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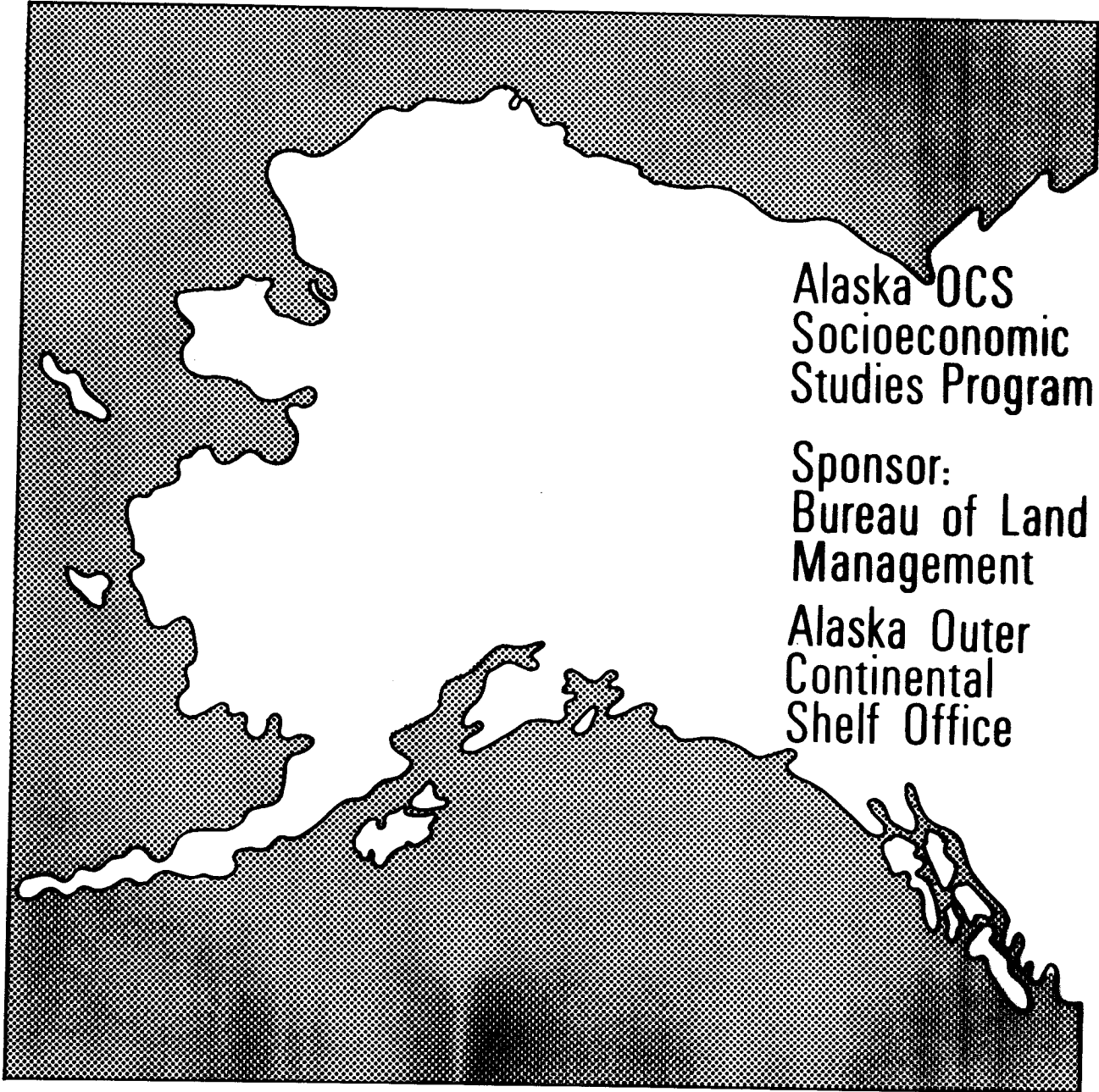## NUMBER 68

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NORTH ALEUTIAN SHELF STATEWIDE
AND REGIONAL DEMOGRAPHIC AND
ECONOMIC SYSTEMS IMPACTS ANALYSIS

Alaska OCS Socioeconomic Studies Program

NORTH ALEUTIAN SHELF STATEWIDE AND REGIONAL
DEMOGRAPHIC AND ECONOMIC SYSTEMS
IMPACT ANALYSIS

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Alaska OCS Socioeconomic Studies Program
North Aleutian Shelf Statewide and Regional Demographic and Economic Systems Impact Analysis

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ABSTRACT

NORTH ALEUTIAN SHELF STATEWIDE AND REGIONAL

DEMOGRAPHIC AND ECONOMIC SYSTEMS IMPACTS ANALYSES

This study examines economic and demographic impacts of the proposed
Outer Continental Shelf (OCS) petroleum development of the North
Aleutian Shelf (Sale 75). The study begins with historical baseline
analyses of the population and economies of the State of Alaska and of
the Anchorage, Aleutian Islands, and Bristol Bay census divisions.
Next, base case projections of conditions in the absence of OCS devel-
opment are prepared for these areas and, subsequently, the impacts of
OCS development are examined. The statewide, Anchorage, and Bristol
Bay projections used the MAP statewide and regional models, while the
Aleutian Islands projections used the SCIMP model. Both of these
models were developed at the University of Alaska Institute of Social
and Economic Research (ISER). The models' projections reflect numer-
ous assumptions about future exogenous activities.

The statewide base case projection of population in 2000 is 649
thousand. The maximum percentage impact of the North Aleutian Shelf
mean case OCS development upon statewide population would be 1.15
percent, or 7,868, in 1982. The Aleutian Islands base case total
population (including enclave residents and military) in 2000 is
25,089. The maximum percentage impact of the North Aleutian Shelf
mean case OCS development upon the Aleutian Islands population would

be 2.5 percent (822) in 1990. The maximum percentage impacts upon Aleutian Islands resident employment would be 16.6 percent (145) in 1990. The maximum projected impact upon Aleutian Islands nonresident or enclave employment (excluding military) would be 27.6 percent (733) in 1989.

I. INTRODUCTION

This study is concerned primarily with measuring the economic effects of the proposed Outer Continental Shelf (OCS) petroleum development in the North Aleutian Shelf (Sale 75). This study includes a statewide and regional historical baseline analysis and base case projections against which the direct and indirect economic effects of North Aleutian Shelf OCS petroleum development are measured. The analysis and projections are carried out on a statewide level and for three regions within the state: the Aleutian Islands, Bristol Bay, and Anchorage.

Part II of the study contains the historical baseline analysis for each of the economic areas in question and generally focuses on specific economic and demographic concerns relevant to an understanding of the historic growth of the economies. The baseline analysis also assists in laying the foundation for the base case assumptions regarding future growth of the areas.

Part III contains three important elements. First, the underlying projection methodology is explained and reviewed in terms of the economic models used and the accuracy and limitations of the projection methodology. Second, the assumptions used to "drive" the models are presented. Finally, the base case projections for the respective areas are presented, i.e., the economic and demographic projections in the absence of OCS development.

Part IV of the study presents a description and analysis of the projected impacts associated with the proposed North Aleutian Shelf lease sale. Results for the different OCS scenarios are discussed, both at the statewide and regional levels. Supporting materials are contained in the appendices.

II. STATEWIDE AND REGIONAL GROWTH:

THE BASELINE HISTORICAL ANALYSIS

This chapter provides historic baseline studies for Alaska and for Anchorage, the Aleutian Islands, and Bristol Bay. These studies are provided for three reasons. First, they should provide the uninitiated reader with a general sense of the structure of the economy and how and why it has changed over time. Second, they provide some indication of how individuals within the system have benefited from the functioning of the system; i.e., an assessment of economic well-being. Third, they provide guidance in developing assumptions regarding future development of the economy.

Potential impacts of OCS development will not be felt uniformly throughout the state. Specific regions within Alaska can be expected to experience both the brunt of the impacts and to capture disproportionate shares of the benefits. Therefore, we address not only the statewide economy, but specific regional economies as well.

The Statewide Economy: Statehood - 1979

At the risk of oversimplification, the economic history of Alaska can be summarized as one of resources, defense, disaster, more resources, and government. Prior to World War II, interest in the state focused

largely on natural resource exploitation, primarily based on furs, fish, and hard rock minerals. World War II and the cold war aftermath lead to a sizable military-government involvement in the state, both in terms of population and economic activity.

The advent of statehood found an economy reflecting a narrowly based private sector, largely dependent upon limited natural resource activity, and a large federal civilian and military presence. In 1960, for example, federal civilian wages and salaries accounted for 25 percent of the total civilian wage bill, while state government (5.9 percent) and local government (5.1 percent) made up an additional 11 percent of total wage and salary payments. When military payrolls are included, 42.5 percent of wage and salary income was accounted for by government.

Discovery of the Swanson River oil field in 1957 had done much to raise expectations about future economic prospects, but it was not until major discoveries in Cook Inlet during 1965 that the oil and gas industry became firmly established and significant levels of production were assured. The emergence of petroleum resources as a significant factor in the Alaska economy considerably improved the potential for private sector development and, more importantly, helped to shore up the extremely shaky fiscal base of state government.

For the mid- and latter part of the decade of the 1960s, it was to be natural disaster that provided much of the impetus for economic

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growth. The Good Friday earthquake of 1964 resulted in a major recon-
struction effort which supported levels of economic activity that
probably would not have been achieved otherwise. A second disaster,
of lesser statewide magnitude but of great consequence for the Fair-
banks region, was the flood of 1967. Disaster relief and reconstruc-
tion funds, followed later by flood control projects, provided a need-
ed boost for the region's economy.

Discovery of oil at Prudhoe Bay in 1968 marks the beginning of the
latest phase of Alaska economic history. Development of the super-
giant field, construction of the oil pipeline, and the related flows
of revenue to state government are providing the impetus for sustained
economic growth and diversification that should carry the state well
into the 21st century.

Against this backdrop, we can now look more specifically at several
important dimensions of growth and change in the Alaska economy. As
suggested earlier, there are certain key measures of economic activity
that are central to the analysis. Personal income and employment data
provide insight into the overall growth of the economy and changes in
the composition of economic activity. In addition, these data can be
used as general indicators of changes in economic well-being over
time. An important corollary variable is population growth. It is
also instructive to review aggregate measures of production for the
economy.

In addition to these general measures of economic activity, there are several specific attributes of the economy that need to be considered. These include such topics as secular and seasonal unemployment, the structure of costs and prices, and the role of state government with respect to determining overall economic activity. Finally, we must consider issues related to potential future economic activity. We now turn to specific measures of the economy.

PRODUCTION

Data measuring the gross value of production by industrial classification are not available for recent years. However, various measures of the value of output for selected industries have been compiled and are presented in Table 1. Except for agriculture, the industries reflect the primary "export base" components of the private sector economy. Data on federal and total government expenditures have also been included for comparative purposes. Furthermore, a large portion of federal government outlays indirectly reflects an export of goods and services by the private sector economy of Alaska.

Fisheries and petroleum have clearly dominated growth in the value of production in the private sector. Value of catch to fishermen has grown at an average annual rate of 15 percent over the period, and wholesale value has grown almost as rapidly (14.4 percent), reflecting both the substantial growth of shellfishing and rising product prices. When deflated by the consumer price index (which is appropriate if we are interested in implicit purchasing power), the value of catch grew

Table 1. Value of Production for Selected Industries
Various Years, 1960-1979
(millions of current dollars)

Industry Year	Agriculture	Forestry	Fisheries Value to Fishermen Salmon	Shellfish	Total	Wholesale Value	Oil & Gas Crude Oil	Dry Gas	Federal Government Outlays in Alaska (FY)	Total Government Spending in Alaska (FY)
1960	5.6	47.3	33.6	3.1	40.9	96.7	1.2	.03	155.8	N.A.
1961	5.7	48.0	35.7	5.1	46.5	128.7	17.7	.129	N.A.	N.A.
1962	5.7	52.3	42.1	7.1	58.4	131.9	31.2	.467	N.A.	N.A.
1963	5.3	54.1	31.3	9.6	46.9	109.0	32.7	1.1	N.A.	N.A.
1964	5.6	61.0	41.4	10.0	56.8	140.9	33.6	1.7	N.A.	N.A.
1965	5.3	57.5	48.3	14.5	70.1	166.6	34.1	1.8	533.7	N.A.
1966	5.3	71.2	54.2	17.6	81.9	197.3	44.1	6.3	N.A.	N.A.
1967	5.2	80.6	24.6	18.3	48.8	126.7	88.2	7.3	N.A.	N.A.
1968	4.9	89.2	49.5	27.9	79.9	191.7	186.7	4.4	N.A.	N.A.
1969	4.3	101.0	40.6	20.8	68.1	144.2	214.5	12.7	N.A.	N.A.
1970	5.2	93.7	68.0	20.5	97.5	213.9	232.8	18.2	728.7	N.A.
1971	5.0	103.5	51.4	23.0	85.5	198.7	234.3	18.0	852.9	N.A.
1972	6.0	82.3	45.3	33.6	92.4	185.7	221.7	18.0	989.4	N.A.
1973	7.0	131.4	60.1	61.4	142.4	283.0	239.6	19.5	1018.6	1592
1974	8.1	154.7	65.7	62.8	144.8	254	347.4	22.5	1135.9	1730
1975	9.2	133.5	55.3	55.4	129.4	293	364.6	42.8	1326.8	2000
1976	8.8	149.5	118.0	96.5	239.6	452	318.8	60.5	1368.1	2226
1977	9.9	179.3	171	157	349	723p	988.9	66.6	1544.9	2524
1978	9.2	N.A.	238p	272p	543p	1118p	2701.5p	89.6	1753.0	2845
1979	9.1p	N.A.	317p	231p	606p	1243p	5493.6p	91.5	1932.2	3147e

p = preliminary
e = estimate
N.A. = not available

SOURCE: See Table 1 Notes

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Table 1 Notes

The data are primarily obtained from selected tables in The Alaksa Economy: Year-End Performance Report 1978 (Alaska Department of Commerce and Economic Development, Division of Economic Enterprise; Juneau, Alaska) and Alaska Statistical Review (Alaska Department of Commerce and Economic Development, Division of Economic Enterprise; Juneau, Alaksa, 1980). The latter source is a preliminary report. Specific sources for each column of the table follow.

Agriculture: page B-13 Alaska Statistical Review (ASR). Value of sales is approximately 74 percent of value of production, with the balance being used on farm.

Forestry: Data from 1960-1971 are from Alaska Statistical Review (1972), p. 90, and reflect total end product value. For 1972-1977, the data are from the 1978 Year End Performance Report and reflect only forest product exports. Here the series are not comparable, but individually reflect growth in the periods in question. Comparable series are not available over the full period.

Fisheries: Data for 1972-1975 are from the 1978 Year End Performance Report, p. 58. 1976 data are from Alaska Catch and Production: 1976 (Alaska Department of Fish and Game). 1977-1979 data are from ASR (1980). 1960-1971 data are from ASR (1972) p. 74. Data for 1960-71, 1976-79 are comparable. Data for 1972-75 represent approximately 92 percent of total wholesale value.

Oil and Gas: ASR (1980) p. B-3. It should be noted that these data do not include value added in transportation and here reflect approximate wellhead value.

Federal Government Outlays in Alaska: 1960-1977 data are from 1978 Year End Report, p. 105. 1978-1979 data are from ASR (1980), p. E-2. Data are for fiscal year ending in given calendar year.

Total Government Spending in Alaska: Data from ASR (1980) p. E-1. The total is net of intergovernmental transfers.

at almost 10.3 percent and the wholesale value by 9.5 percent. Crude oil and natural gas percentage growth rates are relatively meaningless since the base in 1960 is negligible, but their significance is obvious. It is also worth noting that in 1978 (the last year for which data are available) production of minerals other than oil and gas and sand and gravel amounted to 18.4 million dollars, or about 0.6 percent of the total value of mineral production. Neither has there been any significant change in the value of this dimension of mining over the past two decades. In deflated dollars, federal government expenditures have grown at about 9.3 percent.

Government expenditures are not directly comparable to the value of production in other industries since they reflect not only government production (wages and salaries) but purchases of goods and services and transfer payments to individuals. However, in another sense these expenditures do reflect a measure of demand for production of goods and services throughout the economy as a whole and underscore the continuing importance of government spending in the economy.

Of particular significance in overall government spending is the role of state government spending. The state fiscal history can roughly be divided into three periods: early post-statehood, Prudhoe Bay sale to pipeline completion, and Prudhoe Bay production.

During the first period, federal government grants, both statehood transition grants and others, were an important component of state

government revenues. The relative decline in federal grants were more than offset by revenues linked to general economic growth and the development of Cook Inlet petroleum resources, but expenditures were constrained by available revenues.

The $900 million Prudhoe Bay lease sale in the fall of 1969 ushered in the second period and led to an immediate doubling of state government expenditures. Growth in expenditures continued rapidly, although still constrained by available revenues and the rapidly diminishing balance of the lease sale. The third period is marked by the commencement of production from Prudhoe Bay; and, for the first time, the state has significant potential surplus revenues.

The rapid expansion of revenues since 1969 has resulted in a closely correlated growth of state government expenditures. This is reflected not only in expanding state government employment and wages but also by total government expenditures for purchases of goods and services and transfers to local government. The net result has been that state government spending (both directly and through local government) has assumed a significant role in the overall determination of economic activity in Alaska. This is a pattern which will prevail for some time into the future.

In summary, the role of natural resources in the growth of the Alaska economy has been dominated by fisheries and petroleum. Forest products have remained regionally important, primarily for Southeast

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Alaska, but have not demonstrated significant growth. Agriculture has remained stagnant, and, in real terms, the value of production has declined. Government has remained a major force in the economy, with state and local government increasing in relative proportion to total government.

EMPLOYMENT, UNEMPLOYMENT, AND WORK FORCE

Analysis of employment, unemployment, and work force data is important for several reasons. First, since labor is one of the key factors of production, employment data provide a general indicator of the growth and composition of production over time. The main deficiency with these data for such purposes is that they ignore changes in factor proportions over time and differences in factor proportions between industries. This omission is particularly important in industries that are highly capital-intensive, such as the petroleum industry. Also, since these data are based on job counts, they do not reflect actual man hours of production and, hence, provide only an approximate measure of labor input.

Second, work force data, in conjunction with total employment data, determine unemployment. It is instructive to observe the patterns of unemployment over time and in response to changes in total economic activity. Third, the data are useful in measuring seasonal patterns of economic activity and how this may have changed over time.

Tables 2 and 3 provide summary data on employment, labor force, and unemployment for selected years over the 1960-1978 period. Total employment over this period grew at an annual average rate of 4.9 percent. However, substantial variation in the growth rate is evident. From 1960-1973, the rate was .3 percent; while for 1974-1978 (reflecting the pipeline boom) the rate was 8.6 percent. The growth of the civilian labor force shows a similar pattern, although increasing at a slightly higher rate. The result of this is that total unemployment has grown at about 7 percent per year over the period and the unemployment rate has also increased.

It is also worth noting that during the pre-pipeline period the unemployment rate was relatively stable and that the somewhat higher rates of 1977 and 1978 reflect in large part a readjustment to a more normal post-pipeline period. These data clearly illustrate the openness of the Alaska labor market. Large variations in the demand for labor are primarily met by significant in- and out-migration and by changes in labor force participation rates. As a consequence, the long-run rate of unemployment is quite stable and the simple expansion of economic activity has little effect in terms of reducing unemployment. The second block of data in Table 2 provides annual average employment data by broad industry classification. In addition to illustrating the sustained growth of employment and production in all industry categories, these data also indicate relative changes in the significance of specific industries.

TABLE 2. CIVILIAN EMPLOYMENT, UNEMPLOYMENT AND LABOR FORCE
1960, 1965, 1970-1978, BY BROAD INDUSTRY CLASSIFICATION
(IN THOUSANDS)

	1960	1965	1970	1971	1972	1973	1974	1975	1976	1977	1978
Total Civilian Labor Force	73.6	89.8	91.6	97.7	103.6	109.1	125.6	156.0	168.0	174.0	181.0
Total Unemployment	5.9	7.7	6.5	8.0	8.6	9.3	9.9	10.8	14.0	16.0	20.0
% of Total Labor Force	8.0%	8.6%	7.1%	8.2%	8.3%	8.5%	7.9%	6.9%	8.3%	9.2%	11.0%
Total Employment	67.7	82.1	85.1	89.6	95.0	99.9	115.7	145.3	154.0	158.0	161.0

	1960		1965		1970		1971		1972		1973		1974		1975		1976		1977		1978	
	Emp.	%	Emp.	%	Emp.	%	Emp.	%	Emp.	%	Emp.	%	Emp.	%	Emp.	%	Emp.	%	Emp.	%	Emp.	%
Nonagricultural Wage and Salary Employment	56.9	100.0	70.5	100.0	92.5	100.0	97.6	100.0	105.4	100.0	111.2	100.0	129.7	100.0	163.7	100.0	173.5	100.0	166.0	100.0	163.2	100
Mining	1.1	1.9	1.1	1.6	3.0	3.2	2.4	2.5	2.1	2.0	2.0	1.8	3.0	2.3	3.8	2.3	4.0	2.3	5.0	3.0	5.6	3
Contract Construction	5.9	10.4	6.5	9.2	6.9	7.5	7.4	7.6	7.9	7.5	7.8	7.0	14.1	10.9	25.9	15.8	30.2	17.4	19.5	11.7	12.2	7
Manufacturing	5.8	10.1	6.2	8.8	7.8	8.4	7.8	8.0	8.1	7.7	9.4	8.5	9.6	7.4	9.6	5.9	10.3	5.9	10.9	6.6	11.5	7
Food Processing	2.8	4.9	3.0	4.3	3.7	4.0	3.6	3.7	3.7	3.5	4.6	4.1	4.3	3.3	4.3	2.6	5.1	2.9	5.5	3.3	6.3	3
Logging, Lumber, Pulp	2.2	3.9	2.3	3.3	2.8	3.0	2.8	2.9	2.8	2.7	3.2	2.9	3.6	2.8	3.4	2.1	3.2	1.8	3.5	2.1	1.8	1
Transportation, Communications Public Utilities	6.8	12.0	7.3	10.4	9.1	9.8	9.8	10.0	10.0	9.5	10.4	9.4	12.4	9.6	16.5	10.1	15.8	9.1	15.6	9.4	16.4	10
Trade	7.7	13.5	10.0	14.2	15.4	16.6	16.1	16.5	17.1	16.2	18.3	16.5	21.1	16.3	26.2	16.0	27.6	15.9	28.5	17.2	28.8	17.
Finance, Insurance, Real Estate	1.4	2.5	2.2	3.1	3.1	3.4	3.2	3.3	3.7	3.5	4.2	3.8	4.9	3.8	6.0	3.7	7.1	4.1	7.8	4.7	8.2	5.
Services	5.6	9.8	7.5	10.6	11.4	12.3	12.5	12.8	14.0	13.3	15.2	13.7	18.3	14.1	25.1	15.3	27.7	16.0	27.4	16.5	27.6	16.
Government	22.7	39.9	29.7	42.1	35.5	38.5	38.0	38.9	41.7	39.6	42.8	38.5	45.3	34.9	49.5	30.2	49.7	28.6	50.7	30.5	52.2	32
Federal	15.6	27.4	17.4	24.7	17.1	18.5	17.3	17.7	17.2	16.3	17.2	15.5	18.0	13.9	18.3	11.2	17.9	10.3	17.7	10.7	18.1	11.
State	3.9	6.9	7.0	9.9	10.4	11.2	11.7	12.0	13.3	12.6	13.8	12.4	14.2	10.9	15.5	9.5	14.1	8.1	13.9	8.4	14.3	8.
Local	3.2	5.6	5.3	7.5	8.1	8.8	9.0	9.2	11.2	10.6	11.9	10.7	13.1	10.1	15.8	9.7	17.6	10.1	19.1	11.5	19.8	12.

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Table 2 Notes

Sources of data: 1960, 1965 <u>ASR</u> (1972) p. 16. It should be noted that the "labor force" data are actually work force data for these two years and are not directly comparable with the data for 1970-1978. The basic difference between the two series is that work force estimates are based on job counts and, hence, a worker may be counted more than once if holding two or more jobs. Labor force estimates are supposed to eliminate this double counting. Thus, the work force data for 1960 and 1965 somewhat overstate the actual number of employed.

In 1970-1978, labor force and total employment estimates are obtained from <u>Alaska Labor Force Estimates by Area</u> (Alaska Department of Labor), various years.

Non-agricultural wage and salary data are obtained from the <u>Statistical Quarterly</u> (Alaska Department of Labor) for the various years.

TABLE 3.   INDEX OF SEASONAL VARIATION IN NONAGRICULTURAL
EMPLOYMENT: SELECTED YEARS 1960-1978

	1960	1965	1970	1972	1974	1976	1978
Total Nonagricultural Employment	39.4	30.6	22.7	24.6	32.0	23.1	14.0
Contract Construction	156.2	91.7	69.5	77.6	108.2	64.7	47.2
Manufacturing	136.3	116.3	107.9	105.2	70.8	78.2	86.5
Food Processing	211.5	195.2	196.3	175.3	100.6	112.0	125.0
Trade	20.8	20.0	15.6	14.8	25.1	13.5	12.0
Services	28.4	17.2	10.7	16.2	26.8	13.3	17.8
Unemployment Rate, All Industries	117.5	74.4	59.2	65.1	82.3	45.8	30.0
Labor Force	28.2	26.5	21.8	21.0	27.1	21.2	12.0

SOURCE: Compiled from Statistical Quarterly (Alaska Department of Labor),
selected years.   Seasonal variation is measured as the high month
minus the low month divided by average annual figure, stated as
a percent.   Unemployment data are from Labor Force Estimates
(Alaska Department of Labor), various years.

Employment in mining is the one basic sector industry that has increased its share of total employment. The federal government share has declined substantially over the period, while both state and local government have grown, with much of the growth in state government employment occurring during the 1960s and the early 1970s. Local government growth lagged state government in the early years, but by 1975 local government employment exceeded state government employment. Of particular interest is the growth of support sector activity, including trade, finance, insurance and real estate, and services. This growth reflects a steady diversification of support sector activity and the process of import substitution in response to increasing market size, growth of incomes, and opportunities for specialization. In short, the data reflect a general maturation of the economy.

It is also of interest to consider changes in seasonal patterns of economic activity. Table 3 summarizes seasonal activity in selected industries, as well as for total nonagricultural wage and salary employment, labor force, and unemployment. Seasonal variation is measured as the high month minus the low month divided by the average annual figure for the respective variable. Because of secular growth in the variables, the index tends to overstate seasonality for any given year, but for comparative purposes, over time, the index is satisfactory.

The data reflect two important dimensions of the Alaska economy. First, seasonality varies drastically from industry to industry, with

construction and manufacturing (especially food processing) showing the greatest seasonal swings. Second, while significant seasonality remains in all industry, there has been a major reduction over time.

In summary, the data on labor force, employment, and unemployment illustrate several important features of the Alaska economy. First, while growth has been uneven, aggregate economic activity has increased substantially since statehood. Contract construction, mining, and support sector industries grew rapidly during pipeline construction. With the exception of contract construction, levels of employment achieved at the peak of pipeline construction have generally been sustained or have increased.

Second, structural change that reflects a general maturing of the economy has occurred, as evidenced by the increased share of total employment accounted for by support sector activity, including trade, finance, insurance and real estate, and services. Coupled with the greatly reduced dependence of the state on federal government activity and the growth of petroleum and fisheries, the data indicate a general broadening and diversification of economic activity.

Third, in addition to sustained secular growth, there has been a marked decrease in seasonal swings in economic activity. In part, this reflects the relative growth of industries with smaller seasonal variations. In addition, construction and fish processing seasonality have also reduced substantially.

Finally, the relative stability of unemployment rates over time clearly indicates the openness of the Alaska labor market. The generally higher than national average unemployment rates have not responded to aggregate economic expansion historically and probably will not in the future.

PERSONAL INCOME

Personal income measures that part of the total value of production that accrues to individuals and includes: wage and salary income; other labor income; proprietor's income; income from dividends, interest, and rent; and personal transfer payments. While deficient in many respects as a measure of economic well-being, it is nevertheless a useful indicator of the degree to which individuals share in the total benefits of production. Table 4 presents estimates of personal income for Alaska, by major source, for selected years covering the period from 1960 through 1978.

Personal income has grown steadily over the entire period, at an average annual rate of 11.3 percent, while for the pipeline period the growth was about 17 percent per year. Wage and salary income accounted for the majority of personal income throughout the period, averaging 80 percent. In contrast, about 68 percent of U.S. personal income is accounted for by wages and salaries. Proprietor income as a share of total personal income has declined somewhat; while that of dividends, interest, and rent has increased modestly. The share accounted for by transfer payments has increased substantially but still

TABLE 4. PERSONAL INCOME BY MAJOR COMPONENT: ALASKA, SELECTED YEARS 1960-1978

(millions of current dollars)

COMPONENT	1960 $	1960 % Total	1965 $	1965 % Total	1970 $	1970 % Total	1975 $	1975 % Total	1978 $	1978 % Total
Wages & Salary	567.9	84.1	778.2	88.8	1293.9	84.7	3620	85.0	3954.9	80.6
Private, Total	281.5	41.7	463.2	52.8	773.1	50.6	2771	65.1	2907.2	59.2
Mining	10.3	1.5	14.3	1.6	54.2	3.5	116	2.7	248.4	5.1
Contract Construction	77.3	11.5	98.0	11.2	140.2	9.2	1095	25.7	537.8	11.0
Manufacturing	47.1	7.0	59.7	6.8	90.9	5.9	161	3.8	260.9	5.3
Fisheries	17.7	2.6	22.9	2.6	31.4	2.1	46.2	1.1	100.5	2.0
Forest Products	8.4	1.2	22.8	2.6	38.6	2.5	64.8	1.5	50.0	1.0
Support Sector	142.1	21.1	265.3	30.3	457.4	29.9	1364	32.0	1817.0	37.0
Government	286.6	42.5	376.0	42.9	593.6	38.8	993	23.3	1301.8	26.5
Federal Civilian	104.7	15.5	137.6	15.7	195.1	12.8	308	7.2	383.2	7.8
Military	136.0	20.1	143.9	16.4	225.7	14.8	258	6.1	287.5	5.9
State & Local	45.9	6.8	94.4	10.8	172.9	11.3	427	10.0	631.0	12.9
Proprietors' Income	50.1	7.4	62.1	7.1	73.9	4.8	143	3.4	260.5	5.3
Dividend, Interest & Rent	33.0	4.9	52.1	5.9	81.4	5.3	220	5.2	333.4	6.8
Transfer Payments	24.0	3.6	34.2	3.9	79.3	5.2	274	6.4	358.3	7.3
TOTAL	675.0	100.0	876.6	100.0	1528.5	100.0	4257	100.0	3907.1	100.0
Less										
Cont. for Soc. Ins.	11.0		22.3		49.2		172.0		223.5	
Residence Adj.	31.5		45.9		67.1		637.0		314.6	
Resident Personal Income	632.5		900.2		1412.2		3447.0		4369.0	

Table 4 Notes

SOURCE: Major components of the table are obtained from U. S. De-
partment of Commerce, Bureau of Economic Analysis reports of personal
income by state.   Wages and salary figures (row 1) include wage and
salary plus other labor income components of personal income.   Except
for 1960, the private, total row and subcomponents thereunder, contain
wage and salary income, other labor income, and proprietors' income.
Total income is the sum of the wages and salary row plus proprietors'
income; dividends, interest and rents; and transfer payments.   Resi-
dent personal income is equal to total income less contribution for
social insurance and the residence adjustment.

remains well below the national figure of 12.6 percent. The data also generally confirm the relative changes in the composition of industry activity that were observed in the employment data.

The growth of aggregate personal income in Table 4 reflects not only aggregate growth of production but also the influence of inflation. Table 5 presents aggregate personal income in both current and constant dollars. Growth of constant dollar personal income has been significant and has averaged 7.8 percent per year. During the 1974-1977 period, the growth was even more dramatic at 11.8 percent in real terms. The combined effects of inflation and the plateauing of economic activity following completion of pipeline construction have resulted in a slight decline in real personal income in 1978.

There are two other dimensions of personal income that are particularly important in assessing individual economic well-being: per capita income and the distribution of income. Table 5 includes data on the growth of per capita personal income in real and current dollars.

Real per capita income from 1960-1973 grew at an average annual rate of 4 percent. The 1973-1978 period, encompassing pipeline construction and the post-boom readjustment, shows rapid expansion until 1976 and then a substantial drop during 1977 and 1978. The net growth over the period is only 2 percent per year. Two points are worth noting in this respect. First, the rapid expansion of activity occurred during a period of high national inflation and was of sufficient magnitude to

TABLE 5.   ALASKA RESIDENT ADJUSTED PERSONAL INCOME
IN CURRENT AND CONSTANT 1979 DOLLARS
1960, 1965, and 1970-1978

	Millions of Dollars of Personal Income, Total		Per Capita Personal Income	
	Current $	Constant 1979 $	Current $	Constant 1979 $
1960	632.5	1,470.6	2,797	6,503
1965	858.4	1,982.8	3,168	7,318
1970	1,411.9	2,700.3	4,644	8,882
1971	1,557.2	2,954.8	4,939	9,372
1972	1,698.5	3,036.4	5,234	9,631
1973	2,001.5	3,570.0	6,046	10,784
1974	2,436.7	3,822.9	7,138	11,199
1975	3,527.7	4,493.5	9,673	12,321
1976	4,194.8	5,421.4	10,274	13,278
1977	4,313.4	5,346.5	10,455	12,959
1978	4,369.0	4,875.2	10,849	12,106

Average Annual Percent Growth

11.3	7.8	6.9	3.5

SOURCE: Current dollar personal and per capita income from U.S. Department
of Commerce, Bureau of Economic Analysis. Deflated by Anchorage
Consumer Price Index, U.S. Department of Labor.

lead to additional regional inflation in the Alaska economy. Thus, the real value of per capita income growth was greatly diminished. Second, the rapid expansion of total economic activity had only a minimal effect in raising per capita income, again reflecting the ease of entry into the Alaska labor market.

Data on the distribution of personal income are not available for recent years, but it is instructive to look at the pattern of wages over time. Table 6 presents data on relative wages, by industry, for selected years over the 1965-1978 period.

The numbers reflect the ratio of the average monthly wage for the respective industry divided by the average monthly wage for all nonagricultural wage and salary employment. The data must be interpreted with caution since several factors are at work that may account for year-to-year variability. First, the average monthly wage data reflect both straight time and overtime earnings and are thus sensitive to variation in the ratio of straight time to overtime work.

Second, the average monthly wage is computed by dividing total wages by average monthly employment; and average monthly employment, in turn, reflects both full- and part-time work. Thus, the employment data are only an approximation of man hours worked. We are also looking at fairly aggregate data. Some of the variation within industries may be accounted for by changes in composition of activity within the broad industry classifications.

TABLE 6. DISTRIBUTION OF RELATIVE WAGE RATES,
BY INDUSTRY, FOR ALASKA,
SELECTED YEARS, 1965-1978

Industry	1965	1970	1976	1978
Total Nonagriculture Wage and Salary	100	100	100	100
Mining	147	164	140	193
Contract Construction	165	169	210	157
Manufacturing	106	99	73	93
Food Processing	97	78	55	71
Logging, Lumber, and Pulp	115	124	96	119
Other Manufacturing	112	110	83	109
Transportation, Communication, and Public Utilities	115	114	105	128
Wholesale Trade	127	117	94	111
Retail Trade	78	70	50	62
Finance, Insurance, Real Estate	88	81	62	81
Services	74	72	78	75 .
Government	91	97	74	97
Federal	91	100	70	94
State	91	96	79	111
Local	91	93	72	89

SOURCE: Computed from average monthly wage data from the Statistical
Quarterly (Alaska Department of Labor), selected years.
Relative wages are the respective industry wage divided by
the average wage for all industries x 100.

The data first indicate the growing disparity of average wage rates, which would suggest a trend toward a less equal distribution of income. More significant are the changes that occurred at the peak of pipeline construction in 1976. Major distortions in the structure of wages are present, and this suggests that the distribution of benefits during a boom is not uniform, but rather that a small segment of the economy appears to reap a large proportion of the gains. This feature of boom economics is further demonstrated by an analysis of changes in real wages over the 1973-1976 period.

Table 7 shows average monthly wages, by broad industry classification, deflated by the Anchorage consumer price index (CPI). Use of the Anchorage CPI is dictated because there is no statewide index. Hence, the deflation is subject to some error since price changes are not uniform throughout Alaska. As an approximation, however, the data are adequate.

It is clear that drastic differences exist among industries and that the economic benefits of rapid economic expansion tend to be concentrated in a select few industries. A major portion of income implied in the growth of construction wages was also earned by nonresidents or temporary resident employees. With the exception of business services, all components of the support sector and government badly lagged the average growth of wages and, implicitly, relative income. Federal government and finance, insurance, and real estate real wages actually declined.

TABLE 7.   CHANGE IN REAL AVERAGE MONTHLY WAGE
1973-1976, ALASKA (1973 DOLLARS)

Industry	Average Wage 1973	Average Wage 1976	Average Wage Percent Change
Total Nonagriculture Wage and Salary	$1,006	$1,424	12.3%
Oil and Gas Mining	1,661	2,068	7.6
Contract Construction	1,635	2,985	22.2
Manufacturing	961	1,041	2.7
Transportation, Communication, and Public Utilities	1,141	1,494	9.4
Wholesale Trade	1,177	1,341	4.4
Retail Trade	687	709	1.1
Finance, Insurance, Real Estate	897	884	- 0.5
Services	751	1,107	13.8
Hotels, Motels, Lodging	527	537	0.6
Business Services	732	1,706	32.6
Government	1,024	1,047	0.7
Federal	1,062	1,002	- 1.9
State	992	1,132	4.5
Local	1,003	1,024	0.7

SOURCE: Computed from average monthly wage data, Statistical Quarterly
(Alaska Department of Labor), selected years.

While much of the inflation that occurred during the period is attributable to national inflation, significant regional inflation resulting from pipeline construction activity also occurred. Prior to pipeline construction, the Anchorage CPI had been growing at a less rapid rate than the U.S. CPI. However, during pipeline construction, this relationship was reversed, and the Anchorage CPI grew more rapidly. After the pipeline, however, the inflation rate in Anchorage again fell below that of the United States. Except for periods of relative boom in Alaska, consumer prices have tended to rise noticeably slower in Anchorage than outside Alaska. Over the long run, this will tend to narrow price differentials between Alaska and the lower 48 states. Table 8 presents relative rates of growth in the Anchorage and United States CPIs for selected years, and clearly illustrates this pattern.

As one final indication of income distribution patterns, a distribution relating percentage of total wage and salary income to percentage of employment has been constructed for 1965 and 1978 (see Figure 1). The distribution was constructed by ranking industries according to average monthly wage. The percentage of total employment and total wage income accounted for by the respective industry was then computed. The cumulative employment and income percentages were then plotted, yielding the typical Lorenz-type distribution figure.

A comparison of the two distributions reveals a clear shift toward a less uniform distribution of income. This shift is probably accounted for by two factors. First, as indicated earlier, there has been a

TABLE 8.   RATES OF CHANGE FOR THE ANCHORAGE
AND U.S. CONSUMER PRICE INDEX,
SELECTED YEARS, 1960-1981

	1960-1970	1970-73	1973-74	1974-75	1975-76	1976-77
Anchorage	1.8	4.1	13.3	12.3	6.5	5.8
United States	2.8	5.6	12.0	7.6	5.3	6.5

	1977-78	1978-79	1979-80	1980-81
Anchorage	6.3	9.4	8.9	7.5
United States	7.7	11.5	13.0	10.7

SOURCE: Derived from the Bureau of Labor Statistics reports on Anchorage
and United States CPIs.

FIGURE 1. DISTRIBUTION OF WAGE AND SALARY INCOME
ALASKA, 1965 and 1978
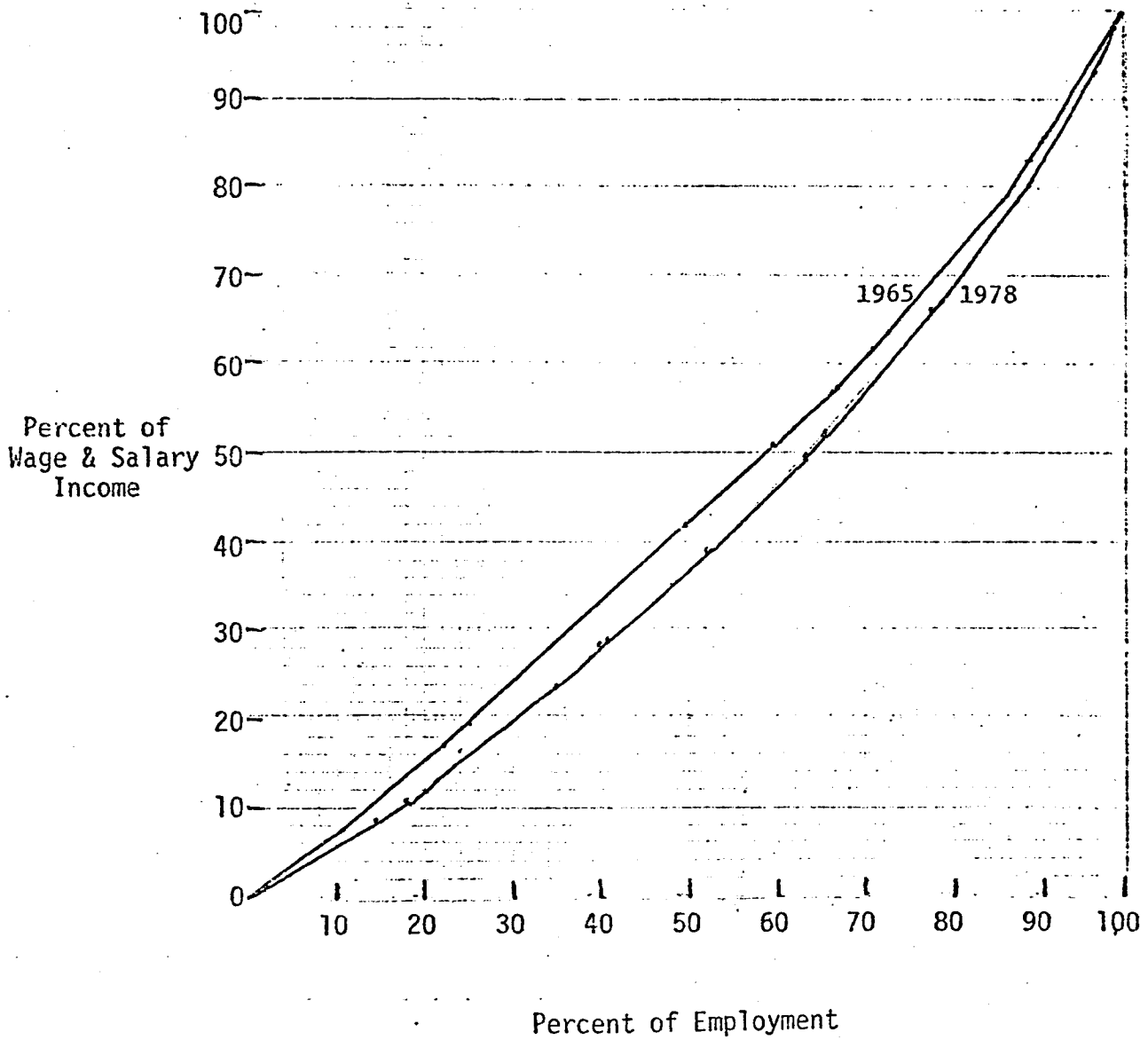
SOURCE: See text.

sizable increase in the share of total activity accounted for by support sector industries, and these industries generally have lower than average wage rates. Second, there has been a substantial growth in the range of relative wages between industries over time.

In summary, real personal income has shown sustained growth over the entire 1960-1978 period, both in aggregate and per capita terms. The growth has not been uniformly distributed, however, and the wage component has become less uniform over time. This was particularly evident during pipeline construction and supports the hypothesis that the benefits of pipeline construction were largely concentrated in a few sectors.

POPULATION

The remaining dimension of growth to be considered is population. Changes in population are divided into two components, natural increase (or decrease) and in/out-migration. Natural population growth results from an excess of births over deaths and is, hence, determined by birth and death rates.

Alaska exhibits both the highest birth rate and the lowest death rate in the United States; and as a result, the rate of natural population increase is the highest in the United States. This phenomenon is largely accounted for by the relative youthfulness of the population, with over 34 percent of the population between the ages of 14 and 30. This age group has both the highest fertility rate and the lowest death rate.

Net migration (in-migration minus out-migration) is the second factor contributing to population change. Many factors influence the migration decision; but for the Alaska case, it appears that (with the exception of military-related migration) migration occurs largely in response to economic opportunity. In the aggregate, relative rates of unemployment and relative wage differentials in Alaska and elsewhere should be important in determining the migration decision. At the individual level, the economic component of the decision is related to the expected gain resulting from the move. Basically, this is the expected wage differential times the probability of getting a job, less the cost of making the change. Thus, either a change in relative wage rates or relative employment opportunities can influence the decision.

That migration is sensitive to economic opportunity is clearly demonstrated by patterns of migration that occur during and after pipeline construction. Data summarizing population and changes in population for Alaska for the years 1965 through 1978 are presented in Table 9. Both the relative stability of natural increase and the volatility of net migration are clear. Natural increase has averaged about 1.5 percent per year; while large variations, even in pre-pipeline years, are evident in the net migration component.

Table 10 presents the age distribution of Alaska in juxtaposition to the overall U.S. age distribution. As would be expected, the middle age groups are significantly larger in Alaska than for the United States as a whole; almost 34 percent of the Alaska population is

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TABLE 9.   ALASKA POPULATION AND COMPONENTS
OF CHANGE: 1965-1978

(thousands)

Year	Total	Natural Increase	Total Change	Net Migration
1965	265.2	5.7	10.2	4.5
1966	271.5	5.3	6.3	1.0
1967	277.9	5.0	6.4	1.4
1968	284.9	5.1	7.0	1.9
1969	294.6	5.6	9.7	4.1
1970	302.4	6.1	7.8	1.7
1971	312.9	5.9	10.6	4.7
1972	324.3	5.5	11.4	5.9
1973	330.4	5.1	6.1	0.9
1974	351.2	5.6	20.8	15.2
1975	404.6	5.9	53.4	47.5
1976	413.3	6.3	8.7	2.4
1977	411.2	6.8	- 2.1	- 8.9
1978	407.0	6.7	- 4.3	-11.0
1979	406.2	7.4	- .8	- 8.2
1980	400.5*		- 5.7	

*U.S. Census figure for 1980, so comparability is more difficult.

SOURCE: Alaska Department of Labor

TABLE 10
ALASKA POPULATION BY AGE, 1980

Age Cohort	Total	Alaska Age Distribution (% of Total)	U.S. Age Distribution (% of Total)
0 - 4	38,777	9.68	7.21
5 - 9	84,917	8.72	7.37
10 - 14	34,166	8.53	8.05
15 - 19	36,980	9.23	9.34
20 - 24	45,058	11.25	9.40
25 - 29	48,452	12.10	7.29
30 - 34	41,916	10.46	7.75
35 - 39	31,182	7.79	6.16
40 - 44	22,570	5.63	5.15
45 - 49	18,355	4.58	4.89
50 - 54	15,801	3.95	5.16
55 - 59	12,592	3.14	5.13
60 - 64	8,095	2.02	4.45
65 +	11,530	2.88	11.28

SOURCE: U.S. Department of Commerce, 1980 Census of Population: Age, Sex, Race, and Spanish Origin by Regions, Divisions and States: 1980, PC 80-S1-1, p. 4-5.

between ages 20 and 35, where the comparable figure for the United States is less than 25 percent. This age group is extremely mobile, and accounts for a good deal of the migration that occurred during the pipeline boom.

In summary, Alaska's natural population growth is substantially above that of the nation as a whole. Furthermore, the response of migration to economic opportunity is clearly evident. Once again, this emphasizes the openness of the Alaska labor market.

The Anchorage Census Division

Anchorage has occupied a central role in Alaska's growth since statehood. It has emerged as a key transportation and distribution center, as well as assuming a dominant role in the growth of other support sector activity. The area has also become the state center for petroleum industry administrative facilities. Its importance as a seat of Federal government activity in Alaska has been supplemented by rapid growth of state and local government. Because of the size of the Anchorage economy, it tends to reflect total state activity as well as to impact upon total economic activity in Alaska. It is because of its central place in the Alaskan economy that economic activity remote from Anchorage is often significantly tied to Anchorage.

EMPLOYMENT, LABOR FORCE, AND UNEMPLOYMENT

Direct measures of production for the Anchorage economy are not available. Neither is Anchorage a commodity producer in which resource-based activity is directly important to total economic activity. This

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makes it particularly important to consider the structure and growth of employment for Anchorage. While such data are only partially reflective of total production, they do provide meaningful insights into changes that have occurred.

Summary data on Anchorage employment, by broad industry classification, for 1965 through 1978, are presented in Table 11. Overall employment has grown at about 7.3 percent per year, and the rate of growth exceeded the statewide rate of 6.7 percent. While growth has generally been consistently upward, it accelerated substantially during pipeline construction. Since then, growth of employment has moderated; but the level of employment still exceeds that achieved during the period of pipeline construction. It is also worth noting that, in contrast to other parts of the state where pipeline construction played a significant role in the expansion of activity, Anchorage growth during this period occurred more uniformly throughout most sectors, reflecting the region's role as a support center.

Several industries expanded more rapidly than the growth of total employment, including: mining (13.3 percent); transportation, communications, and public utilities (8.9 percent); wholesale-retail trade (9.4 percent); finance, insurance, and real estate (11.0) percent; services (11.5 percent); and state and local government (10.5 percent). Construction, manufacturing, and federal government growth rates were all below the regional average for the period.

TABLE 11. ANCHORAGE NONAGRICULTURAL WAGE AND SALARY
EMPLOYMENT, SELECTED YEARS
(thousands)

	1965 Emp	%	1968 Emp	%	1970 Emp	%	1972 Emp	%	1974 Emp	%	1976 Emp	%	1978 Emp	%
Total NonAgric Wage & Salary Employment	30.678	100.0	34.019	100.0	42.019	100.0	48.252	100.0	58.713	100.0	73.733	100.0	76.893	100.0
Mining	0.371	1.2	0.781	2.3	0.958	2.3	0.806	1.7	1.036	1.8	1.409	1.9	1.874	2.4
Contract Construction	3.126	10.2	2.438	7.2	3.514	8.4	4.272	8.9	5.882	10.0	7.587	10.3	6.431	8.4
Manufacturing	0.791	2.6	0.834	2.5	1.018	2.4	1.215	2.5	1.379	2.3	1.629	2.2	1.683	2.2
Transportation, Communications, and Utilities	2.618	8.5	3.046	9.0	3.907	9.3	4.522	9.4	5.583	9.5	7.409	10.0	7.950	10.3
Wholesale-Retail	5.279	17.2	6.552	19.3	8.617	20.5	9.948	20.6	12.298	20.9	15.958	21.6	16.865	21.9
Finance, Insurance and Real Estate	1.295	4.2	1.452	4.3	1.980	4.7	2.415	5.0	3.151	5.4	4.257	5.8	5.019	6.5
Services	3.767	12.3	4.652	13.7	6.403	15.2	7.725	16.0	10.119	17.2	15.450	21.0	15.538	20.2
Federal Government	9.394	30.6	9.216	27.1	9.534	22.7	9.435	19.6	9.925	16.9	9.813	13.3	9.896	12.9
State & Local Government	4.001	13.0	5.022	14.8	6.036	14.4	7.839	16.2	9.242	15.7	9.465	12.8	11.266	14.7

SOURCE: Statistical Quarterly (Alaska Department of Labor), various years.

The growth of the support sector illustrates the maturing of the Anchorage economy as was also observed at the statewide level. A comparison of statewide and Anchorage support sector employment as a percent of total employment also indicates the role of Anchorage as a trade, distribution, service, and financial center for the state as a whole. Employment as a percentage of total Anchorage employment considerably exceeds comparable figures at a statewide level in trade, finance, and services. For Anchorage, these industries accounted for 48.6 percent of total employment in 1978; whereas for the state as a whole the figure is only 39.5 percent. The share of total employment accounted for by the federal government in Anchorage is also above the state proportion, and over 50 percent of total federal government employment in Alaska is based in Anchorage.

The data on labor force and unemployment also illustrates the openness of the Anchorage economy (see Table 12). Over the period from 1970 through 1979, unemployment averaged 7.4 percent. While temporarily dropping during pipeline construction, the unemployment rate has risen again to historic levels in the years since completion of the pipeline, averaging 7.7 percent for 1978 and 1979. Hence, while rapid expansion of employment opportunities may temporarily reduce unemployment, the effects are clearly short-run.

PERSONAL INCOME

Total and per capita personal income for Anchorage are shown in Table 13, both in current and constant (1978) dollars. In current dollars,

TABLE 12.   ANCHORAGE LABOR FORCE, EMPLOYMENT,
AND UNEMPLOYMENT, 1970-1978

Year	Employment	Labor Force	Unemployment	Unemployment Rate
1970	45,757	49,024	3,267	6.7%
1971	49,484	53,902	4,418	8.2
1972	52,395	57,535	5,140	8.9
1973	54,299	60,117	5,818	9.7
1974	54,691	58,661	3,970	6.8
1975	64,721	68,481	3,760	5.5
1976	68,420	73,436	5,016	6.8
1977	79,023	84,513	5,490	6.5
1978	74,819	81,551	6,732	8.3
1979	75,424	81,120	5,696	7.0

SOURCE: Alaska Department of Labor, Labor Force Estimates by Area,
selected years.

both total and per capita personal income have grown every year (at average annual rate of 14.4 percent and 10.0 percent, respectively) with considerable increases in the rate occurring during pipeline construction.   Much of the growth has been negated by inflation, however. In real terms, total incomes grew at 8.2 percent over the period; while per capita income grew at 4.1 percent.   However, both real total and per capita personal income have declined slightly since peaks reached during pipeline construction.   It is also worth noting that the growth rates of Anchorage personal income exceeded those of the state for comparable periods.

TABLE 13. ANCHORAGE PERSONAL INCOME
1965-1978

	Current Dollars		Constant (1978) Dollars	
	Total (millions)	Per Capita	Total (millions)	Per Capita
1965	371	3,412	767	7,056
1966	398	3,595	722	7,153
1967	462	4,061	900	7,911
1968	502	4,228	953	8,027
1969	570	4,622	1,035	8,391
1970	635	4,997	1,109	8,730
1971	733	5,469	1,248	9,313
1972	800	5,631	1,333	9,383
1973	880	6,031	1,385	9,490
1974	1,114	7,402	1,550	10,299
1975	1,625	10,070	2,011	12,463
1976	1,903	10,579	2,212	12,296
1977	2,109	11,592	2,317	12,736
1978	2,128	11,839	2,128	11,839

Average Annual Percent Growth

14.4%	10.0%	8.2%	4.1%

SOURCE: Bureau of Economic Analysis, U.S. Department of Commerce.

POPULATION

Population for Anchorage grew from 102.3 thousand in 1965 to 185.5 thousand in 1978, at an average annual growth rate of 4.7 percent (see Table 14). This was substantially in excess of the statewide growth rate of 3.4 percent. As a result, the Anchorage share of total state population rose from 38.6 percent in 1965 to 45.6 percent in 1978. From 1965 to 1969, the Anchorage and statewide populations grew at about the same rate; while for 1969 through the start of pipeline construction, the population of Anchorage grew at about 6 percent. During this period, the state as a whole grew at about 3.6 percent. Both the state and Anchorage populations grew rapidly during the 1974 through 1976 period (17.7 percent and 20.1 percent, respectively), but the Anchorage population did not peak until 1977; whereas the statewide population reached a peak in 1976. However, the decline in Anchorage population has been proportionately greater than that for the state as a whole. In 1978, statewide population was 6.3 thousand below the pipeline peak; while the Anchorage population was 10.3 thousand below its peak.

In summary, the Anchorage economy has shown substantial growth over the entire period reviewed. Steady diversification of the economy is evident, and the role of Anchorage as an economic center for the state is clear. Furthermore, economic activity remote from Anchorage is nevertheless often significant for the Anchorage economy because of Anchorage's central role.

TABLE 14. ANCHORAGE POPULATION
1965-1980

(thousands)

1965	102.3
1966	105.9
1967	107.8
1968	111.6
1969	114.2
1970	126.3
1971	135.8
1972	144.2
1973	149.4
1974	153.1
1975	177.8
1976	185.2
1977	195.8
1978	185.5
1980	173.9*

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*U.S. Census data.

SOURCE: Alaska Department of Labor.

The Aleutian Islands Census Division

The Aleutian Islands Census Division encompasses all of the Aleutian Islands, the Pribilof Islands, and the Alaska Peninsula from Port Heiden west. This is the definition used by the 1970 Census and the Alaska Department of Labor Statistical Quarterly (the 1980 Census used a slightly different definition).

The economy of the Aleutian Islands Census Division in no sense reflects a cohesive, functional economic area. This economic area is composed of several relatively isolated communities and Federal government military installations. Private sector activity is almost totally dependent upon utilization of the abundant fish resources and includes both harvesting and processing. Harvesting of fur seals on St. Paul Island is also an important local activity. Minor amounts of sheep ranching also occur in the region. Military installations at Shemya and Adak, as well as elsewhere in the region, swell the population, employment, and income figures for the census division but have no perceptible links with other economic units within the census division.

PRODUCTION

Basic sector private production is mostly composed of fisheries-related activity. Both commercial fishing and processing are widely dispersed throughout the region, although processing is more highly concentrated in the eastern portion of the census division. Tables 15 through 17 provide summary data on commercial fishing. In Table 15 the salmon, shellfish, total catch, and value of catch to fishermen

TABLE 15. CATCH AND VALUE TO FISHERMEN,
ALEUTIAN ISLANDS CENSUS DIVISION
1970 TO 1976, SELECTED YEARS

(catch in million pounds; value in million dollars)

Year	Salmon		Shellfish		Total[1]	
	Pounds	Value	Pounds	Value	Pounds	Value
1976	20.910	7.155	154.262	61.032	175.921	69.029
1973	6.993	1.815	60.966	25.135	71.261	29.243
1970	28.695	5.102	44.082	9.108	74.540	14.793

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[1]Totals include minor amounts of other fish. There is also an unreconciled discrepancy for the weight of shellfish in Table 14 and Table 15 for 1973.

SOURCE: Alaska Catch and Production (Alaska Department of Fish and Game, Division of Commercial Fisheries), selected years. Data prior to 1970 not available on a comparable basis.

TABLE 16.   SHELLFISH HARVEST, ALEUTIAN ISLANDS
CENSUS DIVISION, 1962, 1965-1976

(millions of pounds)

Year	Kingcrab	Dungeness	Tanner	Shrimp	Total
1962	6.840	-	-	-	6.840
1965	50.704	.017	-	-	50.717
1966	63.993	.025	.000	.000	64.018
1967	61.990	.000	.003	.000	61.993
1968	53.060	.953	.142	4.375	58.530
1969	39.895	1.380	1.662	2.657	45.594
1970	35.408	.717	3.558	4.399	44.082
1971	53.997	.022	2.307	5.228	61.554
1972	52.957	.000	4.054	14.891	71.902
1973	56.620	.201	6.183	18.947	81.951
1974	66.812	.061	13.998	31.245	112.116
1975	70.002	.004	12.592	20.504	103.102
1976	82.943	.000	30.202	41.117	154.262

SOURCE: Alaska Catch and Production: Commercial Fisheries Statistics
(Alaska Department of Fish and Game, Division of Commercial
Fisheries), various years. Areas included are South Alaska
Peninsula, Aleutians East-Unalaska, Aleutians West-Adak,
and Bering Sea. These boundaries are not strictly comparable
to the census division boundaries, but are adequate for pres-
ent purposes.

TABLE 17.   SHELLFISH HARVEST, BY AREA,
SELECTED YEARS 1962 - 1976
(millions of pounds)

South Peninsula

Year	King Crab	Dungeness	Tanner	Shrimp	Total
1967	16.9	-	.0	-	16.9
1972	4.2	-	3.9	14.8	22.9
1976	.7	-	7.3	37.4	45.4

Aleutians East-Unalaska

Year	King Crab	Dungeness	Tanner	Shrimp	Total
1967	27.1	-	-	-	27.1
1972	10.7	-	.0	.1	10.8
1976	11.4	-	.5	3.7	15.6

Aleutians West-Adak

Year	King Crab	Dungeness	Tanner	Shrimp	Total
1967	12.5	-	-	-	12.5
1972	16.2	-	-	-	16.2
1976	.4	-	.1	-	.5

Bering Sea

Year	King Crab	Dungeness	Tanner	Shrimp	Total
1967	4.4	-	-	-	4.4
1972	21.9	-	.1	-	22.0
1976	70.4	-	22.3	-	92.7

Area Totals

Year	S. Peninsula Total	%	Aleutians-E. Total	%	Aleutians-W. Total	%	Bering Sea Total	%	Total
1967	16.9	27.8	27.1	44.5	12.5	20.5	4.4	7.2	60.9
1972	22.9	31.8	10.8	15.0	16.2	22.5	22.0	30.6	71.9
1976	45.4	29.4	15.6	10.1	.5	.3	92.7	60.1	154.2

SOURCE: Alaska Catch and Production   (Alaska Department of Fish and
Game, Division of Commercial Fisheries), selected years.

are indicated for recent years. The data clearly show the rapid increase in both the value and volume of shellfish harvested in the region.

A longer-run view of shellfish harvest is shown in Table 16 and highlights the growth in the diversity of shellfish caught. In particular, both tanner crab and shrimp have provided much of the growth in the shellfish harvest, helping to offset significant declines in king crab catches that occurred during the late 1960s and early 1970s. Finally, Table 17 provides data on the disparities of catch within areas of the region and how these have changed over recent years. Significant declines in king crab harvests in all areas are noted, with the exception of the Bering Sea which has more than offset the declines in other areas. Tanner crab and shrimp have been increasingly important for the South Peninsula and Aleutian-East areas.

In short, major changes in the pattern of harvests, both regionally and by species, have occurred. The South Peninsula and Bering Sea areas show overall gains and the Aleutian-East and Aleutian West areas show net declines. These patterns are also indicated by the percentage shares of total shellfish harvest shown in Table 17.

A second, important dimension of understanding commercial fishing in the Aleutian economy is an analysis of who does the fishing. Data on this point is fragmentary and is presented in Table 18. The king crab

TABLE 18.   RESIDENCE OF BOATS AND GEAR LICENSE
HOLDERS FISHING THE ALEUTIANS

Proportion of King Crab
Catch Value by Boat Residence

Proportion of Salmon Catch by
Residence of Gear License Holder

Place	Percentage	Place	Percentage
Kodiak	26.8	Kodiak	41.5
Alaska Peninsula	4.0	Aleutians	20.0
Dutch Harbor	4.3	South Central Alaska	3.2
Out of State	64.9	Anchorage	2.6
		Other Alaska	7.1
		Non-resident	19.2
		Unknown	6.5

SOURCE: King Crab: Western Alaska King Crab: Draft Fishery Management
Plan   (North Pacific Fishery Management Council, Anchorage;
Council Review Draft, May 1980).   Derived from data on page 30.

Salmon: Derived from Table 9-8, Measuring The Socioeconomic
Impacts of Alaska's Fisheries, by George W. Rogers, et al,
(Institute of Social and Economic Research; April 1980).

and shellfish industry tends to be dominated by nonresident boats and
crews, and the area of concentration for these vessels is the Bering
Sea.   Much of the remainder of the catch is accounted for by Kodiak-
based boats.

The information on the salmon harvest is even less precise since the region covered is southwest Alaska (the Aleutian Census Division plus Kodiak). It is assumed, with some uncertainty, that the regional proportions apply to the Aleutians.

The overall picture that emerges is one in which the bulk of the commercial fishing in the Aleutians is carried out by fishermen and vessels which are not resident to the Aleutians. More precise information would be desirable but is simply not available.

A final dimension of commercial fishing to be considered is that of employment. No systematic, periodic estimates of commercial fishing employment are made for the Aleutians (nor for the rest of the State). Estimates for the 1969 through 1976 period, however, have been compiled for the State and regions (Rogers, 1980) and in turn have been used to estimate employment in the Aleutians for 1978. This has resulted in an estimate of 756 for average annual employment in commercial fishing. Of these, 251 are estimated to be residents of the Aleutian Islands Census Division.

The procedure used to develop these estimates was to compute the ratio of the 1978 to 1976 catch, by species (salmon, shellfish), and apply this ratio to the Rogers' estimates of employment for 1976. Since his employment estimate was for the southwest region, it was then necessary to allocate to the Aleutians the total employment thus estimated. This was accomplished by apportioning total employment on the basis of

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Aleutian to total southwest region catch and implies uniform productivity throughout the southwest region. The result of these manipulations is an estimate of total Aleutian Islands commercial fishing employment. The estimate of resident employment was developed using ratios presented in Table 18. It goes without saying that these estimates of employment are very approximate and subject to considerable error.

The second major component of the fishing industry in the Aleutians is processing. The present structure of the processing industry reflects a mix of shore-based and floating processors engaged in canning and freezing. The trend is toward freezing an increasing proportion of the catch.

A tally of processor permits for 1980 compiled from Alaska Department of Fish and Game records indicates seven shore-based facilities at Dutch Harbor; two at Sand Point; and one each at King Cove, False Pass, Squaw Harbor, and Port Moller. Some of these permits may cover firms that are only buying fish for transshipment.

Several floating processor permits are held as well: Dutch Harbor (4), Sand Point (1), and False Pass (1). In addition, some 31 permits are held that allow for floating processors to operate throughout the region. Not all permit holders necessarily utilize their permits, and several may actually be nothing more than buyers. It is clear, however, that processing is geographically well dispersed throughout the Aleutians.

Employment data for processing is available for the Aleutians Census Division from the Statistical Quarterly (Alaska Department of Labor). For 1978, 1,621 was the average annual employment in manufacturing, which for the Aleutians is largely synonymous with fish processing. As is the case with commercial fishing, it is important to determine what proportion of the employment was held by residents of the region.

Data regarding this question are fragmentary. In conversations with industry and local government people, it was estimated that somewhere between 5 and 15 percent of the employment was held by residents. A second source of information is The Recommended Community Development Plan: City of Unalaska, Alaska (Trick, Nyman, and Hayes: November 1977). According to this study, 72 out of 875 basic sector jobs (1976) were held by residents, and these jobs were primarily in fish processing. This would indicate that about 8.2 percent of processing jobs were held by residents. Community profiles prepared by the Arctic Environmental Information and Data Center for King Cove, False Pass, and Akutan also contain data that tend to support the above sources regarding resident to nonresident ratios.

Using what appears to be a reasonable estimate of the resident share of processing jobs, 10 percent, then 162 of 1,621 jobs were held by residents. The remainder (1,459) were held by nonresidents. Of these, almost all were from outside of Alaska.

Significant seasonal variation exists in processing employment, although to a much lesser degree than is generally the case in the salmon industry. For 1978, average employment for the four quarters was, respectively: 1,255 (January-March), 1,782 (April-June), 1,649 (July-September), and 1,798 (October-December). The low first quarter, followed by substantial gains in the second through fourth quarters, is typical of recent years. Available data do not indicate how seasonal patterns may vary between residents and nonresidents.

The second element of basic sector production in the Aleutians is Federal government and national defense-related activity. Major installations are located at Adak, Shemya, and Cold Bay. The largest of these is the naval station at Adak. According to data supplied by the Office of Information, Alaska Air Command, there are 1,781 active duty military and civilian defense-related personnel at Adak, as well as 1,400 dependents. These figures do not include additional civilian personnel associated with nondefense activity such as officers' clubs, post-exchanges, etc. Shemya and Cold Bay do not have resident dependents, and military and civilian defense-related personnel number approximately 490. Table 19 summarizes military and related federal civilian employment data for the census division as a whole for 1978.

While the military presence is numerically large, its economic impact on the economy of the Aleutians is negligible. The units are largely self-supporting and the only identifiable ties with the Aleutian or Alaska economy are transportation services provided by Reeve Aleutian

TABLE 19. MILITARY AND RELATED FEDERAL-CIVILIAN
EMPLOYMENT AND WAGES, ALEUTIAN ISLANDS
CENSUS DIVISION, 1978

	Employment	Wages (thousands)
Military and Related Civilian Employment	3,939	45,952
Military Personnel (Active Duty)	3,453	38,950
Military-Related Federal Civilian Employment	486	7,072
PX and NAF (Largely Part-time)[1]	330	1,875
Other Military Related Federal Employment	156	5,127

[1]Post exchange and nonappropriate fund activities, including officers' clubs, etc.

SOURCE: Numbers: Basic Economic Statistics of Alaska Census Divisions (Alaska Department of Commerce and Economic Development, Division of Economic Enterprise: November 1979).

Airways (RAA) and some contract construction. One benefit that does result from the military contracts with RAA is the feasibility of providing more frequent air service to other communities in the Aleutians. Contract construction work at the military installations is generally carried out by non-Aleutian based firms, either from Alaska or out-of-state.

In summary, basic sector production in the Aleutians is almost entirely related to fisheries resources or Federal government military-related activity. Fisheries activity has shown substantial growth but

is still largely dominated by non-Aleutian resident participants. The military presence, while substantial, has no significant relationships with the rest of the census division.

EMPLOYMENT, UNEMPLOYMENT, AND·LABOR FORCE

Analysis of employment in the Aleutians is important for the same reasons that it was important at the statewide level. Table 20 summarizes average monthly employment for the Aleutian Census Division for the years 1965-1978. Over the period, total employment has grown substantially at an average annual rate of 5.9 percent. This growth has been largely dependent upon growth of the fisheries industry and State and local government. Employment in fish processing grew at an average annual rate of 14.1 percent, while State and local government grew at a rate of 8.5 percent. Federal government employment, primarily related to national defense, fluctuated considerably over the period but has shown no appreciable growth. The same is true for contract construction and transportation, communications, and public utilities. The support sector components of wholesale-retail trade; finance, insurance, and real estate; and services have also expanded as would be expected. Finance, insurance, and real estate grew at an average annual rate of 18.9 percent, although much of this growth occurred after 1973. Services grew at 22.7 percent over the period, but this growth rate must be interpreted with caution. The data for early years were not reported in the Statistical Quarterly (the source document) because of disclosure rules and, hence, were estimated. The large variation in this series also raises the question of inconsistency in the data, possibly due to classification difficulties.

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TABLE 20. AVERAGE CIVILIAN MONTHLY EMPLOYMENT
ALEUTIAN ISLANDS CENSUS DIVISION, 1965-1978

Industry	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Construction	174	54	137	125	142	195	285	187	181	180	235	221	116	140
Manufacturing	292	411	422	471	349	476	657	610	675	851	783	991	1130	1621
Transportation, Communications, and Utilities	83	55	51	46	57	45	61	41	93	93	87	88	38	31
Wholesale Retail	117	138	152	138	134	136	125	124	142	137	148	149	110^e	101^e
Finance, Insurance and Real Estate	4^e	4^e	4^e	1^e	5^e	7^e	7^e	8^e	7^e	12	27	32	37	38
Services	12^e	13^e	108^e	232^e	268	143	240	82	47	33	20	93	150	171
Federal Government	678	707	633	550	523	528	574	640	704	813	626	618	569	682
State, Local Government	128	138	157	160	174	168	178	206	227	257	316	330	287	371
Total[1]	1494	1526	1714	1835	1727	1721	2178	1982	2186	2473	2349	2621	2474	3155

e = estimated.

[1]Total includes minor amounts of mining and miscellaneous employment for some years.

SOURCE: Statistical Quarterly (Alaska Department of Labor).

Independent series on wholesale and retail trade are not available for the entire period. For those years in which retail trade data were available, there is steady growth indicated. Wholesale trade appears to be a much higher proportion of total wholesale-retail trade than is the case statewide, and this is apparently linked to wholesale trade activity associated with fisheries. There may also be problems with the industrial classification of wholesale trade.

Firms may engage in both buying or processing of fish and also wholesaling of fish or fish products. The firm's industrial classification would depend on which activity was of greater proportional significance, and this may change from year-to-year. The result is that the wholesale-retail sector reflects a strong mix of basic and support sector activity. In conjunction with possible industrial classification problems, this would account for the apparent lack of growth in this sector.

There is one significant omission in the employment data; this is employment in commercial fishing. Such employment is not included in the _Statistical Quarterly_ data, and as indicated above, a consistent series is not available elsewhere. Estimated commercial fishing employment for 1978, however, was 756. If we include this figure with total reported employment of 3,155, the commercial fishing employment accounted for about 19 percent of total employment for 1978. Commercial fishing plus processing employment amounts to 61 percent of total employment.

A second issue of concern relates to the residency of job holders. Table 21 presents estimates of resident and nonresident employment for 1978. The resident/nonresident breakdown for commercial fishing and processing has already been explained. Allocation of the remainder of employment has been accomplished as follows: State and local government is assumed to be resident employment, as is also the case for transportation, communications, and public utilities; finance, insurance, and real estate; and services. Federal government civilian employment was divided between defense-related and other Federal government activity. Defense-related employment was assigned to the nonresident category (in the sense that incomes earned had no impact on the Aleutian economy), while other Federal government employment was treated as resident employment.

Retail trade was assumed to reflect resident employment. Wholesale trade includes both resident and nonresident employment, and one-half of the employment in wholesale was treated as resident. This division was based on discussions of wholesale trade activity in the Aleutians with the Alaska Department of Labor.

The final industry of concern is contract construction. In conversations with several labor unions and contractors who operate in the Aleutians, it was clear that the vast majority of construction workers in the Aleutians are not residents of the area. Based on a synthesis of these conversations, it was estimated that 5 percent of contract

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TABLE 21. ALEUTIAN ISLANDS CENSUS DIVISION
ESTIMATED RESIDENT AND NON-RESIDENT
EMPLOYMENT, 1978

Industry	Resident	Non-Resident	Total
Commercial Fishing	251	505	756
Manufacturing	162	1459	1621
Construction	7	133	140
Transportation, Communication, and Utilities	31	-0-	31
Wholesale/Retail	89	12	101[e]
Finance, Insurance, and Real Estate	38	-0-	38
Services	171	-0-	171
Federal Government Civilian, Military-Related	-0-	484	484
Other Federal Government	198	-0-	198
State Government	88	-0-	88
Local Government	283	-0-	283
Total	1318	2593	3911

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e = estimated.

SOURCE: Commercial fishing; see text on production. Manufacturing
total from _Statistical Quarterly_; see text on production
for allocation. Federal government civilian military related;
Table 18. All other data on tables from _Statistical Quarterly_
(Alaska Department of Labor). For division of allocation to
resident and nonresident, see text.

construction employment in the Aleutians was accounted for by residents. The remainder was divided as follows: Anchorage (65 percent), southcentral Alaska (15 percent), the rest of the State (10 percent), and non-Alaska (10 percent). While this breakdown is necessarily an approximation, it does reflect the collective judgment of a wide variety of participants in contract construction in the Aleutians.

Using the above delineation of employment between resident and non-resident, it appears that just under 34 percent of the civilian employment in the Aleutians is held by residents. The remaining 66 percent is held by nonresidents. Available data do not permit us to estimate comparable breakdowns of employment for other years, and it is not possible to speculate on how the ratio of resident-to-nonresident employment may have changed over time.

Summary data on labor force, unemployment, and employment for 1970-78 are presented in Table 22. It should be noted that the employment data in this table are not consistent with the data of the previous tables. First, the present table does not include estimates of commercial fishing employment. Second, the data reflect the number of job holders, whereas the previous tables reflect numbers of jobs. The data are also supposed to be resident adjusted, although the resident employment estimate is substantially above that obtained in the previous table.

Of particular interest are the data on unemployment and the unemployment rate. Given the seasonal variation in total activity, the rates are suprisingly low. This would suggest that several factors are at work. First, a high degree of seasonal migration is present. Second, Aleutian residents may tend to drop out of the labor force when employment opportunities are not present. Third, the data include a large proportion of government employment which tends to be seasonally stable.

TABLE 22. ALEUTIAN ISLANDS CENSUS DIVISION:
CIVILIAN RESIDENT LABOR FORCE,
TOTAL EMPLOYMENT, AND UNEMPLOYMENT
1970-1975

Year	Labor Force	Employment	Unemployment	Unemployment Rate (%)
1970	1688	1575	113	6.7
1971	2041	1930	111	5.4
1972	1880	1763	117	6.2
1973	2109	1945	164	7.8
1974	1968	1830	138	7.0
1975	2371	2207	164	6.9
1976	2302	2147	155	6.7
1977	2102	1964	138	6.6
1978	2343	2196	147	6.3

SOURCE: Alaska Labor Force Estimates by Area (Alaska Department of Labor) various years.

A 1978 survey of potential labor force and employment of the Aleut population in the Aleutian region indicates that published data on unemployment may considerably understate the actual situation. Table 23 presents a summary of the survey results. Of the potential labor of 575, only 278 were employed; only 222 earned $5,000 or more for that year; and 297 were not employed.

This implies an unemployment rate of 51.7 percent. This probably overstates the "true" rate since only those of the potential labor force actually employed or seeking employment should be included in the labor force figures used to determine employment rates. There is no way to tell what proportion of the potential labor force would actually seek employment if employment opportunities were available, but it appears that substanial real unemployment exists that is not reflected in published statistics.

In summary, considerable growth in employment in the Aleutians has been evident. This has occurred mainly in response to growth of fisheries-related activity. This growth has also led to growth of employment in the support sector. While historical data are not available to indicate trends, nonresident employment accounts for a dominant proportion of total employment. It also appears that the Native Aleut population has not participated fully in the employment opportunities reflected by overall growth in total employment. Whether this is by choice or due to other reasons is not known.

TABLE 23.   REPORT OF LABOR FORCE 1978
COMPILED BY BUREAU OF INDIAN AFFAIRS
ANCHORAGE AGENCY

		Total	Male	Female
a.	Total Aleut population within the Aleutian region	2,139	1,155	984
b.	Total under 16 years of age included on line "a"	963	520	443

Resident Population of Working Age within the Aleutian Region

		Total	Male	Female
c.	Total 16 years and over (a minus b)	1,176	635	541
d.	16-24 years	447	241	206
e.	25-34 years	235	127	108
f.	35-44 years	212	114	98
g.	45-64 years	212	114	98
h.	65 years and over	70	38	32
i.	Not in labor force (16 years and over) Total (j+k+l+m)	601	243	357
j.	Students (16 years and over, including those away at school)	364	196	167
k.	Men, physically or mentally disabled, retired, institutionalized, etc.	47	47	
l.	Women for whom no child care substitutes are available	133		133
m.	Women, housewives, physically or mentally disabled, institutionalized, etc.	57		57
n.	Potential labor force (16 years and over) (c minus i)	575	392	183
o.	Employed, Total (p+q)	278	185	93
p.	Employed, earning 5,000 or more a year (all jobs)	222	148	74
q.	Employed, earning less than 5,000 a year (all jobs)	56	37	19
r.	Not employed (n minus o)	297	207	90

SOURCE: Tribal Specific Health Plan (Aleutian-Pribilof Islands
Association Health Department, undated).

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PERSONAL INCOME

Personal income data for the Aleutian Census Division have been com-
piled for the years 1965-1978 and are presented in Table 24. Growth
in current dollar total personal income has been at a rate of about
7.4 percent per year, while per capita income has grown at about 7.2
percent per year. When measured in constant dollars, however, the
growth has been substantially less. Real per capita income grew at
1.4 percent, while real total personal income grew at 1.6 percent over
the period.

Several aspects of the data suggest that the numbers be interpreted
with caution. First, the Anchorage Consumer Price Index was used to
deflate the personal income series since no more specific index is
available. Hence, the adjustment is only approximate. Second, a
large proportion of the income is related to military and federal
civilian employment directly linked to military activity. Since this
income does not enter the Aleutian economy in any meaningful sense,
its inclusion is misleading in terms of considering overall economic
activity.

Third, while the Bureau of Economic Analysis (BEA) which compiles the
data makes a resident adjustment, there is some question as to the
validity of the adjustment. In particular, it is not clear to what
extent the adjustment captures the effects of commerical fishing and
processing incomes flowing out of the region. Finally, an analysis of

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TABLE 24.   PERSONAL INCOME BY PLACE OF RESIDENCE:
ALEUTIAN ISLANDS CENSUS DIVISION, 1965-1978

	Current Dollars		Constant (1978) Dollars	
	Total (millions)	Per Capita	Total (millions)	Per Capita
1965	33.951	4,721	70.207	9,763
1966	36.093	4,735	71.818	9,422
1967	38.886	4,727	75.750	9,208
1968	41.688	5,256	79.149	9,979
1969	43.677	5,484	79.296	9,956
1970	53.671	6,627	93.763	11,577
1971	50.655	6,447	86.255	10,978
1972	49.968	6,580	83.267	10,965
1973	60.849	8,235	95.746	12,958
1974	66.084	8,280	91.949	11,520
1975	72.717	9,250	89.995	11,448
1976				
1977	79.765	9,932	87.638	10,912
1978	85.734	11,619	85.734	11,619

SOURCE: Current dollar income figures from U.S. Department of Commerce,
Bureau of Economic Analysis.   Constant dollar figures deflated
by authors, using Anchorage Consumer Price Index.

transfer payments reported for the region shows sizable amounts related

to federal military and related civilian employment that probably had

no effect on the Aleutian economy.

For these and other reasons, we have attempted to develop an estimate

of personal income for 1978 that more accurately reflects the sources

and disposition of personal income for the region.   These estimates

are shown in Table 25.

TABLE 25. ALEUTIAN ISLANDS PERSONAL INCOME, 1978
BY SECTOR, COMPONENTS, AND GEOGRAPHIC DISPOSITION

Income From / To	Support Sector	Contract Construction	Commercial Fishing	Fish Processing	Fed. Gov. Civilian	Fed. Gov. Military	State & Local Govt.	Total
ENDOGENOUS HOUSEHOLDS:								
TOTAL ALLOCATED BY INDUSTRY								
Wages & Salaries	3.715	0.381	0	2.353	3.022	0	5.206	14.677
Other Labor Income	0.695	0.071	0	0.440	0	0	0	1.206
Proprietors' Income	0.951	0.098	12.250	0	0	0	0	13.299
UNALLOCATED COMPONENTS:								
Dividends, Interest, and Rents								0.317
Transfer Payments								3.501
OUT OF REGION:								
Wages & Salaries								
Anchorage	0	4.709	0	0	0	0	0	4.709
Southcentral	0	1.087	0	0	0	0	0	1.087
Rest of State	0	0.725	0	0	0	0	0	0.725
Rest of World	0.275	0.725	0	21.173	5.867	40.584	0	68.624
Other Labor Income								
Anchorage	0	0.881	0	0	0	0	0	0.881
Southcentral	0	0.203	0	0	0	0	0	0.203
Rest of State	0	0.136	0	0	0	0	0	0.136
Rest of World	0.051	0.136	0	3.958	0	0	0	4.145
Proprietors' Income								
Anchorage	0	0	0.780	0	0	0	0	0.780
Southcentral	0	0	33.600	0	0	0	0	33.600
Rest of State	0	0	2.130	0	0	0	0	2.130
Rest of World	0	0	56.870	0	0	0	0	56.870
UNALLOCATED, OUT OF REGION:								
Dividends, Interest, and Rents								
Rest of World								1.623
Transfers								
Rest of World								4.813
TOTAL	5.687	9.152	105.630	27.924	8.889	40.584	5.206	213.326

SOURCE: See text on personal income.

As shown in the table, we have indicated personal income sources by type, accruing from the broad industrial classifications designated at the top of the table. The left hand column of the table indicates the estimated breakdown of income to resident and nonresident recipients. Inclusion of the military and related civilian federal income as non-resident is a judgmental decision based on the fact that these incomes do not appear to enter the general income stream of the Aleutian economy, but rather reflect enclave activity.

While much of the basis for allocating income has already been established in preceding sections of this study dealing with the Aleutians, there are several points that need to be expanded. In general, data on wages and salary income were obtained from the Statistical Quarterly for appropriate years. The Bureau of Economic Analysis data on "other labor income" were apportioned to specific private sector industries on a proportional basis and then assigned to either resident or non-resident categories in proportion to resident/nonresident wage and salary incomes. Dividends, interest, and rent were allocated to residents and nonresidents on the basis of total wage and salary income. Total transfer payments were adjusted to assign military transfers (except for veterans' pensions) to the nonresident category. In addition, 10 percent of federal civilian retirement payments were assigned to residents, with the remainder assigned to nonresidents. With the exception of these adjustments, the remainder of transfer payments were assigned to residents.

Proprietor's income is the income of self-employed and unincorporated enterprises. A large portion of this component for the Aleutians should reflect commercial fishing income, and it was felt that BEA figures did not adequately reflect this income. An estimate of non-commercial fishing proprietor's income was made by assuming that the proportion of proprietor's income to wage and salary plus other labor income was the same for the State as for the Aleutians. This led to an estimate of noncommercial fishing proprietor's income of 4.1 million dollars.

Proprietor's income from commercial fishing was based on the value of catch. No reliable data exist on net profits from commercial fishing. It has been estimated, however, that about 35 to 40 percent of the value of catch is reflected in labor income (Scott, Prospects for a Bottomfishing Industry in Alaska); hence, 35 percent of the value of catch has been used to estimate proprietor's income. This figure has been used in conjunction with the estimated 1978 southwest region value of catch to estimate proprietor's income, as shown in the table, and was allocated by factors established in Table 18.

In general, the data for 1978 show total personal income of 213.3 million. Of this total, residents who are part of the nonenclave economy of the region accrued 33 million dollars. Of the 180 million dollars accruing to nonresidents, about 46.5 million dollars represent wage and salary payments to military personnel and related federal civilian employees, with the remainder (133.9 million dollars) going to other nonresidents.

In terms of the regional allocation of the 180 million dollars, about 6.4 million dollars flowed to the Anchorage region; while 34.9 million dollars went to the southcentral region (primarily Kodiak), with an additional 3.0 million dollars going to the rest of the State. About 136.1 million dollars primarily from commercial fishing and defense-related activities appeared to flow outside the State. Thus, while total personal income was substantial, over 84 percent of the income created by production in the Aleutians flowed out of the Aleutian region. These are indeed very high leakages and present a different picture of the Aleutian economy than that indicated by the BEA personal income data.

In addition to the analysis of total and per capita income, it is again appropriate to consider the distribution of income. Recent data on income distribution are not available, but the Bureau of Indian Affairs prepared an estimate of the 1974 distribution of income which is presented in Table 26. The distribution is shown for both Native and white families. Median income for the two groups is similar, and both are well below the statewide figure of 12,443 dollars for the same year. The greatest disparity between Native and white families appears in the under-5,000 dollar groups, with 26 percent of the Native families and 13.8 percent of white families with incomes below 5,000 dollars. It should be noted that the non-Native families include military personnel, whose incomes tend to flatten the distribution somewhat; whereas for the Native distribution, the under-5,000 dollar and over-15,000 dollar income categories are proportionately more important.

TABLE 26.   FAMILY INCOME: NUMBER AND PERCENT OF NATIVE
AND WHITE FAMILIES BY INCOME LEVELS
ALEUT CORPORATION AREA

	Native		White	
	No. of Families	Percent	No. of Families	Percent
Under 1,000	7	2.1	0	0
1,000-1,999	16	4.9	6	1.0
2,000-2,999	13	4.0	7	1.1
3,000-3,999	30	9.2	31	4.9
4,000-4,999	19	5.8	45	7.1
5,000-5,999	20	6.1	55	8.7
6,000-6,999	26	8.0	65	10.3
7,000-7,999	25	7.7	63	10.0
8,000-8,999	21	6.4	72	11.4
9,000-9,999	18	5.5	37	5.9
10,000-11,999	40	12.2	88	13.9
12,000-14,999	31	9.5	102	16.2
15,000-24,999	56	17.1	43	6.8
25,000-49,999	5	1.5	17	2.7
50,000	0	-	0	0
Median Income	$8,357		$8,604	

SOURCE: Tribal Specific Health Plan (Aleutian-Pribilof Islands Association
Health Department, undated).

POPULATION

Aggregate population data for 1960 and the years 1970-78 are presented in Table 27; it includes total resident and civilian population and military population. Considerable variation in the military population is evident; although for most of the period, it averaged a little over 3,000. For recent years, it has been somewhat lower, dropping to 1,655 in 1978. Total civilian population has shown a steady increase, attributable to both natural increase and net in-migration. Table 28 shows the component of change in both civilian and military population over the 1970-78 period. Civilian population has grown at about 4.8 percent, with natural increase accounting for 47 percent of the total increase. The remainder is accounted for by net in-migration.

Table 29 provides data on population by community and by Native and non-Native components. The data totals are not in strict agreement with the other population data presented but do provide a generally accurate picture of the population distribution in the census division, with major nongovernment-based communities at King Cove, Sand Point, St. Paul, and Unalaska. It is no coincidence that (with the exception of St. Paul) these are the major centers of commercial fishing activity in the Aleutians.

TABLE 27. ALEUTIAN ISLANDS CIVILIAN AND TOTAL RESIDENT POPULATION: 1960, 1970-1978

	Total Resident Population	Total Civilian Population	Military
1960	6,011	2,633	3,378
1970	8,057	4,368	3,689
1971	7,896	4,285	3,611
1972	7,245	4,634	2,611
1973	6,914	3,994	2,920
1974	7,714	4,506	3,208
1975	7,086	4,208	2,878
1976	8,282	5,300	2,982
1977	7,686	4,896	2,790
1978	8,000	6,345	1,655

TABLE 28. ALEUTIAN ISLANDS: COMPONENTS OF POPULATION CHANGE, 1970-78

1970 Population	8,057
Births	1,106
Deaths	176
Natural Increase	930
Net Migration	
Civilian	1,047
Military	- 2,034
1978 Population	8,000

SOURCE: Alaska Department of Labor

TABLE 29. ALEUT REGION POPULATION
BY COMMUNITY, 1977

	Native	Non-Native	Total	Transient
Akutan	69	5	74	360 - 800
Atka	92	3	95	
Belkofski	14	—	14	
False Pass	55	2	57	120
King Cove[1]	425	142	567	60
Nelson Lagoon	49	6	55	
Nikolski	56	2	58	
Sand Point[1]	490	339	829	65
St. George	175	9	184	
St. Paul	437	63	500	
Unalaska	168	557	725	700 - 3,000
Other	126	5,700[2]	5,826	
Total	2,156	6,828	8,984	1,305 - 4,045

[1]City Manager's figures.

[2]Includes military population.

SOURCE: Tribal Specific Health Plan (Aleutian-Pribilof Islands
Association Health Department, undated).

Bristol Bay

Bristol Bay is located in the southwest portion of Alaska on the upper part of the Alaska Peninsula. As a region, it covers approximately 55,000 square miles, which makes it roughly the size of Iowa or Illinois. There are a total of 29 villages in Bristol Bay, and a total population of approximately 5,000 persons. Bristol Bay is, for statistical purposes, actually two separate areas: the Bristol Bay Borough (containing the villages Naknek, South Naknek, and King Salmon) and the Bristol Bay Division (which contains the remainder of the villages, including Dillingham).

The economy of Bristol Bay has one principal component that over-shadows all other activity: the commercial salmon fishery. Although affected in varying degrees, all villages of the region are impacted by the salmon industry. The salmon resource serves as an economic base for subsistence living, as well as the commercial economic activity. In recent years a substantial herring roe fishery has developed. In addition to the fishing, King Salmon Air Force Station in King Salmon also accounts for a significant amount of economic activity, yet its linkages with the other economic units within the region are minimal.

PRODUCTION

Basic sector production is composed of fishery related activity. Both commercial fishing and processing assume major economic proportions in

the economy of the region. This has been especially true over the last three years, as Bristol Bay has had three of the biggest fishing years ever. Table 30 summarizes information (data) on commercial fishing.

The data clearly show tremendous growth in the immediate past. The history of the fishery is one of boom and bust cycles. Commercial fishing began in the late 1800s, and though cyclic in terms of annual harvest, the long run harvest cycle peaked in the mid-30s, followed by a downward trend until the 1960s. The catch, despite cyclical fluctuations, remained relatively constant (averaging nine million fish) until the late 1970s. Over the past three years, however, the harvest has been very high. The average harvest over 1979-81 has been 25 million fish, with 1980 and 1981 (28.2 and 27.7 million fish) being the highest and second highest catch in the history of the fishery.

Table 30 also provides the summary data on the newly developing herring roe fishery. As can be seen, prior to 1977 this fishery was of little economic consequence. Growth in this fishery has been in large part a result of low or depleted stocks of herring elsewhere. Virtually all herring is caught for roe which goes for export. Prices have varied substantially. Exvessel prices in Bristol Bay were $110/metric ton in 1976, $155/metric ton in 1977, $330/metric ton in 1978, and a record high of $650/metric ton in 1979, and fell to $200 and $350 in 1980 and 1981, respectively.

TABLE 30.   CATCH AND VALUE TO FISHERMEN
BRISTOL BAY 1969 TO 1981

| YEAR | SALMON | | HERRING | |
	Pounds (millions)	Value ($millions)	Catch* (metric tons)	Value* ($thousands)
1969	46.0	9.185	48	5.2
1970	115.8	25.468	43	8.0
1971	66.7	16.147	23	7.7
1972	20.8	4.832	103	13.2
1973	14.5	3.120	51	4.0
1974	16.0	6.015	169	43.0
1975	29.7	12.027	100	31.9
1976	48.5	21.948	134	126.9
1977	47.8	26.145	2,660	562.9
1978	83.4	52.273[P]	7,180	2,755.4
1979	130.6	141.462[P]	10,303	6,950.4
1980	177.4[P]	84.262[P]	17,860	3,294.8
1981	180.3[P]	132.000[P]	11,570[P]	4,250.0[P]

*Actually includes herring roe-on-kelp, but this amounted to only about five percent of the total rate or 1.5 percent of catch in 1981.

[P] Preliminary data.

SOURCE: Alaska Catch and Production, Alaska Department of Fish and Game.

In short, the major increases in the economic and biological viability of the fisheries in Bristol Bay have been somewhat surprising. It is not known why this has actually occurred; certainly environmental conditions over the past few years have been optimal. This, along with the limited entry program and the extension of the 200 mile limit (with its concomitant decrease in the high-seas salmon gill net fishery), may have had a major impact. High catches are projected to continue for at least one more year, with the point projection for the 1982 harvest at 36 million fish (a potential record catch).*

The other major dimension to understanding commercial fishing is the ultimate distribution of the catch--where does the income from fishing in Bristol Bay flow? Or, more simply put, who does the fishing? The data on this is fragmentary at best. The data is somewhat better for salmon fishing than for herring, but no precise information is available for either.

In discussing salmon fishing, an understanding of the limited entry program is necessary. The ability to fish for salmon in Alaska is contingent on the ownership of a permit that is issued by the State. The permits were initially issued in 1975 on the basis of a point system (priority was given based on geographical location, economic

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*A fishermen's strike in 1980 resulted in a harvest of only about half of the available harvest.

dependence, and years in the fishery). The permits are transferable; a fairly substantial market for trading permits has arisen. Each fishery has a given number of permits that are gear type specific.

Table 31 provides data on the geographical distribution of the owner-ship of permits. As can be seen, there are 2,600 permits in Bristol Bay, of which roughly 47 percent are held by "residents" of Bristol Bay. This is 1979 data; while additional permit transfers have taken place since then, it is doubtful that these figures would change appreciably.

However, there is a significant difference in income flows from the fishery than might be inferred from permit ownership. First, only 38.55 percent of the drift gill net permits and 62.17 percent of the set gill net permits are in the hands of local residents. The earn-ings of each of these two gear types are significantly different.

From estimates based on survey analysis of the 1979 harvest, the average gross income of the drift gill net fleet was $72,000, as opposed to $16,000 for the set gill net operations (Larson, 1980). Moreover, there appears to be a significant difference in the earnings of Bristol Bay residents as compared with nonlocal residents. The average gross income from fishing (see Table 32) of Bristol Bay drift gill net operators was $52,000, as opposed to $73,000 for other Alaskan fishermen and $81,000 for "out of state" residents. The same type of pattern, though not to the same degree, exists for set gill net operators.

TABLE 31. BRISTOL BAY PERMANENT ENTRY SALMON PERMITS
GEAR TYPE AND RESIDENCE, 1979

	Nonresident	Bristol Bay Resident	Non-Bristol Bay Alaska Resident	Total
Drift gill net	728	662	337	1,727
Set gill net	149	567	196	912
Total	877	1,229	533	2,639

PERCENT

	Nonresident	Bristol Bay Resident	Non-Bristol Bay Alaska Resident	Total
Drift gill net	27.7	25.2	12.4	65.3
Set gill net	5.7	21.6	7.4	34.7
Total	33.4	46.8	19.8	100.0

SOURCE: Steve Langdon, Transfer Patterns in Alaskan Limited Entry Fisheries, report to Limited Entry Study Group, Alaska State Legislature, Jan 17, 1980.

TABLE 32. AVERAGE GROSS EARNINGS FROM SALMON FISHING
BY GEAR TYPE AND RESIDENCE, 1979

Gear Type	All Fishermen	Bris. Bay Residents	Other AK Residents	Out-of-State Residents
Drift gill net	$71,696	$52,147	$72,643	$81,002
Set gill net	$16,493	$14,724	$17,010	$19,484

SOURCE: Doug Larson, "1979 Fishermen Income Survey: Herring and Salmon Fisheries," Alaska Sea Grant Program report 80-5, November 1980.

This difference in productivity is a result of several factors. Bristol Bay residents tend to have smaller and older boats whereas the limit boats (32 feet limit) are more likely to be operated by a non-Bristol Bay resident. Langdon found that among Bristol Bay native fishermen, 40 percent used smaller (less than 32 feet) boats, while Koslow (1979) reported that more than 90 percent of non-Bristol Bay residents fished limit boats. The boats of the natives (local residents) tend to be older and at a lower level of technology. This may also reflect the local residents' access to financial markets and ability to finance the latest technology. Koslow and Langdon both note that the income of local residents is almost exclusively dependent on salmon fishing, whereas out of area residents are not entirely dependent on the Bristol Bay run. Koslow (1979, p. 8) found that more than half of the local captains are dependent on Bristol Bay income for more than two-thirds of their income, as opposed to 20 percent for non-Alaskan captains. Langdon (1981, p. 63) reported that Bristol Bay native fishermen indicated that 83 percent of their annual incomes come from salmon fishing and 50 percent indicated that salmon fishing was their only source of income. This would seem to have a substantial impact on access to financial markets, which impacts income and productivity.

Based on relative gear productivity and the tenure of limited entry permits, it would seem as though a substantial portion of the income flows to other than local residents. Based on the data presented in

Tables 30 and 31, although Bristol Bay residents own 48.8 percent of the limited entry permits, only 32.3 percent of the income generated from the harvest flows into Bristol Bay.

Other Alaskan residents receive 21.0 percent of the value of the harvest (own 19.8 percent of the permits), while 46.7 percent of the value of the harvest accrues to non-Alaskan residents (who own 33.4 percent of the permits).

The harvest of herring has strikingly different economic characteristics from the salmon fishery. Although the experience for the herring fishery is somewhat limited, it appears that little income flow finds its way into the local economy. From conversation with the area biologists from the Alaska Department of Fish and Game, only a small portion of the exvessel value goes to local fishermen. In 1981, for example, about ten percent of the purse seiners and 80 percent of the gill netters were local Bristol Bay boats. However, the productivity of the gill net fishermen is substantially lower. In 1980, gill netters harvested a 43,000 pound average per boat, while the same figure was 247,000 pounds for purse seiners.

The proportion of the catch in terms of income that goes to local residents is also affected by the predicted harvest. A high harvest quota attracts more boats from outside the region, dropping the proportion of income from the fishery that stays in the local economy. All this has led to requests that the fishery be limited in terms of

entry, or that a large portion be allocated to gill netters. (Many of the local salmon fishermen can convert easily to the herring fishery-- the capital requirements to entering the herring fishery are minimal.) However, thus far, the herring fishery has not been managed with the specific intent of affecting the distribution of income (although the defacto distributional outcome is affected by the particular management scheme currently used). It remains to be seen if distributional considerations will become an integral part of the management plan.

From 1981 data and information from Alaska Department of Fish and Game, of the $4,250,000 exvessel value of the herring harvest, only $600,000 (or 14 percent) accrued to Bristol Bay residents. As a percent of the total harvest, this is an increase over the previous year as a result of a lower predicted harvest quota.

The final dimension of commercial fishery to be considered is employment. No systematic periodic estimates of commercial fishing in Bristol Bay (or the rest of the state) are made by the Department of Labor, as fishermen are self-employed and crew members generally work on a "share" basis, and as such, are not salaried employees. Estimates for 1969 through 1976 have, however, been compiled for the state and various regions (Rogers, 1980, p. 13), and will be used here to estimate employment for 1979. It is assumed that crew members come from the same area as the residence of the permit holders. (There may be nonresidents who hire residents, but generally this is not the

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case.) Rogers used a crew factor of 2.0 (including the captain) for drift gill net fishermen and 2.5 for set gill net operations. Based on those estimates, employment in Bristol Bay is 3,454 for driftnets and 2,280 for setnets, with 2,741 being local residents.

Rogers estimates are probably low, though. Drift net fishermen generally employ a "first crewman" for the whole season, but usually employ a second crewman when the harvest is at the peak. Again, this is difficult to estimate—Langdon (1980) reported an average crew size of 1.44 for all Bristol Bay native fishermen, which is more likely. Also, in a small portion of the cases (estimated by Langdon as 10 percent), the crewmen of non-Bristol Bay fishermen may be residents of Bristol Bay. Utilizing this data, total employment is 6,493, with 3,201 being Bristol Bay residents.

The other component of the fishing industry in Bristol Bay is processing. The present structure of the processing industry reflects a mixture of shore-based and floating processors engaged in canning and freezing. In recent years, the trend has been toward an increase in the proportion of the harvest that is fresh frozen. In 1976 more than 90 percent of the salmon was canned, as compared to 1980 when approximately 21 percent of the harvest went to the fresh/frozen market. Additionally, there is a significant portion of the harvest that is airlifted into fresh markets and to other processing centers (Kenai and Kodiak).

In 1980, more than 180 processors and buyers operated in Bristol Bay. Of these, about one third were on-shore processors, another third were floating processors and catcher/processors, and another third were brokers and buying stations.

Employment data for processing is available for Bristol Bay (both statistical areas) from the Statistical Quarterly (Alaska Department of Labor). For 1979, 889 was the average annual employment in manufacturing; which for Bristol Bay is largely synonymous with fish processing. As is the case with commercial fishing, it is important to determine what proportion of the employment is held by residents of the region.

Data on this question are fragmentary at best. First, it must be understood that total employment in Bristol Bay is highly seasonal and is very dependent on salmon fishing. For 1979, average employment in manufacturing (for both statistical areas combined) for the four quarters was, respectively: 15 (Jan.-March), 101 (April-June), 1,708 (July-Sept.), and 193 (Oct.-Dec.). The lowest is the first quarter, with very little activity. Substantial gains are recorded in the second quarter, especially the latter part. Employment peaks in July (the salmon run peaks around July 10), and then falls off through December to the winter low. Available data does not indicate how the seasonal pattern varies between residents and nonresidents.

No other employment category exhibits such extreme seasonal varia-
tions. The processing firms are reluctant to divulge to what extent
they import labor, but it is probably substantial. Part of the in-
crease in processing employment goes to resident workers, but it is
difficult to know how much.

The last element of the basic sector of Bristol Bay is the military.
King Salmon Air Force Station is located in the Bristol Bay Borough
and, as of 1978, had 432 active duty and civilian defense related
personnel (see Table 33). The military preserve is not as numerically
significant as it is in the Aleutians, and the overall regional
economic impact is relatively small. Remote bases tend to be self-
contained and self supporting, and have little effect on the local
economy.

In summary, basic sector production in Bristol Bay is almost exclu-
sively related to salmon fishing, with its relative importance having
increased as of late. In terms of providing employment in manufac-
turing, though, growth has not been substantial because a great deal
of the manufacturing labor is imported. However, the harvests over
the past three seasons have been very large and the near term projec-
tions are for continued high harvests (1982 could exceed all previous
harvests). This is likely to have substantial income effects in the
region.

TABLE 33. MILITARY AND RELATED FEDERAL CIVILIAN EMPLOYMENT AND WAGES
BRISTOL BAY BOROUGH AND BRISTOL BAY CENSUS DIVISION, 1978

	Bristol Bay Borough		Bristol Bay Census Division	
	Employment	Wages (000)	Employment	Wages (000)
Military and Related Civilian Employment	9	151	432	4,980
Military Personnel	5	56	420	4,924
Military Related Federal Civilian Employment	4	95	12	58
PX and NAF (largely part-time)[1]	0	0	12	58
Other	4	95	0	0

[1]PX and NAF (Post Exchange and Nonappropriated Fund activities, including officer's clubs and enlisted men's clubs)

SOURCE: Numbers: Basic Economic Statistics of Alaska Census Divisions, Alaska Department of Commerce and Economic Development, Division of Economic Enterprise, November 1979, p. 32-37.

EMPLOYMENT, UNEMPLOYMENT AND LABOR FORCE

The analysis of employment of the Bristol Bay region is important for understanding the sources of major income flows. These income flows provide insight into the sources of growth of the local economy. Tables 34, 35, and 36 summarize average monthly employment of the Bristol Bay Region for the years 1965-1980. Table 34 provides data for the entire region, while Tables 35 and 36 provide breakdowns for the Bristol Bay Census Division and the Bristol Bay Borough.

TABLE 34

AVERAGE CIVILIAN MONTHLY EMPLOYMENT
BRISTOL BAY LABOR AREA[3]

Industry	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980[2]
Mining	*	*	*	*	*	*	*	*	*	*						
Contract Construction	*	*	*	*	*	*	*	*	*	*				27[1]	53[1]	37
Manufacturing	626	687	373	693	905[1]	851[1]	798[1]	402	445	235	291	289	264	469	889	662
Transportation, Communications & Utilities	89	94	95	113	117	111	110	104	170	148	192	212	215	236	222	236
Wholesale & Retail	29	28	30	35	42	47	47	59	60	74	94	90[1]	80[1]	101[1]	79[1]	145[1]
Finance, Insurance and Real Estate	*	*	*	*	*	*	*	32[1]	*	27	25[1]	35[1]	43[1]	34[1]	32[1]	40
Services	31	27	38	29	25	23	33	45	55	142	182	201[1]	230	304[1]	393	786
Federal Government	188	179	168	167	146	162	120	171	191	193	195	194	194	195	191	186
State & Local Government	100	130	150	174	190	204	264	317	368	396	474	507	437	570	636	566
Miscellaneous	0	0	0	0	0	*	*	*	*	*	*					
Total	1,084	1,002	866	943	1,063	1,253	1,243	1,171	1,354	1,267	1,512	1,579	1,513	1,846	2,473	2,278

*Four firms or less reporting, so privacy dictates that data is not listed, though is included in totals.

[1] Less than four firms reporting in at least one quarter.

[2] Only three quarters reported.

[3] Prior to 1974 data reported on Bristol Bay election district. Since 1975 data has been reported for Bristol Bay Borough and Bristol Bay Census Div.

SOURCE: *Statistical Quarterly*, Alaska Department of Labor.

TABLE 35. AVERAGE CIVILIAN MONTHLY EMPLOYMENT
BRISTOL BAY CENSUS DIVISION

	1975	1976	1977	1978	1979	1980
Mining	*	*	*	*	*	*
Contract Construction	70[1]	*	66	27[1]	34	29
Manufacturing	97	124	131	207	694[1]	313
Transportation, Communication and Utilities	110	143	170	187	178	191
Wholesale Trade	*	*	*	*	81	41
Retail Trade	67	63	53	63	71	98
Finance, Insurance and Real Estate	25[1]	35	43	34	32	29
Services	97[1]	128	170	235	393	273
Federal Government	77	82	100	115	107	113
State and Local Government	331	399	344	372	399	333
Total	855	977	1,038	1,193	1,690	1,399

SOURCE: Statistical Quarterly, Alaska Department of Labor

*Less than four firms reporting, so privacy preservation dictates that data is not listed, though it is included in totals.

[1]Less than four firms reporting for at least one quarter.

[2]Only three quarters of data available.

TABLE 36. AVERAGE CIVILIAN MONTHLY EMPLOYMENT
BRISTOL BAY BOROUGH DIVISION

Industry	1975 [1]	1976	1977	1978	1979	1980 [2]
Mining	*	*	*	0	0	*
Contract Construction	*	*	*	0	19 [1]	8 [1]
Manufacturing	194	165	133	262	195	349
Transportation, Communication and Utilities	82	69	45	49	44	45
Wholesale Trade	*	*	*	*	*	*
Retail Trade	27	27	27	38	*	43 [1]
Finance, Insurance and Real Estate	*	*	*	*	*	11
Services	85	73	60 [1]	69 [1]	*	513
Federal Government	118	112	94	80	84	73
State and Local Government	143	108	93	198	237	233
Total	657	602	475	653	783	879

SOURCE: Statistical Quarterly, Alaska Department of Labor

*Less than four firms reporting, so privacy preservation dictates that data is not listed, though it is included in totals.

[1]Less than four firms reporting for at least one quarter.

[2]Only three quarters of data available.

Over the period, total employment grew substantially at an average annual rate of 5.1 percent. While the basic industry of fish processing registered very little growth, other sectors grew at substantial rates.

Manufacturing (synonymous with fish processing) is to a large degree imported (from outside the region), and is very dependent on the size of the fish harvest. As with harvest data (see Table 30), with the exception of the past three years, no consistent pattern exists.

State and local government grew at a 12.25 percent rate, whereas wholesale and retail trade grew at a 11.3 percent rate, and transportation grew at a 6.7 percent rate. Services grew at a 24.1 percent rate, yet this rate of growth is based upon a statistical anomaly, and is probably significantly lower. (Based on the 1965-1979 period, it still registered a 19 percent rated growth.)

In examining monthly employment data presented in Table 37, there appears to be a great deal of volatility in employment in the manufacturing, service, and state and local government sectors. It appears that the increases in employment in the manufacturing and commercial fishing sector are matched by reductions in each of the other two sectors. Apparently, most of the variation in employment in the government takes place in local government employment, where positions are funded with the intention of permitting commercial fishing during the season.

TABLE 37. BRISTOL BAY MONTHLY NONAGRICULTURAL EMPLOYMENT BY SECTOR, 1979

	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.
Mining	0	0	0	0	0	0	0	0	0	0	0	0
Construction	7*	10*	9*	28	30	42	46*	66*	54*	78	83	64
Manufacturing	17	11*	16*	35*	84*	184	2611	1537	977	438	298	289
Trans.-Comm. & Utilities	200	197	194	209	240	217	227	233	220	255	239	234
Wholesale Trade	*	*	*	*	*	*	8	8	9	7	7	6
Retail Trade	64*	62*	63*	60*	71*	69*	61*	68*	87*	79*	84*	82*
Finance-Insurance	36*	35*	32*	34*	31*	28*	25*	29*	29*	33*	31*	32*
Services	440*	424*	466*	483*	512*	598*	438*	421*	284*	232*	217*	200*
Federal Government	196	194	195	181	187	197	196	205	201	184	182	176*
State & Local Government	692	736	721	755	760	549	351	353	624	660	718	1132
Miscellaneous	1956	1958	1969	2185	2544	2788	4198	3158	2708	2184	2052	1985

SOURCE: Statistical Quarterly, Alaska Department of Labor

*Some specific data not reported for disclosure reasons, but included in totals.

One significant omission from the employment data is commercial fishing. Fishing, as previously discussed, is not traditional salaried employment. Fishermen work for crew shares (e.g., 15 percent of the gross to each crewman); and for tax purposes, crewmen and fishermen are considered to be self-employed. Utilizing previous estimates, it would appear that fishermen (and crew) accounted for 6,493 jobs, and that local residents account for 3,201 jobs in fishing employment (though this is highly seasonal). If we include these figures with total reported employment, then fishing accounted for 72 percent of total employment. Commercial fishing and processing account for 80 percent of total employment. Again, it must be reiterated that a great deal of this employment occurs in a relatively short period of time (the three months of the salmon harvest).

A second issue in employment, as explained earlier, relates to the residency of job holders. As indicated above, a significant portion of employment in commercial fishing is non-resident employment. As reported previously, the bulk of employment by processors is also non-resident.

A few of the processing firms have indicated the extent to which they import labor (Table 38), although there is probably not enough information or consistency to be able to make estimates as to the proportion of the payroll from processing that goes to non-resident labor. From interviews with the processors, it would appear that during the

TABLE 38. BRISTOL BAY SUMMARY OF EMPLOYMENT BY RESIDENCY OF EMPLOYEES, LARGE PROCESSORS

	Seasonal Peak		Local		Other Alaska		Outside Alaska	
	1980	1981	1980	1981	1980	1981	1980	1981
Dillingham/Nushagak								
Queens Fisheries	260	300	0	0	86*	100*	174*	200*
Peter Pan	210	225	120	120	20	20	70	85
Naknek/Kwichak								
Nelbro	280	225	6	6	134	110	140	109
Red Salmon	197	197	20	20	10	10	167	167
Whitney	120	120	10	10	20	20	90	90
Egegik								
Kodiak King	80	85	0	0	19*	20*	61*	65*
Diamond E.	263	263	0	0	66*	66*	197*	197*
Columbia Ward	275	300	0	0	150	175	125	125
TOTAL	1,685	1,715	156	156	505	521	1,024	1,038
% of Total	100%	100%	9.2	9.1	30	30	60	61

*Based on a percentage estimate of season peak.

SOURCE: Data provided by representatives of respective processors.

processing peak, a substantial portion of the income flow to labor accrues to non-resident labor. Perhaps 60 percent of this income flows outside Alaska and 30 percent to non-Bristol Bay Alaskans. It must be remembered, though, that this is only during salmon season, which is basically June, July, and August. This is when employment is at its peak. However, during the other months, there is little migratory labor--the processors bring in the outside labor only for the fishing season.

This finding is reinforced by data on labor force and employment. During the peak of the 1979 salmon harvest, data on employment suggest that there are 4,200 jobs being filled, yet the labor force at that time was only 2,036; it is doubtful that the difference in the two figures is accounted for by moonlighting.

On average, it appears that 90 percent of processing employment during the peak period is non-resident employment. (For purposes here, it is assumed that peak period is July, August and September, and that all other jobs go to the residents.) Based on 1979 monthly data of the 6,497 month jobs, 1,885 (29 percent) were held by residents, and 4,612 (71 percent) were held by non-residents. Of the non-residents, one third of those non-resident jobs (1,537 jobs or .24 percent of the total) were held by Alaskan residents (outside Bristol Bay). On an annual basis, employment in processing would be allocated as follows: Bristol Bay residents, 157 jobs; non-Alaskan residents, 384 jobs; other Alaskan residents, 128 jobs.

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The allocation of the remainder of employment has been accomplished as follows: state and local government is assumed to be local residents, as is also the case for the remainder of the employment categories. With the exception of federal government military employment, most of the other categories are small (construction is the most notable), and though a portion of employment might be allocated to non-residents, for purposes here, employees are assumed to be residents.

Using these assumptions, from the data presented in Table 39, it would appear that 52.3 percent of total employment was held by Bristol Bay residents. The remaining 47.7 percent is held by non-residents. Again, it must be emphasized that this is an estimate, but it does provide a benchmark. Data are not available to make this determination for other years. Also, it is not possible to speculate how resident employment shares will change over time.

TABLE 39. BRISTOL BAY AVERAGE ANNUAL ESTIMATED RESIDENT AND NON-RESIDENT EMPLOYMENT, 1979

Industry	Resident	Non-Resident	Total
Commercial Fishing	3,201	3,292	6,493
Manufacturing	157	512	669
Construction	34	0	34
Transportation	178	0	178
Communications and Utilities			
Wholesale and Retail Trade	152	0	152
Finance	32	0	32
Services	393	0	393
Federal Gov't (military) 1978 data		432	432
Other Federal Government	107	0	107
State and Local Government	399	0	399
Total	4,653	4,236	8,889
	52.3%	47.65%	

Summary data on the labor force, employment, and unemployment for 1970-1981 are presented in Tables 40 and 41. It should be noted here that the employment data in this table is fundamentally and definitionally different from the employment data in previous tables. First, as in the previous data, no official data is available on commercial fishing. Secondly, the data here reflects job holder status, and is based solely on residents (i.e., resident adjusted). Thirdly, and perhaps the most important difference, the data reflect the number of job holders, whereas the previously presented data reflected the number of jobs. The difficulty here is that it is possible to hold more than one job, and thus, it is difficult to adjust income flows on the basis of jobs.

Of particular interest are the levels of unemployment and the unemployment rate. These are surprisingly low, given the cyclic variation in employment (number of jobs). However, given the definition of labor force participation used and the nature of the economy in Bristol Bay, they less surprising. The data suggests that a substantial amount of movement in and out of the labor force is present.

Most observers feel that employment and unemployment figures are tenuous when examining "Bush" economies. People tend to enter the labor force during the summer months when employment opportunities are present. During the remaining part of the year, although they could potentially be employed, they are not in the labor force. This is

TABLE 40. SUMMARY EMPLOYMENT STATISTICS, BRISTOL BAY LABOR AREA

Year	Labor Force	Employment	Unemployment	Unemployment Rate (%)
1970	1,384	1,228	156	11.3
1971	1,483	1,280	203	13.7
1972	1,468	1,291	177	12.1
1973	1,547	1,399	148	9.6
1974	1,601	1,494	107	6.7
1975	2,005	1,897	108	5.4
1976	2,096	1,943	153	7.3
1977	1,928	1,778	150	7.8
1978	1,661	1,497	164	9.9
1979	1,838	1,679	159	8.7
1980	1,824	1,573	151	8.3
1981*	1,860	1,723	137	7.4

*Based on the first three quarters only.

SOURCE: Historical Report on Labor Force and Employment, Bureau of Labor Statistics, U.S. Department of Labor.

TABLE 41. MONTHLY LABOR FORCE AND EMPLOYMENT, BRISTOL BAY, 1979

	Civilian Labor Force	Employment	Unemployment	Rate
January	1,609	1,433	176	10.9
February	1,686	1,508	199	11.8
March	1,828	1,578	250	13.7
April	1,811	1,633	178	9.8
May	1,960	1,764	196	10.0
June	1,922	1,768	154	8.0
July	2,036	1,933	103	5.1
August	1,911	1,800	111	5.8
September	1,879	1,775	111	5.9
October	1,939	1,800	139	7.2
November	1,805	1,656	139	7.7
December	1,679	1,527	152	9.1

SOURCE: Statistical Quarterly, Alaska Department of Labor, 1980.

primarily because of the way in which labor force participation is measured. Those persons who have not actively sought work, even though they may have wanted to work, are considered out of the labor force; therefore, they don't appear within official estimates of unemployment. This effect is similar to what is referred to as the "discouraged worker" effect in national employment data, except in the Alaskan bush the basic economic structure is somewhat different. Nonetheless, it is felt by many that the narrow definition of unemployment accounts for much of the perceived difference between published rates of unemployment and the proportion of people who are not gainfully employed (i.e., unemployed). This shows up somewhat in labor force participation rates--in 1980, the labor force participation rate for Bristol Bay was 24.5 percent, whereas for Alaska and the United States as a whole, it was 47.7 and 46.9, respectively. Many people enter the labor force during the summer when fishing season is in full swing, and then are out of the labor force until the next year.

In a study done by the state in the lower Yukon-Kuskokwim Region, it was estimated that actual unemployment was 24.7 percent, as opposed to official estimates of 13.2 percent. The study used a broader (less restrictive) definition of unemployment that was intended to measure the available worker pool. The question asked was, "Does . . . . want a regular job now, either full- or part-time?"

This is reinforced further by Langdon's study among resident Bristol Bay fishermen. While fishing represents the single most important employment opportunity in Bristol Bay, it is only important for that middle three-month period. Langdon reported that Bristol Bay native fishermen received 83 percent of their annual income from fishing, and that among 58 percent of the fishermen, fishing was their sole source of income. It is recognized that salmon fishing is seasonal, yet the fisherman who is unemployed for the other nine months of the year is an under-utilized resource.

PERSONAL INCOME

Personal income data for the Bristol Bay region for the years 1959-1979 (both statistical areas) have been compiled and are presented in Table 42 and Table 43. the growth rate of current dollar total personal income for the Bristol Bay Division and the Bristol Bay Borough was 11.92 percent and 7.96 percent respectively. Per capita income growth for each was 10.49 percent and 6.92 percent respectively. However, when measured in constant dollars, the growth appears to have been substantially less. In real terms, per capita income has grown at a rate of only 5.68 percent in the Bristol Bay Division and 2.1 percent in the Bristol Bay Borough.

A couple of aspects of the above data suggest that the numbers need to be taken with a fair amount of caution. First, the Anchorage Consumer Price Index was used to adjust the time series to constant dollar

TABLE 42. PERSONAL INCOME
BRISTOL BAY DIVISION

YEAR	TOTAL (000)	PER CAPITA	1979 DOLLARS
1959	2,491	812	
1962	3,052	918	1,975
1965	3,906	1,196	2,604
1966	4,175	1,295	2,710
1967	4,372	1,260	2,581
1968	4,753	1,378	2,757
1969	5,110	1,476	2,855
1970	6,407	1,829	3,419
1971	7,348	2,085	3,784
1972	6,853	1,854	3,278
1973	15,595	4,174	7,079
1974	13,908	3,635	5,562
1975	16,233	4,088	5,499
1976	16,230	3,857	4,815
1977	18,018	4,257	4,984
1978	19,636	4,645	5,078
1979	23,720	5,973	5,973

SOURCE: Current dollar income figures from U.S. Department of Commerce, Bureau of Economic Analysis. Constant dollar figures deflated by using Anchorage CPI.

TABLE 43. PERSONAL INCOME
BRISTOL BAY BOROUGH

YEAR	TOTAL (000)	PER CAPITA	BASED ON 1979 DOLLARS
1959	3,394	3,341	
1962	4,122	3,734	8,271
1965	3,705	3,447	7,505
1966	3,947	3,703	7,550
1967	4,089	3,574	7,323
1968	4,413	3,878	7,759
1969	6,792	5,946	11,504.58
1970	5,758	4,994	9,336
1971	7,304	6,041	10,963
1972	7,339	6,678	11,821
1973	9,315	8,369	14,195
1974	10,028	8,462	12,948
1975	11,419	9,157	12,319
1976	12,707	9,678	12,804
1977	11,761	8,890	10,408
1978	13,014	10,711	11,711
1979	15,705	12,737	12,737

SOURCE: Current dollar incomes from U.S. Department of Commerce, Bureau of Economic Analysis. Constant dollar figures deflated by using Anchorage CPI.

amounts, since no more specific index is available. There is a considerable difference in prices between Bristol Bay and Anchorage, yet aside from some tenuous estimates of the gross difference, no consistent time series is available. Secondly, the CPI has come under a significant amount of criticism as of late, in that many feel that it has consistently overstated inflation, and thus, the rate of real income growth would actually have been higher over the period. Thirdly, the data in no way provides any information about the subsistence economy. If the poverty level of income were adjusted to Bristol Bay, it would suggest that the bulk of the population is below the poverty level. What is missing in the personal income data is the value of subsistent income and how this has changed over time. Additionally, in examining the data for the two different statistical areas, it is evident that the income in the Bristol Bay Borough is more than twice that in the Bristol Bay Division. This has to be explained in large part by the fact that Bristol Bay Borough is one of the centers of commerce, and the portion of individual's existence that is tied up in subsistence activity is less than in the more rural areas. The Bristol Bay Division, on the other hand, includes all the outlying bush communities, in addition to the commercial center of Dillingham.

Data on the distribution of income for Bristol Bay is presented in Table 44. It is recognized that this data is fairly dated, yet it is important as a point of reference. The distribution and levels of income have certainly changed since 1970, but no attempt is made here to speculate what these changes have been.

The distribution is shown for both white and non-white (native) groups. The largest disparity exists in the two lowest income classes, which accounted for 43.4 percent and 42.3 percent of the native families, but only 15.6 percent and 16.9 percent of the white families. Also, compared with statewide data, Bristol Bay natives appear to be concentrated more in the lower income classes.

It must be remembered, however, that the white population is concentrated more in the commercial centers and King Salmon Air Force Station, which would tend to raise the income levels and flatten the distribution. Also, this data does not include any value for subsistence income.

TABLE 44. INCOME OF FAMILIES BY PERCENT IN INCOME CLASS
BRISTOL BAY, 1970

Income Class	BRISTOL	BAY		ALASKAN		
	Total	White	Non-White	Total	White	Non-White
$0 - 4,999	31.9	15.6	43.4	14.1	9.9	37.7
$5,000-9,999	31.7	16.9	42.3	23.6	22.4	30.1
$10,000-14,999	21.8	42.5	7.3	24.6	25.5	19.2
$15,000-24,999	13.2	23.5	6.0	28.2	31.3	11.0
$25,000 and more	1.3	1.6	1.1	9.6	10.9	1.9
	100.0	100.0	100.0	100.0	100.0	100.0

SOURCE: Kresge, Fison, and Gasbarro, Bristol Bay: A Socioeconomic Study, ISEGR Report No. 41, University of Alaska, 1974, p. 4.2.

POPULATION

Aggregate population data for Bristol Bay for 1960, 1970, and 1980 are presented in Table 45; included is the data on population by racial group (native and non-native components). Table 46 provides data on the components of the changes in population between 1960, 1970, and 1980. Overall population grew at a 1.74 percent rate over the two decades, with the native component growing at a somewhat higher rate.

Virtually all of the population growth in Bristol Bay has been accounted for by natural increase. From 1960 to 1970, there was a substantial increase in natural increase, coupled with negative changes in military population and net migration.

Between 1970 and 1980, there was a further reduction in military population, with positive implied net migration and positive natural increase. However, over the two decades, the changes in military population and net migration appear to have been negative. The totals are not in strict agreement, but the data do provide a generally consistent picture with respect to the major causes of population change.

Table 47 provides data on population by community, by native, and non-native components. The highest concentration of Caucasians is in the Dillingham and Naknek areas (the primary centers of the region). Though Caucasians make up 30 percent of the total population, 76 percent of the Caucasian population resides in these two areas, where combined they account for 50 percent of the population.

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TABLE 45. POPULATION GROWTH
BRISTOL BAY, 1960-1980[1]

	1960 Census	1970 Census	1980* Census	1960-80
Total Population	4,024	4,632	5,683	1.74
White	1,423	1,593	1,726	0.96
American Indian, Eskimo, and Aleut	2,574	3,003	3,880	2.07
Black	27	36	48	2.91
Asian			7	NA
Other			22	NA

[1]Prior to 1974, only one census division for Bristol Bay was reported.

*1980 Census of Population and Housing (Advance Reports), Alaska (PHC80-V-3), U.S. Department of Commerce, March 1981.

TABLE 46. COMPONENTS OF POPULATION CHANGE
BRISTOL BAY BOROUGH 1960 - 1980

1960 Population	4024
Change in Military Population	-97
Natural Increase (births-deaths)	947
Civilian Migration	-242
1970 Population[1]	4632

	TOTAL	Bristol Bay Borough	Dillingham Census Area
1970 Population[1]	4974	1147	3827
Change in Military Population	-70	369	-439
Natural Increase (births-deaths)	649	92	557
Civilian Migration	124	-525	649
1980 Population	5677	1083	4594

[1]1970 population was reported for the whole of Bristol Bay, whereas the second reference to 1970 population comes from Alaska 1980 Population - A Preliminary Look, Alaska Department of Labor, 1981.

TABLE 47. DILLINGHAM CENSUS AREA POPULATION BY COMMUNITY, 1980

	White	Native	Other	Total
Aleknagik	16	138	-	154
Clarks Point	9	70	-	79
Dillingham	660	891	8	1563
Ekwok	5	71	1	77
Manokotak	20	273	1	294
Newhalen	5	82	-	87
New Stuyahok	20	311	-	331
Nondalton	11	161	1	173
Port Heiden	31	59	2	92
Togiak	26	443	1	470
Bristol Bay Borough (King Salmon, Naknek & South Naknek	660	360	74	1094
	1464	2805	88	4357

III. THE BASE CASE

In this part of the report we deal with three critical elements of the base case. The first of these is the underlying methodology used to develop the base case. The second element concerns the assumption regarding the future economic activity used to develop the projections. The third is the set of projections themselves.

Methodology

Impact analysis, as carried out in the present study, is based upon a comparison of sets of economic and demographic projections, where one set is the standard or base case set. The base case serves as a frame of reference against which the economic and demographic changes resulting from the proposed OCS lease sale can be measured and evaluated.

There are two components of this process that are of particular concern. First is the question of the accuracy and consistency of the projections. Generally speaking, this is dependent upon the validity of the assumptions utilized regarding future economic growth of the exogenous variables and the projection methodology employed. More will be said on both of these points below.

The second concern relates to the degree of information contained in the projections. Specifically, do the projections contain the information that is necessary to adequately interpret and evaluate the impacts?

While aggregate data on economic and demographic variables generated using the projections methodology employed in this study will answer many questions, it must be recognized that there will be omissions as well.

At the root of impact analysis is the issue of how economic well-being, both individually and collectively, will be affected by the proposed action. Two major problems are associated with this process. First it is not possible to measure all impacts that will result from the lease sale. In part this is due to the volume of information that would be required and the inadequacy of the existing methodology to capture all effects at an acceptable level of cost.

The more serious problem is that many of the effects are not measurable. While reallocation of resources within the context of the functioning of the market, in response to economic change, is desirable from the perspective of efficiency, change on the order of magnitude implied by OCS activity may also lead to situations of market failure and the presence of externalities. These are often difficult to identify and are certainly difficult to measure.

Even if these effects could be isolated they are usually inseparable from a further problem, that of income redistribution. Changes in income distribution and the relative economic position of individuals resulting from OCS activity necessarily implies that there will be lossers and gainers and associated changes in economic welfare. These

are problems that involve normative economic judgements and cannot be dealt with by impact analysis alone. In short, comparative impact analysis provides only part of the information necessary for decision making.

THE MAP AND SCIMP MODELS

We can now turn to a discussion of the models utilized in developing the present base case projections (and associated OCS impacts projections). At the statewide and regional level two models have been utilized, the MAP statewide econometric model and the MAP regional econometric model. For documentation of the MAP statewide model, see Goldsmith, Man-in-the-Arctic Program: Alaska Economic Model Documentation. The MAP statewide model is actually a system of models composed of economic, fiscal, and population models. The three are interdependent, as shown schematically in Figure 2.

FIGURE 2: The MAP Statewide Model
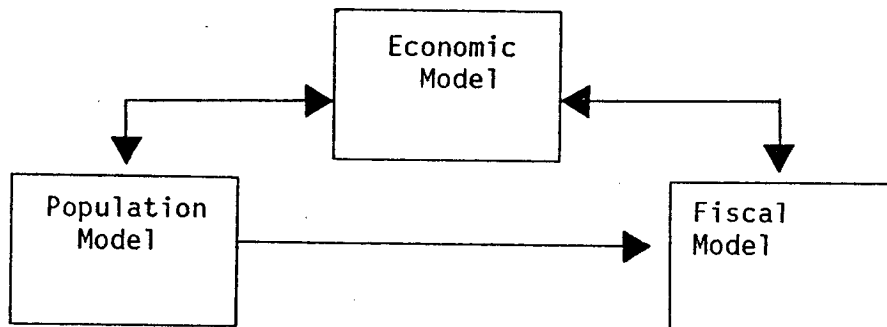
In essence, this states that the economic model receives input from the fiscal and population models, the fiscal model receives input from the economic and population models, and the population model utilizes input from the economic models, but not directly from the fiscal model. Thus, when we talk about the economic model we are really describing the interaction of three models. To simplify things somewhat we can describe the important linkages between submodels and then consider the economic model in more detail.

The population-economic model link is the source of population estimates that are of direct interest, and reflect both natural population change and migration induced by changes in economic conditions. The population estimates are also used by the economic model for purposes of computing various per capita values for economic variables.

The significant link with the fiscal model relates to the role of State government expenditures as a source of major economic stimulus to the aggregate level of economic activity. In turn, State government (and local government) expenditures are dependent upon two key factors, the overall level of economic activity and the level of activity in the petroleum industry. The system allows for a variety of policy choices regarding state government spending and is one of the key points to consider in assessing economic forecasts.

We can now turn to a consideration of the economic model component of the system.

The MAP statewide and regional models belong to a class of econometric models that are known as disaggregate economic base models. In essence, economic activity is classified as either endogenous or exogenous (or basic). Exogenous activity determines the level of endogenous activity, and the specific relationships between the two components of economic activity are what make up the system of equations that are the econometric model. These models can be quite simple or rather complex, and the MAP models fall in this latter category. It is possible to get a feel for the models by considering the MAP statewide model.

As can be seen in Figure 3, determination of industrial production involves the impact of exogenous sector activity, which includes forestry, fisheries, agriculture and other manufacturing, as well as Federal government wages and salaries. Other exogenous sector activity includes the petroleum industry and components of contract construction such as major pipelines. State and local government expenditures may also be considered as exogenous for discussion purposes, although there is some interdependence between these expenditures and total economic activity. It should be noted that in constructing scenarios for forecasting or projection purposes it is primarily these exogenous variables that must be provided.

FIGURE 3. THE MAP STATEWIDE ECONOMIC MODEL
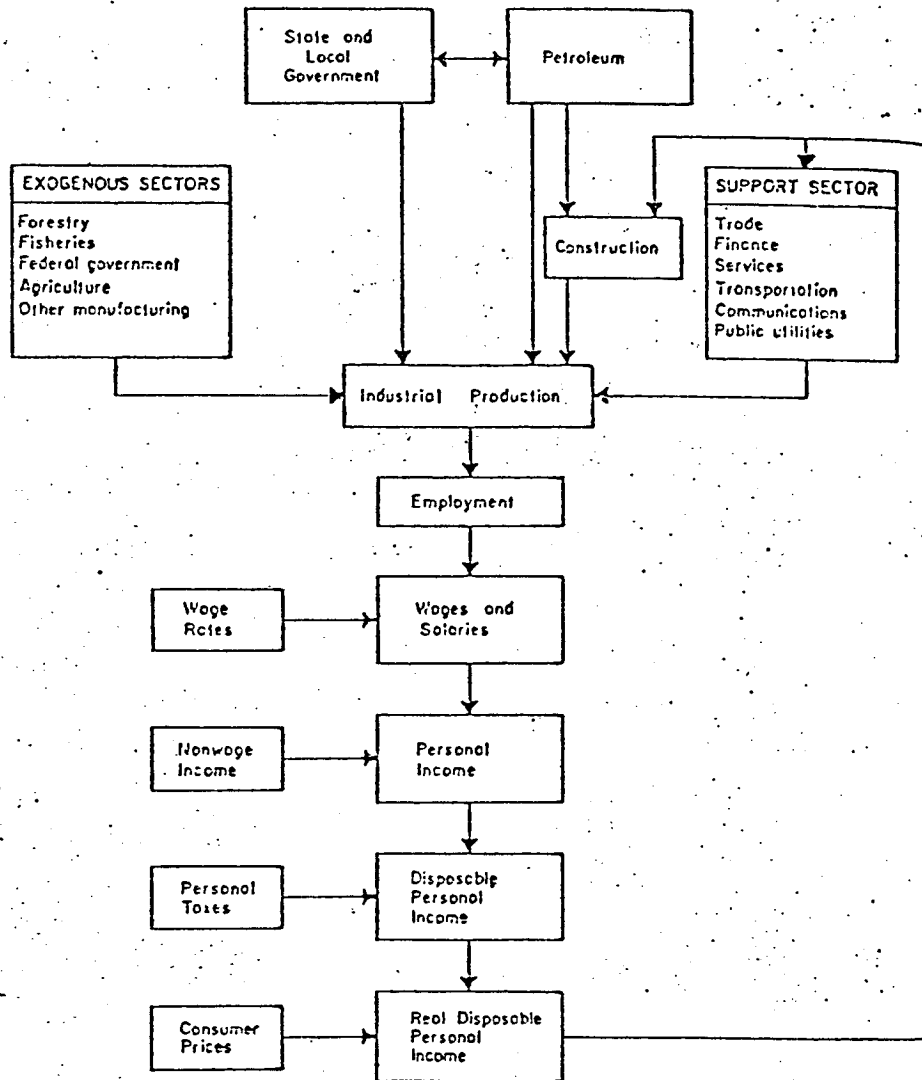
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These exogenous variables combine with demand from the support sector and endogenous construction to generate total industrial production. Industrial production, through a series of steps, determines employment and income, and finally real disposable personal income, which in turn is a determinant of support sector and endogenous construction economic activity. This means that aggregate production depends on both exogenously determined and endogenously determined economic activity, where endogenous activity depends on total activity. As such, the system is a simultaneous equation structure.

It should also be noted that certain other variables enter the model as well. In particular, wage rates are used in determining total wage and salary payments, where the wage rates are in part dependent upon U.S. wage rates, which are determined exogenously. It should also be observed that the model is particularly sensitive to the wage rates used.

The MAP regional model dissagregates the MAP statewide model estimates for population and for employment in the basic, support, and government sectors among 20 regions. Most of these regions correspond to Alaska census divisions. In order to use the regional model, scenarios (or future values for exogenous variables) must be specified on a regional basis. The MAP regional model is described in Appendix A.

For the Aleutian Islands Census Division projections have been developed using the small community population impact model (SCIMP). For

documentation see Lee Huskey and Jim Kerr, "Small Community Population Impact Model". Whereas the MAP models are classified as econometric models, SCIMP is technically an accounting model. A system of equations describes the economic and demographic structure of the economic system. In turn parameters of the equations and a set of exogenous variable inputs provide the numerical basis for utilizing the model for projection purposes. It is the determination of parameters for the model that distinguishes SCIMP from econometric models.

In an econometric model, parameters are typically determined by the application of econometric methods to historical time series or cross section data and the parameter estimates are an integral component of the model. In the case of SCIMP the parameters are determined exogenously by a variety of means, including point estimates, assumptions based on other research, and in some instances by econometric estimation techniques. In other words, in SCIMP both the parameters and exogenous variable data are inputs, while in an econometric model the parameter estimates are an integral part of the model.

There are both advantages and shortcomings to this approach. On the positive side, SCIMP is generally applicable to small regional economies, rather than being region specific, as would be the case with an econometric model. This results in substantially more limited data requirements than is the case for a fully estimated econometric model. The shortcoming is also indicated by the less stringent data

requirements. Specifically, the quality of the parameter estimates may not be as great as that obtained by econometric techniques. However, the costs are substantially less.

We can now turn to a discussion of the assumptions utilized in developing the base case projections. Since distinct sets of assumptions are necessary for each of the models, these will be considered in turn.

The Base Case Assumptions: The MAP Models

The impact of OCS development on the economy will be measured as the change in the development scenario from the base case scenario. The base case scenario is that which is projected to occur without the OCS lease sale of interest. This section describes the base case scenario which will be used in this study.

A set of assumptions about the future levels of various exogenous economic activities defines a development scenario. There are five types of assumptions required for the MAP model development scenarios. These are assumptions about the future level of national variables which directly or indirectly affect Alaska economic activity; assumptions about employment requirements of special projects, such as the gas pipeline; assumptions about the employment requirements for exogenous industry and government sectors of the Alaska economy; an assumption as to the number of tourists who will visit Alaska; and assumptions about State government revenues and expenditures.

Our use of assumptions in developing the base case scenarios does not mean that we are predicting that all or any of these events will occur, since there is considerable uncertainty with respect to the levels and timing of the events in these scenarios. What it does mean is that with a certain degree of probability, we expect the general level of economic activity to follow this scenario. We assume that there is a medium probability that the level of activity will be at least as great as that described by this scenario.

Primarily as a result of the uncertainty attached to the occurrence, magnitude, and timing of any particular event, agreement about particular scenarios is hard to achieve even among those most knowledgeable about the Alaska economy. Emphasizing our concern mainly with general levels of activity, the probabilistic nature of the specific scenario should reduce the disagreement.

Our base case assumptions are summarized in Table 48. They include national variable assumptions, project assumptions, industry and government assumptions, tourism assumptions, and government policy assumptions. Below we present a detailed description of these assumptions.

TABLE 48.   SUMMARY OF BASE CASE ASSUMPTIONS:
MAP MODELS

Assumptions	Description
National Variables Assumptions	
1. U.S. Inflation Rate	Growth in consumer prices slows to 7.5 percent annually by 1985.
2. Average Weekly Earnings	Growth in average weekly earnings rises to 8 percent annually by 1985.
3. Real Per Capita Income	Growth in real per capita income rises to 2 percent annually by 1985.
Special Project Assumptions	
1. Trans-Alaska Pipeline	Construction of 4 additional pumping stations provides 90 jobs through 1982; operating employment remains constant at 1,500.
2. Alaska Natural Gas Transportation System	Construction employment peaks at 10,589 in 1986. Long-term transportation and petroleum sector employment average 319.
3. Prudhoe Bay Petroleum Production	Construction employment on Prudhoe water flooding project peaks at over 1,000 in 1983. Permanent operating employment rises to 1667 in 1983.
4. Upper Cook Inlet Petroleum Production.	Employment remains at 1979 level of 778.
5. National Petroleum Reserve in Alaska	Development and production from 5 oil fields and construction of 525 miles of pipeline provide between 500 and 1,000 jobs after 1985.
6. OCS Development	Exploration employment only for sales CI, 55, 57, 60, and 70. Development of Sale 71 lease (Beaufort Sea) area results in maximum employment of 1,756 in 1994. Development of Sale BF lease area results in maximum employment of 1,082 in 1989.
7. Beluga-Chuitna Coal Production	Eventual export of 4.4 million tons per year provides total employment of 524.

Assumptions	Description

Industry and Government Assumptions

1. Other Mining Activity	Employment increases from a 1979 level of 3,140 at 1 percent annually.
2. Agriculture	Expansion results in employment of over 1,000 ·by 2000.
3. Logging and Sawmill Employment	Employment increases from 2,204 in 1980 to 4,103 in 2000.
4. Commercial Fishing: Non-Bottomfish	Employment levels in fishing and fish processing remain constant at 6,323 and 7,123, respectively.
5. Bottomfish Harvesting and Processing	Resident employment rises from 284 in 1981 to 5,518 in 2000.
6. Federal Civilian Employment	Rises at 0.5 percent annual rate from 17,915 in 1979 to 19,893 in 2000.
7. Federal Military	Employment remains constant at 23,333.
Tourism Assumptions	Number of tourists visiting Alaska rises at 4 percent annual rate from 505,400 in 1979 to over 1.1 million by 2000.
Policy Assumptions	Exogenous revenues from petroleum production taxes, royalty payments, property taxes, and special corporate taxes peak at about $10 billion annually by 1989. Real per capita expenditures grow in proportion to the growth in real per capita income.

NATIONAL VARIABLES ASSUMPTIONS

Inasmuch as Alaska is an open economy, it is affected by changes in the national economy. Consequently, several assumptions about the future growth of the U.S. economy are required. First, a forecast of average weekly earnings in the United States is required as an input into the estimation of Alaskan wage rates. Second, the Alaskan price level is tied in part to the national price level so that a forecast of the U.S. consumer price index is needed. Finally, inasmuch as a major determinant of migration to Alaska is the income differential between Alaska and the lower 48, a forecast is required of real per capita disposable income in the United States.

In 1979, consumer prices in the United States rose 11.5 percent, average weekly earnings grew 7.5 percent, and real per capita disposable income grew by 0.5 percent. In the base case, it is assumed that the growth in U.S. consumer prices slows to a long run rate of 7.5 percent by 1985, that the growth in average weekly earnings rises to a long run rate of 8 percent by 1985, and that real per capita personal income growth rises 2 percent annually by the mid-80s.

SPECIAL PROJECTS ASSUMPTIONS

Widely differing special projects with major implications for future Alaskan development have been proposed by a variety of federal and state agencies and private developers. Each project generates direct employment in one or more of the sectors of the Alaskan economy

treated as exogenous by the MAP forecasting model. The sectors are manufacturing, mining, and parts of the construction and transportation sectors. This section presents our assumptions as to the direct employment generated by each of the major projects either currently in operation or proposed.

1. Trans-Alaska Pipeline (Alyeska

Trans-Alaska Pipeline assumptions are given in Table 49. Trans-Alaska Pipeline Service (TAPS) employment through 1977 included only the exogenous construction employment engaged in the initial construction of the pipeline. Employment since completion in 1977 and future employment is of two types. These are additional construction of four pump stations (see Oil and Gas Journal, 2/25/80, p. 72), and exogenous transportation sector employment associated with operation of the line.

2. Alaska Natural Gas Transportation System

In December 1980, the Northwest Alaska Pipeline Company received rights of way for the Alaskan portion of a 4,800 mile pipeline to transport natural gas from Prudhoe Bay to the United States West Coast and Midwest (see Oil and Gas Journal, 12/8/80, p. 50). Employment projections for this project are shown in Table 50. Construction of the 741-mile Alaskan portion of the line and an accompanying gas conditioning plant on the North Slope was assumed to get underway in 1981 and to be operational by 1987. Construction employment was expected to peak at 10,589 in 1986, falling to a long-term total of 319 persons in transportation and petroleum sector employment.

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TABLE 49 . TRANS-ALASKA PIPELINE EMPLOYMENT ASSUMPTIONS

	EMCNX1	EMT9X	MTOTB	BO4	BO9	B24	B26	B29
1980	0.09	1.5	1.59	0.474	0.169	0.079	0.316	0.552
1981	0.09	1.5	1.59	0.474	0.079	0.079	0.316	0.642
1982	0.09	1.5	1.59	0.474	0.079	0.079	0.406	0.552
1983	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1984	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1985	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1986	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1987	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1988	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1989	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1990	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1991	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1992	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1993	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1994	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1995	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1996	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1997	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1998	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
1999	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552
2000	0.	1.5	1.5	0.474	0.079	0.079	0.316	0.552

EMCNX1 = Exogenous employment in high wage construction (thousands)
EMT9X = Exogenous employment in transportation (thousands)
MTOT   = Total exogenous employment (thousands)
BO4   = Basic sector employment, Barrow/North Slope census division (thousands)
BO9   = Basic sector employment, Fairbanks census division (thousands)
B24   = Basic sector employment, S.E. Fairbanks census division (thousands)
B26   = Basic sector employment, Valdez/Chitina/Whittier census division (thousands)

B29   = Basic sector employment, Yukon Koyukuk census division (thousands)

SOURCE: Construction estimate based on assumed installation of four
        pump stations adding capacity of .15 mmbd each, from Beaufort
        OCS Development Scenarios, Davis and Moore, 1978.

        Operations employment from Alaska Economic Trends, Ak. DoL,
        October 1978.

TABLE 50. ALASKA NATURAL GAS TRANSPORTATION
SYSTEM EMPLOYMENT ASSUMPTIONS

	EMP9	EMCNX1	EMT9X	MTOT	B04	B09	B24	B25
1980	0.	0.	0.	0.	0.	0.	0.	0.
1981	0.	0.217	0.	0.217	0.046	0.069	0.037	0.065
1982	0.	0.217	0.	0.217	0.046	0.069	0.037	0.065
1983	0.	0.563	0.	0.563	0.209	0.225	0.047	0.082
1984	0.	2.435	0.	2.435	0.787	0.741	0.33	0.577
1985	0.	7.103	0.	7.103	2.207	1.637	1.185	2.074
1986	0.16	10.589	0.	10.749	2.997	2.062	2.069	3.621
1987	0.2	6.074	0.119	6.393	1.663	1.491	1.191	2.048
1988	0.2	0.468	0.119	0.787	0.331	0.145	0.126	0.185
1989	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04
1990	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04
1991	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04
1992	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04
1993	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04
1994	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04
1995	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04
1996	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04
1997	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04
1998	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04
1999	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04
2000	0.2	0.	0.119	0.319	0.228	0.008	0.043	0.04

EMP9   = Exogenous employment in mining (thousands)
EMCNX1 = Exogenous employment in high wage construction (thousands)
EMT9X = Exogenous employment in transportation (thousands)
MTOT   = Total exogenous employment (thousands)
B04   = Basic sector employment, Barrow/North Slope census division (thousands)
B09   = Basic sector employment, Fairbanks census division (thousands)
B24   = Basic sector employment, S.E. Fairbanks census division (thousands)
B25   = Basic sector employment, Upper Yukon census division (thousands)

SOURCE: M. Mogford and S. Goldsmith, "The Relationship between the
          Alaska Natural Gas Pipeline and State and Local Government
          Expenditures," Institute of Social and Economic Research,
          1980.

Although construction did not begin in 1981, total Northwest Alaskan Pipeline Company employment for the year actually averaged 347 (Northwest Alaskan Pipeline Company), somewhat higher than the figure of 217 assumed for 1981. The employment assumptions used also reflect the delays in construction expected to result from factors such as the current lawsuit against the pipeline financing waivers recently passed by Congress.

3. Prudhoe Bay Petroleum Production

Prudhoe Bay petroleum production assumptions are shown in Table 51. This employment includes that associated with primary recovery operations from the Sadlerochit formation, secondary recovery (using water flooding) of that formation, new developments of the Kuparuk formation west of Prudhoe Bay, and the permanent work force of Atlantic Richfield Company (ARCO) and British Petroleum (BP) at the main Prudhoe base headquarters. The key assumptions serving as the basis for the employment forecasts are the following:

● Seven rigs (4 Sohio, 3 ARCO) continue development drilling at a rate of 14 wells per year per rig through 1983 (based on estimated activity in Oil and Gas Journal, 2/25/80, p. 88).

● The proposed Prudhoe water flooding project begins in 1981 and is completed by 1985, adding approximately 1 billion barrels of recoverable reserves to Prudhoe. Construction employment peaks

TABLE 51. PRUDHOE BAY PETROLEUM PRODUCTION
EMPLOYMENT ASSUMPTIONS

	EMP9	EMCNX2	MTOT	BO4
1980	2.369	0.	2.369	2.369
1981	2.907	0.035	2.942	2.942
1982	3.018	0.491	3.509	3.509
1983	3.129	1.065	4.194	4.194
1984	2.202	0.484	2.686	2.686
1985	2.502	0.05	2.552	2.552
1986	2.502	0.	2.502	2.502
1987	2.502	0.	2.502	2.502
1988	2.502	0.	2.502	2.502
1989	2.502	0.	2.502	2.502
1990	2.502	0.	2.502	2.502
1991	2.502	0.	2.502	2.502
1992	2.502	0.	2.502	2.502
1993	2.502	0.	2.502	2.502
1994	2.502	0.	2.502	2.502
1995	2.502	0.	2.502	2.502
1996	2.502	0.	2.502	2.502
1997	2.502	0.	2.502	2.502
1998	2.502	0.	2.502	2.502
1999	2.502	0.	2.502	2.502
2000	2.502	0.	2.502	2.502

EMP9   = Exogenous employment in mining (thousands)
EMCNX2 = Exogenous employment in average wage construction (thousands)
MTOT   = Total exogenous employment (thousands)
BO4   = Basic sector employment, Barrow/North Slope census division (thousands)

SOURCE: Construction employment is that associated with Prudhoe
          waterflood project, from U.S. Army Corps of Engineers,
          Final EIS, Prudhoe Bay Oilfield Waterflood Project,
          pp. 2-60. For mining employment sources, see text.

at over 1,000 in 1983, and operations employment adds 300 to the permanent Prudhoe work force (Corps of Engineers, 1980).

● The Kuparuk formation west of Prudhoe is developed. Production at a rate of 50,000 bbls. per day begins in December 1981, rising to 80,000 bbls. per day in 1982 and rising to 250,000 bbls. per day by 1986 (Oil and Gas Journal, 12/21/81, p. 32).

● Permanent ARCO and BP employment on the North Slope rises from 1,000 in 1977 to 1,667 in 1983, remaining constant thereafter (based on Prudhoe Bay Case Study, OCS Program Technical Report No. 4).

● Ten additional rigs are active in exploration and development outside of the Sadlerochit reservoir.

4.   Upper Cook Inlet Petroleum Production

Petroleum sector employment in the Kenai-Cook Inlet Census Division was 778 in 1979 (four quarter average employment, taken from Alaska Department of Labor, Statistical Quarterly, 1979 issues), consisting of exploration, development, and production associated with the Kenai oil and gas fields. Currently, the 120,000 barrels per day output of oil is expected to decline drastically over the forecast period, possibly as fast as 15-20 percent per year. The decline may be partially slowed, however, by a possible redrilling program being considered by the operators (see Oil and Gas Journal, 2/4/80, p. 36);

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and in any case, the prospects for gas development are brighter than those for oil. Gas production is likely to expand from its current 5,000 MMCF per day once the LNG facility proposed by Pacific Lighting and Pacific Gas and Electric (see below) are constructed even without any substantial new discoveries. It is assumed that these increases, coupled with continued exploration activity and possible enhanced recovery of oil, will be adequate to maintain Upper Cook Inlet petroleum employment at its 1978 level throughout the forecast period, as shown in Table 52.

5. Development of the National Petroleum Reserve in Alaska (NPR-A)

The National Petroleum Reserve in Alaska (previously NPR-4) has been the target of publicly sponsored exploration for oil and gas since World War II, first by the Navy and later by the Interior Department. The first exploration program began in 1944 and ended in 1953, after discovery of nine oil and gas fields, all but one being noncommercial (the largest gas field, the Barrow gas field, currently produces for local consumption). In 1974 Congress directed the Navy to resume exploration, eventually transferring the program to the Department of Interior in 1977. To date, this most recent exploration program has produced 22 dry holes and several test wells planned or in progress (Oil and Gas Journal, 12/8/80, p. 36).

Nonetheless, USGS estimates that NPR-A can be expected to contain 5.96 billion barrels of oil in place and 11.3 trillion cubic feet of gas, about 26 percent of which is likely to be recoverable. A study of

TABLE 52. UPPER COOK INLET PETROLEUM PRODUCTION EMPLOYMENT ASSUMPTIONS

	EMP9	MTOT	B12
1980	0.778	0.778	0.778
1981	0.778	0.778	0.778
1982	0.778	0.778	0.778
1983	0.778	0.778	0.778
1984	0.778	0.778	0.778
1985	0.778	0.778	0.778
1986	0.778	0.778	0.778
1987	0.778	0.778	0.778
1988	0.778	0.778	0.778
1989	0.778	0.778	0.778
1990	0.778	0.778	0.778
1991	0.778	0.778	0.778
1992	0.778	0.778	0.778
1993	0.778	0.778	0.778
1994	0.778	0.778	0.778
1995	0.778	0.778	0.778
1996	0.778	0.778	0.778
1997	0.778	0.778	0.778
1998	0.778	0.778	0.778
1999	0.778	0.778	0.778
2000	0.778	0.778	0.778

EMP9 = Exogenous employment in mining (thousands)
MTOT = Total exogenous employment (thousands)
B12 = Basic sector employment, Kenai/Cook Inlet census division (thousands)

SOURCE: See text.

alternative methods for development of the reserve was completed in 1979 by Interior (see Final Report of the 105(b) Economic and Policy Analysis, 12/15/79). In late 1980, Congress passed legislation requiring that the reserve be opened to private leasing by 1982 (Oil and Gas Journal, 12/8/80). Interior held the first sale on January 27, 1982.

It is assumed that five commercial fields are discovered and developed, representing 1.85 billion barrels of oil and 3.73 trillion cubic feet of gas, as described in the mean scenario of the Interior 105(b) study. Construction associated with the development includes 525 miles of pipeline. Construction employment peaks at about 600 following each of the several discoveries. Petroleum sector employment averages about 250/year, and pipeline operation adds 69 to the transportation sector work force, as shown in Table 53.

6. <u>OCS Development</u>

Prior to the scheduled date of OCS Sale 75, eight other OCS sales will have occurred, as follows:

Sale	Location	Date
46	Gulf of Alaska	1976
CI	Lower Cook Inlet	1977
BF	Beaufort Sea	1979
55	Gulf of Alaska	1980
6Ø	Lower Cook Inlet	1981
71	Beaufort Sea	1982
57	Bering-Norton	1982
7Ø	St. George	1983

TABLE 53 . NATIONAL PETROLEUM RESERVE IN ALASKA
EMPLOYMENT ASSUMPTIONS

	EMP9	EMCNX2	EMT9X	MTOT	BO2	BO4
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.038	0.	0.038	0.	0.038
1983	0.	0.038	0.	0.038	0.	0.038
1984	0.044	0.132	0.	0.176	0.004	0.172
1985	0.088	0.494	0.	0.582	0.009	0.573
1986	0.115	0.55	0.	0.665	0.012	0.653
1987	0.222	0.383	0.	0.605	0.022	0.583
1988	0.177	0.157	0.054	0.388	0.018	0.37
1989	0.187	0.271	0.069	0.527	0.019	0.508
1990	0.177	0.546	0.069	0.792	0.018	0.774
1991	0.204	0.587	0.069	0.86	0.02	0.84
1992	0.267	0.383	0.069	0.719	0.027	0.692
1993	0.222	0.157	0.069	0.448	0.022	0.426
1994	0.232	0.271	0.069	0.572	0.023	0.549
1995	0.222	0.546	0.069	0.837	0.022	0.815
1996	0.249	0.587	0.069	0.905	0.025	0.88
1997	0.312	0.383	0.069	0.764	0.031	0.733
1998	0.267	0.157	0.069	0.493	0.027	0.466
1999	0.277	0.271	0.069	0.617	0.028	0.589
2000	0.267	0.546	0.069	0.882	0.027	0.855

EMP9   = Exogenous employment in mining (thousands)
EMCNX2 = Exogenous employment in average wage construction (thousands)
EMT9X = Exogenous employment in transportation (thousands)
MTOT   = Total exogenous employment (thousands)
BO2   = Basic sector employment, Anchorage census division (thousands)
BO4   = Basic sector employment, Barrow/North Slope census division (thousands)

SOURCE: See text.

The first Gulf of Alaska sale (Sale 46) resulted in the drilling of ten dry holes, and exploration has ended in these tracts. Disappointing results of exploration on tracts leased in Lower Cook Inlet (Sale CI) in 1977 also resulted at least temporarily in a halt to exploration there. Exploration is currently underway on tracts leased in the 1979 Beaufort sale and the 1980 Gulf of Alaska sale, and new leasing in Lower Cook Inlet has just occurred.

In the base case, no future employment is assumed to result from Sale 46. In addition, it is assumed that no recoverable resources are discovered on tracts leased in sales CI, 55, 57, 60 and 70; that is, such sales are assumed to generate only exploration employment. The level of recoverable resources in the remaining two sales is assumed to be the USGS estimated mean for the areas, as shown in Table 54.

TABLE 54. ASSUMED OCS OIL AND GAS DISCOVERIES, BASE CASE

Sale	Location	Recoverable Oil	Recoverable Gas
BF	Beaufort Sea	.75 BBO	1.625 TCFG
71	Beaufort Sea	2.38 BBO	1.78 TCFG

SOURCES: U.S Department of the Interior, Final Environmental Impact Statement, Proposed Federal-State Oil and Gas Lease Sale, Beaufort Sea, p. 6; U.S. Department of the Interior, Draft Environmental Impact Statement, Proposed Oil and Gas Lease Sale 71, Diapir Field (December 1981), page xii.

Exploration in 1982 on Sale CI is assumed to provide 38 jobs in mining and 9 jobs in transportation, with 4 of these jobs located in the Anchorage Census Division. No subsequent employment is provided by

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Sale CI. The levels of employment assumed for the remaining six OCS sales are shown in Tables 55-60.

6. Beluga-Chuitna Coal Production

USGS has long recognized the potential economic significance of a large number of beds of subbituminous coal on the west side of Cook Inlet near Tyonek (see USGS, Coal Resources of Alaska, 1967). Recently, several alternative proposals for developing the Beluga-Chuitna fields for export to Japan or other Pacific rim locations have been considered (see Pacific Northwest Laboratory, Beluga Coal Field Development: Social Effects and Management Alternatives, 1979, and Bechtel, Preliminary Feasibility Study: Coal Export Program, Chuitna River Field, Alaska, 1980).

The base case scenario assumes that a coal export program is implemented beginning in 1985. Production begins in 1989 and eventually reaches 4.4 tons per year. Construction begins in 1985, with peak employment of 400 in 1987. Operations employment is 524 distributed 80 percent in mining and 20 percent in transportation, as shown in Table 61.

INDUSTRY AND GOVERNMENT ASSUMPTIONS

In addition to the project-specific assumptions described above, other portions of the exogenous sectors are affected by trends and events which must be anticipated, although they are not as directly traceable

TABLE 55. OCS SALE BF (BEAUFORT SEA)
EMPLOYMENT ASSUMPTIONS

	EMP9	EMCNX1	BO2	BO4	MTOT
1980	0.	0.	0.	0.	0.
1981	0.066	0.062	0.008	0.12	0.128
1982	0.197	0.188	0.024	0.361	0.385
1983	0.197	0.135	0.024	0.308	0.332
1984	0.23	0.211	0.028	0.413	0.441
1985	0.066	0.15	0.01	0.206	0.216
1986	0.112	0.305	0.01	0.407	0.417
1987	0.276	0.383	0.01	0.649	0.659
1988	0.479	0.466	0.021	0.924	0.945
1989	0.616	0.466	0.036	1.046	1.082
1990	0.595	0.155	0.042	0.708	0.75
1991	0.524	0.155	0.038	0.641	0.679
1992	0.503	0.077	0.037	0.543	0.58
1993	0.432	0.155	0.033	0.554	0.587
1994	0.435	0.155	0.033	0.557	0.59
1995	0.438	0.077	0.033	0.482	0.515
1996	0.44	0.022	0.033	0.429	0.462
1997	0.417	0.	0.032	0.385	0.417
1998	0.393	0.	0.032	0.361	0.393
1999	0.393	0.	0.032	0.361	0.393
2000	0.394	0.	0.032	0.362	0.394

EMP9   = Exogenous employment in mining (thousands)
EMCNX1 = Exogenous employment in high wage construction (thousands)
MTOT   = Total exogenous employment (thousands)
BO2   = Basic sector employment, Anchorage census division (thousands)
BO4   = Basic sector employment, Barrow/North Slope census division (thousands)

SOURCE: U.S. Department of the Interior, Final Environmental Impact
         Statement, Proposed Federal-State Oil and Gas Lease Sale,
         Beaufort Sea.

TABLE 56. OCS SALE 55 (GULF OF ALASKA)
EMPLOYMENT ASSUMPTIONS

	EMP9	EMT9X	MTOT	B11	BO2
1980	0.	0.	0.	0.	0.
1981	0.03	0.013	0.043	0.014	0.03
1982	0.03	0.028	0.058	0.024	0.034
1983	0.03	0.028	0.058	0.024	0.034
1984	0.03	0.02	0.05	0.019	0.032
1985	0.	0.007	0.007	0.005	0.002
1986	0.	0.	0.	0.	0.
1987	0.	0.	0.	0.	0.
1988	0.	0.	0.	0.	0.
1989	0.	0.	0.	0.	0.
1990	0.	0.	0.	0.	0.
1991	0.	0.	0.	0.	0.
1992	0.	0.	0.	0.	0.
1993	0.	0.	0.	0.	0.
1994	0.	0.	0.	0.	0.
1995	0.	0.	0.	0.	0.
1996	0.	0.	0.	0.	0.
1997	0.	0.	0.	0.	0.
1998	0.	0.	0.	0.	0.
1999	0.	0.	0.	0.	0.
2000	0.	0.	0.	0.	0.

EMP9 = Exogenous employment in mining (thousands)
EMT9X = Exogenous employment in transportation (thousands)
MTOT = Total exogenous employment (thousands)
BO2   = Basic sector employment, Anchorage census division (thousands)
B11   = Basic sector employment, Southeast Alaska (thousands)

SOURCE: U.S. Department of the Interior, Final Environmental Impact
        Statement, Proposed Federal-State Oil and Gas Lease Sale,
        Northern Gulf of Alaska.

TABLE 57 . OCS SALE 60 (LOWER COOK INLET)
EMPLOYMENT ASSUMPTIONS

	EMP9	EMCNX1	EMT9X	MTOT	B02	B12
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.038	0.028	0.009	0.075	0.004	0.071
1983	0.083	0.	0.026	0.109	0.008	0.101
1984	0.09	0.	0.033	0.123	0.009	0.114
1985	0.075	0.	0.017	0.092	0.008	0.084
1986	0.038	0.	0.009	0.047	0.004	0.043
1987	0.	0.	0.	0.	0.	0.
1988	0.	0.	0.	0.	0.	0.
1989	0.	0.	0.	0.	0.	0.
1990	0.	0.	0.	0.	0.	0.
1991	0.	0.	0.	0.	0.	0.
1992	0.	0.	0.	0.	0.	0.
1993	0.	0.	0.	0.	0.	0.
1994	0.	0.	0.	0.	0.	0.
1995	0.	0.	0.	0.	0.	0.
1996	0.	0.	0.	0.	0.	0.
1997	0.	0.	0.	0.	0.	0.
1998	0.	0.	0.	0.	0.	0.
1999	0.	0.	0.	0.	0.	0.
2000	0.	0.	0.	0.	0.	0.

EMP9   = Exogenous employment in mining (thousands)
EMCNX1 = Exogenous employment in high wage construction (thousands)
EMT9X = Exogenous employment in transportation (thousands)
MTOT   = Total exogenous employment (thousands)
B02   = Basic sector employment, Anchorage census division (thousands)
B12   = Basic sector employment, Kenai/Cook Inlet census division (thousands)

SOURCE: U.S. Department of the Interior, Final Environmental Impact
          Statement, Proposed Federal-State Oil and Gas Lease Sale,
          Lower Cook Inlet.

TABLE 58. OCS SALE 71 (BEAUFORT SEA) EMPLOYMENT ASSUMPTIONS

	EMP9	EMCNX2	EMT9X	MTOT	B02	B04
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.	0.037	0.	0.037	0.	0.037
1985	0.032	0.	0.007	0.04	0.003	0.036
1986	0.052	0.	0.017	0.069	0.005	0.063
1987	0.053	0.	0.018	0.072	0.005	0.066
1988	0.052	0.	0.017	0.069	0.005	0.063
1989	0.	0.	0.	0.	0.	0.
1990	0.	0.076	0.	0.076	0.	0.076
1991	1.205	0.077	0.	1.282	0.121	1.162
1992	1.354	0.035	0.09	1.478	0.135	1.343
1993	1.394	0.	0.247	1.64	0.139	1.501
1994	1.394	0.	0.363	1.756	0.139	1.617
1995	1.408	0.	0.363	1.771	0.141	1.63
1996	1.178	0.	0.363	1.541	0.118	1.423
1997	0.97	0.	0.363	1.333	0.097	1.236
1998	0.97	0.	0.363	1.333	0.097	1.236
1999	0.985	0.	0.363	1.348	0.099	1.249
2000	0.996	0.	0.363	1.358	0.1	1.259

EMP9   = Exogenous employment in mining (thousands)
EMCNX2 = Exogenous employment in average wage construction (thousands)
EMT9X = Exogenous employment in transportation (thousands)
MTOT   = Total exogenous employment (thousands)
B02   = Basic sector employment, Anchorage census division (thousands)
B04   = Basic sector employment, Barrow/North Slope census division (thousands)

SOURCE: Alaska OCS Office, Statewide and Regional Economic and Demographic Systems, Beaufort Sea (71) Impact Analysis Technical Report #62, Alaska OCS Office Social and Economic Studies Program.

TABLE 59. OCS SALE 57 (BERING NORTON)
EMPLOYMENT ASSUMPTIONS

	EMP9	EMCNX1	EMT9X	MTOT	BO2	B18
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.026	0.	0.015	0.041	0.003	0.038
1984	0.056	0.005	0.031	0.092	0.006	0.086
1985	0.03	0.005	0.016	0.051	0.003	0.048
1986	0.	0.	0.	0.	0.	0.
1987	0.	0.	0.	0.	0.	0.
1988	0.	0.	0.	0.	0.	0.
1989	0.	0.	0.	0.	0.	0.
1990	0.	0.	0.	0.	0.	0.
1991	0.	0.	0.	0.	0.	0.
1992	0.	0.	0.	0.	0.	0.
1993	0.	0.	0.	0.	0.	0.
1994	0.	0.	0.	0.	0.	0.
1995	0.	0.	0.	0.	0.	0.
1996	0.	0.	0.	0.	0.	0.
1997	0.	0.	0.	0.	0.	0.
1998	0.	0.	0.	0.	0.	0.
1999	0.	0.	0.	0.	0.	0.
2000	0.	0.	0.	0.	0.	0.

EMP9   = Exogenous employment in mining (thousands)
EMCNX1 = Exogenous employment in average wage construction (thousands)
EMT9X   = Exogenous employment in transportation (thousands)
MTOT   = Total exogenous employment (thousands)
BO2   = Basic sector employment, Anchorage census division (thousands)
B18   = Basic sector employment, Nome census division (thousands)

SOURCE: Alaska OCS Office, Bering-Norton Petroleum Development Scenarios, Economic and Demographic Analysis, Technical Report #50, Alaska OCS Office Social and Economic Studies Program.

TABLE 60 . OCS SALE 70 (ST. GEORGE)
EMPLOYMENT ASSUMPTIONS

	EMP9	EMT9X	MTOT	BO1	BO2
1980	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.
1983	0.05	0.023	0.073	0.068	0.005
1984	0.064	0.037	0.101	0.095	0.006
1985	0.072	0.046	0.118	0.111	0.007
1986	0.065	0.039	0.104	0.097	0.006
1987	0.044	0.008	0.052	0.048	0.004
1988	0.	0.	0.	0.	0.
1989	0.	0.	0.	0.	0.
1990	0.	0.	0.	0.	0.
1991	0.	0.	0.	0.	0.
1992	0.	0.	0.	0.	0.
1993	0.	0.	0.	0.	0.
1994	0.	0.	0.	0.	0.
1995	0.	0.	0.	0.	0.
1996	0.	0.	0.	0.	0.
1997	0.	0.	0.	0.	0.
1998	0.	0.	0.	0.	0.
1999	0.	0.	0.	0.	0.
2000	0.	0.	0.	0.	0.

EMP9 = Exogenous employment in mining (thousands)
EMT9X = Exogenous employment in transportation (thousands)
MTOT = Total exogenous employment (thousands)
BO1   = Basic Sector Employment, Aleutian Islands census division (thousands)
BO2   = Basic sector employment, Anchorage census division (thousands)

SOURCE: Alaska OCS Office, St. George Petroleum Development Scenarios
and Economic Analysis, OCS Technical Report #__ , Alaska
OCS Office Social and Economic Studies Program.

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TABLE 61. BELUGA CHUITNA COAL PRODUCTION
EMPLOYMENT ASSUMPTIONS

	EMP9	EMCNX2	EMT9X	B12
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	0.	0.	0.	0.
1985	0.	0.15	0.	0.15
1986	0.	0.3	0.	0.3
1987	0.	0.4	0.	0.4
1988	0.	0.35	0.	0.35
1989	0.	0.2	0.	0.2
1990	0.21	0.1	0.053	0.363
1991	0.419	0.	0.105	0.524
1992	0.419	0.	0.105	0.524
1993	0.419	0.	0.105	0.524
1994	0.419	0.	0.105	0.524
1995	0.419	0.	0.105	0.524
1996	0.419	0.	0.105	0.524
1997	0.419	0.	0.105	0.524
1998	0.419	0.	0.105	0.524
1999	0.419	0.	0.105	0.524
2000	0.419	0.	0.105	0.524

EMP9   = Exogenous employment in mining (thousands)
EMCNX2 = Exogenous employment in average wage construction (thousands)
EMT9X = Exogenous employment in transportation (thousands)
MTOT   = Total exogenous employment (thousands)
B12   = Basic sector employment, Kenai/Cook Inlet census division (thousands)

SOURCE: Construction employment based on Battelle Pacific Northwest
          Laboratories, Beluga Coal Field Development: Social Effects
          and Management Alternatives, 1979. Other employment based
          on Bechtel, Preliminary Feasibility Study: Coal Export Pro-
          gram, Chuitna River Field, Alaska, 1980.

to specific development projects. These sectors include the following: the portion of mining sector employment not accounted for by the above projects, which will be called "other mining"; agricultural employment; logging and sawmill employment; fish harvesting and processing employment; and federal government employment. We turn now to a discussion of the assumptions used to project employment in these sectors.

1. Other Mining Activity

In 1979, total mining sector employment in Alaska was 5,773, of which 5,354 was in oil and gas. Of this, 2,633 was accounted for by projects discussed above. The residual, or 3,140, is classified as "other mining." It consists of administrative personnel in Anchorage associated with minerals industries, a variety of petroleum exploration activities on the North Slope and elsewhere not broken down by project (i.e., the Husky operation in NPR-A, various drilling contractors on state and native lands, seismic work being conducted offshore prior to OCS lease sales, etc.), and hardrock mining activities.

In the base case, it is assumed that such employment increases from its current level at a rate of one percent annually, as shown in Table 62.

2. Agriculture

Currently, agriculture represents a very small sector of the Alaskan economy, consisting of less than 200 persons, primarily in the Matanuska-Susitna and Fairbanks census divisions.

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TABLE 62. "OTHER MINING" EMPLOYMENT ASSUMPTIONS

	EMP9	BO1	BO2	BO4	BO5	BO8	BO9	B11
1980	3.171	0.015	1.995	0.805	0.004	0.053	0.032	0.039
1981	3.203	0.015	2.015	0.813	0.004	0.053	0.033	0.04
1982	3.235	0.016	2.035	0.821	0.004	0.054	0.033	0.04
1983	3.267	0.016	2.056	0.829	0.004	0.054	0.033	0.041
1984	3.3	0.016	2.076	0.838	0.004	0.055	0.034	0.041
1985	3.333	0.016	2.097	0.846	0.004	0.055	0.034	0.041
1986	3.367	0.016	2.119	0.855	0.004	0.056	0.034	0.042
1987	3.4	0.016	2.139	0.863	0.004	0.056	0.035	0.042
1988	3.434	0.016	2.161	0.872	0.004	0.057	0.035	0.043
1989	3.469	0.017	2.183	0.88	0.005	0.058	0.035	0.043
1990	3.503	0.017	2.204	0.889	0.005	0.058	0.036	0.043
1991	3.538	0.017	2.226	0.898	0.005	0.059	0.036	0.044
1992	3.574	0.017	2.249	0.907	0.005	0.059	0.036	0.044
1993	3.609	0.017	2.271	0.916	0.005	0.06	0.037	0.045
1994	3.645	0.017	2.293	0.925	0.005	0.061	0.037	0.045
1995	3.682	0.018	2.317	0.934	0.005	0.061	0.038	0.046
1996	3.719	0.018	2.34	0.944	0.005	0.062	0.038	0.046
1997	3.756	0.018	2.363	0.953	0.005	0.062	0.038	0.047
1998	3.793	0.018	2.387	0.963	0.005	0.063	0.039	0.047
1999	3.831	0.018	2.41	0.972	0.005	0.064	0.039	0.048
2000	3.869	0.019	2.434	0.982	0.005	0.064	0.039	0.048

	B14	B16	B17	B18	B21	B25	B26	B27	B29
1980	0.002	0.004	0.003	0.098	0.017	0.01	0.004	0.	0.089
1981	0.002	0.004	0.003	0.099	0.017	0.01	0.004	0.	0.09
1982	0.002	0.004	0.003	0.1	0.017	0.01	0.004	0.	0.091
1983	0.002	0.004	0.003	0.101	0.018	0.01	0.004	0.	0.091
1984	0.002	0.004	0.003	0.102	0.018	0.011	0.004	0.	0.092
1985	0.002	0.004	0.003	0.103	0.018	0.011	0.004	0.	0.093
1986	0.002	0.004	0.003	0.104	0.0	0.011	0.004	0.	0.094
1987	0.002	0.004	0.003	0.105	0.01	0.011	0.004	0.	0.095
1988	0.002	0.004	0.003	0.106	0.019	0.011	0.004	0.	0.096
1989	0.002	0.005	0.003	0.107	0.019	0.011	0.005	0.	0.097
1990	0.002	0.005	0.004	0.108	0.019	0.011	0.005	0.	0.098
1991	0.002	0.005	0.004	0.109	0.019	0.011	0.005	0.	0.099
1992	0.002	0.005	0.004	0.11	0.019	0.011	0.005	0.	0.1
1993	0.002	0.005	0.004	0.112	0.019	0.012	0.005	0.	0.101
1994	0.002	0.005	0.004	0.113	0.02	0.012	0.005	0.	0.102
1995	0.002	0.005	0.004	0.114	0.02	0.012	0.005	0.	0.103
1996	0.002	0.005	0.004	0.115	0.02	0.012	0.005	0.	0.104
1997	0.002	0.005	0.004	0.116	0.02	0.012	0.005	0.	0.105
1998	0.002	0.005	0.004	0.117	0.02	0.012	0.005	0.	0.106
1999	0.002	0.005	0.004	0.118	0.021	0.012	0.005	0.	0.107
2000	0.002	0.005	0.004	0.12	0.021	0.012	0.005	0.	0.108

EMP9 = Exogenous employment in mining (thousands)
B01 = Basic sector employment, Aleutian Islands census division (thousands)
B02 = Basic sector employment, Anchorage census division (thousands)
B04 = Basic sector employment, Barrow/North Slope census division (thousands)
B05 = Basic sector employment, Bethel census division (thousands)
B08 = Basic sector employment, Cordova/McCarthy census division (thousands)
E09 = Basic sector employment, Fairbanks census division (thousands)
B11 = Basic sector employment, Southeast Alaska (thousands)
B14 = Basic sector employment, Kobuk census division (thousands)
B16 = Basic sector employment, Kuskokwim census division (thousands)
B17 = Basic sector employment, Matanuska/Susitna census division (thousands)
B18 = Basic sector employment, Nome census division (thousands)
B21 = Basic sector employment, Seward census division (thousands)
B25 = Basic sector employment, Upper Yukon census division (thousands)
B26 = Basic sector employment, Valdez/Chitina/Whittier census division (thousands)
B29 = Basic sector employment, Yukon Koyukuk census division (thousands)

SOURCE: 1979 values from Alaska Department of Labor, Statistical
Quarterly, thereafter assumed to grow at one percent annually.

In the base case, it is assumed that after 1982, state support of an agricultural industry results in expansion of the existing industry to over 1,000 persons by the year 2000, as shown in Table 63.

These assumptions are based on scenarios for agricultural development presented by Michael Scott in Southcentral Alaska's Economy and Population, 1965-2025: A Base Study and Projections, 1979.

3.   Logging and Sawmill Employment

Employment in logging and sawmills is classified by the MAP model as exogenous manufacturing employment, while employment in pulpmills is calculated endogenously. In 1979, the Alaskan timber industry harvested approximately 500 million board feet of lumber.

In the base case, timber output is assumed to rise to 960 million board feet by the year 2000, implying a rise in manufacturing employment from 2,204 in 1980 to 4,103 in 2000, as shown in Table 64. The rate of growth in output in this case is approximately equal to the historical growth in the industry.

4.   Commercial Fishing: Non-Bottomfish

Statewide employment in non-bottomfish commercial fishing and fish processing is assumed to remain constant at current levels of about 6,323 and 7,123, respectively. These figures and their regional breakdowns, shown in Table 65, are based on projections to 1980 of estimates presented in George Rogers, Measuring the Socioeconomic Impacts of Alaska's Fisheries, ISER (April, 1980).

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TABLE 63. AGRICULTURAL EMPLOYMENT ASSUMPTIONS

	EMAGRI	B01	B09	B12	B17
1980	0.178	0.013	0.044	0.008	0.113
1981	0.178	0.013	0.044	0.008	0.113
1982	0.166	0.013	0.04	0.008	0.105
1983	0.204	0.013	0.051	0.008	0.132
1984	0.228	0.013	0.058	0.008	0.149
1985	0.252	0.013	0.064	0.008	0.167
1986	0.276	0.013	0.071	0.008	0.184
1987	0.3	0.013	0.078	0.008	0.201
1988	0.357	0.013	0.093	0.008	0.243
1989	0.413	0.013	0.109	0.008	0.283
1990	0.47	0.013	0.125	0.008	0.324
1991	0.527	0.013	0.141	0.008	0.365
1992	0.583	0.013	0.156	0.008	0.406
1993	0.64	0.013	0.172	0.008	0.447
1994	0.697	0.013	0.188	0.008	0.488
1995	0.753	0.013	0.204	0.008	0.528
1996	0.81	0.013	0.219	0.008	0.57
1997	0.867	0.013	0.235	0.008	0.611
1998	0.923	0.013	0.251	0.008	0.651
1999	0.98	0.013	0.267	0.008	0.692
2000	1.037	0.013	0.283	0.008	0.733

EMAGRI = Exogenous employment in agriculture (thousands)
B01   = Basic sector employment, Aleutian Islands census division (thousands)
B09   = Basic sector employment, Fairbanks census division (thousands)
B12   = Basic sector employment, Kenai/Cook Inlet census division (thousands)
B17   = Basic sector employment, Matanuska/Susitna census division (thousands)

SOURCE: Scott, M., Southcentral Alaska's Economy and Population,
          1965-2025: A Base Study and Projections, 1979.

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TABLE 64. LOGGING AND SAWMILL EMPLOYMENT ASSUMPTIONS

	EMMX2	B02	B08	B09	B11	B12	B15	B21
1980	2.204	0.134	0.09	0.044	1.109	0.147	0.188	0.493
1981	2.273	0.138	0.092	0.046	1.144	0.151	0.194	0.508
1982	2.345	0.143	0.095	0.047	1.18	0.156	0.2	0.524
1983	2.418	0.147	0.098	0.048	1.217	0.161	0.206	0.541
1984	2.494	0.152	0.101	0.05	1.255	0.166	0.212	0.558
1985	2.572	0.157	0.105	0.052	1.294	0.171	0.219	0.575
1986	2.653	0.162	0.108	0.053	1.335	0.176	0.226	0.59
1987	2.736	0.167	0.111	0.055	1.377	0.182	0.233	0.612
1988	2.822	0.172	0.115	0.057	1.42	0.188	0.24	0.631
1989	2.911	0.177	0.118	0.058	1.464	0.193	0.248	0.651
1990	3.001	0.183	0.122	0.06	1.51	0.199	0.256	0.671
1991	3.096	0.188	0.126	0.062	1.557	0.206	0.264	0.692
1992	3.193	0.194	0.13	0.064	1.607	0.212	0.272	0.714
1993	3.293	0.201	0.134	0.066	1.657	0.219	0.28	0.737
1994	3.396	0.207	0.138	0.068	1.708	0.226	0.289	0.76
1995	3.503	0.213	0.143	0.07	1.762	0.233	0.298	0.784
1996	3.613	0.22	0.147	0.072	1.818	0.24	0.308	0.808
1997	3.727	0.227	0.152	0.075	1.875	0.248	0.317	0.834
1998	3.843	0.234	0.156	0.077	1.934	0.255	0.327	0.86
1999	3.964	0.241	0.161	0.079	1.994	0.263	0.338	0.887
2000	4.103	0.25	0.167	0.082	2.064	0.273	0.349	0.918

EMMX2 = Exogenous employment in average wage manufacturing (thousands)
B02   = Basic sector employment, Anchorage census division (thousands)
B08   = Basic sector employment, Cordova/McCarthy census division (thousands)
B09   = Basic sector employment, Fairbanks census division (thousands)
B11   = Basic sector employment, Southeast Alaska (thousands)
B12   = Basic sector employment, Kenai/Cook Inlet census division (thousands)
B15   = Basic sector employment, Kodiak census division (thousands)
B21   = Basic sector employment, Seward census division (thousands)

SOURCE: 1979 value was taken from Alaska Department of Labor, Statistical Quarterly.

TABLE 65 . NONBOTTOMFISH COMMERCIAL FISHING AND PROCESSING EMPLOYMENT ASSUMPTIONS

	EMMX2	EMFISH	MTOT	BO1	BO2	BO5	BO6	BO8	B11
1980	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1981	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1982	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1983	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1984	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1985	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1986	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1987	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1988	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1989	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1990	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1991	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1992	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1993	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1994	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1995	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1996	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1997	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1998	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
1999	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615
2000	7.123	6.363	13.485	2.174	0.479	0.271	1.63	0.723	3.615

	B12	B14	B15	B16	B17	B18	B21	B26	B27
1980	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1981	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1982	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1983	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1984	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1985	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1986	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1987	1.253	0.043	2.907	0.004	0.	0.054	0.05	0.053	0.22
1988	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1989	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1990	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1991	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1992	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1993	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1994	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1995	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1996	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1997	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1998	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
1999	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22
2000	1.253	0.043	2.907	0.004	0.	0.054	0.059	0.053	0.22

```
EMMX2  = Exogenous employment in average wage manufacturing (thousands)
EMFISH = Exogenous employment in fish harvesting (thousands)
MTOT   = Total exogenous employment (thousands)
BO1    = Basic sector employment, Aleutian Islands census division (thousands)
BO2    = Basic sector employment, Anchorage census division (thousands)
BO5    = Basic sector employment, Bethel census division (thousands)
BO6    = Basic sector employment, Bristol Bay Region (thousands)
BO8    = Basic sector employment, Cordova/McCarthy census division (thousands)
B11    = Basic sector employment, Southeast Alaska (thousands)
B12    = Basic sector employment, Kenai/Cook Inlet census division (thousands)
B14    = Basic sector employment, Kobuk census division (thousands)
B15    = Basic sector employment, Kodiak census division (thousands)
B16    = Basic sector employment, Kuskokwim census division (thousands)
B18    = Basic sector employment, Nome census division (thousands)
B21    = Basic sector employment, Seward census division (thousands)
B26    = Basic sector employment, Valdez/Chitina/Whittier census division (thousands)
B27    = Basic sector employment, Wade Hampton census division (thousands)
```

SOURCE: George Rogers, Measuring the Socioeconomic Impacts of Alaska's
          Fisheries, Institute of Social and Economic Research, April
          1980.

5. Bottomfish Harvesting and Processing

The 1981 American domestic catch of bottomfish in the Bering Sea and the Gulf of Alaska totaled 107,540 metric tons (North Pacific Fisheries Management Council, 1981). This is less than 6 percent of the optimum yield of 1.9 million metric tons calculated for these areas by the North Pacific Fisheries Management Council.

Most people agree that the American catch of bottomfish in Alaskan waters will substantially increase over the next twenty years, replacing foreign harvests. However, there is considerable uncertainty as to the extent to which employment in Alaska in bottomfish harvesting and processing may be expected to rise. Past projections have varied widely, primarily as a result of differences in assumptions about total harvests, the location of bottomfish processing (onshore or offshore), and residency patterns of employees.

A number of factors suggest that the U.S. fishing fleet, and in particular onshore Alaska processors, are at an economic disadvantage compared to foreign operations. These are high U.S. labor costs (in particular in Alaska), high transportation costs from Alaska (due partly to the Jones Act), lack of a well-developed transportation and services infrastructure, lack of a highly skilled, stable work force for an onshore processing industry, lack of U.S. marketing channels for Alaska groundfish, high American interest rates, subsidization of foreign fisheries, high quality standards in foreign markets, and import barriers for foreign markets. These factors are discussed in

Scott (1980) and Natural Resources Consultants (1980). Working in favor of the future development of the U.S. bottomfish industry are the commitment of the State of Alaska to this goal and the carrot and stick provided by U.S. allocations of Alaska groundfish resources to foreign operators.

The bottomfish harvesting and processing employment assumptions used in the MAP model runs were based on a number of assumptions, of which the most important are:

- Domestic harvests grow at a constant rate from their 1981 levels to optimum yield levels in 2000.

- In 2000, 60 percent of the catch is accounted for by catcher processors, 20 percent by joint ventures with foreign processors, and 20 percent by onshore Alaska processors. The allocation of the domestic catch changes in a linear fashion over time from the 1981 levels of approximately 89 percent for joint ventures and 11 percent for onshore processing.

- 30 percent of catcher processor employees, 80 percent of trawler employees, and 100 percent of onshore processing plant employees are Alaska residents.

These and other assumptions used in projecting bottomfish employment are reviewed in Appendix B. The bottomfish employment projections are presented in Table 66.

TABLE 66. BOTTOMFISH FISHING AND PROCESSING EMPLOYMENT ASSUMPTIONS

	EMCNX2	EMMX2	EMFISH	BO1	BO2	B15	MTOT
1980	0.	0.	0.	0.	0.	0.	0.
1981	0.	0.088	0.196	0.162	0.	0.122	0.284
1982	0.002	0.107	0.225	0.193	0.003	0.139	0.335
1983	0.003	0.13	0.259	0.229	0.005	0.158	0.392
1984	0.003	0.157	0.297	0.271	0.007	0.18	0.458
1985	0.004	0.19	0.342	0.321	0.01	0.205	0.535
1986	0.005	0.229	0.392	0.379	0.014	0.232	0.626
1987	0.006	0.276	0.45	0.449	0.02	0.263	0.732
1988	0.007	0.332	0.517	0.531	0.026	0.298	0.856
1989	0.008	0.399	0.593	0.628	0.034	0.338	1.
1990	0.01	0.48	0.68	0.743	0.044	0.382	1.169
1991	0.012	0.576	0.78	0.878	0.056	0.433	1.367
1992	0.014	0.69	0.895	1.038	0.072	0.489	1.598
1993	0.016	0.827	1.026	1.226	0.09	0.552	1.869
1994	0.019	0.989	1.176	1.449	0.113	0.622	2.184
1995	0.023	1.183	1.347	1.711	0.141	0.701	2.553
1996	0.028	1.414	1.543	2.02	0.176	0.789	2.985
1997	0.033	1.689	1.768	2.385	0.217	0.887	3.489
1998	0.039	2.016	2.024	2.815	0.268	0.996	4.079
1999	0.046	2.404	2.317	3.322	0.329	1.116	4.768
2000	0.	2.866	2.652	3.9	0.372	1.245	5.518

EMCNX2 = Exogenous employment in average wage construction (thousands)
EMMX2 = Exogenous employment in average wage manufacturing (thousands)
EMFISH = Exogenous employment in fish harvesting (thousands)
BO1   = Basic sector employment, Aleutian Islands census division (thousands)
BO2   = Basic sector employment, Anchorage census division (thousands)
B15   = Basic sector employment, Kodiak census division (thousands)
MTOT   = Total exogenous employment (thousands)

SOURCE: See text.

6. Federal Civilian Employment

Historically, federal civilian employment has grown at an average annual rate of about 0.5 percent. By 1979, such employment had reached a level of 17,915 persons.

In the base case, it is assumed that the historical growth pattern continues in the future, raising federal civilian employment to 19,893 by the year 2000, as shown in Table 67.

7. Federal Military Employment

In 1979, active duty military personnel in Alaska numbered 23,323 persons. In the base case, it is assumed that this level is maintained throughout the forecast period, as shown in Table 68.

TOURISM ASSUMPTIONS

Recent changes in the specification of the MAP model have been made to net out those portions of transportation, trade, and service sector employment generated by tourist activity in the state. Such estimates are now generated in forecasts as a function of an exogenously forecast estimate of total tourists visiting Alaska during the forecast period. In 1979, the Alaska Division of Tourism estimated that 505,400 persons visited the state.

In the base case, it is assumed that the number of visitors continues to grow at a constant annual rate of 4 percent, reaching over 1.1 million persons annually by the year 2000.

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TABLE 67 . FEDERAL CIVILIAN EMPLOYMENT ASSUMPTIONS

	EMGC	GO1	GO2	GO4	GO5	GO6
1980	18.005	0.706	9.794	0.248	0.412	0.193
1981	18.095	0.709	9.843	0.25	0.414	0.194
1982	18.185	0.713	9.893	0.251	0.416	0.195
1983	18.276	0.716	9.942	0.252	0.419	0.196
1984	18.367	0.72	9.992	0.253	0.421	0.197
1985	18.459	0.724	10.042	0.255	0.423	0.198
1986	18.551	0.727	10.092	0.256	0.425	0.199
1987	18.644	0.731	10.142	0.257	0.427	0.199
1988	18.737	0.735	10.193	0.259	0.429	0.2
1989	18.831	0.738	10.244	0.26	0.431	0.201
1990	18.925	0.742	10.295	0.261	0.433	0.203
1991	19.02	0.746	10.347	0.262	0.436	0.204
1992	19.115	0.749	10.399	0.264	0.438	0.205
1993	19.211	0.753	10.451	0.265	0.44	0.206
1994	19.307	0.757	10.503	0.266	0.442	0.207
1995	19.403	0.761	10.555	0.268	0.444	0.208
1996	19.5	0.764	10.608	0.269	0.447	0.209
1997	19.598	0.768	10.661	0.27	0.449	0.21
1998	19.696	0.772	10.714	0.272	0.451	0.211
1999	19.794	0.776	10.768	0.273	0.453	0.212
2000	19.893	0.78	10.822	0.275	0.456	0.213

	GO8	GO9	G11	G12	G14	G15	G16	G17	G18	G21
80	0.036	2.328	2.416	0.104	0.248	0.286	0.077	0.097	0.178	0.06
81	0.036	2.34	2.428	0.105	0.25	0.288	0.078	0.098	0.179	0.06
82	0.036	2.351	2.44	0.105	0.251	0.289	0.078	0.098	0.18	0.06
83	0.037	2.363	2.453	0.106	0.252	0.291	0.079	0.099	0.181	0.06
84	0.037	2.375	2.465	0.107	0.253	0.292	0.079	0.099	0.182	0.07
85	0.037	2.387	2.477	0.107	0.255	0.294	0.079	0.1	0.183	0.07
86	0.037	2.399	2.49	0.108	0.256	0.295	0.08	0.1	0.184	0.07
87	0.037	2.411	2.502	0.108	0.257	0.296	0.08	0.101	0.185	0.07
88	0.037	2.423	2.515	0.109	0.259	0.298	0.081	0.101	0.186	0.07
89	0.038	2.435	2.527	0.109	0.26	0.299	0.081	0.102	0.186	0.07
90	0.038	2.447	2.54	0.11	0.261	0.301	0.081	0.102	0.187	0.07
91	0.038	2.459	2.552	0.11	0.262	0.302	0.082	0.103	0.188	0.07
92	0.038	2.472	2.565	0.111	0.264	0.304	0.082	0.103	0.189	0.07
93	0.039	2.484	2.578	0.111	0.265	0.305	0.083	0.104	0.19	0.07
94	0.039	2.496	2.591	0.112	0.266	0.307	0.083	0.104	0.191	0.07
95	0.039	2.509	2.604	0.113	0.268	0.309	0.083	0.105	0.192	0.07
96	0.039	2.521	2.617	0.113	0.269	0.31	0.084	0.105	0.193	0.07
97	0.039	2.534	2.63	0.114	0.27	0.312	0.084	0.106	0.194	0.07
98	0.039	2.547	2.643	0.114	0.272	0.313	0.085	0.106	0.195	0.07
99	0.04	2.559	2.656	0.115	0.273	0.315	0.085	0.107	0.196	0.07
00	0.04	2.572	2.67	0.115	0.275	0.316	0.086	0.107	0.197	0.07

	G24	G25	G26	G27	G29
1980	0.337	0.034	0.045	0.135	0.259
1981	0.338	0.034	0.045	0.136	0.261
1982	0.34	0.035	0.045	0.136	0.262
1983	0.342	0.035	0.046	0.137	0.263
1984	0.343	0.035	0.046	0.138	0.264
1985	0.345	0.035	0.046	0.138	0.266
1986	0.347	0.035	0.046	0.139	0.267
1987	0.349	0.035	0.047	0.14	0.268
1988	0.35	0.036	0.047	0.141	0.27
1989	0.352	0.036	0.047	0.141	0.271
1990	0.354	0.036	0.047	0.142	0.273
1991	0.356	0.036	0.048	0.143	0.274
1992	0.357	0.036	0.048	0.143	0.275
1993	0.359	0.037	0.048	0.144	0.277
1994	0.361	0.037	0.048	0.145	0.278
1995	0.363	0.037	0.049	0.146	0.279
1996	0.365	0.037	0.049	0.146	0.281
1997	0.366	0.037	0.049	0.147	0.282
1998	0.368	0.037	0.049	0.148	0.284
1999	0.37	0.038	0.049	0.148	0.285
2000	0.372	0.038	0.05	0.149	0.286

```
EMGC  = Federal government civilian employment
G01   = Government Employment, Aleutian Islands census division (thousands)
G02   = Government Employment, Anchorage census division (thousands)
G04   = Government Employment, Barrow/North Slope census division (thousands)
G05   = Government Employment, Bethel census division (thousands)
G06   = Government Employment, Bristol Bay Region (thousands)
G08   = Government Employment, Cordova/McCarthy census division (thousands)
G09   = Government Employment, Fairbanks census division (thousands)
G11   = Government Employment, Southeast Alaska (thousands)
G12   = Government Employment, Kenai/Cook Inlet census division (thousands)
G14   = Government Employment, Kobuk census division (thousands)
G15   = Government Employment, Kodiak census division (thousands)
G16   = Government Employment, Kuskokwim census division (thousands)
G17   = Government Employment, Matanuska/Susitna census division (thousands)
G18   = Government Employment, Nome census division (thousands)
G21   = Government Employment, Seward census division (thousands)
G24   = Government Employment, S.E. Fairbanks census division (thousands)
G25   = Government Employment, Upper Yukon census division (thousands)
G26   = Government Employment, Valdez/Chitina/Whittier census division (thousands)
G27   = Government Employment, Wade Hampton census division (thousands)
G29   = Government Employment, Yukon Koyukuk census division (thousands)
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SOURCE: Alaska Department of Labor, _Statistical Quarterly_, various
         issues, for 1979 value. Projections from 1979 as described
         in text.

TABLE 68. FEDERAL MILITARY EMPLOYMENT ASSUMPTIONS

	EMGM	GO1	GO2	GO4	GO5	GO6
1980	23.323	2.176	11.864	0.016	0.014	0.369
1981	23.323	2.176	11.864	0.016	0.014	0.369
1982	23.323	2.176	11.864	0.016	0.014	0.369
1983	23.323	2.176	11.864	0.016	0.014	0.369
1984	23.323	2.176	11.864	0.016	0.014	0.369
1985	23.323	2.176	11.864	0.016	0.014	0.369
1986	23.323	2.176	11.864	0.016	0.014	0.369
1987	23.323	2.176	11.864	0.016	0.014	0.369
1988	23.323	2.176	11.864	0.016	0.014	0.369
1989	23.323	2.176	11.864	0.016	0.014	0.369
1990	23.323	2.176	11.864	0.016	0.014	0.369
1991	23.323	2.176	11.864	0.016	0.014	0.369
1992	23.323	2.176	11.864	0.016	0.014	0.369
1993	23.323	2.176	11.864	0.016	0.014	0.369
1994	23.323	2.176	11.864	0.016	0.014	0.369
1995	23.323	2.176	11.864	0.016	0.014	0.369
1996	23.323	2.176	11.864	0.016	0.014	0.369
1997	23.323	2.176	11.864	0.016	0.014	0.369
1998	23.323	2.176	11.864	0.016	0.014	0.369
1999	23.323	2.176	11.864	0.016	0.014	0.369
2000	23.323	2.176	11.864	0.016	0.014	0.369

	GO8	GO9	G11	G12	G14	G15	G16	G17	G18	G21
80	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
81	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
82	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
83	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
84	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
85	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
86	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
87	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.01
88	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
89	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
90	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
91	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
92	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
93	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
94	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
95	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
96	0.054	5.579	0.686	0.056	0.015	0.891	0.054	0.147	0.042	0.014
97	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
98	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
99	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014
0	0.054	5.579	0.686	0.056	0.016	0.891	0.054	0.147	0.042	0.014

	G24	G25	G26	G27	G29
1980	0.849	0.028	0.042	0.014	0.413
1981	0.849	0.028	0.042	0.014	0.413
1982	0.849	0.028	0.042	0.014	0.413
1983	0.849	0.028	0.042	0.014	0.413
1984	0.849	0.028	0.042	0.014	0.413
1985	0.849	0.028	0.042	0.014	0.413
1986	0.849	0.028	0.042	0.014	0.413
1987	0.849	0.028	0.042	0.014	0.413
1988	0.849	0.028	0.042	0.014	0.413
1989	0.849	0.028	0.042	0.014	0.413
1990	0.849	0.028	0.042	0.014	0.413
1991	0.849	0.028	0.042	0.014	0.413
1992	0.849	0.028	0.042	0.014	0.413
1993	0.849	0.028	0.042	0.014	0.413
1994	0.849	0.028	0.042	0.014	0.413
1995	0.849	0.028	0.042	0.014	0.413
1996	0.849	0.028	0.042	0.014	0.413
1997	0.849	0.028	0.042	0.014	0.413
1998	0.849	0.028	0.042	0.014	0.413
1999	0.849	0.028	0.042	0.014	0.413
2000	0.849	0.028	0.042	0.014	0.413

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EMGM = Federal government military employment
G01  = Government Employment, Aleutian Islands census division (thousands)
G02  = Government Employment, Anchorage census division (thousands)
G04  = Government Employment, Barrow/North Slope census division (thousands)
G05  = Government Employment, Bethel census division (thousands)
G06  = Government Employment, Bristol Bay Region (thousands)
G08  = Government Employment, Cordova/McCarthy census division (thousands)
G09  = Government Employment, Fairbanks census division (thousands)
G11  = Government Employment, Southeast Alaska (thousands)
G12  = Government Employment, Kenai/Cook Inlet census division (thousands)
G14  = Government Employment, Kobuk census division (thousands)
G15  = Government Employment, Kodiak census division (thousands)
G16  = Government Employment, Kuskokwim census division (thousands)
G17  = Government Employment, Matanuska/Susitna census division (thousands)
G18  = Government Employment, Nome census division (thousands)
G21  = Government Employment, Seward census division (thousands)
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G25  = Government Employment, Upper Yukon census division (thousands)
G26  = Government Employment, Valdez/Chitina/Whittier census division (thousands)
G27  = Government Employment, Wade Hampton census division (thousands)
G29  = Government Employment, Yukon Koyukuk census division (thousands)
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SOURCE: Alaska Department of Labor.

POLICY ASSUMPTIONS

Virtually all past work done using the MAP forecasting model as well as work by other forecasters confirms the central role that state government fiscal policy will play in shaping the pattern of future economic development in Alaska. State expenditures not only determine direct government employment, but also affect all endogenous sectors of the economy through expenditures on goods and services and capital improvements. State revenues drawn out of personal income affect local demands directly, and those drawn from resources serve to relax expenditure constraints on state government.

While anticipating the course of future revenues and expenditures is necessarily extremely speculative, some of the general outlines of the pattern of state fiscal behavior are already in place, and serve as a guide to several of the major assumptions utilized in the base case.

First, on the revenue side, a variety of taxes have been revised in the recent past. For these projections, we assume that the state personal income tax is permanently eliminated. The petroleum corporate income tax assumptions reflect the changes made during the 1981 legislative session. Exogenous state revenues are composed of four items--the property tax on petroleum facilities, royalty payments, state severance taxes, and petroleum corporate income taxes.

As shown in Table 69, property tax revenues from the Prudhoe facility, the TAPS pipeline, the Alaska Natural Gas Transportation System, and

TABLE 69. STATE REVENUE ASSUMPTIONS
(Millions of Current Dollars)

	RPTS	RPPS	RPRY	RTCSPX
1980	469.9	350.	881.3	135.12
1981	1156.	321.333	1389.	860.
1982	1678.	358.801	1666.	820.
1983	2102.	369.348	2087.	495.
1984	2480.	379.617	2463.	593.16
1985	2896.	387.264	2894.	694.8
1986	3497.	397.263	3473.	836.4
1987	3978.	543.154	3962.	952.8
1988	3675.	564.186	4404.	969.48
1989	4149.	586.663	4928.	1089.24
1990	4002.	601.828	4830.	1059.84
1991	3752.	614.356	4641.	1007.16
1992	3656.	622.681	4631.	994.44
1993	3775.	628.037	4814.	1030.68
1994	3661.	634.014	4718.	1005.48
1995	3417.	634.542	4481.	947.76
1996	3256.	630.545	4380.	916.32
1997	3420.	621.568	4659.	969.48
1998	3420.	607.445	4659.	969.48
1999	3420.	589.322	4659.	969.48
2000	3420.	566.396	4659.	969.48

RPTS = Oil and gas production taxes (millions of current dollars)
RPRY = Oil and gas royalties (millions of current dollars)
RPPS = Oil and gas property taxes (millions of current dollars)
RTCSPX = Special oil and gas corporate taxes (millions of current dollars)

SOURCES: Alaska Department of Revenue, Petroleum Production Revenue
Forecast, third quarter 1981. RPPS also includes property
tax estimates for the Northwest Alaska Gas Pipeline, the
Trans-Alaska Pipeline, and Federal-State OCS development in
the Beaufort Sea, as discussed in Alaska OCS Office, Bering
Norton Petroleum Development Scenarios: Economic and Demo-
graphic Analysis, Technical Paper No. 50, Social and Economic
Studies Program, p. 101.

OCS development reach over 500 million dollars by the end of the forecast period. Oil and gas royalty, production tax, and special corporate tax revenues peak at about $10 billion annually by 1989, based on recent petroleum production revenue forecasts by the Alaska Department of Revenue.

On the expenditure side, it is assumed that real per capita expenditures will grow over the forecast period in proportion to the growth in real per capita income.

While this assumed behavior is somewhat more conservative than has been observed in the last several years, it is impossible to use the expenditure path of the recent past as a long term trend, inasmuch as it is simply not sustainable in the long run. The implicitly assumed unitary income elasticity of expenditures does represent a sustainable policy over the forecast period.

The Base Case Assumptions: The SCIMP Model

Utilization of the SCIMP model requires initial period population figures, projected exogenous employment, and a variety of control parameters including employment multipliers, demographic parameters, and labor force participation rates. These assumptions are discussed in this section.

The assumption was made throughout that there is no interaction between the military populations stationed on Adak and Shemya and the rest of the economy of the Aleutian Islands. These populations were assumed to remain constant over the entire period. They were subtracted from total population of the region before running the SCIMP model, and added back into the final population figures. In addition, OCS offshore employment was assumed to have no interaction with the rest of the local economy.

POPULATION

Starting population data for 1980 were taken from 1980 census print-outs. Calculation of the input data by age, race, and sex for civilian population is presented in Table 70. This population was adjusted upward slightly to allow for consistency with the 1970 definition of the Aleutian Islands census division, which is the basis for other input data reported for the region by the State of Alaska. The adjusted 1980 civilian population was 4,328. Adding in the military population of 3,915 results in a total 1980 population of 8,243.

TABLE 70: CALCULATION OF POPULATION DATA FOR SCIMP RUN,
ALEUTIAN ISLAND CENSUS DIVISION

Age Cohort	Total Population (Including Military)		Military Population (Adak & Shemya)		Civilian Population		Native Shares[a]	Civilian Population				Adjusted Civilian Population[b]			
	Male	Female	Male	Female	Male	Female		Non-Native Male	Non-Native Female	Native Male	Native Female	Non-Native Male	Non-Native Female	Native Male	Native Female
0-14	857	773	444	377	413	396	.605	163	156	250	240	183	175	281	270
15-19	576	278	361	111	215	167	.605	85	66	130	101	95	74	146	113
20-24	1,017	523	643	269	374	254	.438	210	143	164	111	236	161	184	125
25-29	759	438	424	225	335	213	.438	188	120	147	93	211	135	165	104
30-44	1,204	587	620	297	584	290	.438	328	163	256	127	368	183	288	143
45-64	410	239	44	47	316	192	.438	178	108	138	84	200	121	155	94
64 +	55	52	2	1	53	51	.885	6	6	47	45	7	7	53	51
TOTAL	4,878	2,890	2,588	1,327	2,290	1,563		1,158	762	1,132	801	1,300	856	1,272	900

[a]Calculated from 1980 census data on native population by age group. These data were not sex-specific.

[b]The 1980 census definition of the Aleutian Islands excluded four communities: Chignik, Chignik Lagoon, Chignik Lake, and Perryville, the population of which totals 475. Civilian population figures were adjusted upwards proportionately by a factor of .12328 to make population figures consistent with statistics issued by the State of Alaska.

SOURCE: 1980 census printouts.

EXOGENOUS EMPLOYMENT

The SCIMP model requires projections of exogenous employment for the entire period. Projections were supplied for federal government employment and for employment in fish harvesting, fish processing, and other basic sector activities. The fish harvesting employment was further subdivided between residents of the Aleutian Islands and nonresidents. Fish processing and other basic sector activities were similarly divided between local residents and enclave employees whose permanent residence is outside the Aleutian Islands.

In developing the fish harvesting and processing employment assumptions, that part of employment involved with species other than bottomfish was assumed to remain constant, with resident harvesting employment at 251, nonresident harvesting employment at 505, resident processing employment at 162, and nonresident processing employment at 1,459. In contrast, bottomfish harvesting employment was assumed to grow rapidly. The calculation of bottomfish employment is discussed in Appendix B.

Other basic sector activities include a small amount of resident employment in agriculture and primarily enclave employment associated with OCS exploration activities from the St. George sale (no development and operations employment is assumed to result from this sale), and construction of bottomfish processing facilities.

Federal government civilian employment was assumed to rise at a rate of 0.5 percent annually from a 1980 level of 706.

The exogenous employment assumptions are summarized in Table 71.

EMPLOYMENT MULTIPLIERS

The SCIMP model calculates support sector employment by multiplying exogenous employment by employment multipliers. A multiplier of .2332 was assumed for all resident employment, based on calculations done for an earlier study (Tuck and Huskey, St. George Basin Petroleum Development Scenarios, Economic and Demographic Analysis, 1981, page 101). A much lower multiplier of .0466 was assumed for exogenous enclave employment, based on the same source. Finally, a figure of .0233 (half the enclave multiplier) was assumed for nonresident fish harvesting employment, on the assumption that these workers would have an even smaller interaction with the local economy. These multiplier assumptions are shown in Table 71.

State and local government employment was calculated by multiplying resident civilian population in the previous year by a factor of .0948. This reflects an assumption that this ratio remains constant over time. The figure was based on the ratio of the 1979 average state and local government employment (reported in the Alaska Department of Labor's Statistical Quarterly) to the 1978 civilian population (calculated by reducing the 1978 population figure reported in the

TABLE 71. SCIMP MODEL EXOGENOUS EMPLOYMENT ASSUMPTIONS

Projection Year (1=1981)	EMFPR		EMFPNR		EMFHR		EMFHNR		EMX		EMXNR		FGVT
1I	175.	I	1497.	I	291.	I	662.	I	15.	I	16.	I	710.
2I	180.	I	1505.	I	302.	I	686.	I	15.	I	18.	I	713.
3I	187.	I	1514.	I	315.	I	714.	I	24.	I	103.	I	717.
4I	195.	I	1525.	I	331.	I	747.	I	30.	I	150.	I	720.
5I	207.	I	1537.	I	350.	I	786.	I	32.	I	174.	I	724.
6I	222.	I	1551.	I	373.	I	831.	I	30.	I	152.	I	727.
7I	242.	I	1567.	I	400.	I	884.	I	24.	I	103.	I	731.
8I	267.	I	1585.	I	432.	I	946.	I	15.	I	25.	I	735.
9I	298.	I	1606.	I	471.	I	1018.	I	15.	I	28.	I	738.
10I	339.	I	1628.	I	517.	I	1102.	I	15.	I	30.	I	742.
11I	390.	I	1653.	I	571.	I	1202.	I	15.	I	34.	I	746.
12I	454.	I	1681.	I	635.	I	1318.	I	15.	I	37.	I	750.
13I	534.	I	1710.	I	710.	I	1455.	I	15.	I	42.	I	753.
14I	635.	I	1741.	I	799.	I	1617.	I	15.	I	46.	I	757.
15I	762.	I	1774.	I	903.	I	1806.	I	15.	I	54.	I	761.
16I	919.	I	1808.	I	1025.	I	2030.	I	15.	I	61.	I	765.
17I	1114.	I	1842.	I	1168.	I	2294.	I	15.	I	70.	I	768.
18I	1356.	I	1874.	I	1335.	I	2605.	I	15.	I	78.	I	772.
19I	1656.	I	1902.	I	1529.	I	2973.	I	15.	I	92.	I	776.
20I	2026.	I	1925.	I	1755.	I	3407.	I	15.	I	17.	I	780.

| Multiplier | .2332 | | .0466 | | .2332 | | .0233 | | .2332 | | .0466 | | .2332 |

EMFPR   = Resident fish processing employment.
EMFPRNR = Nonresident (enclave) fish processing employment.
EMFHR   = Resident fish harvesting employment.
EMFHNR = Nonresident fish harvesting employment.
EMX   = Other basic sector resident employment.
EMXNR   = Other basic sector nonresident (enclave) employment.
FGVT   = Federal government civilian employment.

Alaska Department of Labor's <u>Alaska Population Overview</u> [December 1979]
by military and dependent population).

OTHER PARAMETERS

Birth rate and survival rate parameters were based on 1970 census data
and more recent data obtained from the U.S. Department of Health,
Education and Welfare. No noneconomic induced migration was assumed.

Labor force participation rates for white males were assumed to be the
same as those published in the <u>Survey of Income and Education</u> (1976,
Spring). The published labor force participation rates for white
females, native males and native females were adjusted upwards by a
factor of 1.144. This was done so that the 1980 labor force (pre-
dicted by multiplying the labor force participation rates by the 1980
population figures) would equal the total labor force calculated by
adding 1980 unemployment figures to the total employment figure
projected by the model for 1980.

This completes the description of the base case assumptions. We now
turn to the base case projections.

TABLE 72 . PROJECTED POPULATION AND COMPONENTS OF CHANGE:
ALASKA, 1980 to 2000
(Thousands of Persons)

	POP	NATINC	POPMIG
1980	402.057	5.03	-7.4
1981	415.577	4.62	7.39
1982	433.439	4.804	11.537
1983	448.932	5.133	8.812
1984	464.682	5.343	8.824
1985	489.654	5.558	17.802
1986	521.101	6.14	23.684
1987	537.185	6.935	7.51
1988	540.376	7.041	-5.54
1989	543.411	6.645	-5.344
1990	545.698	6.298	-5.766
1991	552.977	5.951	-0.451
1992	560.559	5.843	-0.054
1993	569.582	5.756	1.453
1994	579.119	5.742	1.959
1995	589.578	5.756	2.845
1996	600.638	5.812	3.366
1997	611.903	5.893	3.466
1998	623.553	5.979	3.739
1999	635.533	6.076	3.945
2000	648.598	6.179	4.9

POP   = Population (thousands)
NATINC = Civilian non-Native natural increase in population (thousands)
POPMIG = Net increase in population due to migration (thousands)

SOURCE: MAP Model Base Case Projections.

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Civilian non-Native natural population increases are fairly steady over the entire period. In contrast net migration shows strong swings in response to fluctuation in labor demand associated with large construction projects.

The net result is a population of 649 thousand in 2000, an increase of 61 percent over the 1980 population of 402 thousand. Of this increase 111 thousand is accounted for by civilian non-Native natural increase, while the balance is attributed to native increase and net migration.

Age Structure

Projections of age structure of the Alaska population are shown in Table 73. The share of adults stays almost the same throughout the period, while the shares of children and aged decline and rise by about two percent, respectively.

Employment

Projections of total employment (EM99), wage and salary employment (EM991), and employment in the basic sector (EMNS), the support sector (EMSP), and government (EMG9) are presented in Table 74. Total employment grows from 204.4 thousand in 1980 to 341.8 thousand in 2000, a growth rate of 2.6 percent. Growth of basic sector employment (at 2.7 percent) occurs in response to construction, expanding petro-leum-related activity, and growth of bottomfishing. Expansion is somewhat more rapid in the first decade (3.4 percent) than in the 1990s (2.0 percent).

TABLE 73 .   PROJECTED AGE STRUCTURE OF ALASKA POPULATION,
1980 - 2000
(Proportion of Total Population)

	POP.KID	POP.AD	POP.GER
1980	0.291	0.669	0.04
1981	0.29	0.668	0.042
1982	0.29	0.668	0.042
1983	0.289	0.668	0.043
1984	0.289	0.667	0.044
1985	0.288	0.669	0.044
1986	0.287	0.67	0.043
1987	0.287	0.669	0.043
1988	0.288	0.667	0.045
1989	0.289	0.665	0.047
1990	0.289	0.663	0.048
1991	0.288	0.662	0.05
1992	0.287	0.662	0.051
1993	0.286	0.662	0.052
1994	0.284	0.662	0.053
1995	0.283	0.663	0.054
1996	0.281	0.663	0.055
1997	0.28	0.664	0.056
1998	0.278	0.664	0.058
1999	0.277	0.664	0.059
2000	0.276	0.664	0.06

POP.KID = Share of children (under age 15) in total population
POP.AD = Share of adults (between ages 15 and 65) in total population
POP.GER = Share of aged (over age 65) in total population

SOURCE: MAP Model Base Case Projections.

TABLE 74. PROJECTED EMPLOYMENT: ALASKA, 1980 - 2000
(Thousands of Persons)

	EM99	EM991	EMNS	EMSP	EMG9
1980	204.352	190.1	45.983	79.777	78.591
1981	213.712	198.785	48.817	81.878	83.017
1982	227.441	211.75	52.979	86.692	87.77
1983	238.289	221.976	55.743	91.751	90.795
1984	248.404	231.498	57.923	97.515	92.966
1985	266.687	248.714	65.548	106.685	94.454
1986	291.365	271.928	74.407	118.14	98.818
1987	302.46	282.322	72.645	123.112	106.703
1988	300.616	280.525	66.574	124.316	109.726
1989	297.076	277.123	64.861	123.852	108.363
1990	293.142	273.339	64.395	121.57	107.177
1991	294.713	274.728	66.318	122.244	106.151
1992	296.775	276.564	66.554	123.465	106.755
1993	300.396	279.854	67.478	125.829	107.09
1994	304.619	283.692	68.439	128.303	107.878
1995	309.842	288.45	69.92	131.144	108.778
1996	315.638	293.723	71.469	134.243	109.927
1997	321.564	299.092	72.949	137.477	111.138
1998	327.805	304.725	74.59	140.872	112.343
1999	334.3	310.561	76.289	144.373	113.638
2000	341.827	317.327	78.612	148.251	114.964

EM99 = Total employment (thousands)
EM991 = Total wage and salary employment (thousands)
EMNS = Employment in basic sector: agriculture, mining, construction
          and manufacturing (thousands)
EMSP = Employment in services (thousands)
EMG9 = Government employment (thousands)

SOURCE: MAP Model Base Case Projections.

However, growth is most rapid (8.4 percent) over the period 1980 to 1986, reflecting primarily gas pipeline construction. Between 1986 and 1990, following the peak of the pipeline construction, basic sector employment falls. Government growth (1.9 percent) is largely accounted for by growth of state and local government.

Support sector growth reflects the growth of the basic sector. For the entire period, growth averages 3.1 percent. Growth is somewhat more rapid (at 4.3 percent) during the 1980s than during the 1990s (2.0 percent).

Support sector employment as a percent of total employment grows from 39.0 percent in 1980 to 43.4 percent in 2000. The share of basic sector employment also rises slightly, from 22.5 to 23.0 percent, while the share of government employment falls from 38.5 to 33.6 percent.

In summary, there is considerable growth in employment over the 20-year period. However, the first 10 years tend to be more volatile and reflect the concentration of several major projects in the 1982-1986 period. The 1990s growth in employment is somewhat more evenly paced, responding largely to growth in fisheries.

Personal Income, Wages and Prices

Personal income projections (measured in 1981 dollars), both total and per capita, are shown in Table 75. Total personal income grows from

TABLE 75. PROJECTED PERSONAL INCOME AND PERSONAL INCOME
PER CAPITA: ALASKA, 1980 - 2000
(Millions of 1981 Dollars, respectively)

	PI.81	PIPC.81
1980	5750.38	14302.4
1981	6060.18	14582.6
1982	6531.98	15070.1
1983	6939.5	15457.8
1984	7456.85	16047.2
1985	8594.86	17552.9
1986	9978.68	19149.2
1987	9968.82	18557.5
1988	9344.13	17291.9
1989	9130.03	16801.3
1990	8983.99	16463.3
1991	9141.17	16530.8
1992	9260.97	16521.
1993	9455.89	16601.4
1994	9662.39	16684.7
1995	9905.07	16800.3
1996	10164.2	16922.4
1997	10428.7	17043.
1998	10711.9	17178.8
1999	11003.9	17314.4
2000	11341.2	17485.7

PI.81   = Real personal income (millions of 1981 dollars)
PIPC.81 = Real per capita personal income (1981 dollars)

SOURCE: MAP Model Base Case Projections.

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5,750 million dollars in 1980 to 11,341 million dollars in 2000, an average annual rate of growth of 3.5 percent. As was the case with other variables considered, the rate of growth is highest for the first six years (9.6 percent), turns negative between 1986 and 1990 (-2.6 percent), and rises at 7.2 percent between 1990 and 2000. This reflects both changes in the rate of growth of employment as well as changes in the composition of economic activity.

This is more clearly seen in the data on per capita income. Between 1980 and 1986, per capita income grows at an annual rate of 5.0 percent, between 1986 and 1990 it declines by 3.7 percent per year, and for the 1990-2000 period rises by only 0.6 percent per year. The decline for the period 1986 to 1990 and the subsequent slow rate of growth are attributable to two factors. First, an increasing share of total employment is accounted for by support sector activity, with relatively lower real wages than the economy as a whole. Second, much of the growth of basic sector employment during the 1990s is in fisheries, also an industry with relatively low wage rates.

Projection of total wages and salaries by sector are shown in Table 76. The wage bills in the basic and support sectors mirror the pattern of growth seen in personal income. Wages in the two sectors peak in 1986 and 1987, respectively, decline steadily until 1990, and then begin growing again. Support sector wages do not regain peak 1987 levels until 1995, and basic sector wages do not reach 1986 levels again during the period.

TABLE 76. PROJECTED WAGES AND SALARIES BY SECTOR:
ALASKA, 1980 - 2000
(Millions of 1981 Dollars)

	WS99.81	WSNS.81	WSSP.81	WSG9.81
1980	4494.67	1150.75	1662.47	1699.02
1981	4705.05	1230.27	1698.34	1810.42
1982	5138.68	1393.41	1770.94	1977.18
1983	5478.66	1506.18	1882.99	2092.19
1984	5923.	1670.9	2059.9	2194.77
1985	6904.72	2223.38	2391.78	2292.01
1986	8090.04	2847.89	2776.15	2468.32
1987	8045.7	2549.8	2784.6	2713.51
1988	7476.12	1975.08	2689.63	2813.51
1989	7289.87	1838.73	2638.72	2814.44
1990	7169.77	1795.2	2555.89	2820.61
1991	7303.63	1895.67	2577.65	2832.16
1992	7404.19	1905.61	2608.24	2892.12
1993	7567.48	1949.57	2673.99	2945.63
1994	7739.2	1988.6	2738.29	3013.94
1995	7939.73	2045.74	2808.96	3086.6
1996	8153.31	2100.89	2885.19	3168.74
1997	8371.23	2152.27	2965.75	3254.65
1998	8604.6	2212.41	3051.34	3342.23
1999	8844.93	2271.79	3140.04	3434.43
2000	9122.31	2356.55	3237.59	3529.44

WS99.81 = Total real wages and salaries (millions of 1981 dollars)
WSNS.81 = Total real wages and salaries in basic sector (millions
          of 1981 dollars)
WSSP.81 = Total real wages and salaries in services (millions of
          1981 dollars)
WSG9.81 = Total real wages and salaries in government (millions of
          1981 dollars)

SOURCE: MAP Model Base Case Projections.

Total government wages grow throughout the period at an overall rate of 3.7 percent with the growth rate for the first 10 years (5.2 percent) considerably above that for the second period (2.3 percent).

Projections of real wage rates are shown in Table 77. These include the real wage rates for the basic sector (WRNS.81), the support sector (WRSP.81), and government (WRG9.81). Basic sector real wage rates increase rapidly from 1980 to 1986 (7.3 percent per year), decline at a rate of 7.6 percent per year until 1990, and then increase at only 0.7 percent per year until 2000. Overall, the growth rate is 0.9 percent. Support sector real wage rates grow at an average annual rate of 2.0 percent over the period 1980-1986, decline at a rate of 2.7 percent over the period 1986-1990, and rise at a rate of only 0.4 percent over the period 1990-2000. Overall the growth rate is only 0.2 percent for the entire period. Government wages show the greatest rate of growth of 1.8 percent over the entire period.

Our discussion of income and wages has been in real terms. Over this period inflation has been substantial. As shown in Table 78, for most of the period both the Alaska and the United States inflation rates are projected to be 7.0 percent or greater.

Government Revenues and Expenditures

State government revenue projections by source are shown in Table 79. The variables include: total state government revenues (RSGF.81), petroleum revenues (RP9S.81), revenues from the Federal government

TABLE 77. PROJECTED REAL WAGE RATES: ALASKA, 1981 - 2000
(1981 Dollars)

	WRNS.81	WRSP.81	WRG9.81
1980	25025.4	20838.9	21618.4
1981	25201.5	20742.3	21807.8
1982	26301.3	20427.8	22526.8
1983	27019.9	20522.8	23043.1
1984	28846.6	21123.9	23608.4
1985	33920.1	22419.	24265.8
1986	38274.7	23498.9	24978.3
1987	35099.4	22618.5	25430.4
1988	29667.6	21635.4	25641.3
1989	28348.9	21305.4	25972.3
1990	27877.7	21024.1	26317.2
1991	28584.4	21086.1	26680.4
1992	28632.3	21125.2	27091.2
1993	28892.	21251.	27506.1
1994	29056.7	21342.4	27938.4
1995	29258.4	21418.8	28375.1
1996	29396.	21492.4	28825.8
1997	29503.5	21572.6	29284.9
1998	29660.8	21660.3	29750.3
1999	29778.7	21749.5	30222.6
2000	29976.9	21838.6	30700.4

WRNS.81 = Real wage rate in basic sector (1981 dollars)
WRSP.81 = Real wage rate in services sector (1981 dollars)
WRG9.81 = Real wage rate in government (1981 dollars)

SOURCE: MAP Model Base Case Projections.

TABLE 78. PROJECTED ALASKA AND U.S. INFLATION RATES, 1980 - 2000
(Percent Change from Previous Year/100)

	ALINF	USINF
1980	0.077	0.119
1981	0.089	0.091
1982	0.079	0.083
1983	0.077	0.079
1984	0.076	0.074
1985	0.077	0.07
1986	0.08	0.07
1987	0.076	0.07
1988	0.072	0.07
1989	0.071	0.07
1990	0.071	0.07
1991	0.07	0.07
1992	0.07	0.07
1993	0.069	0.07
1994	0.069	0.07
1995	0.069	0.07
1996	0.069	0.07
1997	0.069	0.07
1998	0.069	0.07
1999	0.069	0.07
2000	0.068	0.07

ALINF = Alaska rate of inflation
USINF = U.S. rate of inflation

SOURCE: MAP Model Base Case Projections.

TABLE 79. PROJECTED STATE GOVERNMENT REVENUES: ALASKA, 1980 - 2000
(Millions of Dollars)

	RSGF.81	RP9S.81	RSFD.81	RSIN.81	RSNP.81
1980	2692.22	2014.95	345.618	123.388	553.878
1981	4192.1	3726.33	363.311	208.062	257.706
1982	5054.43	4164.37	386.687	281.427	608.626
1983	5367.86	4297.47	406.963	427.582	642.812
1984	5879.05	4649.52	427.574	555.758	673.77
1985	6673.3	5269.06	460.254	676.658	727.584
1986	7426.45	5752.89	501.409	855.013	818.545
1987	8020.16	6092.	522.459	1051.22	876.948
1988	7911.4	5776.34	526.634	1248.37	886.692
1989	8459.53	6165.5	530.606	1411.77	882.267
1990	8109.96	5630.15	533.6	1604.5	875.308
1991	7798.32	5154.3	543.126	1763.06	880.963
1992	7541.41	4758.18	553.048	1889.14	894.096
1993	7673.88	4773.89	564.856	1989.98	910.004
1994	7392.73	4377.32	577.337	2087.26	928.153
1995	7008.22	3907.81	591.025	2150.64	949.773
1996	6689.39	3541.56	605.499	2174.19	973.645
1997	6602.4	3439.79	620.242	2163.84	998.781
1998	6355.28	3192.31	635.488	2138.02	1024.95
1999	6077.07	2938.51	651.166	2086.07	1052.49
2000	5788.25	2698.28	668.265	2007.42	1082.56

RSGF.81 = Total state government revenues (millions of 1981 dollars)
RP9S.81 = Petroleum revenues (millions of 1981 dollars)
RSFD.81 = Federal grants (millions of 1981 dollars)
RSIN.81 = Interest earnings (millions of 1981 dollars)
RSNP.81 = Non-petroleum revenues (millions of 1981 dollars)

SOURCE: MAP Model Base Case Projections.

(RSFD.81), interest earnings (RSIN.81), and non-petroleum revenues (RSNP.81). Non-petroleum revenues include federal grants; thus, total state revenues are the sum of petroleum revenues, interest earnings, and non-petroleum revenues. Total revenue grows steadily from 2.7 billion dollars in 1980 to a peak of 8.5 billion dollars in 1990, and declines steadily thereafter to 5.8 billion dollars in 2000. The bulk of these revenues are accounted for by petroleum revenues. These peak in 1989 at 6.2 billion dollars, and decline through the year 2000 to a level of 2.7 billion dollars.

Receipts from the Federal government increase throughout the period, from .3 billion dollars in 1980 to .7 billion dollars in 2000. Interest earnings rise from .1 billion dollars in 1980 to nearly 2.2 billion dollars in 1996, and then begin to decline. Other revenues (RSNP.81 -RSFD.81) increase from .2 to .4 billion dollars over the period.

Expenditure data are presented in Table 80 and include total State government real expenditures (E99S.81) and real per capita expenditures (ESPC.81). Total expenditures grow at 6.3 percent over the entire period and at 10.4 percent for the first 10 years. During the 1990s the rate is considerably lower at 2.3 percent.

Growth of real per capita expenditures is very rapid at 70 percent per year over the period 1980-1983. Thereafter expenditures fluctuate between 7900 and 9600 dollars per capita.

TABLE 80 . PROJECTED STATE GOVERNMENT EXPENDITURES:
ALASKA, 1980 - 2000
(Millions of 1981 Dollars)

	E99S.81	ESPC.81
1980	1847.4	4594.86
1981	2726.79	6561.45
1982	3362.02	7756.61
1983	3570.36	7952.99
1984	3761.97	8095.8
1985	3970.72	8109.23
1986	4365.8	8378.04
1987	4894.61	9111.58
1988	5082.58	9405.64
1989	5032.65	9261.23
1990	4984.38	9133.95
1991	4967.14	8982.53
1992	4964.51	8856.35
1993	5063.96	8890.66
1994	5196.57	8973.23
1995	5340.2	9057.66
1996	5504.29	9164.06
1997	5675.02	9274.36
1998	5850.85	9383.08
1999	6036.27	9497.97
2000	6230.01	9605.34

E99S.81 = Total state government expenditures (millions of 1981 dollars)
ESPC.81 = Per capita state expenditures (1981 dollars)

SOURCE: MAP Model Base Case Projections.

As shown in Table 81, the permanent fund balance peaks in 1995 and declines thereafter. This downturn occurs when the decline in the value of the fund, due to inflation, begins to exceed the increase in value due to additions to the fund and reinvested interest earnings.

THE MAP REGIONAL BASE CASE PROJECTIONS: ANCHORAGE

The MAP regional model base case projections for Anchorage are shown in Table 82. The Anchorage population is projected to rise from 179 thousand in 1980 to 286 thousand in 2000, resulting in an overall growth rate of 2.4 percent. The growth rate is higher during the first decade (3.0 percent per year) than the second decade (1.8 percent per year). Total employment rises slightly faster than population (2.6 percent per year). However, employment declines slightly from 1988 to 1990. Support sector employment rises from 49.3 percent to 53.4 percent of total employment, basic sector employment rises from 14.4 percent to 16.7 percent of total employment, while government employment falls from 36.4 to 29.8 percent of total employment.

THE MAP REGIONAL BASE CASE PROJECTIONS: BRISTOL BAY

MAP regional model projections for Bristol Bay are shown in Table 83. Population is projected to increase from 5,185 in 1980 to 6,378 in 2000, or at a rate of only 1.0 percent. Total employment grows only slightly faster, at a rate of 1.3 percent. The share of basic sector employment in total employment is projected to fall from 46.6 percent to 39.2 percent; the share of government employment in total employment is projected to rise from 31.6 percent to 37.1 percent; and the

TABLE 81. PROJECTED ALASKA PERMANENT FUND BALANCE AND
PERMANENT FUND BALANCE PER CAPITA: 1980 to 2000
(Millions of 1981 Dollars and 1981 Dollars, respectively)

	BAL99.81	BL9PC.81
1980	2229.99	5546.45
1981	3200.5	7701.34
1982	5015.59	11571.6
1983	6879.1	15323.2
1984	8954.18	19269.5
1985	11481.7	23448.7
1986	14202.2	27254.2
1987	16922.8	31502.7
1988	19251.2	35625.5
1989	21995.	40475.9
1990	24230.8	44403.2
1991	26032.5	47077.
1992	27476.1	49015.5
1993	28873.1	50691.7
1994	29783.	51428.1
1995	30132.3	51108.2
1996	30004.2	49953.9
1997	29653.5	48461.
1998	28931.	46397.
1999	27823.	43779.
2000	26342.3	40614.2

BAL99.81 = Accumulated Permanent Fund balance (millions of 1981 dollars)
BL9PC.81 = Per capita accumulated Permanent Fund balance (1981 dollars)

SOURCE: MAP Model Base Case Projections.

TABLE 82 . BASE CASE PROJECTED POPULATION AND EMPLOYMENT,
ANCHORAGE CENSUS DIVISION, 1980 - 2000

	P.02	M.02	B.02	G.02	S.02
1980	179.118	94.262	13.532	34.276	46.453
1981	183.547	97.707	14.373	35.793	47.54
1982	190.959	103.788	16.191	37.421	50.176
1983	197.529	108.541	17.107	38.464	52.97
1984	202.708	112.868	17.929	39.218	55.721
1985	209.807	119.617	19.479	39.741	60.397
1986	220.193	129.547	21.852	41.238	66.457
1987	230.345	136.328	23.056	43.926	69.346
1988	237.418	138.367	22.665	44.969	70.733
1989	239.566	137.107	22.078	44.527	70.502
1990	239.737	134.851	21.744	44.145	68.962
1991	243.02	135.232	21.948	43.817	69.467
1992	245.945	135.938	21.887	44.041	70.011
1993	250.077	137.706	22.289	44.174	71.244
1994	254.281	139.73	22.75	44.46	72.52
1995	258.997	142.202	23.286	44.785	74.132
1996	263.903	144.916	23.838	45.194	75.885
1997	268.921	147.744	24.407	45.624	77.714
1998	274.213	150.756	25.028	46.052	79.676
1999	279.641	153.89	25.664	46.511	81.716
2000	285.621	157.404	26.353	46.98	84.07

P.02 = Population, Anchorage census division (thousands)
M.02 = Total employment, Anchorage census division (thousands)
B.02 = Basic sector employment, Anchorage census division (thousands)
G.02 = Government employment, Anchorage census division (thousands)
S.02 = Support sector employment, Anchorage census division (thousands)

SOURCE: MAP regional model projections.

TABLE 83. BASE CASE PROJECTED POPULATION AND EMPLOYMENT,
BRISTOL BAY REGION, 1980 - 2000

	P.06	M.06	B.06	G.06	S.06
1980	5.185	3.832	1.784	1.21	0.839
1981	5.248	3.923	1.795	1.286	0.843
1982	5.301	4.046	1.815	1.368	0.863
1983	5.359	4.136	1.827	1.42	0.889
1984	5.392	4.216	1.837	1.457	0.922
1985	5.366	4.296	1.857	1.483	0.957
1986	5.384	4.448	1.887	1.558	1.003
1987	5.59	4.646	1.902	1.694	1.05
1988	5.776	4.727	1.897	1.746	1.084
1989	5.841	4.695	1.889	1.722	1.084
1990	5.886	4.65	1.884	1.701	1.065
1991	5.917	4.624	1.884	1.682	1.058
1992	5.974	4.637	1.883	1.692	1.062
1993	6.02	4.656	1.887	1.697	1.071
1994	6.07	4.684	1.892	1.71	1.081
1995	6.118	4.717	1.898	1.725	1.094
1996	6.169	4.757	1.905	1.745	1.108
1997	6.221	4.8	1.912	1.765	1.123
1998	6.272	4.843	1.919	1.785	1.139
1999	6.325	4.889	1.926	1.807	1.155
2000	6.378	4.936	1.935	1.83	1.172

P.06 = Population, Bristol Bay Region (thousands)
M.06 = Total employment, Bristol Bay Region (thousands)
B.06 = Basic sector employment, Bristol Bay Region (thousands)
G.06 = Government employment, Bristol Bay Region (thousands)
S.06 = Support sector employment, Bristol Bay Region (thousands)

SOURCE: MAP regional model projections.

share of support sector employment in total employment is projected to rise from 21.9 percent to 23.7 percent.

THE SCIMP MODEL BASE CASE PROJECTIONS: THE ALEUTIAN ISLANDS

This section discusses the SCIMP base case projections of employment and population in the Aleutian Islands. In the tables, years 1-20 represent the years 1981 to 2000.

Basic sector employment projections from 1981 to 2000 are summarized in Table 84. Total exogenous employment rises from 2,656 to 9,145, a growth rate of 6.7 percent. All of this growth is the result of expansion in the bottomfish industry. The share of enclave employment in total employment falls from 81.9 percent to 58.5 percent, reflecting the assumption built into the bottomfish employment projections of a rising resident share.

Projected government employment is shown in Table 85. Total government employment rises from 3,294 to 4,284. Most of the increase results from an increase in state and local government employment from 410 to 1,329. This increase is proportional to the increase in resident population.

Table 86 summarizes total employment. Support sector employment-- equal to basic sector and government employment multiplied by employment multipliers, rises from 459 to 1,547, at a rate of 6.6 percent per year. Total employment rises from 6,410 to 14,975, at a rate of

TABLE 84. SCIMP MODEL: BASIC SECTOR EMPLOYMENT PROJECTIONS, BASE CASE

Projection Year (1=1981)	EMA	EMX	ENCLV	EMBA
1 I	466. I	15. I	2175. I	2656.
2 I	482. I	15. I	2209. I	2706.
3 I	502. I	24. I	2519. I	3045.
4 I	526. I	30. I	2714. I	3270.
5 I	557. I	32. I	2839. I	3428.
6 I	595. I	30. I	2826. I	3451.
7 I	642. I	24. I	2731. I	3397.
8 I	699. I	15. I	2556. I	3270.
9 I	769. I	15. I	2652. I	3436.
10 I	856. I	15. I	2760. I	3631.
11 I	961. I	15. I	2889. I	3865.
12 I	1089. I	15. I	3036. I	4140.
13 I	1244. I	15. I	3207. I	4466.
14 I	1434. I	15. I	3404. I	4853.
15 I	1665. I	15. I	3634. I	5314.
16 I	1944. I	15. I	3899. I	5858.
17 I	2282. I	15. I	4206. I	6503.
18 I	2691. I	15. I	4557. I	7263.
19 I	3185. I	15. I	4967. I	8167.
20 I	3781. I	15. I	5349. I	9145.

EMA   = Fishing and fish processing resident employment
EMX   = Other basic sector resident employment
ENCLV = Basic sector nonresident employment
EMBA = Total basic sector employment (resident and nonresident)

TABLE 85.   SCIMP MODEL: GOVERNMENT EMPLOYMENT PROJECTIONS, BASE CASE

Projection Year (1=1961)	EML	FGVT	EMIL	EMGT
1 I	410. I	710. I	2175. I	3294.
2 I	429. I	713. I	2175. I	3317.
3 I	443. I	717. I	2175. I	3334.
4 I	460. I	720. I	2175. I	3356.
5 I	478. I	724. I	2175. I	3377.
6 I	496. I	727. I	2175. I	3399.
7 I	515. I	731. I	2175. I	3421.
8 I	535. I	735. I	2175. I	3444.
9 I	556. I	738. I	2175. I	3470.
10 I	584. I	742. I	2175. I	3501.
11 I	616. I	746. I	2175. I	3537.
12 I	654. I	750. I	2175. I	3578.
13 I	697. I	753. I	2175. I	3625.
14 I	748. I	757. I	2175. I	3680.
15 I	808. I	761. I	2175. I	3744.
16 I	880. I	765. I	2175. I	3820.
17 I	965. I	768. I	2175. I	3908.
18 I	1065. I	772. I	2175. I	4013.
19 I	1185. I	776. I	2175. I	4137.
20 I	1329. I	780. I	2175. I	4284.

EML = State and local government employment (all resident)
FGVT = Federal government civilian employment (all resident)
EMIL = Federal government military employment (all resident)
EMGT = Total government employment (all resident)

TABLE 86.   SCIMP MODEL: EMPLOYMENT PROJECTIONS, BASE CASE

Projection Year (1=1981)	EMBA		EMGT		EMS		EMTT
1 I	2656.	I	3294.	I	459.	I	6410.
2 I	2706.	I	3317.	I	469.	I	6492.
3 I	3045.	I	3334.	I	485.	I	6864.
4 I	3270.	I	3356.	I	500.	I	7126.
5 I	3428.	I	3377.	I	516.	I	7321.
6 I	3451.	I	3399.	I	530.	I	7380.
7 I	3397.	I	3421.	I	544.	I	7362.
8 I	3270.	I	3444.	I	560.	I	7274.
9 I	3436.	I	3470.	I	585.	I	7490.
10 I	3631.	I	3501.	I	615.	I	7747.
11 I	3865.	I	3537.	I	652.	I	8054.
12 I	4140.	I	3578.	I	695.	I	8414.
13 I	4466.	I	3625.	I	747.	I	8839.
14 I	4853.	I	3680.	I	810.	I	9343.
15 I	5314.	I	3744.	I	885.	I	9943.
16 I	5858.	I	3820.	I	975.	I	10652.
17 I	6503.	I	3908.	I	1082.	I	11494.
18 I	7263.	I	4013.	I	1211.	I	12487.
19 I	8167.	I	4137.	I	1366.	I	13669.
20 I	9145.	I	4284.	I	1547.	I	14975.

EMBA = Total basic sector employment (resident and nonresident)
EMGT = Total government employment (all resident)
EMS = Total support sector employment (all resident)
EMTT = Total employment (resident and nonresident)

4.6 percent per year. Resident civilian employment (not shown in the table) rises from 2,060 to 7,452, at a rate of 7.0 percent per year.

Different measures of population are shown in Table 87. The civilian resident population rises from 4,530 in 1981 to 15,825 in 2000 as a result of increased resident bottomfish employment. This represents a rate of population increase of 6.8 percent per year. Enclave population (which includes nonresident fishermen) rises from 2,175 to 5,349, at a rate of 4.9 percent per year. The total population of the region, including military and military dependents as well as enclave workers, rises from 10,620 to 25,089, a growth rate of 4.6 percent per year.

TABLE 87. SCIMP MODEL: POPULATION PROJECTIONS, BASE CASE

Projection Year (1=1981)	BPOPP	PMIL	PRES	ENCLV	BASPP
1I	4530. I	3915. I	8445. I	2175. I	10620.
2I	4675. I	3915. I	8590. I	2209. I	10799.
3I	4862. I	3915. I	8777. I	2519. I	11296.
4I	5048. I	3915. I	8963. I	2714. I	11677.
5I	5241. I	3915. I	9156. I	2839. I	11995.
6I	5438. I	3915. I	9353. I	2826. I	12179.
7I	5646. I	3915. I	9561. I	2731. I	12292.
8I	5873. I	3915. I	9788. I	2556. I	12344.
9I	6167. I	3915. I	10082. I	2652. I	12734.
10I	6509. I	3915. I	10424. I	2760. I	13184.
11I	6902. I	3915. I	10817. I	2889. I	13706.
12I	7362. I	3915. I	11277. I	3036. I	14313.
13I	7900. I	3915. I	11815. I	3207. I	15022.
14I	8537. I	3915. I	12452. I	3404. I	15856.
15I	9293. I	3915. I	13208. I	3634. I	16842.
16I	10187. I	3915. I	14102. I	3899. I	18001.
17I	11251. I	3915. I	15166. I	4206. I	19372.
18I	12518. I	3915. I	16433. I	4557. I	20990.
19I	14029. I	3915. I	17944. I	4967. I	22911.
20I	15825. I	3915. I	19740. I	5349. I	25089.

BPOPP = Civilian resident population
PMIL = Military and military dependent population
PRES = Total resident population
ENCLV = Civilian enclave (nonresident) population
BASPP = Total population (resident and nonresident)

IV. PROJECTED IMPACTS OF THE NORTH ALEUTIAN SHELF SALE

In this portion of the report, we describe the six North Aleutian Shelf OCS sale cases and their projected impacts. Projections of sale impacts are developed by adjusting the non-OCS base case assumptions to include direct OCS impacts (primarily employment) and rerunning the models. The differences between the new projections and the base case projections represent the combined direct and indirect impacts of OCS development. We present tables of both absolute impacts (i.e., increases in employment) and percentage impacts (i.e., percentage changes in employment).

The OCS Sale Cases

We analyze the impacts of six different OCS cases, which we refer to as the low, mean, high, alternative four, mean offshore loading, and alternative four offshore loading cases, respectively. All of these cases assume that some oil and gas resources are discovered and developed. Given this assumption, the low case assumes a level of resources that will occur with 95 percent probability, the mean case assumes a level of resources that will occur with 50 percent probability, and the high case assumes a level of resources that will occur with only 5 percent probability.

For all of the cases, the Alaska OCS office provided estimates of employment in different activities for the exploration, construction, and operations phases of OCS development. This information is reproduced in Appendix C. In order to use these employment figures in the

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MAP and SCIMP models, it was necessary to make assumptions about the share of employees who would be Alaska residents, and the share who would be residents of the Aleutian Islands. These assumptions are discussed in Appendix C. Table 88 presents resident Alaskan OCS employment for each case. These figures were utilized for the MAP model projections. In the mean case, resident Alaskan employment rises from 103 in 1984 to 2,072 in 1989, and then declines to a level of 1,597 in 1994, remaining at this level for the rest of the projection period. In the low case, maximum employment of 597 is reached in 1987, declining to a constant level of 492 after 1992. In the high case, maximum employment is 3,436 in 1990, declining to a constant level of 2,635 after 1996. In the alternative four case and the mean offshore loading cases, employment levels are approximately 80 percent of the mean case levels. In the alternative four offshore loading case, employment levels are approximately 60 percent of the mean case levels.

Tables 89-94 present Aleutian Islands onshore resident and enclave OCS employment associated with each case. These figures were utilized for the SCIMP model projections. In the mean case, local resident employment rises to 161 by 1991, and thereafter remains constant throughout the projection period. Maximum local resident employment is 53 for the low case, 305 for the high case, 127 for the alternative four case, 119 for the mean offshore loading case, and 95 for the alternative four offshore loading case.

TABLE 88. NORTH ALEUTIAN SHELF OCS RESIDENT ALASKAN
EMPLOYMENT ASSUMPTIONS FOR MAP MODEL PROJECTIONS
(Thousands)

Year	Mean Case	Low Case	High Case	Alternative IV Case	Mean Case Offshore Loading	Alternative IV Case Offshore Loading
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.087	0.103	0.087
1984	0.103	0.061	0.158	0.106	0.134	0.106
1985	0.134	0.067	0.205	0.395	0.687	0.395
1986	0.687	0.38	0.19	0.829	1.041	0.829
1987	1.041	0.597	0.664	1.579	1.588	1.444
1988	1.781	0.488	1.619	1.541	1.767	1.347
1989	2.072	0.429	2.715	1.3	1.441	1.101
1990	1.738	0.453	3.348	1.237	1.215	0.958
1991	1.613	0.461	3.436	1.248	1.224	0.968
1992	1.584	0.492	3.132	1.257	1.232	0.977
1993	1.592	0.492	2.611	1.26	1.237	0.98
1994	1.597	0.492	2.623	1.26	1.237	0.98
1995	1.597	0.492	2.63	1.26	1.237	0.98
1996	1.597	0.492	2.635	1.26	1.237	0.98
1997	1.597	0.492	2.635	1.26	1.237	0.98
1998	1.597	0.492	2.635	1.26	1.237	0.98
1999	1.597	0.492	2.635	1.26	1.237	0.98
2000	1.597	0.492	2.635	1.26	1.237	0.98

SOURCE: Alaska OCS Office; residency assumptions presented in Appendix C.

TABLE 89. OCS EMPLOYMENT INPUTS FOR SCIMP MODEL RUNS,
MEAN CASE

Year	Resident Employment	Enclave Employment	Dutch Harbor Enclave Employment	Cold Bay Enclave Employment
I1981I	0. I	0. I	0. I	0. I
I1982I	0. I	0. I	0. I	0. I
I1983I	0. I	0. I	0. I	0. I
I1984I	35. I	180. I	140. I	40. I
I1985I	48. I	266. I	207. I	59. I
I1986I	73. I	319. I	223. I	96. I
I1987I	83. I	311. I	192. I	119. I
I1988I	123. I	530. I	132. I	398. I
I1989I	145. I	733. I	89. I	644. I
I1990I	158. I	660. I	89. I	571. I
I1991I	161. I	630. I	57. I	573. I
I1992I	161. I	463. I	57. I	406. I
I1993I	161. I	463. I	57. I	406. I
I1994I	161. I	463. I	57. I	406. I
I1995I	161. I	463. I	57. I	406. I
I1996I	161. I	463. I	57. I	406. I
I1997I	161. I	463. I	57. I	406. I
I1998I	161. I	463. I	57. I	406. I
I1999I	161. I	463. I	57. I	406. I
I2000I	161. I	463. I	57. I	406. I

SOURCE: Alaska OCS Office (see Appendix C).

TABLE 90. OCS EMPLOYMENT INPUTS FOR SCIMP MODEL RUNS, LOW CASE

Year	Resident Employment	Enclave Employment	Dutch Harbor Enclave Employment	Cold Bay Enclave Employment
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	19.	51.	30.	21.
1985	21.	67.	44.	23.
1986	37.	93.	52.	41.
1987	45.	70.	16.	54.
1988	41.	129.	32.	97.
1989	39.	120.	24.	96.
1990	47.	153.	24.	129.
1991	48.	127.	24.	103.
1992	53.	126.	24.	102.
1993	53.	126.	24.	102.
1994	53.	126.	24.	102.
1995	53.	126.	24.	102.
1996	53.	126.	24.	102.
1997	53.	126.	24.	102.
1998	53.	126.	24.	102.
1999	53.	126.	24.	102.
2000	53.	126.	24.	102.

SOURCE: Alaska OCS Office (see Appendix C).

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TABLE 91 . OCS EMPLOYMENT INPUTS FOR SCIMP MODEL RUNS, HIGH CASE

Year	Resident Employment	Enclave Employment	Dutch Harbor Enclave Employment	Cold Bay Enclave Employment
I1981I	0. I	0. I	0. I	0. I
I1982I	0. I	0. I	0. I	0. I
I1983I	0. I	0. I	0. I	0. I
I1984I	57. I	285. I	222. I	63. I
I1985I	76. I	397. I	309. I	88. I
I1986I	70. I	371. I	289. I	82. I
I1987I	64. I	299. I	208. I	91. I
I1988I	120. I	764. I	200. I	564. I
I1989I	182. I	1428. I	89. I	1339. I
I1990I	272. I	1823. I	114. I	1709. I
I1991I	305. I	1642. I	130. I	1512. I
I1992I	314. I	1453. I	130. I	1323. I
I1993I	272. I	839. I	73. I	766. I
I1994I	272. I	839. I	73. I	766. I
I1995I	272. I	839. I	73. I	766. I
I1996I	272. I	839. I	73. I	766. I
I1997I	272. I	839. I	73. I	766. I
I1998I	272. I	839. I	73. I	766. I
I1999I	272. I	839. I	73. I	766. I
I2000I	272. I	839. I	73. I	766. I

SOURCE: Alaska OCS Office (see Appendix C).

TABLE 92 .   OCS EMPLOYMENT INPUTS FOR SCIMP MODEL RUNS,
ALTERNATIVE FOUR CASE

Year	Resident Employment	Enclave Employment	Dutch Harbor Enclave Employment	Cold Bay Enclave Employment
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	29.	138.	107.	31.
1985	36.	189.	147.	42.
1986	53.	248.	181.	67.
1987	63.	240.	150.	90.
1988	104.	393.	124.	269.
1989	111.	493.	73.	420.
1990	122.	462.	73.	389.
1991	124.	441.	48.	393.
1992	127.	368.	48.	320.
1993	127.	368.	48.	320.
1994	127.	368.	48.	320.
1995	127.	368.	48.	320.
1996	127.	368.	48.	320.
1997	127.	368.	48.	320.
1998	127.	368.	48.	320.
1999	127.	368.	48.	320.
2000	127.	368.	48.	320.

SOURCE: Alaska OCS Office (see Appendix C).

TABLE 93 . OCS EMPLOYMENT INPUTS FOR SCIMP MODEL RUNS, MEAN OFFSHORE LOADING CASE

Year	Resident Employment	Enclave Employment	Dutch Harbor Enclave Employment	Cold Bay Enclave Employment
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	35.	180.	140.	40.
1985	48.	266.	207.	59.
1986	73.	319.	223.	96.
1987	83.	311.	192.	119.
1988	108.	286.	132.	154.
1989	119.	263.	89.	174.
1990	118.	263.	89.	174.
1991	107.	157.	57.	100.
1992	107.	157.	57.	100.
1993	107.	157.	57.	100.
1994	107.	157.	57.	100.
1995	107.	157.	57.	100.
1996	107.	157.	57.	100.
1997	107.	157.	57.	100.
1998	107.	157.	57.	100.
1999	107.	157.	57.	100.
2000	107.	157.	57.	100.

SOURCE: Alaska OCS Office (see Appendix C).

TABLE 94. OCS EMPLOYMENT INPUTS FOR SCIMP MODEL RUNS,
ALTERNATIVE FOUR OFFSHORE LOADING CASE

Year	Resident Employment	Enclave Employment	Dutch Harbor Enclave Employment	Cold Bay Enclave Employment
I1981I	0. I	0. I	0. I	0. I
I1982I	0. I	0. I	0. I	0. I
I1983I	0. I	0. I	0. I	0. I
I1984I	29. I	138. I	107. I	31. I
I1985I	36. I	189. I	147. I	42. I
I1986I	53. I	248. I	181. I	67. I
I1987I	63. I	240. I	150. I	90. I
I1988I	95. I	260. I	124. I	136. I
I1989I	94. I	210. I	73. I	137. I
I1990I	94. I	210. I	73. I	137. I
I1991I	85. I	130. I	48. I	82. I
I1992I	85. I	130. I	48. I	82. I
I1993I	85. I	130. I	48. I	82. I
I1994I	85. I	130. I	48. I	82. I
I1995I	85. I	130. I	48. I	82. I
I1996I	85. I	130. I	48. I	82. I
I1997I	85. I	130. I	48. I	82. I
I1998I	85. I	130. I	48. I	82. I
I1999I	85. I	130. I	48. I	82. I
I2000I	85. I	130. I	48. I	82. I

SOURCE: Alaska OCS Office (see Appendix C).

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In the mean case, enclave employment peaks at 733 in 1989, and falls to a constant level of 463 by 1992. In the low case, peak enclave employment of 153 occurs in 1990, falling to a constant level of 126 by 1992. In the high case, peak enclave employment is 1,823, falling to a constant level of 839 by 1993. For the alternative four, mean offshore loading, and alternative four offshore loading cases, respectively, peak enclave employment is 493, 319, and 260, falling subsequently to constant levels of 368, 157, and 130.

In addition to generating employment, OCS development also results in additional state revenues from property taxes on petroleum industry facilities. Oil and gas property tax assumptions used in the MAP model projections are presented in Table 95. These assumptions are based on estimates of taxable value of OCS facilities provided by the Alaska OCS office.

TABLE 95. NORTH ALEUTIAN SHELF SALE OIL AND GAS PROPERTY TAX
ASSUMPTIONS USED FOR MAP MODEL PROJECTIONS
(Millions of Dollars)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.133	0.133	0.133	0.133	0.	0.
1985	0.133	0.133	0.133	0.133	0.133	0.133
1986	0.133	0.133	0.133	0.133	0.133	0.133
1987	0.133	0.133	0.133	0.133	0.133	0.133
1988	0.133	0.133	0.133	33.737	0.133	0.133
1989	38.898	10.448	0.956	45.784	0.133	0.133
1990	52.81	15.117	74.208	59.035	0.956	0.956
1991	68.113	15.117	97.23	59.035	0.956	0.956
1992	68.113	15.117	109.892	59.035	0.956	0.956
1993	68.113	15.117	109.892	59.035	0.956	0.956
1994	68.113	15.117	109.892	59.035	0.956	0.956
1995	68.113	15.117	109.892	59.035	0.956	0.956
1996	68.113	15.117	109.892	59.035	0.956	0.956
1997	68.113	15.117	109.892	59.035	0.956	0.956
1998	68.113	15.117	109.892	59.035	0.956	0.956
1999	68.113	15.117	109.892	59.035	0.956	0.956
2000	68.113	15.117	109.892	59.035	0.956	0.956

SOURCE: See text.

Statewide Impacts

This section discusses statewide impacts of the North Aleutian Shelf OCS cases, as projected by the MAP statewide model. The accompanying tables present both absolute (numerical) impacts associated with the six OCS cases as well as percentage impacts (the size of the impact as a percentage of the base case projected value of the variables). The impacts result primarily from the employment associated with the OCS sales. Where OCS employment levels are similar between cases, the projected impacts are also similar. Thus, impacts are generally highest for the high case and lowest for the low case. Impacts for the alternative four and mean offshore loading cases are slightly less than for the mean case, and slightly lower still for the alternative four offshore loading case. Our discussion of the impacts will focus on the mean case and the high case. However, the tables permit quick comparison with impacts for the other cases.

POPULATION

As shown in Table 96, the mean case results in a population impact of 9,085 in the year 2000, or a 1.4 percent increase over the base case population. The maximum percentage impact over the base case population is 1.15 percent, in 1989.

The high case population impact is 14,168 in the year 2000, with the maximum percentage impact of 2.5 percent occurring in 1991.

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TABLE 96 .   PROJECTED IMPACT OF NORTH
ALEUTIAN SHELF SALE
STATEWIDE POPULATION
(Thousands)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
A B S O L U T E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.24	0.137	0.378	0.212	0.24	0.212
1985	0.375	0.197	0.61	0.314	0.375	0.314
1986	1.964	1.07	0.755	1.171	1.964	1.171
1987	3.403	1.907	2.066	2.59	3.403	2.59
1988	6.095	2.073	5.024	5.127	5.516	4.72
1989	7.868	2.113	9.059	6.039	6.799	5.341
1990	7.859	2.127	12.082	6.022	6.705	5.264
1991	7.924	2.146	13.84	6.04	6.457	5.055
1992	7.626	2.229	13.926	5.888	6.295	4.923
1993	7.635	2.292	12.953	5.933	6.296	4.939
1994	7.705	2.369	12.702	6.025	6.416	5.04
1995	7.875	2.445	12.599	6.18	6.589	5.179
1996	8.087	2.522	12.769	6.356	6.786	5.333
1997	8.325	2.603	13.052	6.549	6.997	5.499
1998	8.573	2.684	13.402	6.749	7.213	5.669
1999	8.828	2.767	13.78	6.953	7.434	5.842
2000	9.085	2.851	14.168	7.157	7.656	6.017
P E R C E N T A G E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.052	0.03	0.081	0.046	0.052	0.046
1985	0.077	0.04	0.125	0.064	0.077	0.064
1986	0.377	0.205	0.145	0.225	0.377	0.225
1987	0.633	0.355	0.385	0.482	0.633	0.482
1988	1.128	0.384	0.93	0.949	1.021	0.874
1989	1.448	0.389	1.667	1.111	1.251	0.983
1990	1.44	0.39	2.214	1.103	1.229	0.965
1991	1.433	0.388	2.503	1.092	1.168	0.914
1992	1.361	0.398	2.484	1.05	1.123	0.878
1993	1.34	0.402	2.274	1.042	1.105	0.867
1994	1.331	0.409	2.193	1.04	1.108	0.87
1995	1.336	0.415	2.137	1.048	1.118	0.878
1996	1.346	0.42	2.126	1.058	1.13	0.888
1997	1.361	0.425	2.133	1.07	1.143	0.899
1998	1.375	0.43	2.149	1.082	1.157	0.909
1999	1.389	0.435	2.168	1.094	1.17	0.919
2000	1.401	0.439	2.184	1.104	1.18	0.928

SOURCE: MAP Statewide Model Projections.

EMPLOYMENT

Tables 97-100 present projected impacts upon total employment and employment in the basic, services, and government sectors. In the mean case, 7,335 additional jobs occur in 1989, an increase of 2.5 percent in total employment (Table 97). In the high case, 12,758 additional jobs occur in 1991, or an increase of 4.3 percent in total employment.

In 1989, for the mean case, the 2,903 additional basic sector jobs represent an increase of 4.5 percent in basic sector employment (Table 98). In the high case, the 4,304 additional jobs in 1990 represent an increase of 6.7 percent in basic sector employment.

In the mean case, a maximum of 3,679 additional service sector jobs are generated in 1991, an increase of 3.0 percent (Table 99). In the high case, 6,792 additional service sector jobs are generated in 1992, an increase of 5.5 percent.

In the mean case, a maximum of 1,255 additional government jobs are generated in 1990, an increase of 1.2 percent (Table 100). In the high case, 1,882 additional government jobs are generated in 1992, an increase of 1.8 percent.

INCOME, WAGE RATES, AND INFLATION

Tables 101 and 102 present projected impacts on real personal income and per capita personal income. For the mean case, the maximum impact

TABLE 97. PROJECTED IMPACT OF NORTH
ALEUTIAN SHELF SALE
STATEWIDE TOTAL EMPLOYMENT
(Thousands)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case

A B S O L U T E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.221	0.126	0.347	0.192	0.221	0.192
1985	0.375	0.204	0.59	0.314	0.375	0.314
1986	1.909	1.055	0.724	1.143	1.909	1.143
1987	3.281	1.874	1.991	2.5	3.281	2.5
1988	5.784	1.988	4.74	4.88	5.263	4.52
1989	7.335	1.951	8.456	5.653	6.375	5.038
1990	7.213	1.91	11.271	5.544	6.145	4.852
1991	7.031	1.868	12.758	5.36	5.691	4.469
1992	6.504	1.888	12.519	5.027	5.312	4.166
1993	6.281	1.886	11.153	4.895	5.126	4.033
1994	6.14	1.903	10.49	4.827	5.078	4.003
1995	6.123	1.926	10.025	4.83	5.094	4.023
1996	6.152	1.952	9.884	4.868	5.147	4.065
1997	6.214	1.977	9.874	4.92	5.209	4.115
1998	6.287	2.003	9.943	4.981	5.28	4.17
1999	6.37	2.031	10.046	5.048	5.356	4.229
2000	6.454	2.059	10.163	5.115	5.433	4.29

P E R C E N T A G E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.089	0.051	0.14	0.077	0.089	0.077
1985	0.141	0.076	0.221	0.118	0.141	0.118
1986	0.655	0.362	0.248	0.392	0.655	0.392
1987	1.085	0.62	0.658	0.827	1.085	0.827
1988	1.924	0.661	1.577	1.623	1.751	1.504
1989	2.469	0.657	2.846	1.903	2.146	1.696
1990	2.46	0.652	3.845	1.891	2.096	1.655
1991	2.386	0.634	4.329	1.819	1.931	1.516
1992	2.191	0.636	4.218	1.694	1.79	1.404
1993	2.091	0.628	3.713	1.629	1.706	1.342
1994	2.016	0.625	3.444	1.585	1.667	1.314
1995	1.976	0.622	3.236	1.559	1.644	1.299
1996	1.949	0.618	3.132	1.542	1.631	1.288
1997	1.932	0.615	3.071	1.53	1.62	1.28
1998	1.918	0.611	3.033	1.519	1.611	1.272
1999	1.905	0.607	3.005	1.51	1.602	1.265
2000	1.888	0.602	2.973	1.497	1.589	1.255

SOURCE: MAP Statewide Model Projections.

TABLE 98. PROJECTED IMPACT OF NORTH
ALEUTIAN SHELF SALE
STATEWIDE BASIC SECTOR EMPLOYMENT
(Thousands)

A B S O L U T E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.099	0.059	0.157	0.096	0.099	0.096
1985	0.125	0.079	0.214	0.117	0.125	0.117
1986	0.868	0.501	0.22	0.497	0.868	0.497
1987	1.382	0.817	0.836	1.09	1.382	1.09
1988	2.441	0.723	2.145	2.136	2.162	1.943
1989	2.903	0.673	3.756	2.178	2.438	1.882
1990	2.314	0.627	4.304	1.728	2.038	1.568
1991	2.151	0.596	4.297	1.633	1.841	1.445
1992	1.96	0.601	3.718	1.533	1.805	1.42
1993	1.941	0.603	3.172	1.527	1.797	1.419
1994	1.937	0.607	3.097	1.529	1.803	1.424
1995	1.943	0.613	3.061	1.536	1.812	1.433
1996	1.955	0.619	3.063	1.547	1.826	1.443
1997	1.971	0.625	3.074	1.56	1.841	1.455
1998	1.989	0.631	3.096	1.575	1.858	1.468
1999	2.009	0.637	3.123	1.591	1.875	1.482
2000	2.029	0.644	3.152	1.607	1.893	1.496

P E R C E N T A G E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.171	0.102	0.271	0.165	0.171	0.165
1985	0.191	0.121	0.327	0.179	0.191	0.179
1986	1.166	0.673	0.295	0.668	1.166	0.668
1987	1.902	1.124	1.151	1.5	1.902	1.5
1988	3.666	1.087	3.221	3.208	3.248	2.919
1989	4.476	1.037	5.79	3.359	3.758	2.901
1990	3.594	0.973	6.684	2.683	3.165	2.435
1991	3.243	0.898	6.479	2.463	2.777	2.179
1992	2.945	0.903	5.586	2.303	2.712	2.134
1993	2.876	0.893	4.701	2.263	2.663	2.102
1994	2.83	0.887	4.525	2.234	2.634	2.081
1995	2.779	0.877	4.378	2.196	2.592	2.049
1996	2.735	0.866	4.285	2.165	2.555	2.019
1997	2.702	0.856	4.214	2.139	2.524	1.994
1998	2.666	0.846	4.15	2.111	2.49	1.968
1999	2.633	0.835	4.094	2.085	2.458	1.943
2000	2.581	0.819	4.01	2.044	2.408	1.903

SOURCE: MAP Statewide Model Projections.

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case

A B S O L U T E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.113	0.059	0.182	0.09	0.113	0.09
1985	0.208	0.1	0.316	0.162	0.208	0.162
1986	0.916	0.48	0.407	0.559	0.916	0.559
1987	1.496	0.823	0.981	1.149	1.496	1.149
1988	2.682	0.922	2.182	2.221	2.436	2.051
1989	3.419	0.942	3.847	2.63	2.987	2.356
1990	3.643	0.951	5.512	2.843	3.009	2.416
1991	3.679	0.946	6.622	2.801	2.794	2.196
1992	3.432	0.971	6.792	2.643	2.586	2.027
1993	3.313	0.965	6.106	2.566	2.458	1.933
1994	3.198	0.974	5.722	2.507	2.417	1.905
1995	3.182	0.985	5.384	2.504	2.419	1.912
1996	3.192	1.	5.285	2.521	2.445	1.933
1997	3.222	1.012	5.261	2.547	2.477	1.959
1998	3.26	1.026	5.293	2.579	2.514	1.988
1999	3.304	1.041	5.345	2.614	2.555	2.019
2000	3.349	1.056	5.407	2.65	2.596	2.052

P E R C E N T A G E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.116	0.06	0.186	0.092	0.116	0.092
1985	0.195	0.094	0.296	0.152	0.195	0.152
1986	0.775	0.406	0.345	0.473	0.775	0.473
1987	1.215	0.669	0.796	0.933	1.215	0.933
1988	2.157	0.742	1.755	1.786	1.96	1.65
1989	2.76	0.76	3.106	2.124	2.412	1.902
1990	2.997	0.783	4.534	2.339	2.475	1.987
1991	3.009	0.774	5.417	2.292	2.286	1.796
1992	2.78	0.787	5.501	2.141	2.094	1.642
1993	2.633	0.767	4.852	2.04	1.953	1.536
1994	2.493	0.759	4.46	1.954	1.883	1.485
1995	2.427	0.751	4.106	1.909	1.844	1.458
1996	2.377	0.745	3.937	1.878	1.821	1.44
1997	2.344	0.736	3.827	1.852	1.801	1.425
1998	2.314	0.729	3.757	1.831	1.785	1.411
1999	2.288	0.721	3.702	1.811	1.77	1.399
2000	2.259	0.712	3.647	1.788	1.751	1.384

SOURCE: MAP Statewide Model Projections.

TABLE 100.   PROJECTED IMPACT OF NORTH
ALEUTIAN SHELF SALE
STATEWIDE GOVERNMENT EMPLOYMENT
(Thousands)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
A B S O L U T E I M P A C T						---
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.009	0.008	0.009	0.006	0.009	0.006
1985	0.043	0.025	0.059	0.035	0.043	0.035
1986	0.126	0.075	0.097	0.086	0.126	0.086
1987	0.404	0.234	0.174	0.262	0.404	0.262
1988	0.662	0.342	0.414	0.523	0.665	0.526
1989	1.013	0.337	0.853	0.844	0.95	0.8
1990	1.255	0.332	1.456	0.973	1.098	0.868
1991	1.201	0.326	1.839	0.925	1.055	0.828
1992	1.112	0.316	2.009	0.852	0.921	0.718
1993	1.027	0.319	1.875	0.801	0.871	0.681
1994	1.005	0.322	1.671	0.791	0.859	0.674
1995	0.997	0.327	1.58	0.791	0.864	0.679
1996	1.006	0.334	1.537	0.8	0.876	0.689
1997	1.021	0.34	1.539	0.813	0.891	0.701
1998	1.038	0.346	1.554	0.827	0.908	0.714
1999	1.057	0.353	1.578	0.843	0.926	0.728
2000	1.076	0.359	1.603	0.858	0.943	0.741
P E R C E N T A G E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.009	0.008	0.009	0.007	0.009	0.007
1985	0.045	0.026	0.063	0.037	0.045	0.037
1986	0.127	0.076	0.098	0.087	0.127	0.087
1987	0.378	0.219	0.163	0.245	0.378	0.245
1988	0.603	0.312	0.377	0.477	0.606	0.479
1989	0.935	0.311	0.787	0.779	0.876	0.739
1990	1.171	0.31	1.358	0.908	1.024	0.81
1991	1.131	0.308	1.733	0.871	0.994	0.78
1992	1.041	0.296	1.882	0.798	0.863	0.673
1993	0.959	0.298	1.751	0.748	0.813	0.636
1994	0.932	0.298	1.549	0.733	0.796	0.625
1995	0.916	0.301	1.452	0.727	0.794	0.624
1996	0.915	0.303	1.398	0.728	0.797	0.627
1997	0.918	0.306	1.385	0.732	0.802	0.631
1998	0.924	0.308	1.383	0.736	0.808	0.635
1999	0.93	0.31	1.389	0.742	0.815	0.64
2000	0.936	0.312	1.394	0.747	0.82	0.645

SOURCE: MAP Statewide Model Projections.

TABLE 101. PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE
STATEWIDE REAL PERSONAL INCOME
(Millions of 1981 Dollars)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
A B S O L U T E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	12.051	6.359	20.023	11.094	12.051	11.094
1985	16.559	8.426	29.934	14.523	16.559	14.523
1986	110.184	59.246	36.199	64.43	110.184	64.43
1987	166.871	92.699	105.875	131.805	166.871	131.805
1988	289.074	83.996	258.668	249.355	250.73	222.578
1989	343.414	78.148	449.953	257.617	280.078	217.078
1990	286.836	71.691	533.145	215.816	237.207	185.105
1991	270.379	68.297	554.398	202.758	210.641	164.75
1992	236.109	69.051	491.035	182.266	196.324	153.844
1993	230.312	69.453	408.426	179.613	191.855	151.23
1994	226.844	70.578	384.773	178.445	192.633	151.926
1995	228.402	71.789	370.285	180.437	195.051	153.91
1996	231.703	73.262	369.816	183.156	198.418	156.711
1997	235.895	74.918	373.328	186.746	202.543	160.004
1998	240.52	76.473	379.176	190.496	206.801	163.355
1999	245.469	78.098	386.102	194.461	211.277	166.852
2000	250.516	79.762	393.516	198.48	215.828	170.449
P E R C E N T A G E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.162	0.085	0.269	0.149	0.162	0.149
1985	0.193	0.098	0.348	0.169	0.193	0.169
1986	1.104	0.594	0.363	0.646	1.104	0.646
1987	1.674	0.93	1.062	1.322	1.674	1.322
1988	3.094	0.899	2.768	2.669	2.683	2.382
1989	3.761	0.856	4.928	2.822	3.068	2.378
1990	3.193	0.798	5.934	2.402	2.64	2.06
1991	2.958	0.747	6.065	2.218	2.304	1.802
1992	2.55	0.746	5.302	1.968	2.12	1.661
1993	2.436	0.734	4.319	1.899	2.029	1.599
1994	2.348	0.73	3.982	1.847	1.994	1.572
1995	2.306	0.725	3.738	1.822	1.969	1.554
1996	2.28	0.721	3.638	1.802	1.952	1.542
1997	2.262	0.718	3.58	1.791	1.942	1.534
1998	2.245	0.714	3.54	1.778	1.931	1.525
1999	2.231	0.71	3.509	1.767	1.92	1.516
2000	2.209	0.703	3.47	1.75	1.903	1.503

SOURCE: MAP Statewide Model Projections.

TABLE 102. PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE
STATEWIDE REAL PER CAPITA PERSONAL INCOME
(1981 Dollars)

ABSOLUTE IMPACT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	17.645	8.937	30.023	16.555	17.645	16.555
1985	20.367	10.148	39.211	18.375	20.367	18.375
1986	138.738	74.238	41.66	80.426	138.738	80.426
1987	191.871	106.301	125.227	155.145	191.871	155.145
1988	336.117	88.773	314.973	294.602	284.582	258.582
1989	383.16	78.176	538.949	284.207	301.437	232.074
1990	284.434	66.945	599.223	211.484	229.594	178.684
1991	248.52	59.117	574.453	184.105	185.738	145.488
1992	193.801	57.254	454.273	150.043	162.883	128.234
1993	179.414	54.906	331.965	140.957	151.648	120.504
1994	167.484	53.395	292.043	133.172	146.172	116.117
1995	160.848	51.875	263.398	128.602	141.484	112.477
1996	155.812	50.699	250.637	124.547	137.605	109.668
1997	151.566	49.738	241.43	121.488	134.59	107.375
1998	147.512	48.5	233.836	118.293	131.414	104.852
1999	143.727	47.285	227.176	115.297	128.398	102.437
2000	139.371	45.926	219.957	111.82	124.887	99.656

PERCENTAGE IMPACT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.11	0.056	0.187	0.103	0.11	0.103
1985	0.116	0.058	0.223	0.105	0.116	0.105
1986	0.725	0.388	0.218	0.42	0.725	0.42
1987	1.034	0.573	0.675	0.836	1.034	0.836
1988	1.944	0.513	1.822	1.704	1.646	1.495
1989	2.281	0.465	3.208	1.692	1.794	1.381
1990	1.728	0.407	3.64	1.285	1.395	1.085
1991	1.503	0.358	3.475	1.114	1.124	0.88
1992	1.173	0.347	2.75	0.908	0.986	0.776
1993	1.081	0.331	2.	0.849	0.913	0.726
1994	1.004	0.32	1.75	0.798	0.876	0.696
1995	0.957	0.309	1.568	0.765	0.842	0.669
1996	0.921	0.3	1.481	0.736	0.813	0.648
1997	0.889	0.292	1.417	0.713	0.79	0.63
1998	0.859	0.282	1.361	0.689	0.765	0.61
1999	0.83	0.273	1.312	0.666	0.742	0.592
2000	0.797	0.263	1.258	0.639	0.714	0.57

SOURCE: MAP Statewide Model Projections.

on real personal income is $343 million, or 3.7 percent, in 1989. The maximum impact on real personal income is $554 million, or 6.1 percent, in 1991. The maximum mean case impact on real per capita personal income is $383, or 2.3 percent, in 1989; and the maximum high case impact is $599, or 3.6 percent, in 1990.

Table 103 presents projected impacts on real wages and salaries. For the mean case, the maximum projected impact is $289 million, or 4.0 percent, in 1989. For the high case, the maximum projected impact is $462 million, or 6.3 percent, in 1991.

Tables 104-106 present projected impacts on real wage rates in the basic sector, services, and government. The wage rate impacts are highest in the basic sector, with a maximum mean case increase of $1,174 (4.1 percent) in 1989, and a maximum high case increase of $1,819 (6.5 percent) in 1990. In contrast, the maximum mean case impact upon service sector wages is only $168 (0.8 percent) in 1989; while the maximum high case impact upon service sector wages is $316 (1.5 percent) in 1990. Impacts on government wages are very small; the maximum high case impact is less than 0.4 percent.

As shown in Table 107, the projected impacts on the Alaska rate of inflation are insignificant.

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case

A B S O L U T E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	9.855	4.984	16.715	9.09	9.855	9.09
1985	14.75	7.859	26.305	13.105	14.75	13.105
1986	94.004	50.496	30.84	54.996	94.004	54.996
1987	140.938	78.516	90.105	111.57	140.988	111.57
1988	243.672	69.629	219.668	210.551	210.41	187.5
1989	288.582	64.34	382.082	216.086	233.531	181.012
1990	237.273	59.023	448.969	177.965	195.492	152.324
1991	222.168	55.691	462.332	166.215	172.113	134.566
1992	192.672	56.34	405.027	148.738	160.254	125.535
1993	187.832	56.551	333.566	146.496	156.605	123.371
1994	184.984	57.547	313.809	145.633	157.277	124.059
1995	186.453	58.684	301.969	147.176	159.281	125.824
1996	189.023	59.902	301.855	149.578	162.211	128.145
1997	192.461	61.098	304.594	152.359	165.422	130.684
1998	196.254	62.379	309.418	155.441	168.934	133.437
1999	200.309	63.715	315.113	158.684	172.602	136.316
2000	204.453	65.07	321.184	162.	176.332	139.266

P E R C E N T A G E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.153	0.166	0.153
1984	0.166	0.084	0.282	0.19	0.214	0.19
1985	0.214	0.114	0.381	0.68	1.162	0.68
1986	1.162	0.624	0.381	1.387	1.752	1.387
1987	1.752	0.976	1.12	2.816	2.814	2.508
1988	3.259	0.931	2.938	2.964	3.204	2.483
1989	3.959	0.883	5.241	2.482	2.727	2.125
1990	3.309	0.823	6.262	2.276	2.357	1.842
1991	3.042	0.763	6.33	2.009	2.164	1.695
1992	2.602	0.761	5.47	1.936	2.069	1.63
1993	2.482	0.747	4.408	1.882	2.032	1.603
1994	2.39	0.744	4.055	1.854	2.006	1.585
1995	2.348	0.739	3.803	1.835	1.99	1.572
1996	2.318	0.735	3.702	1.82	1.976	1.561
1997	2.299	0.73	3.639	1.806	1.963	1.551
1998	2.281	0.725	3.596	1.794	1.951	1.541
1999	2.265	0.72	3.563	1.776	1.933	1.527
2000	2.241	0.713	3.521			

SOURCE: MAP Statewide Model Projections.

TABLE 104. PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE STATEWIDE REAL WAGE RATE IN BASIC SECTOR (1981 Dollars)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
A B S O L U T E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	50.578	23.035	91.59	51.02	50.578	51.02
1985	45.414	25.371	101.531	47.113	45.414	47.113
1986	322.191	170.555	84.863	184.078	322.191	184.078
1987	475.969	260.285	317.078	394.84	475.969	394.84
1988	1013.36	225.672	1021.39	911.223	822.609	777.781
1989	1173.7	199.66	1802.45	854.82	864.066	655.262
1990	704.297	161.195	1819.28	496.422	561.648	419.711
1991	546.926	125.852	1499.51	393.422	406.512	316.648
1992	399.422	125.391	1001.81	311.777	393.98	310.895
1993	392.039	124.941	642.059	310.977	395.398	314.93
1994	392.852	126.812	603.422	313.18	403.914	321.359
1995	394.613	127.059	591.496	314.391	404.98	322.098
1996	397.625	127.871	600.395	316.715	407.422	324.016
1997	401.941	129.086	608.176	320.082	411.25	327.
1998	404.418	129.812	612.43	321.91	413.238	328.488
1999	407.449	130.73	617.453	324.281	415.918	330.645
2000	405.488	130.133	614.687	322.695	413.73	328.793
P E R C E N T A G E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.175	0.08	0.318	0.177	0.175	0.177
1985	0.134	0.075	0.299	0.139	0.134	0.139
1986	0.842	0.446	0.222	0.481	0.842	0.481
1987	1.356	0.742	0.903	1.125	1.356	1.125
1988	3.416	0.761	3.443	3.071	2.773	2.622
1989	4.14	0.704	6.358	3.015	3.048	2.311
1990	2.526	0.578	6.526	1.781	2.015	1.506
1991	1.913	0.44	5.246	1.376	1.422	1.108
1992	1.395	0.438	3.499	1.089	1.376	1.086
1993	1.357	0.432	2.222	1.076	1.369	1.09
1994	1.352	0.436	2.077	1.078	1.39	1.106
1995	1.349	0.434	2.022	1.075	1.384	1.101
1996	1.353	0.435	2.042	1.077	1.386	1.102
1997	1.362	0.438	2.061	1.085	1.394	1.108
1998	1.363	0.438	2.065	1.085	1.393	1.107
1999	1.368	0.439	2.073	1.089	1.397	1.11
2000	1.353	0.434	2.051	1.076	1.38	1.097

SOURCE: MAP Statewide Model Projections.

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TABLE 105. PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE STATEWIDE REAL WAGE RATE IN SERVICES SECTOR (1981 Dollars)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
A B S O L U T E I M P A C T						
1980	0.	0.	0.	0.	0.	
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	12.5	4.285	24.031	11.086	12.5	0.
1985	14.316	4.777	30.062	11.906	14.316	11.086
1986	84.629	37.918	29.77	49.227	84.629	11.906
1987	83.086	37.711	72.254	74.617	83.086	49.227
1988	163.305	24.566	176.352	143.363	122.441	74.617
1989	168.137	18.902	298.141	116.102	106.73	114.867
1990	99.191	12.012	316.031	72.184	51.465	77.
1991	82.156	7.113	286.937	53.363	19.18	42.145
1992	34.82	7.559	191.762	24.074	1.871	12.773
1993	29.176	5.441	91.129	20.809	-5.352	0.211
1994	20.27	5.539	64.801	15.746	-6.035	-4.078
1995	20.496	5.535	44.328	15.902	-6.051	-4.699
1996	20.332	5.582	44.402	15.844	-5.828	-4.691
1997	20.363	5.617	43.437	15.844	-5.695	-4.535
1998	20.207	5.621	43.125	15.781	-5.582	-4.363
1999	20.082	5.562	42.715	15.668	-5.539	-4.289
2000	19.941	5.543	42.375	15.562	-5.437	-4.242
						-4.176
P E R C E N T A G E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.059	0.02	0.114	0.052	0.059	0.052
1985	0.064	0.021	0.134	0.053	0.064	0.053
1986	0.36	0.161	0.127	0.209	0.36	0.209
1987	0.367	0.167	0.319	0.33	0.367	0.33
1988	0.755	0.114	0.815	0.663	0.566	0.531
1989	0.789	0.089	1.399	0.545	0.501	0.361
1990	0.472	0.057	1.503	0.343	0.245	0.2
1991	0.39	0.034	1.361	0.253	0.091	0.061
1992	0.165	0.036	0.908	0.114	0.009	0.001
1993	0.137	0.026	0.429	0.098	-0.025	-0.019
1994	0.095	0.026	0.304	0.074	-0.028	-0.022
1995	0.096	0.026	0.207	0.074	-0.028	-0.022
1996	0.095	0.026	0.207	0.074	-0.027	-0.021
1997	0.094	0.026	0.201	0.073	-0.026	-0.02
1998	0.093	0.026	0.199	0.073	-0.026	-0.02
1999	0.092	0.026	0.196	0.072	-0.025	-0.02
2000	0.091	0.025	0.194	0.071	-0.025	-0.019

SOURCE: MAP Statewide Model Projections.

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case

A B S O L U T E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	2.766	1.129	5.129	2.648	2.766	2.648
1985	3.227	1.652	6.473	2.984	3.227	2.984
1986	18.176	9.348	5.754	10.535	18.176	10.535
1987	26.172	13.879	17.629	21.449	26.172	21.449
1988	50.664	10.621	52.082	45.113	40.281	37.863
1989	56.719	9.344	89.148	40.117	40.445	29.699
1990	34.332	7.91	88.742	24.027	25.859	19.207
1991	30.527	6.789	73.449	22.148	21.496	16.898
1992	19.875	6.387	48.453	15.625	16.949	13.234
1993	19.66	6.203	29.34	15.418	16.434	12.895
1994	18.891	6.117	28.75	14.891	15.992	12.551
1995	18.473	5.934	27.457	14.52	15.531	12.207
1996	17.816	5.746	26.746	14.07	15.043	11.766
1997	17.242	5.48	25.758	13.562	14.453	11.297
1998	16.566	5.258	24.789	13.02	13.871	10.836
1999	15.84	5.035	23.719	12.461	13.227	10.328
2000	14.988	4.742	22.457	11.797	12.48	9.75

P E R C E N T A G E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.012	0.005	0.022	0.011	0.012	0.011
1985	0.013	0.007	0.027	0.012	0.013	0.012
1986	0.073	0.037	0.023	0.042	0.073	0.042
1987	0.103	0.055	0.069	0.084	0.103	0.084
1988	0.198	0.041	0.203	0.176	0.157	0.148
1989	0.218	0.036	0.343	0.154	0.156	0.114
1990	0.13	0.03	0.337	0.091	0.098	0.073
1991	0.114	0.025	0.275	0.083	0.081	0.063
1992	0.073	0.024	0.179	0.058	0.063	0.049
1993	0.071	0.023	0.107	0.056	0.06	0.047
1994	0.068	0.022	0.103	0.053	0.057	0.045
1995	0.065	0.021	0.097	0.051	0.055	0.043
1996	0.062	0.02	0.093	0.049	0.052	0.041
1997	0.059	0.019	0.088	0.046	0.049	0.039
1998	0.056	0.018	0.083	0.044	0.047	0.036
1999	0.052	0.017	0.078	0.041	0.044	0.034
2000	0.049	0.015	0.073	0.038	0.041	0.032

SOURCE: MAP Statewide Model Projections.

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TABLE 107. PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE
ALASKA RATE OF INFLATION

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case

A B S O L U T E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.	-0.	0.	0.	0.	0.
1985	0.	0.	0.	0.	0.	0.
1986	0.	0.	0.	0.	0.	0.
1987	0.	0.	0.	0.	0.	0.
1988	0.	0.	0.	0.	0.	0.
1989	0.001	0.	0.001	0.	0.	0.
1990	0.	0.	0.001	0.	0.	0.
1991	0.	0.	0.001	0.	0.	0.
1992	0.	-0.	0.	0.	0.	0.
1993	0.	0.	0.	0.	0.	0.
1994	0.	0.	0.	0.	0.	0.
1995	0.	0.	0.	0.	0.	0.
1996	0.	0.	0.	0.	0.	0.
1997	0.	0.	0.	0.	0.	0.
1998	0.	0.	0.	0.	0.	0.
1999	0.	0.	0.	0.	0.	0.
2000	0.	0.	0.	0.	0.	0.

P E R C E N T A G E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.	-0.024	0.043	0.011	0.	0.011
1985	0.028	0.015	0.111	0.041	0.028	0.041
1986	0.083	0.013	0.075	0.053	0.083	0.053
1987	0.209	0.068	0.087	0.14	0.209	0.14
1988	0.503	0.127	0.64	0.44	0.304	0.301
1989	0.873	0.116	1.414	0.667	0.446	0.389
1990	0.432	0.057	1.366	0.23	0.256	0.151
1991	0.306	0.014	1.118	0.196	0.147	0.124
1992	0.178	-0.003	0.717	0.115	0.13	0.104
1993	0.089	0.005	0.454	0.057	0.074	0.054
1994	0.066	0.001	0.241	0.039	0.032	0.023
1995	0.04	0.004	0.198	0.024	0.021	0.016
1996	0.029	0.006	0.107	0.02	0.017	0.013
1997	0.019	0.004	0.065	0.013	0.012	0.01
1998	0.018	0.005	0.044	0.013	0.011	0.009
1999	0.016	0.003	0.035	0.012	0.01	0.009
2000	0.02	0.005	0.04	0.016	0.015	0.012

SOURCE: MAP Statewide Model Projections.

GOVERNMENT REVENUES, EXPENDITURES, AND THE

PERMANENT FUND BALANCE

As shown in Table 108, the OCS cases have relatively little impact upon state revenues. The maximum mean case impact is $34 million (0.4 percent); the maximum high case impact is $49 million (0.6 percent); both occur in 1991. As shown in Table 109, year 2000 state government interest earnings decline by $22 million (1.0 percent) in the mean case and by $35 million (1.8 percent) in the high case. These declines reflect the impacts of increased government expenditures upon the permanent fund balance. As shown in Table 110, total state government expenditures in the year 2000 increase by $74 million (1.2 percent) in the mean case and $106 million (1.7 percent) in the high case, as a result of the higher state population. However, as shown in Table 111, state government per capita expenditures decline slightly, with the maximum high case decline of $44 (0.5 percent) in 2000.

As shown in Table 112, the decrease in the year 2000 permanent fund balance is $340 million (1.3 percent) for the mean case, and $555 million (1.3 percent) for the high case. On a per capita basis, the declines are more significant. As shown in Table 113, the year 2000 decrease is $1,079 per person (2.7 percent) for the mean case and $1,704 per person (4.2 percent) for the high case.

TABLE 108.   PROJECTED IMPACT OF NORTH
ALEUTIAN SHELF SALE
TOTAL STATE GENERAL FUND REVENUES
(Millions of 1981 Dollars)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
A B S O L U T E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.613	0.504	0.699	0.5	0.613	0.5
1985	0.891	0.645	0.809	0.621	0.891	0.621
1986	4.117	2.621	0.715	2.305	4.117	2.305
1987	7.137	4.715	3.113	5.219	7.137	5.219
1988	10.238	4.32	6.516	27.898	10.074	8.555
1989	28.637	8.25	7.004	31.801	9.707	7.488
1990	31.453	9.398	41.883	35.41	6.371	4.855
1991	34.191	8.551	48.937	32.258	2.477	1.738
1992	29.914	7.953	48.266	29.156	-1.25	-1.242
1993	25.895	7.203	38.098	26.289	-4.449	-3.691
1994	23.398	6.602	31.895	24.492	-6.422	-5.184
1995	21.488	6.004	27.535	23.07	-8.016	-6.41
1996	19.641	5.359	24.117	21.625	-9.664	-7.687
1997	17.309	4.613	20.191	19.805	-11.664	-9.246
1998	15.238	3.875	17.219	18.164	-13.527	-10.695
1999	13.141	3.117	14.375	16.492	-15.441	-12.195
2000	10.945	2.309	11.441	14.727	-17.469	-13.773
P E R C E N T A G E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.01	0.009	0.012	0.009	0.01	0.009
1985	0.013	0.01	0.012	0.009	0.013	0.009
1986	0.055	0.035	0.01	0.031	0.055	0.031
1987	0.089	0.059	0.039	0.065	0.089	0.065
1988	0.129	0.055	0.082	0.353	0.127	0.108
1989	0.339	0.098	0.083	0.376	0.115	0.089
1990	0.388	0.116	0.516	0.437	0.079	0.06
1991	0.438	0.11	0.628	0.414	0.032	0.022
1992	0.397	0.105	0.64	0.387	-0.017	-0.016
1993	0.337	0.094	0.496	0.343	-0.058	-0.048
1994	0.317	0.089	0.431	0.331	-0.087	-0.07
1995	0.307	0.086	0.393	0.329	-0.114	-0.091
1996	0.294	0.08	0.361	0.323	-0.144	-0.115
1997	0.262	0.07	0.306	0.3	-0.177	-0.14
1998	0.24	0.061	0.271	0.286	-0.213	-0.168
1999	0.216	0.051	0.237	0.271	-0.254	-0.201
2000	0.189	0.04	0.198	0.254	-0.302	-0.238

SOURCE: MAP Statewide Model Projections.

TABLE 109. PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE
STATE GOVERNMENT INTEREST EARNINGS
(Millions of 1981 Dollars)

ABSOLUTE IMPACT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.	0.011	-0.02	-0.005	0.	-0.005
1985	-0.077	-0.026	-0.19	-0.083	-0.077	-0.083
1986	-0.242	-0.084	-0.431	-0.211	-0.242	-0.211
1987	-1.027	-0.463	-0.746	-0.695	-1.027	-0.695
1988	-2.617	-1.192	-2.091	-1.98	-2.427	-1.847
1989	-5.731	-1.993	-5.488	-3.199	-4.837	-3.938
1990	-7.665	-2.407	-10.57	-3.951	-7.494	-5.949
1991	-9.189	-2.671	-13.956	-4.425	-10.083	-8.002
1992	-10.281	-2.96	-16.773	-4.99	-12.729	-10.08
1993	-11.109	-3.306	-19.103	-5.415	-15.04	-11.879
1994	-12.129	-3.708	-21.118	-6.012	-17.357	-13.688
1995	-13.276	-4.182	-23.242	-6.737	-19.722	-15.543
1996	-14.573	-4.723	-25.333	-7.605	-22.147	-17.446
1997	-16.034	-5.323	-27.567	-8.624	-24.652	-19.408
1998	-17.719	-5.99	-30.074	-9.83	-27.269	-21.458
1999	-19.596	-6.719	-32.827	-11.202	-29.985	-23.586
2000	-21.68	-7.517	-35.851	-12.749	-32.822	-25.806

PERCENTAGE IMPACT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.	0.002	-0.004	-0.001	0.	-0.001
1985	-0.011	-0.004	-0.028	-0.012	-0.011	-0.012
1986	-0.028	-0.01	-0.05	-0.025	-0.028	-0.025
1987	-0.098	-0.044	-0.071	-0.066	-0.098	-0.066
1988	-0.21	-0.095	-0.168	-0.159	-0.194	-0.148
1989	-0.406	-0.141	-0.389	-0.227	-0.343	-0.279
1990	-0.478	-0.15	-0.659	-0.246	-0.467	-0.371
1991	-0.521	-0.152	-0.792	-0.251	-0.572	-0.454
1992	-0.544	-0.157	-0.888	-0.264	-0.674	-0.534
1993	-0.558	-0.166	-0.96	-0.272	-0.756	-0.597
1994	-0.581	-0.178	-1.012	-0.288	-0.832	-0.656
1995	-0.617	-0.194	-1.081	-0.313	-0.917	-0.723
1996	-0.67	-0.217	-1.165	-0.35	-1.019	-0.802
1997	-0.741	-0.246	-1.274	-0.399	-1.139	-0.897
1998	-0.829	-0.28	-1.407	-0.46	-1.275	-1.004
1999	-0.939	-0.322	-1.574	-0.537	-1.437	-1.131
2000	-1.08	-0.374	-1.786	-0.635	-1.635	-1.286

SOURCE: MAP Statewide Model Projections.

TABLE 110. PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE
TOTAL STATE GOVERNMENT EXPENDITURES
(Millions of 1981 Dollars)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
A B S O L U T E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	1.726	1.029	2.642	1.491	1.726	1.491
1985	2.848	1.607	4.275	2.331	2.848	2.331
1986	15.23	8.535	5.367	9.02	15.23	9.02
1987	28.148	16.254	16.758	21.391	28.148	21.391
1988	51.535	17.801	41.449	43.336	47.035	40.246
1989	63.586	17.703	71.691	48.609	56.203	43.887
1990	63.824	17.738	92.656	49.102	55.824	43.836
1991	63.836	17.801	102.625	48.898	55.09	43.074
1992	57.687	18.168	102.277	44.949	49.512	38.512
1993	57.703	18.762	92.691	45.324	49.496	38.625
1994	58.559	19.605	90.422	46.395	50.859	39.777
1995	60.434	20.496	89.484	48.027	52.75	41.328
1996	62.766	21.406	91.434	50.07	55.062	43.109
1997	65.484	22.316	94.484	52.23	57.461	44.973
1998	68.301	23.301	98.262	54.52	60.004	46.961
1999	71.293	24.332	102.426	56.934	62.668	49.039
2000	74.242	25.348	106.613	59.309	65.309	51.109
P E R C E N T A G E I M P A C T						
1980	0.	0.		0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.04
1984	0.046	0.027	0:07	0.04	0.046	0.059
1985	0.072	0.04	0.108	0.059	0.072	0.207
1986	0.349	0.196	0.123	0.207	0.349	0.437
1987	0.575	0.332	0.342	0.437	0.575	0.792
1988	1.014	0.35	0.816	0.853	0.925	0.872
1989	1.263	0.352	1.425	0.966	1.117	0.879
1990	1.28	0.356	1.859	0.985	1.12	0.867
1991	1.285	0.358	2.066	0.984	1.109	0.776
1992	1.162	0.366	2.06	0.905	0.997	0.763
1993	1.139	0.37	1.83	0.895	0.977	0.765
1994	1.127	0.377	1.74	0.893	0.979	0.774
1995	1.132	0.384	1.676	0.899	0.988	0.783
1996	1.14	0.389	1.661	0.91	1.	0.792
1997	1.154	0.393	1.665	0.92	1.013	0.803
1998	1.167	0.398	1.679	0.932	1.026	0.812
1999	1.181	0.403	1.697	0.943	1.038	0.82
2000	1.192	0.407	1.711	0.952	1.048	

SOURCE: MAP Statewide Model Projections.

TABLE 111. PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE
PER CAPITA STATE EXPENDITURES (1981 Dollars)

A B S O L U T E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	-0.465	-0.184	-0.898	-0.48	-0.465	-0.48
1985	-0.387	0.023	-1.371	-0.449	-0.387	-0.449
1986	-2.344	-0.816	-1.84	-1.516	-2.344	-1.516
1987	-5.285	-2.086	-3.84	-4.086	-5.285	-4.086
1988	-10.605	-3.129	-10.652	-8.953	-8.879	-7.621
1989	-16.832	-3.422	-22.094	-13.32	-12.289	-10.156
1990	-14.383	-3.082	-31.734	-10.695	-9.805	-7.703
1991	-13.082	-2.664	-38.273	-9.574	-5.195	-4.18
1992	-17.344	-2.801	-36.645	-12.703	-11.	-8.996
1993	-17.633	-2.828	-38.574	-12.891	-11.254	-9.203
1994	-18.035	-2.844	-39.809	-13.102	-11.461	-9.332
1995	-18.238	-2.789	-40.914	-13.34	-11.633	-9.391
1996	-18.645	-2.832	-41.699	-13.469	-11.727	-9.516
1997	-18.91	-2.961	-42.504	-13.754	-12.004	-9.754
1998	-19.207	-3.	-43.16	-13.969	-12.168	-9.898
1999	-19.492	-3.059	-43.828	-14.172	-12.355	-10.055
2000	-19.793	-3.121	-44.473	-14.398	-12.539	-10.215

P E R C E N T A G E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	-0.006	-0.002	-0.011	-0.006	-0.006	-0.006
1985	-0.005	0.	-0.017	-0.006	-0.005	-0.006
1986	-0.028	-0.01	-0.022	-0.018	-0.028	-0.018
1987	-0.058	-0.023	-0.042	-0.045	-0.058	-0.045
1988	-0.113	-0.033	-0.113	-0.095	-0.094	-0.081
1989	-0.182	-0.037	-0.239	-0.144	-0.133	-0.11
1990	-0.157	-0.034	-0.347	-0.117	-0.107	-0.084
1991	-0.146	-0.03	-0.426	-0.107	-0.058	-0.047
1992	-0.196	-0.032	-0.414	-0.143	-0.124	-0.102
1993	-0.198	-0.032	-0.434	-0.145	-0.127	-0.104
1994	-0.201	-0.032	-0.444	-0.146	-0.128	-0.104
1995	-0.201	-0.031	-0.452	-0.147	-0.128	-0.104
1996	-0.203	-0.031	-0.455	-0.147	-0.128	-0.104
1997	-0.204	-0.032	-0.458	-0.148	-0.129	-0.105
1998	-0.205	-0.032	-0.46	-0.149	-0.13	-0.105
1999	-0.205	-0.032	-0.461	-0.149	-0.13	-0.106
2000	-0.206	-0.032	-0.463	-0.15	-0.131	-0.106

SOURCE: MAP Statewide Model Projections.

TABLE 112. PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE
ACCUMULATED PERMANENT FUND BALANCE
(Millions of 1981 Dollars)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
ABSOLUTE IMPACT						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	-0.883	-0.262	-1.816	-0.852	-0.883	-0.852
1985	-2.582	-1.094	-5.32	-2.453	-2.582	-2.453
1986	-12.121	-5.836	-9.492	-8.191	-12.121	-8.191
1987	-30.387	-15.301	-20.937	-22.16	-30.387	-22.16
1988	-68.094	-26.637	-56.102	-35.031	-62.016	-50.055
1989	-101.074	-33.289	-125.914	-51.566	-102.199	-81.965
1990	-124.211	-37.703	-176.	-58.445	-140.668	-111.453
1991	-141.801	-42.164	-222.117	-67.77	-178.586	-141.363
1992	-155.168	-46.918	-259.719	-74.863	-212.602	-167.961
1993	-170.156	-52.762	-292.461	-83.695	-246.551	-194.453
1994	-187.016	-59.477	-323.492	-94.352	-280.551	-221.082
1995	-205.809	-67.18	-355.332	-106.855	-315.332	-248.352
1996	-226.969	-75.828	-388.312	-121.621	-351.305	-276.535
1997	-251.129	-85.336	-424.707	-138.91	-388.781	-305.887
1998	-278.102	-95.801	-464.406	-158.598	-427.711	-336.379
1999	-307.844	-107.18	-507.637	-180.68	-468.172	-368.059
2000	-340.391	-119.508	-554.559	-205.129	-510.301	-401.02
PERCENTAGE IMPACT						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	-0.01	-0.003	-0.02	-0.01	-0.01	-0.01
1985	-0.022	-0.01	-0.046	-0.021	-0.022	-0.021
1986	-0.085	-0.041	-0.067	-0.058	-0.085	-0.058
1987	-0.18	-0.09	-0.124	-0.131	-0.18	-0.131
1988	-0.354	-0.138	-0.291	-0.182	-0.322	-0.26
1989	-0.46	-0.151	-0.572	-0.234	-0.465	-0.373
1990	-0.513	-0.156	-0.726	-0.241	-0.581	-0.46
1991	-0.545	-0.162	-0.853	-0.26	-0.686	-0.543
1992	-0.565	-0.171	-0.945	-0.272	-0.774	-0.611
1993	-0.589	-0.183	-1.013	-0.29	-0.854	-0.673
1994	-0.628	-0.2	-1.086	-0.317	-0.942	-0.742
1995	-0.683	-0.223	-1.179	-0.355	-1.046	-0.824
1996	-0.756	-0.253	-1.294	-0.405	-1.171	-0.922
1997	-0.847	-0.288	-1.432	-0.468	-1.311	-1.032
1998	-0.961	-0.331	-1.605	-0.548	-1.478	-1.163
1999	-1.106	-0.385	-1.825	-0.649	-1.683	-1.323
2000	-1.292	-0.454	-2.105	-0.779	-1.937	-1.522

SOURCE: MAP Statewide Model Projections.

TABLE 113.   PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE PER CAPITA ACCUMULATED PERMANENT FUND BALANCE (1981 Dollars)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
A B S O L U T E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	-11.836	-6.262	-19.555	-10.605	-11.836	-10.605
1985	-23.203	-11.652	-40.035	-20.059	-23.203	-20.059
1986	-125.523	-67.	-57.625	-76.801	-125.523	-76.801
1987	-254.504	-139.855	-159.555	-192.203	-254.504	-192.203
1988	-521.969	-185.238	-431.047	-399.016	-473.574	-400.324
1989	-761.	-217.816	-891.605	-538.711	-685.898	-543.293
1990	-854.793	-241.207	-1277.35	-590.574	-793.582	-626.504
1991	-917.828	-257.957	-1541.35	-629.828	-862.535	-679.766
1992	-931.008	-277.512	-1640.22	-641.66	-919.34	-723.719
1993	-365.305	-295.457	-1629.24	-667.977	-982.363	-774.25
1994	-993.957	-311.809	-1650.41	-690.754	-1042.63	-822.207
1995	-1018.13	-324.531	-1659.41	-709.484	-1093.82	-862.625
1996	-1036.52	-334.602	-1672.86	-723.434	-1136.4	-896.008
1997	-1055.41	-344.125	-1691.67	-737.77	-1176.05	-927.035
1998	-1069.21	-351.812	-1705.35	-748.418	-1208.64	-952.598
1999	-1077.56	-357.699	-1710.9	-754.98	-1234.32	-972.609
2000	-1078.59	-361.164	-1704.95	-756.121	-1251.42	-985.93
P E R C E N T A G E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	-0.051	-0.032	-0.101	-0.055	-0.061	-0.055
1985	-0.099	-0.05	-0.171	-0.086	-0.099	-0.086
1986	-0.461	-0.246	-0.211	-0.282	-0.461	-0.282
1987	-0.808	-0.444	-0.506	-0.61	-0.808	-0.61
1988	-1.465	-0.52	-1.21	-1.12	-1.329	-1.124
1989	-1.88	-0.538	-2.203	-1.331	-1.695	-1.342
1990	-1.925	-0.543	-2.877	-1.33	-1.787	-1.411
1991	-1.95	-0.548	-3.274	-1.338	-1.832	-1.444
1992	-1.899	-0.566	-3.346	-1.309	-1.876	-1.477
1993	-1.904	-0.583	-3.214	-1.318	-1.938	-1.527
1994	-1.933	-0.606	-3.209	-1.343	-2.027	-1.599
1995	-1.992	-0.635	-3.247	-1.388	-2.14	-1.688
1996	-2.075	-0.67	-3.349	-1.448	-2.275	-1.794
1997	-2.178	-0.71	-3.491	-1.522	-2.427	-1.913
1998	-2.304	-0.758	-3.676	-1.613	-2.605	-2.053
1999	-2.461	-0.817	-3.908	-1.725	-2.819	-2.222
2000	-2.656	-0.889	-4.198	-1.862	-3.081	-2.428

SOURCE: MAP Statewide Model Projections.

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Regional Impacts: Anchorage

Table 114 presents projected impacts on Anchorage population. The year 2000 population increases by 4,358 (1.5 percent) in the mean case and by 6,847 (2.4 percent) in the high case.

Table 115 presents projected impacts on the Anchorage employment. In the mean case, the maximum increase in employment is 3,167 (2.3 percent) in 1990; in the high case, the maximum increase in employment is 5,594 (4.1 percent) in 1991.

Regional Impacts: Bristol Bay

Projected impacts of the North Aleutian Shelf OCS sales in Bristol Bay, shown in Tables 116 and 117, are very small. The maximum population increases projected for the mean and high cases, respectively, are 26 and 38 (0.4 percent and 0.6 percent) in the year 2000. The maximum employment increases projected for these two cases are 41 (0.9 percent) and 68 (1.5 percent), in 1990 and 1992, respectively. These population and employment impacts are results of increased levels of activity in the statewide economy, rather than direct results of OCS activity.

TABLE 114. PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE ANCHORAGE POPULATION
(Thousands)

A B S O L U T E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.116	0.064	0.187	0.104	0.116	0.104
1985	0.181	0.096	0.3	0.154	0.181	0.154
1986	1.009	0.547	0.377	0.6	1.009	0.6
1987	1.659	0.93	1.042	1.281	1.659	1.281
1988	3.009	0.986	2.516	2.532	2.693	2.312
1989	3.83	1.02	4.523	2.915	3.275	2.556
1990	3.741	1.016	5.903	2.873	3.184	2.512
1991	3.816	1.025	6.75	2.904	3.082	2.416
1992	3.654	1.069	6.742	2.828	3.032	2.38
1993	3.678	1.094	6.278	2.866	3.036	2.396
1994	3.702	1.132	6.174	2.905	3.095	2.446
1995	3.782	1.168	6.098	2.978	3.175	2.51
1996	3.878	1.204	6.181	3.061	3.267	2.583
1997	3.993	1.243	6.309	3.153	3.368	2.662
1998	4.113	1.283	6.478	3.25	3.473	2.745
1999	4.234	1.322	6.658	3.347	3.578	2.827
2000	4.358	1.362	6.847	3.445	3.685	2.911

P E R C E N T A G E   I M P A C T

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.057	0.032	0.092	0.051	0.057	0.051
1985	0.086	0.046	0.143	0.073	0.086	0.073
1986	0.458	0.248	0.171	0.272	0.458	0.272
1987	0.72	0.404	0.452	0.556	0.72	0.556
1988	1.267	0.415	1.06	1.066	1.134	0.974
1989	1.599	0.426	1.888	1.217	1.367	1.067
1990	1.56	0.424	2.462	1.198	1.328	1.048
1991	1.57	0.422	2.778	1.195	1.268	0.994
1992	1.485	0.435	2.741	1.15	1.233	0.968
1993	1.471	0.438	2.511	1.146	1.214	0.958
1994	1.456	0.445	2.428	1.143	1.217	0.962
1995	1.46	0.451	2.354	1.15	1.226	0.969
1996	1.47	0.456	2.342	1.16	1.238	0.979
1997	1.485	0.462	2.346	1.173	1.252	0.99
1998	1.5	0.468	2.362	1.185	1.266	1.001
1999	1.514	0.473	2.381	1.197	1.28	1.011
2000	1.526	0.477	2.397	1.206	1.29	1.019

SOURCE: MAP Regional Model Projections.

TABLE 115. PROJECTED IMPACT OF NORTH ALEUTIAN SHELF SALE ANCHORAGE TOTAL EMPLOYMENT
(Thousands)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
A B S O L U T E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.085	0.047	0.137	0.075	0.085	0.075
1985	0.153	0.085	0.246	0.131	0.153	0.131
1986	0.812	0.446	0.32	0.488	0.812	0.488
1987	1.389	0.792	0.854	1.06	1.389	1.06
1988	2.499	0.869	2.027	2.089	2.265	1.928
1989	3.191	0.876	3.655	2.46	2.763	2.187
1990	3.167	0.844	4.865	2.446	2.705	2.15
1991	3.136	0.823	5.594	2.387	2.548	2.002
1992	2.875	0.828	5.531	2.221	2.375	1.867
1993	2.778	0.826	4.992	2.167	2.288	1.807
1994	2.707	0.836	4.677	2.134	2.268	1.796
1995	2.701	0.848	4.438	2.137	2.278	1.807
1996	2.717	0.862	4.375	2.158	2.306	1.83
1997	2.752	0.875	4.372	2.187	2.34	1.857
1998	2.792	0.89	4.413	2.221	2.379	1.887
1999	2.837	0.905	4.47	2.257	2.42	1.919
2000	2.884	0.92	4.536	2.294	2.462	1.952
P E R C E N T A G E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.075	0.041	0.122	0.067	0.075	0.067
1985	0.128	0.071	0.206	0.11	0.128	0.11
1986	0.627	0.344	0.247	0.377	0.627	0.377
1987	1.019	0.581	0.626	0.777	1.019	0.777
1988	1.806	0.628	1.465	1.51	1.637	1.394
1989	2.327	0.639	2.666	1.794	2.015	1.595
1990	2.348	0.626	3.607	1.814	2.006	1.594
1991	2.319	0.608	4.137	1.765	1.884	1.481
1992	2.115	0.609	4.069	1.634	1.747	1.373
1993	2.017	0.6	3.625	1.574	1.662	1.313
1994	1.937	0.598	3.347	1.527	1.623	1.285
1995	1.899	0.596	3.121	1.503	1.602	1.271
1996	1.875	0.595	3.019	1.489	1.591	1.262
1997	1.862	0.593	2.959	1.48	1.584	1.257
1998	1.852	0.59	2.927	1.473	1.578	1.252
1999	1.844	0.588	2.905	1.466	1.573	1.247
2000	1.832	0.585	2.882	1.458	1.564	1.24

SOURCE: MAP Regional Model Projections.

ABSOLUTE IMPACT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	-0.	-0.	-0.001	-0.	-0.	-0.
1985	-0.001	-0.	-0.001	-0.	-0.001	-0.
1986	-0.002	-0.001	0.	-0.001	-0.002	-0.001
1987	0.	-0.	-0.001	-0.001	0.	-0.001
1988	-0.001	0.001	-0.003	-0.002	-0.	-0.001
1989	0.001	0.002	-0.004	0.002	0.002	0.002
1990	0.006	0.002	-0.002	0.005	0.006	0.004
1991	0.008	0.003	0.004	0.006	0.009	0.007
1992	0.01	0.003	0.01	0.007	0.009	0.007
1993	0.012	0.003	0.017	0.009	0.011	0.008
1994	0.014	0.004	0.019	0.01	0.012	0.009
1995	0.016	0.005	0.022	0.012	0.014	0.011
1996	0.018	0.005	0.025	0.013	0.016	0.012
1997	0.02	0.006	0.028	0.015	0.017	0.013
1998	0.022	0.007	0.031	0.017	0.019	0.015
1999	0.024	0.007	0.034	0.018	0.021	0.016
2000	0.026	0.008	0.038	0.02	0.023	0.017

PERCENTAGE IMPACT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	-0.007	-0.009	-0.007
1984	-0.009	-0.005	-0.015	-0.008	-0.01	-0.008
1985	-0.01	-0.006	-0.012	-0.018	-0.036	-0.018
1986	-0.036	-0.022	0.006	-0.014	0.	-0.014
1987	0.	-0.006	-0.018	-0.033	-0.007	-0.026
1988	-0.019	0.023	-0.051	0.029	0.031	0.031
1989	0.024	0.033	-0.068	0.08	0.099	0.075
1990	0.105	0.035	-0.026	0.11	0.147	0.111
1991	0.143	0.043	0.059	0.125	0.157	0.117
1992	0.17	0.046	0.172	0.144	0.178	0.134
1993	0.193	0.057	0.275	0.169	0.202	0.154
1994	0.224	0.067	0.311	0.194	0.229	0.174
1995	0.254	0.077	0.36	0.218	0.254	0.194
1996	0.285	0.087	0.404	0.243	0.28	0.214
1997	0.316	0.096	0.452	0.267	0.305	0.234
1998	0.346	0.106	0.499	0.29	0.33	0.254
1999	0.374	0.116	0.544	0.313	0.354	0.273
2000	0.403	0.125	0.589			

SOURCE: MAP Regional Model Projections.

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
A B S O L U T E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.	0.	0.001	0.	0.	0.
1985	0.001	0.001	0.002	0.001	0.001	0.001
1986	0.006	0.003	0.004	0.004	0.006	0.004
1987	0.014	0.008	0.007	0.01	0.014	0.01
1988	0.024	0.011	0.017	0.019	0.023	0.018
1989	0.035	0.012	0.033	0.028	0.031	0.026
1990	0.041	0.011	0.051	0.032	0.036	0.029
1991	0.041	0.011	0.064	0.031	0.035	0.027
1992	0.037	0.01	0.068	0.028	0.031	0.024
1993	0.034	0.01	0.064	0.026	0.029	0.023
1994	0.033	0.01	0.057	0.026	0.028	0.022
1995	0.032	0.01	0.052	0.026	0.028	0.022
1996	0.033	0.011	0.051	0.026	0.029	0.023
1997	0.033	0.011	0.051	0.026	0.029	0.023
1998	0.034	0.011	0.051	0.027	0.03	0.023
1999	0.034	0.011	0.052	0.027	0.03	0.024
2000	0.035	0.011	0.053	0.028	0.031	0.024
P E R C E N T A G E I M P A C T						
1980	0.	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.009	0.005	0.014	0.008	0.009	0.008
1985	0.032	0.02	0.05	0.028	0.032	0.028
1986	0.132	0.074	0.081	0.086	0.132	0.086
1987	0.297	0.17	0.155	0.206	0.297	0.206
1988	0.513	0.235	0.35	0.405	0.49	0.39
1989	0.741	0.245	0.695	0.6	0.671	0.554
1990	0.881	0.236	1.091	0.689	0.768	0.617
1991	0.852	0.228	1.383	0.673	0.756	0.594
1992	0.791	0.22	1.466	0.604	0.666	0.519
1993	0.733	0.219	1.365	0.567	0.621	0.486
1994	0.7	0.22	1.211	0.549	0.604	0.474
1995	0.688	0.222	1.112	0.544	0.501	0.473
1996	0.686	0.224	1.068	0.545	0.604	0.476
1997	0.689	0.226	1.054	0.548	0.608	0.479
1998	0.694	0.228	1.053	0.552	0.614	0.483
1999	0.7	0.231	1.058	0.557	0.62	0.488
2000	0.706	0.233	1.065	0.562	0.626	0.493

SOURCE: MAP Regional Model Projections.

Aleutian Islands Impacts

This section discusses impacts of the OCS cases upon the Aleutian Islands, as projected by the SCIMP model. Pairs of tables present absolute and procentage impacts.

EMPLOYMENT

Nonresident or enclave basic sector employment impacts are shown in Tables 118 and 119. These represent OCS enclave employment; thus, the figures in Table 118 reproduce the enclave employment figures of Tables 89-94. As shown in Table 119, the maximum percentage impact upon enclave employment is 27.6 percent for the mean case (in 1989) and 66.1 percent for the high case (in 1990).

Tables 120 and 121 present impacts upon basic sector resident employment. The absolute impact projections presented in Table 120 are slightly lower than the resident OCS employment shown in Tables 89-94. This is because the SCIMP model does not treat permanent migrants as residents in the year of migration. The maximum increases in resident basic sector employment are 161 after 1991 for the mean case, and 314 in 1992 for the high case; or 16.6 percent in 1990 for the mean case and 31.3 percent in 1991 for the high case.

TABLE 118. PROJECTED ABSOLUTE IMPACT OF NORTH
ALEUTIAN SHELF SALE
ALEUTIAN ISLANDS BASIC SECTOR
NONRESIDENT EMPLOYMENT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	180.	51.	285.	138.	180.	138.
1985	266.	67.	397.	189.	266.	189.
1986	319.	93.	371.	248.	319.	248.
1987	311.	70.	299.	240.	311.	240.
1988	530.	129.	764.	393.	286.	260.
1989	733.	120.	1428.	493.	263.	210.
1990	660.	153.	1823.	462.	263.	210.
1991	630.	127.	1642.	441.	157.	130.
1992	463.	126.	1453.	368.	157.	130.
1993	463.	126.	839.	368.	157.	130.
1994	463.	126.	839.	368.	157.	130.
1995	463.	126.	839.	368.	157.	130.
1996	463.	126.	839.	368.	157.	130.
1997	463.	126.	839.	368.	157.	130.
1998	463.	126.	839.	368.	157.	130.
1999	463.	126.	839.	368.	157.	130.
2000	463.	126.	839.	368.	157.	130.

SOURCE: SCIMP Model Projections.

TABLE 119. PROJECTED PERCENTAGE IMPACT OF NORTH
ALEUTIAN SHELF SALE
ALEUTIAN ISLANDS BASIC SECTOR
NONRESIDENT EMPLOYMENT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	6.6	1.9	10.5	5.1	6.6	5.1
1985	9.4	2.4	14.0	6.7	9.4	6.7
1986	11.3	3.3	13.1	8.8	11.3	8.8
1987	11.4	2.6	10.9	8.8	11.4	8.8
1988	20.7	5.0	29.9	15.4	11.2	10.2
1989	27.6	4.5	53.8	18.6	9.9	7.9
1990	23.9	5.5	66.1	16.7	9.5	7.6
1991	21.8	4.4	56.8	15.3	5.4	4.5
1992	15.3	4.2	47.9	12.1	5.2	4.3
1993	14.4	3.9	26.2	11.5	4.9	4.1
1994	13.6	3.7	24.6	10.8	4.6	3.8
1995	12.7	3.5	23.1	10.1	4.3	3.6
1996	11.9	3.2	21.5	9.4	4.0	3.3
1997	11.0	3.0	19.9	8.7	3.7	3.1
1998	10.2	2.8	18.4	8.1	3.4	2.9
1999	9.3	2.5	16.9	7.4	3.2	2.6
2000	8.7	2.4	15.7	6.9	2.9	2.4

SOURCE: SCIMP Model Projections.

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TABLE 120. PROJECTED ABSOLUTE IMPACT OF NORTH ALEUTIAN SHELF SALE ALEUTIAN ISLANDS BASIC SECTOR RESIDENT EMPLOYMENT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.	0.	57.	29.	35.	29.
1985	0.	0.	76.	36.	48.	36.
1986	25.	16.	70.	53.	73.	53.
1987	50.	31.	64.	63.	83.	63.
1988	94.	38.	120.	104.	108.	95.
1989	118.	35.	182.	111.	119.	94.
1990	145.	44.	272.	122.	118.	94.
1991	148.	48.	305.	124.	107.	85.
1992	161.	53.	314.	127.	107.	85.
1993	161.	53.	272.	127.	107.	85.
1994	161.	53.	272.	127.	107.	85.
1995	161.	53.	272.	127.	107.	85.
1996	161.	53.	272.	127.	107.	85.
1997	161.	53.	272.	127.	107.	85.
1998	161.	53.	272.	127.	107.	85.
1999	161.	53.	272.	127.	107.	85.
2000	161.	53.	272.	127.	107.	85.

SOURCE: SCIMP Model Projections.

TABLE 121. PROJECTED PERCENTAGE IMPACT OF NORTH ALEUTIAN SHELF SALE
ALEUTIAN ISLANDS BASIC SECTOR
RESIDENT EMPLOYMENT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.	0.	10.3	5.2	6.3	5.2
1985	0.	0.	12.9	6.1	9.1	6.1
1986	4.0	2.6	11.2	8.5	11.7	8.5
1987	7.5	4.7	9.6	9.5	12.5	9.5
1988	13.2	5.3	16.8	14.6	15.1	13.3
1989	15.1	4.5	23.2	14.2	15.2	12.0
1990	16.6	5.1	31.2	14.0	13.5	10.8
1991	15.2	4.9	31.3	12.7	11.0	8.7
1992	14.6	4.8	28.4	11.5	9.7	7.7
1993	12.8	4.2	21.6	10.1	8.5	6.8
1994	11.1	3.7	18.8	8.8	7.4	5.9
1995	9.6	3.2	16.2	7.6	6.4	5.1
1996	8.2	2.7	13.9	6.5	5.5	4.3
1997	7.0	2.3	11.8	5.5	4.7	3.7
1998	5.9	2.0	10.1	4.7	4.0	3.1
1999	5.0	1.7	8.5	4.0	3.3	2.7
2000	4.2	1.4	7.2	3.3	2.8	2.2

SOURCE: SCIMP Model Projections.

Tables 122 and 123 present impacts on civilian government employ-
ment. All of these impacts are upon state and local government, as a
result of higher population. For the mean case, government employment
rises by a maximum of 16, or 1.1 percent, in 1993. For the high case,
government employment rises by a maximum of 49, or 3.4 percent, in
1993.

Tables 124 and 125 present impacts upon support sector employment.
For the mean case, support sector employment rises by a maximum of 46,
or 7.5 percent, in 1991. For the high case, support sector employment
rises by a maximum of 92, or 13.2 percent, in 1991.

POPULATION

Impacts upon civilian resident population are shown in Tables 126 and
127. For the mean case, population rises by a maximum of 173, or 2.3
percent, in 1992. For the high case, population rises by a maximum of
513, or 7.0 percent, in 1992.

Finally, Tables 128 and 129 present impacts upon total population.
This figure includes military personnel and dependents, enclave resi-
dents, and fishermen; i.e., all people physically present in the
Aleutian Islands except for offshore OCS workers. For the mean case,
total population increases by a maximum of 843, or 6.2 percent, in
1989. For the high case, total population rises by a maximum of
2,163, or 14.1 percent, in 1990.

TABLE 122.   PROJECTED ABSOLUTE IMPACT OF NORTH
ALEUTIAN SHELF SALE
ALEUTIAN ISLANDS CIVILIAN GOVERNMENT EMPLOYMENT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	0.	0.	0.	0.	0.	0.
1985	1.	0.	1.	1.	1.	1.
1986	1.	0.	2.	1.	1.	1.
1987	2.	1.	2.	1.	2.	1.
1988	2.	1.	1.	2.	2.	2.
1989	5.	1.	4.	3.	5.	3.
1990	10.	1.	12.	5.	9.	4.
1991	15.	2.	32.	8.	9.	4.
1992	15.	2.	43.	7.	7.	3.
1993	16.	2.	49.	8.	7.	3.
1994	15.	2.	42.	7.	6.	3.
1995	13.	2.	40.	7.	6.	3.
1996	12.	2.	38.	6.	5.	3.
1997	11.	2.	36.	6.	5.	3.
1998	10.	2.	33.	6.	5.	3.
1999	9.	2.	29.	6.	5.	3.
2000	8.	2.	25.	6.	5.	3.

SOURCE: SCIMP Model Projections.

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TABLE 123. PROJECTED PERCENTAGE IMPACT OF NORTH ALEUTIAN SHELF SALE
ALEUTIAN ISLANDS CIVILIAN GOVERNMENT EMPLOYMENT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.	0.	0.	0.	0.	0.
1982	0.0	0.0	0.0	0.0	0.0	0.0
1983	0.0	0.0	0.0	0.0	0.0	0.0
1984	0.0	0.0	0.0	0.0	0.0	0.0
1985	0.1	0.0	0.1	0.1	0.1	0.1
1986	0.1	0.0	0.2	0.1	0.1	0.1
1987	0.1	0.1	0.1	0.1	0.1	0.1
1988	0.2	0.1	0.1	0.1	0.2	0.1
1989	0.4	0.1	0.3	0.3	0.4	0.2
1990	0.8	0.1	0.9	0.3	0.7	0.3
1991	1.1	0.1	2.4	0.6	0.6	0.3
1992	1.1	0.1	3.1	0.5	0.5	0.2
1993	1.1	0.1	3.4	0.6	0.5	0.2
1994	1.0	0.1	2.8	0.5	0.4	0.2
1995	0.8	0.1	2.6	0.4	0.4	0.2
1996	0.7	0.1	2.3	0.4	0.3	0.2
1997	0.6	0.1	2.1	0.4	0.3	0.2
1998	0.5	0.1	1.8	0.3	0.3	0.2
1999	0.5	0.1	1.5	0.3	0.2	0.2
2000	0.4	0.1	1.2	0.3	0.2	0.2

SOURCE: SCIMP Model Projections.

TABLE 124. PROJECTED ABSOLUTE IMPACT OF NORTH ALEUTIAN SHELF SALE ALEUTIAN ISLANDS SUPPORT SECTOR EMPLOYMENT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	11.	5.	18.	9.	11.	9.
1985	16.	6.	25.	12.	16.	12.
1986	23.	10.	23.	17.	23.	17.
1987	25.	12.	20.	19.	25.	19.
1988	36.	12.	37.	31.	31.	28.
1989	43.	11.	57.	33.	34.	27.
1990	46.	13.	83.	35.	33.	27.
1991	45.	13.	91.	35.	29.	23.
1992	45.	15.	92.	35.	29.	23.
1993	45.	15.	75.	35.	29.	23.
1994	45.	15.	75.	35.	29.	23.
1995	45.	15.	75.	35.	29.	23.
1996	45.	15.	75.	35.	29.	23.
1997	45.	15.	75.	35.	29.	23.
1998	45.	15.	75.	35.	29.	23.
1999	45.	15.	75.	35.	29.	23.
2000	45.	15.	75.	35.	29.	23.

SOURCE: SCIMP Model Projections.

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TABLE 125. PROJECTED PERCENTAGE IMPACT OF NORTH ALEUTIAN SHELF SALE
ALEUTIAN ISLANDS SUPPORT SECTOR EMPLOYMENT

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	2.3	1.0	3.6	1.8	2.3	1.8
1985	3.1	1.2	4.8	2.3	3.1	2.3
1986	4.3	1.9	4.3	3.2	4.3	3.2
1987	4.6	2.2	3.7	3.5	4.6	3.5
1988	6.5	2.1	6.7	5.5	5.6	4.9
1989	7.4	1.9	9.7	5.6	5.7	4.6
1990	7.5	2.2	13.5	5.8	5.4	4.3
1991	7.0	2.1	13.9	5.3	4.4	3.5
1992	6.4	2.1	13.2	5.1	4.1	3.3
1993	6.0	1.9	10.0	4.7	3.8	3.1
1994	5.5	1.8	9.3	4.4	3.5	2.8
1995	5.0	1.6	8.5	4.0	3.2	2.6
1996	4.6	1.5	7.7	3.6	2.9	2.3
1997	4.1	1.3	6.9	3.3	2.6	2.1
1998	3.7	1.2	6.2	2.9	2.4	1.9
1999	3.3	1.1	5.5	2.6	2.1	1.7
2000	2.9	0.9	4.9	2.3	1.8	1.5

SOURCE: SCIMP Model Projections.

TABLE 126 PROJECTED ABSOLUTE IMPACT OF NORTH ALEUTIAN SHELF SALE ALEUTIAN ISLANDS CIVILIAN RESIDENT POPULATION

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	8.	3.	15.	8.	8.	8.
1985	10.	4.	20.	9.	10.	9.
1986	20.	10.	18.	14.	20.	14.
1987	23.	13.	15.	18.	23.	18.
1988	57.	16.	37.	36.	51.	32.
1989	110.	15.	125.	48.	99.	41.
1990	162.	18.	340.	84.	91.	40.
1991	160.	18.	458.	79.	77.	35.
1992	173.	20.	513.	86.	69.	35.
1993	159.	20.	446.	79.	63.	35.
1994	140.	21.	427.	73.	59.	34.
1995	124.	21.	405.	68.	56.	34.
1996	111.	21.	378.	65.	53.	35.
1997	102.	21.	346.	63.	51.	35.
1998	95.	22.	307.	61.	50.	35.
1999	90.	22.	267.	60.	49.	36.
2000	86.	22.	235.	59.	49.	36.

SOURCE: SCIMP Model Projections.

TABLE 127. PROJECTED PERCENTAGE IMPACT OF NORTH
ALEUTIAN SHELF SALE
ALEUTIAN ISLANDS CIVILIAN
RESIDENT POPULATION

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.0	0.0	0.0	0.0	0.0	0.0
1982	0.0	0.0	0.0	0.0	0.0	0.0
1983	0.0	0.0	0.0	0.0	0.0	0.0
1984	0.2	0.1	0.3	0.2	0.2	0.2
1985	0.2	0.1	0.4	0.2	0.2	0.2
1986	0.4	0.2	0.3	0.3	0.4	0.3
1987	0.4	0.2	0.3	0.3	0.4	0.3
1988	1.0	0.3	0.6	0.6	0.9	0.5
1989	1.8	0.2	2.0	0.8	1.6	0.7
1990	2.5	0.3	5.2	1.3	1.4	0.6
1991	2.3	0.3	6.6	1.1	1.1	0.5
1992	2.3	0.3	7.0	1.2	0.9	0.5
1993	2.0	0.3	5.6	1.0	0.8	0.4
1994	1.6	0.2	5.0	0.9	0.7	0.4
1995	1.3	0.2	4.4	0.7	0.6	0.4
1996	1.1	0.2	3.7	0.6	0.5	0.3
1997	0.9	0.2	3.1	0.6	0.5	0.3
1998	0.8	0.2	2.5	0.5	0.4	0.3
1999	0.6	0.2	1.9	0.4	0.4	0.3
2000	0.5	0.1	1.5	0.4	0.3	0.2

SOURCE: SCIMP Model Projections.

TABLE 128. PROJECTED ABSOLUTE IMPACT OF NORTH
ALEUTIAN SHELF SALE
ALEUTIAN ISLANDS TOTAL POPULATION
(INCLUDING MILITARY, MILITARY DEPENDENTS,
ENCLAVE RESIDENTS, AND FISHERMEN)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.	0.
1984	188.	54.	300.	146.	188.	146.
1985	276.	71.	417.	198.	276.	198.
1986	339.	103.	389.	262.	339.	262.
1987	334.	83.	314.	258.	334.	258.
1988	587.	145.	801.	429.	337.	292.
1989	843.	135.	1553.	541.	362.	251.
1990	822.	171.	2163.	546.	354.	250.
1991	790.	145.	2100.	520.	234.	165.
1992	636.	146.	1966.	454.	226.	165.
1993	622.	146.	1285.	447.	220.	165.
1994	603.	147.	1266.	441.	216.	164.
1995	587.	147.	1244.	436.	213.	164.
1996	574.	147.	1217.	433.	210.	165.
1997	565.	147.	1185.	431.	208.	165.
1998	558.	148.	1146.	429.	207.	165.
1999	553.	148.	1106.	428.	206.	166.
2000	549.	148.	1074.	427.	206.	166.

SOURCE: SCIMP Model Projections.

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TABLE 129. PROJECTED PERCENTAGE IMPACT OF NORTH
ALEUTIAN SHELF SALE
ALEUTIAN ISLANDS TOTAL POPULATION
(INCLUDING MILITARY, MILITARY DEPENDENTS,
ENCLAVE RESIDENTS, AND FISHERMEN)

Year	Mean Case	Low Case	High Case	Alternative Four Case	Mean Offshore Loading Case	Alternative Four Offshore Loading Case
1981	0.0	0.0	0.0	0.0	0.0	0.0
1982	0.0	0.0	0.0	0.0	0.0	0.0
1983	0.0	0.0	0.0	0.0	0.0	0.0
1984	1.6	0.5	2.5	1.2	1.6	1.2
1985	2.3	0.6	3.4	1.6	2.3	1.6
1986	2.7	0.8	3.1	2.1	2.7	2.1
1987	2.6	0.7	2.5	2.1	2.6	2.1
1988	4.5	1.2	6.1	3.4	2.7	2.3
1989	6.2	1.0	10.9	4.1	2.8	1.9
1990	5.9	1.3	14.1	4.0	2.6	1.9
1991	5.5	1.0	13.3	3.7	1.7	1.2
1992	4.3	1.0	12.1	3.1	1.6	1.1
1993	4.0	1.0	7.9	2.9	1.4	1.1
1994	3.7	0.9	7.4	2.7	1.3	1.0
1995	3.4	0.9	6.9	2.5	1.2	1.0
1996	3.1	0.8	6.3	2.3	1.2	0.9
1997	2.8	0.8	5.8	2.2	1.1	0.8
1998	2.6	0.7	5.2	2.0	1.0	0.8
1999	2.4	0.6	4.6	1.8	0.9	0.7
2000	2.1	0.6	4.1	1.7	0.8	0.7

SOURCE: SCIMP Model Projections.

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APPENDIX A: THE MAP REGIONAL MODEL

Introduction

This appendix presents in general outline form the structure of the
new MAP regional model utilized in this report. This model replaces a
more cumbersome model used in earlier OCS studies.

In developing this model, several major objectives were addressed.
These objectives are the following:

- that the structure be simple and generalizable

- that the parameters be specified in terms with clear,
  intuitive meaning

- that the regions be disaggregated to census division levels

- that the model be sufficiently flexible to be tied easily to
  the MAP statewide model.

This appendix is organized as follows: Part II examines in detail the
structure of the model. Part III presents estimates of the model
parameters.

Structure of the Model

OVERVIEW

The model consists of two components as shown in Figure 4. Given an
exogenous estimate of statewide employment, by sector (provided from a
corresponding state model run), and vectors of basic and government
employment in each of the twenty regions shown in Figure 5, the

Figure 4. SCHEMATIC REPRESENTATION OF
REGIONAL MODEL CDMOD
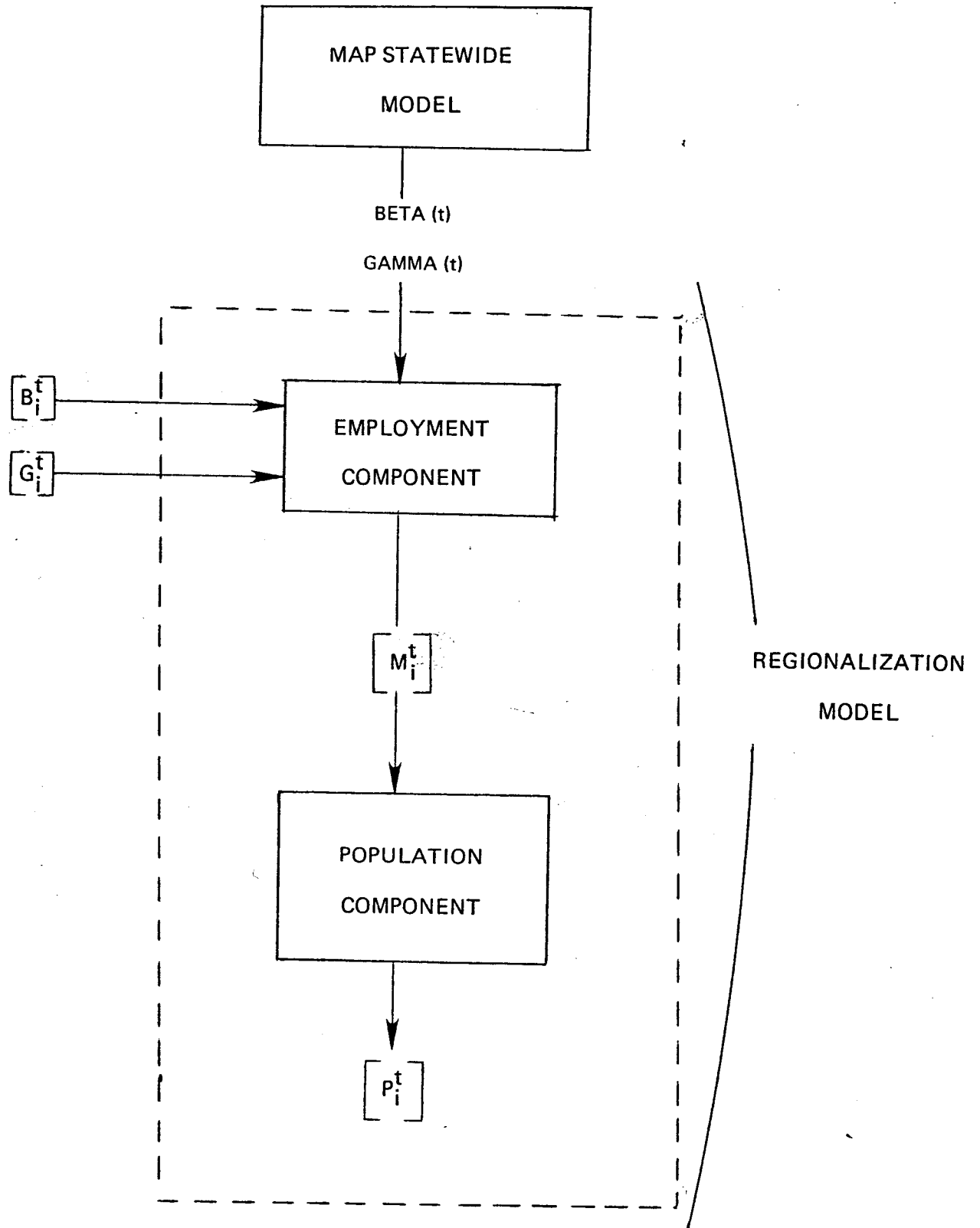
FIGURE 5. ALASKA CENSUS DIVISIONS

Census Divisions

Central cities of SMSA's with fewer than 50,000 inhabitants

Standard Metropolitan Statistical Areas (SMSA's)

Fairbanks (Ø9)

Southeast Fairbanks (24)

Cordova-McCarthy (Ø8)

Valdez-Chitina-Whittier (26)

Anchorage (Ø2)

Seward (21)

Kenai-Cook Inlet (12)

Aleutian Islands (part) (Ø1)

Upper Yukon (25)

Barrow—North Slope (Ø4)

Kobuk (14)

Yukon-Koyukuk (29)

Matanuska-Susitna (17)

Kuskokwim (16)

Nome (19)

Wade Hampton (27)

Bethel (Ø5)

Bristol Bay

Bristol Bay Borough

Kodiak (15)

Aleutian Islands (part) (Ø1)

Haines

Juneau

Angoon

Wrangell-Petersburg

Sitka

Skagway-Yakutat

Prince of Wales

Ketchikan

Outer Ketchikan

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employment component of the model generates estimates of support and total employment in each of the twenty regions. The population component accepts these estimates along with exogenous estimates of statewide population (also from the statewide model) to generate regional population estimates.

THE EMPLOYMENT COMPONENT

Each of the twenty regions is disaggregated into three types of employment: basic, government, and support. Basic employment consists of all sectors or portions of sectors treated as exogenous in the state model: agriculture, forestry, fisheries, manufacturing, mining, construction, and a portion of transportation. Government consists of federal civilian and military employees as well as state and local employees. Support includes all other employment.

The structure of the employment model is as follows:

Define: S_{ij} = Support sector employment in region i serving region j

B_i = Basic sector employment in region i.

G_i = Government sector employment in region i.

M_i = Total employment in region i.

α_{ij} = Proportion of region j support requirements supplied by region i.

b_j = Support employment required per unit of total employment in region j.

Total employment in each of n regions is written:

$$S_{11} + S_{12} + \ldots + S_{1n} + B_1 + G_1 = M_1$$

(1)
$$S_{21} + S_{22} + \ldots + S_{2n} + B_2 + G_2 = M_2$$

$$\vdots$$

$$S_{n1} + S_{n2} + \ldots + S_{nn} + B_n + G_n = M_n$$

Total support sector requirements within each region may be written:

$$S_{11} + S_{21} + \ldots + S_{n1} = b_1 M_1$$

(2)
$$S_{12} + S_{22} + \ldots + S_{n2} = b_2 M_2$$

$$\vdots$$

$$S_{1n} + S_{2n} + \ldots + S_{nn} = b_n M_n$$

But $S_{ij} = \alpha_{ij} b_j M_j$, so that system (1) may be rewritten:

$$\alpha_{11} b_1 M_1 + \alpha_{12} b_2 M_2 + \ldots + \alpha_{1n} b_n M_n + B_1 + G_1 = M_1$$

(1')
$$\alpha_{21} b_1 M_1 + \alpha_{22} b_2 M_2 + \ldots + \alpha_{2n} b_n M_n + B_2 + G_2 = M_2$$

$$\vdots$$

$$\alpha_{n1} b_1 M_1 + \alpha_{n2} b_2 M_2 + \ldots + \alpha_{nn} b_n M_n + B_n + G_n = M_n$$

or, in matrix notation,

$$A = [\alpha_{ij} b_j]$$

$$M = [M_i]$$

$$AM + B + G = M \qquad \text{where} \qquad B = [B_i]$$

$$G = [G_i]$$

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If the A matrix were known, then total employment is calculated as a linear function of basic and government employment, or

$$(3) \qquad M = [I - A]^{-1} [B + G]$$

Of course, we do not know A. By incorporating known regional data with a single simplifying assumption and a behavioral hypothesis describing the allocation of interregional support demands, however, it is possible to estimate A for a point in time, say 1979.

Known Regional Data. Regional employment for 1979 was available from the Alaska Department of Labor publications, specifically Statistical Quarterly and Alaska Economic Trends. The breakdown of such employment by basic, government, and support sectors is shown in Table 130 for 1979.

A Simplifying Assumption. Since the major concern of the regional model is to capture the effect of support sector demands which are supplied in regions other than the one giving rise to such demands, rather than to examine the effects of differential support demands across regions, it seems plausible, or at least not overly restrictive, to impose the condition that

$$(4) \qquad b_1 = b_2 = \ldots = b_n = b = \left(1 - \frac{B + G}{M} \right)$$

That is, a unit of total employment, wherever it occurs in the state, is assumed to give rise to the same support sector requirements. The difference between regions, then, is solely the difference in the locations from which these demands will be supplied.

This assumption has the obvious disadvantage that it neglects real interregional differences in demand for support sector services. However, it also has several advantages which may more than compensate for this shortcoming. Most obviously, it reduces our estimation problem by n-1 parameters. More importantly, it is extremely valuable as a tool for maintaining consistency with the statewide MAP model, both in a static and a dynamic sense. Currently, a unit of basic sector employment in the state model has the same static employment impact regardless of its location in the state. Regionally varying b_j's would produce differing total statewide static impacts by location, thus being inconsistent with the state model. Furthermore, the introduction of b exogenously provides a valuable tool for maintaining dynamic consistency between the models. By letting b vary with time so as to reflect the corresponding state run, we both force the A matrix to vary over time to reflect the same degree of structural change represented by the state model and force the employment totals to replicate the statewide results.

A Behavioral Hypothesis. The major reason that not all support sector requirements are supplied internally from that region is that it would be more costly to do so than to secure those services from a different

TABLE 130 . EMPLOYMENT COMPOSITION, 1979

Region	Support (S_i)	Basic[1] (B_i)	Government[2] (G_i)	Total (M_i)
Ø1 Aleutian Islands	377	2,463	3,264	6,104
Ø2 Anchorage	45,404	13,828	34,009	93,241
Ø4 Barrow/North Slope	594	3,467	1,514	5,575
Ø5 Bethel	1,917	420	1,360	3,697
Ø6 Bristol Bay*	839	1,778	1,197	3,814
Ø8 Cordova/McCarthy	403	1,005	344	1,752
Ø9 Fairbanks	11,191	3,584	12,801	27,576
11 Southeast Alaska**	9,475	9,284	11,081	29,840
12 Kenai/Cook Inlet	2,819	3,564	1,481	7,864
14 Kobuk	402	114	935	1,451
15 Kodiak	1,644	3,631	2,051	7,326
16 Kuskokwim	123	13	435	571
17 Matanuska/Susitna	1,505	560	1,345	3,410
18 Nome	1,083	298	980	2,361
21 Seward	433	709	390	1,532
24 Southeast Fairbanks	240	149	1,636	2,025
25 Upper Yukon	99	25	302	426
26 Valdez/Chitina/Whittier	715	678	927	2,320
27 Wade Hampton	208	236	595	1,039
29 Yukon/Koyukuk	506	807	1,208	2,521
ST Statewide	79,977	46,613	77,855	204,445

*Includes Bristol Bay and Bristol Bay Borough Census Divisions.

**Includes the following Census Divisions: Angoon, Haines, Juneau, Ketchikan, Outer Ketchikan, Prince of Wales, Sitka, Skagway-Yakutat, and Wrangell-Petersburg.

[1]Mining, manufacturing, construction, agriculture-forestry-fisheries, and miscellaneous.

[2]Federal, state, and local government.

region. It is only natural, then, that the cost of supply should be the major determining factor in deciding on which other regions to supply the requirements. Such costs as transportation, communication, etc. are generally expected to increase with distance and to decrease with the size of the support sector source of the region. Specifically, we will assume that such costs are:

(5) $\qquad C_{ij} = k \frac{R_{ij}}{M_i}$ where $\qquad C_{ij}$ = cost of supplying a unit of support service to region j from region i

R_{ij} = distance* between regions i and j

M_i = total employment of region i

k = an arbitrary constant

and are as presented in Table 131 for k = 1000.

The total costs of interregional service provision are then:

(6) $\qquad C = \sum_{j=1}^{n} \sum_{i=1}^{n} C_{ij} S_{ij}$

We hypothesize that the S_{ij}'s actually chosen in any given time period are chosen in such a way as to minimize the costs of providing the required services observed in region j from each of the sources of such supply i.

---

*Air fares were used as a proxy for distance since straight line distances fail to capture the structure of statewide transportation and communications networks.

TABLE 131. ASSUMED COSTS OF INTERREGIONAL SERVICE PROVISION

Supply Region	Demand Region 01	02	04	05	06	08	09	11	12	14	15	16	17	18	21	24	25	26	27	29
01 Aleutian Islands	0	33	52	45	23	57	42	47	36	48	41	40	37	48	37	48	47	40	47	44
02 Anchorage	2	0	1	1	1	*	1	1	*	1	1	*	*	1	*	1	1	*	1	1
04 Barrow/North Slope	57	20	0	33	30	26	15	36	22	29	29	22	24	29	24	25	20	28	38	24
05 Bethel	75	20	50	0	35	29	28	43	25	36	33	32	25	25	26	44	37	32	8	38
06 Bristol Bay	37	15	45	34	0	23	28	37	19	39	13	26	20	39	20	38	37	26	36	33
08 Cordova/McCarthy	199	18	83	61	50	0	47	38	29	70	46	43	30	70	31	68	66	13	64	57
09 Fairbanks	9	2	3	4	4	3	0	4	3	3	3	2	3	3	3	2	1	3	5	2
11 Southeast Alaska	10	3	7	5	5	2	3	0	3	6	4	4	4	6	4	5	4	3	6	5
12 Kenai/Cook Inlet	28	2	16	12	9	6	9	13	0	14	8	8	5	14	5	13	13	8	13	11
14 Kobuk	203	63	112	92	101	85	57	122	75	0	96	76	76	28	78	97	79	93	72	34
15 Kodiak	34	7	22	17	7	11	11	18	9	19	0	13	9	19	10	19	18	13	20	16
16 Kuskokwim	433	77	215	207	175	133	74	228	109	194	161	0	112	123	116	177	131	154	256	49
17 Matanuska/Susitna	65	6	39	28	22	15	21	31	11	33	20	19	0	33	12	32	30	19	30	26
18 Nome	125	39	69	39	62	52	35	75	46	17	59	30	47	0	48	60	49	57	27	21
21 Seward	147	14	89	63	51	35	48	70	26	74	46	43	27	74	0	72	69	43	67	59
24 S.E. Fairbanks	144	43	69	80	71	59	29	79	52	70	67	50	53	70	54	0	45	65	83	54
25 Upper Yukon	674	197	268	319	329	272	77	315	239	270	310	176	244	270	249	216	0	300	385	197
26 Valdez/Chitina/ Whittier	106	19	68	51	43	10	41	38	27	58	40	38	28	58	28	57	55	0	54	48
27 Wade Hampton	273	78	204	27	132	109	126	161	95	101	144	141	97	62	99	163	158	120	0	110
29 Yukon Koyukuk	107	27	52	56	49	40	20	61	34	20	46	11	35	20	36	44	33	44	45	0

* Indicates $C_{ij} < 0.5$.

<u>Estimating the Interregional Interaction Matrix</u>.   The   hypothesis   of
(c) and the condition of (b) imply that our observed 1979 data repre-
sented the solution to a constrained minimization problem of the form:

$$\text{Min} \sum_{j=1}^{n} \sum_{i=1}^{n} C_{ij} S_{ij}$$

$$\text{ST}\quad S_{11} + S_{12} + \ldots + S_{2n} = M_1^{79} - B_1^{79} - G_1^{79}$$

$$S_{21} + S_{22} + \ldots + S_{2n} = M_2^{79} - B_2^{79} - G_2^{79}$$

$$\begin{matrix} \cdot & \cdot & & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & & \cdot & \cdot & \cdot & \cdot \\ \cdot & \cdot & & \cdot & \cdot & \cdot & \cdot \end{matrix}$$

$$S_{n1} + S_{n2} + \ldots + S_{nn} = M_n^{79} - B_n^{79} - G_n^{79}$$

(7)

$$S_{11} + S_{21} + \ldots + S_{n1} = b^{79} M_1^{79}$$

$$S_{12} + S_{22} + \ldots + S_{n2} = b^{79} M_2^{79}$$

$$\begin{matrix} \cdot & \cdot & & \cdot & \cdot \\ \cdot & \cdot & & \cdot & \cdot \\ \cdot & \cdot & & \cdot & \cdot \end{matrix}$$

$$S_{1n} + S_{2n} + \ldots + S_{nn} = b^{79} M_n^{79}$$

$$S_{ij} \geq 0 \quad \forall\ i,j$$

Note that $S_{ij} = \alpha_{ij} b^{79} M_j^{79}$, so that problem (7) may be reformulated in terms of decision variables with a far more intuitive meaning than the S_{ij}'s, namely the α_{ij}'s. The reformulated problem is then:

$$\text{Min } b^{79} \sum_{j=1}^{n} \sum_{i=1}^{n} C_{ij} \alpha_{ij} M_j^{79}$$

$$\text{ST} \quad \alpha_{11} + \alpha_{12} M_2^{79}/M_1^{79} + \cdots \alpha_{1n} M_n^{79}/M_1^{79} = \frac{N_1^{79} / b^{79}}{M_1^{79}}$$

$$\alpha_{21} M_1^{79}/M_2^{79} + \alpha_{22} + \cdots \alpha_{2n} M_n^{79}/M_2^{79} = \frac{N_2^{79} / b^{79}}{M_2^{79}}$$

$$\vdots \qquad\qquad \vdots \qquad\qquad\qquad \vdots \qquad \vdots$$

(7')
$$\alpha_{n1} M_1^{79}/M_n^{79} + \alpha_{n2} M_2^{79}/M_n^{79} + \cdots \alpha_{nn} = \frac{N_n^{79} / b^{79}}{M_n^{79}}$$

$$\alpha_{11} + \alpha_{21} + \cdots + \alpha_{n1} \qquad\qquad = 1$$

$$\alpha_{12} + \alpha_{22} + \cdots + \alpha_{n2} \qquad\qquad = 1$$

$$\vdots$$

$$\alpha_{1n} + \alpha_{2n} + \cdots + \alpha_{nn} \qquad\qquad = 1$$

$$\alpha_{ij} \geq 0 \qquad \forall\ i,j$$

where $\quad N_i^{79} = M_i^{79} - B_i^{79} - G_i^{79}$

which, assuming that a feasible solution exists, can be solved using a standard linear programming routine.

The solution, a set of nxn α_{ij}'s, comprises a matrix which we will call the regional interaction matrix. Each entry, α_{ij}, represents the share of support requirements in region j supplied from region i. Each of the columns, therefore, must sum to unity. Thus, a quick glance down each column provides a subjective test of the plausibility of the matrix. A priori, one would expect nonzero entries in all of the diagonal elements and along the rows of the regional support centers (Bethel, Fairbanks, Nome,) and probably along the entire row corresponding to Anchorage, which is a statewide support center.

Summary. Once the regional interaction matrix has been determined for a single year, say 1979, then this together with b^{79} determines fully the A matrix which existed in 1979. For projections to a future period t, we will assume that the interregional interaction matrix remains stable, but that b changes in the regional model as it does in a corresponding run of the statewide model. Therefore, employment is estimated in year t as

(8) $M(t) = [I - A(t)]^{-1} [B(t) + G(t)]$

where $A(t) = b(t) [\alpha_{ij}^{79}]$

The Population Component

Currently, the population model is specified as independent of the employment model. We can define:

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R_{ij} = Residents from region i working in region j

β_{ij} = Proportion of employees working in region j residing in region i

R_i = Resident employment in region i

P_i = Population in region i

d_i = Dependents per employee in region i

Total resident employment in the regions may be written as:

$$
\begin{array}{l}
R_{11} + R_{12} + \cdots + R_{1n} = R_1 \\
R_{21} + R_{22} + \cdots + R_{2n} = R_2 \\
\quad \vdots \qquad\qquad\qquad\qquad \vdots \\
R_{n1} + R_{n2} + \cdots + R_{nn} = R_n
\end{array}
$$

(9)

or, since $R_{ij} = \beta_{ij}M_j$, as

$$
\begin{array}{l}
\beta_{11}M_1 + \beta_{12}M_2 + \cdots + \beta_{1n}M_n = R_1 \\
\beta_{21}M_1 + \beta_{22}M_2 + \cdots + \beta_{2n}M_n = R_2 \\
\quad \vdots \qquad\qquad\qquad\qquad\quad \vdots \\
\beta_{n1}M_1 + \beta_{n2}M_2 + \cdots + \beta_{nn}M_n = R_n
\end{array}
$$

(9')

Total resident population may then be written:

$$
\begin{array}{l}
(1+d_1)\beta_{11}M_1 + (1+d_1)\beta_{12}M_2 + \cdots + (1+d_1)\beta_{1n}M_n = P_1 \\
(1+d_2)\beta_{21}M_1 + (1+d_2)\beta_{22}M_2 + \cdots + (1+d_2)\beta_{2n}M_n = P_2 \\
\quad \vdots \\
(1+d_n)\beta_{n1}M_1 + (1+d_n)\beta_{n2}M_2 + \cdots + (1+d_n)\beta_{nn}M_n = P_n
\end{array}
$$

(10)

or in matrix notation

(11)   QM = P   where $Q = [(1+d_i)\beta_{ij}]$

$$M = [M_i]$$

$$P = [P_i]$$

Now, the interregional structure of nonresident employment is captured in the Q matrix, called the location matrix, which is unknown and must be estimated.

Generally, there are three properties which this matrix should ideally satisfy. First, it would be desirable that such a structure reflect differential dependency rates across regions ($d_i \neq d_j$). Second, it should reflect independence of extra-regional employment changes. That is, if employment does not change in region i, population should not change in region i. Third, it should be consistent with the state model. Unfortunately, it is impossible to satisfy all three properties simultaneously.

The first and second property may be satisfied by assuming that employees reside in the region of their employment. If such is the case, then the interregional location matrix, composed of the β_{ij}'s, is the identity matrix, and system (9) implies that

(12) $d_i = \dfrac{P_i}{M_i} - 1$ $(i = 1, \ldots, n)$

so that Q is a diagonal matrix which can be estimated using 1979 data. Unfortunately, this procedure cannot be made consistent with the statewide model since total population impacts of changes in the scenarios will be dependent on the location of employment as well as its magnitude, while it is currently independent of location in the statewide model.

By adjusting the d_i's over time, so that

$$(13) \qquad (1 + d_i^t) = (1 + d_i^{79}) * [\frac{\Sigma \ M_i^t}{\Sigma \ (1+d_1^{79}) \ M_1^t}] \ * \ \partial \ (t)$$

where $\partial(t)$ = statewide population-to-employment ratio, we can force consistency with the state model, but at a cost of giving up the independence of extra-regional employment change property. Now, a change in employment in region $j \neq i$ will change the adjustment factor in (13), thus changing total population in region i even if employment does not change in region i.

Consistency with the state model and independence of extraregional employment changes may be achieved by requiring that all d_i's are equal to the statewide average, but this fails to satisfy the first property and is inconsistent with an identity location matrix. If we are willing to abandon the first property, the problem may be solved in much the same way as was the problem posed in estimating the parameters of the employment component, by solving the following linear programming problem:

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$$\text{Min} \sum_{j=1}^{n} \sum_{i=1}^{n} C_{ij} R_{ij}$$

$$\text{ST} \quad R_{11} + R_{12} + \ldots + R_{1n} = R_{1}^{79}$$

$$R_{21} + R_{22} + \ldots + R_{nn} = R_{2}^{79}$$

$$\vdots \qquad\qquad \vdots \quad \vdots$$

$$(14) \qquad R_{n1} + R_{n2} + \ldots + R_{nn} = R_{n}^{79}$$

$$R_{11} + R_{21} + \ldots + R_{n1} = (1+d^{79})\, M_{1}^{79}$$

$$R_{12} + R_{22} + \ldots + R_{n2} = (1+d^{79})\, M_{2}^{79}$$

$$\vdots \qquad\qquad\qquad \vdots$$

$$R_{1n} + R_{2n} + \ldots + R_{nn} = (1+d^{79})\, M_{n}^{79}$$

or alternately, since $R_{ij} = (1+d^{79})\,\beta_{ij}\,M_i^{79}$

$$\text{Min}\ (1+d^{79})\ \sum_{j=1}^{n}\ \sum_{i=1}^{n}\ C_{ij}\beta_{ij}M_j^{79}$$

ST $\quad \beta_{11}M_1 + \beta_{12}M_2 + \ldots + \beta_{1n}M_n = P_1\ /\ (1+d^{79})$

$\quad \beta_{21}M_1 + \beta_{22}M_2 + \ldots + \beta_{2n}M_n = P_2\ /\ (1+d^{79})$

$\quad \cdot \qquad\qquad \cdot \qquad\qquad \cdot$

$\quad \cdot \qquad\qquad \cdot \qquad\qquad \cdot$

$\quad \cdot \qquad\qquad\qquad \cdot \qquad\qquad\qquad \cdot$ (14') $\beta_{n1}M_1 + \beta_{n2}M_2 +$

$\ldots + \beta_{nn}M_n = P_n\ /\ (1+d^{79})$

$\quad \beta_{11} + \beta_{21} + \ldots + \beta_{n1} = 1$

$\quad \beta_{12} + \beta_{22} + \ldots + \beta_{n2} = 1$

$\quad \cdot \qquad\qquad \cdot$

$\quad \cdot \qquad\qquad \cdot$

$\quad \cdot \qquad\qquad \cdot$

$\quad \beta_{1n} + \beta_{2n} + \ldots + \beta_{nn} = 1$

The current version of the model adopts the second of these three alternate procedures, using an identity location matrix and adjusting the d_i's over time as described by equation (13).

While such a procedure has the obvious advantage of simplicity, it has several serious drawbacks. First, as mentioned earlier, such a specification necessarily will produce population impacts in regions where no employment changes have occurred, as a consequence of the adjustment factor in equation (13). The operation of this factor gives the model the property that growing regions will attract population from (relatively) stagnant regions. However, within the constraints of the limited scope of this project, it was felt that such a drawback was less serious than those associated with the available alternatives. Furthermore, there are several reasons to believe that this effect is likely to not be a serious shortcoming of the model. First, the population drawn from stagnant regions is quite small and is generally offset by induced increases in government employment which are always more widely dispersed than initial changes in basic employment. More importantly, however, the direction of the effect will always be the same as a real effect--interregional migration, which has been neglected entirely. Thus, the drain may actually offset, at least in a small way, a known estimation error. Nonetheless, the population estimation procedure must be regarded as generally much weaker than the employment component described earlier, and it needs to be improved with further research.

PARAMETERS OF THE MODEL

The Regional Employment Interaction Matrix

The 1979 $[\alpha_{ij}]$ matrix estimated by the linear programming routine for the problem described in Part II is presented in Table 132. Note that the pattern is as would have been expected. All diagonal terms are nonzero, with the larger support centers being self-sufficient (having diagonal entries of 1). Anchorage and Fairbanks appear to be the only significant support centers, with Anchorage supplying most regions and Fairbanks supplying Kuskokwim, Upper Yukon, and Yukon-Koyukuk. Two local support centers emerge, with Bethel supporting Wade Hampton and Nome supporting Kobuk.

Employment Location Matrix

As discussed above in Part II, the regional employment location matrix will, in this application, be assumed to be the identity matrix.

Population/Employment Ratio Vector

The vector of population-to-employment ratios for 1979 is presented in Table 133.

TABLE 132. EMPLOYMENT INTERACTION MATRIX, 1979

Demand Region

Supply Region	Ø1	Ø2	Ø4	Ø5	Ø6	Ø8	Ø9	11	12	14	15	16	17	18	21	24	25	26	27	29
Ø1 Aleutian Islands	.16																			
Ø2 Anchorage	.84	1.	.73		.44	.41		.19	.08	.01	.43				.28	.7		.21		.25
Ø4 Barrow			.27																	
Ø5 Bethel				1.															.49	
Ø6 Bristol Bay					.56															
Ø8 Cordova/McCarthy						.59														
Ø9 Fairbanks							1.										.41			.24
11 Southeast Alaska								.81				.45								
12 Kenai/Cook Inlet									.92											
14 Kobuk										.71										
15 Kodiak											.57									
16 Kuskokwim												.55								
17 Matanuska/Susitna													1.							
18 Nome										.28				1.						
21 Seward															.72					
24 S.E. Fairbanks																.3				
25 Upper Yukon																	.59			
26 Valdez/Chitina/Whittier																		.79		
27 Wade Hampton																			.51	
29 Yukon Koyukuk																				.51

TABLE 133. POPULATION/EMPLOYMENT RATIOS, 1979

	Region	Population	Employment	Population/ Employment
Ø1	Aleutian Islands	7,030	6,104	1.15
Ø2	Anchorage	. 177,981	93,241	1.91
Ø4	Barrow/North Slope	4,771	5,575	0.86
Ø5	Bethel	9,739	3,697	2.63
Ø6	Bristol Bay	5,204	3,814	1.36
Ø8	Cordova/McCarthy	2,475	1,752	1.41
Ø9	Fairbanks	54,000	27,576	1.96
11	Southeast Alaska	51,319	29,840	1.72
12	Kenai/Cook Inlet	23,244	7,864	2.96
14	Kobuk	4,695	1,451	3.24
15	Kodiak	9,956	7,326	1.36
16	Kuskokwim	2,941	571	5.15
17	Matanuska/Susitna	18,910	3,410	5.55
18	Nome	6,755	2,361	2.06
21	Seward	3,152	1,532	2.06
24	S.E. Fairbanks	5,507	2,025	2.72
25	Upper Yukon	1,482	426	3.48
26	Valdez/Chitina/Whittier	7,013	2,320	3.02
27	Wade Hampton	4,853	1,039	4.67
29	Yukon Koyukuk	5,325	2,521	2.11
ST	Statewide	406,352	204,445	1.99

APPENDIX B: PROJECTION OF BOTTOMFISH HARVESTING

AND PROCESSING EMPLOYMENT

The MAP and SCIMP models require as inputs projections of resident and nonresident employment in fish harvesting and fish processing. One source of employment in these areas which has not been important in the past, but which may expand greatly in the future, is bottomfish harvesting and processing. The 1981 bottomfish harvest in the Bering Sea and the Gulf of Alaska totaled 1,614 thousand metric tons. Of this, the U.S. harvest accounted for only 108 thousand metric tons, or 6.7 percent of the total, while foreign fishing fleets (primarily Japan, the U.S.S.R., Korea, and Taiwan) accounted for the rest (Alaska Department of Fish and Game; National Marine Fisheries Service).

While most observers expect that U.S. bottomfish harvests will rise greatly over the next 20 years, the total extent of this increase and its effects on employment are highly uncertain. A number of factors suggest that the U.S. fishing fleet, and in particular onshore Alaska processors, are at an economic disadvantage compared to foreign operations. These are high U.S. labor costs (in particular in Alaska), high transportation costs from Alaska (due partly to the Jones Act), lack of a well-developed transportation and services infrastructure, lack of a highly skilled, stable labor force for an onshore processing industry, lack of U.S. marketing channels for Alaska groundfish, high American interest rates, subsidization of foreign fisheries, high quality standards in foreign markets, and import barriers for foreign

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markets. These factors are discussed in Scott (1980) and Natural Resources Consultants (1980). Working in favor of the future development of the U.S. bottomfish industry are the commitment of the State of Alaska to growth of the industry and the carrot and stick provided by U.S. allocations of Alaska.groundfish resources to foreign operators.

Widely varying estimates of employment impacts of bottomfish industry expansion have been produced by earlier studies such as those by Sea Grant (Terry, 1980), and Earl R. Combs, Inc. (1981). The difference in these estimates can be attributed to differences in assumptions about total U.S. harvest levels, the allocation of the harvest between different harvesting and processing methods, employment requirements per metric ton harvested and processed, and the residency patterns of harvesting and processing employees. In order to project employment for this study, assumptions were made with respect to each of these variables, based on past studies and other available evidence.

The assumptions used to project Aleutian Islands employment for the SCIMP model varied slightly from those used to project statewide and census division employment for the MAP model, due to the availability of more recent harvest data and a revision of residency assumptions. The assumptions are presented below.

1. Total Domestic Bottomfish Harvest, by Region. The North Pacific Fisheries Management Council divides Alaska bottomfish resources by two regions, the Gulf of Alaska and the Bering Sea/Aleutian Island

area. We used this same regional division. A similar division was used by the Sea Grant study (Terry, 1980), except that only the Chirikov/Shumagin (western) part of the Gulf of Alaska was studied.

Earlier studies by Sea Grant (Terry, 1980) and Earl R. Coombs (1981) assumed that U.S. domestic bottomfish harvests will rise from present levels to a maximum sustained yield level in the year 2000. The Sea Grant study assumed a constant growth rate, with most of the growth occurring towards the end of the period, while the Combs study assumed a normal growth path, with much more rapid growth during the early part of this period.

The assumptions in these studies are to a large extent arbitrary. The rate and form of U.S. takeover of the Alaska bottomfishery will depend upon uncertain economic trends and political and management decisions. Our own best guess is that the growth of the U.S. bottomfish industry will proceed relatively gradually at first, due to the unfavorable economic factors listed above, but will eventually be substantial, as a result of improving markets and political and management support of a U.S. industry. Therefore, we assumed that in each region the domestic catch would grow at a constant rate of growth from 1981 harvest levels to the optimum yield level. This assumption is similar to the Sea Grant assumption, except that we choose the optimum yield rather than maximum sustained yield as the harvest level when total replacement is achieved. This is the harvest level which the North

TABLE 134: ALLOCATION OF HARVEST ASSUMPTIONS

	Joint Venture Trawlers	Catcher Processors	Trawlers Fishing for Onshore Processing
Starting Values (MAP Models)	.89	0	.11
Starting Values (SCIMP Model)	.897	.026	.077
Ending Values (Both Models)	.20	.60	.20

The high ending share for catcher processors reflects an assumption that this form of harvesting and processing will eventually prove most economical for development of the U.S. domestic bottomfish industry.

3. Employment per Metric Ton Harvested and Processed. The following figures are assumed for employment coefficients:

Offshore Processing	.00323	Employees/metric ton
Trawlers Fishing for Onshore Plants	.00222	Employees/metric ton
Onshore Processing Plants	.00746	Employees/metric ton
Joint Venture Trawlers	.00222	Employees/metric ton

The first three figures are based on employment assumptions in the Sea Grant study (Terry, 1980, pp. 46, 47). The offshore processing figure is an average for all bottomfish species (Terry, 1980, Table 4.110, p. 525). We assumed the same employment coefficient for joint venture trawlers as for trawlers fishing for onshore plants.

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4.   Residency. For the MAP models, residency patterns were assumed
to remain constant throughout the projection period. For the SCIMP
model employment projections, residency shares were assumed to in-
crease in a linear fashion over time from 1981 until 2000, as a result
of growth in local communities and establishment of a year-round
harvesting and processing industry. These assumptions are shown in
Table 135.

The MAP model residency assumptions were used for the census division
breakdown of employment for the regional model. Thus, employees
fishing in the Bering Sea, but residing in Kodiak, were considered to
be located in Kodiak for the regional model base case assumptions.
This was in contrast with the treatment of "enclave" employment in the
MAP regional model assumptions, where, for instance, employment at
Prudhoe Bay is considered to be located in the Barrow/North Slope
region, even though very few of these employees reside in the region.

5.   Onshore Processing Plant Construction Employment. A ratio of
.0015 man-years of construction employment per metric ton increase in
onshore processing plant capacity is assumed. This construction
employment is assumed to occur in the year prior to the increase in
onshore processing capacity. For the SCIMP model runs, all of this
employment was assumed to be nonresident.

TABLE 135. BOTTOMFISH EMPLOYMENT RESIDENCY ASSUMPTIONS

MAP Models: Residency Share Assumptions[a]

	Aleutian Islands	Kodiak	Anchorage	Outside of Alaska
Catcher Processors				
Bering Sea	0.2	0.0	0.1	0.7
Gulf of Alaska	0.0	0.2	0.1	0.7
Joint Venture Trawlers				
Bering Sea	0.4	0.4	0.0	0.2
Gulf of Alaska	0.0	0.8	0.0	0.2
Onshore Processing				
Bering Sea	1.0	0.0	0.0	0.0
Gulf of Alaska	0.0	1.0	0.0	0.0
Trawlers for Onshore				
Bering Sea	1.0	0.0	0.0	0.0
Gulf of Alaska	0.0	1.0	0.0	0.0

SCIMP MODEL: Share of Bering Sea Fishing and Processing Employment Residing in the Aleutian Islands

Employment Type	1981	2000
Catcher Processors	.2	.2
Joint Venture Trawlers	.2	.5
Onshore Processing	.25	.8
Trawlers Fishing for Onshore Plants	.25	.8

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[a]Assumed to remain constant.

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Employment Projections

The bottomfish employment projections based on these assumptions are presented in Table 66 (Chapter III, page 150) for the MAP models, and in Table 136 for the SCIMP model.

TABLE 136.   SCIMP MODEL ALEUTIAN ISLANDS BOTTOMFISH EMPLOYMENT ASSUMPTIONS

	1981	1985	1990	1995	2000
Total Harvest	87,512	160,500	342,400	7,307,000	1,559,000
Employment					
Joint Venture Trawlers					
Resident	35	70	147	262	346
Nonresident	139	197	283	360	346
Catcher Processors					
Resident	1	15	66	212	604
Nonresident	6	61	264	848	2,417
Trawlers Fishing for Onshore Plants					
Resident	4	13	52	178	554
Nonresident	11	23	50	94	138
Processing Plants					
Resident	13	45	177	600	1,864
Nonresident	38	78	169	315	466

SOURCE: See text.

Appendix B Sources

Alaska Department of Fish and Game, Groundfish Catch Statistics, included in North Pacific Fisheries Management Council briefing paper (November 24, 1981).

Earl R. Combs, Inc. 1981. St. George Basin and North Aleutian Shelf Commercial Fishing Analysis. BLM Alaskan Outer Continental Shelf Office Technical Report No. 60 (BLM, Anchorage, October).

North Pacific Fishery Management Council. "Fishery Management Plan for the Gulf of Alaska Groundfish Fishery" (Anchorage, North Pacific Fishery Management Council, June 1981).

North Pacific Fishery Management Council. "Fishery Management Plan for Groundfish in the Bering Sea/Aleutian Island Area" (Anchorage, North Pacific Fishery Management Council, November 19, 1979).

Terry, Joseph M., Roger G. Scoles, and Douglas Larson. (Alaska Sea Grant Program, University of Alaska). 1980. Western Alaska and Bering Norton Petroleum Development Scenarios: Commercial Fishing Industry Analysis, OCS Technical Report No. 51 (Anchorage, Alaska OCS Office, August).

APPENDIX C: OCS EMPLOYMENT ASSUMPTIONS

OCS annual employment figures were provided by the Alaska OCS office.
These figures were broken down according to the phases and activities
shown in column (1) of Table 137.   These figures are reproduced as
Tables 138-143, corresponding to the different OCS cases studied.

In order to use these employment figures in the MAP models, it was
necessary to make assumptions regarding the shares of OCS workers who
would be Alaska residents.   These assumptions are shown in column (4)
of Table 137.   For use in the SCIMP model projections for the Aleutian
Islands, it was necessary to make assumptions regarding the shares of
OCS workers who would be residents of the Aleutian Islands.   These
assumptions are shown in column (5) of Table 137.   Both the state
residency and local residency assumptions are based on a paper by Will
Nebesky and Lee Huskey, entitled "Patterns of Resident Employment in
Alaska's Outer Continental Shelf Industry" (November, 1981).

TABLE 137. LOCATION AND RESIDENCE ASSUMPTIONS FOR OCS EMPLOYMENT, SALE 75 (NORTH ALEUTIAN SHELF)

(1) Activity	(2) Abbreviation	(3) Assumed Location	(4) Share of Employment to AK Residents (SEAR)(For Use In MAP Model)	(5) Share of Employment To Local Residents (SELR)(i.e., Share of Workers not Living In Enclaves--For Use In SCIMP Model)
Exploration Phase				
Drilling Rigs	EMDDX	Offshore	0	0
Aircraft Vessels(c)	EMSSX			
Aircraft	EMSSX1	Cold Bay	1.0	.05
Vessels	EMSSX2	Dutch Harbor	.15	.15
Shore Bases(d)	EMSBX			
Cold Bay Base	EMSBX1	Cold Bay	1.0	.1
Dutch Harbor Base	EMSBX2	Dutch Harbor	1.0	.22
Construction Phase				
Platform Installation	EMPIC	Offshore	.25	0
Shore Bases(e)	EMSBC			
Cold Bay Base	EMSBC1	Cold Bay	.5	.10
Dutch Harbor Base	EMSBC2	Dutch Harbor	.5	.22
Pipeline Construction(f)	EMPCC			
Offshore	EMPCC1	Offshore	.25	0
Onshore	EMPCC2	Onshore(a)	.35	.05

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TABLE 137
(CONTINUED)

(1)	(2)	(3)	(4)	(5)
Activity	Abbreviation	Assumed Location	Share of Employment to AK Residents (SEAR)(For Use In MAP Model)	Share of Employment To Local Residents (SELR)(i.e., Share of Workers not Living In Enclaves--For Use In SCIMP Model)
Oil Terminal	EMOTC	Cold Bay	.5	.05
LNG Terminal	EMLTC	Cold Bay	.5	.05
Development Production Phase				
Development Drilling	EMDDD	Offshore	0	0
Aircraft/Vessels[g]	EMSSD			
Vessels	EMSSD1	Dutch Harbor	.95	.18
Aircraft	EMSSD2	Cold Bay	1.0	.05
Shore Bases[h]	EMSBD			
Cold Bay Base	EMSBD1	Cold Bay	1.0	.22
Dutch Harbor Base	EMSBD2	Dutch Harbor	1.0	.22
Headquarters	EMHQD	Anchorage	1.0	0
Oil Terminal	EMOTD	Cold Bay	1.0	.15
LNG Terminal	EMLTD	Cold Bay	1.0	.15
Production Operations	EMPOD	Offshore	.95	.08[b]

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TABLE NOTES

(a) Onshore pipeline construction local resident employees were assumed to live at Cold Bay.

(b) No assumption was made as to the location of residence of those workers who work offshore but live locally, i.e., in the Aleutians. Presumably, they would live either in Cold Bay or Dutch Harbor.

(c) Assumed to be 20 percent aircraft and 80 percent vessels, based on a ratio of one helicopter to two vessels during exploration (Alaska OCS Office).

(d) Assumed to be 20 percent Cold Bay Base and 80 percent Dutch Harbor Base, based on aircraft and vessel breakdown.

(e) Same as (d).

(f) Assumed to be 85 percent offshore and 15 percent onshore.

(g) Assumed to be 34 percent aircraft and 66 percent vessels, based on a ratio of one helicopter to one vessel during development and production (Alaska OCS Office).

(h) Assumed to be 34 percent Cold Bay Base and 66 percent Dutch Harbor.

TABLE 138. OCS EMPLOYMENT, MEAN BASE CASE

REPORT DATE 10/14/81   PCN C3403   NORTH ALEUTIAN SHELF SALE 75
                                                           MEAN BASE CASE
                                    ESTIMATED EMPLOYMENT EXPLORATION PHASE (MAN-MONTHS)

YEAR	DRILLING RIGS (MINING)	AIRCRAFT/VESSELS (TRANSPORTATION)	SHORE BASES (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984	2,858	1,296	360	4,514	376
1985	5,715	2,472	360	8,547	712
1986	6,287	2,472	360	9,119	759
1987	5,715	2,472	360	8,547	712
1988	1,715	708	360	2,783	231

(Continued)

REPORT DATE 10/14/81   PCV CS410

NORTH ALEUTIAN SHELF SALE 75
MEAN BASE CASE
ESTIMATED EMPLOYMENT CONSTRUCTION PHASE (MAN-MONTHS)

YEAR	PLATFORM INSTALLATION	SHORE BASE	PIPELINE CONSTRUCTION	OIL TERMINAL	LNG TERMINAL	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984		924				924	77
1985		924				924	77
1986	12,735	924				13,659	1,138
1987	17,829					17,829	1,485
1988	24,197		2,921	440	2,640	30,198	2,516
1989	20,376		3,473	1,100	4,840	29,789	2,482
1990	5,094			440	2,640	8,174	681
1991				440	2,640	3,080	256

OCS EMPLOYMENT, MEAN BASE CASE
(Continued)

NORTH ALEUTIAN SHELF SALE 75
MEAN BASE CASE
ESTIMATED EMPLOYMENT DEVELOPMENT/PRODUCTION PHASE (MAN-MONTHS)

YEAR	DEVELOPMENT DRILLING (MINING)	AIRCRAFT/ VESSELS (TRANSP)	SHORE BASES (MINING)	HEADQTRS (MINING)	OIL TERMINAL (TRANSP)	LNG TERMINAL (TRANSP)	PRODUCTION OPERATIONS (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1986		708					2,894	3,602	300
1987		1,415					5,787	7,203	600
1988	10,631	2,478	360				10,127	23,596	1,966
1989	18,900	3,186	360	13			13,021	35,480	2,956
1990	11,813	3,136	360	26	720	1,440	13,021	30,566	2,547
1991	8,269	1,770	360	112	1,080	2,160	13,021	26,772	2,231
1992	6,383	1,770	360	224	1,440	2,880	13,021	26,078	2,173
1993	480	1,770	360	316	1,440	2,880	13,021	20,267	1,680
1994	840	1,770	360	375	1,440	2,880	13,021	20,686	1,723
1995	1,080	1,770	360	375	1,440	2,880	13,021	20,926	1,743
1996	1,080	1,770	360	375	1,440	2,880	13,021	20,926	1,743
1997	1,080	1,770	360	375	1,440	2,880	13,021	20,926	1,743
1998	1,080	1,770	360	375	1,440	2,880	13,021	20,926	1,743
1999	1,080	1,770	360	375	1,440	2,880	13,021	20,926	1,743
2000	1,080	1,770	360	375	1,440	2,880	13,021	20,926	1,743
2001	1,080	1,770	360	375	1,440	2,880	13,021	20,926	1,743
2002	1,080	1,770	360	375	1,440	2,880	13,021	20,926	1,743
2003	1,080	1,770	360	375	1,440	2,880	13,021	20,926	1,743
2004	1,080	1,770	360	375	1,440	2,880	13,021	20,926	1,743
2005	1,080	1,770	360	375	1,440	2,880	13,021	20,926	1,743
2006	600	1,062	180	188		2,880	3,888	8,798	733
2007	600	1,062	180	188		2,880	3,888	8,798	733
2008	600	1,062	180	188		2,880	3,888	8,798	733
2009	600	1,062	180	188		2,880	3,888	8,798	733
2010	600	1,062	180	188		2,880	3,888	8,798	733
2011	600	1,062	180	188		2,880	3,888	8,798	733
2012	600	1,062	180	188		2,880	3,888	8,798	733
2013	600	1,062	180	188		2,880	3,888	8,798	733
2014	600	1,062	180	188		2,880	3,888	8,798	733

OCS EMPLOYMENT, MEAN BASE CASE
(Continued)

REPORT DATE 10/15/81   PCN C9438

NORTH ALEUTIAN SHELF SALE 75
MEAN BASE CASE
SUMMARY OF DIRECT EMPLOYMENT (MAN-MONTHS)

YEAR	MINING	CONSTRUCTION	TRANSPORTATION	TOTAL	TOTAL MONTHLY EMPLOYMENT
1984	3,218	924	1,296	5,438	453
1985	5,075	924	2,472	9,471	789
1986	9,541	13,659	3,180	26,380	2,198
1987	11,862	17,629	3,898	33,579	2,798
1988	23,173	30,178	3,186	56,577	4,714
1989	36,204	29,789	3,136	65,269	5,439
1990	25,220	8,174	5,346	38,740	3,228
1991	21,762	3,080	5,010	29,852	2,487
1992	19,908		6,090	26,078	2,173
1993	14,177		6,090	20,267	1,688
1994	14,596		6,090	20,686	1,723
1995	14,836		6,090	20,926	1,743
1996	14,836		6,090	20,926	1,743
1997	14,836		6,090	20,926	1,743
1998	14,836		6,090	20,926	1,743
1999	14,836		6,090	20,926	1,743
2000	14,836		6,090	20,926	1,743
2001	14,836		6,090	20,926	1,743
2002	14,836		6,090	20,926	1,743
2003	14,836		6,090	20,926	1,743
2004	14,836		6,090	20,926	1,743
2005	14,836		6,090	20,926	1,743
2006	4,856		3,942	8,798	733
2007	4,856		3,942	8,798	733
2008	4,856		3,942	8,798	733
2009	4,856		3,942	8,798	733
2010	4,856		3,942	8,798	733
2011	4,856		3,942	8,798	733
2012	4,856		3,942	8,798	733
2013	4,856		3,942	8,798	733
2014	4,856		3,942	8,798	733

TABLE 139. OCS EMPLOYMENT, LOW FIND (95% PROBABILITY) CASE

REPORT DATE 10/16/81   PCN CS400   NORTH ALEUTIAN SHELF SALE 75
                                            95 PERCENT CASE
                                 ESTIMATED EMPLOYMENT EXPLORATION PHASE (MAN-MONTHS)

YEAR	DRILLING RIGS (MINING)	AIRCRAFT/VESSELS (TRANSPORTATION)	SHORE BASES (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984	1,143	708	360	2,211	184
1985	1,143	708	360	2,211	184
1986	1,143	708	360	2,211	184
1987	572	708	360	1,640	136

OCS EMPLOYMENT, LOW FIND (95% PROBABILITY) CASE
(Continued)

REPORT DATE 10/16/81   PCN CS410   NORTH ALEUTIAN SHELF SALE 75
                                                95 PERCENT CASE
                                   ESTIMATED EMPLOYMENT CONSTRUCTION PHASE (MAN-MONTHS)

YEAR	PLATFORM INSTALLATION	SHORE BASE	PIPELINE CONSTRUCTION	OIL TERMINAL	LNG TERMINAL	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984		286				286	23
1985		429				429	35
1986	6,368	429				6,797	566
1987	8,915					8,915	742
1988	2,547					3,923	326
1989			716	660		2,148	179
1990			1,268	880			
				660		660	55

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REPORT DATE 10/16/81   PCN C5420

OCS EMPLOYMENT, LOW FIND (95% PROBABILITY) CASE
(Continued)

NORTH ALEUTIAN SHELF SALE 75
95 PERCENT CASE
ESTIMATED EMPLOYMENT DEVELOPMENT/PRODUCTION PHASE (MAN-MONTHS)

YEAR	DEVELOPMENT DRILLING (MINING)	AIRCRAFT/ VESSELS (TRANSP)	SHORE BASES (MINING)	HEADQTRS (MINING)	OIL TERMINAL (TRANSP)	LNG TERMINAL (TRANSP)	PRODUCTION OPERATIONS (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1986		354					1,919	2,273	189
1987		708					3,839	4,547	378
1988	2,126	708	360				3,839	7,033	586
1989	2,126	354	360	13			3,839	6,692	557
1990	2,126	354	360	26	720		3,839	7,425	618
1991	1,890	354	360	92	1,080		3,839	7,615	634
1992	120	354	360	112	1,440		3,839	6,225	518
1993	240	354	360	112	1,440		3,839	6,345	528
1994	240	354	360	112	1,440		3,839	6,345	528
1995	240	354	360	112	1,440		3,839	6,345	528
1996	240	354	360	112	1,440		3,839	6,345	528
1997	240	354	360	112	1,440		3,839	6,345	528
1998	240	354	360	112	1,440		3,839	6,345	528
1999	240	354	360	112	1,440		3,839	6,345	528
2000	240	354	360	112	1,440		3,839	6,345	528
2001	240	354	360	112	1,440		3,839	6,345	528
2002	240	354	360	112	1,440		3,839	6,345	528
2003	240	354	360	112	1,440		3,839	6,345	528

OCS EMPLOYMENT, LOW FIND (95% PROBABILITY) CASE
(Continued)

REPORT DATE 10/16/81   PCN CS430

NORTH ALEUTIAN SHELF SALE 75
95 PERCENT CASE
SUMMARY OF DIRECT EMPLOYMENT (MAN-MONTHS)

YEAR	MINING	CONSTRUCTION	TRANSPORTATION	TOTAL	TOTAL MONTHLY EMPLOYMENT
1984	1,503	286	708	2,497	208
1985	1,503	429	708	2,640	220
1986	3,422	6,797	1,062	11,281	940
1987	4,771	8,915	1,416	15,102	1,258
1988	6,325	3,923	708	10,956	913
1989	6,338	2,148	354	8,840	736
1990	6,351	660	1,074	8,085	673
1991	6,101		1,434	7,615	634
1992	4,431		1,794	6,225	518
1993	4,551		1,794	6,345	528
1994	4,551		1,794	6,345	528
1995	4,551		1,794	6,345	528
1996	4,551		1,794	6,345	528
1997	4,551		1,794	6,345	528
1998	4,551		1,794	6,345	528
1999	4,551		1,794	6,345	528
2000	4,551		1,794	6,345	528
2001	4,551		1,794	6,345	528
2002	4,551		1,794	6,345	528
2003	4,551		1,794	6,345	528

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TABLE 140. OCS EMPLOYMENT, HIGH FIND (5% PROBABILITY) CASE

REPORT DATE 10/16/01   PCN CS400   NORTH ALEUTIAN SHELF SALE 75
                                             5 PERCENT CASE
                           ESTIMATED EMPLOYMENT EXPLORATION PHASE (MAN-MONTHS)

YEAR	DRILLING RIGS (MINING)	AIRCRAFT/VESSELS (TRANSPORTATION)	SHORE BASES (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984	5.144	1.884	360	7.388	615
1985	8.573	3.060	360	11.993	999
1986	8.573	3.060	360	11.993	999
1987	8.573	3.060	360	11.993	999
1988	6.858	2.472	360	9.690	807

OCS EMPLOYMENT, HIGH FIND (5% PROBABILITY) CASE
(Continued)

NORTH ALEUTIAN SHELF SALE 75
5 PERCENT CASE
ESTIMATED EMPLOYMENT CONSTRUCTION PHASE (MAN-MONTHS)

YEAR	PLATFORM INSTALLATION	SHORE BASE	PIPELINE CONSTRUCTION	OIL TERMINAL	LNG TERMINAL	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984		1,870				1,870	155
1985		2,244				2,244	187
1986		1,870				1,870	155
1987	12,735					12,735	1,061
1988	24,197		3,473	1,320	4,070	33,060	2,755
1989	35,111		4,024	3,520	11,193	51,848	4,320
1990	29,291			3,520	11,193	44,004	3,667
1991	20,376			2,640	7,123	30,139	2,511
1992	5,094			1,320	4,070	10,484	873

OCS EMPLOYMENT, HIGH FIND (5% PROBABILITY) CASE
(Continued)

NORTH ALEUTIAN SHELF SALE 75
5 PERCENT CASE
ESTIMATED EMPLOYMENT DEVELOPMENT/PRODUCTION PHASE (MAN-MONTHS)

YEAR	DEVELOPMENT DRILLING (MINING)	AIRCRAFT/ VESSELS (TRANSP)	SHORE BASES (MINING)	HEADQTRS (MINING)	OIL TERMINAL (TRANSP)	LNG TERMINAL (TRANSP)	PRODUCTION OPERATIONS (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1987		708					2,894	3,602	300
1988		1,773					7,234	9,004	750
1989	21,263	3,186	360	13			13,021	37,843	3,153
1990	21,263	4,248	360	26	2,040	2,400	17,361	47,698	3,974
1991	28,350	4,956	360	125	3,060	3,600	20,255	60,706	5,058
1992	21,263	4,956	360	256	4,080	4,800	20,255	55,970	4,664
1993	14,415	2,478	360	414	4,080	4,800	20,255	46,802	3,900
1994	8,633	2,478	360	552	4,080	4,800	20,255	41,158	3,429
1995	1,080	2,473	360	638	4,080	4,800	20,255	33,691	2,807
1996	1,440	2,478	360	697	4,080	4,800	20,255	34,110	2,842
1997	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
1998	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
1999	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2000	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2001	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2002	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2003	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2004	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2005	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2006	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2007	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2008	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2009	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2010	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2011	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2012	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2013	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2014	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2015	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2016	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2017	1,680	2,478	360	697	4,080	4,800	20,255	34,350	2,862
2018	840	1,416	180	349		4,800	6,804	14,389	1,199
2019	840	1,416	180	349		4,800	6,804	14,389	1,199
2020	840	1,416	180	349		4,800	6,804	14,389	1,199

OCS EMPLOYMENT, HIGH FIND (5% PROBABILITY) CASE
(Continued)

NORTH ALEUTIAN SHELF SALE 75
5 PERCENT CASE
SUMMARY OF DIRECT EMPLOYMENT (MAN-MONTHS)

YEAR	MINING	CONSTRUCTION	TRANSPORTATION	TOTAL	TOTAL MONTHLY EMPLOYMENT
1984	5,504	1,870	1,884	9,258	771
1985	8,933	2,244	3,060	14,237	1,186
1986	8,933	1,870	3,060	13,863	1,155
1987	11,827	12,735	3,768	28,330	2,360
1988	14,452	33,060	4,242	51,754	4,312
1989	34,657	51,848	3,186	89,691	7,474
1990	39,010	44,004	8,688	91,702	7,641
1991	49,090	30,139	11,616	90,845	7,570
1992	42,134	10,484	13,836	66,454	5,537
1993	35,444		11,358	46,802	3,900
1994	29,800		11,358	41,158	3,429
1995	22,333		11,358	33,691	2,807
1996	22,752		11,358	34,110	2,842
1997	22,992		11,358	34,350	2,862
1998	22,992		11,358	34,350	2,862
1999	22,992		11,358	34,350	2,862
2000	22,992		11,358	34,350	2,862
2001	22,992		11,358	34,350	2,862
2002	22,992		11,358	34,350	2,862
2003	22,992		11,358	34,350	2,862
2004	22,992		11,358	34,350	2,862
2005	22,992		11,358	34,350	2,862
2006	22,992		11,358	34,350	2,862
2007	22,992		11,358	34,350	2,862
2008	22,992		11,358	34,350	2,862
2009	22,992		11,358	34,350	2,862
2010	22,992		11,358	34,350	2,862
2011	22,992		11,358	34,350	2,862
2012	22,992		11,358	34,350	2,862
2013	22,992		11,358	34,350	2,862
2014	22,992		11,358	34,350	2,862
2015	22,992		11,358	34,350	2,862
2016	22,992		11,358	34,350	2,862
2017	22,992		11,358	34,350	2,862
2018	8,173		6,216	14,389	1,199
2019	8,173		6,216	14,389	1,199
2020	8,173		6,216	14,389	1,199

REPORT DATE 10/16/81   PCN CS400   NORTH ALEUTIAN SHELF SALE 75
                                                      ALTERNATIVE IV
                                  ESTIMATED EMPLOYMENT EXPLORATION PHASE (MAN-MONTHS)

TABLE 14T. OCS EMPLOYMENT, ALTERNATIVE 4 CASE

YEAR	DRILLING RIGS (MINING)	AIRCRAFT/VESSELS (TRANSPORTATION)	SHORE BASES (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984	1,715	708	360	2,783	231
1985	3,429	1,416	360	5,205	433
1986	5,144	1,884	360	7,388	615
1987	5,144	1,884	360	7,388	615
1988	1,143	708	360	2,211	184

OCS EMPLOYMENT, ALTERNATIVE 4 CASE
(Continued)

REPORT DATE 10/16/81   PCN CS413

NORTH ALEUTIAN SHELF SALE 75
ALTERNATIVE IV
ESTIMATED EMPLOYMENT CONSTRUCTION PHASE (MAN-MONTHS)

YEAR	PLATFORM INSTALLATION	SHORE BASE	PIPELINE CONSTRUCTION	OIL TERMINAL	LNG TERMINAL	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984		924				924	77
1985		924				924	77
1986	6,368	924				7,292	607
1987	15,282					15,282	1,273
1988	24,197		2,921	440	1,238	28,796	2,399
1989	14,009		2,921	1,100	2,475	20,505	1,708
1990	2,547			440	1,238	4,225	352
1991				440	1,238	1,678	139

OCS EMPLOYMENT, ALTERNATIVE 4 CASE
(Continued)

NORTH ALEUTIAN SHELF SALE 75
ALTERNATIVE IV
ESTIMATED EMPLOYMENT DEVELOPMENT/PRODUCTION PHASE (MAN-MONTHS)

YEAR	DEVELOPMENT DRILLING (MINING)	AIRCRAFT/ VESSELS (TRANSP)	SHORE BASES (MINING)	HEADQTRS (MINING)	OIL TERMINAL (TRANSP)	LNG TERMINAL (TRANSP)	PRODUCTION OPERATIONS (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1986		354					1,447	1,801	150
1987		1,062					4,340	5,402	450
1988	9,450	2,124	360	13			8,681	20,615	1,717
1989	18,900	2,478	360	26			10,127	31,878	2,656
1990	8,269	2,478	360	118	720	960	10,127	22,940	1,911
1991	7,088	1,416	360	243	1,080	1,440	10,127	21,629	1,802
1992	5,318	1,416	360	348	1,440	1,920	10,127	20,824	1,735
1993	360	1,416	360	388	1,440	1,920	10,127	15,971	1,330
1994	720	1,416	360	388	1,440	1,920	10,127	16,371	1,364
1995	840	1,416	360	388	1,440	1,920	10,127	16,491	1,374
1996	840	1,416	360	388	1,440	1,920	10,127	16,491	1,374
1997	840	1,415	360	388	1,440	1,920	10,127	16,491	1,374
1998	840	1,416	360	388	1,440	1,920	10,127	16,491	1,374
1999	840	1,416	360	388	1,440	1,920	10,127	16,491	1,374
2000	840	1,416	360	388	1,440	1,920	10,127	16,491	1,374
2001	840	1,415	360	388	1,440	1,920	10,127	16,491	1,374
2002	840	1,416	360	388	1,440	1,920	10,127	16,491	1,374
2003	840	1,416	360	388	1,440	1,920	10,127	16,491	1,374
2004	840	1,416	360	388	1,440	1,920	10,127	16,491	1,374
2005	840	1,416	360	388	1,440	1,920	10,127	16,491	1,374
2006	840	1,416	360	388	1,440	1,920	10,127	16,491	1,374
2007	840	1,416	360	388	1,440	1,920	10,127	16,491	1,374
2008	480	738	180	194		1,920	2,916	6,398	533
2009	480	708	180	194		1,920	2,916	6,398	533
2010	480	708	180	194		1,920	2,916	6,398	533
2011	480	708	180	194		1,920	2,916	6,398	533
2012	480	708	180	194		1,920	2,916	6,398	533
2013	480	708	180	194		1,920	2,916	6,398	533
2014	480	708	180	194		1,920	2,916	6,398	533

OCS EMPLOYMENT, ALTERNATIVE 4 CASE
(Continued)

NORTH ALEUTIAN SHELF SALE 75
ALTERNATIVE IV
SUMMARY OF DIRECT EMPLOYMENT (MAN-MONTHS)

YEAR	MINING	CONSTRUCTION	TRANSPORTATION	TOTAL	TOTAL MONTHLY EMPLOYMENT
1984	2,075	924	708	3,707	308
1985	3,789	924	1,416	6,129	510
1986	6,951	7,292	2,238	16,481	1,373
1987	9,844	15,282	2,946	28,072	2,339
1988	19,994	28,796	2,832	51,622	4,301
1989	29,400	20,505	2,478	52,383	4,365
1990	18,782	4,225	4,158	27,165	2,263
1991	17,693	1,678	3,936	23,307	1,942
1992	16,048		4,776	20,824	1,735
1993	11,195		4,776	15,971	1,330
1994	11,595		4,776	16,371	1,364
1995	11,715		4,776	16,491	1,374
1996	11,715		4,776	16,491	1,374
1997	11,715		4,776	16,491	1,374
1998	11,715		4,776	16,491	1,374
1999	11,715		4,776	16,491	1,374
2000	11,715		4,776	16,491	1,374
2001	11,715		4,776	16,491	1,374
2002	11,715		4,776	16,491	1,374
2003	11,715		4,776	16,491	1,374
2004	11,715		4,776	16,491	1,374
2005	11,715		4,776	16,491	1,374
2006	11,715		4,776	16,491	1,374
2007	11,715		4,776	16,491	1,374
2008	3,770		2,628	6,398	533
2009	3,770		2,628	6,398	533
2010	3,770		2,628	6,398	533
2011	3,770		2,628	6,398	533
2012	3,770		2,628	6,398	533
2013	3,770		2,628	6,398	533
2014	3,770		2,628	6,398	533

TABLE 142. OCS EMPLOYMENT, MEAN BASE CASE WITH OFFSHORE LOADING

REPORT DATE 12/08/81   PCN C5400

NORTH ALEUTIAN SHELF SALE 75
MEAN BASE CASE - OFFSHORE LOADING
ESTIMATED EMPLOYMENT EXPLORATION PHASE (MAN-MONTHS)

YEAR	DRILLING RIGS (MINING)	AIRCRAFT/VESSELS (TRANSPORTATION)	SHORE BASES (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984	2,858	1,296	360	4,514	376
1985	5,715	2,472	360	8,547	712
1986	6,287	2,472	360	9,119	759
1987	5,715	2,472	360	8,547	712
1988	1,715	708	360	2,783	231

OCS EMPLOYMENT, MEAN BASE CASE WITH OFFSHORE LOADING
(Continued)

REPORT DATE 12/08/81   PCN CS410

NORTH ALEUTIAN SHELF SALE 75
MEAN BASE CASE - OFFSHORE LOADING
ESTIMATED EMPLOYMENT CONSTRUCTION PHASE (MAN-MONTHS)

YEAR	PLATFORM INSTALLATION	SHORE BASE	PIPELINE CONSTRUCTION	OIL TERMINAL	LNG TERMINAL	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984		924				924	77
1985		924				924	77
1986	12,735	924				13,659	1,138
1987	17,829					17,829	1,485
1988	24,197					24,197	2,016
1989	20,376		878			21,254	1,771
1990	5,616					5,616	468
1991							

REPORT DATE 12/08/81   PCN 03420

NORTH ALEUTIAN SHELF SALE 75
MEAN BASE CASE - OFFSHORE LOADING
ESTIMATED EMPLOYMENT DEVELOPMENT/PRODUCTION PHASE (MAN-MONTHS)

YEAR	DEVELOPMENT DRILLING (MINING)	AIRCRAFT/ VESSELS (TRANSP)	SHORE BASES (MINING)	HEADQTRS (MINING)	OIL TERMINAL (TRANSP)	LNG TERMINAL (TRANSP)	PRODUCTION OPERATIONS (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1986		728					2,894	3,602	300
1987		1,416					5,787	7,203	600
1988	10,631	2,478	360				10,127	23,596	1,966
1989	13,500	3,186	360	17			13,021	35,480	2,956
1990	11,813	3,186	360	26			13,021	28,406	2,367
1991	8,269	1,770	360	112			13,021	23,532	1,961
1992	6,383	1,770	360	224			13,021	21,758	1,813
1993	480	1,770	360	316			13,021	15,947	1,329
1994	840	1,770	360	375			13,021	16,366	1,362
1995	1,080	1,770	360	375			13,021	16,606	1,382
1996	1,080	1,770	360	375			13,021	16,606	1,382
1997	1,080	1,770	360	375			13,021	16,606	1,382
1998	1,080	1,770	360	375			13,021	16,606	1,382
1999	1,080	1,770	360	375			13,021	16,606	1,382
2000	1,080	1,770	360	375			13,021	16,606	1,382
2001	1,080	1,770	360	375			13,021	16,606	1,382
2002	1,080	1,770	360	375			13,021	16,606	1,382
2003	1,080	1,770	360	375			13,021	16,606	1,382
2004	1,080	1,770	360	375			13,021	16,606	1,382
2005	1,080	1,770	360	375			13,021	16,606	1,382
2006	600	1,062	180	188			3,888	5,918	493
2007	600	1,062	180	188			3,888	5,918	493
2008	600	1,062	180	188			3,888	5,918	493
2009	600	1,062	180	188			3,888	5,918	493
2010	600	1,062	180	188			3,888	5,918	493
2011	600	1,062	180	188			3,888	5,918	493
2012	600	1,062	180	188			3,888	5,918	493
2013	600	1,062	180	188			3,888	5,918	493
2014	600	1,062	180	188			3,888	5,918	493

OCS EMPLOYMENT, MEAN BASE CASE WITH OFFSHORE LOADING
(Continued)

NORTH ALEUTIAN SHELF SALE 75
MEAN BASE CASE - OFFSHORE LOADING
SUMMARY OF DIRECT EMPLOYMENT (MAN-MONTHS)

YEAR	MINING	CONSTRUCTION	TRANSPORTATION	TOTAL	TOTAL MONTHLY EMPLOYMENT
1984	3,218	924	1,296	5,438	453
1985	6,075	924	2,472	9,471	789
1986	9,541	13,659	3,180	26,380	2,198
1987	11,862	17,322	3,895	33,579	2,798
1988	23,193	24,197	3,186	50,576	4,214
1989	32,294	21,254	3,186	56,734	4,728
1990	25,220	5,616	3,186	34,022	2,835
1991	21,762		1,770	23,532	1,961
1992	19,988		1,770	21,758	1,813
1993	14,177		1,770	15,947	1,328
1994	14,596		1,770	16,366	1,363
1995	14,836		1,770	16,606	1,383
1996	14,836		1,770	16,606	1,383
1997	14,836		1,770	16,606	1,383
1998	14,836		1,770	16,606	1,383
1999	14,836		1,770	16,606	1,383
2000	14,836		1,770	16,606	1,383
2001	14,836		1,770	16,606	1,383
2002	14,836		1,770	16,606	1,383
2003	14,836		1,770	16,606	1,383
2004	14,836		1,770	16,606	1,383
2005	14,836		1,770	16,606	1,383
2006	4,856		1,062	5,918	493
2007	4,856		1,062	5,918	493
2008	4,856		1,062	5,918	493
2009	4,856		1,062	5,918	493
2010	4,856		1,062	5,918	493
2011	4,856		1,062	5,918	493
2012	4,856		1,062	5,918	493
2013	4,856		1,062	5,918	493
2014	4,856		1,062	5,918	493

TABLE 143. ALTERNATIVE 4 CASE WITH OFFSHORE LOADING

REPORT DATE 12/30/81   PCN 05400

NORTH ALEUTIAN SHELF SALE 75
ALTERNATIVE IV - OFFSHORE LOADING
ESTIMATED EMPLOYMENT EXPLORATION PHASE (MAN-MONTHS)

YEAR	DRILLING RIGS (MINING)	AIRCRAFT/VESSELS (TRANSPORTATION)	SHORE BASES (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984	1,715	708	360	2,783	231
1985	3,429	1,416	360	5,205	433
1986	5,144	1,624	360	7,388	615
1987	5,144	1,664	360	7,388	615
1988	1,143	708	360	2,211	184

ALTERNATIVE 4 CASE WITH OFFSHORE LOADING
(Continued)

REPORT DATE 12/08/61   PCN C5410

NORTH ALEUTIAN SHELF SALE 75
ALTERNATIVE IV - OFFSHORE LOADING
ESTIMATED EMPLOYMENT CONSTRUCTION PHASE (MAN-MONTHS)

YEAR	PLATFORM INSTALLATION	SHORE BASE	PIPELINE CONSTRUCTION	OTL TERMINAL	LNG TERMINAL	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1984		924				924	77
1985		924				924	77
1986	6,368	924				7,292	607
1987	15,282					15,282	1,273
1988	24,197					24,197	2,016
1989	14,009		878			14,887	1,240
1990	5,069					3,069	255
1991							

ALTERNATIVE 4 CASE WITH OFFSHORE LOADING
(Continued)

NORTH ALEUTIAN SHELF SALE 75
ALTERNATIVE IV - OFFSHORE LOADING
ESTIMATED EMPLOYMENT DEVELOPMENT/PRODUCTION PHASE (MAN-MONTHS)

YEAR	DEVELOPMENT DRILLING (MINING)	AIRCRAFT/ VESSELS (TRANSP)	SHORE BASES (MINING)	HEADQTRS (MINING)	OIL TERMINAL (TRANSP)	LNG TERMINAL (TRANSP)	PRODUCTION OPERATIONS (MINING)	TOTAL MAN-MONTHS	AVERAGE MONTHLY EMPLOYMENT
1986	7,450	554					1,447	1,801	150
1987	18,900	1,062					4,340	5,402	450
1988	8,269	2,127					8,661	20,615	1,717
1989	7,062	2,478	360	12			10,127	31,878	2,656
1990	5,310	1,416	360	26			10,127	21,260	1,771
1991	360	1,416	360	118			10,127	15,105	1,552
1992	720	1,416	360	243			10,127	17,464	1,455
1993	640	1,416	360	348			10,127	12,611	1,050
1994	640	1,416	360	388			10,127	13,211	1,084
1995	640	1,416	360	388			10,127	13,131	1,054
1996	840	1,416	360	388			10,127	13,131	1,054
1997	840	1,416	360	388			10,127	13,131	1,054
1998	840	1,416	360	388			10,127	13,131	1,054
1999	840	1,416	360	388			10,127	13,131	1,054
2000	640	1,416	360	388			10,127	13,131	1,054
2001	640	1,416	360	388			10,127	13,131	1,054
2002	640	1,416	360	388			10,127	13,131	1,054
2003	640	1,416	360	388			10,127	13,131	1,054
2004	640	1,416	360	388			10,127	13,131	1,054
2005	640	1,416	360	388			10,127	13,131	1,054
2006	640	1,416	360	388			10,127	13,131	1,054
2007	640	1,416	360	388			10,127	13,131	1,054
2008	480	708	180	194			2,916	4,478	273
2009	480	708	180	194			2,916	4,478	273
2010	480	708	180	194			2,916	4,478	273
2011	480	708	180	194			2,916	4,478	273
2012	480	708	180	174			2,916	4,478	273
2013	480	708	180	194			2,916	4,478	273
2014	480	708	180	174			2,916	4,478	273

ALTERNATIVE 4 CASE WITH OFFSHORE LOADING
(Continued)

NORTH ALEUTIAN SHELF SALE 75
ALTERNATIVE IV - OFFSHORE LOADING
SUMMARY OF DIRECT EMPLOYMENT (PERSON-MONTHS)

YEAR	MINING	CONSTRUCTION	TRANSPORTATION	TOTAL	TOTAL MONTHLY EMPLOYMENT
1984	2,075	954	709	3,707	308
1985	3,787	424	1,416	6,129	510
1986	6,951	7,072	2,236	16,461	1,373
1987	9,644	15,288	2,836	28,072	2,339
1988	19,954	24,197	2,832	47,022	3,918
1989	29,490	14,857	2,472	46,765	3,897
1990	18,782	3,059	2,472	24,329	2,027
1991	17,693		1,416	19,109	1,592
1992	16,048		1,416	17,464	1,455
1993	11,195		1,416	12,611	1,050
1994	11,595		1,416	13,011	1,084
1995	11,715		1,416	13,131	1,094
1996	11,715		1,416	13,131	1,094
1997	11,715		1,416	13,131	1,094
1998	11,715		1,416	13,131	1,094
1999	11,715		1,416	13,131	1,094
2000	11,715		1,416	13,131	1,094
2001	11,715		1,416	13,131	1,094
2002	11,715		1,416	13,131	1,094
2003	11,715		1,416	13,131	1,094
2004	11,715		1,416	13,131	1,094
2005	11,715		1,416	13,131	1,094
2006	11,715		1,416	13,131	1,094
2007	11,715		1,416	13,131	1,094
2008	3,770		708	4,478	373
2009	3,770		708	4,478	373
2010	3,770		708	4,478	373
2011	3,770		708	4,478	373
2012	3,770		708	4,478	373
2013	3,770		708	4,478	373
2014	3,770		708	4,478	373

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