	123
Housing	137	136	137	133	134	135	137	122	118	118	121	121	122	122
Rental Housing	177	175	180	150	151	147	147	148	143	146	126	127	127	126
Apparel and Upkeep	116	113	113	118	116	115	115	113	110	110	117	116	114	117
Other Goods and Services	113	113	114	119	116	117	119	115	116	118	117	113	113	113
All Items Less Housing	117	116	116	120	119	120	122	117	117	117	117	116	116	117

Notes:

1. The indexes for the years 1961 through 1963 compared costs in each Alaskan city with Seattle but were not designed to measure the differences in costs among the Alaskan cities. November is the pricing period used for the index for the period 1961-1963.

2. The indexes for 1964-1966 are designed to compare the cost of the average Alaskan family's spending pattern in each of the Alaskan cities with equivalent costs in Seattle. They are not entirely comparable with indexes for 1961-1963, but are estimated to be approximately one point apart.

3. For detailed breakdown on items included in the several categories, see "Indexes of Consumer Prices and Living Costs for Anchorage, Fairbanks, Juneau, and Ketchikan, Alaska - Autumn 1966", SF BLS 7-13, Bureau of Labor Statistics, San Francisco, California, March 21, 1967.

Source: Bureau of Labor Statistics, "Indexes of Consumer Prices and Living Costs for Anchorage, Fairbanks, Juneau, and Ketchikan, Alaska", Autumn, 1961-1967.

B. Area Economic Profiles

Southeast Alaska contains five subregions which, despite more intensive economic links in recent years, maintain considerable autonomy. Interregional ties have been strengthened in recent years through the increased importance of such activities as log traffic to the various mills from cutting areas and dispersion of freight on the Marine Highway System from Ketchikan and Juneau to other communities; but ties between most of the subregions in Southeast Alaska and areas outside the region, especially Seattle, are of equal or even greater importance. Thus, analysis of the region's key areas is justified by their economic autonomy as well as by differences in their principal employment-generating activities.

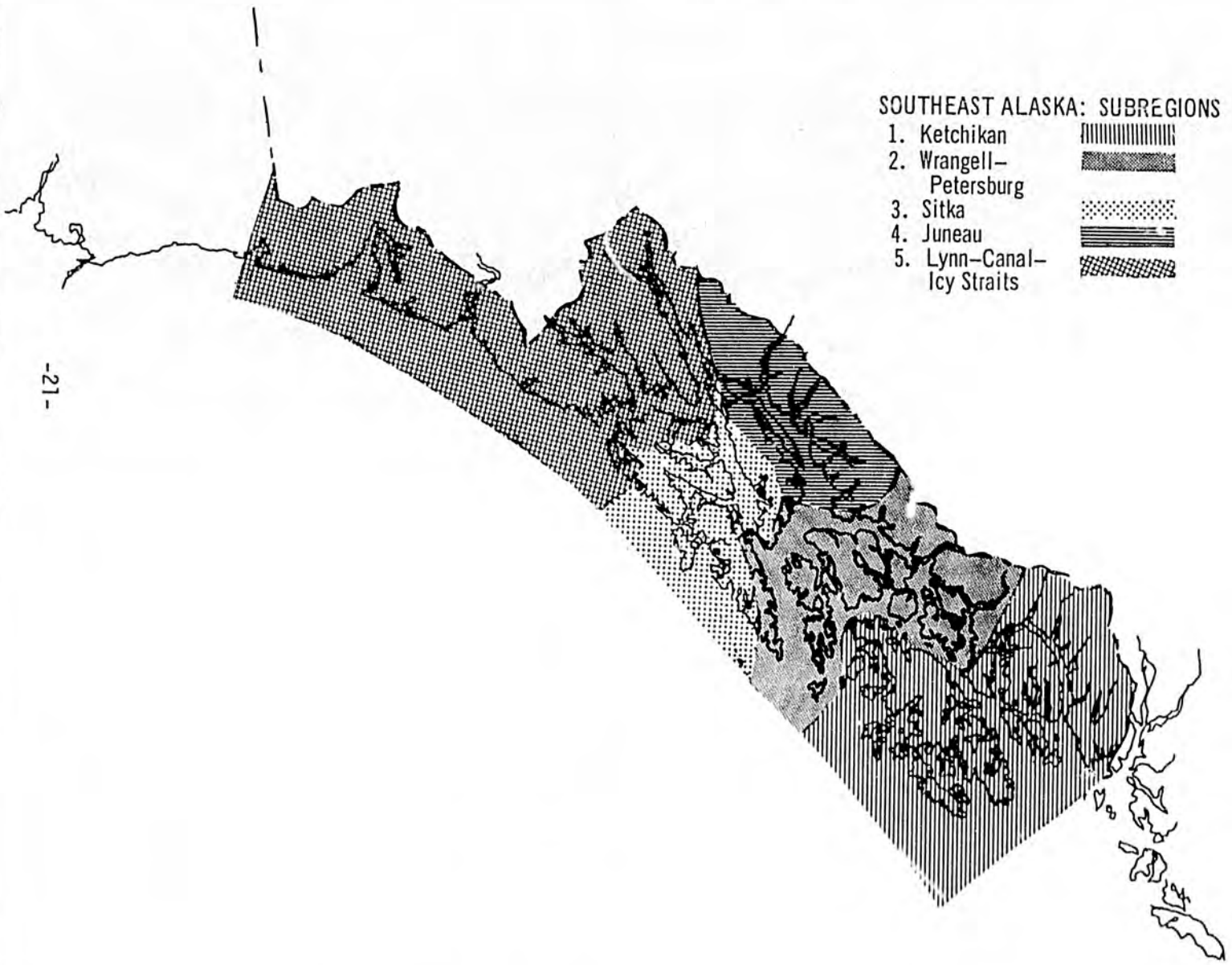
Following are brief profiles of the five principal subregions. (Figure 2-9 indicates the geographic area boundaries.)

Ketchikan Area Profile

	1961	1966
Government employment	669	1,050
Other civilian employment	3,217	3,863
Total civilian employment	3,886	4,913
Unemployment as a percentage of total civilian workforce	14.5	8.5
Government employment as a percentage of all civilian employment	17.2	21.4
Population	12,461	13,769

The principal industry of the Ketchikan area is logging, lumbering, and pulp manufacture, which together with government employment, accounts for most of the increase in civilian employment between 1961 and 1966. Ketchikan is the site of the Ketchikan Pulp Company, a 200,000-ton-per-year dissolving pulp mill, which is estimated to account for 1,000 employees in the mill and in the woods. Rail barges from Prince Rupert serve the mill, bringing in chemicals and other supplies and taking out the pulp. Ketchikan Spruce Mills, an export cant mill with a capacity of about 180,000 board feet per shift, is also located in Ketchikan and has recently started two-shift operation. Georgia-Pacific Company, Inc., one of the owners of Ketchikan Pulp Company, recently purchased Ketchikan Spruce Mills. A significant development since the purchase has been a diversification of marketing. The mill now sells half its output through Wrangell Lumber Company, the dominant trading channel

FIGURE 2-9


SOUTHEAST ALASKA: SUBREGIONS
1. Ketchikan
2. Wrangell–Petersburg
3. Sitka
4. Juneau
5. Lynn–Canal–Icy Straits

for lumber between Alaska and Japan, and the other half through a Japanese trading company. Ketchikan is also the site of three major fish-processing plants.

While total civilian employment increased by 26 percent from 1961 to 1966, the population increased by only 10.5 percent between 1961 and 1966, indicating a healthy balance between jobs and people evident through the marked decline in unemployment.

Wrangell-Petersburg Area Profile

	1961	1966
Government employment	235	363
Other civilian employment	1,113	1,434
Total civilian employment	1,348	1,797
Unemployment as a percentage of total civilian workforce	18.6	13.3
Government employment as a percentage of all civilian employment	17.4	20.2
Population	3,579	5,287

The principal industries of the Wrangell-Petersburg area are logging-lumbering, fish-processing, and government. The manufacturing and government sectors produced most of the increase in employment in the years 1961-1966, but increases in the government sector were less important than in manufacturing. Within the latter sector, increased production at Wrangell Lumber Company and the restarting of operations at Alaska-Pacific Lumber Company (now called Alaska Forest Products, Inc.) accounted for most of the increased employment, with the continuing prosperity of the fish-processing activities at Petersburg also contributing. By 1966 the combined export to Japan of the two Wrangell mills was 64 million board feet, increasing to nearly 80 million board feet the following year as Wrangell Lumber Company started two-shift operation.

The three major fish-processing plants at Petersburg are well diversified, having produced a total of 187,000 cases of canned salmon, 2,200,000 pounds of frozen salmon, and 3,950,000 pounds of frozen halibut in 1966, along with other fish products such as shrimp and sablefish. Petersburg is one of the principal fish-processing centers in Alaska, and most of its products are shipped to Seattle.

Population and employment have both increased rapidly in the Wrangell-Petersburg area, the former growing 48 percent between 1961 and 1966, and the latter one-third. Unemployment has decreased, partly due to the population mix which includes increasing numbers below working age,

as Wrangell especially becomes a more stable community. Another factor is the smoothing out of seasonal fluctuations in the fishing industry.

Sitka Area Profile

	1961	1966
Government employment	827	846
Other civilian employment	1,523	1,590
Total civilian employment	2,350	2,436
Unemployment as a percentage of total civilian workforce	12.4	5.4
Government employment as percentage of all civilian employment	35.2	34.7
Population	8,143	7,301

The Sitka area is unique in Southeast Alaska in that government employment has not been a principal force in increasing the total civilian employment and, in fact, its relative position in Sitka's employment situation declined. Sitka is also the only area in Southeast Alaska to lose population in the 1961-66 period. The decline was the main reason for the sharp decrease in unemployment, as employment increased only slightly.

Other than in government, small increases occurred in manufacturing, chiefly at the Alaska Lumber & Pulp Company mill, and in trade. Two small fish-processing plants are also present in the Sitka area, employing about sixty people at the height of the summer season. Sitka is also an educational and institutional center, possessing a Public Health Service Hospital, the Alaska Pioneer Home, Mt. Edgecumbe Bureau of Indian Affairs HIgh School, and the Sheldon Jackson Junior College.

Juneau Area Profile

	1961	1966
Government employment	2,709	2,937
Other civilian employment	2,734	2,822
Total civilian employment	5,443	5,759
Unemployment as a percentage of total civilian workforce	5.6	5.2
Government employment as a percentage of all civilian employment	49.8	51.0
Population	10,462	13,227

Government employment has been the principal motive force in Juneau's employment increase. Manufacturing employment has declined with the shift of fish-processing and lumbering activities elsewhere. Other increases have been spread throughout the range of distributive and service industries. As the state capital, Juneau has experienced a significant increase in state employees, but the most rapid rate of increase was in local government employment which grew 39 percent between 1961 and 1965. Federal government employment declined slightly.

The principal growth in Juneau's population, which led all of Southeast Alaska in rate of growth from 1960 to 1966, has been a great increase in dependents, accompanying the continued shift from a resource-based economy to one relying mainly on government employment. While population grew 26 percent, employment increased only 6 percent between 1961 and 1966. However, the continued low unemployment rate indicates that most of the new people were not in the labor force.

Lynn Canal-Icy Straits Area Profile

	1961	1966
Government employment	150	229
Other civilian employment	686	696
Total civilian employment	836	925
Unemployment as a percentage of total civilian workforce	10.2	11.3
Government employment as a percentage of all civilian employment	17.9	24.8
Population	2,718	3,194

Employment in the Lynn Canal-Icy Straits area, which includes the cities of Haines, Skagway, Hoonah, and Yakutat, increased about 11 percent while the population grew by 17.5 percent. Unemployment increased slightly. The only significant employment increases occurred in the government sector, with lesser increases in construction. Lumbering and logging activity has increased markedly during the last two years with the enlargement of the two cant mills at Haines. However, increased employment in this sector was not sufficient to offset losses in fish-processing, and manufacturing employment decreased. A new fish-processing plant is going into Yakutat aided by an Economic Development Administration grant for a dock, and the Forest Service is proceeding with road construction in the Yakutat area which will make additional timber stands commercially accessible.

2. ECONOMIC FORCES DETERMINING THE FUTURE OF THE REGION

Projections of Southeast Alaska's economic future require analysis of the sectors that are expected to provide most of the motive force for the region's growth. The key areas are forest products, fisheries, government, and tourism. Transportation, electric power, and communications--important adjuncts to development--will also be considered in this section.

A. Government

The government sector expanded at a decreasing rate during the early 1960s following the initial dip in 1962. Although the next year this employment area grew by 10 percent, it declined to a growth rate of 4 percent in 1964 and 3 percent in 1965 and 1966.

The various sectors of government employment showed sharply divergent rates of growth. Despite several variations during the 1961-66 period, federal government employment was at the same level in 1966 as in 1961: 2,100. The state and local sector grew by approximately one-third from 2,500 to 3,300 with the local sector being the fastest growing area; although state government employees formed the most numerous segment.

It is expected that the government sector in Southeast Alaska will continue to grow, although not at the same rate as in the 1961-66 period. The future rate for state and local government employment is projected to be approximately 5 percent a year. Under the assumption of a gradually increasing commitment to Alaska's development, federal government employment is expected to increase; although at a slower rate than state and local government, or approximately 3 percent a year.[3]

B. Forest Products Sector

Figure 2-10 shows the progress of the forest products industry, the leading industrial activity of Southeast Alaska. With pulp mills at Sitka and Ketchikan and major sawmills at Ketchikan, Wrangell, Petersburg, and Haines, output has increased about 55 percent since 1961;and a momentum to timber sales and rising stumpage prices has resulted. Southeast Alaska clearly dominates the wood products industry of the state. Out of a total estimated dollar value of $73 million in 1966, over $70 million came from the region.

Almost the entire production is exported to Japan. In 1966, this amounted to about 150 million board feet of cants (log scale) and 160,000 tons of dissolving pulp. The Southeastern sawmills sell virtually their entire output through Wrangell Lumber Company, the Japanese-owned

FIGURE 2-10

SOUTHEAST ALASKA ANNUAL TIMBER CUT AND VALUE
1960-1966

	NATIONAL FOREST		STATE FOREST			TOTAL			
YEAR	VOLUME CUT-MBF	VALUE CUT-$	EST. END PRODUCT VALUE-$	EST. VOLUME CUT-MBF	EST. VALUE CUT-$	EST. END PRODUCT VALUE-$	EST. VOLUME CUT-MBF	EST. VALUE CUT-$	EST. END PRODUCT VALUE-$
1960	347,496	859,888	45,761,748	189	566	16,706	347,685	860,454	45,778,454
1961	338,207	896,588	45,154,016	1,788	5,192	158,041	339,995	901,780	45,312,057
1962	366,276	922,486	48,733,022	6,185	17,991	546,692	372,461	940,477	49,279,714
1963	395,143	924,338	50,894,418	9,570	19,896	845,892	404,713	944,234	51,740,310
1964	443,736	910,234	57,685,680	16,330	53,236	1,443,409	460,066	963,470	59,129,089
1965	397,610	816,796	52,973,580	21,745	51,337	1,922,041	419,355	868,133	54,895,621
1966	474,277	1,111,642	67,831,097	28,098	66,355	2,483,582	502,375	1,177,997	70,314,679

Source: Alaska Division of Lands, *1966 Annual Report*, and U. S. Forest Service unpublished data.

parent of the Alaska Lumber & Pulp Company, which is also a major producer. The Alaska Lumber & Pulp Company pulp mill at Sitka accounted for the pulp export to Japan, with the remaining 20,000 tons of its production going to the United States and other countries. The Ketchikan Pulp Company mill at Ketchikan produced an estimated 210,000 tons of dissolving pulp in 1966, almost all of it going to the conterminous United States.

The dependence on the Japanese market, especially on one channel of that market, has become intertwined with the question of round-log exports from the region. A recent study recommended limited round-log export to create competition and more fairly value the stumpage.[4] In any event the whole effect of log exports in the Alaskan context requires more thorough analysis. The major arguments may be briefly outlined. Considerable support for allowing some log export from Alaska can be drawn from statements on the Pacific-Northwest log export experience. For instance, the Forest Service Pacific Northwest Forest and Range Experiment Station finds that logs exported from the Pacific Northwest produce $100 per 1,000 board feet in income for landowners, loggers, longshoremen, and exporters while income would be only $95 per 1,000 board feet if the logs were processed into lumber at domestic mills.[5]

The Treasury Department in its brief for the round-log export hearings earlier this year suggested that the principal problem connected with log export is supply from federal forests:

> *The major issue* is the computation of the allowable cut, which is intended to obtain a steady yield of timber over time. Under present policy much good timber may be permanently lost, and the growth capacity of the forest lands never realized. Timber will *rot* on the forest floors in Washington, Oregon, and Alaska, under present policy. In part, it is not adequately recognized that new stands of trees grow fairly rapidly--i.e., have a *positive* real rate of interest, and the old, overripe pine forest actually has a negative rate of interest--mortality losses over time exceed new growth, and therefore the usable volume of harvestable timber is reduced.
>
> . . .
>
> Moving to an accelerated-cut policy will yield larger 'one-time' gains, *spread over several decades*... .[6]

The Treasury Department recommended holding export of unprocessed logs from Alaska and the Pacific Northwest to the 1967 level of about 1.7 billion board feet. The report also suggests a change in the Jones Act to allow lumber to be sent from Alaska to the East Coast in foreign bottoms. Such a change would be beneficial to the forest products economy of Southeastern by opening the possibility of increased competition and higher prices in addition to more intensive processing. Government stumpage payments would also be expected to increase.[7]

The opponents of log exports focus their arguments on the rise in stumpage with the increase in Japanese log purchases and the closing of northwestern mills in Oregon and Washington. The proponents of export cite increased employment in the whole northwestern timber products industry since export became active and claim that the closing of mills is due to the trend towards large integrated operations.[8]

In any case log export from Alaska would take place in a different setting than in the northwest. Mill unemployment could not be attributed to the trend towards integration. Also, since virtually the entire lumber industry in Alaska is geared to export, some amount of capital facilities for the export trade has already been installed; although this could be offset by the lower labor content in Alaskan lumber cited previously.

There is also a real question regarding the comparative benefits of log export from southeastern Alaska. Approximately one-half the presently allowable cut of one billion board feet is being taken, and logging employment is approximately 1,000 persons with 1,200 employees in the mills. If all the pulp and sawmills primarily dependent on the Japanese market closed down with log export, mill unemployment in the order of 700 persons might result. An increased cut of 350,000,000 board feet would be necessary to generate equivalent logging employment, assuming a labor complement of two man-years per million board feet. This would stretch to the limits or slightly exceed the present annual allowable cut assuming that the Champion-U.S. Plywood allotment of 175 million board feet is used. A tentative conclusion would be that allowing log export from Southeast Alaska would spur cutting but, under present allowable yield limitations, the dislocations of mill closures would barely be equaled by increased logging employment. Of course, the question of major mill closures may not be relevant if the Treasury Department's proposal is seen to apply only to new sales and not to the allowable cut already committed to existing mills.

The principal development on the horizon in the Southeastern forest products industry is a pulp mill-sawmill-plywood complex, plans for which have been announced by U. S. Plywood-Champion Papers, Inc., which has an option on 8.75 billion board feet of Forest Service timber in the Juneau and Yakutat Working Circles. The company has until mid-September, 1968, to sign a contract agreeing to build a pulp mill by 1973. The site for the complex is not yet known, but two places in the Juneau area are strong contenders. If it does "come in," such an integrated development

might employ 750 people plus about 350 in the woods.[9]

If a major forest products complex does not develop in the time frame of this study, the large bloc of timber would most likely be broken up into smaller sales as a basis for expansion of present sawmills in the short term. Increased employment would be in the order of 100 persons in the mills and a roughly similar amount as loggers, and a similar increase could be expected in the intermediate and long terms.

C. Fisheries Sector

The value of the Southeastern fish catch has more than tripled between 1960 and 1966, although the growth has not been steady and there is a definite question on future trends (Figure 2-11). In this region also the spectacular increase in the salmon catch of 1966 was followed by the disastrous season of 1967. Salmon continues to be the dominant species, with halibut, shellfish, and other fish (chiefly herring) stable or declining. Apporximately half the value of the "other fish" category came from herring eggs on kelp, a new industry.

The table indicates the overall stability of total value to the fishermen due mostly to the movement of salmon prices opposite to the catch amounts. There was a smaller number of fishermen at the end of the 1960-1966 period than in the beginning, causing an increase in value paid per fisherman. The number of fish-processing employees also fell.

The fishing industry in Southeast Alaska is undergoing marked change. Larger boats with better equipment have come into use, allowing the reduction in manpower and increased value per fisherman. On shore, frozen fish products are growing at the expense of canned fish; and some plants have closed with production centered at more advantageously located spots.

The industry has several areas of opportunity for improvement. Further change from canned to frozen salmon would increase the value. Facilitating such a change would be improved transportation, centering around adequate loading facilities for refrigerated container cargo at the outports of the region. The application of new techniques in mechanical shrimp peeling, already used in Kodiak, could increase utilization of this resource.

Development of bottomfish provides an opportunity for dramatically increasing the total fisheries output of this region. Financing a pilot filleting operation in Petersburg has been discussed by the Bureau of Commercial Fisheries and the Economic Development Administration, but the

FIGURE 2-11

SOUTHEAST ALASKA

ANNUAL FISH CATCH AND VALUE,* 1960-1966

	SALMON		HALIBUT		OTHER FISH		SHELLFISH		TOTALS	
	Catch (lbs.)	Value to Fishermen ($)	Catch (lbs.)	Value to Fishermen ($)	Catch (lbs.)	Value to Fishermen ($)	Catch (lbs.)	Value to Fishermen ($)	Catch (lbs.)	Value to Fishermen ($)
1960	34, 238, 553	6, 327, 373	22, 495, 620	2, 511, 632	86, 822, 803	1, 710, 622	5, 339, 964	293, 998	148, 896, 940	10, 843, 625
1961	102, 565, 300	12, 482, 830	29, 423, 600	4, 394, 810	75, 817, 790	723, 000	6, 343, 700	364, 680	214, 150, 390	17, 965, 320
1962	83, 425, 850	12, 762, 640	23, 339, 000	6, 208, 170	35, 102, 290	516, 050	9, 104, 410	744, 200	150, 971, 550	20, 231, 060
1963	102, 412, 430	14, 844, 120	17, 592, 000	3, 390, 860	32, 679, 570	603, 670	8, 902, 200	797, 190	161, 586, 200	19, 635, 840
1964	115, 948, 420	15, 985, 610	14, 645, 000	3, 110, 000	49, 008, 050	1, 076, 790	8, 264, 000	752, 930	187, 865, 470	20, 925, 330
1965	83, 139, 060	13, 458, 630	23, 809, 660	5, 237, 511	26, 459, 352	678, 430	6, 830, 752	521, 790	140, 238, 824	19, 896, 361
1966	140, 729, 181	24, 206, 885	18, 954, 000	5, 972, 300	16, 064, 433	1, 052, 956	6, 443, 094	520, 368	182, 190, 708	31, 702, 509

Source: Alaska Department of Fish and Game, *Commercial Fisheries Statistics*, 1960-1966.

* Neither catch nor value can be equated directly to Alaska income and employment since there is no breakout of who made the catch and to whom the value accrued, e.g., Alaska, Seattle fishermen.

market presently appears adverse. More research on location of species, cheaper processing, and markets should be done to take advantage of what is thought to be a large resource. Among the leading beneficiaries of diversification could be the five Native community-owned canneries in the southern part of the region, which have been in financial difficulties since organization in the late 1950s. An organizational improvement here would be operating these canneries as a unit with the communities sharing in the total profits. This would allow a certain diversification through operating the most advantageously located plants as related to the particular runs.

In the short and intermediate terms one can expect a very modest increase in value from a continuation of the trend to frozen salmon and limited additional development of shrimp and bottomfish. Any more substantial growth, principally from the latter two sources, must await the long term at which time it could mean increased employment of perhaps 200 persons in fish processing.

D. Tourism Sector

Tourism is one of the most dynamic elements of Southeast Alaska's economy and, unfortunately, one in which quantitative data are most lacking. Some of the figures developed by the Cresap, McCormick & Paget study for the state have applicability to Southeastern. The study estimates that the number of tourists in Alaska increased from 59,200 in 1964 at an annual average growth rate of 14 percent to 86,700 in 1967. Another estimate is that approximately 60,000-65,000 tourists passed through Southeastern in the latter year. Based on the foregoing data, tourists' expenditures amounted to $3 million of personal income in Southeastern last year and were responsible for approximately 500 jobs.

The region abounds in tourist attractions. The scenery is spectacular, with snow-clad mountains and glaciers terminating in protected waterways. Fishing is excellent, and hiking and climbing opportunities are plentiful. The legacy of the Russian past and the Native culture are colorful attractions. The region contains the state capital, which is also an old-time mining center.

An important problem that will have to be overcome for full development of the tourist industry in Southeastern is that there are only limited activities for tourists in the principal cities. One solution is to provide better access and facilities for taking advantage of the unique scenic and sport possibilities outside the centers. One instance where this has been well done is the Glacier Bay area, where a very attractive National Park Service lodge has been built and frequent air service is available during the summer. Similar establishments could be located at

other worthwhile places. Another solution is to offer more activities in the centers.

The recent airline mergers of Alaska carriers should be beneficial through more active and more organized promotion. The "Dollar Defense" program will also be an aid to Alaskan tourism that might last through the intermediate term. Assuming more active promotion, the continued international dollar gap into the intermediate period, development of more attractions, and continued supply of transport capacity (especially ferries), tourism in the region can be expected to increase by as much as 50 percent in the short term, double in the intermediate term, and increase by four times its 1967 level by 1985.

E. Minerals Sector

The mineral industry of Southeast Alaska is now virtually nonexistent. Only a small barite deposit near Petersburg is being worked. The region has large iron deposits in the order of one billion tons of ore each at Klukwan near Haines and at Snettisham and Union Bay between Juneau and Petersburg. These deposits are low grade and contain titanium in a quantity that makes the ore difficult to work under present technology. Southeastern also possesses a large copper deposit at Sumdum, also between Juneau and Petersburg, and a promising nickel deposit, which, unfortunately, is located under Brady Glacier in the Glacier Bay National Monument.

The region has, of course, produced large amounts of gold. Although no gold mining has been done since the beginning of World War II, there is renewed interest in existing claims with the recent rise in the gold price. However, it is anticipated that a considerable additional increase in price would have to take place before operations would start again.

At best, only limited mineral development will take place in Southeastern even in the long term, say by 1985. Such development might include the small higher-grade iron-copper deposits and uranium deposits near Ketchikan, some development of the region's rich limestone deposits, and a small amount of work on gold deposits, possibly underwater. This could mean an addition of several hundred employees, but such a projection is made under the assumption of no technological breakthrough in processing of titanium-bearing iron ore.

F. Transportation, Power, and Communications

(1) Transportation

Transportation, power, and communications have been significant

impediments to the Southeast region's development. Fortunately, recent and possible future changes hold the promise of substantial improvement.

In water transportation, the region has been burdened with high overall rate levels compared to Southcentral Alaska, which is served by competing modern and efficient railcar and trailer van services. The Federal Maritime Commission commenting on the relation of transportation and terminal charges to Alaska prices in its *Alaska Trade Study* concluded that,

> ...If merchants at Juneau order food products from Seattle, their transportation costs on apples, lettuce, flour, and potatoes would raise corresponding F.O.B. prices 29, 41, 29, and 22 percent respectively (according to 1965 prices and rates). Transportation charges on lumber and cement would raise the prices on these items approximately 71 and 100 percent respectively. [10]

The steamship company serving the area has recently phased out most of its ships on the Southeastern run and replaced them with barges. It and other shippers have made use of the Alaska State Ferry since it extended its run to Seattle early this year. The latest rates published by the Alaska Steamship Company include slight reductions in van-load lots and increases in less-than-van-load shipments.

Other improvements in marine transportation to be looked forward to include a distribution system featuring freight movement by fast ships with efficient handling equipment to redistribution centers such as Ketchikan and Juneau with delivery to other ports by smaller vessels. A limited version of such a system is in operation for a small amount of freight, using Alaska Steam's barges and the Ferry System. Better facilities for handling container cargo, especially at Ketchikan, Sitka, and Petersburg; and reduction of high terminal rates could go a long way toward lowering the cost of living in the region.

Besides Alaska Steam, Northland Marine Lines, Inc., cruise ships, and the Alaska Marine Highway (State Ferry System) serve southeastern Alaska. The principal economic significance of the Alaska Marine Highway to Southeast Alaska is as a conveyor of tourists. Between 1964 and 1967 the number of tourists using the State Ferry System grew by an estimated 63 percent, from 11,650 to 18,950 with most of the tourists attributable to the Southeastern system. A recent study of the Greater Juneau Borough shows the significance of ferries in bringing tourists to that community. Between 1962 and 1965, total estimated number of tourists increased from approximately 23,000 to 34,000 with ferry traffic increasing from zero in 1962 to 11,650 in 1965; air tourists increasing

from 7,500 to 9,600; and cruise ship passengers decreasing from 15,300 to 14,800.[11] Ferry traffic is expected to show a marked increase with the addition of a new vessel this year, the *M.V. WICKERSHAM*, and the extension of service to Seattle begun at the end of last year. The number of cruise ship passengers is also expected to grow with the addition of a new ship by Westours, Inc.

The other vital Southeastern transport mode, air transport, is also undergoing large changes: The merger of Alaska Coastal Airlines into Alaska Airlines and increased use of land-based aircraft in place of amphibians raises the possibility of at least keeping down future costs and rate increases.

Fields of a length sufficient for jets are under construction at Petersburg and Wrangell, and planning has started for a field to serve Ketchikan. The new fields will most likely be served by propeller planes of roughly similar capacity as the Convairs presently in service.

Planning is now going forward for an airport at Hoonah, with a possibility of Alaska Airlines serving it with F-27 service for passengers and cargo, principally fish, which would connect with southbound freight service at Sitka. The recently completed transportation study on all of Alaska points to the feasibility of an area airport at Craig and Klawak and also indicates the continued need for amphibians and float planes serving the smaller communities where airport construction would be uneconomic.[12] The key issue for the future of air transport in Southeastern will be whether the expansion of land-based service will result in significant rate reductions.

Alaska Airlines absorbed Cordova Airlines and took over Cordova's route between Anchorage and Juneau by way of Cordova, Cape Yakataga, and Yakutat. The take-over has so far meant little to the region as equipment and scheduling have stayed the same.

Although Southeastern air service will probably continue to be separate from the rest of the Alaska Airlines system, benefits can be expected from some common maintenance and the aggressive promotion program of Alaska Airlines. The Western Airlines-Pacific Northern Airlines merger will be felt in Southeastern mainly through increased tourist promotion. Competition between these two airlines should prove beneficial in the longer term.

Ultimately, significant impact on the Southeastern economy can be expected from the Forest Highway Program, which aims to create a system of roads and short ferry links throughout the region. Substantial completion of the system would have special impact on tourism, and this is an important governmental good.

(2) Power and Communications

Provision of electric power is an area awaiting future breakthroughs for control of high costs. Industrial users in Ketchikan, Wrangell, Petersburg, and Juneau are paying 2.5 to 3 cents per kilowatt hour and residential users up to 50 and 60 percent higher than industrial rates.

The centers of population rely mostly on diesel generation, but development of presently studied small hydroelectric projects would have only a limited effect in controlling high rates. The sixteen potential hydroelectric projects listed by the Department of the Interior totaling 223 megawatts installed capacity would make firm power available at bus-bar costs of from 6.9 to 11 mills per kilowatt hour at 1966 prices (exclusive of fish and wildlife mitigation costs and assuming a 75-year payoff period with 3-1/8% interest).[13]

The Snettisham hydroelectric project, 28 air miles south of Juneau, is now under construction; and the first stage is scheduled for completion by December, 1972, with an installed capacity of 46,700 kilowatts. The entire project calls for 70,000 kilowatts. Present estimates are that the first stage will make power available in the Juneau area at around 10 mills per kilowatt hour at the Juneau bus-bar, assuming a 55 percent load factor. There should be substantial power available from the Snettisham project for industrial use after satisfying residential demands. However, the sawmill and plywood mill which have been proposed for the Juneau area would not likely be heavy electricity users.[14] Development of the Snettisham iron deposit and the Sumdum copper deposit in the area of the hydroelectric project would not be heavy power users under previously considered techniques. Snettisham does not have a large enough block of power, even if it were at low rates, to attract materials for processing from outside the area.

The projected rate for Snettisham power delivered in Juneau is approximately the same as the present rate for power generated by diesel and small hydro plants. It may be that the main hope for Snettisham power is that, although it may not reduce electricity rates in Juneau, it will serve to slow the increase that would occur without it. Two basic controls must be exercised with regard to the Snettisham power: Construction costs must be kept under control or financing arranged so that the generated cost of power is kept within bounds; and regulation must be exercised to ensure that savings are passed to the consumers. The former responsibility rests with the Corps of Engineers and the Alaska Power Administration, the latter with the state Public Service Commission.

The principal hope for a large block of cheap power would be the Yukon-Taiya project. Potential development involves installation of 1,200 megawatts initial capacity with ultimate capacity of 3,200 megawatts. The

bus-bar rate is estimated at 2.4 to 4 mills. It appears that the aluminum industry is no longer interested in Yukon-Taiya power as it apparently was some years ago, but at such low rates Yukon-Taiya power could be transmitted considerable distances in the southeastern region to supply industrial and residential demand at lower rates than most other plants, hydroelectric, thermal, or nuclear. Use of Yukon-Taiya would require an intertie to other areas.

Intertie with Canada is another possibility for bringing low-cost power to the region. Considerable negotiation with the Canadians would be necessary for this as for the Yukon-Taiya project, the latter being dependent upon the Canadian part of the Yukon River. In the short and intermediate terms, the region will probably see additions to the power supply in the form of diesel-fired plant or small hydroelectric projects such as the Lake Grace project near Ketchikan and the Takatz Creek project near Sitka, both of which have been proposed to the Congress. Although high-cost projects, they would be improvements over the present power situation in those communities.

Interties with Canada and the Yukon-Taiya project do not seem to be on the horizon in the six-year time frame.

The communications services of Southeast Alaska, like those of Alaska as a whole, are far more expensive than the rest of the country and a definite hindrance to its economy. The long-lines system must be modernized to bring down costs and improve service. This should be accomplished with the sale of the system to the private sector in 1969-1970. Some of the problems of telecommunications in Southeastern are at the local level. New subscribers find it difficult to obtain telephone service. Several of the local companies have been acquired by the Continental Telephone Company, most recently the Juneau and Douglas Telephone Company. Improvements in local service should come at least by the intermediate term period.

G. Linkages with Other Regions

Southeast Alaska presently has governmental and financial ties with other regions of the state, but it retains among all the regions the strongest ties to Seattle. It is also unique in the extent of links to Canada. The presence of the decision-making apparatus of the state government and the regional offices of several federal agencies have led to statewide governmental linkages. Through the statewide banking system, the region depends to a great degree on financial services headquartered in Anchorage, with some legal and financial services coming from Seattle. For many tourists the region is the first stop before going on to other parts of Alaska.

In water transportation, Southeast Alaska is dependent for freight inflow mainly upon Seattle, with small amounts coming from Vancouver to Skagway by the White Pass and Yukon Railroad container ship. The region also serves as a conveyor of traffic from Vancouver to the Yukon Territory through Skagway and has served a similar function for outbound asbestos, copper, and zinc-lead-silver shipments from the Yukon to Vancouver. It will shortly transship zinc from the Yukon through Skagway to Japan. Pulp shipments move to Japan and other countries as well as by rail-barge to the Eastern United States.

Considerable discussion has taken place concerning shipment of ores from the Yukon by highway through Skagway and Haines. Present plans call for shipping an estimated 30,000 tons a year of lead, zinc, and silver from the Anvil Mine northeast of Whitehorse over the existing trackage of the White Pass and Yukon Railroad through a new loading dock at Skagway, able to take 35,000-ton ore carriers. The lead, zinc, and silver will be sold through a consortium of Japanese firms under an eight-year contract. Presently, copper from the New Imperial Mine near Whitehorse; lead, zinc, and silver from the United Keno Hill Mine east of Dawson; and asbestos from the Cassiar Mine on the Yukon River just east of the Alaska-Canada border are moving through Skagway for shipment south. In 1966 slightly over 100,000 tons of ore concentrates moved through Skagway--78,203 tons of asbestos and 22,143 tons of lead, zinc, and silver. In-bound traffic to Skagway totaled over 140,000 tons in 1966, almost all brought by the modern container, petroleum, and mineral-products carrier of the White Pass and Yukon Railroad and bound for the Yukon Territory over the railroad from Skagway to Whitehorse. The company has started construction of another identical vessel.[15]

The shipments through Skagway are handled in a machinery-intensive manner and generate only an estimated longshoring employment of twenty men. Employment of a portion of these is justified by the cruise ships that call at Skagway. The immediately prospective and future mineral developments in the Yukon will probably not generate much additional employment.

There are indications that in the future Southeastern will develop more ties with Canada. These are likely to be in power transmission, as mentioned previously, and in highway construction.

A recent study for the Federal Field Committee for Development Planning in Alaska points to other possible developments in Southeast Alaska to facilitate shipment from the Yukon and northern British Columbia in these terms:

> ...In particular, Haines will become an increasingly important shipping point for ores from the Yukon; Skagway will handle

> greater tonnage to and from the Yukon; the Wrangell area will have a modern port to handle British Columbia ores and supplies; Hyder will benefit from the growth of its close neighbor, Stewart, British Columbia; and Prince Rupert will expand to handle the rapidly increasing highway and ferry traffic. Traffic on the Taku River may be resumed, and there may be demand for export of Canadian ores and timber products through the Unuk River near Ketchikan--possibly at some more distant date, through the Alsek River east of Yakutat. All of this depends, however, upon formulation of appropriate arrangements.[16]

Future mining developments will force a decision on whether to make the White Pass and Yukon Railroad standard-gauge and press for highways. There has been renewed interest in the Skagway-Carcross road.

The study points out that prior southeastern Alaska-Canada contacts have focused on maintenance of transportation systems--chiefly the Haines cutoff, which before last year, was maintained by the Alaska Department of Highways under contract to the Canadian government and now is being maintained directly by the Canadian government; pipelines to Interior Alaska and Northern Yukon; and ferry service. The latter includes complementary scheduling of the Alaska state ferries and the British Columbia ferry from the tip of Vancouver Island through Prince Rupert.

Southeast Alaska-Canada links also exist in the field of communications. The chief one is a contract between British Columbia Telephone Company and ACS for use of a 240-voice channel tropospheric scatter microwave facility between Annette Island and Vancouver or Port Angeles, Washington, where it connects with the Bell System. The total number of messages presently is small: 6,443 in 1966.

3. FORECAST

Figure 2-12 summarizes "judgment" projections of employment. The table presents a preview of the region's development that is optimistic principally because it assumes the coming of an integrated forest products complex, probably at Juneau. The other principal sector of employment, government, has been projected to increase at different rates for the federal and state and local components--3 percent and 5 percent respectively, for the planning period with a "balloon" in the short term due to the

anticipated end of the Viet Nam war and a spurt of government expenditures to catch up with cuts made in Alaska. A basic assumption is continued federal interest in Alaska's development throughout the period comparable to the recent past. The government estimates could be upset, of course, by a national policy to downgrade Alaska's priority; but most recent studies (e.g., *Alaska Natural Resources and the Rampart Project* published last year by the Department of the Interior) recommend programs that could have positive effects on government employment in the region. In the study cited the Department of the Interior recommends sharply increased mineral study programs to be carried out by the Geological Survey and the Bureau of Mines. Of possibly greater impact in Southeastern in terms of government employment is the fisheries development programs suggested in the same publication which call for extension services, formation of a marketing cooperative, training of Alaskans in modern fishing, processing, and marketing techniques, and demonstration of improved methods, in addition to research and development work.[17] The possibility of accelerated federal development programs such as those recommended in *Alaska Natural Resources and the Rampart Project* has been included in the high projection, which includes 150 additional employees over the likely level in the short term, 200 in the intermediate term, and 300 in the long term.

The fishery development projected for southeastern Alaska will require considerable government assistance. A small amount of additional employment from development of shrimp and bottomfish and a continuation of the trend to frozen salmon, say, in the range of 25 to 50 employees has been projected in the short- and intermediate-terms, with 200 in the long term. A lessening of federal support in exploratory fishing, assistance to pilot plants, and other areas could mean a significant reduction in the long-term employment potential, possibly by 50 percent, while increased government programs could add 100 employees each in the intermediate and long terms.

Alternative development possibilities in the forest products sector will have the greatest impact on the regional economy. If the huge timber sale now under option is completed and an integrated complex containing a pulp mill, plywood mill, and cant mill results, an estimated 1,100 new workers will be added in the intermediate and long term. If the complex is not built and the sale is broken up into a number of smaller sales, the minimum expansion would involve additions to existing mills resulting in an estimated 200 new employees in the short term and a similar increase in the intermediate and long terms.

Mineral industry employment is another area of highly volatile projections: A breakthrough in processing titaniferous iron ore could bring the large deposits into operation. If two of the iron deposits became operational and development of the Sumdum copper deposit and Brady Glacier nickel deposit were to take place, long-term employment might be four times

FIGURE 2-12

SUMMARY OF EMPLOYMENT PROJECTIONS, SOUTHEAST ALASKA

Employment Sectors	Short Term (To 1971)	Intermediate Term (To 1974)	Long Term (1975-1985)
Government	6,600	7,400	11,500
Manufacturing	3,200	4,300	4,500
Tourism	750	1,000	2,000
Minerals	---	---	500

Source: Author's computations.

the 500 projected from working the small high-grade iron-copper deposits and uranium deposits near Ketchikan, some development of limestone, and opening of certain gold deposits. Five hundred employees might be present in the intermediate term in the high projection. The most pessimistic prediction would be that the present situation of little or no minerals employment will continue.[18]

In summary, the "judgment" prospective for Southeast Alaska's population is: 52,600 in the short term; 57,700 in the intermediate term; and 74,100 by 1985. With the unfavorable economic events outlined previously, the prospective population levels would be 51,000, 52,900, and 60,000. The high prospective would be 54,200, 62,100, and 82,800.

FOOTNOTES

CHAPTER 2

1. Greater Juneau Borough, Planning and Zoning Department, *A Comprehensive Plan for the Development of the Greater Juneau Borough*, December 1966, p. 11.

2. Bureau of Indian Affairs, *Report of Labor Force Employment and Unemployment as of March 1967, Juneau District.*

3. The last section of this chapter summarizing projections of employment and population will go into more detail concerning various assumptions underlying government employment projections. However, it is expected that the rate of federal employment increase will be somewhat higher in the short term than the 3 percent expected for the whole planning period, assuming that the Viet Nam war ends and there is a spurt to catch up with programs presently affected by budget limitations.

4. Arlon R. Tussing, University of Alaska, *Alaska-Japan Economic Relations*, Institute of Social, Economic and Government Research, 1968, p. 26. One defect of this recommendation is that if the present market is monopsonistic in character there is no real assurance that the present buyer would not emerge as the major log exporter as well.

5. Quoted in *Seattle Post-Intelligencer*, December 6, 1967.

6. *Treasury Department Staff Report on the Pacific Northwest Log Export Problem*, pp. 8, 9. The Staff Report states that the Forest Service prohibition on log export from Alaska has not been successful because it has not led to shipment of lumber to the conterminous United States, but only crudely processed logs to Japan, and that the present allowable cut, even though very conservative, cannot be marketed, leading to loss through fire, insects, and mortality.

7. *Ibid.*, pp. 11-15.

8. *Forest Industries*, March 1968, "Log Exports--Pro and Con", Statements by William D. Hagenstein, executive vice president, Industrial Forestry Association, and A. Saheki, Kanematsu-Gosho (U.S.A.), Inc., pp. 34-36.

9. The estimate of loggers is based on the contract requirement of 175 million board feet per year for ten years. Mill employment is based upon present experience of the pulp mills and estimates for the associated processing.

10. Federal Maritime Commission, Bureau of Domestic Regulation, *Alaska Trade Study*, July 1967, I-4.

11. Planning and Zoning Department, Greater Juneau Borough, *Op. Cit.*, p. 19.

12. *Transportation and Economic Development In Alaska*, prepared by the Transportation Task Force of the Federal Field Committee for Development Planning in Alaska, Anchorage, Alaska, 1968, p. 161.

13. U. S. Department of the Interior, *Alaska Natural Resources and the Rampart Project*, 1967, Table 23.

14. U. S. Department of the Interior, Bonneville Power Administration, *Pacific Northwest Economic Base Study for Power Markets*, Vol. II, Part 6, "Forest Industries", pp. 82-83; Alaska Power Administration, *Industrial Electric Power STudy, Phase I, Southeast Alaska*, unpublished study, June 30, 1967. The average lumber mill in Southeast Alaska is estimated to use only 34 kilowatt hours per 1,000 board feet cant production and plywood mills in the Pacific Northwest consumed 120 kilowatt hours per thousand square feet of plywood in 1962. Pulp mills producing through chemical processes generate their own power to a large extent.

15. U.S. Army Corps of Engineers, *Waterborne Commerce of the United States*, 1966, p. 153. The data do not include copper concentrates from the New Imperial Mine, which began shipping in 1967.

16. *Alaska-Northwest Canada Economic Activities, Part II*, prepared by George W. Rogers with Douglas N. Jones for the Federal Field Committee for Development Planning in Alaska, Anchorage, Alaska, 1968, p. 26.

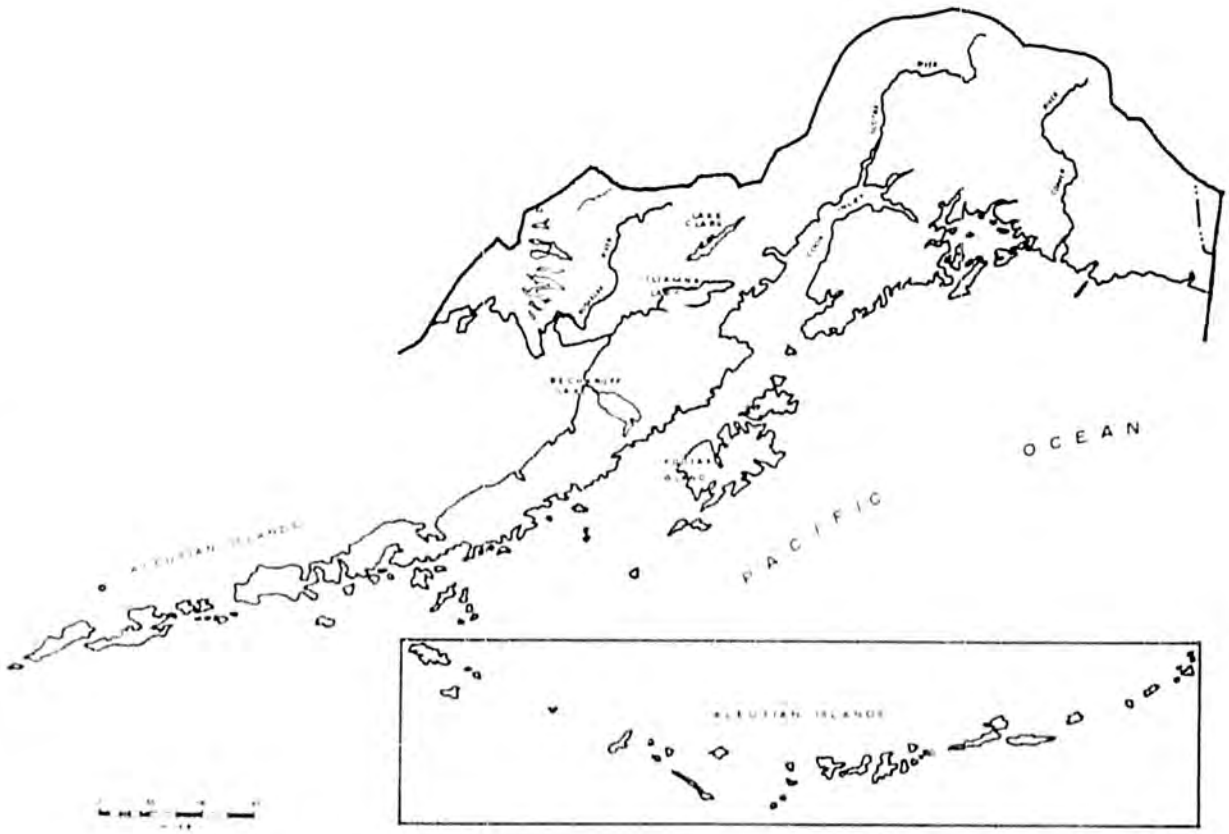
17. *Alaska Natural Resources and the Rampart Project, op. cit.*, pp. 40, 42-43.

18. The prospectives outlined above have been translated into population estimates under certain assumptions: (1) The ratio of population to employment, which has remained at 2.7 to 1.0 from 1961 through 1966, would gradually decrease to 2.5 to 1.0 in the short term, 2.3 to 1.0 in the intermediate term, and 2.1 to 1.0 in the long term. The declining population-employment ratio is based on the assumptions that the rate of natural increase of non-Native population will decline to approximately 10 per 1,000 from the present 12 per 1,000; and that the Native rate of natural increase will continue to decline at the rapid rate of the 1960s, when it fell from 36 per 1,000 to 23 between 1961 and 1966, so that it will

decline to 12 per 1,000 by 1985. The underlying assumption regarding the non-Native population-employment ratio is that any increase in the fertility ratio would be offset by the more settled nature of the population whereby fewer dependents would be coming to join persons employed in resource-development industries. (2) Distributive and construction employment would be in a 1 to 1 ratio with primary employment during the planning period, slightly less than the 1961-66 level. Two-thirds of the government employment has been placed in the primary category, comprising the federal employees and part of the state sector. (3) The military sector will continue at 700 men with an assumed equal number of dependents.

SUBREGION II

Southcentral Alaska



CHAPTER 3

SOUTHCENTRAL ALASKA-REGION II

1. DIAGNOSTIC CHARACTERISTICS

The function of this section is to give the reader a rapid acquaintance with the key economic features of southcentral and southwestern Alaska and a glimpse of historical growth. It provides an outline of the backdrop against which assessments and forecasts will be made in Section 2 in analyzing this subregion. The important forces of population and labor force are treated at the outset followed by an aggregating of income and employment for these sectors. There is next presented a statistical and brief narrative profile of each of the eight sectors comprising the economic activity of the region. A discussion of the dynamics that link Region II with other regions (within and outside Alaska) concludes this section.

A. Population and the Labor Force

The study of an area's economy begins quite naturally with the population of the region, for it is because of people in their role as producers that economic activity is made possible, and it is for people in their role as consumers that economic activity is designed. The size of an area's population, the rate of growth, and the distribution of the population in the labor force, then, become central elements in an analysis of the economy's past, present, and future.

In analyzing the characteristics of the population in Region II it is useful to separate the population into three groups: Natives, non-Natives, and the military. The military during World War II and the Korean conflict was responsible for Region II's rapid population growth between 1940 and 1955. With the cutbacks in defense construction and personnel in 1955, the population of Region II declined, then grew at a slower rate in the 1960's as the level of military personnel stabilized.

Today the military makes up 13 percent of the population when in 1945 they made up 74 percent, so that while their significance is still considerable, it is nowhere what it was in the 1940's.

The Natives in Alaska typically have a higher rate of population growth than the rest of the Alaskan population. Region II in this respect seems to be no different from the rest of Alaska. The Native population in this region does have a slightly higher birth rate and death rate than the Natives in other regions; and, on balance, they have a higher natural rate of increase (birth - deaths) than in other regions. The Natives in Region II, however, are a much smaller percentage of the total population than in

other regions so that their high rates of growth do not seriously affect the overall pattern of population growth.

By far the largest number of people in Region II fall within the non - Native civilian class. This group is characterized by its youth, its high level of education and personal income, and its high but declining birth rate. In the Anchorage area, for example, where 82 percent of the people in Region II live, the birth rate has dropped from 34 per thousand per year in 1960 to 24 per thousand per year in 1966. People under 14 years of age made up 34 percent of the Anchorage area population in 1960 and 36 percent of Alaska in 1964. People over 65 make up only 1 percent of the population of the Anchorage area population, but in all of Alaska they make up 2.3 percent (and, in the U. S. as a whole, 9.2 percent).

Figure 3-1 shows the growth in population in the southcentral region since 1940. As can readily be seen population growth has been much slower in the 1960's than in the '50's and '40's. Net migration has had some impact on the region's population. On balance, this factor has been positive, adding more to population than taking away from it, but migration has been negative in those years in which employment opportunities have declined or living conditions (as in the earthquake) have been adverse.

(1) Education

Alaska, and in particular the southcentral region is favored with a population and labor force with a high level of educational attainment. In Region II, 81 percent of the population 25 years old and over had more than a grade school education in 1960. This compares with a figure of 61.4 percent in the U. S. and 73.6 percent in all of Alaska. The education level of a population is an important factor in any region's economic growth, and Region II's high level of educational attainment has had a decisive impact on the region's economic growth. But as might be expected, there is a great deal of variation in the educational status of different groups within the economy, and this poses difficult problems for the balanced growth of the region. As indicated, in Figure 3-2 those geographical regions that have a higher percentage of Natives in them reveal a much lower level of educational attainment. In Bristol Bay, for instance, almost one-fourth of the population over 25 has had no formal education whatsoever. Some improvement over the years has been made in raising the educational level of these neglected groups, but a great deal of work has yet to be done in this field. The pockets of illiteracy that exist today represent a serious underutilization of human resources. If these pockets can be removed in the near future, economic growth in the not-too-distant future will be much easier and much faster.

FIGURE 3-1

ESTIMATES OF TOTAL RESIDENT POPULATION

REGION II, 1940-1966
(in thousands)

JULY 1	TOTAL POPULATION	POPULATION COMPOSITION MILITARY	CIVILIAN NON-NATIVE	NATIVE
1940	19.4	.5	10.7	8.2
1950	64.4	18.5	37.9	8.0
1960	119.0	20.0	88.9	10.0
1961	126.4	20.0	95.9	10.5
1962	128.6	20.2	97.4	10.9
1963	133.6	20.2	102.0	11.3
1964	135.5	20.1	103.6	11.8
1965	144.4	20.7	111.5	12.1
1966	149.2	20.7	115.8	12.6

Source: George Rogers, *Alaska Regional Population & Employment*, 1967; and Alaska Department of Health & Welfare, *Aalska's Vital Statistics*, 1966.

Chapter 3-2

YEARS OF EDUCATION COMPLETED BY PERSONS OVER THE AGE OF 25
REGION II--1960

YEARS OF SCHOOL	ELECTION DISTRICT									
	Cordova	Valdez	Palmer	Anchorage	Seward	Kenai	Kodiak	Aleutian Islands	Bristol Bay	Region II
0	1.8%	4.3%	.8%	.5%	.7%	2.2%	2.0%	13.6%	23.5%	1.7%
1 - 4	3.4%	2.7%	2.2%	9.6%	1.6%	3.0%	3.3%	7.2%	15.7%	2.1%
5 - 8	25.1%	22.6%	20.6%	13.3%	25.3%	22.7%	20.6%	25.3%	18.4%	16.0%
9 - 12	49.8%	48.2%	56.9%	59.0%	53.7%	52.4%	57.0%	48.4%	29.6%	56.6%
13+	19.7%	22.2%	19.3%	26.1%	19.2%	18.9%	17.0%	15.5%	12.8%	23.6%

Source: *Labor Market Area Profiles*, Alaska Department of Labor, Employment Security Division (1965).

(2) Population and Urbanization

Population in Region II was approximately 149,000 in 1966 with a civilian population of 128,300. A low estimate, assuming no net in-migration from other states, puts the population in Region II at 167,100 in 1970 and 179,100 in 1975.

The great majority of these people (82 percent) lived within the Anchorage area, and a sizeable percentage (36 percent) lived within the city of Anchorage (Figure 3-3). In recent years the population of the city of Anchorage has grown at approximately the same rate as Alaska as a whole so that, in 1966, 19.8 percent of Alaskans lived within the city--the same percentage as in 1960. But the population of the Anchorage *area* has grown much more rapidly than the rest of the state. In 1960, 38 percent of the state's population lived within the Anchorage area, in 1966 44 percent lived within these bounds; by 1967 this figure jumped to 48 percent.

This concentration of population in Anchorage and to some extent in Kenai is not entirely an unmixed blessing. For it means not only that economic development must proceed at an even more rapid pace in order to provide jobs for the increase in the work force but also that the city and borough governments must act to provide more schools, more roads, and more health and recreation facilities. And, as the experience of the rest of the nation suggests, as the economy advances, as personal incomes rise, people demand not only *more* roads and schools and sewers but *better* roads and *better* schools and *better* water systems. It is imperative, therefore, that Region II grow rapidly in order to provide jobs and a strong fiscal base upon which to finance the needed social expenditures.

The future population of a region is a function of the birth rate, the death rate, and the net migration into the region. The natural rate of increase (birth rate minus death rate) depends upon the age distribution of the population, its level of education and personal income, and the percentage of the population that is urban bound. The inmigration into a region is influenced by the supply of "amenities of life" in the region, the cost of living, the level of income, and the employment opportunities relative to these characteristics in other regions. Knowledge of a region's economic growth and development and realistic assumptions as to how peoples' decisions to bear children and to relocate in response to economic changes are required for responsible predictions of population growth.

For the special case of Alaska and Region II much more work has to be done in analyzing how differences between regions affect migration. Region II's probable economic growth will doubtless attract many people into this area, but the magnitude of this migration cannot be predicted without making some assumption about the rate of economic growth in other regions. All indicators suggest that Region II will grow economically faster than the whole of Alaska and thereby exert some pull on the population centers of other regions. On the other hand if Region II's economic growth is slower

FIGURE 3-3

POPULATION OF ANCHORAGE, ALASKA

1920-1967

Census Year	Anchorage City Limits	Percent Change Since Previous Census	Anchorage Area	Percent Change Since Previous Census	Anchorage Area as Percent of Alaska Total	Alaska Total	Percent Change Since Previous Census
1920	1,856	--	NA	--	--	55,036	--
1929	2,277	+23	2,736	--	4.6	59,278	+8
1939	3,495	+53	4,229	+55	5.8	72,524	+22
1950	11,254	+222	32,060	+658	24.9	128,643	+77
1960	44,237*	+293	82,833	+158	36.6	226,167	+76
1967	53,000	+20	121,700	+47	44.1	276,000	+22

*Includes persons living in areas annexed by the city since the previous census.

Sources: The figures for 1920-60 are from the decennial reports of the U. S. Bureau of the Census. The figures for 1967 are computed from estimates made by the Anchorage Area Borough, and the State of Alaska.

than that of the U. S. or the western U. S. people in Alaska and Region II will be drawn to the continental U. S. On balance, then, whether net inmigration is positive or negative depends critically upon what assumptions are made about *relative* rates of economic growth.

To adjust for the degree of variability in the migration factor, both a high and a low estimate for future population levels is presented in Figure 3-4. The low estimate which assumes no net inmigration is based on a regional breakdown of the low projections of the Alaska population made by the Bureau of the Census. The high estimate assumes significant net-inmigration in response to an intensification in federal programs involved in power, fisheries, minerals, and transportation development. Both high and low estimates assume gradually declining military force levels in Region II.

The population figures in Figure 3-4 were derived from figures presented in George Rogers' *Alaska Regional Population and Employment* and adjusted in the following manner. Population projections for Election Districts14 and 15 were added to the figures for Rogers' "Southcentral Region" to obtain the projections for the Federal Field Committee's "Region II" as used in this study. The figures for the non-Native and Native populations in Election Districts 14 and 15 were derived by assuming that these two populations would grow at the same rate as their respective populations in the whole Southwestern region, so that if Natives in Election Districts 14 and 15 make up 31 percent of the Southcentral Native population in 1967, they will make up 31 percnet of the Southcentral Native population in 1990; and if non-Natives make up approximately 55 percent in 1967, they will make up 55 percent of the non-Native population in 1990. Actually, the non-Native population has been growing slightly faster outside of Election Districts 14 and 15, so that the figures may overestimate the population figures. There is, however, no guarantee that the future will look like the past and in fact one could argue that the non-Native population will grow faster in Election Districts 14 and 15 than outside should there be substantial oil exploration and development in Bristol Bay, in which case the projections would underestimate the future population.

Native figures are based on the assumption (Rogers') that the Natives will increasingly come to participate in the expanding economic opportunities outside the Southwestern region and that the Natives will be provided with adequate birth control information and supplies. The validity of this assumption may be doubtful but it has been retained in this case because it does not seriously affect the results for Region II.

FIGURE 3-4

ESTIMATES OF TOTAL RESIDENT POPULATION

REGION II, 1970-2000
(in thousands)

JULY 1	TOTAL POPULATION	LOW ESTIMATE POPULATION COMPOSITION MILITARY	CIVILIAN Non-Native	CIVILIAN Native	JULY 1	TOTAL POPULATION	HIGH ESTIMATE POPULATION COMPOSITION MILITARY	CIVILIAN Non-Native	CIVILIAN Native
1970	167.1	20.8	132.2	14.1	1970	168.0	20.8	132.0	15.2
1975	179.1	20.2	143.0	15.9	1975	181.3	20.2	142.9	19.2
1980	190.6	19.7	152.0	17.9	1980	196.8	19.7	153.3	23.8
1985	203.7	19.7	164.0	20.0	1985	253.3	19.7	178.2	32.4
1990	216.0	19.7	174.2	22.1	1990	260.7	19.7	201.4	39.6
1995	229.8	19.7	185.4	24.2	1995	300.9	19.7	237.1	44.1
2000	242.6	19.7	196.8	26.1	2000	331.9	19.7	263.6	48.6

Source: George Rogers, *Alaska Regional Population and Employment*, 1967. Region II is equal to Rogers' Southcentral region plus election districts 14 and 15. The figures in this table are based on the assumption that election districts 14 and 15 will grow as fast as the rest of the Southwestern region of which they are a part.

FIGURE 3-5

LABOR FORCE PARICIPATION--REGION II

YEAR	CIVILIAN POPULATION	WORKFORCE (EMPLOYED & UNEMPLOYED)	LABOR FORCE PARTICIPATION RATIO
1961	106.4	40,830	38.4
1962	108.3	42,092	38.9
1963	113.3	44,082	38.9
1964	115.4	46,359	40.2
1965	123.6	50,856	41.1
1966	128.4	53,395	41.6

Source: Population figures are from Figure 3-1.
Labor force figures are from *Workforce Estimates, 1961-1966,* Alaska Department of Labor, Employment Security Division.

(3) Labor Force Participation

The labor force, like the rest of the population in Region II, is largely urban bound, young, and highly educated. Recalling that Region II is vast and diverse, there are several exceptions to this general rule. In the Aleutian Islands, for instance, the labor force is scattered in numerous small communities; in Bristol Bay a good part of the labor force relies on subsistence hunting and fishing. In both these areas the level of education is quite low, and a good deal of job training is needed to allow these people to compete in the commercial industrial workforce.

The size of the workforce is determined primarily by the size of the population, but it is affected by a great many other factors as well. The number of people willing to work depends upon the wage level, the attractiveness of the jobs, and the age and sex distribution of the population.

The percentage of the population in the labor force (the labor force participation ratio or LFPR) is higher in Region II than in the rest of Alaska but lower than in the rest of the United States. This percentage, however, has been definitely increasing since 1961 as inspection of Figure 3-5 reveals.

The explanation for this increase probably lies in the so-called "encouraged worker" effect--the idea that as employment opportunities and the wage rate increase, more and more people are encouraged to join the labor force because the attractiveness of employed work has increased relative to the attractiveness of nonmarket alternatives (leisure, fishing, and hunting.)

Despite a rather rapid increase in recent years, the rate still is considerably below figures for the United States as a whole. The smaller figure for Alaska is certainly understandable in view of its level of economic development compared with the rest of the nation and its traditional reliance on nonmarket activities like fishing and hunting. Still it is smaller than one might expect when one considers the age and sex distribution of the Alaska population compared with the rest of the nation. In general,(the LFPR will)be higher the larger is the percentage of males in the population and the smaller is the percentage of people in the retirement age group. Especially, in past years, Alaska has been noted for its dominance of prime-age males. This, on balance, would tend to make for a high LFPR and, over time, as the percentage of females grew to approximate that of males, a declining rate over time. That this has not been the trend over time indicates that the "encouraged worker" effect has been strong enough to dominate the effect caused by a change in the population distribution. In the absence of any migration into or out of the region, the increase in the LFPR in Region II means that employment opportunities must increase faster than the growth in population if unemployment is to be reduced. Otherwise the proportionately larger increases in the labor force

(with respect to the population) will be forced to join the ranks of the people looking for jobs.

Migration into or out of a region helps to equilibrate the supply of labor with the demand, since long-term migration patterns are largely in response to economic factors. But migration into Region II from other areas of Alaska and the U. S. may be much more influenced by the wage level than by the availability of jobs or the unemployment rate. If this is true, then in the presence of "sticky" wage rates in the downward direction, migration may fail to adjust the size of the population with the supply of jobs. Net inmigration and the increase in the LFPR could mean that unemployment problems would persist even with moderate economic growth in the region.

B. Employment and Income

(1) Unemployment and Employment

Region II contains the bulk of the Alaskan population, the major city of Alaska, and relative to the remainder of the state, those structural elements which characterize a mature economy. Yet Region II is still plagued by the seasonality of employment and a high rate of unemployment that is characteristic of the rest of the economy.

The two major causes of seasonality of employment for the whole of Alaska--the severe climate and the seasonal fishing industry--are also the main contributors to the problem in Region II. The seasonality problem, of course, is not as severe in Region II as it is in the rest of the economy because of its milder climate and the importance of the distrubutive sector. Still, the seasonal unemployment is much above that of the rest of the nation's economy.

A useful measure of seasonality is obtained by taking the average employment as a base and comparing the seasonal highs and lows as a percent of that base. For Region II the 1966 high (July) was 117.8 percent and the low (February) was 90.1 percent. This compares with a range of 98.4 to 102.4 percent in the U. S. economy in 1960, and a range of 51.6 to 166.4 percent in all of Alaska in 1960.

Within Region II the Bristol Bay area suffers from the greatest degree of seasonality. Kodiak and the Aleutian Islands also have a very high index. Some improvement in the Kodiak area has come in recent years in the winter months as the crab industry has expanded. Employment in the Bristol Bay region in the near future will likely remain seasonal because of the importance of the fishing industry. Increases in tourism in both regions will add slightly to the seasonality, but the increase in timber operations on Kodiak and possible development of mining and petroleum in Bristol Bay may serve to counteract these tendencies.

The following table indicates the degree of seasonality in each of the election districts within Region II in 1966 and 1961.

FIGURE 3-6

SEASONALITY OF EMPLOYMENT 1966 and 1961 - REGION II

DISTRICT	1966 HIGH	1966 LOW	1961 HIGH	1961 LOW
Cordova	1.55	.57	1.55	.56
Valdez	1.34	.69	1.34	.68
Palmer	1.30	.80	1.30	.85
Anchorage	1.08	.91	1.05	.91
Seward	1.09	.88	1.09	.87
Kenai	1.31	.65	1.31	.65
Kodiak	1.25	.90	1.25	.89
Aleutian Islands	1.50	.75	1.50	.75
Bristol Bay	3.50	.59	3.50	.38

Source: *Workforce Estimates, 1961, 1966*, Alaska Department of Labor, Employment Security Division.

As can be seen by the above table there has been virtually no change in the seasonality of employment in Region II since 1961. Yet reducing the seasonality should be a major goal for the Alaskan economy because the seasonality of labor tends to raise the whole level of wage rates in the economy. Until the wage rates in Alaska become comparable with the rest of the U. S., the resulting high costs of production will continue to contribute toward putting Alaska at a competitive disadvantage with the rest of the nation. But until the seasonality of employment shows some decline, there will be only small gains in the reduction of labor costs.

Alaska and Region II are characterized by their high *unemployment* rates. As the figures in Figure 3-7 indicate, there has been little, if any, improvement in the unemployment rates since 1961. Some improvement, of course, came as the result of the construction activity following the Good Friday earthquake in 1964; but in 1966 as construction activity began to level off, the unemployment rate jumped back to its 1961 level.

Some caution must be observed in interpreting the unemployment rates as the figures for unemployment in Alaska cannot be taken as a precise measurement of the number of unemployed. The decision as to who is included in the count of the unemployed is always an arbitrary decision--and what may be a satisfactory criterion for some public policy concerns may not be satisfactory for other uses. In addition to the definitional problem, the job of actually enumerating the unemployed is especially difficult in Alaska where much of the labor force is scattered, and much of the employment is seasonal and subsistence.

Nevertheless, the unemployment figures provided by the Department of Labor are useful even though they may consistently understate (or overstate) the amount of unemployment. They are useful because a consistent measurement allows the determination of trends in unemployment over time and among regions. In most cases it is the trend and the relative differences rather than the absolute amount that is most important.

The high annual average unemployment rate is due in large part to the slack in wintertime demand for labor. The seasonality of labor demand, with its peak demand in the construction and fishing industries that draws people into the labor force in the summer months and leaves them without jobs in the winter, contributes to the high annual unemployment rate and, at the same time, puts very definite limits on possible future reductions in the unemployment rate. Unless the composition of the economy shifts towards industries that do not have seasonal production schedules, little success will be achieved in reducing the unemployment rate. In most areas the labor market is extremely tight in the summer months but the average annual rates of unemployment remain very high. In Cordova, Valdez, Kodiak, and Bristol Bay election districts in 1966, the monthly unemployment rate in the summer fell below 3.7 percent. Yet the annual average for these regions was over 9 percent.

FIGURE 3-7

BY ELECTION DISTRICT

REGION II CIVILIAN UNEMPLOYMENT

1961-1966

(Percent)

ELECTION DISTRICT	1961		1962		1963		1964		1965		1966	
	Annual Average	High Month	Annual Average	High Month	Annual Average	High Month	Annual Average	High Month	Annual Average	High Month	Annual Average	High Month
Cordova	11.5	31.7	10.1	24.6	12.3	24.8	12.7	23.0	8.4	15.8	13.7	24.6
Valdez	11.3	17.0	10.7	18.3	10.5	19.5	11.3	20.2	9.9	15.0	10.6	19.9
Palmer	17.1	23.9	16.7	27.1	16.4	22.9	11.9	22.8	14.0	20.9	14.3	22.6
Anchorage	6.8	9.8	6.5	9.8	6.9	9.6	5.7	9.6	6.2	7.8	7.1	9.9
Seward	9.2	12.8	9.6	15.1	9.7	15.6	14.8	18.0	16.5	24.7	17.3	33.3
Kenai	16.3	30.5	14.7	26.7	16.8	24.5	14.7	28.0	12.0	21.3	11.7	19.6
Kodiak	7.3	9.8	6.9	9.8	7.7	12.6	8.3	18.8	5.9	7.7	6.5	11.2
Aleutian Islands	7.9	10.5	7.5	11.6	7.6	14.7	8.8	16.2	10.0	16.4	7.7	11.8
Bristol Bay	7.9	26.2	10.4	31.1	13.1	25.7	12.2	30.8	9.8	28.9	10.9	31.3
Region II	8.2		8.0		8.5		7.6		7.5		8.2	

Source: *Workforce Estimates, Alaska*, 1961-1966, Alaska Department of Labor, Employment Security Division.

FIGURE 3-8

SUMMARY OF EMPLOYMENT ..ON II, 1961-1966

	1961		1962			1963			1964			1965			1966		
	No. Employed	% of Total	No. Employed	% of Total	% Change from 1961	No. Employed	% of Total	% Change from 1962	No. Employed	% of Total	% Change from 1963	No. Employed	% of Total	% Change from 1964	No. Employed	% of Total	% Change from 1965
Nonag. Wage & Salary Emp.*	31,591	100.0	32,799	100.0		34,355	100.0		36,624	100.0	-0.3	40,380	100.0		42,404	100.0	
Mining	612	1.9	744	2.2	.3	744	2.3	0.1	734	2.0	3.6	722	1.8	-0.2	1,043	2.5	0.7
Contract Construction	2,225	7.0	2,448	7.4	.4	2,346	6.8	-0.6	3,825	10.4	-1.3	4,203	10.4	--	3,988	9.4	-1.0
Manufacturing	2,503	7.9	2,515	7.7	-.2	2,623	7.6	--	2,314	6.3	-0.9	2,862	7.0	0.2	3,123	7.4	.4
Transportation, Comm. & Utilities	3,312	10.5	3,253	10.0	-.5	3,145	9.1	-0.9	3,018	8.2	-0.6	3,330	8.2	--	3,344	7.9	-0.3
Trade	4,706	15.0	4,938	15.9	--	5,149	15.0	--	5,286	14.1	0.2	6,223	15.4	1.0	6,866	16.2	.8
Fin., Ins., & Real Estate	950	3.0	1,083	3.3	.3	1,149	3.3	--	1,279	3.5	0.2	1,490	3.7	.2	1,513	3.6	-0.1
Services & Misc.	3,328	10.5	3,343	10.2	-.3	3,765	11.0	0.9	4,123	11.2	-1.0	4,622	11.4	.2	5,048	11.9	.5
Government	13,955	44.3		44.1	-.2	15,384	44.8	0.7	16,045	43.8		16,928	41.9	-1.9	17,479	41.2	-0.7

*Percent totals may not add in detail due to rounding.

Source: *Workforce Estimates* Alaska Department of Labor, Employment Security Division, 1961-1966.

Seasonality of employment does not necessarily adversely affect the economic welfare of a region. Housewives and students may temporarily join the labor force, migrant labor may enter a given area, work in the fish canneries or on the construction crews then willingly return to their normal activities when the season ends. These mutually beneficial arrangements do exist in the labor market areas of Region II; the laborforce does significantly contract during slack periods. But these contractions are not enough to eliminate the problem of unemployment.

The employment figures represent people who do not want to leave the labor force, who do not view their summer jobs as temporary. In short, the seasonality of employment does adversely affect the welfare of the people living in Region II. The problem is made even more serious by the fact that the unemployment is not rotated; it is not shared equally by all members of a community but rather tends to fall on the same people over long periods of time.

A major question is whether the economy will grow in a way that will solve the problem of seasonal fluctuations. Solving the problem requires the kind of growth that does not simply reinforce the existing seasonal fluctuations. Among other things, seasonality tends to condition a way of life that frustrates attempts to break the fluctuations. In the fish processing industry, for example, some firms are reporting difficulty in extending their production periods because the laborforce, conditioned to years of just summer employment, is initially unwilling to work longer periods of the year.

Seasonality of employment is not the only reason for unemployment in Region II. The areas of Palmer, Seward, Kenai, and Anchorage are less influenced by this factor than are the regions of Kodiak and Bristol Bay; and yet Palmer, Seward, and Kenai have unemployment rates over 11 percent. In these areas unemployment is due to a lack of aggregate demand, insufficient information in the job market, and a lack of the requisite training, education, and job skills in the labor force. Unemployment represents a very heavy burden that an unacceptably large number of people have to bear. The unemployment rate in Palmer, for example, is serious; but Palmer's high unemployment rate coupled with its relatively high level of income may be more "acceptable" than Bristol Bay's lower unemployment rate but relatively low level of income.

Employment in Region II is summarized in the following three tables. Relative to the rest of Alaska, the service, trade, and finance sectors employ proportionately more people than the manufacturing and transportation sectors. The dependence of Region II on distributive and service employment indicates that Region II is in a more advanced stage of development than the rest of Alaska, but comparisions between Region II and the U. S. indicate that the former's development is built on a rather shallow base (Figure 3-9). The government sector accounts for 41 percent of the employment in Region II, with only 16 percent in the U. S.

FIGURE 3-9

EMPLOYMENT BY SECTOR AS A PERCENTAGE OF TOTAL NON-AGRICULTURAL CIVILIAN EMPLOYMENT FOR REGION II, OTHER REGIONS AND THE U.S.-1966
(in percent)

	REGION II 1966	REGION I, III, IV, V 1966	U.S. 1966
Government	41.2%	43.5%	16.0%
Wholesale and Retail Trade	16.2	12.7	22.0
Services	11.9	9.1	12.6
Construction	9.4	6.1	5.3
Transportation, Communications and Public Utilities	7.9	12.9	7.4
Manufacturing	7.4	11.5	30.7
Finance, Insurance, & Real Estate	3.6	2.9	4.7
Mining	2.5	1.3	1.3
TOTAL	100%	100%	100%

Source: *Workforce Estimates, 1966* Alaska Department of Labor, Employment Security Division.

FIGURE 3-10

INDEX OF GROWTH IN EMPLOYMENT IN REGION II
BY SECTOR, 1961-1966

Sector	B*
Government	.72
Wholesale and retail trade	.76
Services	1.04
Construction	1.23
portation	0
Manufacturing	.43
Finance	1.34
Mining	1.95

*Where $B = \frac{\frac{\Delta \text{employment (1961-1966)}}{\text{employment (1961)}}}{\frac{\Delta \text{A.G.P. (1961-1966}}{\text{A.G.P. (1961)}}}$

Source: *Workforce Estimates*, 1961-1966 Alaska Department of Labor, Employment Security Division and *An Aggregate Income Model of a Semi-autonomous Alaska Economy* by Bradford H. Ford, Federal Field Committee for Development Planning In Alaska, 1967.

The manufacturing industries provide only 7.2 percent of the employment in Region II while in the U. S. these industries account for 30.7 percent of the employment. Region II has, so to speak, "skipped" the secondary state of development so that today it has a well-developed and growing primary sector (basic extractive industries) and growing teriary sector (distributive and service industries), but a very modest and slowly growing manufacturing sector.

The growth in employment in each sector since 1961 is given in index form in Figure 3-10. The index is an elasticity measure that compares the percentage rate of growth in each sector with the percentage rate of growth of Alaska Gross Product (AGP).

As the elasticity measure indicates, growth since 1961 has been quite rapid in the mining sector despite the declining demand for coal. The slack in the coal industry has been more than taken up by the rapid increases in the production of oil and gas in the Cook Inlet basin.

In the period 1961-1966, finance and construction also grew rapidly in employment. Much of the increase in construction came after the 1964 earthquake as each community rapidly mobilized to restore what had been destroyed. The boom in construction maintained itself well into 1966. In 1967 construction activities began to taper off in many communities, but this slack was taken up by the boom in construction in the Kenai area.

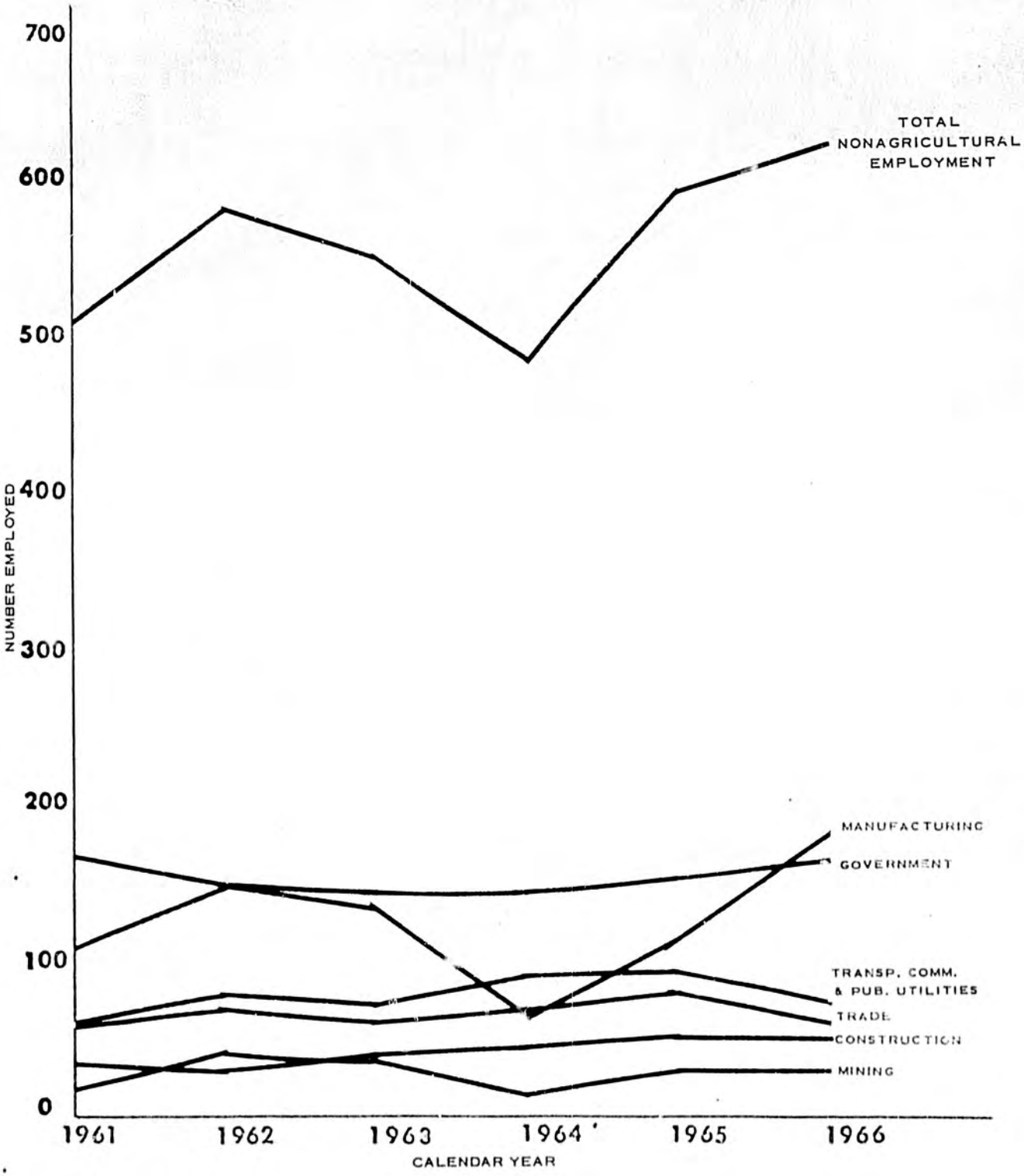
Growth in the manufacturing sector has been slow and will continue to be slow as long as the price structure continues to put Alaska at a competitive disadvantage with the rest of the U.S. As a result of the high cost of the factors of production in Alaska relative to costs in competing manufacturing areas, many resources are extracted from Alaska, shipped to other areas to be processed, then shipped back to Alaska for retail sale. If Alaska can beat down this high price structure--and some gains can be made simply by promoting competition in all markets--economic growth in the future will be much easier.

(2) District Characteristics

The charts and narrative in the section that follows provide a brief summary of the employment characteristics of each election district. The districts within Region II heavily influence and are influenced by the economic activities in the Anchorage and Kenai election districts. As such, the individual subregions are best handled by discussing all of them as a single economic unit rather than individually. For this reason the summary of each subregion is made appropriately brief. However, the Aleutian Islands election district is a somewhat special case due to the substantial military presence there. Because of its unique features a somewhat extended discussion of the Aleutian Islands election district is used to conclude this section.

FIGURE 3-11

CORDOVA–McCARTHY (ELECTION DISTRICT NO. 7)
EMPLOYMENT BY SECTOR, 1961–1966



Source: Figure 3–12.

FIGURE 3-12

EMPLOYMENT CORDOVA ELECTION DISTRICT, 1961-1966[b]

EMPLOYMENT SECTOR	1961 NO. EMP'D.	1961 % OF TOTAL	1962 NO. EMP'D.	1962 % OF TOTAL	1963 NO. EMP'D.	1963 % OF TOTAL	1964 NO. EMP'D.	1964 % OF TOTAL	1965 NO. EMP'D.	1965 % OF TOTAL	1966 NO. EMP'D.	1966 % OF TOTAL
Total Nonagr. Wage & Salary Employment[c]	520	100.0	593	100.0	551	100.0	493	100.0	603	100.0	632	100.0
Mining	21[a]	4.0	43	7.3	35[a]	6.2	13[a]	2.6	30[a]	5.0	30[a]	4.7
Contract Construction	33[a]	6.3	30[a]	5.1	41	7.3	45[a]	9.1	51	8.5	50	7.9
Manufacturing	167	32.2	152	25.6	135	24.1	62[a]	12.6	112[a]	18.6	186[a]	29.4
Trans., Communications, & Pub. Utilities	64	12.3	80	13.5	72	12.8	93	18.9	96	15.9	72	11.4
Trade	60	11.5	69	11.6	62	11.1	66	13.4	80	13.3	66	10.4
Finance, Ins. & Real Est.	4[a]	0.8	4[a]	0.7	4[a]	0.7	4[a]	0.8	4[a]	0.6	4[a]	0.6
Services	61	11.7	65	11.0	65	11.6	65[a]	13.2	75[a]	12.4	61	9.7
Government	110	21.1	150	25.3	147	26.2	145	29.4	155	25.7	163	25.8

[a]Estimated figures necessitated by disclosure regulations.
[b]By old election districts.
[c]Percentage totals may not add in detail due to rounding.

Source: Derived from *Revised Workforce Estimates*, Alaska Department of Labor, Employment Security Division.

(a) Cordova-McCarthy

The economy of the Cordova-McCarthy area is based on the harvesting, canning, and packaging of seafoods. Employment in the fishing industry is seasonal and cyclical. The introduction of shellfish harvesting and processing has added some wintertime employment and dampened the seasonal fluctuations, but the cyclical nature of the employment remains as the result of the historically generated replacement cycles.

Seasonality in manufacturing has also been dampened to some degree by the stability of employment in federal government jobs; the cyclical fluctuations, in recent years, have been moderated by a steady succession of construction jobs resulting from urban renewal projects, and the rebuilding of the harbor and the airport. The 1968 fire that destroyed the canning operations leaves the future of fish processing in Cordova uncertain.

Tourism has had a small impact on the economy of this area, and the significance of this industry should increase in the future as the number of tourists coming to Alaska increases. The eventual completion of the Copper River highway will allow Cordova to draw a greater share of the increased tourist traffic into the Southcentral region.

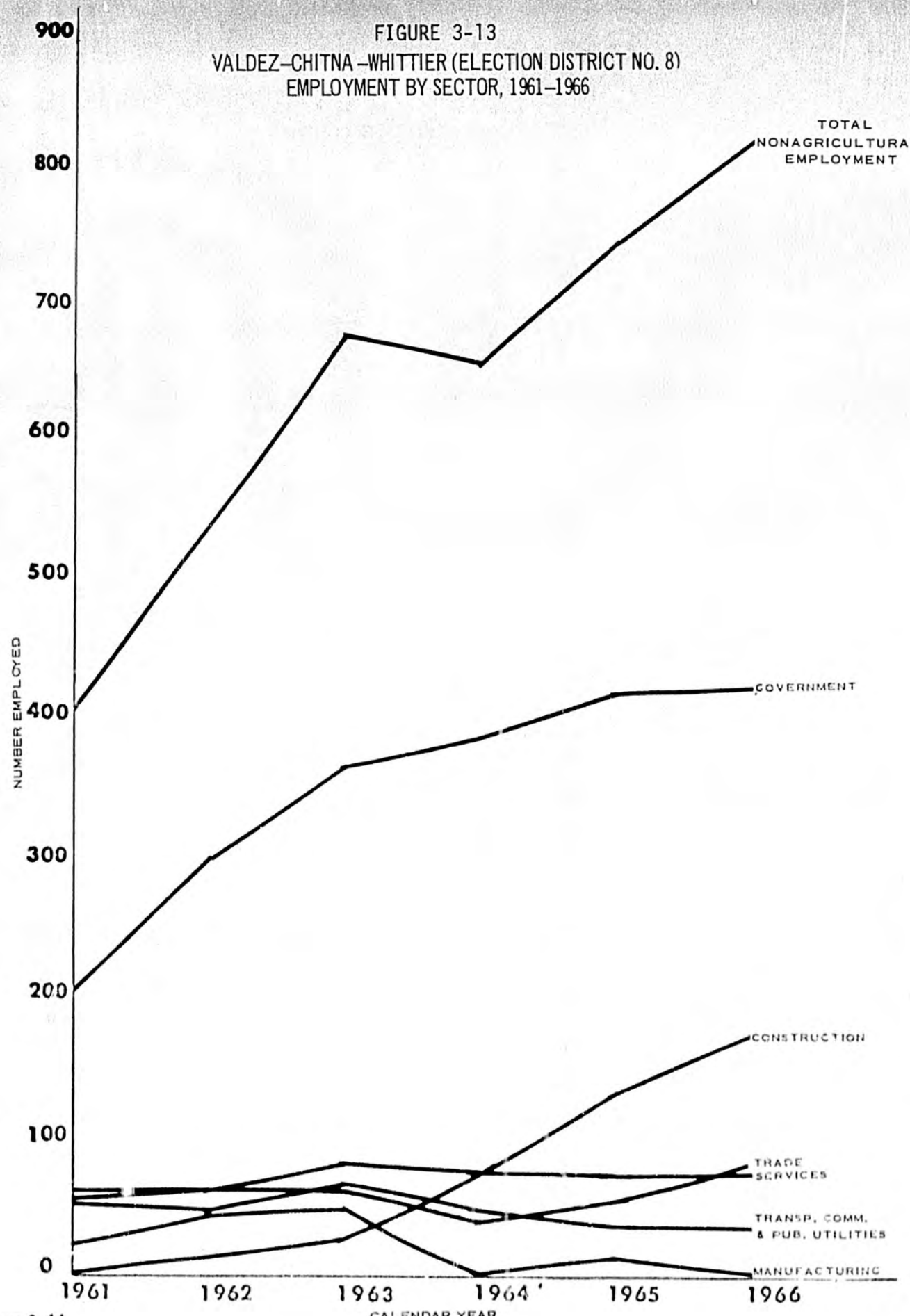
(b) Valdez-Chitina-Whittier

The economy of the Valdez area is a diverse one. Employment comes from subsistence hunting and fishing, commercial fishing and fish canning, timber operations (in Whittier) tourism and the federal government. The latter employs people in the operation of air and highway transportation systems. In addition, a number of military personnel are stationed in the area.

The Valdez area is becoming a popular recreation area for the residents of Anchorage and tourists from other states. Part of the employment in trade and services is a result of this tourist traffic.

Construction work on highway projects and the rebuilding of the city of Valdez in a new location has added significantly to employment in election district 8; but the recent completion of some construction contracts has re-enforced the steady out-migration of citizens, continuous from 1960.

FIGURE 3-13
VALDEZ–CHITNA–WHITTIER (ELECTION DISTRICT NO. 8)
EMPLOYMENT BY SECTOR, 1961–1966



Source: figure 3–14.

FIGURE 3-14

EMPLOYMENT VALDEZ ELECTION DISTRICT, 1961-1966[b]

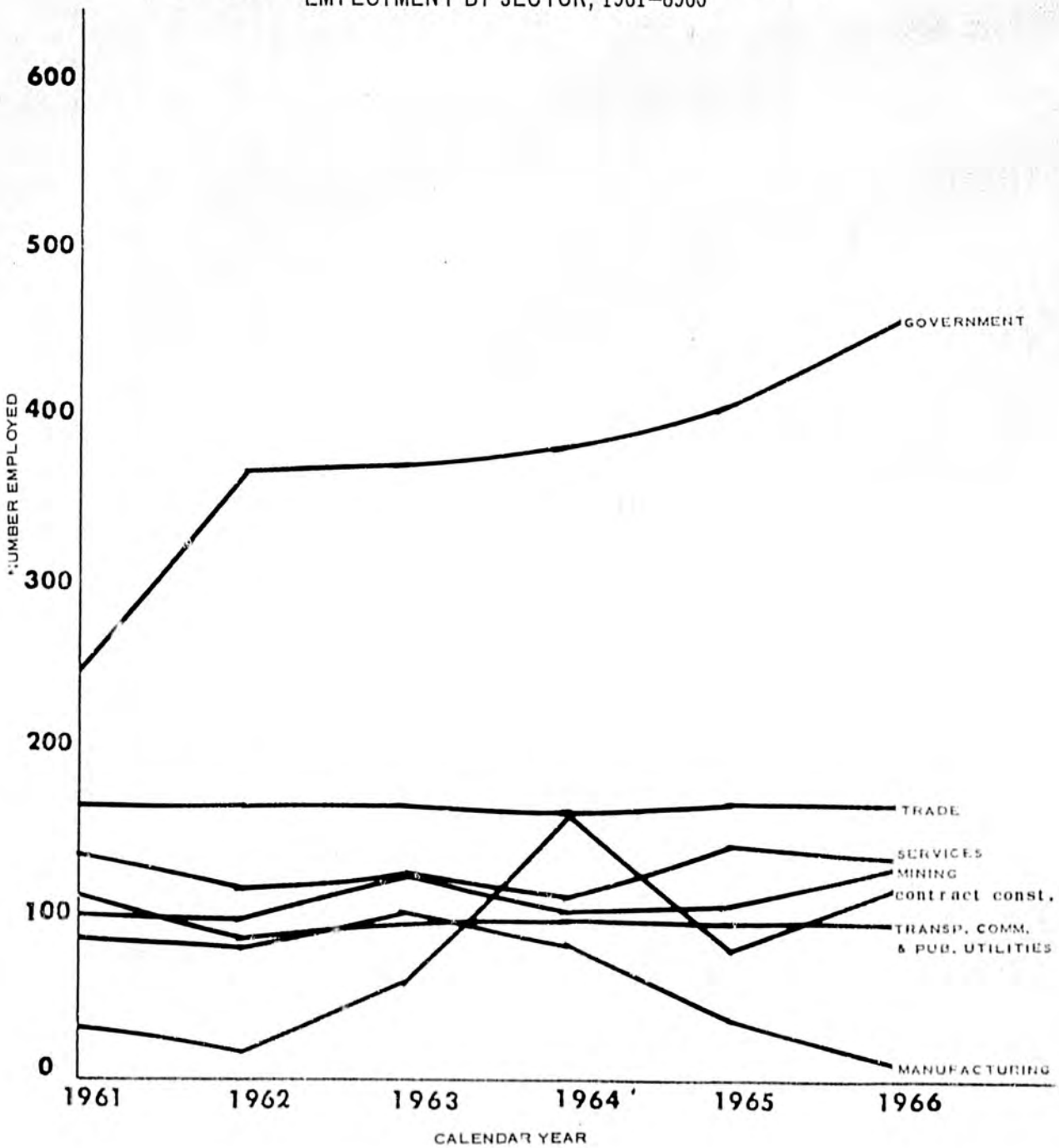
EMPLOYMENT SECTOR	1961 NO. EMP'D.	1961 % OF TOTAL	1962 NO. EMP'D.	1962 % OF TOTAL	1963 NO. EMP'D.	1963 % OF TOTAL	1964 NO. EMP'D.	1964 % OF TOTAL	1965 NO. EMP'D.	1965 % OF TOTAL	1966 NO. EMP'D.	1966 % OF TOTAL
Total Nonagr. Wage & Salary Employment[c]	412	100.0	545	100.0	683	100.0	666	100.0	752	100.0	822	100.0
Mining	0	0	1[a]	0.2	0[a]	0	10[a]	1.5	0[a]	0	0[a]	0
Contract Construction	4[a]	0.9	14	2.6	29	4.2	75[a]	11.3	135	18.0	188	22.9
Manufacturing	25	6.0	48	8.8	52	7.6	5[a]	0.8	11[a]	1.5	6[a]	0.7
Trans., Communications, & Pub. Utilities	54	13.1	48	8.8	69	10.1	49	7.4	41	5.5	38	4.6
Trade	63	15.3	62	11.4	71	10.4	46	6.9	56	7.4	81	9.9
Finance, Ins. & Real Est.	3[a]	0.7	2[a]	0.4	4[a]	0.6	13[a]	1.9	13[a]	1.7	4[a]	0.5
Services	56	13.6	63	11.4	84	12.3	74	11.1	72	9.6	75	9.1
Government	207	50.2	307	56.3	374	54.8	394	59.2	424	56.4	430	52.3

[a]Estimated figures necessitated by disclosure regulations.
[b]By old election districts.
[c]Percentage totals may not add in detail due to rounding.

Source. Dervied from *Revised Workforce Estimates*, Alaska Department of Labor, Employment Security Division.

FIGURE 3-15

PALMER-WASILLA-TALKEETNA (ELECTION DISTRICT NO. 9)
EMPLOYMENT BY SECTOR, 1961-8966



FIGURES FOR TOTAL NONAGRICULTURAL EMPLOYMENT (NOT SHOWN) ON GRAPH ARE PRESENTED IN FIGURES 3-16

SOURCE: FIGURE 3-16

FIGURE 3-16

EMPLOYMENT PALMER ELECTION DISTRICT, 1961-1966[b]

EMPLOYMENT SECTOR	1961 NO. EMP'D.	1961 % OF TOTAL	1962 NO. EMP'D.	1962 % OF TOTAL	1963 NO. EMP'D.	1963 % OF TOTAL	1964 NO. EMP'D.	1964 % OF TOTAL	1965 NO. EMP'D.	1965 % OF TOTAL	1966 NO. EMP'D.	1966 % OF TOTAL
Total Nonagr. Wage & Salary Employment[c]	849	100.0	942	100.0	1,025	100.0	1,136	100.0	1,082	100.0	1,138	100.0
Mining	98[a]	4.0	97	10.3	120[a]	11.7	100[a]	8.8	103[a]	9.5	129[a]	11.3
Contract Construction	26	6.3	14	1.5	57	5.6	160[a]	14.1	78	7.2	107	9.4
Manufacturing	82	32.1	78	8.3	100[a]	9.8	80[a]	7.0	35[a]	3.2	10[a]	0.9
Trans., Communications, & Pub. Utilities	103	12.3	82	8.7	91	8.9	95	8.4	94	8.7	95	8.3
Trade	162	11.5	163	17.3	162	15.8	159	14.0	164	15.2	166	14.6
Finance, Ins. & Real Est.	2[a]	0.8	27	2.9	3[a]	0.3	49	4.3	60[a]	5.5	32[a]	2.8
Services	130	11.7	114	12.1	120	11 7	110[a]	9.7	140[a]	12.9	140	12.3
Government	246	21.1	367	39.0	373	36.4	383	33.7	408	37.7	459	40.3

[a]Estimated figures necessitated by disclosure regulations.
[b]By old election districts.
[c]Percentage totals may not add in detail due to rounding.

Source: Derived from *Revised Workforce Estimates*, Alaska Department of Labor, Employment Security Division.

(c) Palmer-Wasilla-Talkeetna

Farming dominates the economy of the Palmer area, creating direct employment in the production of milk, potatoes, feed grains, and fresh vegtables, as well as related employment in the processing of these agricultural products. In recent years there has been an increase in employment by the federal government of personnel concerned with the administering of agricultural projects but a corresponding decline in employment in processing and marketing of agricultural crops due to the shift to Anchorage of some of these facilities.

Coal, gold, and limestone mining add to the employment in election district 9. In recent years there has been a decline in the military and civilian demand for coal due to the lower price for equivalent units of natural gas resulting in the closing of the coal mine near Jonesville in 1968. In future years, copper mining could become profitable in the Palmer area if government policy with respect to export of this mineral is favorable; but its impact on the economy would be small.

Several saw mills operate in the area and a recent sale of timber promises an increase in employment though not enough to counteract the downward trend in manufacturing that has prevailed since 1963.

Tourism is the only sector of the economy that will show any significant gain in the next few years, for demand conditions in all other sectors are expected to be stable.

(d) Anchorage

All sectors of the Anchorage economic community are on the upswing (Figure 3-16). Even construction, which shows a tapering off from 1965 to 1966, picked up again in 1967 in response to the increase in building projects and work on the Minnesota by-pass.

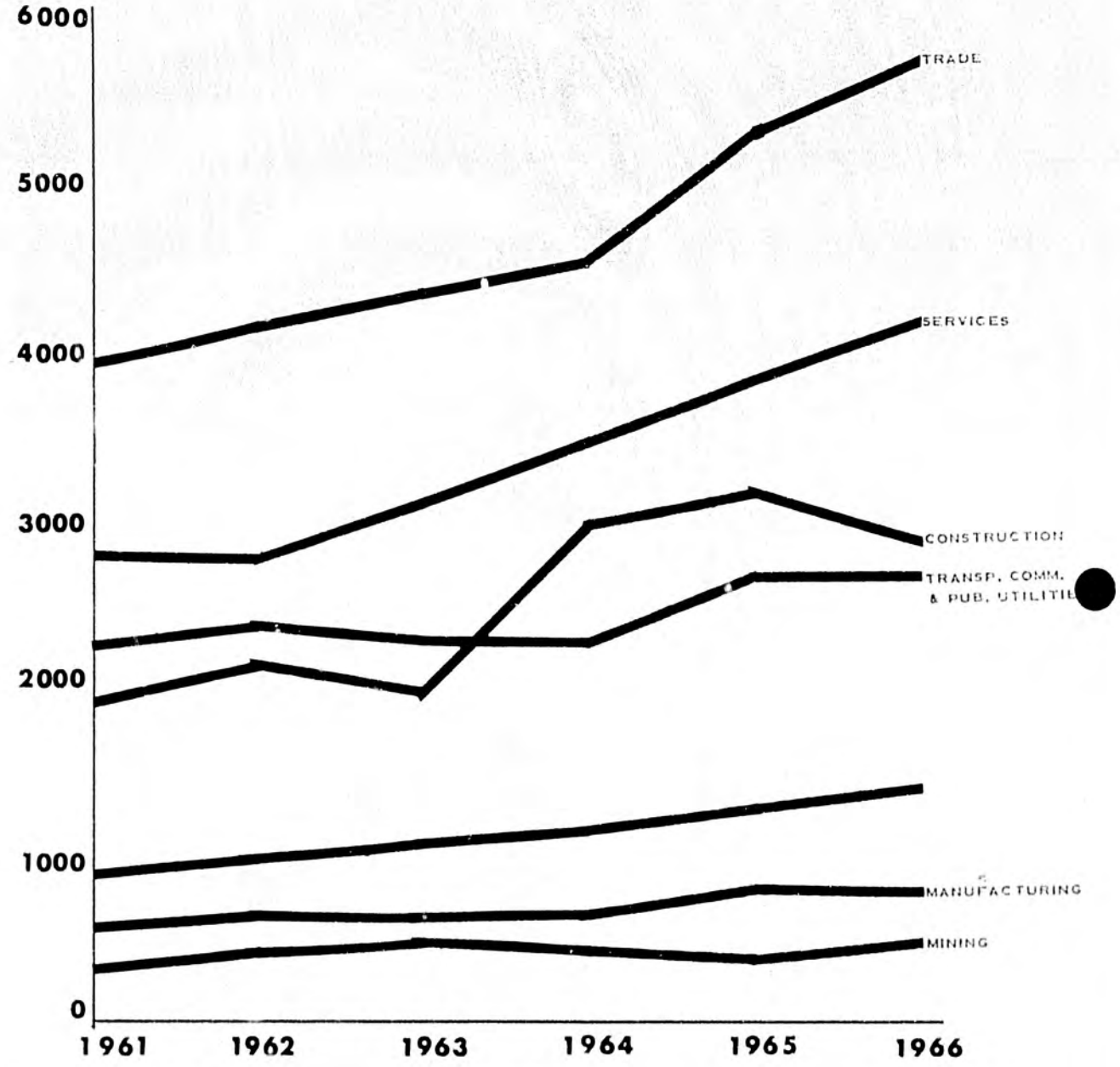
The federal government is the backbone of the Anchorage economy with the large number of military personnel stationed in the area and the many government agencies that service the whole of Alaska. In addition to this direct employment, government payrolls add significantly to the demand for food, clothing, and housing and hence to the derived demand for employment in the production and sale of these goods.

Anchorage, however, is more than the governmental service center for Alaska. Anchorage is the hub of Alaska's transportation system, the center for manufactured goods distribution, the finance and real estate capital of Alaska, and the supply center for the oil and gas industry.

Anchorage is favored by a relatively low unemployment rate, a low seasonal employment index, and a relatively low consumer price index. These

FIGURE 3-17

ANCHORAGE (ELECTION DISTRICT NO. 10) EMPLOYMENT SECTOR, 1961 TO 1966



Source: Figure 3-18

FIGURES FOR GOVERMENT EMPLOYMENT AND TOTAL NONAGRICULTURAL EMPLOYMENT (NOT SHOWN) ON GRAPH ARE PRESENTED IN FIG. 3-18

FIGURE 3-18

EMPLOYMENT ANCHORAGE ELECTION DISTRICT, 1961-1966[a]

EMPLOYMENT SECTOR	1961 NO. EMP'D.	1961 % OF TOTAL	1962 NO. EMP'D.	1962 % OF TOTAL	1963 NO. EMP'D.	1963 % OF TOTAL	1964 NO. EMP'D.	1964 % OF TOTAL	1965 NO. EMP'D.	1965 % OF TOTAL	1966 NO. EMP'D	1966 % OF TOTAL
Total Nonagr. Wage & Salary Employment[b]	23,872	100.0	24,741	100.0	25,819	100.0	28,073	100.0	30,678	100.0	31,520	100.0
Mining	328	1.4	423	1.7	470	1.8	425	1.5	371	1.2	448	1.4
Contract Construction	1,908	8.0	2,103	8.5	1,962	7.6	2,906	10.3	3,126	10.1	2,846	9.0
Manufacturing	562	2.4	619	2.5	615	2.4	688	2.4	792	2.6	796	2.5
Trans., Communications & Public Utilities	2,229	9.3	2,328	9.4	2,224	8.7	2,264	8.1	2,618	8.5	2,619	8.3
Trade	3,903	16.3	4,116	16.7	4,316	16.7	4,495	16.0	5,280	17.2	5,696	18.1
Finance, Ins. & Real Est.	860	3.6	968	3.9	1,028	4.0	1,110	4.0	1,295	4.2	1,359	4.3
Services	2,763	11.6	2,718	11.0	3,098	12.0	3,440	12.2	3,800	12.4	4,105	13.0
Government	11,249	47.2	11,466	46.4	12,086	46.8	12,745	45.4	13,396	43.6	13,651	43.3

[a]By old election districts.
[b]Percentage totals may not add in detail due to rounding.

Source: Derived from *Revised Workforce Estimates*, Alaska Department of Labor, Employment Security Division.

factors coupled with Anchorage's well-developed infrastructure including hospitals, college, port facilities that are operative year round, and a major international airport insure Anchorage's position as the growth center for Alaska.

(e) Kenai-Cook Inlet

The Kenai-Cook Inlet Election District is a boom area. The production of oil and natural gas has transformed Kenai into an area of major economic importance to the state. In addition to the direct employment involved in oil exploration and pumping, the industry has led to an increase in shipping and tug activity, a rapid increase in new housing starts, and the introduction of an ammonia-urea plant.

Figure 3-17 indicates that before major oil operations were begun the area was characterized by only moderate growth, with some increase in the 1962-63 period in government employment with the formation of the Kenai Borough and the switch by Wildwood Air Force Base in communication systems. Neither the moderate expansion in 1962 nor the major expansion in 1964 has significantly changed the seasonality of employment or the unemployment rate. The oil and gas industry has, to a large extent, demanded skills that the existing labor force did not have in adequate supply. Thus, many of the workers in the oil and gas, and petrochemical industries have been imported into the Kenai area.

The notion of a boom economy implies that rapid growth is a temporary phenomenon that soon levels off. Kenai is now at the stage where the growth in basic inputs from the oil and petrochemical industries will begin to level off. In the next few years Kenai will experience only the consolidation of recent gains.

(f) Seward

Seward, in contrast to Anchorage and Kenai, has been in a state of economic decline since 1961. Seward's economy is based on transportation. With the introduction of containerization and the roll-on-roll-off barges in 1961, the Port of Anchorage began to take over much of the business that Seward had previously handled. When the 1964 earthquake destroyed the railway system and the port facilities in Seward, the remaining transportation activity shifted to Whittier and Anchorage. Some logging operations continue in the Seward area and a cant mill may be opened in the near future. Rebuilding of the portions of the Seward highway destroyed in the earthquake has brought an increasing number of tourists to this scenic area.

Seward's potential was not by any means destroyed by the earthquake. Much of the infrastructure remains and the excellent ice-free port

FIGURE 3–19

KENAI – COOK INLET ELECTION DISTRICT NO. 12
EMPLOYMENT BY SECTOR*, 1961–1966

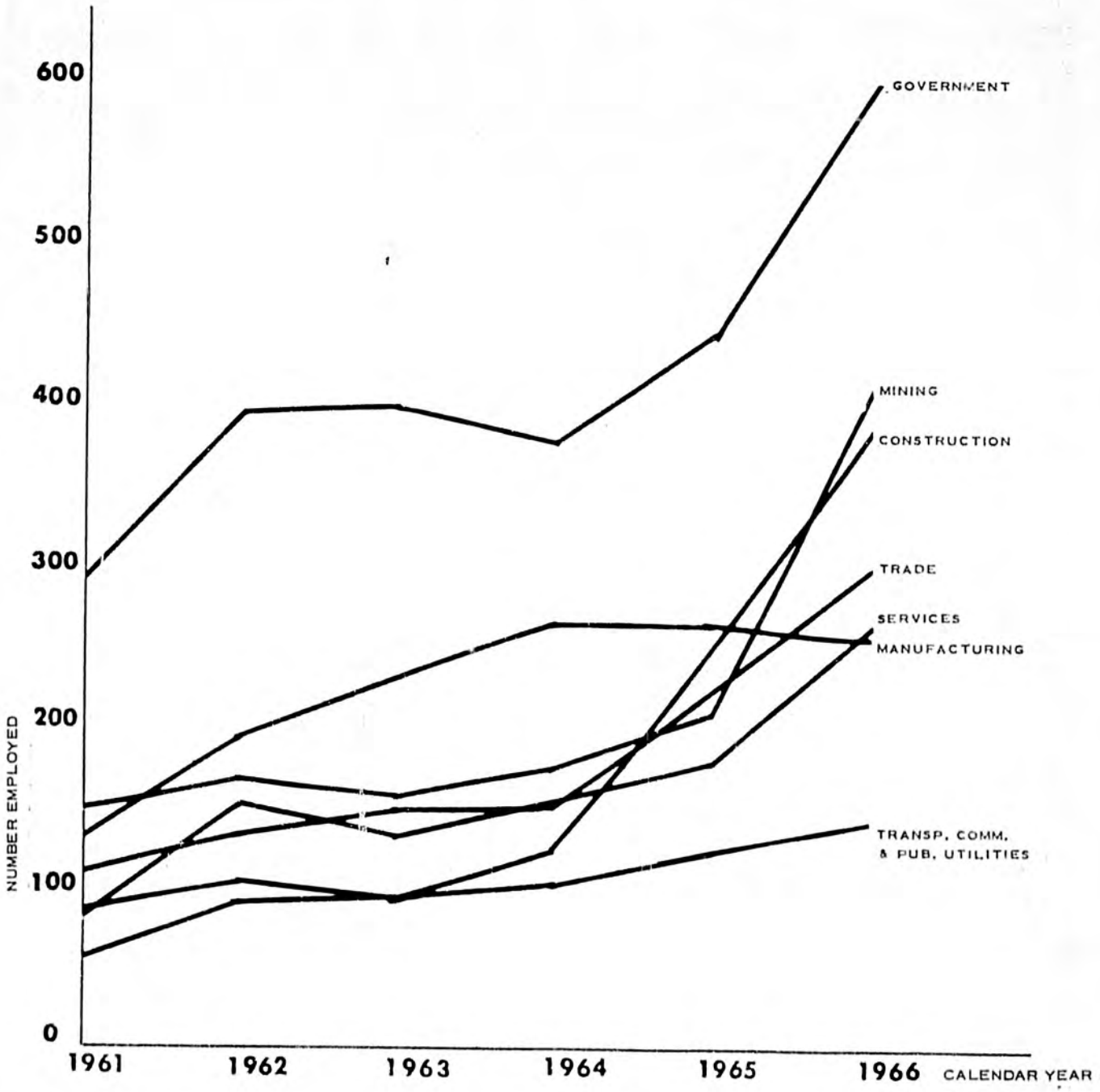


*FIGURE FOR TOTAL NONAGRICULTURAL EMPLOYMENT (NOT SHOWN ON GRAPH) ARE PRESENTED IN FIGURE 3–20.

Source: Figure 3–20.

FIGURE 3-20

EMPLOYMENT KENAI ELECTION DISTRICT, 1961-1966[b]

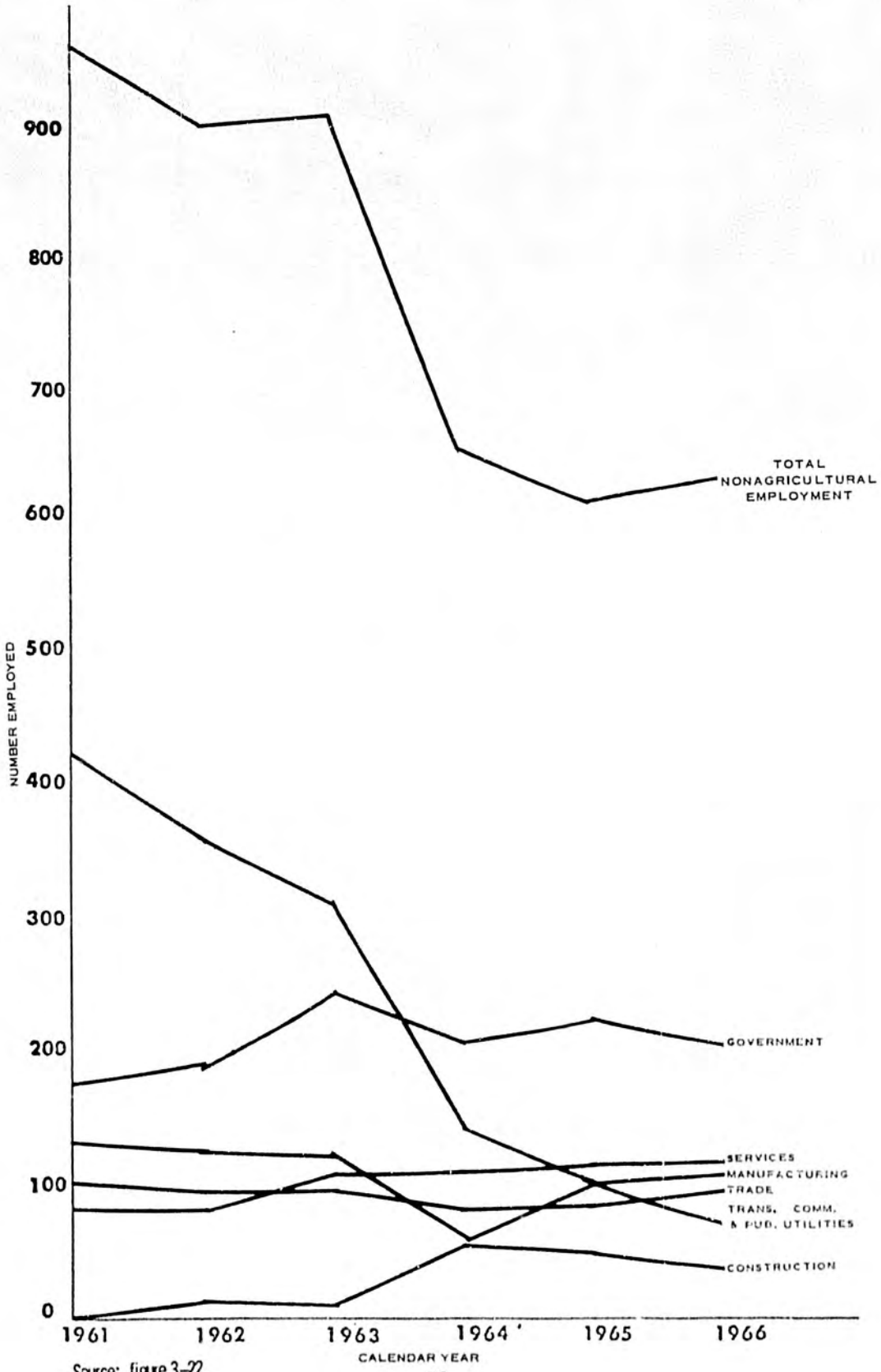
EMPLOYMENT SECTOR	1961 NO. EMP'D	1961 % OF TOTAL	1962 NO. EMP'D.	1962 % OF TOTAL	1963 NO. EMP'D.	1963 % OF TOTAL	1964 NO. EMP'D.	1964 % OF TOTAL	1965 NO. EMP'D.	1965 % OF TOTAL	1966 NO. EMP'D.	1966 % OF TOTAL
Total Nonagr. Wage & Salary Employment[c]	960	100.0	1,284	100.0	1,322	100.0	1,397	100.0	1,754	100.0	2,423	100.0
Mining	155	15.7	169	13.2	159	12.0	179	12.8	212	12.1	415	17.1
Contract Construction	57	5.9	94	7.3	99	7.5	128	9.2	259	14.7	388[a]	16.0
Manufacturing	138	14.5	198	15.4	236	17.9	266	19.0	264	15.1	258	10.6
Trans., Communications, & Pub. Utilities	90	9.4	104	8.1	94	7.1	107	7.7	125	7.1	141	5.8
Trade	113	11.8	134	10.4	152	11.5	151	10.8	219	12.5	303	12.5
Finance, Ins. & Real Est.	27	2.8	34	2.6	44	3.3	30[a]	2.1	50[a]	2.9	60[a]	2.5
Services	86	9.0	154	12.0	135	10.2	156[a]	11.2	180[a]	10.3	263	10.9
Government	294	30.7	397	30.9	403	30.5	380	27.2	445	25.4	595	24.6

[a]Estimated figures necessitated by disclosure regulations.
[b]By old election districts.
[c]Percentage totals may not add in detail due to rounding.

Source: Derived from *Revised Workforce Estimates*, Alaska Department of Labor, Employment Security Division.

FIGURE 3-21

SEWARD (ELECTION DISTRICT NO. 11)
EMPLOYMENT BY SECTOR*, 1961–1966



Source: figure 3-22.

FIGURE 3-22

EMPLOYMENT SEWARD ELECTION DISTRICT, 1961-1966[b]

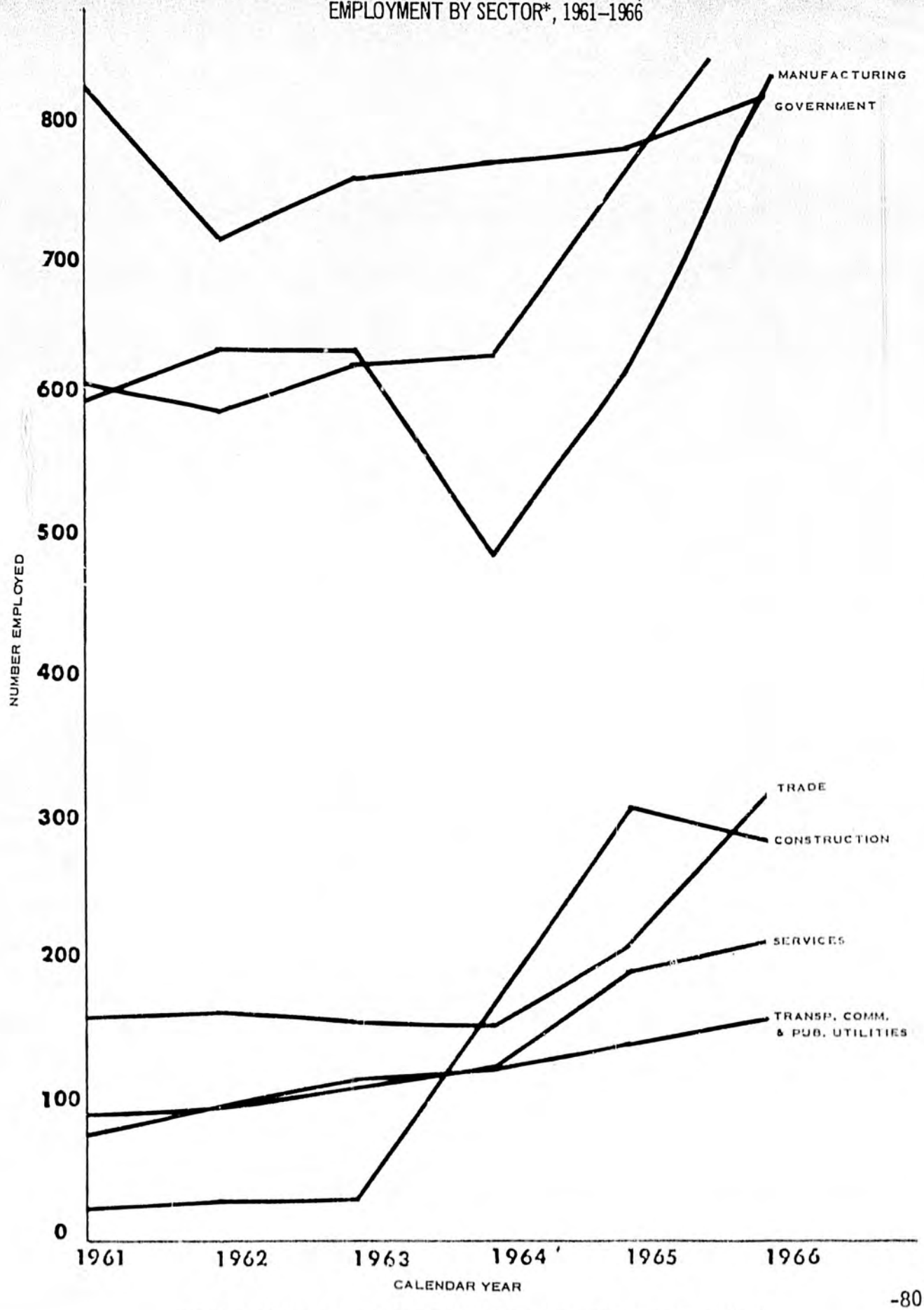
EMPLOYMENT SECTOR	1961 NO. EMP'D.	1961 % OF TOTAL	1962 NO. EMP'D.	1962 % OF TOTAL	1963 NO. EMP'D.	1963 % OF TOTAL	1964 NO. EMP'D.	1964 % OF TOTAL	1965 NO. EMP'D.	1965 % OF TOTAL	1966 NO. EMP'D.	1966 % OF TOTAL
Total Nonagr. Wage & Salary Employment[c]	969	100.0	910	100.0	914	100.0	670	100.0	623	100.0	641	100.0
Mining	6[a]	0.6	6[a]	0.7	6[a]	0.7	6[a]	0.9	6[a]	0.9	6[a]	0.9
Contract Construction	6[a]	0.6	14[a]	1.5	11	1.2	55	8.2	45	7.2	35[a]	5.5
Manufacturing	135	13.9	129	14.2	123	13.6	60	9.0	100	16.1	109[a]	17.0
Trans., Communications & Pub. Utilities	432	44.6	365	40.1	316	34.5	146	21.8	42	6.7	70[a]	10.9
Trade	104	10.7	98	10.8	96	10.5	80	11.9	85	13.6	94	14.7
Finance, Ins. & Real Est.	10[a]	1.1	10	1.1	7[a]	0.7	8[a]	1.2	7[a]	1.1	10[a]	1.6
Services	93	9.6	94	10.3	105	11.5	105[a]	15.7	113	18.1	112	17.5
Government	183	18.9	194	21.3	250	27.4	210	31.3	225	36.1	205	32.0

[a]Estimated figures necessitated by disclosure regulations.
[b]By old election districts.
[c]Percentage totals may not add in detail due to rounding.

Source: Derived from *Revised Workforce Estimates*, Alaska Department of Labor, Employment Security Division.

FIGURE 3-23

KODIAK (ELECTION DISTRICT NO. 13)
EMPLOYMENT BY SECTOR*, 1961–1966



FIGURES FOR TOTAL NONAGRICULTURAL EMPLOYMENT (NOT SHOWN)
ON GRAPH ARE PRESENTED IN FIGURE 3–24.

FIGURE 3-24

EMPLOYMENT KODIAK ELECTION DISTRICT, 1961-1966[b]

EMPLOYMENT SECTOR	1961 NO. EMP'D.	1961 % OF TOTAL	1962 NO. EMP'D	1962 % OF TOTAL	1963 NO. EMP'D.	1963 % OF TOTAL	1964 NO. EMP'D.	1964 % OF TOTAL	1965 NO. EMP'D.	1965 % OF TOTAL	1966 NO. EMP'D.	1966 % OF TOTAL
Total Nonagr. Wage & Salary Employment[c]	1,824	100.0	1,780	100.0	1,876	100.0	1,890	100.0	2,310	100.0	2,700	100.0
Mining	1[a]	d	1[a]	d	4[a]	0.2	1[a]	d	0[a]	0	15[a]	0.5
Contract Construction	24	1.3	28	1.6	31[a]	1.7	176	9.3	312	13.5	291	10.8
Manufacturing	606	33.2	643	36.1	643	34.3	492	26.0	630	27.3	832	30.8
Trans., Communications & Pub. Utilities	79	4.3	96	5.4	119	6.3	124	6.6	142	6.1	160	5.9
Trade	164	9.0	167	9.4	160	8.5	157	8.3	211	9.1	324	12.0
Finance	26[a]	1.4	30[a]	1.7	38	2.0	45	2.4	36[a]	1.6[a]	40	1.5
Services	93	5.1	96	5.4	116	6.2	122[a]	6.5	196	8.5	215	8.0
Government	831	45.6	719	40.4	765	40.8	773	40.1	783	33.9	823	30.5

[a]Estimated figures necessitated by disclosure regulations.
[b]By old election districts.
[c]Percentage totals may not add in detail due to rounding.
[d]Less than one-tenth of 1 percent.
Source: Derived from *Revised Workforce Estimates*, Alaska Department of Labor, Employment Security Division.

has been partially rebuilt. Seward is favored by the University of Alaska as the location for a marine college proposed for Alaska, and shipping operations could begin again on a large scale if a Gulf of Alaska oil field is developed. A scallop industry is just beginning. Finally, if foreign fishing fleets are allowed to use Seward as a rest and recreation and basing point (as has been proposed by a Korean firm), additional economic recovery and growth can be foreseen.

(g) Kodiak

The island economies in the Kodiak group rely on the sea for a good part of their employment. In addition to the Naval and Coast Guard operations that generate some employment, Kodiak's location provides employment in fisheries and seafood processing. The harvesting of shellfish, particularly crab, affords employment in the winter, favoring Kodiak in contrast to most fishing areas with a relatively stable year-round employment.

Kodiak is also favorably endowed with wildlife and forest resources. The Kodiak bear, grouse, ptarmigan, dall sheep and goats attract tourists and trophy hunters. The recent sale of commercial forest land on Afognak Island and the possible future sale on Shuyak Island will add further employment in the forest industries.

The construction activity which increased rapidly after the earthquake has now slackened. The city's urban renewal objectives, however, are still not complete and construction employment continues at an abnormally high level.

(h) Bristol Bay

The economy of Bristol Bay, like that of the Aleutians, depends upon the military and the fishing industry. The summer red salmon runs give the region an exceptionally seasonal and unstable employment picture, leaving local commercial fisherman and cannery workers with virtually no employment opportunities and no money income during the winter months. Some experiments have been made in training natives to harvest whitefish in the winter months, but extreme poverty conditions remain, leaving almost 25 percent of the households with yearly incomes of less than $300.

Air transportation and tourism provide some employment which may increase slightly in future years.

FIGURE 3–25

BRISTOL BAY ELECTION DISTRICT NO. 15
EMPLOYMENT BY SECTOR*, 1961–1966

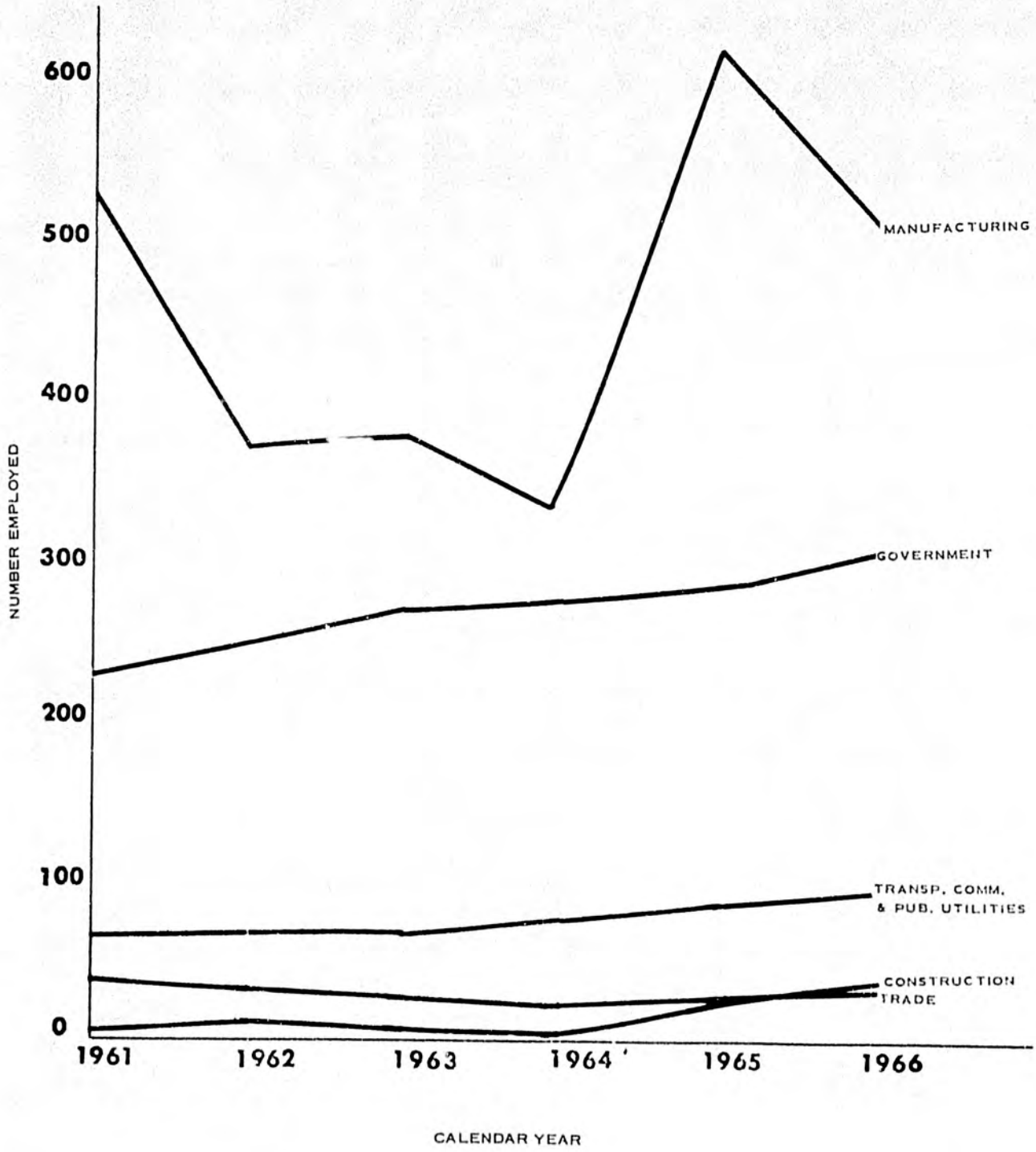


*FIGURE FOR TOTAL NONAGRICULTURAL EMPLOYMENT (NOT SHOWN ON GRAPH) ARE PRESENTED IN FIGURE 3–26.

FIGURE 3-26

EMPLOYMENT BRISTOL BAY ELECTION DISTRICT, 1961-1966[b]

EMPLOYMENT SECTOR	1961 NO. EMP'D.	1961 % OF TOTAL	1962 NO. EMP'D.	1962 % OF TOTAL	1963 NO. EMP'D.	1963 % OF TOTAL	1964 NO. EMP'D.	1964 % OF TOTAL	1965 NO. EMP'D.	1965 % OF TOTAL	1966 NO. EMP'D.	1966 % OF TOTAL
Total Nonagr. Wage & Salary Employment[c]	897	100.0	765	100.0	780	100.0	743	100.0	1,084	100.0	1,002	100.0
Mining	3[a]	4.0	4[a]	0.5	3[a]	0.4	0[a]	0	0[a]	0	0[a]	0
Contract Construction	8[a]	6.3	11[a]	1.4	6[a]	0.7	6[a]	0.8	23[a]	2.1	29[a]	2.9
Manufacturing	525	32.1	370	48.4	382	49.0	334	45.0	626	57.7	515	51.4
Trans., Communications & Pub. Utilities	65	12.3	67	8.8	68	8.7	73	9.8	89	8.2	94	9.4
Trade	39	11.5	34	4.4	28	3.6	24	3.2	29	2.7	28	2.8
Finance, Ins. & Real Est.	0	0	4[a]	0.5	1[a]	d	0[a]	0	0[a]	0	0[a]	0
Services	28	11.7	24	3.1	22	2.8	31	4.2	31	2.9	27[a]	2.7
Government	229	21.1	251	32.8	270	34.6	275	37.0	286	26.4	309	31.0

[a]Estimated figures necessitated by disclosure regulations.
[b]By old election districts.
[c]Percentage totals may not add in detail due to rounding.
[d]Less than one-tenth of 1 percent.

Source: Derived from *Revised Workforce Estimates*, Alaska Department of Labor, Employment Security Division.

(i) Aleutian Islands

The economy of the Aleutian Islands subregion is based primarily on government (including military activities), construction, and seafood processing. However, in terms of employment and income accruing to permanent residents of the subregion, seafood processing and portions of the government sector have by far the greatest economic impact.

Militarily, the Aleutian Islands are highly strategic, extending as they do like a series of stepping stones reaching towards islands off the Russian coast and the Kamchatka Peninsula. The remains of the American buildup in this area during World War II are everywhere present, ranging from the huge military ghost town at Dutch Harbor down to abandoned quonset huts and junked equipment. Today, in response to the Cold War, DEW line stations are located at Nikolski, Driftwood Bay, Cape Sarichef,and Cold Bay with similar stations further up the Alaska Peninsula at Port Moller and Port Heiden. Two major military installations are located within the subregion: the Adak Naval Station and the Shemya Air Force Station. In addition, a small communication station is maintained at Unalaska and a classified installation on Attu.

Finally, the U.S. Coast Guard maintains stations on St. Paul, Unimak and Adak and Attu Islands. Because of the buildup of military strength in the Aleutian's in 1960's, the military population is now more than 50 percent of the total population.

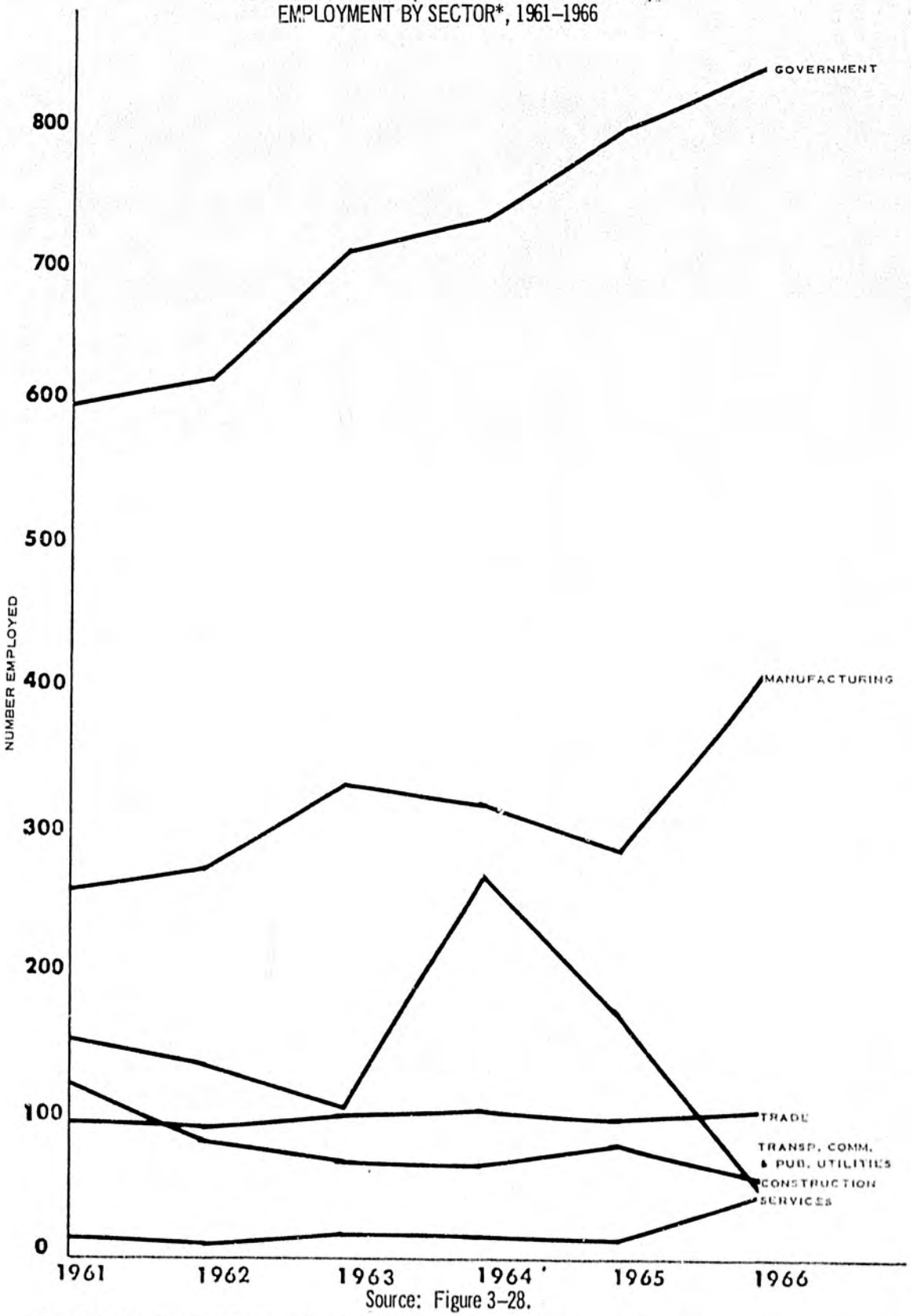
Other government employment falls into "quasi-military" and "domestic" categories. The quasi-military category is dominated by the underground nuclear testing operations being conducted on Amchitka Island under the jurisdiction of the U. S. Atomic Energy Commission, while the domestic category includes the Bureau of Commercial Fisheries' fur seal operations on the Pribilof Islands, the Federal Aviation Agency station at Cold Bay, State-operated schools, and local governement operations to service the three small incorporated cities in the Aleutian Chain.

While military and quasi-military activities represent large capital investments by the federal government and sizeable payrolls, they have relatively little economic impact on the Aleutian area. The three major installations--Amchitka, Adak and Shemya--are all located within the Aleutians National Wildlife Refuge, and are remote from any of the civilian communities of the subregion. Relatively few civilians are hired to work on construction projects and those few civilians are frequently hired from Anchorage or from out of state. Supplies are brought in by sea from out of state or by air from Anchorage. As a result, the only significant contribution to the subregion's economy occurs at Adak, where king crab processors take advantage of naval docking and communication facilities.

By contrast, the Bureau of Commercial Fisheries' fur seal operations

FIGURE 3-27

ALEUTIAN ISLANDS (ELECTION DISTRICT NO. 14)
EMPLOYMENT BY SECTOR*, 1961–1966



Source: Figure 3-28.

FIGURES FOR NONAGRICULTURAL EMPLOYMENT (NOT SHOWN) ON GRAPH ARE PRESENTED IN FIGURE 3-28

FIGURE 3-28

EMPLOYMENT ALEUTIAN ELECTION DISTRICT, 1961-1966[b]

EMPLOYMENT SECTOR	1961 NO. EMP'D.	1961 % OF TOTAL	1962 NO. EMP'D.	1962 % OF TOTAL	1963 NO. EMP'D.	1963 % OF TOTAL	1964 NO. EMP'D.	1964 % OF TOTAL	1965 NO. EMP'D.	1965 % OF TOTAL	1966 NO. EMP'D.	1966 % OF TOTAL
Total Nonagr. Wage & Salary Employment[c]	1,288	100.0	1,239	100.0	1,375	100.0	1,556	100.0	1,494	100.0	1,526	100.0
Mining	0	0	0	0	0	0	0[a]	0	0	0	0	0
Contract Construction	159	12.3	140	11.3	110[a]	8.0	274	17.6	174	11.6	54	3.5
Manufacturing	263	20.4	278	22.4	337	24.5	327	21.0	292	19.5	411	26.9
Trans., Communications & Pub. Utilities	126	9.8	83	6.7	72	5.2	67	4.3	83	5.6	55	3.6
Trade	98[a]	7.6[a]	95	7.7	102	7.4	108[a]	6.9	99[a]	6.6	108[a]	7.1
Finance, Ins. & Real Est.	18[a]	1.4[a]	4[a]	0.3	18[a]	1.3	20[a]	1.3	25[a]	1.7	4[a]	0.3
Services	18	1.4	15[a]	1.2	20	1.4	20[a]	1.3	15[a]	1.0	50[a]	3.3
Government	606	47.0	624	50.4	716	52.1	740	47.6	806	53.9	844	55.3

[a]Estimated figures necessitated by disclosure regulations.
[b]By old election districts.
[c]Percentage totals may not add in detail due to rounding.

Source: Derived from *Revised Workforce Estimates*, Alaska Department of Labor, Employment Security Division.

FIGURE 3-29

PERSONAL INCOME REGION II, 1960-1965
(in millions of dollars)

YEAR	TOTAL PERSONAL INCOME	MILITARY INCOME	LABOR INCOME	OTHER INCOME*
1960	361.1	86.3	225.2	49.6
1961	354.1	75.6	220.8	57.7
1962	380.4	14.3	245.5	60.6
1963	396.2	73.9	260.4	61.9
1964	455.4	86.0	305.0	64.4
1965	496.4	87.2	339.9	69.3

*Includes proprietors income, property income, wage and salary income from sources not covered by unemployment insurance programs, and transfer payments (less personal contributions for social insurance.)

Sources: George Rogers *Alaska Regional Population and Employment 1967*, and *Statistical Quarterly (1960-1966)*, Alaska Department of Labor, Employment Security Division.

on the Pribilof Islands and seafood processing have a direct impact on the Aleutian Islands subregion. The harvesting and processing of fur seals is the lifeblood of the Pribilof Islands' economy, while seafood processing is the basic industry of the remaining communities of the subregion.

With the exception of king crab processing operations at Adak, the seafood processing facilities are either based in or operate out of the established communities of the subregion. Unalaska (Dutch Harbor), King Cove, and Sand Point are the other major seafood processing centers; but there are also plants at False Pass, Squaw Harbor, and Akutan. In 1967 the Aleutian subregion was the number one king crab processor in the state, edging out Kodiak for the first time since 1964. An indication of the rapid growth of this industry over the past few years can be seen in the case of Unalaska, which had one crab processing plant in 1964 and, five in 1967. The salmon industry has long been active in the Aleutians subregion; Sand Point is a major halibut port; and shrimp processing operations are underway at Squaw Harbor.

Of the other economic activities represented in the Aleutian subregion, construction and transportation are numerically the most significant. The level of construction employment in the Aleutians subregion is closely tied to the demands of the military and quasi-military agencies. As a result, strong fluctuations in this employment sector have occurred from year to year. Transportation employment declined consistently between 1961 and 1966, from 126 to 55 employees; however, this decrease is more a reflection of the increasing number of transportation personnel being stationed in Anchorage than a decline in the level of transportation services being offered.

Service employment is only lightly represented within the subregion. Outside of the military installations, professional services are almost entirely lacking. Transient facilities are limited to those provided by the Bureau of Commercial Fisheries on St. Paul Island, by the airlines at Cold Bay and by the military at the various bases. The bulk of the small service sector is made up of amusement services, principally in the form of movie theaters. Trade employment has been experiencing limited growth in recent years in response to the increased activity in the seafood processing industry.

(3) Personal Income

Figures 3-29 and 3-30 present the changes in personal income in Region II since 1960. Within the public sector, military salaries represent a considerable but declining portion of the total income in the region. Income from federal government wage and salary disbursements (apart from military salaries) has been increasing at approximately the same rate as total income, so that in 1960 federal government salaries amounted to 19 percent of total personal income and in 1965, 18.4 percent of total income. During the same period, state and local governments have increased in importance and have expanded their share in total personal income. As the result of growing local needs, the state and local government salaries in Region II have grown

from 5.6 percent of total income in 1960 to 9.3 percent in 1966.

The declining importance of military salaries in the Region II economy and the increasing importance of state and local salaries tend to balance each other so that, taken togther, total government wage and salary disbursements represent approximately the same percentage of income in 1965 that they did in 1960. The indication, then, is that the Southcentral region is slowly losing its dependence on the federal government and is gradually coming to rely on private employment and state and local government activity as a means of income creation.

Within the private sector, the oil activity in Kenai and the rebuilding efforts after the earthquake have made the largest contributions to the *growth* of income since 1960. Wage and salary income in the construction industry has more than doubled in the five-year period between 1960 and 1965; total wages and salaries in the commodity-producing industries (including mining) have grown by more than 50 percent. In the distributive sector, growth in the transportation, communication, and public utilities industries has been slow; but activity in finance, insurance, real estate, and services has been rapid so that, taking all distributive industries together, income has grown by over 25 percent in the five-year period.

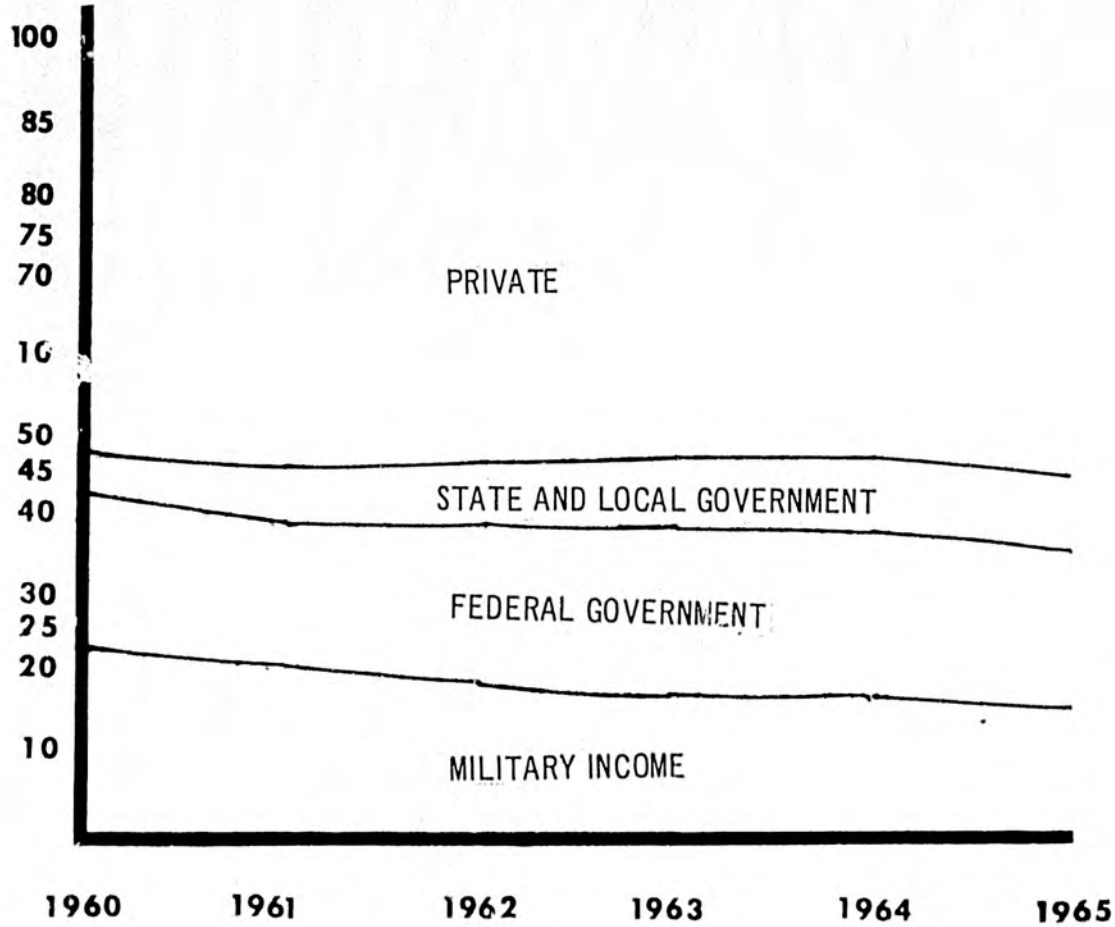
Per capita income in Region II is the highest of any of the five regions in Alaska (Figure 3-32) and higher than the per capita income in the U.S. at large. Deflating the per capita figures to adjust for cost of living differences has the effect of increasing the differential between Region II and all of Alaska, and reducing the differential between Region II and the rest of the U.S.

The cost of living in Anchorage relative to Seattle has declined slightly since 1960 (due mostly to a fall in food, apparel, and rental housing prices). The decline in the still very high prices of rental housing relative to Seattle is due in part to the rapid increase in demand for housing in the Seattle area, but prices of rental housing in Anchorage have risen more slowly than other Anchorage prices indicating that part of the improvement in rental housing is "real" rather than merely a function of the particular base used. The decline in food prices is a result of increased competition in the retail food market and improvements in transportation services between Anchorage and the rest of the country.

One final point: The distribution of income as well as its absolute level is important in describing a region's economy. A distribution of income that violates the community's sense of equity is as deleterious to a society's welfare as a level of income that is so low it prohibits the fulfillment of basic needs. Of concern to Region II is the distribution of income between Natives and non-Natives, which resembles the statewide distribution that puts the income of Natives substantially below that of non-Natives. The low income of the Native groups, their high unemployment rate, and their low level of education are all elements in the cycle of poverty that must be removed.

FIGURE 3-30

INCOME IN REGION II BY SECTOR AS A PERCENT OF TOTAL, 1960–1965



SOURCE: FIGURE 3-31

FIGURE 3-31

INCOME IN REGION 1[illegible]Y SECTOR AS A PERCENT OF TOTAL
1960-1965

	Military	Federal Government	State and Local	Private
1960	24%	19%	6%	51
1961	21	18	7	54
1962	20	20	8	52
1963	19	21	9	51
1964	19	20	9	52
1965	18	18	9	55

Source: Percentages derived from George Rogers, *Alaska Regional Population and Employment*, 1967, and *Statistical Quarterly, 1960-1966*, Alaska Department of Labor, Employment Security Division.

FIGURE 3-32

PER CAPITA INCOME REGION II, 1960-1965
(in current dollars)

YEAR	REGION II	ANCHORAGE	ALL ALASKA
1960	3,034	3,381	2,760
1961	2,801	na	2,672
1962	2,958	na	2,731
1963	2,966	na	2,862
1964	3,361	na	3,082
1965	3,438	3,847	3,181

Source: Total personal income for Region II from Figure 3-29 divided by resident population Figure 3-1 . Figures for Anchorage are from *Overall Economic Development Plan*, Greater Anchorage Area Borough, Planning Department. Figures for Alaska are from Rogers, Alaska *Regional Population and Employment*, 1967.

C. Statistical Profile

The economic activities of the southcentral and southwestern areas of Alaska (Region II) comprise most of the sectors of the state's economy generally. Accordingly, this section includes a brief sector-by-sector statistical profile of the nature of those activities. These profiles, taken in the aggregate, focus on two other themes--the magnitude of activity in the region as a proportion of total state activity and the demonstration of growth and expansion in every sector. The conclusion is that this region is truly the engine for economic growth in Alaska. The following charts and narratives set out concisely the outlines of this growth.

(1) Oil and Gas

Figure 3-33 includes petroleum production in the Cook Inlet Basin and total local marine tonnage through the Port of Anchorage (including petroleum) for the period 1962 to 1967. Petroleum production almost tripled while port tonnages increased by a factor of 12.

FIGURE 3-33

COOK INLET BASIN PETROLEUM PRODUCTION
AND PORT OF ANCHORAGE LOCAL MARINE TONNAGE
INCLUDING BARRELS OF PETROLEUM

	PETROLEUM PRODUCTION COOK INLET BASIN (Barrels)	PORT OF ANCHORAGE TOTAL LOCAL MARINE TONNAGE (Tonnage Includes Barrels of Petroleum)
1962	10,259,310	97,463
1963	10,739,964	1[illegible],410
1964	11,089,626	828,590
1965	11,128,545	922,208
1966	14,361,118	1,106,485
1967	28,917,467	1,337,382

Source: Anchorage Chamber of Commerce, *Statistical Profile*, 1968.

(2) Fisheries

Figure 3-34 presents a summary of the catch of fisheries products in southcentral Alaska and its value to fishermen in 1966. The overwhelming importance of salmon and king crab in both catch size and value is readily apparent.

FIGURE 3-34

CATCH AND VALUE TO FISHERMEN

SOUTHCENTRAL ALASKA, 1966

Species	Catch (lbs.)	Value to Fishermen ($)
Salmon	188,223,855	29,390,873*
Halibut	9,982,000	3,020,000
Herring	5,575,677	83,635
Sablefish	93,249	13,987
Other	30	6
Total Fish	203,874,811	32,508,501
Crab		
Dungeness	2,557,319	306,878
King	159,095,796	15,658,836
Tanner	217	11
Shrimp	24,407,624	1,098,343
Clams	43,963	8,793
Total Shellfish	186,104,919	17,072,861
TOTAL	389,979,730	49,581,362

*Value to fishermen in Bristol Bay derived from prices paid to fishermen, provided by the Alaska State Department of Fish and Game, Juneau.

Source: Adapted from Alaska State Department of Fish and Game, *Alaska Catch and Production, Commercial Fisheries Statistics*, Statistical Leaflet No. 13, 1966.

Figure 3-35 presents the catch and value of Kodiak-the state's most important fisheries area- for 1965 through 1967. In value to fishermen king crab landings led all other species with salmon second as was the case by wholesale value of products. And while the dungeness crab slacked off, the shrimp catch grew markedly. In terms of aggregates, however; the 1967 value of the catch to all fishermen dropped $1.5 million from 1966; and the wholesale value of all products dropped $4 million (or about by one seventh of the 1966 figure).

FIGURE 3-35

CATCH AND VALUE TO FISHERMEN
OF MAJOR KODIAK FISHERIES

1965-1967

Product		Landings (lbs)	Percent of Total Alaska Landings	Value to Fishermen
King Crab	1965	76,586,430	58.2	7,568,643
	1966	90,616,615	57.0	9,500,000
	1967	60,211,744	n.a.	7,500,000
Salmon	1965	16,562,000	6.0	1,744,484
	1966	51,934,591	15.6	6,493,727
	1967	2,469,500	n.a.	668,700
Halibut	1965	4,382,114	15.4	1,148,114
	1966	3,455,117	11.9	1,170,000
	1967	4,200,000	n.a.	760,000
Dungeness Crab	1965	3,311,570	37.2	397,388
	1966	1,416,174	28.0	167,109
	1967	5,912,208	n.a.	769,000
Shrimp	1965	13,810,170	82.1	621,458
	1966	24,097,141	85.5	963,886
	1967	38,014,697	n.a.	1,710,000

Source: Alaska Department of Fish and Game, Division of Commercial Fisheries data.

(3) Forest Products

Figure 3-36 shows the land area of southcentral Alaska forests by survey unit. Of the total forest land of the four survey units of the interior, about 40 percent is classified as commercial forest while almost 50 percent of the six units of coastal forest land is so classified. Note that the greatest remaining stands are the interior forests of the Susitna, Kenai, and Copper River areas. Figure 3-37 graphically sets out the geographic ownership pattern of the timber lands.

FIGURE 3-36

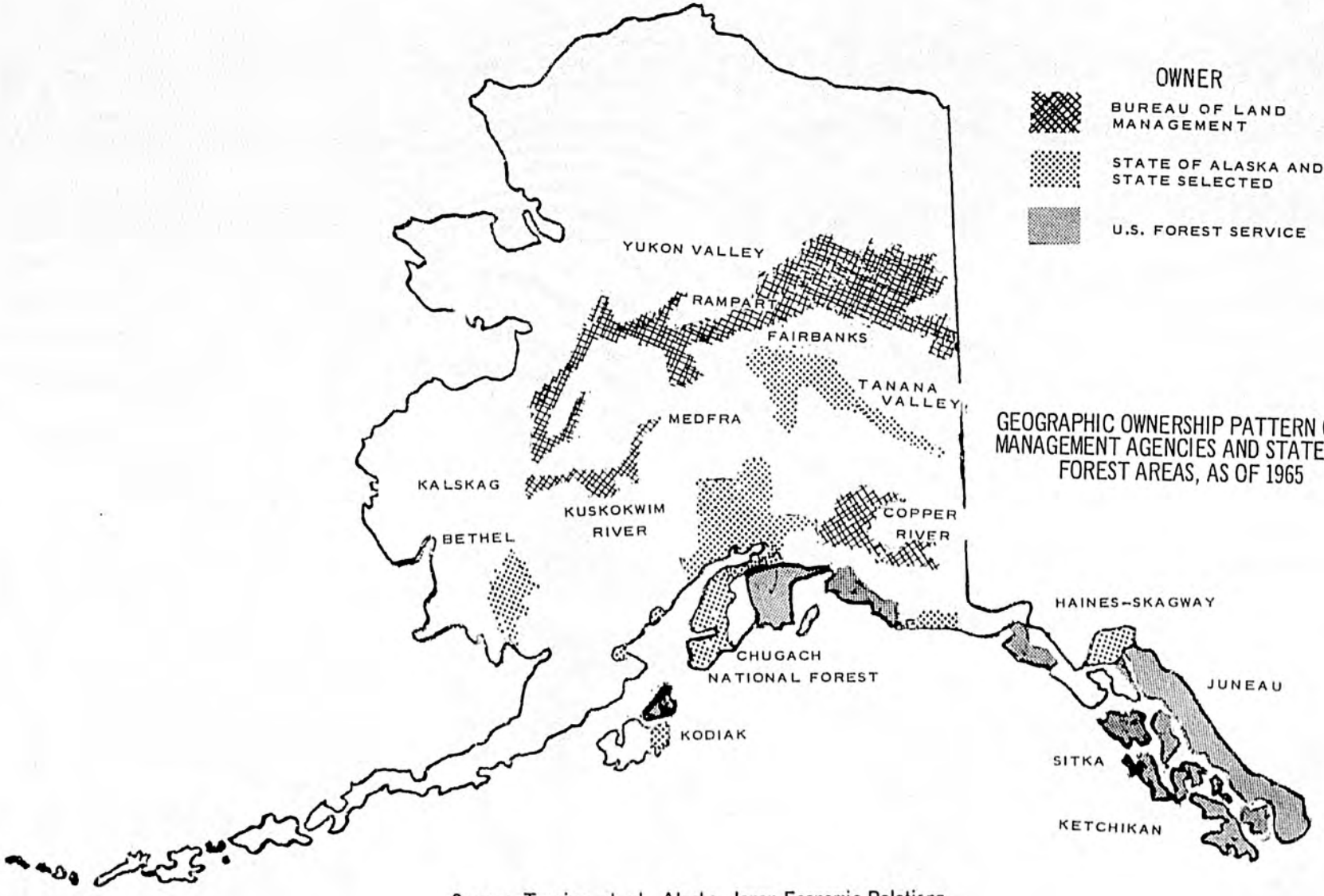
LAND AREAS IN SOUTHCENTRAL ALASKA
BY MAJOR CLASS OF LAND AND SURVEY UNIT
(In Thousands of Acres)

SURVEY UNIT	TOTAL FOREST LAND	COMMERCIAL FOREST	UNPRODUC-TIVE FOREST	NON-FOREST LAND	TOTAL LAND
	-- Interior Forest Land --				
Susitna*	4,292	2,023	2,269	12,198	16,490
Kenai	2,070	1,481	589	3,595	5,665
Copper River	4,431	1,060	3,037	11,993	16,424
Bristol Bay	2,741	704	2,037	10,136	12,877
Total	13,534	5,268	8,266	37,922	51,456
	-- Coastal Forest Land --				
Cordova	1,177	335	842	1,859	3,036
Kenai	266	190	76	993	1,259
Afognak[a]*	354	276	78	213	567
Kodiak[b]	81	47	34	2,494	2,575
Yakataga*	243	174	69	3,049	3,292
Public Domain	168	17	151	1,173	1,341
Total	2,289	1,039	1,250	9,781	12,070

*All or part state owned.
[a]Includes: Afognak, Raspberry, Shuyak, and Marmot Islands.
[b]Includes: Kodiak and adjacent islands.

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

FIGURE 3-37



GEOGRAPHIC OWNERSHIP PATTERN OF TIMBER MANAGEMENT AGENCIES AND STATE-SELECTED FOREST AREAS, AS OF 1965

Source: Tussing, et. al., Alaska-Japan Economic Relations

(4) Agriculture

Figure 3-38 presents the value of agricultural production in Alaska's southcentral regions and the percent this is of the state total. Taken together the three areas make up almost 80 percent by value of all agricultural production in the state.

FIGURE 3-38

VALUE AND DISTRIBUTION OF REGION II AGRICULTURAL PRODUCTION, 1961-1966

	1961		1962		1963		1964		1965		1966	
	VALUE (000) DOLLARS	% OF STATE TOTAL	VALUE (000) DOLLARS	% OF STATE TOTAL	VALUE (000) DOLLARS	% OF STATE TOTAL	VALUE (000) DOLLARS	% OF STATE TOTAL	VALUE (000) DOLLARS	% OF STATE TOTAL	VALUE (000) DOLLARS	% OF STATE TOTAL
Matanuska Valley	3,945	72	3,939	70	3,721	71	4,018	72	3,406	66	3,785	69
Kenai	326	6	334	6	383	7	333	6	481	9	439	8
Peninsula Southwest*	138	3	166	3	186	4	204	4	184	4	274	5
TOTAL REGION II	4,509	81	4,439	79	4,290	82	4,555	82	4,071	79	4,498	82

*Figures for Southwest have been adjusted to conform with boundaries of Region II.

Source: Derived from *Agricultural statistics 1953-1966*, Agricultural Task Force Committee Report to the Federal Field Committee for Development Planning in Alaska.

(5) Tourism

Figure 3-39 shows the increasing significance of tourism in the Alaska eocnomy. For the period 1964 to 1967 there was a 49 percent increase in the number of tourists visiting the state, a 61 percent increase in tourist expenditures, a 67 percent increase in primary wages, and a 50 percent rise in primary nongovernment employment. While these figures are for Alaska as a whole, it may fairly be assumed that they are generally indicative of the increases experienced in the tourism sector of Region II.

FIGURE 3-39

INDICATORS OF THE INCREASING SIGNIFICANCE OF TOURSIM IN THE ALASKA ECONOMY, 1964 and 1967

	1964	1967	INCREASE 1964-1967
Number of Tourists	59,200	89,700	27,500
Tourist Expenditures	$18,200,000	$29,000,000	$10,800,000
Primary Nongovernment Employment	1,100	1,650	
Primary Wages	$6,600,000	$10,900,000	$4,300,000

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

Figure 3-40 shows total primary wages paid in selected industry sectors of the Alaska economy in 1964 and 1967. Note that the tourism sector is second only to the oil and gas industry in rate of growth over the four-year period--a remarkable 47 percent increase. These are statewide figures, but the major participation of Region II in most of these totals can be reasonably inferred.

FIGURE 3-40

TOTAL PRIMARY WAGES PAID IN SELECTED SECTORS OF ALASKA'S ECONOMY
($ Millions)

INDUSTRY	1964	ESTIMATED 1967	INCREASE 1964-1967	PERCENT CHANGE
Logging, lumbering and pulp	$19.8	$25.1	$5.3	27
Food processing	18.2	21.0	3.2	12
Oil and gas	8.5	18.7	10.2	120
Tourism	6.6	10.9	4.3	47
Metal and other mining	4.3	4.8	.5	12

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

(6) Government and Services

Figure 3-41 shows the impact of oil and gas revenues on state finances for the period 1969 to 1966. Nonvolume receipts averaged $14 million annually, while volume-related revenues averaged $4 million from 1963 to 1966 and rose to an estimated $8.5 million in 1967. One estimate for these latter revenues for 1968 is $27.5 million.

FIGURE 3-41

ESTIMATES OF OIL AND GAS REVENUES
RECEIVED BY STATE OF ALASKA
1959 to 1966
(In Dollars)

Year	Nonvolume Receipts[a]	Volume Receipts[b]	Total Receipts
1959	8,280,664	17,848	8,298,512
1960	3,069,809	115,973	3,187,782
1961	24,800,922	2,162,226	26,963,148
1962	21,384,077	3,189,860	24,513,937
1963	12,898,570	4,414,404	17,312,974
1964	12,369,681	3,893,657	16,263,338
1965	16,895,544	3,946,130	20,841,674
1966	14,113,852	4,564,068	18,788,920
1967	--	8,500,000(est)	--

[a]Includes bonus payment, rent to state on state land, not related to volume of output, and rent to state via federal leases.

[b]Includes federal revenue payments to the State of Alaska for oil and gas royalties, and state revenues from drilling permits, filing fees, state royalties, and production and conservation taxes.

Sources: Alaska Division of Lands, *1967 Annual Report*, State of Alaska Department of Natural Resources; Joseph Shafer *Alaska's Economy In Case of a National Economic Pause*, prepared for the Federal Field Committee for Development Planning in Alaska, 1968; and Alaska Division of the Western Oil and Gas Association, "Alaska Petroleum Industry Facts", unpublished memornadum, January, 1967.

Figure 3-42 contains area food prices for five cities in Region II based on a Seattle index. In most cases the index indicates food prices to be in excess of 30 points over the base.

FIGURE 3-42

SOUTHCENTRAL AREA FOOD PRICES
(Seattle Prices =100)*

		Anchorage	Kodiak	Seward	Valdez	Palmer
March	1961	129	133	128	n.a.	126
March	1965	132	134	136	n.a.	133
March	1966	141	136	136	148	131
Sept.	1967	133	134	134	146	126
March	1968	127	132	132	n.a.	124

*Compared with Seattle, Washington, which may be as much as 5% higher than the U. S. average.

Source: Alaska Agricultural Experiment Station, Palmer, Alaska *Quarterly Report on Alaska's Food Prices*, 1961-1968.

Figure 3-43 presents one index used by the Corps of Engineers and indicates construction costs in three cities in Region II based on Seattle. The computation takes into consideration materials and supplies, wage rates and productivity, transportation and seasonality, and other factors and has been used as an estimating device.

FIGURE 3-43

CONSTRUCTION COST INDEX FOR ALASKA
FEBRUARY, 1967
(Seattle = 100)*

Anchorage	170
Kenai	210
Kodiak	200

*Use of a Seattle base tends to understate Alaska differential with the U. S. as a whole.

Source: U. S. Corps of Engineers, 1967.

Figure 3-44 presents postal receipts for the Anchorage area office over the period 1962 to 1967. Receipts increased by 76 percent.

FIGURE 3-44

ANCHORAGE POSTAL RECEIPTS
1962-1967

	POSTAL RECEIPTS
1962	1,576,700
1963	1,846,800
1964	2,117,421
1965	2,273,941
1966	2,500,209
1967	2,726,229

Source: Anchorage Chamber of Commerce, *Statistical Profile*, 1968.

Figure 3-45 contains magnitudes of credit union assets and mortgages and deed of trust affecting real estate for the Anchorage area over the period 1962 to 1967. Credit union total assests tripled in five years.

FIGURE 3-45

TOTAL ASSETS, ANCHORAGE AREA CREDIT UNIONS
1962-1967

YEAR	TOTAL ASSETS
1962	7,360,882.37
1963	8,905,016,03
1964	13,492,104.83
1965	19,342,165.00
1966	22,218,640.00
1967	25,351,054.00

Source: Anchorage Chamber of Commerce, *Statistical Profile*, 1968.

Figure 3-46 presents the market-radius population of the Anchorage area, 1964 to 1966. Within the 30-mile radius the market population increased by a third and by about 12 percent for the 100-mile radius for the period cited.

FIGURE 3-46

MARKET-RADIUS POPULATION
ANCHORAGE AREA
1964-1966

	1964	1965	1966
30-Miles Radius Anchorage Area	93,685	117,000	121,000
100 Mile Radius of Anchorage	113,035	121,517	126,114
250 Mile Radius of Anchorage	122,408	132,572	136,549
300 Mile Radius of Anchorage	193,246	203,771	209,368
All Western Alaska	211,221	222,902	228,700
All Alaska	249,904	253,000	271,505

Source: Anchorage Chamber of Commerce, *Statistical Profile*, 1967.

Figure 3-47 summarizes the gross business receipts of the Anchorage area by commercial sector for the period 1962 to 1967. Measured by dollar value the retail, finance and real estate, and services sectors grew by 50 percent.

FIGURE 3-47

ANCHORAGE GROSS BUSINESS RECEIPTS
(in dollars)

	RETAIL	FINANCE & REAL ESTATE	SERVICE
1962	110,091,220.72	24,766,355.09	12,592,334.87
1963	130,159,177.57	31,395,228.14	12,971,902.85
1964	126,288,587.08	32,699,034.30	12,793,644.68
1965	137,159,622.10	36,178,699.50	13,824,553.01
1966	176,406,451.29	44,426,220.34	18,707,937.82
1967	170,611,129.81	37,083,656.68	18,933,315.07
%change since 1962	+54	+49	+50

Source: Anchorage Chamber of Commerce, *Statistical Profile*, 1968.

Figure 3-48 shows school and college enrollments in the Anchorage area for the period 1962 to 1966. School enrollment enlarged by 25 percent and college enrollment by 50 percent.

FIGURE 3-48

ANCHORAGE SCHOOL AND COLLEGE ENROLLMENT

	School Enrollment	Colleges
1962	16,138	1,629
1963	15,188	1,977
1964	17,325	1,908
1965	19,297	2,496
1966	20,185	2,462

Source: Anchorage Chamber of Commerce, *Statistical Profile*, 1967.

(7) Transportation

Figure 3-49 reveals the expansion of air freight and passengers handled at Anchorage International Airport over the period 1959 to 1967. Total tonnages doubled, and a major percentage increase for 1967 over 1965 can be noted. While data for the most recent years are not available statewide, it is fair to estimate that tonnages handled at Anchorage airport presently make up over half the Alaska statewide total. Passenger traffic more than tripled over the nine-year period and showed greater than an 80 percent increase 1967 over 1965.

FIGURE 3-49

ANCHORAGE INTERNATIONAL AIRPORT
PASSENGER AND FREIGHT TRAFFIC
1959-1967

YEAR	PASSENGERS IN	PASSENGERS OUT	THROUGH PASSENGERS	TOTAL PASSENGERS	FREIGHT IN (POUNDS)	FREIGHT OUT (POUNDS)	TOTAL FREIGHT (POUNDS)
1959	108,605	115,164	41,080	264,849	12,544,361	26,377,746	38,922,107
1960	113,786	118,480	54,210	286,476	12,627,502	24,919,794	37,547,296
1961	124,825	130,387	122,483	377,695	14,507,499	26,277,533	40,785,032
1962	135,316	140,881	121,209	397,406	14,926,390	27,530,757	42,457,147
1963	150,667	156,026	171,763	478,456	15,159,422	27,898,062	43,057,484
1964	180,404	185,348	180,900	546,652	22,350,000	33,530,508	55,880,508
1965	202,209	211,001	167,853	581,063	20,373,527	31,935,908	52,309,435
1966	222,209	224,344	359,943	807,056	20,611,961	45,011,663	65,623,624
1967	293,933	300,609	360,631	955,173	24,221,696	55,884,882	80,106,578
Percent Increase 1967 over 1959	170	161	784	260	92	112	106

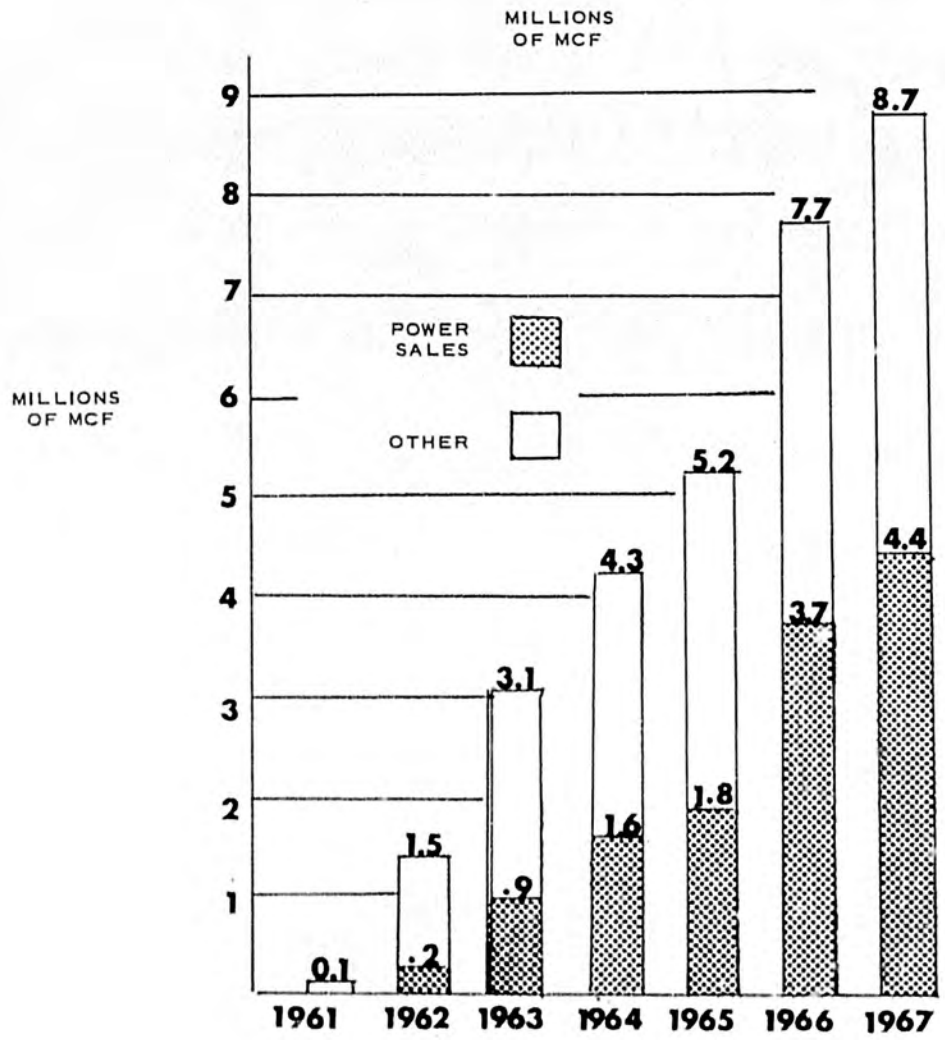
Source: Anchorage International Airport, Accounting Office, 1968.

(8) Power and Communications

Figure 3-50 displays the sustained growth in natural gas sales in Anchorage over the past seven years. Note that power sales doubled from 1965 to 1966, and total sales expanded by 50 percent.

FIGURE 3-50

NATURAL GAS SALES IN ANCHORAGE, 1960–1967

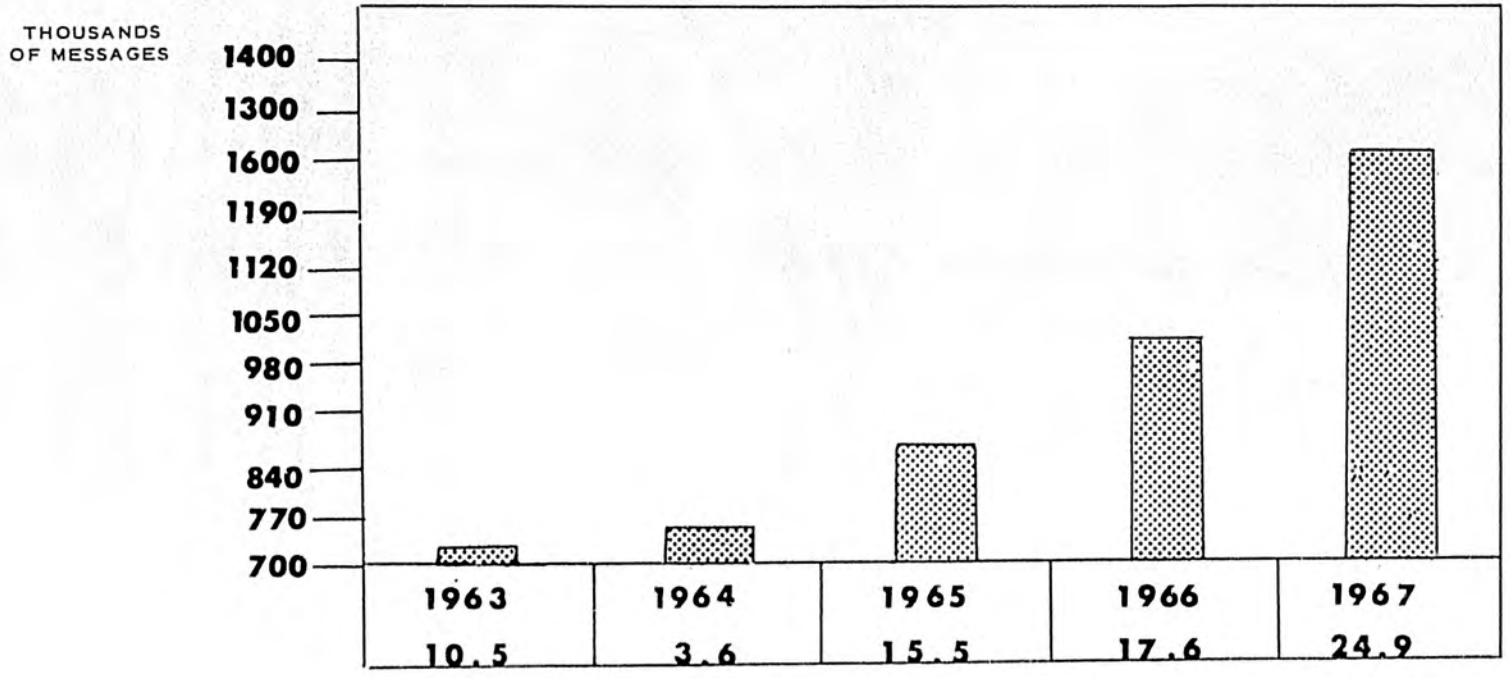


Source: Updated from Alaska Review of Business and Economic Conditions, University of Alaska, Institute of Social, Economic and Government Research February, 1967.

Figures 3-51 and 3-52 present the number of telecommunication messages attributable to the Anchorage toll center for the period 1963 to 1967 together with the annual growth changes. Long distance telephone messages have climbed steadily and dramatically resulting in 16, 17, and 25 percent growth rates for 1965, 1966, and 1967 respectively. (Length of call also increased though this is not shown here.) Commercial telegraph usage has increased in each year other than 1965 over 1964 with moderate growth indicated as new commercial services (e.g., TELEX) and lower rates come in.

FIGURE 3-51

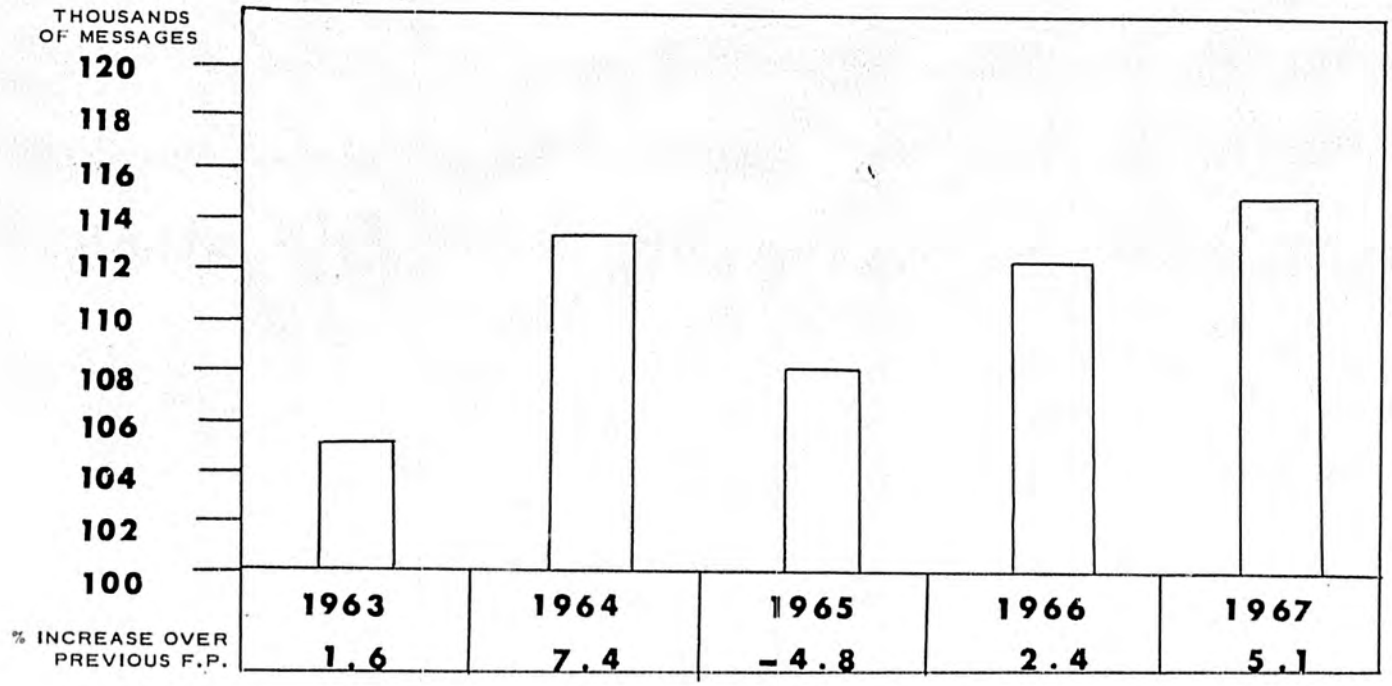
ALASKA COMMUNICATION SYSTEM
ANCHORAGE TOLL SYSTEM
COMMERCIAL TELEPHONE MESSAGES, 1963–1967



Source: ACS Headquarters, Seattle, 1968.

FIGURE 3-52

ANCHORAGE COMMERCIAL TELEGRAPH MESSAGES, 1963–1967



Source: ACS Headquarters, Seattle, 1968.

Figure 3-53 summarizes electrical energy growth in the Anchorage area.

FIGURE 3-53

SUMMARY OF ELECTRICAL ENERGY GROWTH
MATANUSKA ELECTRICAL ASSOCIATION, ANCHORAGE MUNICIPAL
LIGHT AND POWER, AND CHUGACH ELECTRIC ASSOCIATION
1956 to 1965

POWER SYSTEM	KW (1965)	KWH (1965)	AVERAGE ANNUAL GROWTH RATE 1956-1965 KW	KWH
Matanuska	7,904	37,648,000	11.2	12.6
Anchorage	31,992	155,678,000	8.8	9.9
Chugach	49,800	220,630,000	15.6	16.4
Total	89,696	413,956,000	10.5	13.6

Source: *Alaska Railbelt Transmission System* U. S. Department of the Interior, Alaska Power Administration Working Paper, 1967.

Figure 3-54 presents the electric energy consumption for Homer and Seward over the period 1956 to 1964. While Homer shows an eight-year average annual growth rate of 36 percent in power consumption, the city of Seward has averaged only 1 percent annually in kwh consumption.

FIGURE 3-54

SUMMARY OF ELECTRICAL ENERGY GROWTH
HOMER ELECTRIC ASSOCIATION, AND CITY OF SEWARD
1956 to 1964

POWER SYSTEM	KW (1964)	KWH (1964)	AVERAGED ANNUAL GROWTH RATE 1956-1964 KW	KWH
Homer	3,858	22,098,000	32.9	35.9
Seward	1,500	6,464,000	.9	1.0
Total	5,358	28,562,000	24.7	27.7

Source: *Alaska Railbelt Transmission System*, U. S. Department of the Interior, Alaska Power Administration, Working Paper, 1967.

It is anticipated that the isolated systems at Kenai, Valdez, Cordova, Seldovia, and the Copper Valley Electric Association will ultimately be interconnected with other systems of the area. These systems each have their own generating plants operating at relatively high costs. System generating capacity and 1964 loads are presented in Figure 3-55.

FIGURE 3-55

MISCELLANEOUS ELECTRIC POWER SYSTEMS
OF REGION II

POWER SYSTEM	NAME PLATE RATING	1964 LOAD	
		KW	KWH
Kenai	2,650	800*	3,817,700
Valdez	896	480*	2,000,000*
Cordova	2,100	1,100	4,567,310
Seldovia	1,283	570*	2,300,000
Copper Valley	1,200	560	2,915,836

*Estimated.

Source: *Alaska Railbelt Transmission System*, U. S. Department of the Interior, Alaska Power Administration, Working Paper, 1967.

The two large military installations at Fort Richardson and Elmendorf Air Force Base are interconnected, for emergency service only, with the other systems of the Palmer-Anchorage-Kenai Peninsula area by a 34,500-volt tie at the Bureau of Reclamation's Anchorage Substation. The principal generating station at each base operates in conjunction with a steam generating system. The 1965 load of all military installations was in excess of 31,000 kilowatts and 154 million kilowatt-hours. In total, the installations have over 47,000 kilowatts of operable generating equipment. The past requirements for these systems are shown in Figure 3-56.

FIGURE 3-56

MAJOR MILITARY ELECTRIC POWER SYSTEMS
REQUIREMENTS IN REGION II, 1958-1965

YEAR	ANNUAL PEAK KW	ANNUAL USE KWH
1958	25,300	118,416,000
1959	25,300	134,778,000
1960	28,000	133,542,000
1961	29,800	144,140,000
1962	28,200	154,243,000
1965	31,200	154,705,000

Source: *Alaska Railbelt Transmission System*, U. S. Department of the Interior, Alaska Power Administration, Working Paper, 1967.

Figure 3-57 contains selected economic data for Anchorage over the period 1957 to 1966. Note that vehicle registrations increased 83 percent, telephone services 117 percent, and power consumption 191 percent. All indicators shown demonstrate the substantial growth of this dominant economic center.

FIGURE 3-57

SELECTED ECONOMIC DATA

(Anchorage, Alaska)
1957-1966

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	Percent Change From 1957
Vehicle Registration	34,938	33,880	36,577	41,383	44,208	46,468	47,810	55,102	62,210	64,079	+83
Telephones in Service	15,441	16,900	18,200	21,523	23,214	23,253	25,348	27,098	29,687	33,477	+117
Lighting and Power Customers	18,488	18,310	20,026	21,989	22,733	22,518	23,880	25,356	26,370	26,843	+45
Thousand Kilowatt Hours Consumed	124,958	134,842	147,723	167,918	188,107	218,365	245,242	276,886	310,405	363,313	+191
Municipal Water Customers	6,469	6,325	6,660	7,511	8,827	9,609	9,926	9,836	10,788	10,770	+66

Source: *Alaska Review of Business and Economic Conditions*, University of Alaska, Institute of Social, Economic and Government Research, July, 1967.

Figure 3-58 contains additional selected economic data for Anchorage for the period 1957 to 1966. All indicators demonstrate dramatic growth, with real property values and property taxes tripling, and bank deposits and assets about doubling over the period. These data are shown in current dollars.

FIGURE 3-58

SELECTED ECONOMIC DATA, ANCHORAGE
1957-1966
(in thousands current dollars)

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	Percent Change From 1957
Building Permits (Value)	5,677	8,227	15,746	23,375	13,088	18,087	18,080	28,791	19,591	20,079	+254
Assessed Value Real Property	140,158	150,212	139,936	183,981	218,591	243,027	263,273	303,913	474,700	560,156	+300
Assessed Value Personal Property	41,572	45,620	51,418	56,013	55,187	56,528	64,051	82,604	107,537	133,775	+222
Total Assessed Value	181,730	195,832	191,354	239,994	273,778	299,555	327,324	386,517	582,237	693,931	+282
Property Taxes Collected	2,780	3,077	2,139	2,590	3,302	3,657	3,461	5,250	8,076	11,715	+321
Total Bank Assets	n.a.	99,439	102,953	139,696	146,315	184,001	190,312	248,103	275,908	291,714	+193*
Bank Deposits	n.a.	93,334	97,067	130,235	133,625	164,204	174,557	231,282	252,215	263,279	+182*
Bank Loans and Discounts	n.a.	41,150	51,142	64,306	73,320	94,070	100,531	113,020	155,843	157,251	+282*

*Indicates percentage change from 1958.

Source: *Alaska Review of Business and Economic Condition's*, University of Alaska, Institute of Social, Economic and Government Research, July, 1967.

2. ECONOMIC FORCES AND FORECASTS

This section contains a series of analyses of the principal sectors that make up the economy of Region II. These analyses involve both the identification of the key economic forces which will determine the shape of the economic future of the subregion as well as a forecast of their nature and extent in the short-run, intermediate-run, and long-run time frames. As elsewhere in this study the measures of future economic activity are expressed where possible in income, employment, and investment. The sectors (and the discussion of linkages with other regions) are taken up in the order of the previous sections; i.e., Petrochemicals through Power.

A. Oil and Gas

Crude petroleum production in the Cook Inlet Basin reached a daily rate of 175,000 barrels in April, 1968. On an annual basis, this production is worth roughly $180 million. Production has been increasing month by month. During 1967 it rose from 54,000 barrels per day in January to 144,000 barrels in December. Official industry and state estimates indicate that the daily rate of production from known fields will peak in 1970 at between 275,000 and 330,000 barrels per day. If this projection is realized, the annual value of Cook Inlet petroleum production will range between $285 million and $345 million.

Declines in the daily production rate are anticipated after 1970, for the "undersaturated" condition of all the established oil fields normally leads to significant deterioration in the initial production rate of a well shortly after regular production commences. The rate of output from Cook Inlet fields in the years immediately beyond 1970, along with total long-term recovery, will depend upon the magnitude and success of repressurization programs undertaken by the operators.

The major part of development drilling in the known Cook Inlet oil fields will be complete within the next two years. Continuation of development drilling beyond that time will depend on the discovery of new fields. Since the time required to verify the discovery and execute initial stages of new field development probably extends beyond the time required to complete development of the known fields, even the most optimistic projection of such drilling must call for at least a temporary decline to near zero activity in late 1970.

Recent reduction of exploration efforts indicates that this slump may well extend several years beyond 1970. The number of offshore exploration rigs working in Alaska has been markedly reduced, and the acceleration of offshore drilling in California has provided a particular

attraction for rigs formerly available in Alaska. The state's supply of standby stationary rigs is not so acute. Unfortunately, with the one exception of the Swanson River field, on-shore exploration drilling in Southcentral Alaska has been notably unsuccessful.

While production from the known oil fields in the Cook Inlet Basin is confidently expected to peak within several years, the pace of further development of known natural gas fields is more uncertain. Gas demands for power generation, for oil field repressurization, and for domestic purposes will grow; but significant jumps in consumption must come from the addition of petrochemical plants or liquification facilities such as are now under construction north of Kenai. Of the 17 known gas fields in the Cook Inlet Basin, only three are now producing. One inlet platform will be installed this year to develop a gas field for supplying the liquification plant now being built, but no significant development activity on a sustained basis in the gas fields is otherwise anticipated. Discovery of new gas fields at this time should be classified a byproduct of oil exploration rather than a considered objective.

The precise investment by the oil and gas industry is difficult to determine, but the magnitude of the economic impact is not. The State of Alaska's direct income from oil and gas rentals, royalties, taxes and bid bonuses totaled $176 million for the ten year period ending with 1967.

The oil companies employed close to 700 people during 1967; drilling, geophysical, and supply and service firms closely affiliated with the industry employed an additional 1,800, although an unknown percentage of these jobs are a result of activities unrelated to oil and gas. Payrolls totaled $11,430,000 that year; affiliated firms paid $29,925,000. The entire industry paid $9,061,000 in local taxes and those state taxes not included in direct state revenues reported above. It is estimated that the ten year program of the industry for activities in Alaska (including operating costs as well as investment) approached $1,300 million.

The percentage of these expenditures actually made in Alaska is subject to question. A substantial portion of the facility investment charged to Alaska is spent in other states for equipment, facility pre-fabrication, and services. There is also a question regarding the local impact of payrolls disbursed to specialized drilling, construction and service crews who are not permanently domiciled in the state and often are provided both housing and board by the employer.

A question should also be raised as to the ultimate economic impact of the State of Alaska's direct income from the oil and gas industry as compared to the impact of the industry's direct injection of monies into the private sector. The decisions as to how the state disburses the direct

revenues will determine, perhaps, the magnitude of total benefits in Alaska from oil and gas development to an extent equal to or greater than the industry's payments to private individuals and firms in the state. The distribution of the state's direct income as between services, public works and indebtedness servicing (and the types of services and public construction selected) can influence significantly not only the immediate well-being of the state's residents but also the possible rate of improvement in their well-being.[2]

The following discussion of Alaska's oil and gas industry attempts to define more precisely the industry's current status and to project its growth and development. The latter effort is a difficult matter of distinguishing the probable from the possible. The difference appears to be a matter of how many assumptions must be made and the tenability of each assumption. Major assumptions will be explicitly identified, for they relate either to new oil and gas discoveries or to the establishment of new related industry. The primary assumption is that further growth of the oil and gas industry in Southcentral Alaska (Region II) is not only possible but so probable that the characteristics of this growth must be considered not only for the projection of jobs, income and population but also as a basis for establishing wise policy to shape and encourage the growth.

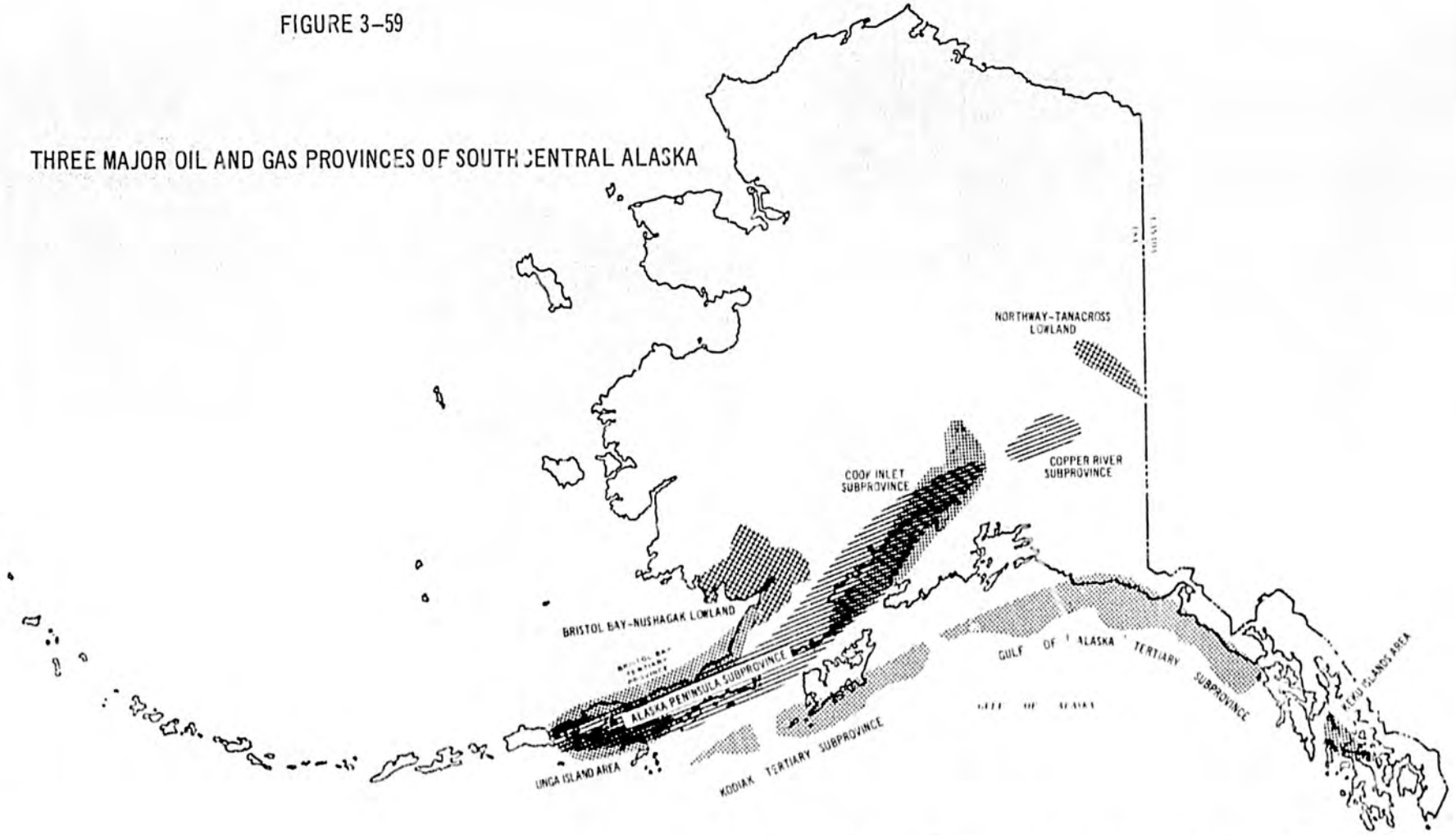
(1) The Oil and Gas History and Location

Oil drilling in Alaska was initiated in 1902. Southcentral Alaska's first major commercial field was located 55 years later at Swanson River on the Kenai Peninsula. Oil had been discovered at Katalla, but the entire output over a 31 year period ending in 1934 totaled only 154,000 barrels. Many of the early wildcat wells found traces of oil, gas, or both, but never in commercial quantities. Indeed, Richfield Oil Corporation's discovery well on Swanson River was fortuitously located, for subsequent development of the field proved the well to be on the northernmost margin of the reservoir.

Southcentral Alaska contains three major gas and oil provinces along its coastal areas and one smaller province inland.[3] The *Alaska Peninsula-Cook Inlet province* ranges from upper Cook Inlet southwest along the Pacific side of the Alaska Peninsula (Figure 3 - 59). It is a long narrow prism about 900 miles in length varying in width from five to sixty miles. The *Pacific-margin Tertiary province* sweeps from Icy Point in Southeastern Alaska past Chirikof Island southwest of Kodiak Island. The area of land and continental shelf in the Pacific-margin province inferred to be underlain by petroliferous tertiary sedimentary rock is approximately 40,000 square miles. The *Bristol Bay Tertiary province* slopes north from the mountainous backbone of the Alaska Peninsula, extending an unknown distance under the bay itself. The area is at least 250 miles long

FIGURE 3–59

THREE MAJOR OIL AND GAS PROVINCES OF SOUTH CENTRAL ALASKA



Source: Gates, Grantz and Patton, Geology and Natural Gas and Resources of Alaska.

FIGURE 3-87

and may be more than 20 miles in width; it probably exceeds 7,500 square miles in area. The inland *Copper River province* is considered to be a part of the rock sequence of the Cook Inlet basin. It lies between the Alaska Range and Chugach mountains on the north and south and is bordered by the Wrangell and Talkeetna Mountains east and west. It is approximately 30 to 40 miles wide and 100 miles long.

The *Cook Inlet subprovince* contains all the state's current commercial oil and gas fields with the exception of the small gas field at Barrow. The subprovince area believed to have petroleum possibilities is five to sixty miles wide and about 250 miles long. The 9,500 square mile area lies approximately 45 percent offshore, 15 percent in tidal areas, and 40 percent onshore. Four of the five Cook Inlet oil fields are located offshore, the one exception being the Swanson River field. The more numerous gas fields have been located on both shores of the Inlet, and in the Inlet itself.

Estimates of proved recoverable reserves of petroleum for the five producing fields totaled 682 million barrels as of January 1, 1968.[4] The comparable figure as of January 1, 1967, was 321 million barrels. These estimates are tied closely to the number of development wells drilled at the time of computation. Completion of scheduled production drilling will further expand these "proved" reserve estimates. Conservative industry estimates of these known fields' ultimate yield range from 1.0 billion to 1.5 billion barrels. Estimates of gas reserves are less meaningful because of the number of shut-in, suspended or abandoned discovery wells. Estimates of just the Kenai gas field's potential yield range up to 3 trillion cubic feet; the ultimate reserve of all gas fields is conservatively placed at five trillion cubic feet.

If future exploration should prove that the northern Cook Inlet oil potential extends from the Forelands to the mouth of the Inlet, the total gas and oil reserves now identified could make up only a fourth of the basin's total reserves; for the relatively unexplored lower Inlet contains roughly three-quarters of the basin's geologically favorable acreage. The chances are favorable that additional large deposits of oil and gas will be discovered when the acreage becomes available for leasing and is subject to intense exploration. An indication of the oil industry's endorsement of this assumption can be found in the record bonus monies received by the state from the 20th competitive oil and gas sale held in 1967. Geologically favorable acreage below the Forelands was bid at very high levels relative to past Inlet experience.

The *Alaska Peninsula subprovince* has been subject to geological study in recent years. Oil and gas seeps are known. Shows of oil, or gas and oil, have been reported from test wells. However, no commercial reserves

have been discovered. It has been suggested that stratigraphic data and exploration experience indicate large accumulations will be relatively difficult to find. Continued investment by the industry in seismic and geophysical work in the Alaska Peninsula subprovince indicates that, despite these lower discovery odds, the prospect of large and prolific reserves being located is still attractive.

The *Bristol Bay Tertiary province* has not yielded to test drilling. Nevertheless, probable petroleum source and reservoir rocks within the province suggest that commercial deposits exist. As in the case of the Alaska Peninsula subprovince, industry has continued its siesmic and geophysical exploration. The state's 21st competitive oil and gas sale, held March, 1968, brought$3 million in bonus bids for approximately 165,000 acres in the Port Moller and Port Heiden offshore areas.

The *Gulf of Alaska Tertiary subprovince* extends from Icy Point on the east to the Copper River delta 300 miles west. The tertiary sedimentary rocks extend inland from 2 to 40 miles and probably out under the Gulf waters to the edge of the continental shelf. The area includes Middleton Island. The land area of the subprovince approximates ,000 square miles, while the offshore area totals about 18,000 square miles. The subprovince has been the subject of intense investigation in recent years because of the many known oil and gas seeps and petroliferous beds and because of the small, but once commercial, Katalla oil field. Recent exploratory drilling has not been successful, for the tertiary structure is complex. Despite this experience, there is abundant evidence indicating that petroleum exists. It is probable that suitable reservoir rocks in favorable structural positions will be found and that commercial deposits of petroleum will be developed.

The *Kodiak Tertiary subprovince* extends southwest from Middleton Island on past the Kodiak Islands. If the Tertiary rocks of the Gulf of Alaska subprovince extend through the Kodiak subprovince, then the Kodiak subprovince area of the continental shelf and marginal islands could approximate 17,000 square miles. It is difficult to evaluate the subprovince's petroleum possibilities. No test wells have been drilled. Outcroppings on the marginal islands expose only a small portion of the total area and do not provide a comprehensive cross section of the province. The areas of outcropping indicate only limited petroleum potential. The major question, then, is whether or not the rock formations of the large offshore areas are more favorable.

(2) Exploration

A key factor in projecting future exploratory drilling is the rate of current geological and geophysical investigation. A recap of total crew months spent each year in Alaska by exploration crews (Figure 3-60) suggests that there has been some reduction in overall effort during the last several

FIGURE 3-60

INVESTMENT OF OIL EXPLORATION CREW TIME IN ALASKA

YEAR	CREW MONTHS
1957	32-1/2
1958	178
1959	231
1960	103
1961	145
1962	142
1963	183
1964	167
1965	109
1966	127
1967	108

Note: Includes geological field parties and seismic, gravity, and aeromagnetic investigation crews.

Source: *Alaska Petroleum Industry Facts*, Alaska Division, Western Oil and Gas Association, 1968.

years but that the rate of investment in exploration is still significant. More precise data as to the concentration of exploration effort by sub-province would provide a much better insight for evaluating the possibility of wildcat drilling.

Another key to overall exploration effort is the rate of wildcat drilling. A recap of Alaska's drilling (Figure 3-61) shows a steady growth trend in the number of wildcat wells over the past ten years. The highest success ratios were recorded in 1965 and 1966. All the discoveries over this period were in the Cook Inlet basin, and all the oil discoveries with the exception of Swanson River were in the Inlet.

But exploratory drilling in Alaska cannot be considered the product of the oil industry's weighing investment costs and probable returns for this state alone. The decisions to drill wildcat wells in Alaska are made only after the industry has evaluated other exploratory prospects across the globe. (Political considerations may weigh as heavily as geological or economic ones.) Competitive drilling opportunities outside Alaska may have more to say about exploration drilling in southcentral Alaska for the next several years than does the level of local geological and geophysical investigation.

There has been a significant withdrawal of offshore drilling rigs from Alaska in the last several years. The California Santa Barbara Channel sale has undoubtedly been one major factor. Figure 3-62 recaps the change in Alaska's drilling-rig inventory. The reduction in offshore exploratory drilling and drilling capability as opposed to the steady increase in development drilling by stationary rigs on platforms suggests that the oil industry has currently reached a stage of consolidation in southcentral Alaska where the primary effort is concentrated in the development of known Cook Inlet fields. Since the world demands for offshore rigs are increasing, and the standby expense of these rigs is high, it is possible that Alaska m even lose more of its offshore drilling capability unless the rig operators secure contracts soon.[5]

But, if adequate and favorable geological information and the availability of appropriate rigs are prerequisites to exploratory drilling, certainly the availability of favorable acreage for leasing is just as important. The Native land-claims "freeze" (treated in detail in Chapter 9), affecting most of the public domain in Alaska, has constricted the amount of upland now available for leasing. A considerable portion of the upland in Southcentral's oil provinces is in the public domain. The major portions of the provinces' offshore area is continental shelf controlled by the federal government. The tidelands under state jurisdiction do include favorable acreage--the most notable case being the upper Cook Inlet--but tideland leases alone may not meet the industry's needs for sizable blocks of land to assure the operator adequate development protection of a new

FIGURE 3-61

EXPLORATORY DRILLING IN ALASKA

YEAR	TOTAL WELLS DRILLED	SUCCESSFUL OIL WELLS	SUCCESSFUL GAS WELLS	DRY HOLES
1957	2	1	0	2
1958	2	0	0	2
1959	6	0	1	5
1960	9	1	2	7
1961	24	3	5	16
1962	24	0	3	21
1963	15	1	1	13
1964	23	1	4	18
1965	19	7	3	9
1966	36	6	5	25
1967	35	1	3	31

Source: *Alaska Petroleum Industry Facts*, Alaska Division, Western Oil and Gas Association, 1968.

FIGURE 3-62

RIGS IN ALASKA

1965	August 3, 1965	
	4	Floaters working
	6	Stationary rigs working (includes one [illegible] on platform)
	18	Rigs idle and stacked
	28	TOTAL
1966	August 2, 1966	
	11	Floaters working
	8	Stationary rigs working (includes three rigs on platforms)
	17	Idle and stacked
	36	TOTAL
1967	August 8, 1967	
	6	Floaters working
	17	Stationary rigs working (including eleven rigs on platforms)
	16	Rigs idle and stacked
	39	TOTAL
1968	January 10, 1968	
	5	Floaters tied up in Homer (one of these departed for California first week in February)*
	21	Stationary rigs working (includes eighteen rigs on platforms)
	20	Stacked and idle
	46	TOTAL

*As of June 5, 1968, one floater was drilling in Cook Inlet while three remained idle.

Source: Alaska Scouting Service Report as provided by Alaska Department of Natural Resources, Division of Mines and Minerals.

discovery. The amount of lands in private ownership is relatively small, and mineral rights upon patent of the land may have been retained by government. It becomes obvious then that government law and policy regarding land leasing have a major infuence on exploratory efforts.

The most attractive acreage in southcentral Alaska is the subject of an ownership dispute between the state and federal government. Until this dispute is finally adjudicated, or some interim escrow provision for lease monies arranged, there will be no test drilling of the large offshore area beyond the three-mile limit which ranges from below Kalgin Island to the mouth of the Inlet. Exploration to determine whether or not "Oil Alley" does extend southwest under the balance of the Inlet is, however, being undertaken on a limited scale. State leases located below the forelands were issued as a result of the 20th competitive sale, which was held in 1967.[6] The total of the winning bids was the highest in competitive sale history, and the highest bid per acre was also registered at that time, despite the elimination of royalty rate reductions once granted for discovery wells in Cook Inlet and the extension of the lease life for new leases to ten years as compared to five years for earlier leases.

Further upland drilling in the north Cook Inlet basin during the next several years should not be ruled out. Mobilization costs are low relative to those for offshore drilling, and the elapsed time and costs for developing a discovery field are often more favorable than for an offshore discovery.

No immediate exploratory drilling can be anticipated in the Gulf of Alaska tertiary subprovince with the exception of the Middleton Island area where both upland and tideland leases are outstanding. The Department of the Interior has indicated it will call for lease nominations for outer continental shelf tracts in the Gulf late in 1968. A sale is tentatively scheduled sometime in 1969. The Alaska Construction and Oil Report noted in its July-August, 1967, issue that the Gulf of Alaska appeared to be the primary interest of that summer's geological field party activity. One offshore seismic survey effort represented 21 companies. Secretary of the Interior Stewart Udall commented recently while in Anchorage that preliminary geophysical work in the Gulf suggested structures "comparable in size to those in the Middle East." At the same time, the Secretary indicated that the difficult operating conditions combined with relatively limited experience in the area would require a long elapsed time between the call for nominations and the actual sale. A comparable elongation of mobilization time can probably be expected between the sale and exploratory drilling. It appears that the State of Alaska has decided that its best interests dictate withholding tidal acreage in the Gulf from competitive bidding until federal leasing plans are more certain. These federal and state restrictions on available favorable acreage, combined with the difficult physical problems

of operating in the Gulf, make it unlikely that any exploratory drilling will occur other than at Middleton Island for several years.

The spot most likely to see exploratory drilling in the Alaska Peninsula and Bristol Bay provinces is that tidal area covered by the state's 21st competitive sale. While the leased areas offshore from Port Moller and Port Heiden are limited in acreage, the sale appears to have renewed or reinforced interest in the exploration of both adjacent federal offshore areas and uplands (despite the Native claim restrictions on the latter). No permits for drilling have been issued to date. Nor has the Department of the Interior indicated that an invitation for offshore lease nominations will soon be issued. However, the combination of industry interest and relative accessibility of the 21st-sale area suggests that some exploratory drilling can be expected in this Bristol Bay tidal area within the next several years.

No announcements have been made regarding further wildcat operations in the Copper River province. However, leasing activities indicate continued interest in the area. As in the case of upland Cook Inlet lands, the availability of stationary rigs and the often favorable cost factors for drilling and development as compared to offshore work will probably lead to further wildcats. Such upland drilling may be attractive to the small independent operator, for experience in Alaska to date indicates that offshore exploration and drilling is too expensive and risky for one independent or several small operators in joint effort.

Exploratory drilling in the Kodiak tertiary subprovince during the next several years appears the least probable for all southcentral Alaska's oil provinces. There is no public information available at this time that suggests exploratory drilling will be undertaken in the Kodiak subprovince until drilling efforts of considerable magnitude have been completed in more favorable areas.

The above comments on exploratory drilling in southcentral Alaska must, of course, be considered in context with the total state exploratory effort. Prior to the recent Prudhoe Bay discoveries, the total exploration budget of the petroleum industry in Alaska could be considered as relatively fixed in the short run. A successful wildcat in one area could create a competitive demand for funds in another, possibly leading to a reduction of exploratory effort in the latter. However, the magnitude of the Prudhoe Bay petroleum reserves, as estimated by the operators, requires a new perspective when considering the petroleum industry's future exploratory and development investment in the state. If the new field's petroleum reserves are of a magnitude several times that of current "proved" Cook Inlet fields, then the industry might well completely recast its investment plans for Alaska. Because the investment sums for further exploring and developing the North Slope will be of such high magnitude, it is probable that the financial effort to meet the new investment demands will be considered quite aside from the exploratory effort in the balance of the state. Rather than diverting

exploratory funds from other areas of the state, the North Slope discoveries should engender a greater interest in other Alaska petroleum provinces. This may be particularly true for those areas considered to have good oil prospects but where exploratory efforts to date have been very limited.

Prior to the Prudhoe Bay discoveries, the possibility of the federal government's opening the Naval Petroleum Reserve No. 4 for commercial operation could have been viewed as a contingent competitive demand on exploratory funds and efforts otherwise available for southcentral Alaska. The proximity of NPR #4 to the Prudhoe Bay field suggests (among other implications) that any opening of the reserve would now engender exploratory and development plans by the petroleum industry which would be above and beyond the industry's normal short range planning for the state as a whole. Authority for opening the Reserve to leasing can now be expected to be sought more actively.

(3) Current Oil and Gas Activity

Total employment by oil companies and affiliated supply and service firms was 2,525 in 1967 as compared to 1,850 in 1966 and 1,160 in 1965. As may be computed from Figure 3-63, the ratio of the supply and service workers to oil company workers rose rapidly in that three-year period from 1.8 to 2.7. This shift reflects the increase in total industry activity to a level which justifies location in Alaska of permanent quarters and staff for firms catering directly to oil companies. It also reflects the growing importance of development drilling.

The major development drilling effort on the known Cook Inlet oil fields will be completed by late 1970. Swanson River is already developed. Figure 3-64 recaps development to date of all Cook Inlet platforms now in place or under construction.[7] Development drilling on the Middle Ground Shoal, on Granite Point and from the monopod should be near completion during 1968. The 1968 overall development drilling rate for Cook Inlet should exceed that for the last several years. This higher drilling activity could continue through 1969 but will taper off as total development of known Cook Inlet oil fields is approached. If the elapsed time from field-discovery date to major development drilling is as long as indicated in Figure 3-64 (i.e., three to five years), then it seems evident that even if another major discovery is made in the Inlet during 1968 it is not probable that development drilling on the new field would be accomplished soon enough to offset the decline which will come in 1970 in the drilling of the know Inlet fields.

(4) Cost Commentary[8]

In view of the fact that both American and Japanese petroleum industry spokesmen frequently highlight the high cost of operation in Alaska, and that the former in particular couple this with warnings about the

FIGURE 3-63

OIL INDUSTRY PERSONNEL AND PAYROLLS IN ALASKA
1965-1967

YEAR	PERSONNEL		PAYROLLS	
	OIL COMPANIES	DRILLING, GEOPHYSICAL SUPPLY & SERVICE CO.	OIL COMPANIES	DRILLING, GEOPHYSICAL SUPPLY & SERVICE CO.
1965	414	749	4,865,125	7,872,000
1966	608	1,242	7,976,533	16,342,721
1967	686	1,834	11,430,476	24,319,254

Source: *Alaska Petroleum Industry Facts*, 1967, 1968, Alaska Division, Western Oil and Gas Association.

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]

[a]Gas field. All other fields shown are oil.
[b]Production drilling substantially completed by early 1969 (estimate).
[c]Placed spring, 1968.
[d]Scheduled 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 minumum $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 3-66) for the southcentral region delivered to Alaska-based processors was 389,979,730 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 Sand Point, 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 form 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 fis .ng 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 quantitities. 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 singificant 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]

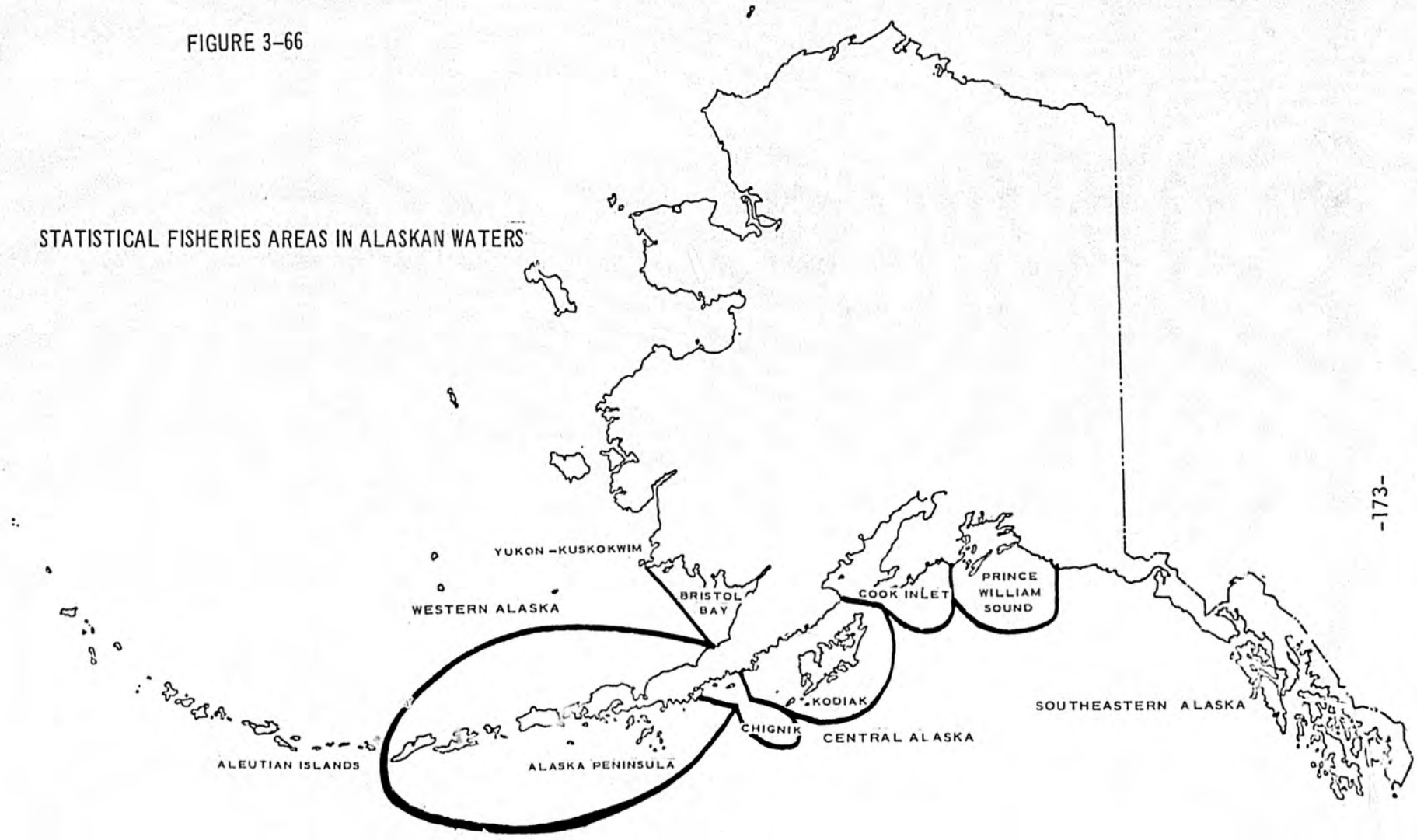
The *Cook Inlet area* can be divided into three separate areas--Upper Cook Inlet, Lower Cook Inlet, and Seward. The Upper Cook Inlet area is centered about Kenai and produces a salmon pack throughout the season, extending from the 9th of July to mid-August. Two major packers operate on the Kenai River 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	309,676
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	58,106,680	--
1964	19,629,819	48,6[illegible]70	--
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) Forecasts[30]

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 communitied 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 under-utilized 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 faciliteis 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	57	58
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
Demand	(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
Supply						
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%

Forest Production	Unit	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 writer[42] 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 Employment	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	14.9
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 Decmeber 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: Matanuska-Susitna	Kenai	Northeast Kodiak	Total Region II
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	81,480	34,375	122,193	238,048
	1,163,990	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	Kenai	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	tons	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	Kenai	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 Umnak 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	10,700	13,250	12,000	15,100	13,200	16,250	16,700	20,600
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 mady 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 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, than 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 take $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, McComick 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 Vactioner	$13.9	76%	$21.4	74%
Tour Tourist	3.8	21%	7.3	25%
Cruise Tourist	0.5	3%	0.3	1%
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)
To and From Alaska			
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 mile[d]			6.8
Routes Outside Alaska			
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 mile[d]			5.3

[a]Coach or comparable fares.
[b]Also a special rate of $75, not comparable to coach.
[c]Also a special rate of $80, not comparable to coach.
[d]Weighted 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 eocnomy. 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	10.7	11.9	12.9
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 Sector[64]

(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. Northbound 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 interntional 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 Pensinsula, 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 deomonstrate 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 eocnomic 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 manyfold 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 fo 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 inthe 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 ot 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 likewsie 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 kilwoatt-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-statin 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 [illegible] 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 sect r 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 prusued, 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

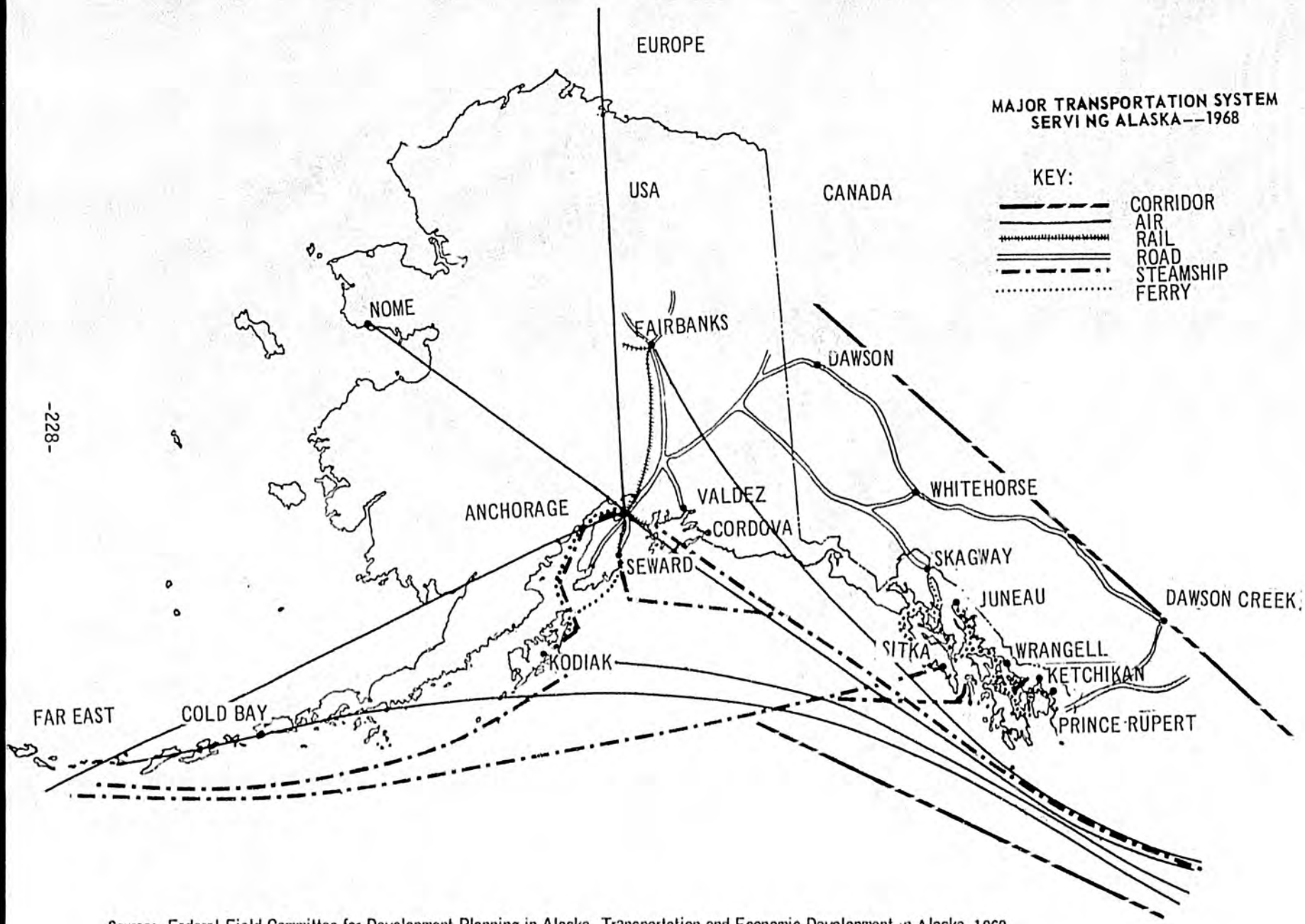
As has been seen, southcentral Alaska contains the present economic heartland of the state by almost any measure. The core of self-sustained economic activity--the only real growth area of any size--is located here. The present dynamic forces of development are embraced most specifically in the Cook 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 southeast 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.

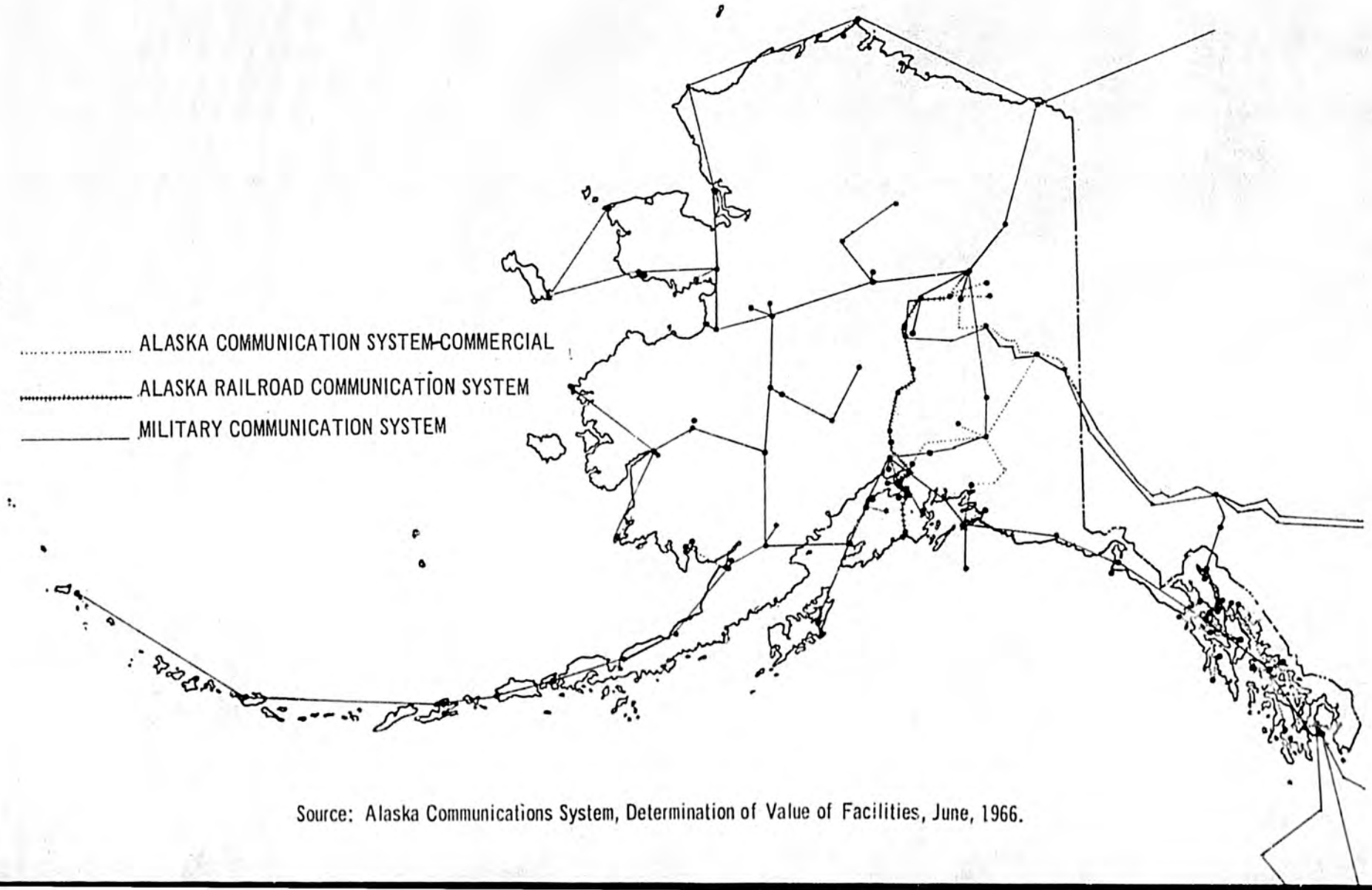
When Alaska's presently fragmented electric power facilities are rationalized into an efficient grid system, the interties from generation to transmission to distribution will be of greatest importance to the reduction of power charges throughout the Railbelt region (Regions II and IV).

Real estate, banking, and insurance enterprises emanate from Region II. The practice of branch banking (Figure 3-88) is a force for interregional 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.

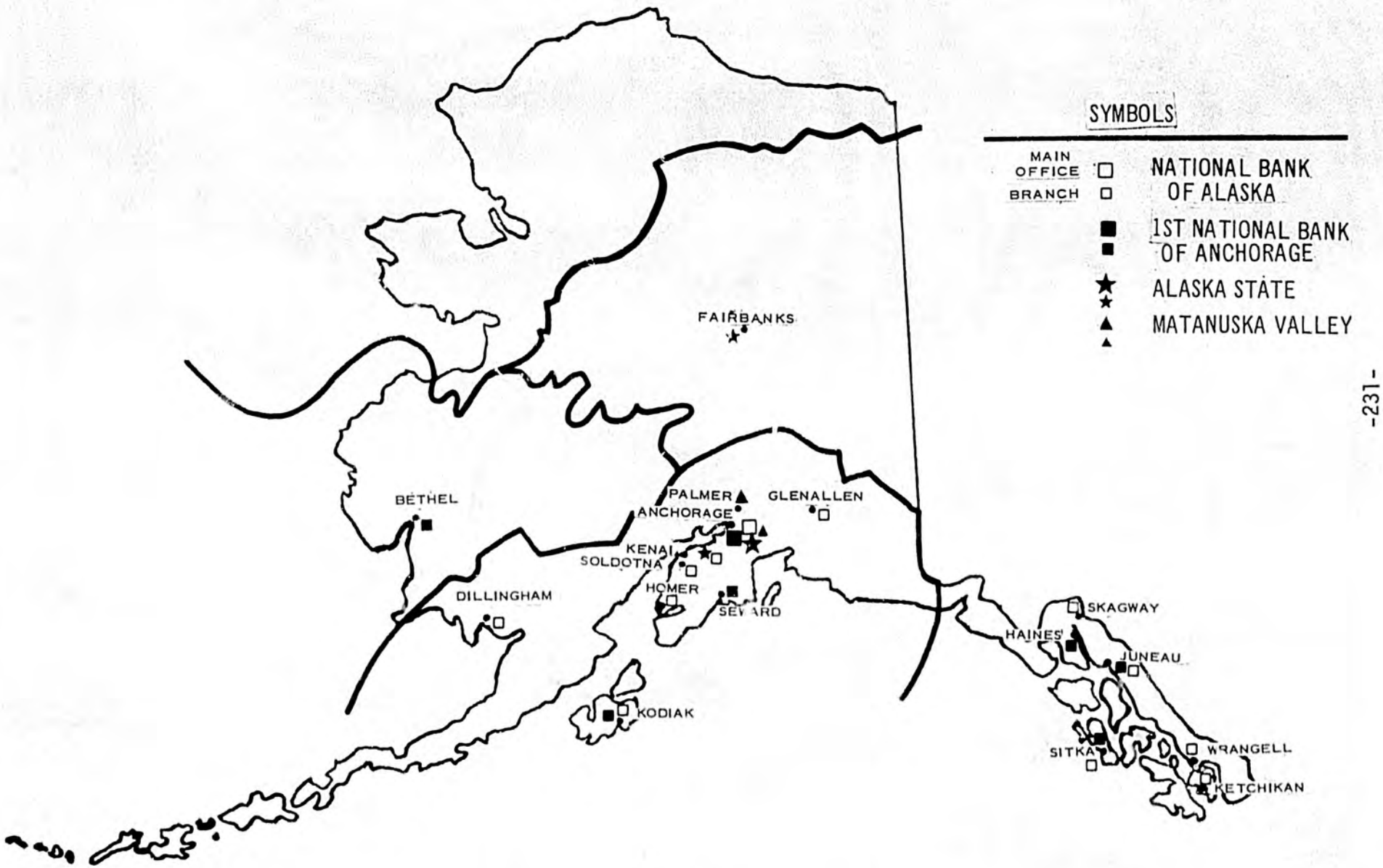
COMMUNICATION NETWORKS
1967



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:

Total regional activity = f(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		X Base
	Government, Military	Gm
	Government, Federal Civilian	Gfc
	Mining	Mi }
	Manufacturing	Ma } = P
Distributive		DIST
	Transportation, Communications, and Public Utilities	TCPU
	Finance, Insurance, and Real Estate	FIR
	Wholesale-Retail	W-R
	Services	SER
Supportive		SUPP
	Distributive Sector	DIST
	Contract Construction	CC
	Government, State and Local	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 ($t = -C.22$) 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 comparision 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, foresty, 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 employent 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 poin 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 prodution., 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 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 196[illegible]

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, Junea, 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 polution 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.

45. Forest Products Task Force of the Federal Field Committee for Development Planning in Alaska, *Alaska Forest Resource Inventory Project*, March, 1968.

46. Johnson to Jones, *op. cit.*

47. This analysis ignores the possibility of a change in the round-log export prohibition as it relates to Region II. No analysis has yet been done on the various effects that might flow from such a change.

48. Alaska Department of Natural Resources, Division of Agriculture, *1967 Alaska Agricultural Statistics*, and U. S. Department of Agriculture, Palmer, Alaska.

49. Transportation Task Force of the Federal Field Committee for Development Planning in Alaska, *Transportation and Economic Development in Alaska*, 1968, p. 28.

50. U. S. Department of the Interior, Bureau of Reclamation, *Livestock Industry in Alaska: Possibility of an Integrated Livestock Industry on Kenai Peninsula, Kodiak, and Adjoining Islands*, Juneau, Alaska, 1967.

51. Tussing, *op. cit.*, p. 74.

52. *1967 Alaska Agricultural Statistics, op. cit.*

53. *Ibid.*

54. Howard Walters, Production Manager, Matanuska Maid Dairy, in a telephone conversation, July 11, 1968.

55. *1967 Alaska Agricultural Statistics, op. cit.*

56. Leigh H. Hammond, *et al.*, *The Feasibility of Producing and Processing Certain Vegetables in Southeastern North Carolina*, Economic Research Report, Department of Economics, North Carolina State University, Raleigh, North Carolina, 1967.

57. Tussing, *op. cit.*, Part VIII.

58. There will also be forces at work which may cancel out any increased demand derived from either within the state or outside of Alaska; e.g., transportation advances and wage increases in other sectors of the economy may rise (hence, farming would become a less attractive source of employment).

59. Discussions following the proposal of the Rampart Dam indicate what a sizable impact man-made change can have on the physical environment.

60. For some specific recommendations as to what form this cooperation might take, the reader is referred to Jerome R. Saroff, *Alaska Recreation & Government Policies*, prepared for the Federal Field Committee for Development Planning in Alaska, 1967; and also Cresap, McCormick, and Paget's recently completed study, *A Program for Increasing the Contribution of Tourism to the Alaskan Economy*.

61. See for instance the survey reported in *Traveler's Profiles*, Alaska Department of Economic Development and Planning, 1964, p. 52.

62. Imposition of a travel tax to relieve pressure on the U. S. gold supply could *temporarily* alter this situation.

63. According to the Civil Aeronautics Board, the 29 percent reduction in fares between Anchorage and Seattle lead to a 100 percent increase in passenger travel between the two cities.

64. Much of this analysis is freely drawn from the recent Federal Field Committee publication, *Transportation and Economic Development in Alaska*, prepared by the Transportation Task Force of the Federal Field Committee, 1968.

65. A balanced view requires a realistic appraisal of how spatial analyses bear on Alaska as well as the recognition of some of the distinctive limitations of transport planning. The state enjoys (and must capitalize on) a prime position on the Polar air (and perhaps undersea) routes of the world; the crossroads between Europe, northeastern United States, and Asia; and the shipping lanes along the northwest Pacific Rim. Yet its "corner area" remoteness from traditional United States markets and mainstreams of commerce places Alaska at some disadvantage locationally.

66. The impact upon the transportation system for the more isolated processing plants along the Alaska Peninsula and the Aleutian Chain has been less significant, for the reduction in seasonality has been less evident and the increases in total tonnages relatively small for individual ports. The Kimbrell-Lawrence Transportation Company is preparing an additioanl vessel to service processing plants from Cook Inlet to the Aleutian Chain. The new ship will have a much larger capacity than the firm's existing vessel for northbound commodities as well as for southbound frozen and canned fish products. The new vessel will be an addition to the Kimbrell-Lawrence and Alaska Steamship fleet currently serving the area.

67. Air freight can, of course, be used effectively where other transportation modes do not exist at all or are available for only a part of the year. The movement of fresh salmon by charter cargo planes from isolated Arctic and Bering Sea fisheries appears feasible. Anchorage could be the point of transshipment or delivery for further

processing, or the salmon could move directly to the U. S. fresh-fish markets. Backhaul of salmon from outlying points of supply via certificated air carriers could also be utilized, provided the carriers offer incentive rates and dependable service.

68. King Salmon has been served seasonally by Western Airlines. The runway is adequate for jet service, but a new apron is required to serve not only the Western Airlines jets but also those of Wien Consolidated Airlines. There are no firm state plans for the programming of this work.

69. That the State of Alaska is at least partially ready for a shift from the traditional "connecting-of-cities" approach to one of "opening up the country" is evidenced in the considerable and broad planning it is now devoting to the possible construction of a developmental trunk road in southwestern Alaska, crossing the Alaska Peninsula from Iniskin Bay in the lower Cook Inlet to Bristol Bay by joining onto the Naknek-King Salmon road. The road would skirt the state's largest lake, providing access to the scenic northeastern end of Iliamna and surrounding Lake Clark as well as allowing motorists by a branch road to reach Katmai National Monument, an attraction made famous by National Geographic Society but until now barely visited. Metallic mineral deposits have been proven, fisheries and wildlife abound, but perhaps the greatest resource of the area is its wilderness character. The road could be integrated into the southcentral highway system at Homer by means of the state ferry system which would make the trip across Cook Inlet from Iniskin Bay, thus breaking the surface remoteness of the Bristol Bay communities with the economic heartland of the state. Another possibility, of course, in the longer term would be the construction of a road down the west side of Cook Inlet with perhaps a crossing of Knik Arm out of Anchorage. The whole matter could be hastened toward resolution if significant oil development should be indicated for Bristol Bay.

70. Portions of this section draw on the unpublished study, still in progress, by the Federal Power Commission, entitled, *Alaska Power Survey*.

71. *Ibid.* Utility and nonutility capacities are about equally divided in southeastern Alaska. The nonutility percentage is 86 in northwest and southwest Alaska combined and is 76 percent in interior Alaska. Data are for 1965.

72. *Ibid.* In 1965 there was approximately 559,000 kw of electric generating plant capacity located throughout the five Alaska geographic study areas. Of this, the capacity in all utility plants is about 240,000 kw. Of the remainder about 261,800 kw is installed on military bases and at communication centers. Of Alaska's total plant capacity, the largest part (about 250,000 kw) is located in the southcentral area around

Anchorage and on the Kenai Peninsula. Of this capacity, about 151,700 kw is in generating plants of the utilities. The next largest concentration of plant capacity (some 155,400 kw) is located around Fairbanks in the Interior area. Of this, about 35,200 kw is in generating plants of the utilities.

73. *Ibid.*

74. *Ibid.* An analysis of this subject (prepared in conjunction with the Federal Power Commission study) is under way, entitled, *Alaska Railbelt Transmission System*, by the Alaska Power Administration, Juneau, Alaska. Portions of the following discussion draw from this unpublished and uncompleted study.

75. The two military installations at Anchorage tie into this system for emergency service only.

76. *Alaska Power Survey, op. cit.*

77. *Ibid.*

78. *Ibid.* The lowest projected increase is for the southwestern Alaska area--6 to 7 percent annually over the period.

79. For a discussion of the possibilities of power cost reductions through changes in natural gas pricing practices see Arlon R. Tussing, *et al., op. cit.*, pp. 59-62.

80. *Alaska Power Survey, op. cit.* In the Interior area it is expected that hydro generation will supply about 70 percent of the required load in 1985 with thermal power supplying the remaining 30 percent. In 1965 thermal power provided 93 percent of the kilowatt-hour requirements of this area. In the Northwest and Southwest areas no electric energy was produced by hydro power in 1965. Although there are several potential hydroelectric sites in these two areas, due to the small scattered load centers, the terrain and climatic conditions, it is expected that in 1985 the power generated will still be by fuel oil. Hydro power will supply about 87 percent of the Southeast area load requirements in 1985 with thermal plants fired by oil furnishing the remaining kilowatt-hour requirements. In the Southcentral area hydro power is expected to supply about 30 percent of the kilowatt-hour requirement for 1985. This area will require 83 percent of the total fuel requirements for the State of Alaska in 1985.

81. Standard Oil Company lists posted prices of diesel oil at 14.9 cents per gallon in San Francisco, 24.8 cents per gallon at Juneau and Ketchikan, and 26.2 cents per gallon at Anchorage. These prices are usually bettered, however, when quantity purchases are made. Ketchikan

Utilities reports paying about $6 per barrel (14 cents per gallon) in 1966, but Golden Valley reports a cost of $8.30 per barrel at Fairbanks and $10.42 at Nenana. These prices amount to about 21 and 26 cents per gallon. Thus, transportation has increased the cost of diesel oil at Fairbanks by nearly 50 percent and a Nenana by almost 100 percent over Ketchikan prices. Of course, this is not to suggest that transportation charges are entirely contolling in the price and routing of fuel supplies; lines of credit and marketing patterns of long standing are other significant factors worthy of mention. Federal Field Committee for Development Planning in Alaska, Transportation Task Force study, *Transportation and Economic Development in Alaska,* 1968, p. 79.

82. Parts of this analysis are drawn directly from recent Federal Field Committee analyses of the Alaska Communication System and the present disposal action.

83. Alaska Communication System Headquarters, Seattle, 1968.

84. *Ibid.* This performance was made possible by growth in the number of messages (Anchorage) over the same years of 11 percent, 18 percent, and 25 percent.

85. At this writing the extension of new minimal telephone service to 42 villages in western Alaska is being actively considered by ACS. Advances for the bush area, like educational television, seem not to be on the foreseeable time horizon.

86. The same result could be reached if the municipalities were fully committed to lower charges and upgraded service to subscribers. Struggles over interconnecting charges and the division of revenues between the long-lines carrier and the exchanges are not the proper focus: the total charges paid by the Alaskan public for telephone and telegraph service are. Conceivably, lower charges might be arrived at by the long-lines carrier while total charges remained as high as ever because a municipality attempted to "protect its receipts." The history of local governments' using their telephone exchanges as tax instruments is almost an unbroken one.

87. A good discussion of the following points is found in Steven J. Weiss and Edwin C. Gooding, *Estimation of Differential Employment Multipliers in a Small Regional Economy*, Research Report to the Federal Reserve Bank of Boston, No. 37, November, 1966, pp. 10-13.

88. The notion is valid to the extent that, for a particular industry, regional factor costs, technology, and productivity are roughly the same as for other regions. On the other hand, it makes little sense to attempt to diversify a regional economy when the result is the creation of inefficient and noncompetitive producers.

89. The Alaska subregions contain many examples of situations where the above considerations have been real deterrents to growth of the export base. Lack of adequate transportation facilities is frequently cited as a prime barrier to the development of various resource potentials. Kobuk copper and various forest-product projects might be cited as cases in point. The high cost of long-distance communications is a deterrent to commercial activity. Problems with economies of scale and frequency of transportation service are obstacles to development of competitive sheep or cattle operations in the Aleutian Chain. In any event, consideration of the supportive sectors of Alaska's regions is of more importance than may be the case in other regional studies.

90. There are certain modifications that need to be made to this classification of the distributive sector. Data are not available in sufficient detail to quantify the magnitudes involved, but it is evident that some part of the distributive sector is engaged in export activity. Examples of this might include long-lines communications from other regions through Anchorage, the role of Anchorage as a wholesale distribution center to other regions, and the provision of medical services to the rest of Alaska.

91. Before the theory can be empirically utilized certain additional assumptions are necessary. The first deals with the explicit functional form of the relationship. Generally, a linear relationship is postulated to exist. Hence, the theory can be stated as,

$$TRA = a + b(EBA),$$

where TRA = total regional activity, EBA = economic base activity, "a" = a constant term, and "b" = the multiplier. The assumption of linearity in effect asserts that a stable, proportional relationship exists between total economic activity and economic-base activity. The linearity assumption also implies that all relevant technological relationships remain constant. If this is not the case then the constant term and/or the multiplier may change. In the presence of less than full employment of resources (particularly capital), the multiplier may overstate the effect of changes in the economic base (especially in the short run). On the other hand, assuming a linear relationship between export activity and total regional activity facilitates the quantitative handling of Region II and should not seriously distort reality in the short run.

92. The equations and calculations are as follows:

$$(1)\quad DIST = -61.58 + 0.89\ X\ Base \qquad r = 0.8957$$
$$(0.147)$$
$$t = 6.045$$

(2) SUPP = -111.51 + 1.58 X Base r = 0.9405
(0.191)
t = 8.286

93. These multipliers were used with full awareness of their faults mentioned above (p.235). A fundamental assumption of the projections, therefore, is that the progress of import substitutions, the increase in fiscal transfer from the federal to state and local government, and the private investment accelerator, will have the same relative weight in total economic activity they had in the 1955-1965 period. Since this is a highly optimistic assumption, the projected figures for the distributive and support sectors are probably rather high.

94. Weiss and Gooding, *op. cit.*, pp. 29-31.

95. The following results were obtained:

(3) DIST = -7.62 + 0.81 Gfc + 1.73 P Mult. r = 0.9715
(0.257) (0.404)
t + 3.15 t + 4.28

(4) SUPP = -30.0 + 1.9 Gfc + 2.0 P Mult. r = 0.9489
(0.581) (0.913)
t = 3.29 t = 2.16

96. The following results were obtained:

(5) TCPU = 8.80 + 0.09 Gfc + 0.57 P Mult. r = 0.8888
(0.131) (0.205)
t = 0.661 t = 2.79

(6) FIR = -6.00 + 0.13 Gfc + 0.16 P Mult. r = 0.9828
(0.024) (0.038)
t = 5.48 t = 4.17

(7) W-R = 0.00 + 0.29 Gfc + 0.65 P Mult. r = 0.9592
(0.115) (0.038)
t = 2.53 t = 3.62

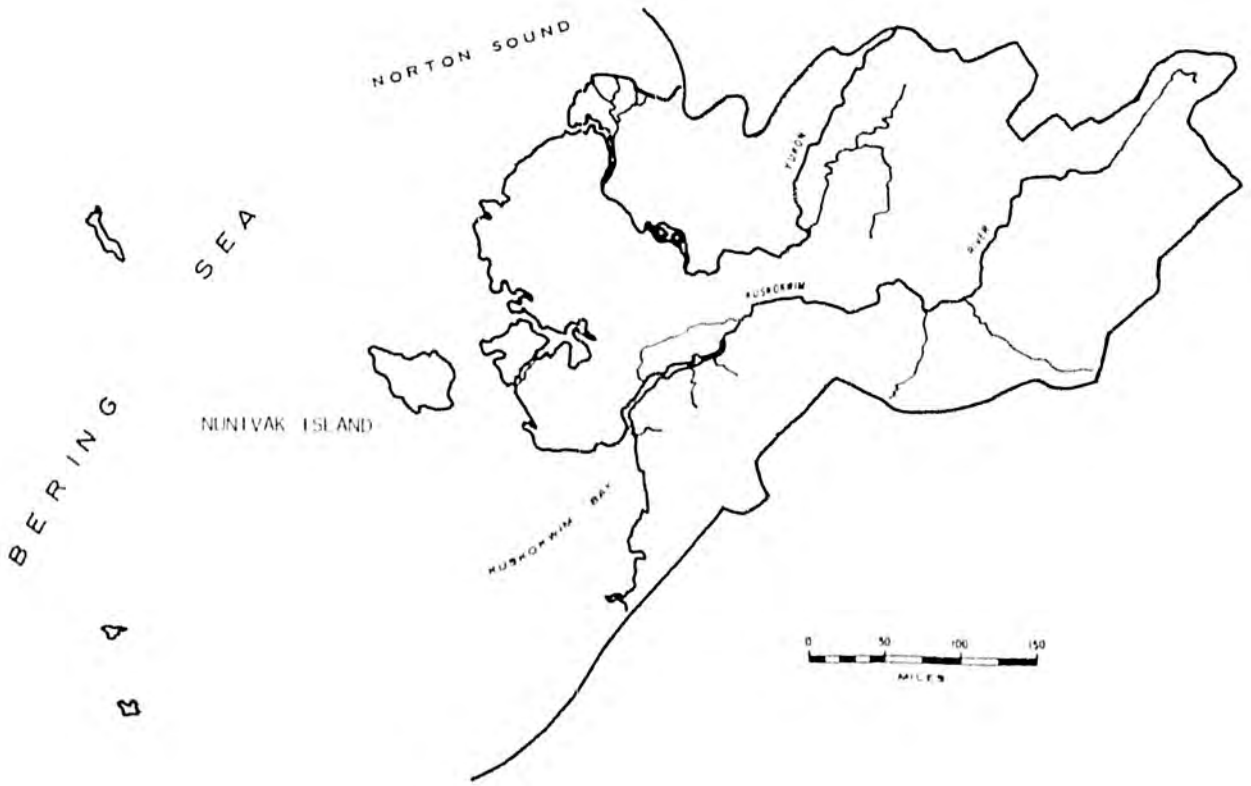
(8) SER = 10.45 + 0.30 Gfc + 0.35 P Mult. r = 0.9612
(0.083) (0.130)
t = 3.64 t = 2.68

97. Weiss and Gooding, *op. cit.*, pp. 37-39. Military activity in Region II is, of course, largely dominated by two large bases in the Anchorage area (Elmendorf Air Force Base and Fort Richardson). Both are largely self-contained units providing for most of the needs of the personnel.

Other studies also have found that the military employment multiplier can be significantly lower than for other types of export activity. In another study on Alaska it was concluded that for the post-1955 period, and particularly in the post-statehood period, the statewide military expenditure multiplier has been so weak as to be statistically nonidentifiable. The implication of the above is, of course, that the leakages from defense spending, both from Region II and from the state as a whole, are extremely high. See Robert C. Haring's "The Employment Multiplier Impact of Defense Spending in Alaska," *1966 Papers of the Regional Science Association--Western Section*, Institute of Social, Economic and Government Research, University of Alaska, College, Alaska, 1966, pp. 130-134.

SUBREGION III

Kuskokwim Area



CHAPTER 4

KUSKOKWIM--REGION III

1. DIAGNOSTIC CHARACTERISTICS OF THE REGION

Region III consists of the entire drainage of the Kuskokwim River together with that of the lower Yukon River plus Nunivak Island. Its 98,116 square miles are bordered on the east by the Mt. McKinley massif, but the population is concentrated in the western half of the region in the low, treeless *akola* of the Yukon-Kuskokwim delta. Temperatures in the interior, near McGrath and Lake Minchumina, typically range from -55° to +85° F., and in the delta and along the coast between -30° and +70° F. The region experiences storms, precipitation, high winds, and fogs the year round.

A. Population and Labor Force

The 1960 Census figure for resident population of the region was 10,966, of whom 9,660 were enumerated as Alaska Natives.[1] The population in 1967 was between 13,000 and 14,000, of which approximately 12,000 were Alaska Natives. Because of difficulties in enumerating the widely dispersed, highly migratory population, even the Census figures can be considered reliable only as indicators of orders of magnitude. Bureau of Indian Affairs annual estimates of the population of individual Native villages are reasonably reliable, but U. S. Bureau of the Census and State of Alaska figures for the non-Native population since 1960 are believed to be highly suspect. Figure 4-1 compares various population estimates for the region between 1929 and 1967. The State of Alaska Department of Health and Welfare figures show a more than threefold increase in the number of non-Native civilians since 1960--the authors simply do not know where these persons could possibly be. There is no evidence from employment data or from the appearance of the villages that there has been any increase in the non-Native civilian (or, for that matter, military) population. The virtual abandonment of the mining districts in the eastern part of the region has been offset by some growth in Bethel, but the relative numbers remain a matter of conjecture.

According to the estimates in Figure 4-1, more than 87 percent of the resident population in 1967 were Natives. About nine-tenths of these are Southern, or *Yupik*-speaking Eskimos; the remainder are *Ingalik* Athapascan Indians. About 1,750 persons live in Bethel, the largest settlement, main port, and center of government. The rest are scattered in about 45 smaller settlements along the rivers and the Bering seacoast. Figure 4-2 lists the settlements of Region III in order of their estimated 1967 population.

FIGURE 4-1

POPULATION OF REGION III, 1929-1967

YEAR	SOURCE	RESIDENT POPULATION TOTAL	NON-NATIVE	NATIVE	MILITARY	RESIDENT CIVILIANS TOTAL	NON-NATIVE	NATIVE
1929	Census	7,498						
1939	Census	7,739						
1950	Census	8,290						
1960	Census[a]	10,966	1,306	9,660[c]	348	10,618	(958)	(9,660)
	Ak Dept H & W	11,000	1,300	9,770				(9,700)
1961	Ak Dept Labor	11,663			348	11,319		
	Ak Dept H & W	11.700	1,600	10,100				(10,100)
1962	Ak Dept Labor	12,997			350	12,647		
	Ak Dept H & W	12,400	2,000	10,400				(10,400)
1963	Ak Dept Labor	12,939			350	12,589		
	Ak Dept H & W	13,100	2,300	10,800				(10,800)
1964	Ak Dept Labor	13,254			350	12,904		
	Ak Dept H & W	13,900	2,800	11,100				(11,100)
1965	Ak Dept Labor	14,481			330	14,151		
	Ak Dept H & W	14,700	3.100	11,600				(11,600)
1966	Ak Dept Labor	15,351			470	14,881		
	Ak Dept H & W	15,400	3,500	11,900				(11,900)
	H. P. Gazaway	12,921	1,800	11,061				(11,061)
1967	Ak Dept H & W	15,900			500	15,400	3,200	12,200
	BIA-FFC[b]	12,628	787	11,841				(11,841)
	Our Estimate[d]	13,700	1,700	12,000	500	13,200	1,200	12,000

Note: Region is Bethel, Kuskokwim and Wade-Hampton Districts; in census years before 1960, add to these

FIGURE 4-1 (Continued)

Innoko, Mt. McKinley, and Otter Districts, plus Anvik and Holy Cross villages from Nulato District, and Mekoryuk and Cape Nash villages from Cape Nome District.

[a]Alaska Department of Labor uses Census enumeration for 1960, U. S. Bureau of the Census estimates for subsequent years.
[b]Population of places with 25 or more Natives.
[c]"Indians" and "Other Races" (....than white, Negro, Japanese, Chinese and Filipino).
[d]Rounded to hundreds from Figure 4-2.

Figures in parentheses are for comparison and assume no Natives in armed forces.

FIGURE 4-2

VILLAGE POPULATION ESTIMATES, REGION III

VILLAGE	OLD ELECTION DISTRICT	CULTURE	1967 POPULATION BIA-FFC ESTIMATES			1966 GAZAWAY TOTAL	U.S. CENSUS POPULATION		
			NON-NATIVE	NATIVE	TOTAL		1960	1950	1939
Bethel	16	E-W	220	1,530	1.750	1,600	1,258	651	376
Hooper Bay	24	E	23	531	554	540	460	307	299
Alakanuk	24	E	10	437	447	385	278	140	61
Chevak	24	E	12	400	412	380	315	230	43
Mountain Village	24	E	18	394	412	352	300	221	128
Kwethluk	16	E	14	388	402	375	325	242	186
Nunapitchuk	16	E	9	382	391	405	327	125	121
Emmonak (Kwiguk)	24	E	9	405	414	375	358	67	42
Kwigillingok	16	E	7	330	337	363	344	245	146
St. Mary's (Andreavsky)	24	E	33	297	330	295	225		
Akiachak	16	E	12	299	311	310	229	179	156
Quinhagak	16	E	7	304	311	263	228	194	224
Mekoryuk	16	E	9	301	310	266	242	156	
Kipnuk	16	E	3	281	284	267	221	185	144
Napakiak	16	E	4	275	279	254	190	139	113
Pilot Station	24	E	6	267	273	260	219	52	39
Holy Cross	17	I	19	241	260	235	256	157	226
Tununuk	16	E	3	244	247	236	183	112	65
Kotlik	24	E	8	237	245	160	57	44	35
Aniak	17	E	55	185	240	240	308	142	122
Kasigluk	16	E	3	227	230	235	224	111	66
Tooksook Bay	16	E	2	213	215	180	new		
Goodnews Bay (Mumtrak)	16	E	6	203	209	185	154	100	
McGrath	17	W-I	100	100	200	250	241	175	138
Eek	16	E	4	193	197	200	200	141	170

FIGURE 4-2 (Continued)

VILLAGE	OLD ELECTION DISTRICT	CULTURE	1967 POPULATION BIA-FFC ESTIMATES NON-NATIVE	NATIVE	TOTAL	1966 GAZAWAY TOTAL	U.S. CENSUS POPULATION 1960	1950	1939
Scammon Bay	24	E	2	188	190	163	115	103	88
Napaskiak	16	E	5	183	188	215	154	121	167
Tuntuliak	16	E	2	181	183	165	144	68	
Akiak	16	E	6	173	179	155	187	168	209
Tuluksak	16	E	4	172	176	160	137	116	88
Lower Kalskag	17	E	6	163	169	145	122	88	
Kalskag	17	E	3	164	167	152	147	139	76
Shageluk	17	I	6	159	165	175	155	100	92
Grayling (Holikachuk)	17	I	14	141	155	130	122	98	77
Russian Mission	24	E	4	146	150	128	102	55	34
Stony River (Moose)	17	I	14	131	145	117	75		
Chefornak	16	E	8	135	143	146	133	105	
Marshall (Fortuna Ledge)	24	E	12	130	142	110	166	95	91
Newtok (Keyaluvik)	16	E	2	129	131	135	129	69	
Sleetmute	17	E	10	117	127	149	122	120	96
Anvik	17	I	10	115	125	120	120	99	110
Sheldon Point	24	I	0	117	117	111	125	43	
Nikolai	17	I	3	112	115	119	85	88	
Nightmute	16	E	6	104	110	103	237	27	78
Platinum	16	E	27	53	80	69	43	72	45
Crooked Creek	17	E	4	75	79	113	92	43	48
Oscarville	16	E	3	52	55	46	51	27	11
Russian Mission	17	E	0	50	50	40			
Kongigonak	16	E	2	47	44				
Pitkas Point	24	E	1	40	41	52	28	84	50
Hamilton	24	E	15	20	35	30	35	43	4
Georgetown	17	I	2	30	32	29			
Lime Village (Hungry)	17	I	0	25	25	27		29	38
Red Devil	17	W	10	15	25	25	152		
Medfra	17	W	10	15	25	25		25	

FIGURE 4-2 (Continued)

VILLAGE	OLD ELECTION DISTRICT	CULTURE	1967 POPULATION BIA-FFC ESTIMATES NON-NATIVE	NATIVE	TOTAL	1966 GAZAWAY TOTAL	U.S. CENSUS POPULATION 1960	1950	1939
Chaneliak	24	W			30	93	100	93	
Flat	17	W			50	27	95	146	
Nyac	16	W			35	54	64	33	
Farewell	17	W			25				
Ophir	17	W				68	68	84	
Takotna	17	I				40	42	70	
Chakaktolik	24	A				32	98	60	
Napaimute	17	A				10	44	75	
Kashegelok	17	A				5			
Akulurak	16	A					197	162	
New Knockhock	24	A					122		
Nanvarnaluk	16	A					116		
Umkamute	16	A					99		
Chukfaktulik	16	A					59	34	
Checking	16	A					54	55	
Chiftak	16	A					50		
Nash Harbor	16	A					49		
Nunachuk	16	A					44	17	
Paingakamiut	16	A					44		
Nilikluguk	16	A					40		
Takshak	24	A					39	18	
New Hamilton	24	E					27	25	
Okogamute	24	A					27	29	
Parks	17	A					11		
Cape Newenham	16	M	#	#	#				
Cape Romanzof	24	M	#	#	#				
Sparrevohn	17	M	#	#	#				
Tatalina	17	M	#	#	#				

FIGURE 4-2 (Continued)

VILLAGE	OLD ELECTION DISTRICT	CULTURE	1967 POPULATION BIA-FFC ESTIMATES NON-NATIVE	NATIVE	TOTAL	1966 GAZAWAY TOTAL	U. S. CENSUS POPULATION 1960	1950	1930
ENUMERATED ABOVE			787	11,841	12,628	11,904	10,449	7,629	5,553
OTHER PLACES			900*	200*	1,100*	1,017	517	661	2,186
TOTAL			1,687*	12,041*	13,738*	12,921	10,966	8,290	7,739

*Our estimate.

# = Military and non-Native Department of Defense and contractor employees living on military installations included in "OTHER PLACES."
A = Abandoned.
E = *Yupik*-speaking Eskimo.
I = *Ingalik* Indian.
M = Military.
W = Non-Native.

Figure 4-3 shows the number of births and deaths attributed to residents of the region by the Alaska Department of Health and Welfare between 1960 and 1966. The peculiar age-sex composition of the non-Native minority (a preponderance of young, adult males), together with the unreliability of current population figures for this group, make it difficult to deal with its characteristics in terms of birth and death rates. In any case, changes in the non-Native population are determined by employment opportunity, rather than by vital statistics. The Native population[2] between 1960 and 1967 showed an overall annual increase of 29.5 per thousand.[3] Figure 4-4 gives estimates of the composition of this increase between 1960 and 1966. The crude birth rate of 47.2 is among the highest in the world, but there has been a marked drop since 1964, apparently as a result of the widespread introduction of intrauterine devices. The total death rate was not much higher than that of the total United State population, so that the annual rate of natural increase over the same period was exceptionally high. 36.4 per thousand.[4]

Natural increase of population was partially offset by migration of young adults from the region. We have no firm information on the distribution of outmigrants, but Dillingham and Anchorage are important recipients. One result has been a relative decline in the number of working-age adults. In 1960, persons 15 to 39 years of age comprised 34.8 percent of the non-white Census population, compared with 42.5 percent for the total population of Alaska. The Bureau of Indian Affairs estimates in Figure 4-9 suggest that the proportion of this age group in the region's Native population was less than 30 percent in 1967.

The most important migration within the region, apart from seasonal movements, is from the smaller villages to Bethel, which has increased its share of the region's population from 7.9 percent in 1950 to 12.7 percent in 1967. The establishment in Bethel of a regional high school and its dormitory facilities, a housing fabrication plant, and a fisheries cold-storage facility is expected to accelerate the growth of Bethel at the expense of other villages. Nevertheless, migration out of most small villages has not yet been rapid enough to prevent absolute increases in their population. The moderate pace of outmigration so far can be explained mainly by the low level of acculturation of the Native people. Even larger Eskimo communities, like Bethel and Dillingham, can be expected to have little pull on people who cannot effectively communicate in English, let alone read and write the language. Native population movements in the relatively more advanced northwest portion of Alaska (Region V) suggest, however, that rising levels of educational attainment, coupled with even limited employment opportunities, will cause a rapid movement from the smaller villages to the larger.

The distributions of most indicators of social and economic levels in the population are distinctly bimodal, reflecting the vast gulf between the Native majority and the white minority. In educational attainment, for

FIGURE 4-3

BIRTHS AND DEATHS, REGION III
1960-1966

	1960	1961	1962	1963	1964	1965	1966
Births							
All	492	534	520	539	482	501	517
White	33	27	24	26	20	13	18
Nonwhite	459	507	496	513	462	488	499
Deaths							
All	102	118	117	107	96	139	103
White	9	9	12	7	8	8	3
Nonwhite	93	109	105	100	88	131	100
Native Birth and Death Rates per 1,000 Population*							
Birth Rate	48	51	48	49	43	44	43
Death Rate	10	11	10	9	8	12	9
Natural Increase	38	40	38	40	35	32	33

Source: Numbers of births and deaths--Alaska Department of Health and Welfare.

*Nonwhite births and deaths against Native population estimated by exponential interpolation between 1960 Census figure and 1967 Bureau of Indian Affairs-Federal Field Committee estimate. Non-Native (white) rates were not estimated because of unreliability of population data. Non-Native rates for 1960, based on Census figures were births 25, and deaths 7, per 1,000.

FIGURE 4-4

ESTIMATED COMPONENTS OF POPULATION CHANGE
NATIVE POPULATION, REGION III, 1960-1966

		AVERAGE ANNUAL RATE PER THOUSAND	
		REGION III NATIVES	U. S. AVERAGE 1966
1960 Population (Census Count)	9,660		
1966 Population (exponential interpolation between 1960 Census and 1967 Bureau of Indian Affairs-Federal Field Committee estimate)	11,500		
Total Increase	1,840	29.5	10.9
Births (1/2 of 1960; 1961-1965; 1/2 of 1966, Table III-3) nonwhite	2,946	47.2	18.6
Deaths (1.2 of 1960; 1961-1965; 1/2 of 1966, Table III-3) nonwhite	675	10.8	9.5
Natural Increase	2,301	36.4	9.1
Net Migration (residual)	-431	-6.9	+1.8

instance, the median number of school years completed by the population 25 and over in 1960 was 12.7 for whites, far above the national average, and 1.9 for nonwhites, by far the lowest of any political subdivision in the fifty states (Figure 4-5). The pattern of income distribution is similar; the median income of nonwhite individuals in the region according to the 1960 population census was less than one-fourteenth that of whites and less than one-sixth of the United States average (Figures 4-6 and 4-7). Because of the inadequacy of the rural schools of the region, the median number of years of school probably understates the educational backwardness of the region. Likewise, high local prices (probably about twice national averages) compound the impact of extremely low money incomes.

In 1960, less than one-third of Region III's working-age population and less than one-fifth of the nonwhite working-age population were attached to the labor force in its conventional definition. The labor force participation rates for white males and females over 14 was 92.9 percent and 68.5 percent, and for nonwhite males and females 30.9 percent and 8.3 percent respectively; 89.9 percent of white males were actually employed on the date of the census, compared to 21.9 percent of nonwhite males (Figure 4-8). Bureau of Indian Affairs estimates for September, 1967, which are not strictly comparable to the Census categories, show a labor force participation rate for Native males 16 years and over of 62.3 percent, and for females of 22.2 percent. A better indication of the labor force participation of Native residents is the fact that only 17.7 percent of Native males and 10.4 percent of Native females of working age had either permanent or temporary employment, and the bulk of this employment was temporary or seasonal (Figure 4-9).

B. The Subsistence Economy

The overwhelming majority of the Native people are still economically and culturally oriented to the same subsistence resources on which they depended prior to contact with Western civilization. The composition of subsistence resources utilized differs considerably from village to village. In the delta area, where most of the people live, there are no large land mammals--both the pattern of activity and the diet of the people reflect a water orientation. The most important wildlife resources in the area are fish (primarily chum and king salmon), seal, and waterfowl. Seal are important along the coast. In the upland areas, moose are available, and the McGrath area has access to caribou, but the place of these large mammals in the total diet or labor expenditure of the region is not large. Surveys of the five Eskimo villages in the region in the *Alaska Dietary Survey* found local foods accounting for 37 to 45 percent of the calories consumed and 67 to 88 percent of the protein. These proportions are probably typical of the region. Local materials are an important source of fuel, and furs are used for clothing. The proportion of goods from the subsistence

FIGURE 4-5

EDUCATIONAL ATTAINMENT OF THE POPULATION, REGION III, 1960

	TOTAL	WHITE	NONWHITE
Number of Persons Over 25 Years of Age	3,996	791	3,205
No Schooling	1,326	7	1,319
Elementary School			
1-4 years	1,176	7	1,169
5-6 years	435	16	419
7 years	190	14	76
8 years	175	65	110
High School			
1-3 years	175	23	52
4 years	264	231	33
College			
1-3 years	155	143	12
4 years or more	200	185	15
Median School Years Completed			
Region III	3.6	12.7	1.9
Alaska	12.1	12.4	6.6
United States	10.6	10.9	8.2

Source: U. S. Census of Population.

FIGURE 4-6

FAMILY INCOME DISTRIBUTION, REGION III, 1959

	TOTAL	WHITE	NONWHITE
Number of Families	1,849	252	1,597
Income			
Under $1,000	550	4	546
$1,000 to $1,999	470	0	470
$2,000 to $2,999	264	6	258
$3,000 to $3,999	125	18	107
$4,000 to $4,999	50	4	46
$5,000 to $5,999	83	22	61
$6,000 to $6,999	68	24	44
$7,000 to $7,999	34	10	24
$8,000 to $8,999	43	34	9
$9,000 to $9,999	45	25	20
$10,000 and over	117	105	12
Median Income of Families Region III*	$1,870	$8,120	$1,530
Alaska	$7,305	$8,060	$3,339
U. S.	$5,660	$5,893	$3,711

Source: U. S. Census of Population.

*Medians calculated on assumption of proportional distribution within median income class.

FIGURE 4-7

INDIVIDUAL INCOME DISTRIBUTION, REGION III, 1959

	TOTAL	WHITE	NONWHITE
Number of Persons	6,158	1,003	5,155
Without Income	2,248	90	2,194
With Income	3,874	917	2,961
Income			
$1 to $499 or less	1,024	39	985
$500 to $999	827	156	771
$1,000 to $1,499	515	59	456
$1,500 to $1,999	225	37	188
$2,000 to $2,499	234	77	157
$2,500 to $2,999	167	65	102
$3,000 to $3,499	108	62	46
$3,500 to $3,999	66	44	22
$4,000 to $4,499	77	38	39
$4,500 to $4,999	55	28	27
$5,000 to $5,999	172	95	77
$6,000 and over	404	313	91
Median Income All Persons*			
Region III	$ 410	$2,830	$ 200
Alaska	$1,980	$2,670	$ 690
U. S.	$1,280	$1,390	$ 770

Source: U. S. Census of Population.

*Medians calculated on assumption of proportional distribution within median income class.

FIGURE 4-8

EMPLOYMENT CHARACTERISTICS OF THE WORKING AGE POPULATION, REGION III, 1960

	NUMBER OF PERIONS REGION III			PERCENTAGE OF TOTAL				
				REGION III			Alaska	U.S.
	Total	White	Non-White	Total	White	Non-White	Total	Total
Persons 14 years and Over	6,158	1,003	5,155	100.0	100.0	100.0	100.0	100.0
Labor Force	1,885	856	1,029	30.6	85.3	20.0	66.8	55.3
Armed Forces	348	299	49	5.7	29.8	1.0	21.8	1.7
Civilian Labor Force	1,537	557	980	24.9	55.5	19.0	45.0	53.9
Employed	1,232	536	696	20.0	53.4	13.5	39.1	51.1
Unemployed	305	21	284	5.0	0.2	5.5	5.7	2.8
(Percent of Civ. Labor Force)				(19.9)	(3.8)	(29.0)	(12.6)	(5.0)
Not in Labor Force	4,273	147	4.126	64.9	14.6	80.0	33.1	44.6
Inmates of Institutions	18	5	13	0.3	0.0	0.3	0.6	1.4
Enrolled in School	829	7	822	13.5	0.1	15.9	6.0	8.2
Other under 65	3,169	109	3,060	51.5	10.9	59.3	24.0	25.2
Other 65 and over	257	26	231	4.2	0.3	4.5	2.6	9.9
Males 14 Years and Over	3,351	692	2,659	100.0	100.0	100.0	100.0	100.0
Labor Force	1,466	643	823	43.8	92.9	30.9	85.3	77.4
Armed Forces	348	299	49	10.4	43.2	1.8	36.6	2.8
Civilian Labor Force	1,118	344	774	33.4	49.7	29.1	48.7	74.6
Employed	857	323	534	25.6	46.7	20.1	41.6	70.8
Unemployed	261	21	240	7.8	3.0	9.0	7.0	3.7
(Percent of Civ. Labor Force)				(23.4)	(6.1)	(31.0)	(14.3)	(5.0)
Not in Labor Force	1,885	49	1,836	56.2	7.1	69.1	14.7	22.6
Inmates of Institutions	18	5	13	0.5	0.7	4.9	0.7	1.7
Enrolled in School	421	0	421	12.6	0.0	15.8	5.3	8.2
Other under 65	1,306	22	1,284	39.0	3.1	48.3	6.3	4.8
Other 65 and over	140	22	118	4.2	3.1	44.4	2.4	7.9
Females 14 Years and Over	2,807	311	2,496	100.0	100.0	100.0	100.0	100.0
Civilian Labor Force	419	213	206	14.9	68.5	8.3	36.9	34.4
Employed	375	213	162	13.4	68.5	6.5	35.5	32.6
Unemployed	44	0	44	1.6	0.0	1.8	3.8	1.9
(Percent of Civ. Labor Force)				(10.5)	(0.0)	(21.4)	(10.3)	(5.5)
Not in Labor Force	2,388	98	2,290	85.1	31.5	91.7	60.3	65.5
Inmates of Institutions	0	0	0	0.0	0.0	0.0	0.3	1.1
Enrolled in School	408	7	401	14.5	2.3	16.1	7.1	8.2
Other under 65	1,863	87	1,776	66.4	28.0	71.1	50.0	44.5
W/own children under 6	1,045	36	1,009	37.2	11.6	40.4	27.4	17.2
Married, W/husband	982	36	946	35.0	11.6	37.9	26.7	16.4
Other 65 and over	117	4	113	4.2	1.3	4.5	2.9	11.7

Source: U. S. Census of Population.

FIGURE 4-9

EMPLOYMENT STATUS OF NATIVE POPULATION, REGION III, SEPTEMBER, 1967

	NUMBER OF PERSONS			PERCENTAGE OF WORKING AGE POPULATION		
	Total	Male	Female	Total	Male	Female
Total Resident Native Population	12,216	6,393	5,823			
Under 16 Years	6,511	3,354	3,157			
Working Age (16 Years and Over)	5,705	3,039	2,666	100.0	100.0	100.0
16-19	969	480	489	17.0	15.6	18.3
20-24	922	476	446	16.3	15.5	16.7
25-34	1,253	667	586	22.0	22.0	22.0
35-44	1,017	533	484	17.8	17.3	18.1
45-64	1,238	707	531	21.7	23.0	19.9
65 and over	306	176	130	5.4	5.7	4.9
Labor Force	2,486	1,894	594	43.6	62.3	22.2
Employed	814	537	277	14.2	17.4	10.4
Permanent (more than 12 mos.)	310	211	99	5.4	6.9	3.7
Temporary (incl. persons out of region on seasonal work)	504	326	178	8.8	10.6	6.8
Unemployed (actively seeking work)	1,671	1,357	314	29.4	44.2	11.8
(Percent of Labor Force)				(67.2)	(71.6)	(53.1)
Fully or Partially Unemployed (sum of two items above)	2,175	1,683	492	38.1	54.9	18.5
(Percent of Labor Force)				(87.4)	(91.5)	(82.9)
Not in Labor Force	3,220	1,145	2,075	56.4	37.6	77.8
Disabled, Ret., Institutionalized	606	292	312	10.6	9.5	11.7
Students (over 16 years of age, incl. those at school out of region)	832	448	384	14.6	14.6	14.4
Others	1,782	405	1,377	56.4	37.3	77.7
Women with children	1,135	--	1,135	19.9	--	42.6

Source: Bureau of Indian Affairs. Data rearranged for maximum comparability with 1960 Census figures, Figure 4-7. Compiler evaluated the reliability of these data as "reasonably accurate" to "unsatisfactory."

economy in the total input of goods and services understates thier importance in the livelihood of the people. Virtually every Native family, even in Bethel, is culturally oriented to the subsistence sector and devotes the larger proportion of its total labor input to subsistence-type activities. A substantial proportion of the cash of the population is derived from commercial activities otherwise identical with subsistence pursuits (fishing and trapping), and a substantial proportion of the receipts is in turn used for inputs of capital goods (boats and motors, snow machines, rifles) and supplies used in the subsistence sector.

It is not clear that the Eskimo subsistence economy in this region can absorb further increases in population. The history of the region shows a continuing use conflict between commercial and subsistence fishing for salmon,[5] but there is little information on the stocks of other fishes used, nor on their degree of utilization. There have, however, been severe local shortages and even starvation in comparatively recent times. In addition, the majority of waterfowl, which are the largest single source of food in some villages, are apparently taken illegally.[6] As in other parts of Alaska, attempts to enforce laws relating to migratory waterfowl are regarded by the Natives as a threat to their livelihood and have provoked minor insurrections. In the absence of fundamental changes in the economy and culture, population growth, full commercial utilization of the salmon resource, enforcement of federal migratory bird laws can be expected to make village life as it exists next to impossible.

C. The Money Economy

The money economy of Region III is overwhelmingly in the hands of non-Natives. In September, 1967, Bureau of Indian Affairs semi-annual report on employment and unemployment showed 310 permanently employed Natives in the region. This is only 5.3 percent of the reigon's Native population of working age (16 years and over); despite the fact that Natives account for more than four-fifths of the population 16 to 64 years of age,[7] they hold less than one-third of the permanent jobs.[8]

The money economy is dominated by the government sector, which directly accounted for almost three-fourths of wage and salary employment in 1966 and about two-thirds of permanent wage and salary employment (Figure 4-10). It accounted for 132 percent of the increase in average total employment between 1960 and 1966. All commodity production; i.e., mining, manufacturing, and contract construction, accounted for only 12 percent of average total employment in 1966 and for none of the permanent jobs.

Major government activities include four small military installations; Federal Aviation Administration and Weather Bureau facilities; Bureau of Indian Affairs schools, district office in Bethel, and demonstration

FIGURE 4-10

EMPLOYMENT AND UNEMPLOYMENT, REGION III
1961-1967, by Quarter

YEAR/ QUARTER	TOTAL WORK FORCE	UNEMPLOY-MENT	RATE OF UNEMPLOY-MENT	TOTAL EMPLOY-MENT	NONAGRICUL-TURAL WAGE AND SALARY EMPLOYMENT	COMMODITY PRODUC-TION	TRANSPORT., COMMUNICA-TIONS, UTILITIES	TRADE	SERVICES	GOVT.
1961 1	1,399	512	36.6	887	743	71*	72*	101*	111	383
2	1,783	466	26.1	1,317	1,030	304*	122*	128*	104	367
3	1,718	266	15.5	1,412	1,139	330*	122*	170*	107	405
4	1,493	331	22.2	1,162	950	132*	95*	184*	111	423
1962 1	1,682	732	43.5	950	824	78*	81*	102*	109	454
2	2,392	911	38.1	1,981	1,192	309*	83*	186*	121*	488
3	2,057	323	15.7	1,734	1,380	389*	107	210*	112*	557
4	1,644	410	24.9	1,234	1,055	111*	77	182*	120*	560
1963 1	1,565	502	32.1	1,063	864	22	50	189	121	547
2	2,123	740	34.8	1,383	1,170	180	96	176	117	596
3	1,853	443	23.9	1,410	1,209	201	94	161	122	626
4	1,721	561	32.6	1,160	1,024	91	55	146	127	600
1964 1	1,652	697	42.2	955	858	20*	52	101	110*	570
2	2,038	739	36.3	1,299	1,096	150	90	167	108*	576
3	2,038	421	20.6	1,617	1,331	218*	106	214	110	678
4	1,773	448	25.3	1,325	1,170	152*	61*	148*	105	699
1965 1	1,625	708	43.6	917	826	21*	57*	121	108*	514
2	2,248	957	42.6	1,291	1,090	154*	133	197	111*	495
3	2,411	463	19.2	1,948	1,658	330*	106*	164	112*	940
4	2,009	574	28.6	1,434	1,262	116*	106	137	115*	783

FIGURE 4-10 (Continued)

YEAR/ QUARTER	TOTAL WORK FORCE	UNEMPLOY-MENT	RATE OF UNEMPLOY-MENT	TOTAL EMPLOY-MENT	NONAGRICUL-TURAL WAGE AND SALARY EMPLOYMENT	COMMODITY PRODUC-TION	TRANSPORT., COMMUNICA-TIONS, UTILITIES	TRADE	SERVICES	GOVT.
1966 1	2,118	933	44.0	1,185	1,098	49	68*	120	98	758
2	2,555	1,164	45.6	1,391	1,199	170*	112*	165	117	630
3	2,500	605	24.2	1,895	1,618	339*	149*	175	119*	831
4	1,905	623	32.7	1,282	1,129	134*	79*	149	120*	642
1967 1					1,016	43*	76*	147	137	608
2					1,230	60*	117*	188	154	706
3					1,675	206*	138*	235	139	941
GROWTH RATE (Percent)	5.9	13.1		2.2	4.5	-7.5	0.7	0.5	0.0	11.2
Index of Seasonality	1.3	2.0		1.7	1.6	8.2	1.8	1.7	1.1	1.2

Note: Region consists of Bethel, Kuskokwim, and Wade-Hampton Labor Market areas. "Commodity Production" is mining, contract construction, and manufacturing.

An asterisk indicates synthetic figure; component of one labor market area was established by projection, interpolation, or seasonal adjustment.

Growth rate is exponential least squares regression coefficient; index of seasonality is ratio of highest quarter average to lowest quarter average. Growth rate and index of seasonality were calculated simultaneously with regression:

$$\log E_t = a + bT + cQ_2 + dQ_3 + eQ,$$

where E_t is number employed in quarter T numbered consecutively from beginning of series; and Q_i is 1 in quarter i of each year, zero in all other quarters.

Source: Alaska State Department of Labor.

reindeer herd on Nunivak Island; a Public Health Service hospital; a state-operated school system in Bethel; and a variety of federal and state offices.

The Bethel Housing Project, financed jointly by the Economic Development Administration, Department of Housing and Urban Development, and Office of Economic Opportunity, and involving in total eight federal and four state agencies, began in 1968 to construct a multi-purpose housing prefabrication plant. This facility is intended initially to produce materials for 200 to 300 houses in Bethel, create at least 67 permanent jobs, and permit job training.

A large, but unmeasured, proportion of the private sector economic activity reflects direct government procurement or services to government employees.[9] The small commodity-producing sector consists, apart from construction activity mainly for the government, of salmon dressing and freezing and of scattered small-scale mining.

2. ECONOMIC DEVELOPMENT POTENTIAL

A. Fisheries

The fishery resource in this region, with the possible exception of the Yukon River, is neither large nor divergent enough to permit a large-scale processing enterprise to operate at profit in a given area. This broad statement is true of Norton Sound, the Kuskokwim River delta, and also of Kotzebue Sound in Region V. While the lower Yukon area does have some processing facilities, both canning and freezing, it still shares the same basic problems as does the rest of the region.

The grand total of all salmon species landed in Regions III, IV, and V[10] was far less than a million fish in 1966. The largest subtotal, the Yukon's 412,227, cannot match the processing volume of even one large salmon cannery; and the commercial catch there was only 183,974 or about 4 or 5 percent of the handling volume of a typical large cannery.

It is estimated that the construction cost of a plant in the region would be one-fourth to one-half higher than in parts of Alaska Southeast of the Alaska Peninsula; utilities and otner operating expenses would be comparably higher.

In the absence of local processing facilities, commercial utilization of the resource has been both incomplete and inefficient. Only the best quality fish of the high-value species, kings and silvers, have been able to bear the cost of air shipment to Anchorage or Fairbanks, and then often to Seattle after minimum primary processing. This mode of

FIGURE 4-11

REGION III'S SALMON HARVEST, 1966

	KINGS	REDS	COHOS	PINKS	CHUMS	
Kuskokwim:						
Commercial	25,545	--	22,985	--	--	
Subsistence	49,280	--	--	--	180,054	
	74,825		22,985		180,054	277,864
Kanektok:						
Commercial	278	1,030	--	268	2,610	
Subsistence	--	--	--	--	--	
	278	1,030		268	2,610	4,186
Yukon:						
Commercial	93,315	--	19,254	--	71,405	
Subsistence	14,017	--	--	369	215,867	
	107,332		19,254	369	285,272	412,227
Norton Sound (largely Region V):						
Commercial	1,553	14	5,755	12,778	80,245	
Subsistence	269	--	2,210	14,325	21,873	
	1,822	14	7,965	27,113	102,118	139,032

Source: Alaska Department of Fish and Game.

operation has, among other things, precluded the region from producing its own permanent pool of trained labor, local management capability and organizational know-how, all of which are needed for the growth of industry. Under these conditions, this region's salmon fisheries have remained a high-risk as well as high-cost operation, and the operating inefficiency has been long subsidized by the region's fishermen in the form of fish prices far below the state's average.[11]

There are in the region in addition to salmon a number of saltwater, freshwater, and anadromous species of lower unit value, including whitefish, sheefish, arctic char, herring, and bottom fish. In none of these species, however, are the prospective catch volumes sufficient to sustain local processing facilities, nor is the present price at the point of processing or consumption outside the region high enough to bear the cost of air transport.

All these circumstances indicate that efficient utilization of the region's fisheries resource requires processing and storage facilities mainly built around the salmon catch but handling all species. Any plant(s) must be of sufficient scale to pool the catch to the point where low-cost surface transportation can be utilized. There is little indication that the small-scale fish buyers, who operate on a thin margin at high risk, will be able to develop other fisheries which are bound to be less profitable than salmon.

Additional constraints on commercial fisheries development arise from the heavy use of fish products (even the highest value species) for subsistence, from the sacrifice of time and effort required in subsistence pursuits, and from the additional cash inputs required by fishermen to engage in commercial fishing. On the other hand, a large proportion of the catch is now dried for dog food, and the replacement of sled dogs with snow machines will free part of this quantity for sale.

B. Advent of Fishing Cooperatives

The 1967 summer fishing season witnessed the establishment of a fisheries cooperative made up of seven commercial fishermen in Bethel. They fished for their own cooperatives; processed their catch in the co-op's name; and marketed the end products, frozen dressed salmon, by themselves. The enterprise turned out a modest business success. Some of the implications of their success are far reaching. They managed to retain the "middleman's" profit, which would have been taken out of Bethel if they had sold in the customary way to fish buyers from outside the area. As a locally conceived enterprise, the cooperative generated greater local profit and local wages and convinced some of the fishermen that they could succeed not only as fishermen but also as fish processors.

The cooperative's small freezer plant burned down during the fall, but the 1968 season saw the return of the cooperative to the Kuskokwim's salmon fisheries. It increased its membership from seven to over one hundred and took almost half of the river's commercial king salmon landings for processing and marketing. In addition to becoming the largest processing enterprise on the Kuskokwim River, the cooperative has more than doubled the cash income of the member fishermen.[12] At the same time, the cooperative's competition with the established fish buyers seems to have raised the average prices paid even to nonmembers by about one-fourth.

The Economic Development Administration has approved a loan to the cooperative to reestablish the freezer-smoker plant on a larger scale. Completion of the plant is expected further to increase local receipts from salmon sales, to attract more members, and to allow the cooperative to diversify into other fisheries. The cooperative's plan, partly because of the lack of its own freezer plant, to sell directly to a Japanese freezer ship in the Kuskokwim River during the 1968 season involved the organization in a turbulent political controversy with the state government.[13] Despite the controversy, which induced one of the Japanese principals to withdraw from the arrangement, the possibility of selling the entire catch including inferior fish directly to Japanese exporters, saving the fishermen the cost of air shipment to Anchorage, the dangers of spoilage, and at least part of the middleman's profit, was influential in the apparent success of the cooperative.[14]

Figure 4-12 presents a rough estimate of the potential volume and FOB value of produce of the fisheries industries in Region III. Keeping in mind that these estimates are upper limits and represent gross values rather than net value added within the region, it can be seen that the region's only significant commodity industry has a potential for expansion of perhaps $150 per year per capita.

With Bethel as its only deepwater harbor and its many natural and economic handicaps, the region offers no attractions, especially in competition with Bristol Bay or Aleutian sites, for the basing of offshore or high-seas commercial fleets. Fleets based in these areas and processing plants there undoubtedly would provide some seasonal employment openings for workers from Region III.

C. Minerals

The region is not generally considered a promising petroleum province. The Kuskokwim Mountains have been one of Alaska's major placer gold provinces, accounting for about 10 percent of the state's recorded production; but in the absence of radical changes in the price of gold or in technology, there is no prospect for a revival of the placer mining industry.

FIGURE 4-12

POTENTIAL GROSS VALUE OF FISHERIES, REGION III

	VOLUME (1,000 LBS)			AVERAGE RAW FISH PRICE	PROCESSED PRICE	FOB GROSS VALUE ($1,000)		
	1966 (Actual)	1970	1973 on	1966 (Actual)	1970 on	1966 (Actual)	1970	1973 on
Lower Yukon								
King Salmon	2,000	2,100	2,100	$.20	$.30	400	630	630
Chum Salmon	500	1,250	1,250	.08	.30	40	375	375
Coho	140	450	450	.10	.35	14	158	158
Salmon Roe		190	190		1.00		190	190
Other Species		250	750		.30		75	225
TOTAL VALUE						454	1,428	1,578
Kuskokwim								
King Salmon	450	600	600	.12	.30	54	180	180
Chum Salmon		500	500		.30		150	150
Coho	150	500	500	.067	.35	10	175	175
Red		150	150		.30	30	45	45
Salmon Roe			-				88	88
Whitefish		300	300		.30		90	90
Herring			300		.07			21
Other Species			300		.30			90
TOTAL VALUE						94	728	839
GRAND TOTAL						548	2,156	2,417

Note: Assumptions of this table are: approach to maximum commercial utilization of the product by 1973 based on local storage and freezing or processing in optimum scale facilities along lines contemplated by Kuskokwim Fishermen's Cooperative. Further assumptions are: no major change in technology, ability of local enterprise to sell directly to highest price market in U. S. or Japan, and no change in CIF, U. S., or Japan prices. Norton Sound estimates are presented with Region V discussion. Average FOB prices are converted on the basis of round fish weight equal to the fishermen's delivery weight.

The area is also one of North America's most important mercury provinces--one quicksilver mine is presently active, and there are some thirty known prospects. Some production of tungsten, lead, and antimony is recorded from the region. As in most of Alaska, the mineral potential is poorly known, but in general this region is considered the least promising in the state.[15]

D. Timber

Recent estimates of the commercial timber resources in the Kuskokwim basin amount to about 800 million board feet on 170,000 acres. The lower Yukon portion of the region may account for about half as much. The timber is preponderantly spruce, of small diamter and sparse, suitable mainly for pulpwood. The rotation time for sustained-yield production would not be less than 125 years. Even for export as round logs, the stands would probably not yield a stumpage price of greater than $7 to $12 per thousand board feet. A primary-processing requirement could be expected to make utilization prohibitive as the direct cost of logging, transport, and processing in this area would likely be higher than the market price of the final product. The rationale for sustained-yield or "even-flow" timber harvesting is the provision of a stable supply for local processing facilities of the population they support. Since processing itself, except perhaps for local use, seems to be an unrealistic objective, the benefits generated by the resource would probably be optimized by their rapid "mining." Logging in this region would probably be largely a winter operation;[16] a twenty-year logging program for the area, cutting 60 million board feet annually using techniques employed in the upper Midwest, would employ 50 to 60 men per season in logging and transport operations.

3. ECONOMIC FUTURE OF THE REGION

Bluntly put, Region III has no apparent base for economic growth. It has a rapidly growing population, without local employment prospects, and generally without the cultural, educational, or skill prerequisites for successful outmigration. In the foreseeable future, outside of the growth of a moderate-size fisheries industry, any growth of opportunity either for employment or for enterprise in the region will result directly from government action. The only prospect for expansion of the public sector, in turn, can be anticipated as a result of efforts to overcome the cultural and economic handicaps of the region's population.

The regional "multiplier" effect of injections of income from commodity exports or government activity is remarkably weak; the coefficient of 1.18 calculated for total wage and salary employment against employment in commodity production and government between 1961 and 1967 means that five

additional jobs in these sectors are necessary to create one in trade, transportation and communications, services, and miscellaneous activities.[17]

The government sector will inevitably grow, and will almost certainly grow mainly in Bethel. This growth will, in turn, attract population into the community, primarily because of the superior health and school facilities there, and the wider range of amenities. So long as Bethel remains a predominantly Eskimo settlement, it will provide a stepping stone into the modern economy for some of the more acculturated youth of smaller villages.[18] The hope of employment will also attract Natives into Bethel, but the labor force in the money economy, in both its private and public sectors, will probably continue to be largely non-Native transients in the absence of concentrated efforts to create or earmark jobs for the local people.

Figure 4-13 presents a relatively optimistic projection of the population, labor force, employment, and unemployment of Region III through 1974, based upon foreseeable economic developments there. The perhaps unrealistically optimistic assumptions on which it is based include fulfillment of the fisheries development potentials set forth in Figure 4-12 and the proposition that half of the new jobs created in the region will be filled by resident Natives. Despite these assumptions, however, the future of the region appears exceptionally gloomy.

FIGURE 4-13

PROJECTIONS OF POPULATION, LABOR FORCE, EMPLOYMENT AND UNEMPLOYMENT
REGION III, ANNUAL AVERAGE, 1967-1974

	1967	1968	1969	1970	1971	1972	1973	1974
Civilian Population	13,200	13,623	14,024	14,767	15,187	15,614	16,074	16,545
Non-Native	1,200	1,311	1,392	1,470	1,544	1,616	1,712	1,810
Native	12,000	12,312	12,632	12,297	13,643	13,998	14,362	14,735
Civilian Labor Force	3,509	3,832	4,138	4,520	4,844	5,182	5,552	5,936
Non-Native	1,073	1,173	1,245	1,315	1,381	1,445	1,531	1,619
Native	2,436	2,659	2,893	3,205	3,463	3,737	4,021	4,317
Unemployment	2,078	2,200	2,362	2,604	2,795	3,005	3,202	3,410
Percent of Civilian Labor Force	59	57	57	58	57	58	58	58
Total Employment	1,431	1,632	1,776	1,916	2.049	2.177	2,350	2.526
Nonagricultural Wage & Salary Emp.	1,255	1,432	1,558	1,681	1,798	1,910	2,061	2,216
Mining & Manufacturing	110	124	128	132	136	137	137	138
Construction		70	92	104	104	90	99	99
Trade, Transport, Communications Services, Misc.	420	447	465	482	499	515	537	559
Government	725	791	873	963	1,059	1,168	1,288	1,420

Note: Population base for 1967 is from Figure 4-1. Native population was projected using 1966 rate of natural increase from Figure 4-3 and 1961-66 rate of outmigration from Figure 4-4. Non-Native population was calculated as a function of labor demand, using a constant labor force participation rate for whites (0.894) from 1960 census and attributing half of employment increment to non-Natives. The Native labor force participation rate was assumed to increase from 20.3 percent (BIA 1967 Bethel district figure, Figure 4-9) at a constant rate to reach 26.7 percent (1967 Nome district figure, Figure 6-5) in five years and to continue increasing at the same rate. Employment in mining, manufacturing, and construction assumed all new developments to be increments over 1967 level; that fisheries potential in Figure 4-12 would be realized; that present plans of Bethel Housing Project, construction plans of FAA, Department of Defense, and Alaska Department of Education will be carried out. Government employment figures are based on actual agency plans where available, and for other agencies on projection of 11.2 percent annual growth rate from 1961-67. Employment in trade, transportation, communications, utilities, services, and miscellaneous activities was calculated by use of multiplier described in footnote 17.

FOOTNOTES

CHAPTER 4

1. Indian Population amounted to 907, and the remainder "Other Races" (i.e., other than white, Negro, Indian, Chinese, Japanese, or Filipino) were presumably Eskimo.

2. "Native" and "nonwhite" are virtually interchangeable in this region. The 1960 Population Census shows 32 Negro and 2 Japanese residents.

3. Figure for 1960 is Census enumeration; 1967 is Bureau of Indian Affairs-Federal Field Committee estimate.

4. Age-sex specific death rates for the region's nonwhites are expectably higher than national averages.

5. Stephen Pennoyer, Kenneth R. Middleton, and Melvan E. Morris, Jr., "Arctic-Yukon-Kuskokwim Area Salmon Fishing History," Alaska State Department of Fish and Game Informational Leaflet 70 (1965).

6. See the *Alaska Dietary Survey*, p. 272-3, for reference to spring wildfowl hunting at Hooper Bay.

7. In 1960, 85.7 percent.

8. The number of permanent jobs in the region in 1966-1967 was estimated at 950 in the following manner: For each of the three labor market areas and for each of eight industrial categories, the lowest employment in any month in the last two quarters of 1966 and the first two quarters of 1967 was taken as permanent employment. These were aggregated to achieve a figure for permanent wage and salary employment of 865. Total permanent employment was estimated as the same proportion of average total employment as permanent wage and salary employment was of wage and salary employment.

9. For instance, a survey of traffic on two airlines serving the region shows that well over half the passenger traffic originating at points in the region is paid for by government travel requests.

10. The Alaska Department of Fish and Game's Arctic-Yukon-Kuskokwim (AYK) region.

11. Prices in 1967 for whole salmon in Regions III and V ranged between 3 and 15 cents per pound.

12. Preliminary figures indicate that the Kuskokwim Fishermen's Cooperative, Inc., has paid 16 cents to its member fishermen, dressed the fish, and shipped them by air to Anchorage for sale at an average of close to 50 cents per pound. On Quinhagak River below the Kuskokwim mouth, the same cooperative will increase its members' cash income on small salmon through July, 1968, by five times their customary receipts.

13. The best account of this dispute is found in John Wiese, "What the Kuskokwim Fisheries Flap is About," Anchorage Daily News, June 16, 1968, and "The Native Fish Co-op: Economic Prop for the Kuskokwim Region," Anchorage Daily News, June 17, 1968.

14. Another benefit to cooperative members from dealing directly with the Japanese vessel was the purchase of imported gear and supplies at about half the alternative prices.

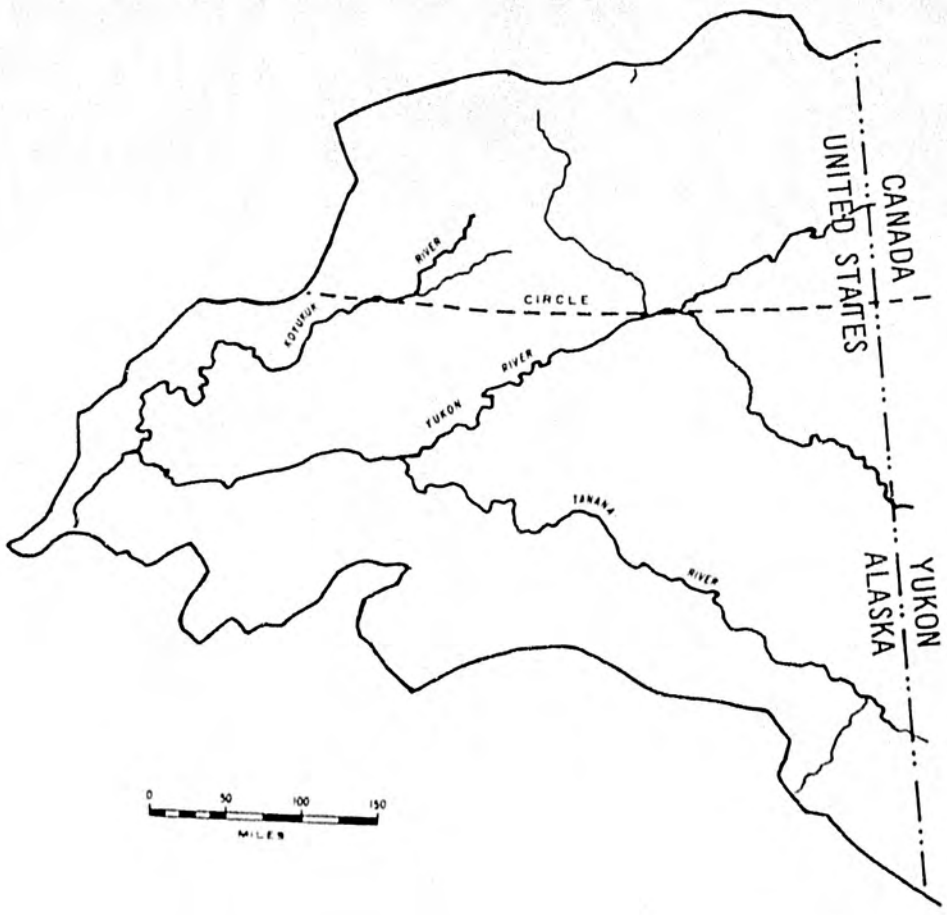
15. A June, 1968, report of the U. S. Geological Survey calls attention to mineral potentials in the extreme southeast portion of Region III. Bruce L. Reed and Raymond L. Elliott, *Geochemical Anomalies and Metalliferous Deposits Between Windy Fork and Post River, Southern Alaska Range*, Geological Survey Circular 569, Washington, 1968.

16. Rapid and widespread timber cutting here would not be expected to have the same deleterious effects on water resources it has on the steep, high rainfall areas of the Pacific Northwest or southeastern Alaska.

17. The multiplier expression, $E_1 = 245.5 - 1.62T + 1.18E_2$, was obtained by least-squares regression analysis of quarterly data from the first quarter of 1961 to the third quarter of 1967. E_1 is total wage and salary employment; T is the quarter numbered consecutively from the beginning of 1961; and E_2 is employment in mining, manufacturing, construction, and government. Standard errors of the two coefficients and of the estimate were 1.58, 0.06, and 46.6 respectively. The multiple correlation coefficient was 0.981.

18. Dillingham, in Region II, may play a similar role for the people of Region III as does Bethel. It has two major differences: (1) Commodity production and the private sector generally offer a greater proportion of employment opportunities in the Bristol Bay area than they do in Region III. (2) Dillingham is regarded as more white-dominated than is Bethel and less congenial to village people, especially those less acculturated to Western ways. The *Ingalik* people of the Kuskokwim district may be expected for cultural reasons to be oriented in a similar fashion perhaps not to Bethel, Dillingham, and Anchorage, but to places such as Tanana and Fairbanks.

SUBREGION IV
Interior Alaska



CHAPTER 5

INTERIOR ALASKA--REGION IV

Interior Alaska, stretching from the Canadian border to the Yukon-Kuskokwim divide and from the Wrangell Mountains to the summit of Brooks Range, has been one of Alaska's "problem" regions. Although income shows significant improvement in the past several years, population and employment have advanced very little. The mineral industry, once a key element in the area's economy, has virtually disappeared and revival would depend upon suspected but largely unknown deposits. The principal present supports are government, military and civilian, and distributive activities, the "basic" element of which is represented by businesses dependent upon tourism and services to areas outside the region. The latter is mostly attributable to the role of Fairbanks, the region's center, as a distribution point. Leading potential growth sectors are forestry, tourism, and services to oil development on the North Slope.

1. POPULATION AND EMPLOYMENT

Figure 5-1 indicates the stable nature of interior Alaska's population in the 1960's. Since 1960, the population has only grown by 1,400 persons, attributable entirely to natural increase. While there was an out-migration of 8,200 persons, natural increase provided 9,600 new persons. Within the total, the military sector of the population has declined slightly during the 1960's.

Approximately 10 per cent of the interior Alaska population are Natives. As of April 1, 1967, the Native population was 5,200 persons out of a total population of 51,400. This is considerably below the state average of 52,000 Natives per 279,000 total population. While the rate of natural increase of the Native population has decreased markedly in the 1960's from a high of 40 per thousand in 1961 to 29.6 in 1966, there has been a steady migration of Natives from outlying villages to the region's center, Fairbanks, where they form a large proportion of the poor.[1] The rate of non-Native natural increase has also decreased, but less rapidly than that of the Native group.

Total employment in Region IV has grown about twice as fast as the population in the 1960's, although about one-third as fast as the state growth (Figure 5-2). Interior Alaska followed the state pattern in government employment. The military declined slightly, and federal civilian employment showed a small increase. State and local government employment was the fastest-growing government sector in interior Alaska, although not as fast as for the state as a whole.

FIGURE 5-1

ESTIMATES OF TOTAL RESIDENT POPULATION, REGION IV-INTERIOR ALASKA, 1940-1967

July 1	POPULATION COMPOSITION				COMPONENTS OF CHANGE				
	Total Population	Military	Civilian		Total	Natural Increase		Net Migration[a] Military	Net Migration[a] Civilian
			Non-Native	Native					
	(12 month average, thousands of persons)								
1940	11.0	--[b]	7.5	3.5	(not available on comparable basis)				
1945	18.0	6.0	8.4	3.6					
1950	25.0	5.5	15.8	3.7					
1955	47.0	12.0	30.9	4.1					
1960	50.0	10.9	34.5	4.6					
1961	48.5	10.9	32.9	4.7	(1.5)	1.3	0.2	--	(3.0)
1962	51.0	10.9	35.3	4.8	2.5	1.3	0.2	--	1.0
1963	51.9	10.9	36.1	4.9	0.9	1.3	0.2	--	(0.6)
1964	51.0	10.5	35.5	5.0	(0.9)	1.3	0.2	(0.4)	(2.0)
1965	50.8	10.7	35.0	5.1	(0.2)	1.1	0.2	0.2	(1.7)
1966	51.1	10.6	35.3	5.2	0.3	1.1	0.1	0.1	(0.8)
1967	51.4	10.4	35.8	5.2	0.3	1.1		(0.2)	(0.6)

Notes: [a]Decreases and net out-migrations shown in parentheses.
[b]Less than 50.

Source: Estimates for 1940, 1950, and 1960 rounded from regional population in decennial census reports, 1945 and 1955 estimated from vital statistics and school enrollment data (as index of migration). Annual estimates for 1961 through 1966 rounded from total of estimates for election districts within region. Alaska Department of Labor, *Current Population Estimates-Alaska, by Election District;* Alaska Department of Health and Welfare, *Estimated July 1st Population by Race and Election District.*

FIGURE 5-2

TOTAL EMPLOYMENT, REGION IV, INTERIOR ALASKA, 1955-1966

Calendar Year	Civilian Workforce	Unemployment Rate	Total	GOVERNMENT			PRIVATE[a]		
				Military	Federal	State & Local	Construction	Other Commodity Producing[b]	Distributive[c]
				(thousands of persons, 12 month average)					
1955			22.1	12.0	2.7	0.7	1.4	0.9	4.4
1956			22.3	11.5	2.8	0.8	1.5	0.9	4.8
1957			23.0	12.0	3.3	0.9	1.4	0.8	4.6
1958			22.4	12.0	2.9	1.0	0.9	1.1	4.5
1959			22.2	11.0	2.9	1.2	1.2	0.9	5.0
1960			23.1	11.0	2.7	1.6	2.1	0.9	5.0
1961	13.9	12.2	23.2	11.0	2.6	1.7	1.1	1.0	5.7
1962	14.2	11.3	23.6	11.0	2.8	2.1	0.9	1.0	5.8
1963	14.9	8.8	24.6	10.9	3.3	2.1	1.2	0.7	6.4
1964	15.1	7.9	24.4	10.5	3.1	2.4	1.1	0.6	6.7
1965	16.0	8.1	25.4	10.7	3.2	2.7	1.2	0.6	6.9
1966	16.1	7.5	25.5	10.6	3.3	3.0	1.2	0.6	6.8

[a]Includes estimate of agricultural workers, self-employed, and unpaid family workers, distributed by industry.
[b]Other Commodity Producing Industries: Agriculture, fishing, hunting, forestry, mining, and manufacturing.
[c]Distributive Industries: Transportation, communications, public utilities, trade, finance, insurance, real estate, services.

Source: Military personnel from U. S. Bureau of the Census, 1960 and prior years, Alaska Department of Labor, *Revised Workforce Estimates--Alaska, by Industry, 1950-1962*, Juneau, Alaska, August 1, 1966; same for 1963, 1964, 1965, and 1966; Alaska Department of Labor, *Current Population Estimates by Election District.*

The principal explanation of Interior's stagnation can be found in the commodity-producing sector. Construction employment declined by over 40 per cent and other commodity-producing industries, principally mining, by approximately one-third, reflecting the shutdown of all gold mining except for small operations. Although the commodity-producing sector of total Alaskan employment increased only slightly in the same years, interior Alaska fell markedly behind in this area, especially compared with the southcentral region.

The principal distributive activities in the interior region are trade, services, and transportation-communications-public utilities. Employment in distributive sector increased by almost 80 per cent in interior Alaska, compared to the 20 per cent increase for all Alaska, but it occupied a less important position in the overall employment picture in this region than in the state, comprising 27 per cent of total employment in 1966 compared to 31 per cent.

When the military are excluded from employment data, the balance of the principal employment sectors in the interior region changes considerably vis-a-vis the state. Distributive employment made up 46 per cent of total civilian employment in the Interior, compared to 44 per cent in Alaska. Similar comparisons for government employment and commodity-producing employment are: 42 per cent against 37 per cent and 12 per cent against 19 per cent. This explains the lesser difference between high-month and low-month employment in the Interior than in Alaska as a whole. The seasonality factor appears to be improving in (Figure 5-3) the Interior; however, this is mainly due to the unhealthy sign of reduction of peak season employment rather than a greater increase in off-season work.

2. INCOME

Personal income increased moderately between 1960 and 1966, and the equal increase in population is reflected in the roughly equivalent rate of increase of per capital income (Figures 5-4 and 5-5). The composition of personal income reinforces the analysis of the interior Alaska economy obtained through employment data. Government is the principal sector with state and local government income increasing most rapidly. Distributive and service industries are the second most important income-generating segment, with transportation, communications, and public utilities the fastest-growing category.

The faster growth of employment and wages than population boosted interior Alaska's per capita income so that per capita income in the Interior increased at a faster rate than in the rest of the U. S. Between 1960 and 1966 (Figure 5-5) per capita income in all of Alaska increased at a slower rate than per capita income in the U. S. In 1960, Alaska's per capita income of $2,846 was 28 per cent above the United States average of $2,215,

FIGURE 5-3

SEASONALITY IN EMPLOYMENT
INTERIOR ALASKA

High Month and Low Month Employment
as a Percentage of Average Monthly Employment
1961-1966

	1961		1966	
	Interior Alaska	Alaska	Interior Alaska	Alaska
High Month as Percent of Average Monthly Employment	119	116	115	117
Low Month as Percent of Average Monthly Employment	86	87	88	87

Source: Alaska Department of Labor, Employment Security Division, *Workforce Estimates*, 1961-1966.

FIGURE 5-4

DISTRIBUTION OF PERSONAL INCOME IN INTERIOR ALASKA BY MAJOR SOURCES
1960 AND 1966
($1000)

	1960	1966
Total Personal Income	$ 143.0	$ 198.0
Less: Personal Contributions for Social Insurance	3.7	5.4
TOTAL:	$ 139.3	$ 192.6
Wage and Salary Disbursement	$ 121.3	$ 173.3*
Government	72.1	101.8
Federal - Civilian	17.7	24.4
Federal - Military	44.7	52.7
State and Local	9.7	24.7
Earnings of Persons in Private Industry	49.2	58.6
Commodity-Producing Industries	21.6	23.2
Mining	2.7	2.9
Contract Construction	17.2	18.4
Manufacturing	1.7	1.9
Distributive and Service Industries	27.6	35.4
Wholesale and Retail Trade	11.8	12.6
Finance, Insurance and Real Estate	1.8	2.7
Transportation, Communications and Public Utilities	6.9	11.8
Services	7.1	8.3
Property Income, Proprietors' Income, Transfer Payments and Other Income	21.7	24.7

*Discrepancies between total and components for 1966 due to omissions in data for Upper-Yukon and Yukon-Koyukuk Election Districts to avoid disclosure of data for individual firms.

Source: Alaska Department of Labor, Employment Security Division, *Statistical Quarterly*, 1966; and Transportation Consultants and Wilbur Smith and Associates, *Alaska Highway Study*, 1965, *Working Papers*.

FIGURE 5-5

PER CAPITA INCOME, 1960 AND 1966
INTERIOR ALASKA, ALASKA, AND UNITED STATES

	1960	1966
Interior Alaska	$ 2,786	$ 3,767
Alaska	2,846	3,421
United States	2,215	2,963

Source: U. S. Department of Commerce, *Survey of Current Business*, August, 1967, Tables 1 and 4.

but by 1966 the spread had narrowed to 15 per cent. At least prior to the Fairbanks flood the increase in Region IV's per capita income was made more significant by the decline in the cost of living relative to the nearest conterminous United States center, Seattle (Figure 5-6). Of the cities in Alaska that were sampled, the decline in the relative costs of all items in Fairbanks has been second only to Anchorage and more than Juneau and Ketchikan.

The Native employment situation has been a countervailing trend to the increasing per capita income, as in other areas of Alaska. A recent study states that Eskimos and Indians comprise most of the poor in Fairbanks (the level of poverty being defined as an annual gross income level of $4,500 for a family of four).[2] Native unemployment in the Interior region is almost five times that of the total workforce.[3]

Before leaving the subject of income in the Interior region, note should be taken of the income effects of the Fairbanks flood of August 1967 and the post-flood recovery. Both the public and private sectors sustained substantial damage, and the city was declared a disaster area. Homes, personal property, and store inventories were ruined, and public services were put out of commission. Estimates of damage and funds put in for restoration have not yet been completed, but, the Federal Field Committee for Development Planning in Alaska prepared shortly after the disaster a model of the effects on the Fairbanks economy of various levels of government inputs to the income stream. One of the principal concerns of the piece was "how much assistance Fairbanks can absorb without setting off undue upward pressures on prices. A corollary question was, "At what *rate* can Fairbanks absorb these funds?"[4]

Indications are that combined government income inputs for flood recovery will be in the order of magnitude of the highest amount of dollar response contemplated in the model. The study concludes that this amount would be "moderately inflationary."[5] One indication of pressure on prices is the possible rate of increase of wages and salaries suggested in the model. Under preflood conditions, wages and salaries were projected to rise statewide 10 per cent from 135.9 million dollars in the third quarter of 1967 to 157.9 million dollars in the third quarter of 1968. If, as it appears, the highest magnitude response was made, an increase of approximately 24 per cent is possible, and there is evidence that there is pressure on prices in the Fairbanks area more than double what might have been expected without postflood income inputs by the government.

3. ECONOMIC SECTORS AND GROWTH POINTS

Total civilian employment in the interior region grew at a pace about 10 per cent slower than for all Alaska in the 1961-1966 period. However, the even slower rate of increase in the workforce related to the net outflow of population resulted in a considerable decrease in the unemployment rate of the region (Figure 5-2).

FIGURE 5-6
COST OF LIVING INDEXES
FAIRBANKS, ALASKA, COMPARED WITH SEATTLE, WASHINGTON,[a] AUTUMN, 1960-1966
(Cost in Seattle = 100)

	1960	1961	1962	1963	1964	1965	1966	1967
All items	136	136	135	136	134	133	132	132
Food[b]	144	146	143*	142	138	140	139	142
Housing[c]	154	153	152	151	143	141	141	140
Rental housing[d]	219	213	202	205	188	187	180	179
Apparel and upkeep	118	122	119	119	124	124	122	120
Other goods and services[e]	122	120	120	122	127	123	122	121
All items less housing	128	128	127*	128	130	129	127	127

*Revised since publication of April 1963 comparison.

[a] Based on the average pattern of expenditures of Alaskan wage- and clerical-worker families of two or more persons who were full-year residents in the State during 1959 or 1960. (Average expenditures of families living in Anchorage, Fairbanks, Juneau, or Ketchikan were combined with a system of weights based on the estimated number of consumer units in each city as derived from the 1960 Census of Population.)

[b] Included food at home and away from home.

[c] Includes rent, hotel and motel rates, homeownership costs (mortgage principal and interest payments, taxes, insurance, maintenance and repairs), fuel and utilities, household furnishings and operation. (Intercity indexes measure differences in the costs of maintaining a home as reflected in principal payments and mortgage interest charges. These indexes cannot be used to measure changes in acquisition costs, i.e., interest rates and the prices of owned homes purchased in current markets.)

[d] Average contract rent for tenant-occupied, 2-, 3-, 4-, and 5-room dwellings meeting defined standards, plus cost of heating fuel, utilities, and specified equipment when the cost of these items is not included in the monthly rent.

[e] Includes transportation, medical care, personal care, recreation, reading and education, tobacco, beverages, and miscellaneous expenses.

A. Civilian Government

Civilian government employment has been the principal contributor to the overall employment increase, and state and local government employment has been most important i. this growth. Employment in state and local government almost doubled between 1960 and 1966 while federal civilian employment increased by approximately 25 per cent.

Expansion of the University of Alaska has been an important part of the state government employment growth. On-campus enrollment at College, Alaska has more than doubled since the 1960-61 year to approximately 2,000, and the budget for academic services more than quadrupled to about $10 million. Government-financed research has become an important factor at the University. It operates a satellite tracking station for the National Aeronautics Space Agency and one for a European space organization, and additional work of this kind is being planned. Extensive research projects in Arctic biology, fisheries, minerals, and other fields are carried out, taking advantage of the University's unique location.

This rapid rate of growth cannot be expected to continue because basic staffing of University functions and local government (the other fast-growing governmental area) has been accomplished. The subsequent section, "Future Economy," projects an annual rate for state and local government growth, exclusive of the University, at 1.5 per cent. A possible influence on slowing the basic state government growth would be a dispersion of University functions from the Fairbanks area, especially with the growth of the Anchorage Community College. Further growth of state government employees through whole offices shifting to Fairbanks, such as the State Division of Mines and Minerals, is not expected to be a significant factor in in the future. The University may continue to act as a magnet for federal research-oriented activities, like the Institute of Northern Forestry and the water pollution control laboratory.

B. Tourism

Interior Alaska possesses some of the state's outstanding tourist attractions. Chief among them is Mt. McKinley National Park, containing the highest mountain in North America. Riverboat trips, including visits to Native villages and entertainment displaying the colorful gold-mining period are other outstanding attractions.

It is estimated (Cresap, McCormick & Paget study cited elsewhere) that approximately 50,000 tourists visited interior Alaska in 1967 and were responsible for some 350 jobs and 2.1 million dollars of income. According to the study, the number of tourists visiting Alaska has increased at an annual average rate of 14 per cent since 1964. It is likely that, especially because of the attraction of Mt. McKinley National Park, interior Alaska's

tourism has increased somewhat faster. Future increases are partly dependent upon continued development within the region. Most frequently mentioned are arguments that the present McKinley Park Lodge is located in the wrong place to see the mountain to its full advantage, and, it is too small for the tourist season; and that easier access to the park's wildlife should be provided, and consideration given to expanding the airfield at the park for air tours of the area. In the Fairbanks area, the Alaska Centennial exhibition (A-67) may be further developed with additional exhibits and fairground facilities. The museum and research institutes at the University of Alaska may be promoted as tourist attractions.

The rate of increase in the Interior tourism industry should exceed past experience into the long-term future. Improvements in air transport should be a significant factor. The two air mergers have led to better equipment and service as well as more active promotion. If the route awards made by the Civil Aeronautics Board in the Trans-Pacific Route Case are upheld, Pan American Airways will serve Fairbanks on the New York-Tokyo route. Although under the present decision passengers cannot originate or terminate in Fairbanks to or from New York, they can do so on the Fairbanks-Orient segment, and stopovers are a possibility.

C. Forestry Sector

The interior region contains vast areas of forest, but only very small production for the local market is now taking place. Considerable attention is being focused on development of Interior timber, chiefly in the Tanana River Basin. Estimates are that approximately 4.3 million acres of commercial forest land in the Basin support a volume of 7.4 billion board feet of sawtimber, mostly spruce, with an annual allowable cut of 138 million board feet.[6] Considerable interest has been expressed by industry in developing the Tanana River timber, and the aerial photography inventory which will start this year with the aid of an Economic Development Administration grant can be expected to spur development here.

The Yukon River Valley provides another area of potential development. The entire Yukon is estimated to contain 15.4 million acres with 5.9 million acres containing commercial forests with a total stand volume of 8.9 billion board feet. This could provide 194 million board feet per year. All but 1.6 million acres are in the middle and upper Yukon, which flows through interior Alaska. The timber is mostly spruce with some high-value white spruce stands.[7]

Considerable development of the Tanana River timber may be taking place in the intermediate term, and limited development of the Yukon Valley can be expected in ten years or so. However, whether the

mill dependent upon the Tanana stands is located in the Interior or at tidewater will depend on the effects of climate and transportation rates. It is expected that, within the short term, about one-half the presently calculated annual allowable yield of the Tanana Forest will become used, with full development in the intermediate term. This should add approximately 100 employees in each period, 65 loggers and 35 cantmill workers. The logging estimates especially could be overoptimistic in view of advances in cutting machinery in similar Canadian forests. Assuming continuation of present high demand in the export market, it is likely that at least one-half the Middle and Upper Yukon forests will be developed in the long term with resultant employment of 250 loggers and 150 mill workers, again leaving out the possibility of labor-saving breakthroughs in cutting small timber.

D. Utilities Sector

Transportation: Development of transportation in the Interior is important for development and shipment of raw material products as well as further growth of tourism and more efficient movement of people and goods. The principal route for goods coming into the region is the Alaska Railroad from Whittier, Seward, and Anchorage. Freight tonnage, passenger traffic, and revenue of the railroad are shown in Figure 5-7. Freight tonnage has increased at an average rate of about 2 per cent a year since 1960 while passenger traffic has declined by nearly one-third in the face of air and highway competition.

The railroad could play a more significant part in the region's economy if the extensions to the Northwest and the North Slope become a reality. However, the Bornite copper deposit and the promising oil discoveries on the North Slope appear to be the only traffic generators in the immediate future, and as presently contemplated, the railroad extension is subject to the federal budget. If additional economic mineral deposits were located on the railroad, its feasibility would increase. Such development is contingent upon increased exploration of the Interior and Northern regions where detailed knowledge of the economic geology is sparse. An intensified search for minerals would require increased funds for basic work by government agencies as well as simple roads to allow prospectors to do more detailed, on-the-ground work. Initially, such roads could be multipurpose, serving timber areas, recreation sites, and mineralized zones. Such an approach would spur each of these key potential contributors to the region's growth, while maximizing the chances of paying off the roads.

Furthermore, if the interior region is to benefit significantly from the railroad extension, Fairbanks or Dunbar, the proposed jumping-off place for the extension, must become a gathering or processing point for crews and minerals.[8]

FIGURE 5-7

FREIGHT AND PASSENGER TRAFFIC--TO AND FROM FAIRBANKS
FISCAL YEARS 1957 THROUGH 1966

	1957	1958	1959	1960	1961
Grand Totals					
Tons	581,550	675,176	573,834	557,573	549,467
Revenues	$5,824,359	$5,676,163	$5,616,082	$5,032,808	$5,049,263
Passenger Traffic					
No. of Passengers	57,884	52,762	47,677	46,195	49,645
Revenue	$ 543,652	$ 479,408	$ 460,439	$ 391,119	$ 298,305

	1962	1963	1964	1965	1966
Grand Totals					
Tons	665,047	667,150	695,074	668,139	712,868
Revenues	$5,799,214	$6,266,348	$6,597,590	$6,212,196	$6,230,495
Passenger Traffic					
No. of Passengers	45,020	38,209	35,576	30,520	31,862
Revenue	$ 278,203	$ 317,206	$ 311,770	$ 312,000	$ 298,881

Source: *Fairbanks North Star Borough Official Statement*, June, 1967, p. 29.

The interior region contains a range of air services from interstate jet service to "bush" service for the villages. The regional center, Fairbanks, is served by Pan American World Airways and Alaska Airlines from Seattle, and the Fairbanks International Airport is presently an alternate for international flights to Anchorage. Fairbanks also serves as a center for intra-Alaska flights by multi and single-engine aircraft to cities and villages in northwest and interior Alaska. One of the most heavily traveled intrastate routes is between Fairbanks and Anchorage, which is served by jet aircraft as well as propeller planes of two carriers.

Significant growth has taken place in air traffic at Fairbanks. Originating passengers increased about 20 per cent from 61,600 in 1962 to 75,200 in 1966, while inbound freight and mail rose from 3,600 to 5,600 tons, an increase of 61 per cent and outbound freight and mail 27 per cent from 8,800 to 11,200 tons.[9] Fairbanks is second only to Anchorage as a center for air activity in Alaska.

Before their merger, Wien Air Alaska and Northern Consolidated Airlines has made significant improvements to their bush fleets with the addition of such planes as the Pilatus Porter, a single-turboprop plane and the two-engine Skyvan which is readily adaptable to passenger and freight operation into short fields. New generations of short takeoff and landing aircraft should open additional possibilities of this nature.

The possibility of continuous international air service through Fairbanks could also have significant economic impact. Fairbanks might gain from attracting visitors coming from the Orient and from stopovers. Assuming service by one Boeing 747 or similar aircraft per day each way and slightly less than a 50 per cent load factor on 450 seats, approximately 1,800 persons per year might stop over in Fairbanks if 1 per cent of the total were to take advantage of the opportunity. With a stay of two days in the region, expenditures of visitors might total approximately $75,000 under present estimates.[10]

Fairbanks would also benefit from aircraft servicing - the brief prepared for the Trans-Pacific Route Investigation by the Fairbanks parties indicates its direct economic impact. Taxes on fuel and airport landing charges would provide approximately $20,000 a month, and the cost of providing ground support for sixteen to twenty crew members would be approximately $12,000 per month, plus around twenty additional employees involved in ground service with an estimated monthly payroll of $16,000. The brief also indicates that hotels in the Fairbanks area had a 1965 occupancy rate of 88 per cent. Although a new motel has been completed on Airport Road and other expansion has taken place, any significant stopover traffic would necessitate new hotel capacity.[11]

Interior Alaska is served by a highway system centering in Fairbanks which serves as the second most important conveyor of freight after the Alaska Railroad. Trucks move to Fairbanks mainly from Seward over the Seward, Glenn, and Richardson Highways, with some truck traffic coming the length of the Richardson Highway from Valdez. Smaller amounts are shipped directly from the conterminous United States over the Alaska Highway. This route also serves as the principal one for tourists coming by land to Alaska, although many branch off to Anchorage or Haines before reaching Fairbanks.

The principal change in the highway situation in interior Alaska is the completion of the Anchorage-Fairbanks Highway, a federal-aid primary highway route now under construction and planned for completion during fiscal year 1972-73.[12] Providing an alternate route to the Alaska Railroad, the highway might offer rate competition in certain articles. It will also provide an additional tourist route. The increased tourist travel will have special impact on Mt. McKinley National Park with increased use of the lodge (already at capacity during the tourist season). Creation of a circle route from either Anchorage or Fairbanks to Mt. McKinley National Park would be an added boost to tourism in the area. Such development would require improvement of the Denali Highway from Cantwell to its junction with the Richardson.

Another transport mode that could have a changing significance for interior Alaska in selective cases further in the future is the pipeline from Haines in southeastern Alaska, presently owned and operated by the military to supply aviation fuel and petroleum products to bases in the Fairbanks area. The recent report by the Federal Field Committee for Development Planning in Alaska recommends consideration to making the Haines-Fairbanks pipeline a limited public utility to supply civilian demand.[13] Such competition could be beneficial in reducing rates, assuming that a balance between modes (particularly the railroad) is maintained.

The Yukon River could be an important adjunct to the surface transportation system of interior Alaska, especially in connection with exploration or development roads designed to open mineralized areas. Such roads might be more economically built if they were connected to the Yukon and adequate transshipment facilities were present at Fairbanks and road connection points along the river.

One of the principal questions affecting interior Alaska and, in particular, Fairbanks, is the relationship of developments on the Arctic Slope to the area. This has been thrown into sharp relief by the recent announcement of significant oil finds by Atlantic-Richfield Company at their Prudhoe Bay and Sag River wells. Reserve figures of 5-10 billion barrels have been authoritatively mentioned for the North Slope. Several companies have announced plans for drilling exploration wells in the area. There will be an immediate need for better transportation to the North Slope and an even greater demand as time progresses. One company is planning to

bring in its equipment down the Mackenzie River; another by barge through the Bering Sea.[14] The NORTH Commission of the state government is contemplating the building of a well-surveyed winter road to the North Slope.

The Department of the Interior in *Alaska Natural Resources and the Rampart Project* and the Federal Field Committee in its meeting with the President's Review Committee for Development Planning in Alaska last year recommended that the federal government immediately look to extending the Alaska Railroad first to Kobuk, and in a second state from Alatna to Gubic to serve the North Slope.[15] It is conceivable that if development of North Slope oil accelerates, the priority for the analysis of the two phases of construction might be reversed. Recent estimates are that construction to the North Slope could take at least three years if work began immediately.

The railroad would be of key importance in making movement of inbound freight cheaper and easier. However, a decision on the best transport system will involve an analysis of all movement to the North Slope, both inbound and outbound. The use of polar icebreakers for commercial operation and pipeline construction have both been prominently mentioned.

The impact of developments on the North Slope on interior Alaska, chiefly the Fairbanks area, will be linked to transportation methods. If the railroad extension is built both to the North Slope and the Kobuk area, supplies would be expected to move directly from Seward, Whittier, or Anchorage without being handled at Fairbanks beyond separating cars headed further north. Intensified air and cat-train supply activities would benefit employment in the Fairbanks area; barging through the Bering Sea or down the Mackenzie River would have no impact. Assuming the railroad were extended and development of the North Slope oil and Kobuk copper took place, around 500 new workers might be needed in the intermediate term for construction, with an estimated 100 in the long term to work trains. The section on the region's future economy includes estimates of distributive and service employment under various assumptions of transportation links to the North.

Electric Power: The present nameplate capacity of electric generating equipment in interior Alaska is estimated at 115,000 kilowatts. The principal electric power organizations are the Golden Valley Electric Association, stations on the military bases, the City of Fairbanks, and miscellaneous small installations. The latter include diesel plants at far-flung Native villages as well as small plants located at the University of Alaska, Healy, McKinley Park, Cantwell, and Tok.[16]

One of the principal problems confronting development in the Interior is the high cost of electricity, which is among the highest in the nation. Average generation cost for the Fairbanks area is approximately twice that in the Anchorage area-itself comparatively high. A proposed Alaska railbelt transmission system appears to carry the possibility of significantly reducing the power costs in the Interior and in

Southcentral through providing a large gas-fired plant in the gas fields south of Anchorage with a high voltage interconnection to the Fairbanks area. Projections indicate that the proposed 150,000 kilowatts capacity would be underutilized through 1970, but that less efficient plants could be placed in reserve. By 1975, additional units would have to be added to the projected plant, and by 1985 over four times its capacity would be needed.

The high cost of electric power generation in the villages would not be solved by the intertie. A recently funded program, however, seeks to bring electricity to 67 villages over the next few years. Under this program a statewide cooperative, Alaska Village Electrification Cooperative, Inc., is obtaining an REA loan to purchase generators and related equipment. It is expected that five villages will be served the first year. Other agencies are providing grants for initial administrative costs, training of villagers as power plant operators, and for other purposes. While the cooperative will bring lower cost electricity and its benefits to villages, a breakthrough to central generation for large groups of villages appears beyond the time of this study.

E. Agriculture

The Tanana Valley of interior Alaska is the state's second-ranking agricultural area measured by value of production. However, outputs per district show sharp annual fluctuations during the 1960's, and a sharp decline in 1966. From 1960 through 1965, the Tanana Valley supplied approximately 16 per cent of Alaska's small agricultural production, but declined to 12 per cent in 1966.

Principal commercial agricultural products are milk, potatoes, and hay, most of which is used in the area. The value of both milk and potatoes declined sharply in 1966, illustrating the principal weakness of agriculture in the Interior--its dependence on the military market and competition from other states and in southcentral Alaska. Alaskan farmers are heavily dependent on purchases by the military which gives preference to local producers. The fluctuations in the value of production in the Tanana Valley indicate success or failure in obtaining military contracts.

Based on statewide statistics, an annual average of 100-120 persons are employed on commercial farms in interior Alaska. This figure is probably overstated since it is based on four survey weeks during the year, and many of the persons involved in agriculture in the region are only part-time farmers.

The prospects for interior Alaska agriculture in the short-and intermediate-term future approximate continuation of the situation in the present and immediate past. Value of production should fluctuate in the same range--between mid-$600,000 and mid-$900,000. The position of farms

in this area will continue to be affected by transportation improvements elsewhere and from the Matanuska Valley competition. Only a slight improvement can be foreseen in the long term when increased population both within and outside the region might lead to higher production.

Mention should be made of non-commercial agriculture. Of principal importance are the herds of caribou which form a principal food source for the Native people of northern Interior.

4. CANADA TIES

Connections between the interior region and Canada have been largely centered on common use of the Yukon River. The river was a principal route for miners during the Yukon Gold Rush at the turn of the century, but, since the river is not navigable between the Interior and Yukon Territory for boats of appreciable size and other means have developed to give the Yukon Territory access to the sea, its relative importance has decreased.

The Yukon River in recent times has been the subject of agreements between the United States and Canada protecting the interest of each nation in use of the waters. The recent study on Alaska-Canada relations for the Federal Field Committee for Development Planning in Alaska characterizes these contacts in the following terms:

> The obvious international development relations and problems here focus on the joint use of this international river system as reflected in part in the treaties and agreements designed to protect the interests of each nation in its different uses of this international river system. This has given these relationships a defensive rather than a dynamically constructive tone. For example, in a number of instances proposals for Alaskan hydroelectric development (e.g., Rampart, Woodchopper, Yukon-Taiya, etc.) have been hampered where there might have been adverse effects upon upstream fisheries and other resources and river transportation. On the other hand, as noted earlier, a joint United States-Canada plan and program for the maximum multiple-use development of the entire Yukon River system could result in greater overall benefits than unilateral development of each political division of the system. The existing legal arrangements and history of attempted or proposed uses of the river system and its resources suggest possible arrangements which would maximize benefits to all parties. Mutually advantageous transportation and trade arrangements should be considered. It is quite possible that Fairbanks

and the Railbelt could handle export shipments from Yukon Territory, as might Valdez (especially after the road through Skolai Pass to the Alaska Highway is completed), more economically than present routes overland through Canada.[17]

It should be noted that neither the State of Alaska nor the Canadian side have yet done any concrete planning for any road links between interior Alaska and the Yukon Territory. Furthermore, a detailed cost analysis would be necessary to decide whether it would be more economical to ship mineral products from the Yukon Territory through southeastern Alaska ports or through interior and southcentral Alaska. These comments apply also to the idea presented in the aforementioned study of extending the Alaska Railroad eastward to link up with a northern extension of the Canadian Railroad system, especially in view of the interest expressed by the British Columbia railroad authorities in extending north.

There does seem long-run potential in exploiting the mutual interest of interior Alaska and the Yukon Territory in improved access to the Arctic Ocean, which is increasingly discussed as a route to Europe. In the longer term, joint facilities might include a port at the mouth of the Mackenzie River and necessary transport facilities to reach it.

In addition to ties with the Yukon Territory, presently centering mainly on common interest in the Yukon River, interior Alaska has, of course, connections with all Canada in the field of communications. The Alaska Communications System (ACS) has one contract with the communication subsidiary of Canadian National Railways (CNR) under which CNR provides voice and record communications from the Alaska-Yukon border through the Yukon and Alberta to the conterminous states. Only a small number of messages has been flowing over this channel between Alaska and Canada. In 1966, a total of 17,444 calls was recorded with 7,714 to Canada and 9,730 from Canada.

Given the elasticity of demand for communications services, the expansion of use between interior Alaska and Canada depends in part on evolution of service and reduced prices. In particular, there seems to be considerable pent-up demand for a TELEX system by enterprises in the Fairbanks area.[18]

5. ECONOMIC FUTURE

A. Fairbanks, The Regional Center

The Fairbanks area, including the populated areas on the highways north and south of the city, contained approximately 45,000 people in 1967, including military and dependents, approximately 80 per cent of the interior

Alaska population. (The Fairbanks area is defined as the North Star Borough plus Big Delta, site of Fort Greely, southeast of the borough, as shown on Figure 5-8.) The population of the Fairbanks area has increased only about 4.5 per cent from 1960 through 1967. A negative net migration of nearly 6,000 persons was recorded in the period, indicating that the population growth came entirely from natural increase.[19]

Increased employment and the out-migration have improved the overall employment situation in the area, although adversely affecting the balance between the tax-providing population and the consumers of government services. From 1961 through 1966, the total civilian labor force increased 17 per cent (a little less than 12,000 to 14,000) while civilian employment grew by 30 per cent, resulting in a decline of roughly 36 per cent in the unemployment rate (from 11.2 per cent in 1961 to 7.2 per cent in 1966).

Employment in government, transportation, services, and construction are the main props of the Fairbanks economy (Figure 5-9).

Federal, state, and local government provided approximately one-half of all nonagricultural wage and salary employment in 1966, although employment in transportation and contract construction increased at a faster rate than government in 1961-66.

Despite the lack of specific data, a considerable amount of employment in the main sectors of the Fairbanks area is related to activities outside the area. Fairbanks is the headquarters for government activities in northern Alaska, and much of the transportation and some trade and construction employment is geared to supporting activities outside Fairbanks which are largely government-financed.

Federal and state agencies involved in such activities as education contribute significantly to the use of air transport in administering villages in the region and in financing construction projects outside the Fairbanks area.

Another principal employment sector in the Fairbanks area, civilian government, is expected to show a mixed picture. The growth of federal civilian employment in the 1960's is attributable to a general expansion of federal government activities in the region and to a centralization of federal employees from northern and western Alaska posts.[20]

Assuming that the centralization has largely been completed, federal employment should expand at approximately one-half the 3 per cent annual rate of the 1960-66 era. This projection leaves out the possibility of a greatly expanded program of assistance to Native communities headquartering in Fairbanks.

FIGURE 5-8

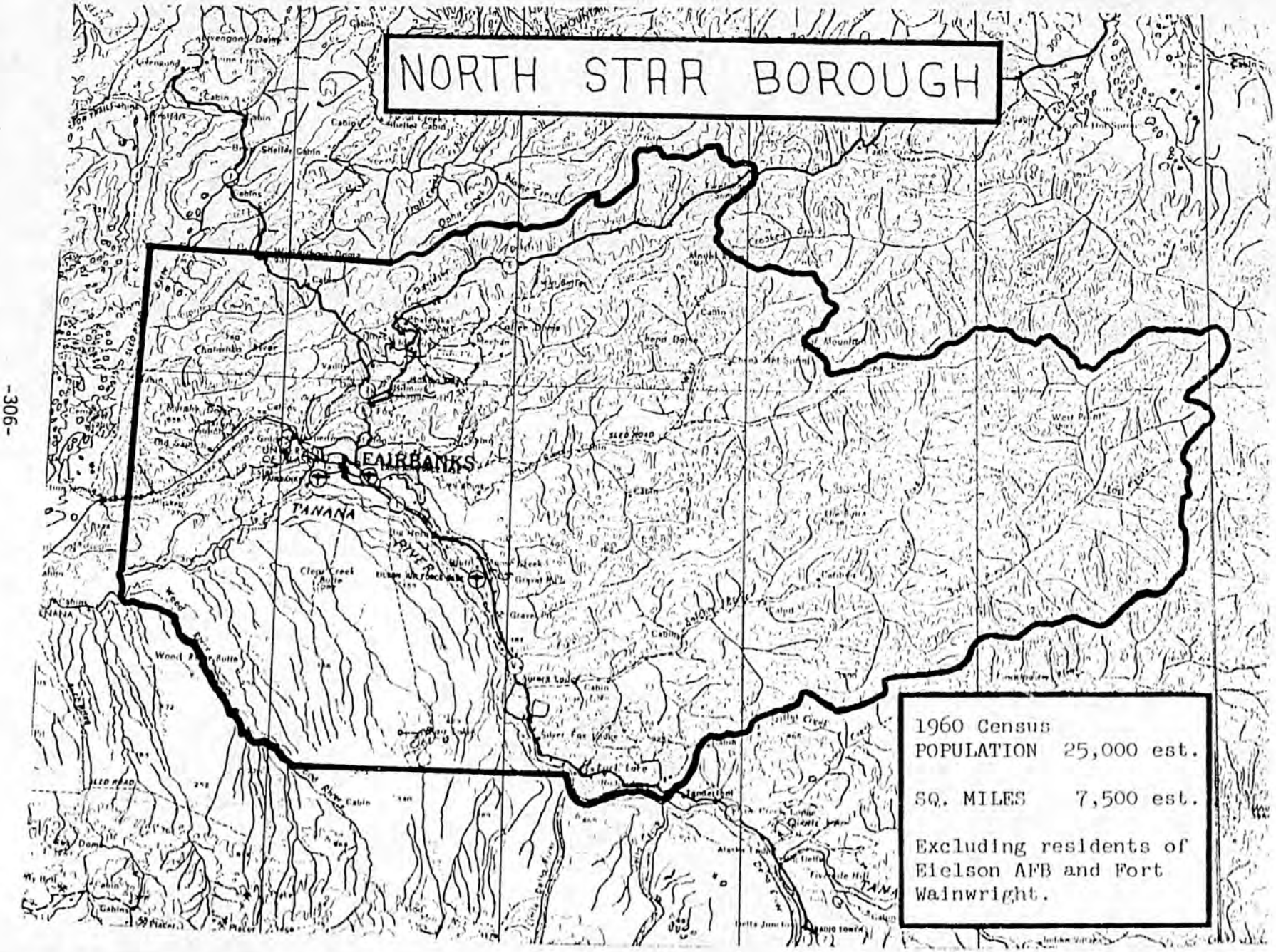

NORTH STAR BOROUGH
FAIRBANKS
TANANA
1960 Census
POPULATION 25,000 est.
SQ. MILES 7,500 est.
Excluding residents of Eielson AFB and Fort Wainwright.

FIGURE 5-9

NONAGRICULTURAL WAGE AND SALARY EMPLOYMENT BY INDUSTRY--FAIRBANKS
1961-1967

	1961	1962	1963	1964	1965	1966	1967
Total Employment	10,336	10,857	11,716	12,013	12,885	13,009	N.A.
Nonagricultural Wage and Salary Employment	9,068	9,632	10,454	10,681	11,508	11,765	11,535*
Mining	199	177	182	162	152	132	100*
Contract Construction	940	866	1,160	1,085	1,229	1,183	902*
Manufacturing	254	237	242	235	224	208	217*
Transportation, Communications and Utilities	746	817	841	982	1,037	1,068	1,074*
Wholesale Trade	230	234	253	292	287	(	
Retail Trade	1,242	1,132	1,261	1,284	1,377	(1,723	1,726*
Finance, Insurance and Real Estate	317	371	414	385	386	401	432*
Service and Miscellaneous	1,133	1,362	1,230	1,272	1,393	1,319	1,295*
Government	4,007	4,436	4,871	4,984	5,423	5,685	5,789*

*Projected on basis of first two quarters' data.

Source: University of Alaska, *Economic Base of the Fairbanks North Star Borough, Alaska*, by Robert C. Haring and Clem Correia, June, 1967, pp. 24-25.

The principal determinant of growth in the state and local sector is the University of Alaska. The University presently employs approximately 400 professionals with about 50 per cent additional in technical, administrative, clerical, and maintenance positions. The 1966-67 enrollment of 1,900 represents a 100 per cent increase over 1960-61.

Appropriations for research in fiscal years 1966-67 through 1968-69 are also impressive. Total expenditures for the Geophysical Institute, the Marine Science Institute, the Institute of Arctic Biology, the Institute for Social, Economic and Government Research, and the Alaska Agricultural Experiment Station rose from 6.7 million dollars in 1966-67 to 8.8 million dollars in 1967-68 to an estimated 9.8 million dollars in the present year, an average growth of approximately 20 per cent a year. The funding is heavily oriented to the Geophysical Institute, which is budgeted for about 5 million dollars this year, followed by the Marine Science Institute with 1.6 million dollars.

The differential growth of the funding by state and other, primarily federal, sources is significant for projections. Between 1966-67 and 1967-68 state research funds grew 4 per cent while federal and other funding increased 42 per cent . This year, however, state funding will increase 23 per cent and federal and other sources will grow by 12 per cent. For the short, intermediate, and long-run future, a 10 per cent rate of increase in research funds has been assumed, but if the federal component continues to slow, the growth of the University's research programs could be in jeopardy.

Since the teaching expense per student at the University of Alaska is extremely high, it is reasonable to assume that there will not be a rate of increase in faculty commensurate with expected enrollment increase. If enrollment increases by 50 per cent in the short-run (1971), we expect employment related to enrollment increase to grow by approximately one-half that rate. With a 10 per cent increase for research-related employment, total growth of 35 per cent is projected by 1971. The same rate is expected to hold in the medium and long-term futures. The University accounts for approximately 20 per cent of state and local government employment in the Fairbanks area. Assuming that most local government staffing has been accomplished, this area, excluding University employment, should increase at about the same rate as federal employment, approximately 1.5 per cent a year.

The other principal area of expected growth in the Fairbanks vicinity is construction and distributive employment. These activities are, in the end, dependent on primary expenditures in the federal and state government, mining, manufacturing, and tourism sectors. (About one-half of the state and local government employment is assumed in the primary category, as part of the state component is supported by funds from outside the region.) The previous assumptions regarding government employment lead to

a "judgment" projection of 6,300 employees in the short term, 7,000 in the intermediate term, and 8,400 in the long term.[21]

As described earlier, the possibility of constructing the extensions to the Alaska Railroad or some surface transport facility to the north - road or pipeline - has been included in the intermediate estimates, with 500 additional employees projected in the intermediate term as construction proceeds, decreasing to a hundred operational employees. The possibility of missile-site construction and manning has been covered by a 200-man addition in the high estimates, and the possibility of a complete military withdrawal has been included in the low projections.

Fairbanks area mining employment, which has declined sharply during the 1960's, is presently confined to small operations and explorations, together with supporting activities for the coal mining in the Healy area. At the minimum, the complete elimination of mining employment by the end of the intermediate term has been projected. The intermediate prospective is for development of North Slope oil to have an effect on mining employment in Fairbanks through the intermediate term roughly similar to the Anchorage area experience in the early 1960's. Assuming a continued decline of other mining employment in the short term, this would mean 150 mining employees by 1971 and 200 by 1974. The long-term projection calls for a doubling of mostly oil-related employment to 400. The high prospective assumes that intensive development of North Slope oil will take place by the intermediate term and continue into the long term, and, in addition, other mineral activities will have an impact on the Fairbanks area. Under this prospective, 350 employees are foreseen in the intermediate term and 500 in the long term.

Manufacturing in the Fairbanks area is presently heavily oriented to supporting other areas of the economy and is composed primarily of printing, making construction materials, bakeries, etc., rather than being truly primary industries. (An exception is several small lumber mills.) The high prospective includes the possibility that an oil refinery, employing some 100 persons, will be established in the Fairbanks area in the intermediate term. The timber industry will be largely located outside the Fairbanks area, which will benefit only from providing supporting services.

The present ratio of distributive and service employment to primary employment is .5 to 1, including mining, federal, civilian, and part of state government employment, plus military in the primary category. Three different levels of distributive and service employment have been projected, all of which assume development of the timber industry as outlined in the forestry section. Under the assumption that only limited development of oil will take place, no significant changes in the present transportation system will be made, and no increase in the rate of tourism growth, the ratio is projected to fall to .4 to 1; with intensive oil development, extension of the railroad, which would require few persons

involved in transshipment, and moderate increase in the growth of tourism, the ratio is projected at .6 to 1; with intensive development of oil, no railroad extension, and high tourism increase, the ratio is estimated at .8 to 1. The justification for the latter as far as oil development is concerned is that a higher level of supporting services will be established in Fairbanks, although Anchorage will continue as the management center for the North Slope. In addition, the railroad would require less transshipment than the present system of supplying the North Slope or an improved version of the present system. The three alternative ranges for distributive and service functions have been applied to the intermediate and long terms. For the short term, the ratio of .5 to 1 has been applied. Figure 5-10 indicates prospective levels of primary, secondary, and military employment as well as alternative populations for the Fairbanks area.

The prospective population has been calculated under several assumptions:

(1) During the 1960-66 period, the rate of natural increase in the Fairbanks area declined by almost 28 per cent from 29 per 1,000 to 21 per 1,000. The Native sector, although comprising less than 2,000 in 1967, was the population segment with the fastest-declining rate of natural increase, from 49 per 1,000 to 36 per 1,000. The white population rate of natural increase declined from 28 per 1,000 to 20 per 1,000. The rate is expected to continue declining during the period under study, but at a slower rate, approximately 3 per cent per year.

(2) Under the "low" prospective, a heavy out-migration is foreseen which, partly because of the military outflow, would be especially heavy in younger, single people. For this reason and because of the greater proportion of Natives left in the population, the population-employment ratio would be expected to increase to about 2.2 to 1 in the short term, and 2.5 in the intermediate term, compared to the 2 to 1 of 1960-66. With the continued decline of the Native rate of natural increase, the ratio would be expected to return to around 2 to 1 in the long term.

(3) Under the intermediate prospective, a continued out-migration would be expected, although at a slower rate than in the earlier 1960's. Accompanied by a slowing down and decline of natural increase, the slower out-migration would imply a slight increase in the population-employment ratio in the intermediate and long terms to 2.1 and 2.2, respectively.

(4) The high prospective would call for small in-migration in the intermediate and short terms, which with the declining rate of natural increase, would tend to lower the population-employment ratio. The ratio has accordingly been set slightly lower than the 2.0 average of the earlier 1960's, at 1.9. The population projected under the previous assumptions is shown in the following table.

FIGURE 6-10

PROJECTED EMPLOYMENT--FAIRBANKS

	Short Term (to 1971)			Intermediate Term (1971-74)			Long Term (1975-85)		
	Low	Inter-mediate	High	Low	Inter-mediate	High	Low	Inter-mediate	High
Primary:									
Government	6,300	6,300	7,000	7,000	7,000	8,750	8,400	8,400	10,500
Mining	50	100	150	-0-	200	350	-0-	400	500
Manufacturing-Refinery						100			100
Railroad Construction					500			100	
Military	-0-	11,000	11,000	-0-	11,000	11,000	-0-	11,000	11,000
Missile Base			200			200			200
TOTAL PRIMARY AND MILITARY:	6,350	17,400	18,350	7,000	18,700	20,400	8,400	19,900	22,300
Distributive and Service	3,175	8,700	9,175	2,800	11,220	16,320	3,360	11,940	17,840
TOTAL EMPLOYMENT:	9,525	26,100	27,525	9,800	29,920	36,720	11,760	31,840	40,140
POPULATION:	20,900	52,400	55,100	24,500	56,800	61,800	23,500	60,509	76,200

FIGURE 5-11

POPULATION PROJECTIONS-FAIRBANKS AREA

	Short Term	Intermediate Term	Long Term
Low	20,900	24,500	23,500
Intermediate	52,200	56,800	60,500
High	56,100	69,800	76,200

Source: Author's computations.

B. Regional Economic Future

There are indications that the area outside the Fairbanks vicinity grew faster in population than the latter. Figure 5-12 presents the populations of villages outside the Fairbanks area, and the totals check closely with other sources such as the 1967 statistics of the state Department of Labor.[22] Only Election District No. 20, of which Fort Yukon is the principal city, showed a decline in population (with Fort Yukon losing 51 inhabitants between 1960 and 1967). Tok with a 1967 population of 550 compared to 129 in 1960 was the fastest-growing place, spurred by travel-related establishments.

Although Tok and a few other places are not primarily Native communities, most of the area is heavily Native in population, and projections based on rates of Natives' natural increase are therefore valid. Between 1960 and 1966, Native natural increase throughout interior Alaska declined from 36.8 per 1,000 population to 27.2 per 1,000, a decrease of approximately 25 per cent. The low population projection assumes that the rate of natural increase will decline slightly faster than in the 1960 to 1966 period to about 20.5 by 1971, 18 by 1974, and 10 by 1985. The intermediate prospective calls for a decline in the rate of natural increase at 3 per cent a year, and the high projection is for a decline in the rate of natural increase at 2 per cent a year.

Present data on migration indicates an outflow at about 2 per cent a year in 1960 to 1967, and under the low prospective the same annual rate is projected.[23] This is based on the assumption of no significant development of timber, minerals, or other employment-generating activities. The intermediate prospective calls for an out-migration rate of 1 per cent a year, and the high prospective no in or out-migration, reflecting increased levels of employment in timber and minerals.

FIGURE 5-12

1960 AND 1967 POPULATION
OF VILLAGES IN INTERIOR ALASKA

		1960	1967
Election District No. 18	Allakaket	115	158
	Bettles	77	80
	Cantwell	85	100
	Galena	261	298
	Hughes	69	90
	Huslia	168	180
	Kaltag	165	226
	Koyukuk	128	125
	Manley Hot Springs	72	42
	Minto	161	202
	Nenana	286	470
	Nulato	283	307
	Rampart	49	47
	Ruby	157	168
	Tanana	349	400
	Election District No. 18 Total:	2,425	2,893
Election District No. 19	Dot Lake	56	50
	Northway	196	131
	Tanacross	102	112
	Tetlin	122	92
	Tok	129	550
	Election District No. 19 Total:	605	935
Election District No. 20	Arctic Village	110	82
	Beaver	101	106
	Birch Creek	32	33
	Canyon Village	N.A.	41
	Chalkyitsk	57	96
	Circle	41	86
	Eagle	92	89
	Fort Yukon	701	650
	Stevens Village	102	98
	Venetie	107	135
	Election District No. 20 Total:	1,343	1,334*
	TOTAL:	4,373	5,162
	TOTAL:**	4,373	5,121

*Ex-Canyon Village: 1,293. **Ex-Canyon Village.

Source: Federal Field Committee for Development Planning in Alaska, *Villages in Alaska and Other Places Having a Native Population of 25 or More, Estimates, 1967.* U. S. Bureau of the Census, *U. S. Census of Population: 1960, Number of Inhabitants, Alaska,* 1960, pp. 3-10, 11. State of Alaska, *Community Gazetteer of Alaska.*

The following tables show the projected population in the ex-Fairbanks region and the summary for the villages and the Fairbanks region (Figures 5-13 and 5-14, respectively).

FIGURE 5-13

POPULATION EX-FAIRBANKS AREA

	Short Term	Intermediate Term	Long Term
Low	5,200	5,200	4,700
Intermediate	5,500	5,700	6,100
High	5,800	6,300	7,400

Source: Author's computations.

The sums of the prospectives for the Fairbanks area and the rest of the region are shown in the following table.

FIGURE 5-14

POPULATION FOR TOTAL REGION

	Short Term	Intermediate Term	Long Term
Low	26,100	29,700	28,200
Intermediate	57,700	62,500	66,600
High	61,900	76,100	83,600

Source: Figures 5-11, 5-12, 5-13.

FOOTNOTES

CHAPTER 5

1. Alaska Department of Health and Welfare, *Estimated July 1st Population by Race and Election District.*

2. University of Alaska, *Fairbanks Community Survey: A Profile of Poverty*, p. 1.

3. Bureau of Indian Affairs, *Report of Labor Force Employment and Unemployment as of March, 1967, Fairbanks District.*

4. Federal Field Committee for Development Planning in Alaska, *Fairbanks Flood Disaster and Alaska's Economy*, prepared by Bradford H. Tuck with Douglas N. Jones, p. 7. Three policy "sets" concerning income input are tested. Under Set 1, no special disaster loans or grants are made available by any government agency. The federal government would only maintain levels of civilian and military employment in effect at the time of the flood and reconstruct its own facilities. Policy Sets 2 and 3 would distribute funds in larger amounts by quarterly injection into the economy. The time distribution was based on assumptions of such factors as the ability of the Fairbanks economy to absorb inputs to its income stream without undue inflationary pressures.

5. *Fairbanks Flood Disaster and Alaska's Economy, op. cit.*, p. 15. It should be mentioned that the Senate recently passed the Omnibus Rivers and Harbors Bill, including $113.5 million for the Fairbanks Flood Control project. Assuming two-thirds of this amount will enter the income stream and the project will take three years, approximately $25 million will become part of regional income.

6. *Alaska Forest Resource Inventory Project*, a project proposal by the Forest Products Task Force of the Federal Field Committee for Development Planning in Alaska, March, 1968, p.22.

7. *Ibid.*, p. 22. The Yukon River Valley is considered by the Forest Service to be the area of second priority after the Tanana for aerial photography. Since the export market is most likely, the river should be studied for transportation of logs and lumber. In addition, dock or at least anchorage sites at the mouth of the river should be investigated.

8. For a more detailed analysis of the railroad extension, see (among other possible citations) *Transportation and Economic Development in Alaska*, prepared for the Federal Field Committee for Development Planning in Alaska, pp. 180-190. (Prepared by the Transportation Task Force, Lyle K. Brown, Chairman, with Douglas N. Jones.)

9. *Ibid.*, p. 21. Included in the outgoing air freight from Fairbanks is that carried by the Hercules C-130 aircraft of Alaska Airlines. The craft has carried loads up to 50,000 pounds to oil exploration activities north of the Brooks Range and to the copper development at Bornite northeast of Kotzebue.

10. Alaska Department of Economic Development and Planning, *Traveler Profiles*, December, 1964, p. 21 and Cresap, McCormick & Paget, *A Program for Increasing the Contribution of Tourism to the Alaskan Economy*, 1968.

11. *Direct Exhibits submitted by the City of Fairbanks, North Star Borough, and Fairbanks Chamber of Commerce, Inc. (Fairbanks Parties)*, November 15, 1966, Exhibit FAI 900, pp. 6-7 and Supplemental Request for Evidence, dated June 11, 1966, p. 1.

12. State of Alaska, Department of Highways, *Long-Range Highway Program*, January, 1968.

13. Federal Field Committee for Development Planning in Alaska, *Transportation and Economic Development in Alaska, op. cit.*, p. 11. The Department of Defense is presently exploring the feasibility of such action.

14. *Anchorage Daily News*, July 21, 1968, p. 11.

15. U. S. Department of the Interior, *Alaska Natural Resources and the Rampart Project*, p. 41; Report of the President's Review Committee for Development Planning in Alaska, transmitted to the White House March, 1968.

16. Data for this section were obtained from a working paper of the Alaska Power Administration entitled *Alaska Railbelt Transmission System*, December, 1967. Golden Valley Electric Association, an REA cooperative, provides electric power to the heavily-settled area around Fairbanks, to an area extending about 30 miles southeast along the Alaska Highway, and to the community of Delta, approximately 70 miles from Fairbanks. Interconnections are maintained with Fort Wainwright Army Base near Fairbanks, Fort Greely near Delta, the City of Fairbanks, and the University of Alaska. GVEA has recently constructed a 22,000 kilowatt mine-mouth steam plant using subbituminous coal in the Healy area. The plant has more than doubled the previous capacity of GVEA and should take care of the load into the middle or late 1970's, assuming the 10 per cent annual increase experienced since the early 1950's. The Fairbanks municipal system increased consumption at an average annual rate of 7 per cent since the late 1950's. Most of the requirements are supplied by the city's coal-fired plants, and the utility also operates a 5,000 kilowatt oil-fired turbine.

17. Federal Field Committee for Development Planning in Alaska, *Alaska-Northwest Canada Economic Activities,* Part II, prepared by George W. Rogers with Douglas N. Jones, 1968, pp. 15, 19.

18. *Ibid.,* p. 112.

19. Alaska Department of Labor, *Current Population Estimates-Alaska, by Election District,* July 1, 1967.

20. University of Alaska, *Economic Base of the Fairbanks North Star Borough,* p. 41.

21. *Alaska Natural Resources and the Rampart Project, op. cit.,* p. 40. Several factors could favorably affect the government employment picture. One is expanded commitment to Native development. Another is the mineral research program suggested in *Alaska Natural Resources and the Rampart Project,* including the Institute of Arctic Mineral Resources at the University of Alaska.

22. Alaska Department of Labor, *Current Population Estimates by Election District-Alaska,* July 1, 1967.

23. *Ibid.*

SUBREGION V
Northwest Alaska

CHAPTER 6

NORTHWEST ALASKA--REGION V

1. DIAGNOSTIC CHARACTERISTICS OF THE REGION

Region V consists of all of Alaska north of the Yukon River drainage. Its approximately 150,000 sqare miles[1] make up the most "arctic" region under United States jurisdiction. The area is generally north of the treeline and consists mainly of tundra and mountains, and the climate is inhospitable to most human activity. Typical temperature ranges in the interior are -55° to +80° F. On the north and west coasts, where most of the people are concentrated, the extremes are more moderate--in the vicinity of -30° to +50° F.--but there the cold is aggravated by overcast or fog most of the year and average wind velocities of 8 to 25 knots.

A. Population and Labor Force

The population, estimated at 13,400 in 1967, is scattered along the seaboard and in a handful of villages on the Kobuk and Noatak rivers (Figure 6-1). This is the home country of the "Northern" or *Inupiat*-speaking Eskimo; of the total resident population, about 83 percent are estimated to be Alaska Natives, all but a few of whom are Eskimo. About 43 percent of the Natives and more than half of the non-Natives live in the three largest villages, Nome (1967 population 2,450), Kotzebue (1,774), and Barrow (1,560). (See Figure 6-2.) Thirty-two other villages with year-round residents plus a handful of defense and communications installations account for the rest.

As in Region III, the Bureau of Indian Affairs estimates of Native population can be accepted as reasonable indicators of orders of magnitude, and they are in close agreement with the current estimates of the U. S. Bureau of the Census and of the State of Alaska. Both of the latter, however, show a rapid growth of non-Native population for Region V, which growth is not confirmed by any other evidence, such as employment statistics or qualitative examination of individual communities (including remote defense installations). On the contrary, there has probably been a slight decline in the non-Native population.[2] In any case, the non-Native population, both military and civilian, contains a large proportion of young, adult male transients,[3] and the primary determinant of the size of this group in Region V is labor demand rather than birth and death rates.

The Native population of northwest Alaska increased at an annual rate of 22.7 per thousand between 1960 and 1967.[4] (Figure 6-3.) This growth resulted in part from a very high crude birth rate, 42.6 per thousand

FIGURE 6-1

POPULATION OF REGION V, 1929-1967

YEAR	SOURCE	RESIDENT POPULATION			MILITARY	RESIDENT CIVILIANS		
		TOTAL	NON-NATIVE	NATIVE		TOTAL	NON-NATIVE	NATIVE
1929	Census	6,101						
	Rogers-Cooley	7,730	1,360	6,370				
1939	Census	7,633						
	Rogers-Cooley	9,211	1,549	7,662	5	9,206		(7,762)
	Rogers	10,000				10,000	2,300	7,700
1950	Census	9,717						
	Rogers-Cooley	9,624	1,961	7,663	477	9,177		(7,633)
	Rogers	10,000			500	9,500	1,800	8,400
1960	Census[a]	11,784	2,411	9,373[b]	742	11,042	(1,669)	(9,373)
	Rogers-Cooley	11,784	2,411	9,373	748	11,036	(1,663)	(9,373)
	Rogers	12,000			800	11,200	(1,800)	(9,400)
	Ak Dept H & W	11,800	2,400	9,400				
1961	Rogers	12,300			800	11,500	2,000	9,500
	Ak Dept Labor	12,309			792	11,566		
	Ak Dept H & W	12,000	2,400	9,600				(9,600)
1962	Rogers	12,300			800	11,500	1,800	9,700
	Ak Dept Labor	12,338			792	11,546		
	Ak Dept H & W	12,200	2,500	9,700				(9,700)
1963	Rogers	12,700			800	11,900	1,900	10,000
	Ak Dept Labor	12,690			792	11,898		
	Ak Dept H & W	12,600	2,700	9,900				(9,900)
1964	Rogers	12,300			800	12,500	2,300	10,200
	Ak Dept Labor	13,343			792	12,551		
	Ak Dept H & W	12,700	2,700	10,000				(10,000)

FIGURE 6-1 (Continued)

YEAR	SOURCE	RESIDENT POPULATION TOTAL	NON-NATIVE	NATIVE	MILITARY	RESIDENT CIVILIANS TOTAL	NON-NATIVE	NATIVE
1965	Rogers	13,200			700	12,500	2,200	10,300
	Ak Dept Labor	13,242			575	12,667		
	Ak Dept H & W	12,900	2,800	10,100				(10,100)
1966	Rogers	13,000			700	13,900	1,800	10,500
	Ak Dept Labor	13,022			688	12,334		
	Ak Dept H & W	13,300	3,000	10,300	700	12,600	(3,500)	(10,100)
	H. P. Gazaway[c]	13,325	2,062	11,263				
1967	Ak Dept H & W	13,300	3,000	10,300	700	13,700		
	BIA-FFC[d]	12,506	1,534	10,972				
	Our Estimate[e]	13,400	2,200	11,200	500	12,700	(1,700)	(11,200)

Note: Region is Barrow, Kobuk, and Nome districts plus Barter Island, except for censuses before 1960 in which it is Cape Nome District less Mekoryuk and Cape Nash; Fairhaven and Noatak-Kobuk districts, plus Kaktovik village in Fairbanks District. Rogers-Cooley and Rogers estimates are for "Northwest Alaska."

[a]Alaska Department of Labor uses unadjusted Census figures for 1960, U. S. Bureau of the Census estimates for other years.
[b]Natives are taken as "Indians" and "Other Races" (....than white, Negro, Japanese, Chinese, and Filipino).
[c]Nome area, plus Barrow, Barter Island, Meade River, Point Lay, Wainwright, and a proportional part of population in places not listed by name in Fairbanks area.
[d]Population of places with Native population of 25 or more.
[e]Rounded from Figure 6-2.

Figures in parenthesis are presented for comparison, and assume no Natives in armed forces.

FIGURE 6-2

VILLAGE POPULATION ESTIMATES, REGION V

VILLAGE	OLD ELECTION DISTRICT	CULTURE	1967 POPULATION BIA-FFC ESTIMATES			1966 GAZAWAY TOTAL	U. S. CENSUS POPULATION		
			NON-NATIVE	NATIVE	TOTAL		1960	1950	1939
Nome	23	E-W	816	1,634	2,450	2,700	2,316	1,876	1,559
Barrow	21	E	160	1,651	1,811	1,560	1,314	951	363
Kotzebue	22	E	227	1,513	1,740	1,774	1,290	623	372
Unalakleet	23	E	109[a]	513	622[a]	650	574	469	329
Selawick	22	E	16	420	436	387	348	273	239
Noorvik	22	E	8	437	445	468	384	248	211
Gambell	23	E	15	402	417	360	358	309	296
Savoonga	23	E	5	402	407	390	299	249	209
Point Hope (Tiagara)	22	E	11	313	325	340	324	264	257
Wainwright	21	E	8[a]	310	318[a]	307	253	227	341
Kiana	22	E	10	253	263	227	253	181	167
Shishmaref	23	E	7	242	249	221	217	194	257
Teller	23	E	25	224	249	238	217	160	118
Stebbins	23	Y	3	218	221	202	158	115	98
Noatak	22	E	8	192	200	296	275	326	336
Kivalina	22	E	3	190	193	153	142	117	98
St. Michael	23	Y	15	180	195	196	205	157	142
Shaktolik	23	E	5	186	191	181			
Koyuk	23	E	4	170	174	139	129	134	100
Shungnak	22	E	4	163	167	153	135	141	193
Barter Island (Kaktovik)	21	E	9[a]	141	150[a]	145	125		
Elim	23	E	4	142	146	175	145	154	
Ambler	22	E	6	128	134	114	70		
Wales	23	E	10	115	125	128	128	191	193
White Mountain	23	E	4	115	119	144	151	129	199

FIGURE 6-2 (Continued)

VILLAGE	DISTRICT	CULTURE	1967 POPULATION BIA-FFC ESTIMATES NON-NATIVE	NATIVE	TOTAL	1966 GAZAWAY TOTAL	U. S. CENSUS POPULATION 1960	1950	1939
Brevig Mission	23	E	3	115	122	107	77	109	
Anaktuvuk Pass	21	E	2	115	117	110	35	66	
Golovin	23	E	3	91	94	91	59	94	116
Buckland	22	E	2	90	92	88	87	108	115
Deering	22	E	2	87	89	60	95	174	230
Diomede	23	E	1	69	70	69	88	103	
Kobuk	22	E	5	61	64	70	54	38	31
Northeast Cape	23	E	[a]	55	56	56			
Bornite	22	W	18	17	35	90			
Candle	22	E	6	15	21	21	103	105	119
King Island	23	A				16	66		208
Umiat	21	W				75			
Point Lay (Kali)	22	M-E	[a]		[a]	12	50	75	117
Tikililuk (Meade River)	21	A					30	49	78
Mary's Igloo	23	A					5	64	114
Bessie No. 5	23	A						54	
Tin City	23	M	[a]		[a]				
Cape Lisburne	22	M	[a]		[a]				
Other Military Installations	22	M	[a]		[a]				
ENUMERATED ABOVE			1,534	10,972	12,506	12,460	10,559	8,477	7,205
OTHER PLACES			700[b]	250[b]	950[b]	865	1,225	938	428
TOTAL			2,234[b]	11,222[b]	13,456[b]	13,325	11,784	9,415	7,633

Note: Region is Barrow, Kobuk, and Nome districts plus Barter Island except for censuses prior to 1960, in which region is Cape Nome, Fairhaven, and Noatak-Kobuk districts (1950 boundaries) less Nunivak Island.

[a]Military and non-Native Department of Defense and contractor employees living on military installations are included in "OTHER PLACES."
[b]Our estimate.

E = *Inupiat*-speaking Eskimo. Y = *Yupik*-speaking Eskimo. W = Non-Native. A = Abandoned. M = Military.

FIGURE 6-3

BIRTHS AND DEATHS, REGION V

	1960	1961	1962	1963	1964	1965	1966
Births							
All	485	473	474	444	449	464	409
White	34	40	30	33	36	30	34
Nonwhite	451	433	441	401	413	434	375
Deaths							
All	99	104	112	111	106	71	106
White	15	15	14	16	11	8	11
Nonwhite	84	89	98	95	95	63	95
Native Birth and Death Rates per 1,000 Population*							
Birth Rate	48	45	45	40	40	41	35
Death Rate	9	9	10	9	9	6	9
Natural Increase	39	34	34	31	31	35	26

Source: Numbers of births and deaths--Alaska Department of Health and Welfare.

*Nonwhite births and deaths against Native population estimated by exponential interpolation between 1960 Census figure and 1967 Bureau of Indian Affairs-Federal Field Committee estimate. Non-Native (white) rates were not estimated because of unreliability of population data. Non-Native rates for 1960, based on Census figures were births 19, and deaths 4, per thousand.

between 1960 and 1966. The Native birth rate, however, has dropped spectacularly during this period, from 48 to 35 per thousand (Figure 6-4), and can be expected to fall further because of the rapid and effective distribution of contraceptive devices and the selective outmigration of young women. The high birth rate joined with a total death rate lower than the overall U. S. national average[5] to produce an annual rate of natural increase of 22.7 per thousand, approximately twice the national average.

More than one-third of the natural increase in Native population was offset by outmigration. There has also been a movement from the smaller villages to Barrow, Nome, and Kotzebue; together these three places accounted for 30 percent of the region's population in 1939, 36 percent in 1950, 42 percent in 1960, and 45 percent in 1967. Migration, both within and from the region, has been a highly selective one of young adults so that many villages are now composed overwhelmingly of old people and children.[6] In 1960, persons 15 to 39 years of age made up 30.7 percent of the nonwhite census population (compared to 42.5 percent of the total Alaska population); the proportion has probably declined since that time. The absence of young women is particularly conspicuous in the small villages. Bureau of Indian Affairs 1967 figures for its Nome district (Nome and Kobuk election districts) as a whole showed Native males over 16 years of age outnumbering females by nine percent (Figure 6-9).

The distribution profile for various indicators of welfare, social development, and acculturation are typically bimodal, reflecting a large gulf between the conditions of the Native and non-Native population. For instance, in the 1960 census the median number of school years completed by whites was 11.7 and for nonwhites 4.2 (Figure 6-5). The median individual income for whites over 14 was almost eight times that of nonwhites (Figures 6-6 and 6-7). The low educational and economic positions of the region's Natives are understated by these figures because of the low quality of the few years of schooling completed and the low purchasing power (perhaps half the national average) of the few dollars of money income.

The bipolarity of the social statistics for the northwest region reflects its dual economy, the existence (side by side) of the largely non-market hunting and fishing economy of the Eskimos with a few enclaves or extensions of North American urban society.

B. The Subsistence Economy

Contact with Western civilization over the past hundred years has changed the pattern of Eskimo life considerably, but most of the people are still economically and culturally oriented to the same subsistence resources on which they depended prior to contact. With the exception of Nome and two or three other mining camps, every settlement in the region was located

FIGURE 6-4

ESTIMATED COMPONENTS OF POPULATION CHANGE
NATIVE POPULATION, REGION V, 1960-1966

		AVERAGE ANNUAL RATE PER THOUSAND	
		REGION V NATIVES	U. S. AVERAGE 1966
1960 Population (Census Count)	9,373		
1966 Population (exponential interpolation between 1960 Census and 1967 Bureau of Indian Affairs-Federal Field Committee estimate)	10,725		
Total Increase	1,352	22.7	10.3
Births (1/2 of 1960; 1961-1965; 1/2 of 1966, Table V-3, nonwhite)	2,536	42.6	18.6
Deaths (1/2 of 1960; 1961-1965; 1/2 of 1966, Table V-3, nonwhite)	530	8.9	9.5
Natural Increase	2,036	33.7	9.1
Net Migration (residual)	-684	-11.0	+1.8

FIGURE 6-5

EDUCATIONAL ATTAINMENT OF THE POPULATION, REGION V, 1960

	TOTAL	WHITE	NONWHITE
Number of Persons Over 25 Years of Age	4,667	1,354	3,313
No Schooling	524	10	514
Elementary School			
1-4 years	1,027	14	1,013
5-6 years	849	22	827
7 years	328	40	288
8 years	533	116	417
High School			
1-3 years	364	235	129
4 years	461	364	97
College			
1-3 years	299	294	5
4 years or more	282	259	23
Median School Years Completed			
Region V	5.9	11.7	4.2
Alaska	12.1	12.4	6.6
United States	10.6	10.9	8.2

Source: U. S. Census of Population.

FIGURE 6-6

FAMILY INCOME DISTRIBUTION, REGION V, 1959

	TOTAL	WHITE	NONWHITE
Number of Families	1,831	377	1,454
Income			
Under $1,000	299	7	292
$1,000 to $1,999	376	15	361
$2,000 to $2,999	252	62	190
$3,000 to $3,999	189	14	175
$4,000 to $4,999	136	39	97
$5,000 to $5,999	130	35	95
$6,000 to $6,999	121	44	77
$7,000 to $7,999	62	19	43
$8,000 to $8,999	80	22	58
$9,000 to $9,999	42	26	16
$10,000 and over	180	145	35
Median Income of Families			
Region V*	$2,940	$6,370	$2,390
Alaska	$7,305	$8,060	$3,339
U. S.	$5,660	$5,893	$3,711

Source: U. S. Census of Population.

*Medians calculated on assumption of proportional distribution within median income class.

FIGURE 6-7

INDIVIDUAL INCOME DISTRIBUTION, REGION V, 1959

	TOTAL	WHITE	NONWHITE
Number of Persons	6,851	1,870	4,981
Without Income	1,912	143	1,779
With Income	4,939	1,737	3,202
Income			
$1 to $499 or less	981	65	916
$500 to $999	792	88	704
$1,000 to $1,499	639	217	422
$1,500 to $1,999	312	101	211
$2,000 to $2,499	291	107	184
$2,500 to $2,999	334	202	132
$3,000 to $3,499	224	101	123
$3,500 to $3,999	138	70	68
$4,000 to $4,499	175	86	89
$4,500 to $4,999	125	80	45
$5,000 to $5,999	212	99	113
$6,000 and over	816	621	195
Median Income All Persons*			
Region V	$ 840	$3,060	$ 390
Alaska	$1,980	$2,670	$ 690
U. S.	$1,280	$1,390	$ 770

Source: U. S. Census of Population.

*Medians calculated on assumption of proportional distribution within median income class.

by reference to the availability of game, fish, or fuel. Again with the exception of Nome, in each settlement within the region the primary occupation of most families is subsistence hunting and fishing. The *Alaska Dietary Survey* found that locally harvested foods in four northwest Alaska villages accounted for 30 to 46 percent of the caloric intake and 67 to 81 percent of the protein. These ranges are probably typical of most smaller settlements and also of Barrow. The dependence on local subsistence food resources is much less at Nome and may be somewhat less in Kotzebue and Unalakleet. Locally gathered materials are the main source of fuel outside of Nome, Kotzebue, and Unalakleet, where oil heat prevails; and Barrow, where natural gas is available. Some local materials are used for clothing, building materials, and for making utensils and craft items for sale.

The proportion of subsistence production in the total quantity or value of goods and services consumed by the Eskimos of Region V understates their importance in terms of total economic activity and cultural significance. Cash incomes, which are highly irregular, are typically obtained in temporary employment at relatively high wage rates or, in some cases, from welfare payments. The vast bulk of labor input in terms of man-hours is devoted to hunting, fishing, fuel gathering, and other traditional activities. A substantial part of the cash flow is used for inputs of durable goods such as outboard motors, snow machines, and guns, and of supplies used in the subsistence sector. Seasonal life patterns are still dominated by the movements of fish, caribou, and marine mammals. Hunting skill remains the single most important determinant of social status and influence.

The composition of subsistence production and consumption varies widely among villages, depending mainly on the resources available. For the region as a whole, the most important wildlife resources are probably, in rough order of physical quantity utilized: caribou, seal and ugruk, fish (primarily salmon and arctic char), and fowl. Walrus, whales, moose, sheep, bear, and rabbits are also consumed.

The viability of the Eskimo subsistence economy in the region is apparently not now endangered by population pressures on the wildlife resources nor by the influx of nonresident hunters. The take of the most important species is in no case clearly approaching the maximum sustainable yield; stocks of caribou, seal and ugruk, walrus, beluga whales, etc., can probably yield a substantially greater kill.[7] Technical progress in the subsistence sector can result in much greater yields per unit of human effort, but will in most cases require material inputs obtainable only with money. The snow machine is working a revolution in hunting (and in other ancient pursuits, such as hauling of firewood and water) comparable only to the introduction of the rifle. But snow machines cost from $700 to $2,000 and require purchased fuel and parts. On the other hand, to the extent

they replace sled dogs they can be expected to improve markedly the utilization of the kill--much of the meat and fish taken today are fed to dogs.

The limits on the perpetuation and expansion of the subsistence sector are more cultural-economic and environmental than they are functions of population as such. Opportunities for wage employment, however uncertain, educational, health, and recreational opportunities are drawing part of the population to places like Nome, where game is scarce and where the white man's values predominate. In Nome and Kotzebue especially, young people gain neither the skills for subsistence production nor respect for those skills.[8] The environmental dangers are more difficult to define. All life in the Arctic is exceedingly precarious, and its ecological net is considered to be extremely fragile; the impact of pollution, erosion, overgrazing, etc., seems proportionately more catastrophic than in temperate regions. The effect on the caribou of roads or railways through their main migration routes or of mining wastes on the salmon, char, and sheefish of the Kobuk River and of the small, marginal runs to the north is very uncertain.

C. The Money Economy

The money economy of the region is overwhelmingly the province of its white minority. Though quantification of employment by cultural group is almost impossible from existing information, there seem to be no more than 500 to 600 resident Natives in year-round wage and salary employment (Figures6-8 and 6-9). In addition to these there are perhaps forty or fifty Native storekeepers, repairmen, and petty entrepreneurs; only a handful of these could be regarded as prosperous or successful. Outside of Nome, almost every family which includes a wage earner or owns a "business" has at least one full-time hunter/fisherman or other ties to the subsistence sector.[9]

The biggest and steadiest source of employment and of income in the region is government (Figure 6-10). Direct federal, state, and local employment accounted for 49.5 percent of average wage and salary employment and 42.4 percent of all payrolls in 1966. In addition, almost all contract construction (1.7 percent of employment and 3.8 percent of payrolls) and a large part of transportation, communications, and utilities (17.8 and 24.1 percent) and of miscellaneous services (14.8 and 18.2) were generated directly by government procurement.[10] Wage and salary employment is highly seasonal, but not exceptionally so for Alaska because of the heavy weight of government employment in the total and the counter-seasonal input of of petroleum exploration. Payrolls in the peak quarter of the year run 30 to 60 percent higher than in the lowest quarter, depending mainly on the

FIGURE 6-8

EMPLOYMENT CHARACTERISTICS OF THE WORKING AGE POPULATION
REGION V, 1960

	NUMBER OF PERSONS REGION V			PERCENTAGE OF TOTAL				
				REGION V			Alaska	U.S.
	Total	White	Non-White	Total	White	Non-White	Total	Total
Persons 14 Years and Over	6,851	1,870	4,981	100.0	100.0	100.0	100.0	100.0
Labor Force	3,518	1,648	1,870	51.4	88.1	37.5	68.8	55.3
Armed Forces	742	644	98	10.8	34.4	2.0	21.8	1.7
Civilian Labor Force	2,776	1,004	1.772	40.5	53.7	35.6	45.0	53.9
Employed	2,112	1,515	1,170	30.8	81.0	23.5	39.1	51.1
Unemployed	659	62	597	9.6	3.3	12.0	5.7	2.8
(Percent of Civ. Labor Force)				(23.7)	(6.2)	(33.7)	(12.6)	(5.0)
Not in Labor Force	3,333	223	3,110	48.7	11.9	62.4	33.1	44.6
Inmates of Institutions	0	0	0	0.0	0.0	0.0	0.6	1.4
Enrolled in School	644	133	511	9.4	7.1	10.3	6.0	8.2
Other under 65	2,282	158	2,124	33.3	8.4	42.6	24.0	25.2
Other 65 and over	407	32	375	5.9	1.7	7.5	2.6	9.9
Males 14 Years and Over	4,135	1,469	2,666	100.0	100.0	100.0	100.0	100.0
Labor Force	2,786	1,418	1,368	67.4	96.5	51.3	85.3	77.4
Armed Forces	742	644	98	17.9	43.8	3.7	36.6	2.8
Civilian Labor Force	2,044	774	1,270	49.4	52.7	47.6	48.7	74.6
Employed	1,525	724	801	36.9	49.3	30.0	41.6	70.8
Unemployed	519	50	469	12.5	3.4	17.6	7.0	3.7
(Percent of Civ. Labor Force)				(25.4)	(6.4)	(36.9)	(14.3)	(5.0)
Not in Labor Force	1,349	52	1,297	32.6	3.5	48.7	14.7	22.6
Inmates of Institutions	0	0	0	0.0	0.0	0.0	0.7	1.7
Enrolled in School	389	14	375	9.4	1.0	14.1	5.3	8.2
Other under 65	735	13	722	17.8	0.9	27.1	6.3	4.8
Other 65 and over	225	25	200	5.4	1.7	7.5	2.4	7.9
Females 14 Years and Over	2,716	401	2,315	100.0	100.0	100.0	100.0	100.0
Civilian Labor Force	732	230	502	27.0	57.3	21.6	36.9	34.4
Employed	587	218	369	21.6	54.3	15.9	35.5	32.6
Unemployed	140	12	128	5.2	3.0	5.5	3.8	1.9
(Percent of Civ. Labor Force)				(19.1)	(5.2)	(25.5)	(10.3)	(5.5)
Not in Labor Force	1,984	171	1,813	73.0	42.6	78.3	60.3	65.5
Inmates of Institutions	0	0	0	0.0	0.0	0.0	0.3	1.1
Enrolled in School	255	19	236	9.4	4.7	10.2	7.1	8.2
Other under 65	1,547	145	1,402	57.0	3.6	60.6	50.0	44.5
W/own childrenunder 6	876	83	793	32.3	20.7	34.3	27.4	17.2
Married, W/husband	838	83	755	30.9	20.7	32.6	26.7	16.4
Other 65 and over	182	7	175	6.7	1.7	7.6	2.9	11.7

Source: U. S. Census of Population.

FIGURE 6-9

EMPLOYMENT STATUS OF NATIVE POPULATION
WESTERN PORTION OF REGION V, SEPTEMBER, 1967
(Bureau of Indian Affairs Nome District,
Equivalent to Nome and Kobuk Election Districts)

	NUMBER OF PERSONS			PERCENTAGE OF WORKING AGE POPULATION		
	Total	Male	Female	Total	Male	Female
Total Resident Native Population	9,741	5,112	4,629			
Under 16 Years	4,835	2,518	2,317			
Working Age (16 Years and Over)	4,906	2,594	2,312	100.0	100.0	100.0
Labor Force	2,609	1,793	818	53.1	69.1	35.4
Employed	1,225	899	326	24.9	34.7	14.1
Permanent (more than 12 mos.)	513	385	128	10.4	14.8	5.5
Temporary (incl. persons out of region on seasonal work)	712	514	198	20.4	19.8	8.6
Unemployed	1,386	894	492	28.2	34.4	21.3
(Percentage of Labor Force)				(53.1)	(49.9)	(60.1)
Partially Unemployed (Temporary plus Unemployed)	2,098	1,408	690	42.8	40.4	29.8
(Percentage of Labor Force)				(80.4)	(78.5)	(84.4)
Not in Labor Force	2,295	801	1,494	46.8	30.9	64.6

Source: Bureau of Indian Affairs. Compiler evaluted data as "highly accurate" to "reasonably accurate."

FIGURE 6-1C

EMPLOYMENT AND UNEMPLOYMENT, REGION V
1961-1967 by Quarters

YEAR/ QUARTER		TOTAL WORK FORCE	UNEMPLOY-MENT	RATE OF UNEMPLOY-MENT	TOTAL EMPLOY-MENT	NONAGRICUL-TURAL WAGE AND SALARY EMPLOYMENT	MINING	CONTRACT CONSTRUG-TION & OTHERS	TRANSPORT., COMMUNICA-TIONS, UTILITIES	TRADE	SERVICES	GOVERNMENT
1961	1	2,181	623	30.8	1,508	1,307	42	23	344	283	108	507
	2	2,765	665	24.0	2,100	1,743	101	158	510	335	121	518
	3	2,908	228	9.9	2,620	2,156	105	189	575	557	131	599
	4	2,170	351	16.2	1,819	1,566	81	85	379	317	133	571
1962	1	2,154	699	32.4	1,455	1,398	24	76*	335	197	156*	610
	2	2,601	622	23.9	1,979	1,624	66	81*	493	221	166*	657
	3	2,760	333	12.3	2,421	2,052	94	178*	536	377	154*	713
	4	1,946	456	23.4	1,490	1,632	44	73	386	223	204*	703
1963	1	2,224	672	30.2	1,552	1,402	8*	20*	280	184	195	715
	2	2,587	707	27.3	1,880	1,685	29	59	361	234	209	793
	3	2,752	428	15.6	2,144	1,983	61	128	429	341	188	836
	4	2,452	522	20.5	1,930	1,746	52	81	285	249	287	792
1964	1	2,405	669	27.8	1,736	1,582	94	40	229	207	289	723
	2	2,573	656	25.5	1,917	1,587	95	76*	264	269	123*	760
	3	2,900	457	15.8	2,443	2,102	73	234*	413	314	217*	851
	4	2,279	404	17.7	1,875	1,879	76	89	358	273	264*	819
1965	1	2,301	543	23.6	1,758	1,598	61	69	864	212	250	742
	2	2,812	680	24.2	2,132	1,886	75	85	396	260	306	764
	3	3,221	418	13.0	2,803	2,461	40	277	484	339	285	1,036
	4	2,641	538	20.4	2,103	1,886	34	117	302	237	276	920

FIGURE 6-10 (Continued)

YEAR/ QUARTER		TOTAL WORK FORCE	UNEMPLOY-MENT	RATE OF UNEMPLOY-MENT	TOTAL EMPLOY-MENT	NONAGRICUL-TURAL WAGE AND SALARY EMPLOYMENT	MINING	CONTRACT CONSTRUC-TION & OTHERS	TRANSPORT., COMMUNICA-TIONS, UTILITIES	TRADE	SERVICES	GOVERNMENT
1966	1	2,464	624	25.3	1,840	1,690	47	35*	268	206	241*	893
	2	2,739	737	29.1	1,942	1,760	16	49*	334	269	269*	823
	3	3,027	476	15.7	2,551	2,267	31	142*	457	269*	341*	1,037
	4	2,596	610	23.5	1,986	1,888	31	97*	306	232	258*	914
1967	1					1,712			357	213	316	877
	2					1,921			434	288	367	986
	3					2,498			404	378	396	1,069
GROWTH RATE (Annual, %)		1.4	2.4		1.5	1.9	-2.4#	0.8##	-4.4	-4.4	7.3	4.0
Index of Seasonality		1.26	1.73		1.19	1.39	2.11	4.57	1.74	1.71	1.41	1.19

Note: Region consists of Barrow, Kobuk and Nome Labor Market areas. "Contract Construction and Others" includes numerically minor categories of manufacturing; and finance, real estate and insurance.

An asterisk indicates synthetic figures, one or more of whose components was furnished by projection or seasonal adjustment, or which is a residual depending on one or more synthetic figures.

Growth rate is exponential least squares regression coefficient; index of seasonality is ratio of average in highest quarter to average in lowest quarter. Growth rate and seasonality index calculated simultaneously by multiple regression analysis of series.

#Trend not significant to .75 level.
##Trend not significant to .60 level.

Source: Alaska State Department of Labor.

level of construction activity. The seasonal pattern of tourism with its impact on the transportation and service industries is another source of fluctuation.

In such an economic context, rates of insured unemployment are very poor indicators of economic welfare. They tend to range from about 5 to 10 percent of the labor force during the seasonal employment peaks, to 25 to 40 percent in the seasonal lows. A more meaningful, if imprecise, observation is that virtually every resident white male is employed in the money economy the year round, while only a small minority of resident Native males are employed year round. Non-Native seasonal workers are almost all transients.

Other sources of income for the Native residents include temporary employment in construction work, both inside and outside the region; employment at fish processing plants in Bristol Bay and elsewhere; fire fighting; service occupations catering to tourists; small-scale commercial fishing; trapping and commercial hunting for local markets; reindeer herding and slaughtering; handicrafts such as skin sewing and ivory carving; public assistance and remittances from family members residing outside the region. Of the foregoing, temporary employment is by far the most important. Welfare payments are a remarkably insignificant proportion of total income and actually appear to be declining relative to the population.[11]

It should be pointed out that the region is not at all homogeneous. The "basic industries" of the Barrow labor market area are, in order of importance: (1) defense installations and contractors (DEW line, etc.) and Department of Defense-supported research (Naval Arctic Research Laboratory), and (2) petroleum exploration. Unemployment rates are relatively low for rural Alaska and average incomes relatively high. About half the permanent civilian employment seems to be held by local Eskimos, thanks to the deliberate efforts of the U. S. Navy and of some government contractors to develop and use the local labor force.[12]

The Nome labor market area's "basic industries" are: (1) government, mainly in the fields of general government; social services; and education; and (2) tourist services, Unemployment and underemployment are both high, and steady employment is overwhelmingly in the hands of the white minority. The most depressed part of the region is the Kobuk labor market area, whose major settlement is Kotzebue. There is some government, tourist, and mineral activity, but none of them is a large source of income or employment at present. The labor force participation rate for Natives 16 to 65 years of age is in the vicinity of 40 percent, and probably over half the Natives regarded as in the labor force are unemployed even at the seasonal employment peak.

2. ECONOMIC DEVELOPMENT POTENTIALS

The potential for economic development of the region rests largely in minerals and tourism. At present, no mineral production is being carried out, but the North Slope as a whole may turn out to be one of the world's richest petroleum provinces, and the general geology of the Brooks Range suggests the possibility of major metallic ore deposits. Actual production of either is unlikely within four or five years, and the future of the mineral industries in the area is still highly speculative. In the present primitive state of mapping, surveys, and exploration, statements about the region's "vast mineral wealth" are prophesies of the faithful more than assertions of fact.[13] Nevertheless, indications of oil and gas and of other commercial mineral prospects have been sufficient to encourage substantial private investment in exploration.

The general statements concerning fisheries development potential in Region III are applicable to Region V as well; but the latter's resources are even more limited, less effectively utilized, and bring resident fishermen a lower unit price than the former's. Figure 6-11 presents a rough estimate of the produce of the fisheries industries of Region V. The assumptions are the same as in Figure 4-12 *(q.v.)*. There are other, offshore and high-seas fisheries resources in the Bering and Chukchi seas, but they are unlikely to be developed from bases in the region.

A. Mineral Resources with a High Probability of Development

The North Slope oil province, extending north from the foothills of the Brooks Range out to and beyond the Arctic Coast, has one proved oil field at Umiat, on the edge of Naval Petroleum Reserve No. 4. There has also been considerable exploration activity in the North Slope area in 1967 and 1968. In January, 1967, 23 offshore Arctic Ocean tracts were leased for $1.5 million. Exploration drilling has been on two wells near Prudhoe Bay, and significant quantitites of both oil and gas have been found.

Wildcatting activity north of the Brooks Range has been generally considered a speculative hedge against the distant future, but the nature of the Prudhoe discovery may have already brought about a spectacular change in this attitude. Initial information indicates that the geologic structure (or structures) tapped by the two wells may very likely be of gigantic proportions. From a technical point of view, the thickness of the pay sections, the indications of high gas saturation (meaning high reservoirs of energy), and the seven-mile distance from the two test wells all point toward a very large discovery.

FIGURE 6-11

POTENTIAL GROSS VALUE OF FISHERIES, REGION V

	VOLUME (1,000 LBS)				AVERAGE RAW FISH PRICE	PROCESSED PRICE		FOB GROSS VALUE ($)			
	1966 (Actual)	1968	1970	1973 on	1966	1970	1973 on	1966	1968	1970	1973 on
Norton Sound											
Chum Salmon	540		800	800	.10		.30	54,000		240,000	240,000
King Salmon	31		60	60	.20		.50	6,200		30,000	30,000
Pink Salmon	38		300	800	.079		.10	3,000		30,000	30,000
Coho Salmon	40		150	150	.12		.40	4,800		60,000	60,000
Salmon Roe										75,000	75,000
Herring			750	750			.07			52,500	52,500
Bottom Fish				450			.05				22,500
Other Species			250	350			.30			105,000	105,000
TOTAL VALUE								68,000		592,500	615,000
Kotzebue Sound											
Chum Salmon	250	400	450	450	.10	.176	.30	25,000	70,400	135,000	135,000
Salmon Roe									20,000	22,500	22,500
Sheefish	26	100			.10	.30		2,600	30,000		
Arctic Char	27	200	350	350	.10	.30	.30	2,700	60,000	105,000	105,000
Other Species											
Herring			250	250			.07			17,500	17,500
Bottom Fish				450			.05				
TOTAL VALUE								30,300	180,400	280,000	302,500
GRAND TOTAL								98,300		872,500	917,500

Note: Assumptions of this table are: approach to maximum commercial utilization of the product by 1973 based on local storage and freezing or processing in optimum scale facilities along lines contemplated by Kuskokwim Fishermen's Cooperative. Further assumptions are: no major change in technology, ability of local enterprise to sell directly to highest price market in U. S. or Japan, and no change in CIF, U. S., or Japan prices. Average FOB prices are converted on the basis of round fish weight equal to fishermen's delivery weight. See discussion of fisheries in Region III, pp. 275-278.

Industry people familiar with the North Slope have stated that a pipeline to an ice-free port would be a reality if Naval Petroleum Reserve No. 4 had been open to private leasing at the conclusion of federal drilling in 1953. Since it was thought that from one to two billion barrels would have to be discovered on the North Slope to justify either a pipeline to an ice-free port or development of the technology for an alternate means of transport, the decision whether or not to proceed with the development of any North Slope discovery was expected to hinge on the decision to lease NPR #4. However, the apparent size of the Prudhoe strike now leaves this assessment in some doubt. It is certain, for instance, that the companies which made the discovery are now proceeding as fast as possible with pipeline route feasibility studies and have perhaps already entered the design phase, clearly on the assumption that the discovery will turn out to be large enough to support, by itself, the huge investment necessary for the construction of a pipeline.[14]

Part of the reason for this rush is the State of Alaska's "discovery incentive" which allows reduced royalties on discovery lease production for a ten-year period *commencing at the date of discovery*. Under this pressure the firms have abandoned their previous policy for working only during the winter months when the frozen ground makes it possible to move equipment overland. For the immediate future, 30-50 men will probably be employed in year-round drilling. If the initial size indications are confirmed, employment will undergo a gradual buildup, peaking during the actual pipeline construction. The most optimistic estimates indicate that this might occur between as early as the winter of 1970-71, but there is little certainty associated with this date. Employment levels would probably reach a maximum of 750-1,000 at the height of construction.

Most of the jobs involved will require high levels of technical skill; this may be no absolute deterrent to employment of residents (Natives) as has been shown by the training and recruitment of indigenous workers by petroleum companies in the Middle East and by the successful development of skilled Eskimo labor by defense contractors on the North Slope and by mining companies in Canada. Although in the long run it may be cheaper for the industry to recruit from a population which is at home in an area whose conditions of life most Americans find intolerable, there is little indication that the industry will on its own take the initiative in this direction.

Anchorage, Kenai, and Fairbanks are now staging points for Atlantic-Richfield's operations at Prudhoe Bay, as was Fairbanks for the Navy's earlier efforts in Naval Petroleum Reserve No. 4. Offices, supply depots, and ancillary facilities for even a larger oil industry on the North Slope will probably continue to be located in the Cook Inlet area, largely because of the harsh climate, long winter nights, and lack of amenities in the North. Oil executives, technicians, and laborers alike will be

disinclined to make their homes in the area; and the high cost of maintaining permanenet bases and offices will more than offset the additional cost of moving men and materials as needed from southcentral Alaska.[15]

Over 100 million tons of relatively high-grade copper ore are known to exist in the vicinity of Ruby Creek in the Kobuk River drainage. The Kennecott Copper Corporation is now carrying on underground explorations and has probably already invested over $10 million in the prospect. It was originally thought that a mine here could be operated at a relatively small scale, but the progress of exploratory drilling has convinced the company that only a very large operation, if any at all, would provide the necessary extraction economies. While Kennecott is secretive about both its findings and its intentions, there is a possibility that production will be initiated within the next five years, with 200 to 500 persons engaged directly in the mining facility and perhaps as many in supporting activities. At present Kennecott employs an average of about thirty men in the exploration operation, and some of these workers are Kobuk Valley Eskimos.

B. Mineral Resources with a Limited Probability of Development

The Seward Peninsula and Kobuk River areas are both historically important gold mining areas. At the present time, there seems little likelihood that the onshore placer deposits that formerly dominated the industry will see much development unless there should be either a radical change in the price of gold or a radical advance in placer technology. Offshore placer deposits, however, particularly along the south shore of the Seward Peninsula, are currently being investigated by several organizations, including Shell Oil Company and the U. S. Geological Survey. Underwater dredging and mining techniques are being investigated, and it is conceivable that a significant industry could develop using these techniques. The employment impact of such operations is highly uncertain; the activity would probably be seasonal and extremely capital intensive, requiring only a handful of technical personnel.

The Lost River tin deposit on the Seward Peninsula constitutes the most important domestic U. S. source of tin now known. A smelter was operated here during and immediately after World War II, but expanding foreign supplies and unfavorable cost relationships resulted in its closure. Reduced availability of foreign supplies or national security requirements could conceivably bring about a resumption of production, but known reserves are limited, and additional discoveries would be necessary for continuing production.

C. Mineral Resources with a Low Probability of Development

Huge reserves of bituminous and sub-bituminous coal underlie the area from Cape Lisburne eastward to the Colville and north to Petard Bay, but prospects for marketing are very dim. Other minerals certainly present, not now in known commercial quantitities or form, include phosphate rock, flourite and beryllium, tungsten, lead, and graphite.

D. Tourism

The number of tourists visiting the region annually is now approaching the number of residents. Most visitors spend one night or less in the region, and the bulk of their spending is for transportation in and out rather than for local goods or services. The number of visitors and their average duration of stay may be expected to increase, however, as tourist facilities are provided, such as Alaska Airlines' new 45-unit hotel at Nome. One aspect must be kept in mind in projecting future levels of tourism: The region's attractions to tourists are its reminders of the traditional subsistence activities and way of life of the Eskimos and its unique wildlife resources. If development results in the disappearance of these, the region will have little special for the average traveler but its harsh weather.

3. ECONOMIC FUTURE OF THE REGION

The population and potential labor force of Region V is expected to continue to increase rapidly,[16] and there is little prospect for this increase to be absorbed by local employment opportunities. In addition, the new entrants (and nonentrants) to the labor force will not generally have the education or acculturation for successful outmigration. The only certain sources of growth are in general government, social services, tourism, and Arctic research, each of which will make some contribution to the income and employment of the Native people. There are, however, possiblities for spectacular developments in the mineral industries, but the *assured* economic impact of mineral activity is limited to a continuing growth of exploration. Both the future level of exploration and the likelihood of actual production of oil and gas, copper, or other minerals will be determined mainly by the material quantity and quality of forthcoming discoveries. On the whole, the development of neither a labor force nor an economic infrastructure in advance of proved discoveries seems to be critical.[17] On the other hand, acceleration of mapping and survey activity by either the U. S. Geological Survey or by the state can be expected after two or three years to result in substantially greater exploration effort; and the latter in turn would increase the expectation of actual production commencing in perhaps five to ten years.[18]

Even in advance of possible production, the exploration investment in Region V and the public revenues generated from leases will be enormous in resident *per capita* terms, as will the gross value of product and public royalties and revenues when any production begins. But these flows will not generate a direct demand for the labor of local Eskimos *at their present levels of acculturation, education, and skills*, and in conformity with their present customs of employment and livelihood, so that the constructive impact on the indigenous economy may not be great.[19]

The secondary labor demand, or "multiplier effect," of large-scale extractive industry will be exceptionally small because the indigenous economy has virtually nothing to sell to the petroleum and mining companies or to their employees--not capital goods, or labor, or transportation services, or foodstuffs, or even the services of local government. The employment multiplier for Region III's "basic industries" (commodity production and government) of 1.18 indicated that five jobs are required in "basic industry" to generate one in trade, transportation and communications, services, and miscellaneous activities in the region. The multiplier coefficient for Region V's mineral activities must be even smaller;[20] most of Region III's employees in "basic industry" (overwhelmingly government) at least live in the villages, make some purchases at village stores, travel by common carrier, and the like. In Region V, on the other hand, a much higher proportion of personnel in the extractive industries are expected to be stationed at remote camps supplied directly from Anchorage or Fairbanks and hence effectively isolated from the indigenous subregional economy.

FOOTNOTES

CHAPTER 6

1. The area of the old Barrow, Kobuk, and Nome election districts was 127,064 square miles. As here defined, Region V is these districts plus the remainder of the area north of the crest of the Brooks Range.

2. "Non-Native" and "white," and "Native" and "nonwhite" are roughly interchangeable in the region. The 1960 Census enumerated, in addition to whites, Inidans, and "Others" [Eskimos], 96 Negroes, 22 Japanese, 1 Chinese, and 1 Filipino.

3. Among resident whites over 14 years of age in Region V in 1960, males outnumbered females by more than 4-1/2 to 1.

4. This rate is derived from the 1960 Census enumerations and the 1967 Bureau of Indian Affairs-Federal Field Committee estimates.

5. The relatively low death rate for Natives in Region V is a result of the age profile of the population; specifically, the high proportion of children. Age-sex-specific death rates for Natives in the region are still higher than national averages.

6. A. Hippler and others, *Northwest Alaska Regional Study*, University of Alaska, Institute of Social, Economic and Government Research, for the Federal Field Committee for Development Planning in Alaska (unpublished at date of this writing).

7. Dall sheep, polar bear, and grizzly bear are relatively scarce and could not sustain heavy hunting pressure. But their economic potential to the region is undoubtedly greater as an attraction for the expenditures of nonresident hunters in search of trophies. The caribou of northern Alaska seem to be more abundant now than at any time in recorded history, after a long "disappearance" beginning in the mid-nineteenth century. Their decline used to be explained by the introduction of rifles and by the market hunting on behalf of the whalers. While this account is now almost completely discredited, biologists have not yet satisfactorily explained for the apparent absence of caribou. There is no assurance that interaction with man was not somehow involved or that he cannot again somehow trigger the disappearance of the caribou. On the other hand, the most persuasive theory today is that the crash was caused by an excessive animal population on the range; if this is the case, a high level of harvest may be the only practical way *to prevent* their catastrophic decline.

8. Hippler, *et al.*, *op. cit.*

9. *Ibid.*

10. The biggest single enterprises in both the "transportation, communications, and utilities" and the "services" groups are defense contractors. More than half the airline passenger traffic to and from Nome, Kotzebue, Barrow, Unalakleet, and Barter Island is paid for directly by government travel request.

11. Hippler, *et al.*, *op. cit.*

12. The Naval Arctic Research Laboratory at Barrow, operated by the University of Alaska for the Department of Defense, alone employs 40 to 50 local Eskimos in permanent jobs.

13. The absence of knowledge of the region's resources is, in our opinion, the main deterrent to their development. There is no conclusive evidence, for instance, that the lack of transport facilities is inhibiting the development of important known resources. See Tussing, Erickson, and Rudd, *Alaska Mineral Policy and Legal Analysis*, University of Alaska (unpublished at date of this writing). See also, Lawrence E. Heiner and Ernest N. Wolff, *Mineral Resources of Northern Alaska*, University of Alaska, Mineral Industry Research Laboratory, Report No. 16, 1968. For a different view of the relation of transportation access to resource development in Northwest Alaska, see the Federal Field Committee's Transportation Task Force report, *Transportation and Economic Development in Alaska*, 1968.

14. Atlantic-Richfield Company announced in August, 1968, its intention to complete a pipeline to an ice-free port by 1970. It is reported in addition that British Petroleum, Ltd., which holds large leases on the North Slope as well as in the Canadian north, has let contracts for a prototype submarine tanker.

15. Fairbanks, while almost three hundred miles closer to the North Slope than Anchorage-Kenai, may be passed over as the major staging point because of the external economies generated by existing Cook Inlet oil activity. One real possibility, however, is for the bulk of the labor force required on North Slope petroleum projects to be housed in Fairbanks and flown daily to the work sites. This strategy would, of course, reduce both the opportunities for and advantages to the industry of local Eskimo hire.

16. The *rate* of increase can be expected to decrease, however,

17. Neither the petroleum industry nor Kennecott Copper Company has given notable encouragement to efforts to extend surface transportation networks into the Arctic.

18. Tussing, Erickson, and Rudd, *op. cit.*

19. The difficulty of matching local labor demand to local labor supply will be exacerbated by the customery (and understandable) practice of large employers, including government agencies, to do their recruiting for remote projects in Fairbanks, Anchorage, Seattle, New Jersey, or other larger labor markets. For instance, the large contractors who would be involved in construction of a pipeline from the North Slope to tidewater or further normally "bring in" their entire work force to any remote project.

20. No multiplier could be calculated for Region V from available employment data because both the "transportation, communications, and utilities" and "services" categories in the employment statistics are dominated by defense contractors who should properly be included in the region's "basic industries." Making these categories part of the independent variable of the multiplier expression, however, would leave only trade as the dependent component and would give a meaningless coefficient.

CHAPTER 7

PUBLIC FINANCE AND REGIONAL DEVELOPMENT

1. THE GENERAL CASE

The traditional broad divisions of public finance--taxation, expenditures, and debt management--are all especially applicable to regional development in Alaska. The dominance of government--federal, state, and local--by almost any measure is the explanation for this. Of particular importance to the strength of the state's economy is government's fiscal behavior both on the revenues side (including taxation and intergovernmental transfers) and the expenditure side (as these translate into income, employment, and social investment).

In reviewing briefly Alaska's tax structure the following types of state taxes are noted: net income tax (individuals and corporations); business license tax; tobacco and liquor tax; insurance, license, mining license, and vending machine license taxes; inheritance and school tax; motor fuel oil tax; and oil and gas properties production tax.[1] At present sales taxes and property taxes are left to governmental units below the state level.

Receipts from taxes typically make up 50 percent of total revenues of the states generally; in Alaska the figure is closer to 25 percent. This does not imply a lagging tax effort on the part of Alaska--rather, that heavy intergovernmental transfers are involved as transitional grants and aids to highways and airports, education, public welfare, employment security, and the like.[2] In fact, federal payments typically have made up about two-thirds of Alaska's total revenues. This fraction is projected to diminish over the period to less than half by FY 1971. Excluding federal assistance, Alaska follows the pattern of most states in its breakdowns of revenue sources with the income and gross receipts taxes among the chief yielders. Unlike many states, however, rents and royalties from extractive operations and charges for the extensive state ferry system are very important sources.

Alaska follows the pattern of state expenditures in some cases, but it generally diverges rather markedly from the typical patterns. This divergence is to be expected in that the establishment of a viable state as an integral part of the Republic populated mainly with persons used to and demanding of all the public service trappings of a modern society requires great initial expenditures to "catch up." State of Alaska expenditures by type and function are presented in Figure 7-1, and expenditures of federal programs for Alaska are presented in Figure 7-2.

FIGURE 7-1

EXPENDITURE BY TYPE AND FUNCTION: STATE OF ALASKA, 1967
(Millions of Dollars)

Type/Function	Expenditure*	Percent of Total*
Total General Expenditures	$264.4	100.0 %
Education	59.4	22.5
Highways	116.1	43.9
Public Welfare	9.6	3.6
Hospitals	4.6	1.7
Health	3.1	1.2
General Control	5.7	2.2
Correction	3.1	1.2
Natural Resources	8.9	3.4
Employment Security Administration	2.4	0.9
Housing and Urban Renewal	9.4	3.6
Airports	8.5	3.2
Water Transport and Terminals	0.6	0.2
Miscellaneous Commercial Activities (State Ferry)	6.0	2.4
General Public Buildings	6.5	2.6
Interest on General Debt	3.2	1.2
Insurance Trust Expenditures	8.0	3.0
Miscellaneous and Other	10.8	4.1

*Columns may not add in detail due to rounding.

Source: *State Government Finance in 1967*, U. S. Department of Commerce, Bureau of the Census, Table 9.

FIGURE 7-2

AGGREGATE EXPENDITURES OF FEDERAL PROGRAMS FOR ALASKA BY AGENCY
FY 1967

AGENCY		EXPENDITURE
Defense Department		$320,734,500
Air Force	$185,791,500	
Army	104,755,000	
Navy	30,188,000	
Commerce Department		58,940,572
Health, Education & Welfare		50,628,932
Independent Agencies		49,416,841
Interior Department		46,921,576
Treasury Department		15,364,000
All Other		23,972,185
GRAND TOTAL		$565, 978,606

Source: News Letter, *Report from Washington*, from the Office of Senator E. L. Bartlett, February 4, 1966.

From this heavy governmental involvement some have concluded that Alaskans are contributing fiscally far less than their revenue capacities and, specifically, that their tax effort is less than it "should" (could) be. It is true that the history of the revenue capacities of the states is one marked with great resilience and resourcefulness; i.e., their capacities are almost always underestimated; and Alaska is perhaps no exception. Considerable care must be exercised, however, in the computations of tax burdens and efforts in the Alaskan case. Per capita total tax payment by Alaskans in 1965 was a respectable $213 *vs.* $162 for all states. Within this comparison, the income tax payment (corporate and individual) was $96 *vs.* $36. Licenses and miscellaneous charges are significantly above the 50-state averages. But even these comparisons seriously understate the tax effort made by the Alaskan citizenry. From its quarter million population, several substantial "subtractions" must be made in arriving at a reasonable denominator. Of the 46,000 Eskimos, Indians, and Aleuts, perhaps 30,000 could be at all considered as members of family economic units participating in the economy. Another 50,000 persons should be largely subtracted as military population residing on military bases and generally exempt from Alaska taxes. Using the adjusted population figure of 184,000, the per capita tax payments become $315, with the income tax going to $141 per person.

A further fiscal constraint on local governments in the case of the property tax comes from the dominance of federal ownership of land in Alaska. Federal government land holdings in Alaska make up about half of its total U. S. holdings (359 million out of 700 million acres).[3] In 37 states the federal government owns less than 10 percent with the overall public land acreage totaling a third of the U. S. land area.[4] This compares with a 98 percent figure for Alaska frequently cited. Furthermore, the great amount of federal (and state) properties and real estate established to house and operate governmental activities are tax exempt though, in many cases, they are in very valuable locations and they enjoy the public services provided by the community in which they are located. The acquisition cost of the major real estate properties owned by the federal government in Alaska is estimated at over $2 billion.[5] Since many are admittedly located in remote areas not even incorporated by a subordinate governmental unit, it is not here argued that private properties would necessarily be constructed or utilized in the absence of public real estate. Nor is the point denied that the taxes foregone are vastly more than made up in terms of the economic activity generated by government. The point is simply that they are separate features of the fiscal finances in Alaska. Alaska typically receives about half of the 50 state average in the per capita amount of property taxes--$53 *vs.* $111.[6] This has meant that the property tax yields about 24 percent of the total tax revenues in Alaska as opposed to a 50-state average of 44 percent. In the case of the upcoming sale of the Alaska Communication System (now operated by the Air Force) to the private sector, revenues from the several direct tax sources would amount to over a quarter million dollars annually, exclusive of the corporate income tax. This is revenue foregone and is estimated conservatively on

the basis of a $10 million fair market property value for the utility and $16 million annual gross receipts. If the Alaska Railroad were privately owned, the $130 million value of its facilities would, of course, come on the tax books. This last is mentioned only as a further case in point.[7]

2. SOME PARTICULAR CASES

In the private sector some major industrial facilities are soon due to yield tax receipts to state and local units. Alaska Lumber & Pulp Company is presently in the final years of its 10-year tax concession from Sitka and the state. The new petrochemical plants on the Kenai Peninsula are variously estimated to yield up to $6 million yearly in state income taxes ($4 million annually on the ammonia-urea plant and $2 million annually on the gas liquefaction plant) beginning in 1970.[8] A third pulp mill is due on the scene in southeastern Alaska in the coming three-year period as Champion-U. S. Plywood makes its selection of site and construction for the commercial usage of its recent purchase of Forest Service timber. Additional smaller facilities can be expected to spring up in the fisheries, forestry, and tourism industries. And, if further tax concessions are withheld or limited in their granting, the tax base of communities can be moderately strengthened with valuations increasing. Use of the sales tax will, as elsewhere, likely be expanded for it continues to be a "good yielder."

But by far the major private source of tax receipts paid the State of Alaska will come from the oil and gas industry in the foreseeable future. Figure 7-3 presents two sets of projections of future state revenues from oil and gas. These figures, assuming as they do no bonus payments or rentals from new leases, are exceedingly conservative.[9] Nevertheless, disposing of even $40 million annually, other than through debt retirement or holding it as idle funds, will, of course, give rise to additional Alaska income.

3. DEBT MANAGEMENT

As with most other costs in Alaska, the cost of contracting and managing public debt is high. It is viewed by the finance markets as a relatively high-risk area with a limited financial history and a tradition of high prices, including interest (the price of money). Accordingly, the bond ratings for most of Alaska's communities having any experiences in money markets is relatively low. At the moment, the state and the major communities within it have a bond rating of BAA. This situation can be expected to change gradually over the coming half dozen years as the economic soundness of particular communities (and the state) is demonstrated and the lingering myths about the region are dispelled.

FIGURE 7-3

ESTIMATED FUTURE RECEIPTS BY STATE OF ALASKA FROM
OIL AND GAS RENTALS, BONUSES, ROYALTIES, AND PRODUCTION TAXES ON PROVED FIELDS
1967-1972

	1967-68	1968-69	1969-70	1970-71	1971-72
OIL INDUSTRY ESTIMATES[a]					
Oil and Gas Production Tax[c]	$ 2,278,030	$ 5,893,023	$ 5,838,427	$ 6,069,643	$ 5,257,493
Bonuses from Oil and Gas Leases[b]	22,742,700	4,236,000	2,050,000	2,050,000	2,050,000
State Oil and Gas Royalties	13,814,505	31,840,951	31,680,659	33,439,506	30,034,560
Federal Oil and Gas Rentals and Royalties[b,d]	7,002,700	6,906,200	6,930,800	6,862,500	5,446,400
State Mineral Lease Rentals[b,d]	3,067,800	3,315,800	3,721,000	4,036,000	4,451,000
Oil Industry Totals	$48,905,735	$52,191,974	$50,220,886	$52,457,649	$47,239,453
STATE ESTIMATES[b]					
Oil and Gas Production Tax[c]	$ 1,952,000	$ 4,205,000	$ 4,971,000	$ 4,520,000	$ 3,951,000
Bonuses from Oil and Gas Leases	22,742,700	4,236,000	2,050,000	2,050,000	2,050,000
State Oil and Gas Royalties	8,706,000	20,863,000	26,034,000	23,870,000	20,351,000
Federal Oil and Gas Rentals and Royalties[d]	7,394,000	7,336,000	7,361,000	7,293,000	8,114,000
State Mineral Lease Rental[d]	3,067,800	3,315,800	3,721,000	4,036,000	4,451,000
State Totals	$43,862,500	$39,955,800	$44,137,000	$41,769,000	$38,917,000

Sources: [a]Western Oil and Gas Association, presentation to Second Session, Fifth Alaska State Legislature, February, 1968.
[b]Alaska Department of Natural Resources, Division of Mines and Minerals, February 19, 1968, estimates.

Notes: [c]Reflects 1 percent Disaster Severance Tax effective October 11, 1967.
[d]Includes a small amount of revenue from lease rentals on minerals other than oil and gas.

FOOTNOTES

CHAPTER 7

1. Portions of the analysis for this section are drawn from Douglas N. Jones' "Development Constraints on State Tax Policy Formulation," contained in the *National Tax Association Papers and Proceedings*, 1966, pp. 445-463.

2. With total intergovernmental federal revenue contributions running eight times the 50-state average (within which Education was eight and Highways ten times the average), the result is for Alaska's per capita Total General Revenue to be about three and one-half times that for other states. At the same time, however, state and local taxes as a proportion of personal income were 49th among the 50 states. *State Government Finances in 1967*, U. S. Department of Commerce, Bureau of the Census.

3. *Public Land Statistics*, 1966, U. S. Department of the Interior, Bureau of Land Management.

4. *Ibid.*

5. The Army and the Air Force together estimate a figure of $1.5 billion. The Alaska Railroad is valued at $130 million and the Federal Aviation Administration holdings at $36 million. The value of the holdings of the Department of the Interior agencies brings the total to over $2 billion. The results of the Public Land Law Review Commission's *Alaska Study* may in the longer term have significant effects toward diminishing government land holdings.

6. *Compendium of State Government Finances in 1965*, U. S. Department of Commerce, Bureau of the Census.

7. For some comments on the implications of Native land claims for taxation, see Chapter 9 of this study.

8. Study prepared for the Federal Field Committee for Development Planning in Alaska by Joseph E. Shafer, entitled, *Alaska's Economy in Case of a National Economic Pause: Fiscal Strength through Oil and Gas Receipts*, 1968, p. 18.

9. Preliminary projections, based on the same limited assumptions, completed independently in September, 1968, by the state and by the Western Oil and Gas Association, both show substantial increases over the February, 1968, estimates. In addition, the impact on industry expectations of Atlantic Richfield's Arctic Slope discoveries vastly increases the potential bonus income from future competitive leases in that region.

CHAPTER 8

SCIENCE, TECHNOLOGY, AND ECONOMIC DEVELOPMENT

The broad fields of science, technology, and education have particular relevance to any developing region; and in the case of Alaska this is especially so. Except in the defense area, the United States has limited experience in how to "handle" an arctic and sub-arctic environment. And the defense experiences it does have are not fully helpful in the building of a society in the Middle and Far North because they largely ignore the critical factor of cost. It is one thing, for example, to fashion an early warning defense communications complex in a severe and hostile environment where cost is not a governing consideration and quite another to build and operate a commercial telecommunications system where the cost factor really counts.

The role of science and technology in regional development is a subject receiving increasing attention.[1] Two aspects of this role are the *location* of scientific and technological activity itself and the usefulness of the *results* of that activity in application. Both of these aspects have relevance to Alaska's growth and development. They are here considered under the general proposition of information and information gathering as catalysts to development. The major sectors to be affected in Alaska are the petroleum, forest products, transport, and the construction and engineering industries and the fields of oceanography and meteorology. The institutions related to these are the universities, government, and private research facilities.

It is generally held that (1) there is a direct relationship between the growth of a firm or industry and the level of investment in research and development; and (2) rapid-growth regions include concentrations of technology-intensive industries; concentrations of scientists, engineers, and technicians; and relatively high research and development expenditures.[2] In Alaska the only commodity industry that ranks high in these terms is oil and gas--forest products and fisheries historically rank very low in scientific and engineering activity and research and development expenditures. And the firms active in these industries are national or international in scope, and have little reason to concentrate research facilities in Alaska. The agglomeration effect of research activities begetting research activities is at present not more than a modest force in Alaska. It has been the Field Committee position that government-agency arctic research activity be centered at the University of Alaska to the extent possible, and this is increasingly taking place. In the four-to-six-year time period, it is quite likely that the southcentral area of the state will experience a moderate increase in research and development activity both from the growth of university facilities and the locating of new government and private facilities in the region.

1. OCEAN PROGRAMS

As a maritime region, Alaska finds its development future, not surprisingly, closely tied to those fields in science and technology embraced by ocean programs. The fact is, the Alaska stake in increasing United States participation in ocean programs is a direct function of several factors: its undeveloped status, existing economic orientation to the marine environment, maritime-rim civilization, quantity and quality share of U. S. continental shelf resources, strategic polar position, and the richness of adjacent ocean waters, estuarine, and river systems.

Nowhere else under the flag of the United States can ocean program payouts be so great as in Alaska simply because so little has been done and the known resource, economic, and social potentials are so great. The state must, therefore, be vitally concerned with the direction and impact of federal ocean programs--in science, fisheries, mineral and fuel resources, transportation, hydrographic and geodetic surveys, pollution, recreation, environmental warning systems, national security, polar sea development, and international collaboration.

Much needs to be done. Alaska waters are largely inadequately surveyed or unsurveyed altogether. Onshore geodetic control is minimal. Bathymetric charts for resource explorations are inadequate, and the securing of navigation chartes with up-to-date data is difficult. Oceanographic data taken in the past from federal, state, and university expeditions in Alaska waters are yet to be correlated and placed in a single repository. In short, a great deal of marine survey data are required in order to permit governmental and industrial planning, explorations, and capital investment decisions. The task includes hydrographic surveys to increase the safety and efficiency of ferry and ship operations; geodetic control surveys to adequately plan and reference the development of resources, highways, communications, railroads, port and airport facilities and cities; and geodetic control for resolution of Alaska's seaward boundary; and bathymetric charts for fisheries, mineral and fossil-fuel resource developments on the continental shelf.

The Alaska Institute for Fisheries Development has been proposed in recognition of the importance of fisheries in Alaska's economy and the need for extension of assistance and demonstrational investigation and research for fisheries development. The future for Alaska's commercial fisheries is excellent. Most fishery resources are found on or over the world's continental shelves. Alaska has more than 550,000 of the U. S. total of 862,000 square miles of continental shelf area. Experts have estimated that Alaska's fishery potential is at least 5 to 10 times current production--including a half billion pounds of shrimp, 1.5 billion pounds of flounder, 1.2 billion pounds of cod and pollock, 500 million pounds of sablefish, and 500 million pounds of other species.

Economic development of Alaska's fishery potential can be hastened by an aggressive program of extension and demonstration of existing knowledge and research findings. The assumption is that government can be as effective in transforming knowledge into practice in fisheries as it has been in agriculture. This responsibility stems from the common-property status of the resource and from the basic structure of the industry.

The Fisheries Development Institute is conceived as a focal point for federal-state-industrial cooperation in developing new fisheries. Basically, the concept of the Institute is analogous to the many "college" farms and dairies that have been successful in extending knowledge to practice in the field of agriculture. The Institute would be a comprehensive and integrated venture of federal-state-industry cooperation in research and demonstration of new innovative technology for primary fisheries development and extension assistance to citizens for the development of a larger local share of the harvested fishery wealth.[3]

Of special interest, too, is the possible inclusion of Alaska in the National Science Foundation's emerging "Sea Grant College" program. Southcentral Alaska is the scene of rapidly expanding marine resource and industrial development. Scientific knowledge of the Alaska marine environment is an essential prerequisite and partner of this growth.

The University of Alaska has an excellent Institute of Marine Science growing in competence and stature. On-campus academic facilities are augmented through association with several governmental research centers in the biological, physical, and environmental sciences. The Institute now has a facility at Douglas Island in southeast Alaska, which has been in operation for the past several years, that offers an excellent outlet to the Alexander Archipelago region of southeast Alaska. This facility has special value for working the marine environment in this area, training students, and maintaining facilities for research on problems that can be especially well researched there. No other facilities permit an outlet to the sea and to the other vast regions of Alaska. The initiation of such other facilities is now especially timely.

In the 1967 legislative session three resolutions were passed encouraging the establishment of marine facilities at three locations along the southern coast of Alaska. These resolutions specified Kodiak, Seward, adn Juneau as possible locations. Part of this interest at the state level was stimulated by Public Law 89-688, "The National Sea Grant College and Program Act," which was established for the purpose of accelerating national development of marine resources through support and encouragement to academic institutions, research institutions, and laboratories for which modest funding has been provided for FY 1968. The first such laboratory would likely be placed in one of the southcentral Alaska locations where investigation of the continental shelf of the Gulf of Alaska would be undertaken

and at the same time permit studies of the very great resource area which includes Prince William Sound, Cook Inlet, Kenai Peninsula, and the Kodiak region. In the longer time period, similar installations might eventually be desired in southwest and northwest Alaska and even to the Arctic Coast.

Placing the above remarks in a time frame leads to the finding that, while the provision of information (if not discovery) is an on-going process, the results of scientific, technological, and engineering inquiry in ocean programs will not have dramatic developmental effects on Alaska over the one-to-three-year period. Results may be notable in the four-to-six year period in the petroleum industry and soon after that in the fisheries industry. Paybacks from research activities on the mining of the continental shelf might not eventuate until substantially later.

2. TRANSPORTATION[4]

The technological aspects of transportation and economic development in Alaska are many and varied. In some respects (though not all) Alaska presents the case in which there is an advantage in "coming last." That is to say, since the transport sector serving the state is generally still in the formative stages--perhaps with the exception of air transportation--there is the opportunity of leaping whole generations of technology, innovating and experimenting with new techniques and approaches, adapting and refining transport methods used elsewhere to the peculiarities of the Alaska case. At the minimum, where the transport sector is emerging and thus the inflexibility that comes with historical investment in particular patterns has not yet been experienced, the premiums on good policy planning are high and the possible paybacks great.

When looking at alternate transport technologies, a system view is, of course, required. Here must be considered both the inputs and the outputs in supplying transport facilities; for example, the relative capital requirements, operating and maintenance costs as well as paybacks, managerial talent, labor skills, associated facility requirements, and social and political impacts. In this context it has been pointed out that science and technology may make even a greater contribution to transportation by lessening the need for carriage than by supplying more capacity. If demands for transport can be reduced, scarce resources can be shifted to other neglected sectors of our economy. After all, it must be remembered that the main objective of our economy is higher standards of living and not merely higher standards of moving.[5] Advances in communications, like the advent of television to Native villages for use in education (classrooms) and medical services (diagnoses), could result in marked reductions in travel demands presently associated with these two activities.

As all-pervasive as technology is to the total transport problem, its facets can at least be categorized into those associated with the mode

(air, water, road, rail, and pipeline), those with the medium through--or over--which transport takes place (air and water navigation, land surfaces), those with the transport plant (terminals, docks, airports), and those associated with ancillary equipment (containers, materials, handling gear). Improvements in all of these categories will largely be the solution to Alaskan transport difficulties. Some already have come or are on the near horizon in the Alaska transport picture. Containerization in rail and water transport in a part of the Alaskan trade, coupled with modern shore-loading equipment, has shortened turn-around times, lowered transit times and inventories and their costs to the commercial core of the state. Ice-breaking vessels might be utilized to extend the shipping season in the future.

Slow, World War II, converted cargo vessels with equally slow dock equipment and inadequate terminals still describe a large segment of the Alaska sea trade. Piggyback, fishyback, van lines and trainships are methods now familiar to the current scene. The helicopter is a major vehicle for servicing the needs of exploration and extraction of the oil and minerals industry in the state, and hovercraft are now in experimental usage in commercial carriage. The Lockheed C-130 has been placed in scheduled commercial service for the movement of bulk and outsize cargo to, from, and within the state--frequently to remote sites with minimum landing facilities.

The theme is a consistent one. Given the small population and the high price/cost problems of the Alaskan economy, the formula must be: Improved Transport Technology = Capital Intensiveness = Low Total Wage Bill and High Productivity. To quite a degree, the Anchorage-Kenai area of Region II is now enjoying the benefits of transportation advances that have recently come on the scene. A major task now is to continue the development of new transportation technology for the state generally and translate those cost and service benefits presently enjoyed by the Anchorage-Kenai area into improvements throughout the region and to other outlying regions. This last is entirely possible in the one-to-three-year period and should be in full swing in the four-to-six-year period. The really basic breakthroughs in transportation technology (e.g., submarine tanker, VTOL aircraft and ground-effect machines, and associated plant and cargo handling facilities) would seem to be beyond the seven-year time horizon.

3. CONSTRUCTION AND ENGINEERING

Given that the construction cost index is two-to-three times that of Seattle, Washington, in many of Alaska's communities it is proper to look to advances in construction and engineering sciences as an important avenue toward cost reduction. The task is many faceted. It involves moves toward capital-intensive techniques in order to increase efficiencies and reduce the total wage bill. It involves moves toward extending the construction

season by environmental-control techniques which tend to reduce seasonal unemployment; e.g., the pouring of cement at extremely low temperatures. An increase in the attention to and exchange of mining, transportation, and construction information with other countries of the circumpolar community should in the future be helpful here, but no immediate breakthroughs are seen to be on the horizon.

FOOTNOTES

CHAPTER 8

1. For a good recent compilation of the major themes and works in this field see the U. S. Department of Commerce, Economic Development Administration, publication, *Impact of Science and Technology on Regional Development,* prepared by Midwest Research Institute, Decmeber, 1967.

2. *Ibid.*, p. 31.

3. The Institute would be composed of a multi-discipline staff of experts and supportive facilities to develop new technologies throughout the productive chain from the fishermen's nets to the retailers' shelves. The program itself would be problem oriented.

4. Much of this discussion of technology and transportation has been drawn from the recent Federal Field Committee publication, *Transportation and Economic Development in Alaska,* prepared by the Transportation Task Force of the Federal Field Committee, 1968, pp. 114-120.

5. *Transportation*, Vol. V, Science, Technology, and Development, United Nations Conference on the Application of Science and Technology for the Benefit of the Less Developed Nations, p. 16. In the Alaskan case, as elsewhere, the minimizing of the need for movement can take the form of good land-use planning in terms of industrial park locations, the agglomerating of commercial activities close to docks or airports, and the like. Kenai and Kodiak are current examples of this. It can take the form of upgrading the value of the commodity to be shipped through processing and reducing weight and bulk, enabling the commodity to better absorb transport charges. Thus, freezing, drying, and canning of foods may be the technology that is to be pursued and not only transportation technology. From this can come additions to local employment, local capital accumulations, and a more efficient use of the transport system. Finally, the minimizing of the need for movement can come through substitution, for example, the transmission of power over high-voltage lines from a central source instead of the transport of fossil fuels to generate that power at the points of usage. The Anchorage-Fairbanks circumstance might be a case in point.

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