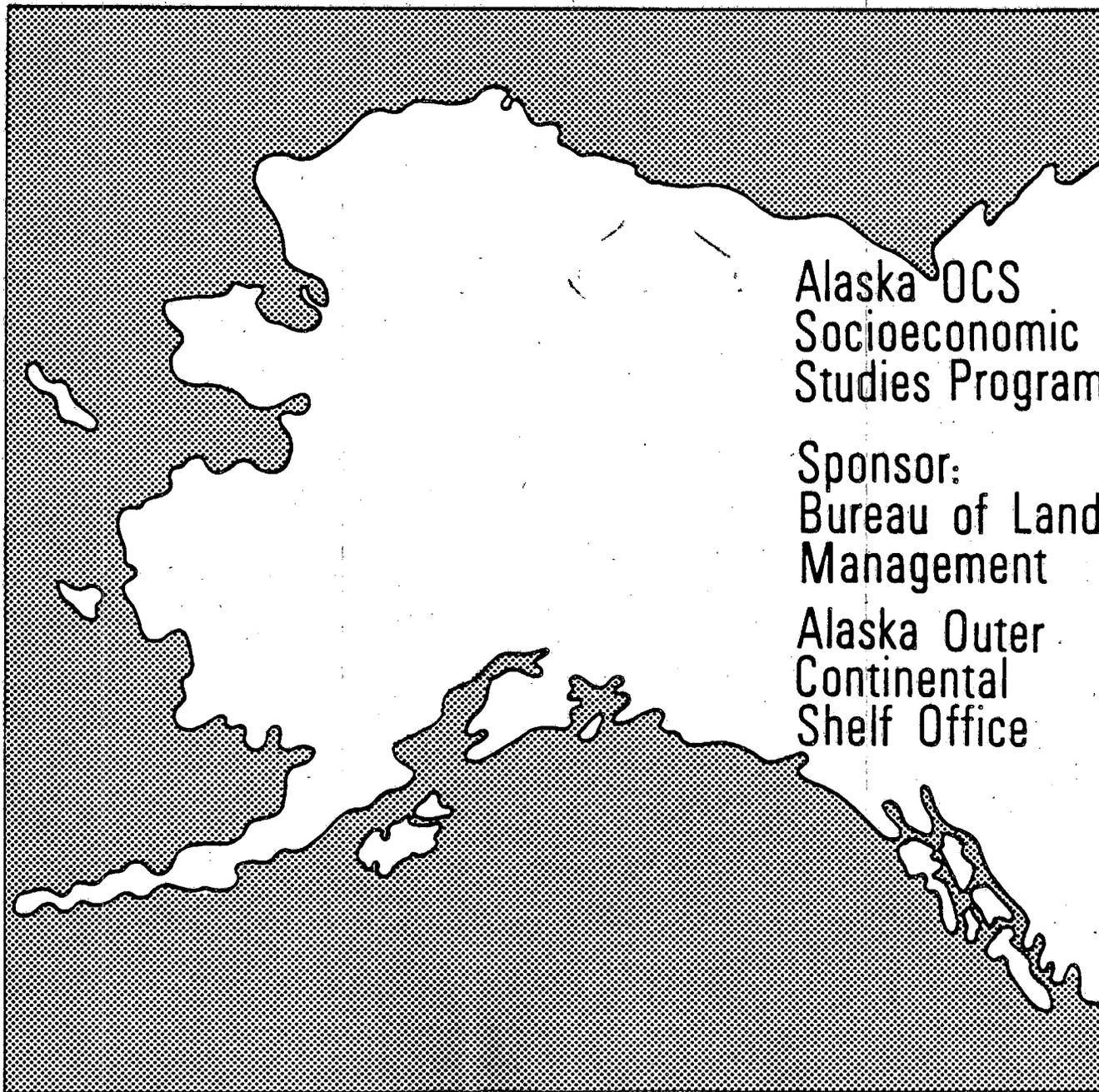


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**TECHNICAL REPORT  
NUMBER 62**



Alaska OCS  
Socioeconomic  
Studies Program

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**BEAUFORT SEA STATEWIDE AND  
REGIONAL DEMOGRAPHIC AND  
ECONOMIC SYSTEMS IMPACTS**

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TECHNICAL MEMORANDUM NO. 62

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STATEWIDE AND REGIONAL ECONOMIC AND DEMOGRAPHIC SYSTEMS,  
BEAUFORT SEA (71) IMPACT ANALYSIS

PREPARED FOR

BUREAU OF LAND MANAGEMENT  
ALASKA OUTER CONTINENTAL SHELF OFFICE

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STATEWIDE AND REGIONAL  
ECONOMIC AND DEMOGRAPHIC SYSTEMS  
BEAUFORT SEA (71) IMPACT ANALYSIS

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## I. INTRODUCTION

This study is concerned primarily with measuring the economic effects of the proposed Outer Continental Shelf (OCS) petroleum development in the Beaufort Sea (sale 71). This study includes a statewide and regional historic baseline analysis and base case projections against which the direct and indirect economic effects of Beaufort Sea OCS petroleum development are measured. The analysis and projections are carried out on a statewide level for selected regions within the state economy. The regions include Anchorage, Southcentral, Fairbanks, and North Slope regions of the Man-in-the-Arctic Program (MAP) models.

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 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 accuracy and limitations of the projection methodology and the projections themselves. Second, the assumptions necessary to "drive" the models are presented. Finally, the base case projections for the respective areas are presented.

## II. STATEWIDE AND REGIONAL GROWTH: THE BASELINE HISTORICAL ANALYSIS

### The Statewide Economy: Statehood - 1978

In carrying out the historic baseline studies, either for Alaska or the regions, it is important to keep in mind the purpose of the analysis. There are three primary objectives involved. First, the analysis 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, the study should 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, the baseline history should provide guidance in developing assumptions regarding future development of the economy.

Hence, the historical baseline study is not simply a description of the economy, but rather provides an analysis of the growth and changes in the system, the dimensions of economic well-being, and its future prospects. With these comments in mind, we can now turn to the baseline study of the state as a whole.

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

growth. The Good Friday earthquake of 1964 resulted in a major reconstruction 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 Fairbanks region, was the flood of 1967. Disaster relief and reconstruction funds, followed later by flood control projects, provided a needed 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.

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

Year	Agriculture	Forestry	Fisheries			Wholesale Value	Oil & Gas		Federal Government Outlays in Alaska (FY)	Total Government Spending in Alaska (FY)
			Value to Fishermen				Crude Oil	Dry Gas		
			Salmon	Shellfish	Total					
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	26.0	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	2701.5	89.6	1753.0	2845
1979	9.1P	N.A.	317P	231P	606P	1243P	5493.6P	91.5	1932.2	3147 <sup>e</sup>

p = preliminary

e = estimate

N.A. = not available

SOURCE: See Table 1 Notes

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.

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

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											
	<u>Emp.</u>	<u>%</u>																				
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	100.0
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	3.4
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	7.5
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	7.0
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	3.9
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	1.1
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	10.0
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	17.6
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	5.0
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	16.9
Government	22.7	39.9	29.7	42.1	35.6	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	32.0
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	11.1
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	8.8
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	12.1

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

	<u>1960</u>	<u>1965</u>	<u>1970</u>	<u>1972</u>	<u>1974</u>	<u>1976</u>	<u>1978</u>
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.

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.

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

(millions of current dollars)

COMPONENT	1960		1965		1970		1975		1978	
	\$	% Total	\$	% Total	\$	% Total	\$	% Total	\$	% 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	

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

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.

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.

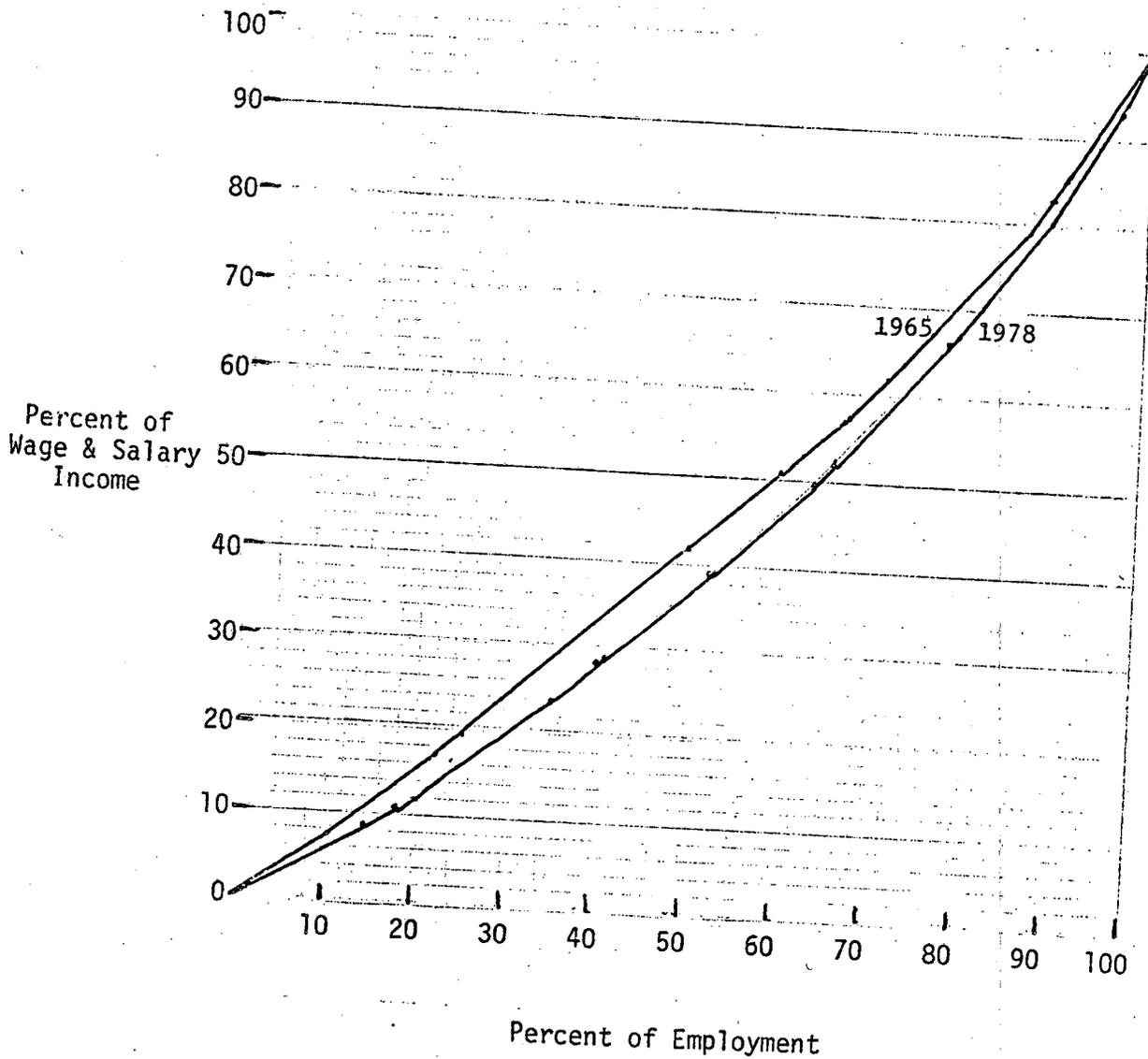
It is clear that drastic differences exist among industries and that the economic benefits of rapid economic expansion tend to be concentrated in a select few industries. A major portion of income implied in the growth of construction wages was also earned by nonresidents or temporary resident employees. 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.

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. Table 8 presents relative rates of growth in the Anchorage and U.S. CPIs for selected years and clearly illustrates the regional inflation associated with pipeline construction.

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 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.

FIGURE 1. DISTRIBUTION OF WAGE AND SALARY INCOME  
ALASKA, 1965 and 1978



SOURCE: See text.

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.

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.

Regional Economies: Anchorage, Southcentral,  
Fairbanks, and the North Slope

Potential impacts of OCS development will not be uniformly felt throughout the state. Rather, specific regions within Alaska can be

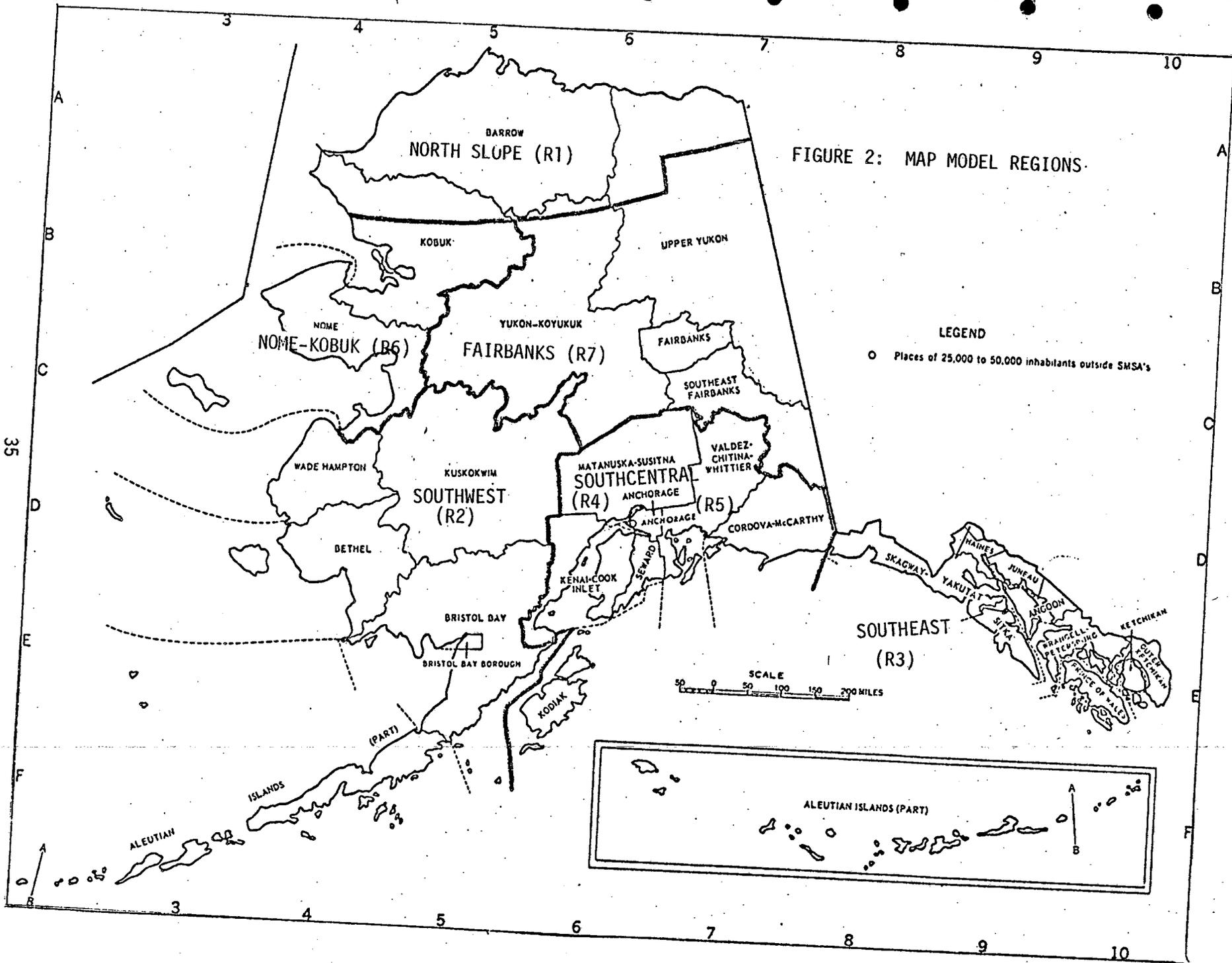
expected both to experience the brunt of the impacts and to capture disproportionate shares of the benefits. In the case of the present proposed lease sale, the Anchorage, Southcentral, and Fairbanks regions shown in Figure 2 can expect impacts as well as where the sale would occur. Hence, the baseline analysis must address these regions as well as the state as a whole.

#### ANCHORAGE AND SOUTHCENTRAL

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 makes it particularly important to consider the structure and growth



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 11). 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 12, both in current and constant (1978) dollars. In current dollars,

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.

#### Population

Population for Anchorage has grown from 102.3 thousand in 1965 to 185.5 thousand in 1978, at an average annual growth rate of 4.7 percent (see Table 13). 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

TABLE 13. ANCHORAGE POPULATION  
1965-1978

(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

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SOURCE: Alaska Department of Labor.

## FAIRBANKS

The Fairbanks region in the MAP model includes the Upper Yukon, Yukon-Koyukuk, Southeast Fairbanks, and Fairbanks Census Divisions, and comprises Alaska's geographic interior (see Figure 2). The distribution of economic activity among these regions remains fairly stable during the 1970s. The Fairbanks Census Division which includes the city of Fairbanks captured about 85 percent of regional personal income in both 1970 and 1978. The remaining 15 percent was distributed in diminishing amounts among the Yukon-Koyukuk, Southeast Fairbanks, and Upper Yukon Census Divisions.

Until the mid-1970s, the government sector, consisting primarily of defense, communications, and the University of Alaska, was the largest producer of income and employment in the region. Between the late-1960s and mid-1970s the construction employment, as a proportion of regional employment, grew from less than 10 percent to more than 25 percent and temporarily became the largest determinant of overall economic activity. Headquartered in the Fairbanks Census Division, the northern half of the Trans-Alaska Pipeline System was the principal source of direct and multiplier construction employment in the mid-1970s. The role played by Fairbanks during the oil pipeline construction reflects the importance of Fairbanks as a center of transportation, distribution, and other economic support for the interior region.

TABLE 14. NONAGRICULTURAL WAGE AND SALARY EMPLOYMENT IN THE FAIRBANKS REGION, SELECTED YEARS

(Persons)

	1965		1968		1970		1972		1974		1976		1979	
	Emp	%												
Total NonAgric Wage & Salary Employment	13107	100	13828	100	15770	100	17258	100	24443	100	32195	100	24704	100
Mining	270	2	180	1	181	1	211	1	*	*	283	1	*	*
Contract Construction	1393	11	997	7	*	*	1208	7	5360	22	8647	27	*	*
Manufacturing	250	2	*	*	248	2	245	1	307	1	*	*	*	*
Transportation, Communications, and Utilities	1722	13	1736	13	2119	13	1969	11	2476	10	3725	12	*	*
Wholesale-Retail	*	*	2152	16	*	*	*	*	*	*	4588	14	*	*
Finance, Insurance and Real Estate	386	3	458	3	*	*	562	3	656	3	*	*	859	3
Services	*	*	1575	11	1794	11	2515	15	3546	15	5420	17	*	*
Federal Government	3181	24	2931	21	2905	18	3262	19	3131	13	2974	9	2946	12
State & Local Government	2745	21	3524	25	4034	26	4652	27	4646	19	5162	16	6136	25

\* Withheld under nondisclosure regulations.

SOURCE: Alaska Department of Labor tabulations.

1970s than levels experienced prior to pipeline construction. Hence, labor force increases during and immediately after the pipeline boom were not matched by comparable, sustained increases in total employment during the period of post-pipeline decline.

#### Personal Income and Population

As shown in Table 16, personal income expressed in current dollars grew at varying rates from the mid-1960s to the late 1970s. The eight percent average annual rate of growth between 1965 and 1970 nearly tripled to 23 percent per year from 1970 to 1976. Personal income in 1976, \$916 million, expanded over five times the 1965 level. Although regional income dropped 19 percent to \$768 million between 1976 and 1977, the data suggest that this decline was short lived as income increased slightly thereafter. Over the entire 13 year period, personal income grew at an average annual rate of 11.9 percent.

Expressed in constant, 1978 dollars, personal income grew at about half its nominal rate, suggesting a 6.1 percent average annual rate of inflation over the same period. After adjusting for population expansion (Table 17) per capita personal income grew at a real rate of 3.5 percent per year.

Population growth is similar to the varied pattern of income and employment growth in the Fairbanks region except that regional population peaks one year earlier than personal income at nearly 79,000 persons in 1975. Over the 10-year period preceding 1975, population grew

TABLE 17. POPULATION IN THE FAIRBANKS REGION  
1965-1979  
(Persons)

1965	50,779
1966	51,139
1967	51,369
1968	51,300
1969	52,830
1970	56,077
1971	54,977
1972	56,797
1973	56,593
1974	63,151
1975	78,614
1976	68,572
1977	58,208
1978	67,500
1979	66,314

Average Annual Percent Growth

<u>1965-1975</u>	<u>1965-1979</u>
4.5%	1.9%

SOURCE: Alaska Department of Labor, Alaska Population Overview,  
December 1979 (estimate for 1979 is provisional).

The majority of the North Slope economy is in stage two or three.

Subsistence continues to play a important role in the economy. A recent survey in the region showed that over 70 percent of the Native residents participated in subsistence activities during the year. Over 45 percent of the residents got at least half of their food through subsistence activities (Kruse, 1981). Although the same survey found little negative association between working and participation in subsistence activities, the importance of subsistence as an economic activity does affect the local market economy. The subsistence economy will affect the response to market sector opportunities by influencing such things as, the demand for market goods, the labor force participation, and the seasonality of participation.

The second important factor to consider when analyzing the North Slope economy is its frontier or remote nature. The North Slope is a remote, low density region. In relation to its population, the region possesses a large amount of resources (see example, Kreitner, 1978). In regions such as the North Slope with a high resource to population ratio, economic growth is primarily determined by the development of the resources.

The pattern of growth in such regions is described by the Staple Theory of growth (Watkins, 1972). Staple or natural resource exports in economies like the North Slope are the leading sector of growth. Most capital and labor used in the production of the natural resource

opening of whaling grounds in the 1870s. North Slope natives participated in the whaling industry both as crews for wages and as entrepreneurs who organized their own crews. With the decline in whaling, trapping for furs rose as the predominant industry in the cash economy. Furs replaced whaling in the early 1900s (historical information from Sonnenfeld, 1957).

The effect of the way the natural resource is produced on the economic growth of the region can be examined by looking at the effect of whaling and trapping on population concentration. Because of the need for crews and the physical advantage of Point Barrow, whaling led to a concentration of the population at Barrow. Trapping of furs requires a large territory per trapper, so this production reversed the trend toward concentration and led to population dispersal.

Whaling and fur production linked the North Slope economy to the broader market economy. These activities represented the beginnings of dependency of the region, as locally produced goods were replaced by imported goods. In many cases these goods increased the efficiency of subsistence activity (Sonnenfeld sights the introduction of the shoulder gun for whaling), but increased the dependence on outside markets to obtain subsistence. These activities also introduced the vagaries of natural resource markets. Both whaling and fur production experienced rapidly fluctuating prices which affected regional production but were determined by outside factors.

Prudhoe Bay is the largest known petroleum reserve in North America; it contains reserves estimated at 9.6 billion barrels of oil and 25 trillion cubic feet of gas. Development of the field began in 1969. The development of Prudhoe Bay resulted in the construction of considerable infrastructure including major projects such as the Trans-Alaska Pipeline and the Prudhoe Bay haul road, as well as airports, port facilities, and employee living quarters (Alaska Consultants, 1978).

The prevailing conditions in arctic regions--remoteness, lack of infrastructure, and separation--dictate the production attributes of successful arctic commercial activity. Such enterprises must be large, have access to large amounts of capital, import technologies, and export the product in the most easily transportable form (Rea, 1976). The high costs of production in the arctic also dictate that only bonanza resource deposits will be developed. The petroleum development at Prudhoe Bay fits this description.

Prudhoe Bay development has three potential linkages with the local regional economy. The first linkage is its effect on the production of other petroleum resources in the region. The large cost of infrastructure development which is absorbed by the Prudhoe Bay development, allows smaller arctic fields near this existing infrastructure to be developed. Prudhoe Bay has changed the cost of petroleum development in the region making more resources economic (Kreitner, 1978). This will affect future development.

TABLE 18. NORTH SLOPE REGION POPULATION GROWTH

<u>Year</u>	<u>Total</u>	<u>Barrow</u>	<u>Other Traditional Communities</u>	<u>Prudhoe Bay and Other Industrial Areas</u>
1950	1678	951	727	-0-
1960	2577	1314	1263	-0-
1970	3423	2152	945	326
1979	8695	2715	1606	4374
1980 <sup>1</sup>	4199	2207	1992	-0-

<sup>1</sup>1980 census resident population. Excludes population working in the region with residence outside the region.

SOURCE: Table 3-1. Kruse, et al. 1981.

TABLE 19. NORTH SLOPE REGION DEMOGRAPHIC STRUCTURE  
OF NORTH SLOPE ESKIMOS  
(Percent of total)

Age	1960		1970		1977	
	Male	Female	Male	Female	Male	Female
< 10	22	20	17	16	11	11
11-17	7	6	10	10	11	11
18-24	5	5	6	5	8	7
25-34	9	6	5	5	10	6
35-44	5	3	5	4	5	4
45-54	3	3	3	4	4	3
55+	4	2	6	4	5	4

SOURCE: Figure 3-1. Kruse, et al. 1981.

TABLE 20. NORTH SLOPE REGION EMPLOYMENT GROWTH  
(Annual average employment)

<u>Year</u>	<u>Total Employment</u>	<u>Prudhoe Bay</u>	<u>Net</u>
1970	--	--	977 <sup>1</sup>
1975 <sup>2</sup>	6172	3820	2352
1976	6932	4444	2488
1977	5674	2723	2951
1978	6059	2493	3566
1979	5549	2282	3267

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<sup>1</sup>Prior to North Slope Borough formation, employment district did not include Prudhoe Bay.

<sup>2</sup>1975-1979 employment estimates from Alaska Department of Labor communications.

TABLE 21. NORTH SLOPE REGION STRUCTURE OF EMPLOYMENT  
(Percent of total)

<u>Industry</u>	<u>1970</u>	<u>1979</u>	
		<u>Total</u>	<u>Net of Prudhoe</u>
Mining	28.6	46.3	21.6
Construction	17.7	7.5	9.7
Transportation	8.8	6.4	8.5
Trade & Finance	13.4	7.0	11.5
Service	14.5	5.8	3.4
Government	16.9	27.0	45.7
Per capita support sector employment	.088	.082	.113

SOURCE: Base of Alaska Department of Labor communications.

Table 22 shows the seasonality of employment. Seasonality is compared in three years; 1970 and 1973 exclude Prudhoe Bay activity. The pattern of seasonality is much less in 1979 than in 1970. The pattern of seasonality does not vary significantly between 1973 and 1979. There seems to be little seasonality evident in the employment figures. This may be partly a result of complementary seasonal patterns in different mining phases: exploration, development, and production. The small size of the economy means that this pattern can be easily changed by some major activity, such as a large construction project.

#### Economic-Demographics Linkage

Traditionally regional population growth has been assumed to be related to the change in employment opportunities. An increase of jobs over residential labor force results in an increase in population, and population is reduced if labor force is greater than the available jobs. This pattern does not describe the growth of rural regions in Alaska. In the North Slope while the resident population (non-Prudhoe Bay) increased by forty percent between 1970 and 1979, non-Prudhoe employment increased by over two hundred percent.

Four factors make the relation between employment and population growth less direct than traditionally assumed. First, the enclave nature of employment in the region means many workers come to the region simply to work, and jobs are filled by nonresidents. The short-term nature of much of the employment in construction and resource development makes this nonresident pattern of employment possible.

employment in the oil and gas industry in Alaska (Alaska Department of Labor, 1978) with job descriptions supplied by the U.S. Department of Labor (U.S. Labor Department, 1974), we found no more than 25 percent of the jobs could be considered unskilled or semiskilled. If clerical positions are removed, this figure would be approximately 17 percent. This illustrates the natural resource jobs available to North Slope residents may be limited.

#### Government Growth

The major linkage between the resource development at Prudhoe Bay and the local North Slope economy was the government linkage. The formation of the North Slope Borough in 1972 provided residents with the ability to maintain some of the income arising from petroleum production in the region through taxation of petroleum facilities. One of the main features of the Borough is that it has used the tax resources not only to provide services and public facilities but also to provide jobs. Growth of local government employment is the major determinant of economic growth in the local economy.

The North Slope Borough collects a property tax on Prudhoe Bay facilities. This tax is limited in two ways. First, the state places a 20-mill ceiling on all taxation of oil and gas property which both the state and local governments can collect. Second, the local government share of this property tax is determined by a formula determined by either population (\$1500 per capita) or a formula accounting for the average statewide per capita property assessment. As a way around

TABLE 23. NORTH SLOPE REGION BOROUGH REVENUES  
(Thousands of dollars)

<u>FY</u>	<u>Total</u>	<u>Source</u>			
		<u>Property Tax</u>	<u>Sales Tax</u>	<u>Transfers</u>	<u>Miscellaneous</u>
1973	528	79.0%	7	9.0	5.0
1974	6,143	57.8%	16.9	22.6	2.7
1975	11,719	46.9%	10.1	34.7	8.3
1976	16,634	44.5%	--	39.6	15.9
1977	29,999	63.9%	1.3	30.5	4.3
1978	45,259	60.4%	3.2	25.0	11.4
1979	59,392	71.1%	3.1	23.8	13.1
1980	74,280	65.6	2.0	18.7	8.2

SOURCE: Table 3. McBeath. 1981.

TABLE 25. CAPITAL IMPROVEMENT PROGRAM  
 FY 1975 to FY 1985  
 (Millions)

<u>Function</u>	<u>G.O. Bonds Authorized and to Be Authorized</u>
Schools	\$131.6
Roads	43.7
Housing	111.7
Water & Sewer Facilities	106.6
Airports	15.9
Urban Development	3.1
Light and Power	34.2
Public Safety	13.1
Communications	1.1
Prudhoe Bay Sanitary Facilities	38.9
Health Facilities	9.4
Library/Cultural Facilities	<u>1.7</u>
Total	\$511.0

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SOURCE: Table 4. McBeath. 1981.

TABLE 26. NORTH SLOPE REGION GOVERNMENT EMPLOYMENT GROWTH

<u>Year</u>	<u>Government</u>			<u>Total</u>
	<u>Federal</u>	<u>State</u>	<u>Local</u>	
1970	128	---	---	165
1971	168	---	---	282
1972	173	142	19	334
1973	171	118	106	395
1974	283	86	272	641
1975	265	93	432	790
1976	239	79	573	892
1977	240	71	766	1078
1978	256	77	1140	1473
1979	248	67	1183	1498

SOURCE: Alaska Department of Labor Employment estimates.

to \$47.8 million in 1979. If the cost of living in the region increased at the same rate as the Anchorage CIP (7.2 percent per year), real personal income increased at a rate of 16 percent per year.

Two major structural changes can be observed over the period. The share of labor and proprietor income created in the region which stays in the region changes significantly over the period. In 1970 eighteen percent of the income earned in the region stayed in the region; in 1979 the figure was twenty-one percent. The share of resident income was less than ten percent in 1975 at the height of Prudhoe Bay development and pipeline construction. The other structural change is the reduction in the share of transfer payments in personal income from 14 percent in 1970 to 8 percent in 1979. As employment opportunities increase in the region this trend would be expected.

#### Summary

The economic growth of the North Slope region has been and will continue to be determined by natural resource production. The primary determinant of growth in the recent past has been the development of petroleum resources at Prudhoe Bay. The enclave nature of development meant that the linkages between Prudhoe Bay and the local economy were less than direct. The major link was the government link; the North Slope Borough translated tax revenues from property tax at Prudhoe Bay into employment opportunities in the local economy. Future economic activity in the region will follow a similar pattern. One major new

### III. THE BASE CASE

#### Methodology

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.

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.

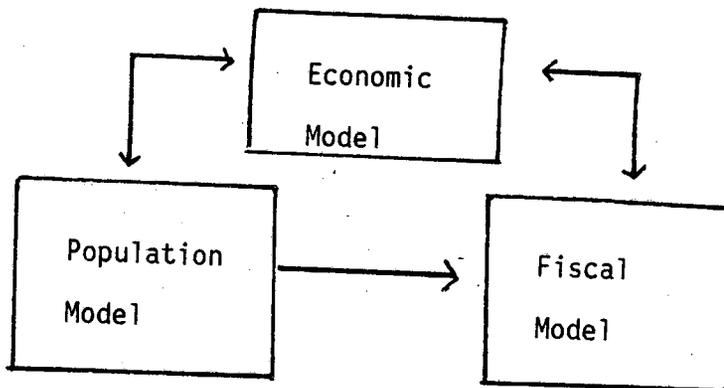
There are two components of this process that are of particular concern. First the question of the accuracy and consistency of the projections. Generally speaking, this is dependent upon the validity of the assumptions utilized regarding future economic growth of the exogenous variables and the projection 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?

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

We can now turn to a discussion of the specific methodology employed 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 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 3.

FIGURE 3: MAP SUBMODELS



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 4, 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.

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 is structurally similar to the statewide model except that the model is disaggregated to seven regions. (See Figure 4) This means that scenarios (or future values for exogenous variables) must be specified on a regional basis and that forecasts of endogenous variables (such as income, employment, and population) will be generated on a regional basis. Otherwise the models are similar.

## 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. The assumptions needed are threefold. 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.

The long-run assumptions for these national variables are based on long-term forecasts prepared by Data Resources, Inc., in their September 1979 forecast of U.S. economic activity (TRENDLONG0979). This forecast predicts a long-run average rate of increase in the U.S. consumer price index of 8.85 percent through 1990. A rate of 8.3 percent (the 1990 value) is used for the 1991-2000 period. Real disposable per capita income is forecast to increase at a 3.38 percent average annual rate. Hourly earnings are forecast to increase at 10.2 percent, while average hours worked are forecast to decline slowly at -0.23 percent.

Consequently, average weekly earnings may be expected to grow at an annual rate of 9.97 percent (i.e., 10.2 percent minus 0.23 percent).

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. In an attempt to reduce even further the disagreement, the scenario was developed based upon existing scenarios which have attained some measure of consensus. The most important source for these scenarios were the scenarios developed in the Level B Southcentral Water Study (Scott, 1979) and the Susitna Dam feasibility study (Goldsmith and Huskey, 1980). The major exception is the series related to bottomfishing activity, as commented upon above.

The economic scenario is described in Table 28. The assumptions are described below; these discussions are organized by industry.

### Mining

Currently, the mining sector in Alaska is dominated both in employment and output by the petroleum industry. This is assumed to continue in the future.

The scenario includes production at Prudhoe Bay and in the Upper Cook Inlet. Production from the Sadlerochet formation at Prudhoe is assumed to include both primary recovery and secondary recovery using water flooding. Development of the water flooding facilities begins in 1982.

TABLE 28. SCENARIO ECONOMIC ASSUMPTIONS

<u>Special Projects</u>	<u>Description</u>	<u>Dates &amp; Employment</u>	<u>Location</u>	<u>Source</u>
Trans-Alaska Pipeline	The construction of the TAPS was completed in 1977. Additional construction of four pump stations is assumed as well as pipeline operations.	<u>1979-1982</u> - Pump station construction of 90/year <u>1977-2000</u> - Operations employment of 1500/yr.	Operations employment allocated: 1/3 to Southcentral 1/3 to Fairbanks 1/3 to N. Slope	E. Porter, <u>Bering-Norton Statewide-Regional Economic and Demographic Systems, Impact Analysis</u> , Alaska OCS Socioeconomic Studies Program, Bureau of Land Management, 1980.
Northwest Gasline	Construction of natural gas pipeline from Prudhoe Bay which includes construction of an associated gas conditioning facility on the North Slope.	<u>1982-1986</u> - Construction peak employment of 10,589 (1985) <u>1986-2000</u> - Operations begin employing 200 petroleum and 119 transport workers	2/3 of pipeline construction and transportation employment in Fairbanks. 1/3 in North Slope. All gas conditioning employment in North Slope.	Mogford and Goldsmith, 1981 (Forthcoming)
Prudhoe Bay Petroleum Production	Primary recovery from Sadlerochit formation, secondary recovery using water flooding of that formation and development of the Kuparuk formation.	<u>1982-1984</u> - Construction of water flooding project peak employment of 2,917 (1983) <u>1980-2000</u> - Mining employment long-run average of 1,802/year	All in North Slope	E. Porter, 1980.
Upper Cook Inlet Petroleum Production	Employment associated with declining oil production is assumed to be replaced by employment associated with rising gas production maintaining current levels of employment.	<u>1980-2000</u> - Mining employment of 705/year	All in Southcentral region	E. Porter, 1980

TABLE 28. SCENARIO ECONOMIC ASSUMPTIONS (cont.)

Industry Assumptions	Description	Dates & Employment	Railbelt Location	Source																		
Fisheries/Food Processing	Small increase in employment in traditional fishery. Major expansion of domestic groundfish industry. Expansion to replace foreign fishery in the 200 mile limit by 2000.	Fishery employment expands to 9638 by 2000 (resident). Processing employment expands to 10,420 by 2000 (resident).	Resident regional employment in year 2000: <table border="1" data-bbox="1247 367 1612 557"> <tr> <td></td> <td>F</td> <td>P</td> </tr> <tr> <td>Southcentral</td> <td>2658</td> <td>2405</td> </tr> <tr> <td>Southeast</td> <td>1376</td> <td>538</td> </tr> <tr> <td>Northwest</td> <td>57</td> <td>17</td> </tr> <tr> <td>Southwest</td> <td>5547</td> <td>7306</td> </tr> <tr> <td>Anchorage</td> <td>0</td> <td>154</td> </tr> </table>		F	P	Southcentral	2658	2405	Southeast	1376	538	Northwest	57	17	Southwest	5547	7306	Anchorage	0	154	Sea Grant, 1980; Earl Coombs, Inc., memo to OCS; OCS.
	F	P																				
Southcentral	2658	2405																				
Southeast	1376	538																				
Northwest	57	17																				
Southwest	5547	7306																				
Anchorage	0	154																				
Forestry/Pulp and Paper Manufacturing	Employment expands to accommodate 960 million board feet of lumber.		Approximately 11% of activity in Fairbanks region. Remainder in Southeast.	M. Scott, 1979.																		
Other Manufacturing	Expansion of existing manufacturing of locally consumed goods.	Growth of output at 4% per year.	Regional distribution based on existing distribution of employment.																			
Federal Government	Civilian employment assumed to grow at recent historical rate. Military declines at 0.05%	Civilian employment grows at 1.0%/year	Existing regional distribution.	M. Scott, 1979.																		
Other Mining	No expansion of existing nonspecial projects.	Employment constant at 1979 level, 2,350/yr.	Regional allocation constant																			
Agriculture	Assumes that a relatively low priority is given to agriculture development because of priorities for recreation and wilderness or the lack of markets.	Employment grows to 1,037 by 2000.	71% of growth located in Fairbanks region and 29% in Southcentral region. Other regions remain the same.	M. Scott, 1979.																		

Fisheries also hold promise for the future. The major determinant of future increases in fisheries employment will be the expansion of the Alaska bottomfish industry. The creation of the 200-mile limit may support increased Alaska bottomfish activity.

The fishing industry is assumed to undergo a rapid expansion in this scenario. Total resident employment in fisheries grows at 8.0 percent per year over the projection period, while employment in processing expands at 13.3 percent. This growth results primarily from the development of the bottomfish industry. The domestic fishery is assumed to completely replace the foreign fishery operating within the 200-mile limit by 2000 and expand to catch the allowable biological catch (Sea Grant, 1980; Earl Combs, Inc. memo to BLM/AK OCS Office, and BLM/AK OCS Office). We would state again that we feel that the bottomfish projections are substantially over optimistic and we are using them at the instruction of the BLM/AK OCS Office.

Not all fishery-related employment is assumed to have full economic impact on the state and regional economy. Boats and crews may be from outside and only fish Alaska waters; these crews have limited impact on the economy. Processing employees are also often brought in from outside the state and live in enclaves having little effect. For this reason, the resident share rather than total employment has been used. Table 29 provides estimates for 1980, 1990, and 2000.

For the Aleutians and part of Southcentral (Kodiak) the figures were supplied by OCS, for bottomfishing. The remainder of traditional and bottomfishing total employment projections, by region, were obtained from Sea Grant (1980). Residency adjustments were developed utilizing residency factors in Rogers (1980) and are based upon residence of fishermen, by type of gear, and fishing in each of the regions. Projections for processing were similarly developed.

#### Federal Government

Federal government employment has always been an important component of Alaska's economy. In recent years, federal government employment has been growing very little; increases in civilian employment have been offset by decreases in military employment. Low rates of growth in federal government employment are assumed to occur. Civilian employment grows at about 1 percent per year, while military employment declines at 0.05 percent per year.

#### Manufacturing

The manufacturing industry in Alaska has four important components: seafood processing, lumber-wood products-pulp, petrochemicals, and manufacturing for the local economy. Production of seafood processing is expected to continue to dominate the food processing industry in Alaska; growth of this industry was based on projections provided by Sea Grant to SESP (Sea Grant, 1980 and OCS, as explained above).

### Construction

The final exogenous industry for which scenarios are required is that portion of the construction industry where the level is determined outside the economy. This sector includes construction employment associated with the special projects described above. This sector does not include capital improvement projects of any level of government or construction activity which supports the local economy; the remainder of construction activity is determined endogenously in the MAP model. The major development of special projects occurs in the early part of the projection period. The most important project during this period is the construction of the Northwest gasline which is assumed to begin in 1982. The construction of the petrochemical facility is assumed to begin in 1984. An additional major construction project is the construction of the Susitna Hydro Project which begins in 1984. Construction of the bottomfish processing facilities projected also increase employment. It is assumed that it will require 40-man years to build a processing plant (conversation with industry sources).

### PETROLEUM REVENUE ASSUMPTIONS

Petroleum revenues to the state consist of royalties, production taxes, property taxes, the corporate income tax, and miscellaneous revenues.

### Royalties and Production Taxes

Royalties and production taxes arise from three sources--those associated with production of oil and gas from Upper Cook Inlet, those associated with existing and planned production at Prudhoe Bay and

- Field processing and gathering costs are 75¢/bbl in FY 1980, also remaining constant in real terms through 2000.
- TAPS pipeline tariff is assumed to be \$5.25 in FY 1980. The nominal tariff is assumed to remain constant through 1990 when increased operating costs are assumed to dominate decreasing capital costs. After 1990, the tariff remains constant in real terms.

Wellhead value of gas is derived by the following assumptions:

- Under the interim rules of the Natural Gas Policy Act of 1978, the ceiling price of Prudhoe gas as of December 1, 1978, is \$1.63 per MMBTU, or \$1.78 per MCF. Since recent sales by Exxon (OGJ, 4/2/79) reflect this ceiling, the ceiling price, kept constant in real terms, is assumed throughout the period.
- Prudhoe Bay gas must be treated in a conditioning plant, at a cost of 80\$/MCF which, according to recent rulings by FERC, will be deducted from the ceiling price received by producers for the gas. This cost remains constant in real terms.

Production taxes are computed as follows. The production tax is a fraction of nonroyalty value, with the fraction dependent on the productivity of the average well in the field. The tax rate on oil is assumed to equal 12 percent through 1989, after which the rate falls to 11 percent. For gas, the 12 percent rate is assumed throughout the period. Production tax estimates are shown in Table 30.

Royalties for oil are computed as 12.5 percent of the value of production net of field costs; while for gas, royalties are 12.5 percent of wellhead value received by the producer. Royalty estimates are shown in Table 31.

TABLE 31. STATE ROYALTY REVENUES  
(Millions of Current Dollars)

Year	Upper Cook Inlet <sup>1</sup>		Prudhoe Bay <sup>2</sup>		Beaufort Sea <sup>2</sup>		Total
	Oil	Gas	Oil	Gas	Oil	Gas	
1980	29.9	6.4	1240.34	0.0	0.0	0.0	1276.64
1981	36.4	7.4	1440.2	0.0	0.0	0.0	1484.00
1982	81.3	8.0	1635.54	0.0	0.0	0.0	1724.84
1983	96.1	9.5	1802.89	0.0	0.0	0.0	1908.49
1984	116.9	10.8	1991.01	0.0	0.0	0.0	2118.71
1985	114.8	16.3	2194.73	135.334	0.0	0.0	2461.164
1986	113.2	17.1	2416.95	147.026	0.0	0.0	2694.276
1987	111.7	17.6	2659.55	159.729	0.0	0.0	2948.579
1988	107.8	18.5	2922.72	173.529	0.0	0.0	3222.549
1989	104.4	19.2	3178.59	188.522	43.446	1.42	3535.578
1990	99.7	20.1	3313.53	204.81	127.209	4.208	3769.557
1991	96.0	20.7	3336.43	222.506	186.797	6.248	3868.681
1992	91.4	21.5	3167.77	241.73	206.942	6.788	3736.130
1993	87.3	22.1	3023.86	262.615	225.089	7.375	3628.339
1994	83.5	23.0	2811.4	285.305	244.824	8.012	3456.041
1995	87.8	23.6	2612.36	309.955	261.444	8.704	3303.863
1996	92.8	23.6	2433.65	336.734	279.092	9.226	3175.102
1997	92.8	23.6	2258.21	365.828	297.823	9.772	3048.033
1998	92.8	23.6	2092.24	397.435	299.001	9.8	2914.876
1999	92.8	23.6	1929.09	431.773	291.321	9.464	2778.048
2000	92.8	23.6	1775.36	469.078	279.997	9.317	2650.152

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<sup>1</sup>From Alaska Department of Revenue, Petroleum Production Revenue Forecast, September 1979.

<sup>2</sup>1979-81 from Alaska Department of Revenue, op. cit.; thereafter, calculated as explained in text.

TABLE 32. STATE PETROLEUM PROPERTY TAX REVENUES  
(Millions of Current Dollars)

Year	TAPS	ALCAN	Lower Cook Inlet OCS I	Beaufort Sea I	Northern Gulf OCS	Bering-Norton	Lower Cook Inlet OCS II	St. George	Total
1980	187.929	0.0	0.0	0.0	0.0	0.0	0.0	0.0	187.929
1981	193.714	0.0	0.0	0.3	0.0	0.0	0.0	0.0	194.014
1982	199.299	0.0	0.0	0.4	0.0	0.0	0.558	0.0	200.257
1983	204.622	0.0	0.0	0.7	0.0	0.128	0.576	0.0	206.026
1984	209.611	0.0	19.7	0.7	0.0	0.135	0.594	0.0	230.740
1985	214.184	0.0	19.7	0.8	0.0	0.141	2.381	0.0	237.206
1986	218.251	133.168	19.6	3.0	0.1	0.148	25.199	0.0	399.466
1987	221.709	137.506	19.4	6.2	2.0	14.73	26.737	8.309	436.591
1988	224.442	141.739	19.2	11.0	2.4	36.581	27.562	26.68	489.604
1989	226.322	145.826	18.9	16.2	7.8	49.781	28.358	76.327	569.514
1990	227.203	149.721	18.6	18.5	7.8	58.392	29.116	101.089	610.421
1991	226.923	153.371	18.1	20.7	7.8	61.177	29.825	106.009	623.905
1992	225.303	166.717	17.5	22.1	7.8	64.009	30.474	111.025	634.928
1993	222.141	159.693	16.8	24.2	7.8	66.873	31.049	116.116	644.672
1994	217.214	162.223	15.9	26.4	7.7	69.753	31.536	121.258	651.984
1995	210.271	164.223	14.9	27.6	7.7	72.633	31.917	126.422	655.666
1996	201.038	165.598	14.0	28.0	7.5	75.489	32.175	131.573	655.370
1997	189.207	166.243	13.0	28.0	7.4	78.297	32.287	136.67	651.104
1998	174.438	166.039	12.0	27.8	7.2	81.026	32.23	141.666	642.399
1999	156.354	164.853	11.0	27.5	7.0	83.642	31.978	146.505	628.832
2000	134.539	162.54	10.0	27.1	6.7	86.106	31.501	151.122	609.608

TABLE 33. CORPORATE INCOME TAX REVENUES  
(Millions of Current Dollars)

<u>Year</u>	<u>Upper Cook Inlet OCS I</u>	<u>Prudhoe Bay</u>	<u>Beaufort Sea I</u>	<u>Total</u>
1980	5.87	232.757	0.0	238.627
1981	7.3	270.126	0.0	277.256
1982	12.66	306.63	0.0	319.290
1983	14.66	337.875	0.0	352.535
1984	17.29	373.001	0.0	390.291
1985	17.42	438.094	0.0	455.514
1986	16.98	481.927	0.0	498.907
1987	16.39	529.771	0.0	546.161
1988	15.64	581.673	0.0	591.313
1989	14.97	632.439	8.413	655.822
1990	14.32	636.792	24.64	675.752
1991	13.82	644.434	36.194	694.448
1992	13.52	617.999	40.07	671.589
1993	13.09	596.226	43.581	652.897
1994	12.89	562.548	47.4	622.838
1995	13.42	531.679	50.646	595.745
1996	13.92	504.891	54.051	572.862
1997	13.92	479.155	57.663	550.738
1998	13.92	455.625	57.888	527.433
1999	13.92	433.149	56.383	503.452
2000	13.92	412.96	54.235	481.115

SOURCE: See text.

choice within this new framework, cannot be modeled simply from past experience. Past experience can, however, provide qualitative guidance in formulating hypothetical fiscal policy options for use in simulation. First, we can expect that, as in the past, increasing levels of economic activity generate new demands for government services. As prices and population rise, increased expenditure is required to simply maintain services at a constant level. In fact, however, this level will be expected to rise over time if historical trends continue.

Secondly, historical data gives at least some indication of state fiscal policy response to surplus petroleum revenues. The revenues generated by the Prudhoe Bay lease sale in FY 1970 led to a rapid jump in both the level and growth of nominal and per capita expenditures, with nominal expenditures jumping from an average growth of 8.9 percent annually prior to the sale to an average 19.7 percent after the sale; and real per capita expenditures jumped from 2.3 percent prior to the sale to 7.7 percent after the sale.

If these qualitative features carry over into future fiscal responses to surplus petroleum revenues, future real per capita expenditures can be expected to rise within the bounds set by revenue quantities and statutory constraints. At a minimum, the state might choose simply to maintain real per capita expenditures at their current levels. At a maximum, it could choose to spend all but 25 percent of restricted petroleum revenues as they are incurred. Unfortunately, the range of

### Existing

- Lower Cook
- Beaufort Sea (Joint state/federal)

### Scheduled

- Northern Gulf (Sale 55)
- Lower Cook Inlet (Sale 60)
- Bering-Norton (Sale 57)
- St. George (Sale 70)

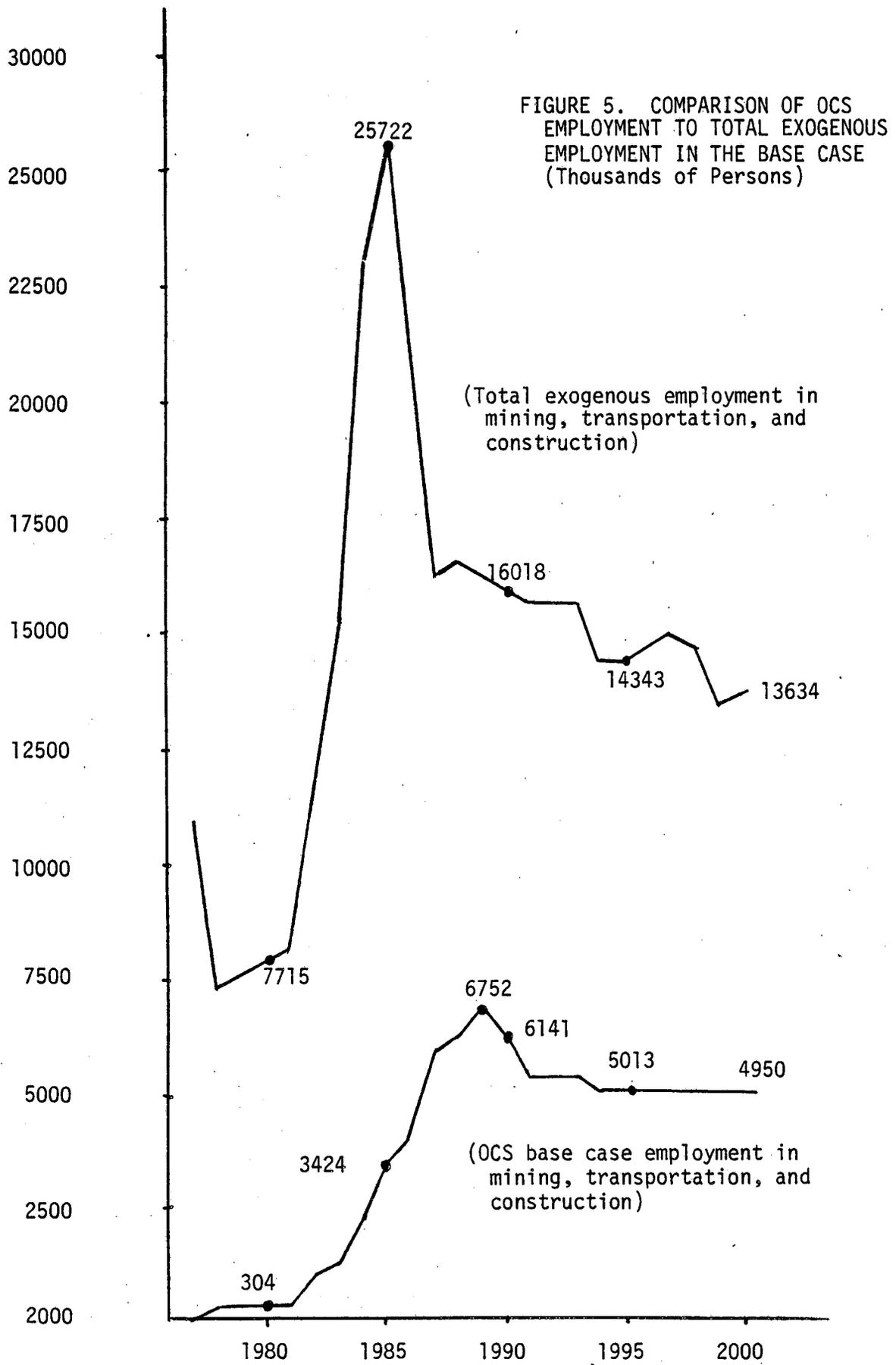
The timing, amount, and residency location of employment for each of the above lease sales are shown in Table 34. In general, the bulk of OCS employment in the base case occurs in the mid-to-late 1980s and early 1990s. Over half of OCS employment is assumed to reside in Anchorage. The remainder is distributed in diminishing amounts between southcentral Alaska and Fairbanks, with a small proportion residing in the immediate vicinity of the leased tracks for each case.

As shown in Figure 5 OCS base case employment represents about one-third of total exogenous employment in the mining, transportation, and construction industries combined.

The figures in Table 34 and Appendix A have been adjusted to net out nonresident OCS employees that live in enclaves for the duration of their work task. Nonresident (enclave) OCS employment refers generally to offshore, temporary, and specialized work such as offshore drilling crews for exploration and construction crews during field development. Further, we assume that offshore and specialized labor is

TABLE 34

<u>OCS Lease Sale</u>	<u>Year of Sale</u>	<u>Employment Schedule</u>	<u>Residency Location</u> (Approximate)
Northern Gulf (Sale 55)	1980	<u>Operations: 1981-2000+</u> Median: 310 Peak: 343 in 1991	10 percent Anchorage 90 percent Southcentral
		<u>Construction: 1984-1988</u> Peak: 98 in 1987	100 percent Southcentral
		<u>Transportation: 1981-2000+</u> Peak: 107 in 1990-91	100 percent Southcentral
Lower Cook (Sale 60)	1981	<u>Operations: 1982-2000+</u> Median: 430 Peak: 430 in 1991	12 percent Anchorage 88 percent Southcentral
		<u>Construction: 1982-1987</u> Peak: 299 in 1986	100 percent Southcentral
		<u>Transportation: 1982-2000+</u> Peak: 443 in 1991	100 percent Southcentral



increases the earnings of the commercial sector while the population effect increases the "load" on public services, thereby indirectly stimulating government action. These same avenues of effect are also present for nonresident OCS employees, although to a reduced and possibly negligible degree.

To the extent that enclave OCS workers do impact the economy, their effect will probably not be felt in the region of lease sale activity. These enclave workers are more likely to leave a more noticeable trail in the Anchorage region which links them directly to the outside world. Furthermore, the support sectors affected by enclave OCS workers are most likely confined to transportation, communications, and government. The enclave OCS worker's expansionary effect in these specific sectors of the economy will depend on the economy's present capacity (and that induced by the resident OCS population--many of whom also travel regularly to the Anchorage region where they reside permanently) to absorb their direct and indirect demands.

The overall effect of enclave OCS workers may, therefore, be negligible since it is confined primarily to the Anchorage region which may have the capacity to absorb their relatively marginal effects (including transportation) without any appreciable change to the level of support sector and government services.

ISER economists are presently not able to test this or other hypotheses regarding the secondary economic effects of enclave employment

in the location of permanent residence during rotation leave. Historically, the pattern of residency of TAPS and Prudhoe employment suggests that enclave employees reside in the Anchorage, Southcentral, and Fairbanks regions, depending on the location and type of work task.

In past MAP work related to the North Slope region, we have dealt with the distinction between residency and workplace by incorporating MAP model specifications designed to redistribute some of the secondary impacts of basic sector activity in the North Slope to other MAP model regions. Briefly, total wage and salaries earnings used to determine output in several secondary industries (e.g., transportation, public utilities, trade, etc.) were divided into enclave and resident categories in the North Slope region. This dichotomy tends to reduce the contribution of basic sector earnings to support sector output, and therefore, employment in the North Slope region. It does not detract from total statewide basic sector earnings, but shifts some of the secondary effects of North Slope petroleum development to other regions of the state. Thus, exogenous North Slope employment associated with several projects was entered into the North Slope region in the MAP model, even though it was evident that most of these employees officially resided in other areas of the state.

their North Slope workplace location to other more probable areas of instate residence. The number of North Slope residents transferred to other regions stabilizes at about 4000 persons during the latter 1980s and 1990s.

In previous MAP/OCS work, neither the local residency adjustment nor the SEAR adjustment (Appendix B) were used on direct OCS employment in the Beaufort Sea Joint State/Federal OCS lease sale. Thus, in addition to the adjustment in North Slope resident status described above, the SEAR adjustment to direct OCS employment was also applied to Beaufort I employment. The use of both employment adjustments reduces both the level of statewide employment (SEAR adjustment) and the level of employment in the North Slope (residency-status adjustment).

Again, the adjustment in North Slope resident status is not intended to undermine the importance of North Slope employment, but to more accurately reflect the resident distribution of North Slope employment.

#### Base Case Forecasts

The base case employment, revenue, and expenditure assumptions outlined above were used in conjunction with the MAP statewide and regional econometric models to forecast economic activity in Alaska through the year 2000. The section presents these base case forecasts which will be used as a benchmark from which to measure the impacts of proposed federal OCS development in the Beaufort Sea.

TABLE 35. PROJECTED POPULATION AND COMPONENTS  
OF CHANGE: ALASKA, 1980-2000  
(Thousands of persons)

	POPTST	NINCTOT	MIGNET
1980	397.976	6.556	-14.93
1981	395.49	5.855	-8.371
1982	402.451	5.456	1.434
1983	417.090	5.466	9.172
1984	443.713	6.78	25.848
1985	483.759	6.759	33.32
1986	510.3	7.99	14.039
1987	516.114	8.39	-3.062
1988	519.502	8.113	-4.736
1989	525.482	7.807	-1.844
1990	534.1	7.637	0.969
1991	544.443	7.598	2.746
1992	556.238	7.618	4.172
1993	570.21	7.71	6.258
1994	583.372	7.892	5.27
1995	596.829	8.032	5.422
1996	613.972	8.183	8.957
1997	633.259	8.48	10.809
1998	652.729	8.842	10.633
1999	670.029	9.187	8.117
2000	690.057	9.422	10.605

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POPTST = Population ( $10^3$  persons)

NINCTOT = Civilian non-Native plus Native natural increase ( $10^3$  persons)

MIGNET = Net migration ( $10^3$  persons)

SOURCE: MAP Model Projections.

## Employment

As shown in Table 37, Alaska employment would begin to recover from the TAPS construction decline by 1982. By 1985, basic sector employment (i.e., construction, mining, manufacturing, and agriculture) would peak at over 53,000 workers. This rise, due largely to the construction of the gas pipeline, triggers a boom-bust cycle in total employment similar qualitatively to that accompanying the TAPS construction cycle, although of lesser severity. Total employment at the peak of construction in 1985 is 35 percent above its 1980 level. The downside of the gasline cycle witnesses a 1 percent drop in total employment from its peak level by 1986, despite a much more significant decline (over 17 percent) in basic sector employment. Basic sector employment does not regain its 1985 levels until 1993, after which growth tends to stabilize. As in the case of the post-TAPS decline, the resiliency of the economy can be traced to resiliency in the support sector (i.e., transportation, communication, public utility, trade, finance, and service employment) which by 1988 declines less than 3 percent from the 1986 peak. After the gasline cycle, support sector employment growth resumes at more or less stable rates resembling historical growth. In the early 1980s a significant long-run change takes place in the structure of the state economy, as the support sector rapidly overtakes government as the primary source of Alaskan employment. By 2000, total employment reaches nearly 381,000, 100 percent higher than its 1980 level, for an average annual growth of 3.5 percent. The support-sector share of employment rises from 34 percent in 1980 to over 46 percent in 2000. This, combined with

the growth in basic industries, causes the government's share of total employment to fall substantially, from nearly 44 percent in 1980 to 30 percent in 2000, as shown in Table 38.

#### Personal Income, Wages, and Prices

The mid-1980s boom-bust cycle associated with gas pipeline and other special projects is more evident in patterns of projected personal income growth than in population and employment growth. As shown in Table 39, the gas pipeline boom sends real per capita incomes (PIRPCST) rapidly to a new peak in 1985, averaging 10.7 percent real growth since 1980. Total statewide real personal income (PIRST) grows at a more astounding rate of 15.3 percent over the same period. By the peak in 1985, real income would be twice its 1980 level, and real per capita income is two-thirds higher than its 1980 level. Real income drops nearly 10 percent; and real per capita income, 17 percent by 1988, following the decline of gas pipeline construction activity. After 1988, a period of steady income growth brings real personal income to 13.4 billion dollars in 2000, over 200 percent higher than its 1980 level, for an average annual growth of 5.9 percent. Real per capita income, on the other hand, grows by about 80 percent by the end of the period, reflecting an average annual rate of growth of 3.0 percent. The decline in total and per capita real personal income after 1985 and the generally lower rate of income growth in the second decade of the forecast period reflects both the sudden reduction of high paying construction jobs with the completion of several major construction projects and a long-term shift toward lower-wage jobs in support sector and fisheries industries.

TABLE 39. PROJECTED PERSONAL INCOME:  
ALASKA, 1980-2000  
(Millions of 1980 Dollars  
and 1980 Dollars, Respectively)

	PIRST	PIRPCST
1980	4274.3	10739.3
1981	4351.3	11027.6
1982	4720.2	11728.6
1983	5377.93	12893.0
1984	7020.61	15646.1
1985	8725.83	17848.9
1986	8673.73	16930.7
1987	6007.	15514.
1988	7343.06	15289.8
1989	8065.78	15349.3
1990	8324.97	15586.9
1991	8661.71	15909.3
1992	9080.83	16325.5
1993	9529.02	16711.4
1994	9872.18	16922.6
1995	10327.7	17304.4
1996	10959.7	17863.8
1997	11652.6	18401.
1998	12261.	18734.2
1999	12724.9	18991.6
2000	13399.1	19417.4

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PIRST = Personal income (millions of 1980 dollars)  
PIRPCST = Real per capita personal income (1980 dollars)

SOURCE: MAP Model Projections.

TABLE 40. PROJECTED WAGES AND SALARIES  
 BY SECTOR: ALASKA, 1980-2000  
 (Millions of 1980 Dollars)

	WS99RST	WSB1RST	WSS1RST	WSG9RST
1980	3490.77	774.791	1158.03	1557.95
1981	3554.51	811.618	1146.52	1606.37
1982	3664.35	984.509	1210.87	1668.97
1983	4434.59	1275.96	1397.74	1760.89
1984	5955.07	2120.86	1878.14	1966.07
1985	7347.24	2819.12	2510.73	2017.4
1986	7218.37	2404.4	2638.18	2175.8
1987	6591.03	1877.34	2432.67	2280.87
1988	6525.13	1836.38	2334.91	2353.85
1989	6618.12	1831.77	2337.27	2446.08
1990	6834.23	1898.24	2365.47	2550.52
1991	7119.23	1986.63	2468.	2664.6
1992	7455.73	2108.25	2571.56	2785.93
1993	7823.33	2219.55	2690.55	2918.23
1994	8103.86	2257.17	2786.98	3059.72
1995	8402.34	2373.06	2884.29	3201.
1996	9020.15	2591.7	3077.53	3350.93
1997	9584.07	2794.72	3273.91	3515.44
1998	10078.8	2933.69	3450.41	3689.72
1999	10453.3	3000.14	3583.42	3869.77
2000	11012.7	3215.16	3749.53	4048.05

---

WS99RST = Total wages and salaries, statewide (millions of 1980 dollars)  
 WSB1RST = Basic sector wages and salaries (millions of 1980 dollars)  
 WSS1RST = Support sector wages and salaries (millions of 1980 dollars)  
 WSG9RST = Government sector wages and salaries (millions of 1980 dollars)

SOURCE: MAP Model Projections.

TABLE 41. PROJECTED REAL WAGE RATES: ALASKA, 1980-2000  
(1980 Dollars)

	WRB1RST	WRS1RST	WRG9RST
1980	28098.7	18120.5	18505.
1981	25702.5	18304.5	19017.1
1982	30232.7	18699.8	19687.
1983	33913.3	19674.9	20789.5
1984	44180.6	22081.4	22564.9
1985	52968.1	24060.6	24450.2
1986	48538.3	23318.6	25216.2
1987	41258.5	21758.5	25396.1
1988	39694.3	21277.6	25784.8
1989	39031.1	21124.1	26379.8
1990	39106.9	21116.9	27029.2
1991	39349.7	21205.3	27765.9
1992	39331.6	21341.9	28539.3
1993	40167.9	21419.5	29309.
1994	39782.9	21351.6	29994.3
1995	40243.2	21451.3	30762.7
1996	41191.5	21725.3	31692.7
1997	42046.4	21957.4	32630.4
1998	42351.4	22040.4	33483.6
1999	42057.2	21993.	34247.
2000	42475.9	22116.4	35126.5

WRB1RST = Wage rates in the basic sector (millions of 1980 dollars)  
WRS1RST = Wage rates in the support sector (millions of 1980 dollars)  
WRG9RST = Wage rates in the government sector (millions of 1980 dollars)

SOURCE: MAP Model Projections.

TABEL 43. PROJECTED STATE GOVERNMENT REVENUES:  
ALASKA, 1980-2000  
(Millions of 1980 Dollars)

	REVGFR	RP9SR	RFDSR	RNDSR
1980	2288.14	1830.68	226.392	230.57
1981	3053.97	2663.31	205.067	182.59
1982	3395.39	2829.54	190.048	366.8
1983	3743.37	3005.42	180.043	557.904
1984	4052.59	3066.6	174.109	811.877
1985	4497.46	3284.03	171.103	1042.32
1986	4923.62	3450.46	165.229	1307.94
1987	5181.14	3496.88	154.092	1530.18
1988	5409.54	3539.08	143.005	1727.46
1989	5677.27	3614.43	133.545	1929.3
1990	5730.64	3462.05	125.247	2143.35
1991	5767.66	3299.92	117.847	2349.89
1992	5623.79	2973.19	111.123	2545.48
1993	5307.18	2692.43	105.062	2709.63
1994	5352.52	2396.41	99.245	2656.86
1995	5200.77	2138.26	93.709	2970.76
1996	5080.49	1911.75	88.806	3059.94
1997	4937.84	1710.07	84.366	3143.4
1998	4813.84	1523.4	80.132	3210.32
1999	4680.04	1351.75	75.981	3252.41
2000	4554.99	1197.97	71.964	3285.05

---

REVGFR = Total general fund revenue (millions of 1980 dollars)  
 RP9SR = Total petroleum revenues (millions of 1980 dollars)  
 RFDSR = Revenues from the federal government (millions of 1980 dollars)  
 RNDSR = Other (nonfederal, nonpetroleum) revenues (millions of 1980 dollars)

SOURCE: MAP Model Projections.

TABLE 44. PROJECTED TOTAL AND PER CAPITA STATE  
 GOVERNMENT EXPENDITURES: ALASKA, 1980-2000  
 (Millions of 1980 Dollars)

	E99SR	E99SRPC
1980	1495.46	1112.41
1981	1547.09	1158.04
1982	1616.14	1188.8
1983	1705.11	1210.22
1984	1790.47	1181.26
1985	1892.08	1146.02
1986	2019.62	1170.6
1987	2131.85	1222.8
1988	2245.06	1279.34
1989	2370.62	1335.63
1990	2505.7	1368.84
1991	2651.23	1441.59
1992	2806.48	1493.64
1993	2971.19	1542.56
1994	3146.98	1596.96
1995	3331.43	1652.45
1996	3524.89	1699.59
1997	3730.68	1744.12
1998	3949.32	1791.16
1999	4180.21	1846.93
2000	4419.67	1896.05

---

E99SR = Total state expenditures (millions of 1980 dollars)  
 E99SRPC = Real per capita state expenditures

SOURCE: MAP Model Projections.

TABLE 45. PROJECTED TOTAL AND PER CAPITA FUND  
BALANCES: ALASKA, 1980-2000  
(Millions of 1980 Dollars)

	FUNDR	FUNDRPC
1980	1931.51	1436.77
1981	3534.99	2646.04
1982	5295.65	3995.4
1983	7244.46	5141.84
1984	9257.03	6107.29
1985	11527.8	6932.23
1986	14063.4	8150.53
1987	16457.	9439.53
1988	18776.6	10699.9
1989	21133.9	11906.1
1990	23279.	12902.9
1991	25211.1	13708.4
1992	26751.6	14237.6
1993	27832.	14501.5
1994	28744.	14586.4
1995	29183.6	14475.5
1996	29260.6	14118.1
1997	29090.9	13599.5
1998	28616.1	12978.5
1999	27854.2	12306.7
2000	26800.5	11497.5

---

FUNDR = Total fund balance (millions of 1980 dollars)  
FUNDRPC = Real per capita fund balance (millions of 1980 dollars)

SOURCE: MAP Model Projections.

TABLE 47. PROJECTED EMPLOYMENT: NORTH SLOPE, 1980-2000  
(Thousands of Persons)

	EM99R1	EM98R1	EMB1R1	EMS1R1	EMG9R1
1980	2.318	2.127	0.509	0.457	1.161
1981	2.363	2.179	0.526	0.443	1.208
1982	2.579	2.408	0.598	0.459	1.352
1983	2.764	2.605	0.691	0.488	1.426
1984	3.023	2.874	0.902	0.571	1.401
1985	3.412	3.267	1.184	0.718	1.366
1986	3.485	3.333	1.138	0.753	1.447
1987	3.317	3.159	0.965	0.691	1.513
1988	3.251	3.105	0.912	0.649	1.544
1989	3.141	2.997	0.814	0.613	1.57
1990	3.165	2.992	0.777	0.6	1.615
1991	3.298	3.126	0.845	0.615	1.667
1992	3.402	3.233	0.892	0.628	1.713
1993	3.5	3.332	0.932	0.643	1.758
1994	3.59	3.423	0.958	0.655	1.811
1995	3.707	3.542	1.005	0.672	1.868
1996	3.842	3.679	1.07	0.695	1.914
1997	3.985	3.825	1.137	0.723	1.964
1998	4.119	3.959	1.192	0.746	2.021
1999	4.236	4.079	1.232	0.763	2.083
2000	4.373	4.218	1.296	0.793	2.139

---

EM99R1 = Total employment in the North Slope ( $10^3$  persons)  
 EM98R1 = Wages and salary employment in the North Slope ( $10^3$  persons)  
 EMB1R1 = Basic sector employment in the North Slope ( $10^3$  persons)  
 EMS1R1 = Support sector employment in the North Slope ( $10^3$  persons)  
 EMG9R1 = Total government sector employment ( $10^3$  persons)

SOURCE: MAP Model Projections.

TABLE 48. PROJECTED TOTAL AND PER CAPITA REAL  
PERSONAL INCOME: NORTH SLOPE, 1980-2000  
(Millions of 1980 Dollars and in  
1980 Dollars, Respectively)

	PIRRI	PIRPCRI
1980	64.456	15392.4
1981	66.869	15325.2
1982	76.507	17103.6
1983	91.466	19162.9
1984	128.947	25365.9
1985	183.	32311.3
1986	176.921	29570.3
1987	148.236	24725.
1988	138.151	23274.2
1989	126.708	21976.1
1990	127.651	21393.4
1991	136.638	22072.2
1992	144.061	22540.
1993	150.827	22906.8
1994	155.057	22851.3
1995	162.94	22216.5
1996	174.362	24122.2
1997	186.51	24932.2
1998	195.901	25365.3
1999	202.647	25453.
2000	213.234	26051.

---

PIRRI = Real personal income in the North Slope (millions of 1980 dollars)  
PIRPCRI = Real per capita personal income in the North Slope (millions of  
1980 dollars)

SOURCE: MAP Model Projections.

TABLE 49. PROJECTED POPULATION: ANCHORAGE, 1980-2000  
(Thousands of Persons)

	POPTR5
1980	181.965
1981	179.323
1982	183.452
1983	192.052
1984	208.975
1985	231.467
1986	241.412
1987	241.536
1988	242.209
1989	244.445
1990	247.652
1991	251.736
1992	257.356
1993	263.364
1994	268.715
1995	275.424
1996	283.488
1997	292.793
1998	301.854
1999	309.548
2000	318.366

---

POPTR5 = Total population in Anchorage ( $10^3$  persons)

SOURCE: MAP Model Projections.

by Anchorage as a regional distribution center for the state. Further, the Anchorage region absorbs a large portion of special-project employment (except for the gas pipeline) that permanently reside in Alaska, and act as an additional stimulant to endogenous construction, a major portion of basic sector growth in Anchorage. The concentration of support and basic sector employment occurs at the expense of government employment which, as a proportion of statewide government employment, declines from 43.6 percent in 1980 and 27.7 percent in 2000.

#### Personal Income

Table 51 presents projected real and real per capita personal income in the Anchorage region. Over the entire projection period real personal income grows at an average annual rate of 5.7 percent, slightly less than statewide real personal income growth of 5.9 percent per year. Anchorage income growth accelerates in the early 1980s, although less rapidly than North Slope income growth. By the year 2000, Anchorage personal income is over three times larger than it was in 1980. In real per capita terms, personal income expands over 70 percent, averaging 2.8 percent annual growth.

#### Fairbanks

Population. In general, Fairbanks' population growth is similar to other regions of Alaska. A period of accelerated growth occurs from 1980 to 1985, followed by absolute population decline with a gradual resumption of growth thereafter. What distinguishes Fairbanks' population growth from other regions is its magnitude in the early years.

From 1980 to 1985 population grows at a remarkable average rate of 9.3 percent annually. as shown in Table 52. This compares to an average annual rate of 4.2 percent statewide and 4.9 percent in the Anchorage bowl. Further, the period of accelerated population growth in Fairbanks is more concentrated into fewer years than elsewhere in Alaska. Again, increases in gas pipeline construction employment, which are expected to concentrate in the Fairbanks area, represent the major contribution to the dramatic population expansion in the early 1980s. In contrast to statewide and to Anchorage population growth which continue to increase after a period of accelerated growth, Fairbanks' population falls by 6 percent to 82,144 in 1987, following its 1985 peak of 87,415. From 1987 (when population growth resumes) to 2000, Fairbanks' population grows at a moderate 2.1 percent per year. By the year 2000, Fairbanks' population was projected to increase to nearly 108,000 persons, about 92 percent higher than its 1980 level. As a proportion of statewide population, Fairbanks population increases from 14.1 in 1980 to 15.6 in 2000.

Employment. As with population growth, the pattern and composition of projected employment in Fairbanks is similar to, but more pronounced than, that of Anchorage and of statewide employment. As shown in Table 53 the gas pipeline boom would create a 300 percent increase in 1980 basic sector employment (i.e., construction, mining, manufacturing, and agriculture) from 3,500 to 13,000 in 1985. The 30 percent annual average rate of growth over the first five projection years is matched by a decline equally as abrupt to levels well below half the

TABLE 53. PROJECTED EMPLOYMENT AND EMPLOYMENT  
COMPONENTS: FAIRBANKS, 1980-2000  
(Thousands of Persons)

	EM99R7	EM98R7	EMB1R7	EMS1R7	EMG9R7
1980	32.029	30.088	3.52	9.3	17.267
1981	32.26	30.312	3.786	9.272	17.255
1982	33.975	31.972	4.71	10.026	17.236
1983	37.404	35.291	6.447	11.663	17.181
1984	46.265	43.876	11.316	15.76	16.8
1985	52.538	50.05	12.967	20.347	16.736
1986	50.152	47.717	9.495	20.872	17.351
1987	45.801	43.514	5.868	19.707	17.939
1988	45.258	42.988	5.612	19.199	18.177
1989	45.504	43.233	5.616	19.214	18.404
1990	46.416	44.126	5.804	19.661	18.662
1991	47.563	45.246	6.07	20.259	18.916
1992	48.856	46.511	6.279	21.05	19.181
1993	50.259	47.883	6.411	21.974	19.498
1994	51.56	49.153	6.473	22.783	19.897
1995	53.09	50.653	6.731	23.642	20.23
1996	54.807	52.337	7.071	24.76	20.506
1997	56.769	54.263	7.346	26.083	20.835
1998	58.627	56.068	7.52	27.327	21.24
1999	60.293	57.722	7.631	28.389	21.703
2000	61.992	59.397	7.927	29.394	22.076

---

EM99R7 = Total employment in Fairbanks ( $10^3$  persons)  
EM98R7 = Wages and salary employment in Fairbanks ( $10^3$  persons)  
EMB1R7 = Basic sector employment in Fairbanks ( $10^3$  persons)  
EMS1R7 = Support sector employment in Fairbanks ( $10^3$  persons)  
EMG9R7 = Total government sector employment ( $10^3$  persons)

SOURCE: MAP Model Projections.

Personal Income. Projection of growth in real and real per capita personal income is presented in Table 54. Expressed in millions of 1980 dollars, real personal income grows from \$807 in 1980 to a maximum of \$2245 millions in 1985, representing a 22.7 average annual rate of growth over the first five forecast years. Preceded by a 3-year period of post-boom decline, positive growth resumes by 1989, averaging 4.4 percent per year. The effects of a shift away from high wage construction jobs after 1985 is largely responsible for the sharp 30 percent reduction in real personal income between 1985 and 1988.

By the end of the forecast period income would recover and grow to over 300 percent of its 1980 level. However, because Fairbanks' population also was projected to almost double over the same period, real personal income expressed in per capita terms would increase only 59 percent from \$14,400 in 1980 to \$22,800 in 2000. Although this overall increase reflects an improvement in individual real per capita purchasing power, real per capita personal income in 2000 is still only 89 percent of the peak level achieved largely from high wage construction employment in 1985.

#### Southcentral

Population. At an average annual rate of 2.4 percent from 1980 to 2000, projected population growth in Southcentral Alaska would be less rapid than statewide population growth (2.8 percent) and regional population in the North Slope (3.5 percent), Anchorage (2.8 percent), and Fairbanks (3.3 percent). In general, the Anchorage and Fairbanks regions absorb a greater share of exogenous construction, mining,

transportation, and manufacturing employment than the share we assume would reside in Southcentral. As shown in Table 55, however, population growth in Southcentral would be smoother than other regions during the cycles of economic expansion and decline in the 1980s. The downswing that follows the completion of gasline construction is not evident in Southcentral population projections which displays strong growth from 1985 to 1987. From 1987 to 1988, Southcentral population would decline by less than 1 percent compared to a 6 percent decline in Fairbanks. By 2000 Southcentral population is about 60 higher than its 1980 level. As a proportion of statewide population the Southcentral region would diminish from 12.5 percent in 1980 to 11.6 percent in 2000.

Employment. As shown in Table 56, total employment in Southcentral grows steadily throughout the post-boom decline of the mid- to late-1980s. In contrast to the other regions, which generally experience an employment peak by the mid-1980s, Southcentral employment reaches a peak in 1993 primarily in response to construction of the Susitna Hydroelectric project. By the year 2000, total employment has more than doubled at 43,475, representing an average growth rate of 3.7 percent annually. This long-run growth rate exceeds that of other regions. Further, the employment participation rate (i.e., the ratio of employment to population) rises from 42.4 in 1980 to 54.4 in 2000. The bulk of employment growth occurred in the basic sector which by the end of the forecast period exhibited a 200 percent increase from 1980 levels. Over the 20-year forecast period basic sector employment would grow

TABLE 56. PROJECTED EMPLOYMENT AND EMPLOYMENT COMPONENTS:  
SOUTHCENTRAL, 1980-2000  
(Thousands of Persons)

	EM99R4	EM98R4	EMB1R4	EMS1R4	EMG9R4
1980	21.079	18.107	4.574	6.495	7.038
1981	21.049	18.097	4.716	6.308	7.073
1982	22.443	19.44	5.942	6.406	7.093
1983	24.09	21.04	7.038	6.925	7.076
1984	27.635	24.488	9.767	7.957	6.783
1985	29.777	26.606	10.405	9.466	6.735
1986	31.629	28.351	10.206	10.931	7.215
1987	32.496	29.147	9.937	11.554	7.656
1988	32.55	29.211	10.118	11.254	7.839
1989	32.857	29.523	10.15	11.35	8.024
1990	33.367	30.055	10.376	11.448	8.231
1991	34.068	30.728	10.68	11.618	8.43
1992	34.733	31.392	10.978	11.779	8.635
1993	35.586	32.233	11.218	12.134	8.881
1994	35.562	32.228	10.649	12.386	9.192
1995	36.414	33.076	10.000	12.720	9.447
1996	37.766	34.404	11.533	13.218	9.653
1997	39.277	35.889	12.148	13.838	9.993
1998	40.48	37.075	12.432	14.429	10.214
1999	41.042	37.638	12.091	14.977	10.57
2000	43.475	40.016	13.429	15.728	10.849

---

EM99R4 = Total employment in Southcentral ( $10^3$  persons)  
EM98R4 = Wages and salary employment in Southcentral ( $10^3$  persons)  
EMB1R4 = Basic sector employment in Southcentral ( $10^3$  persons)  
EMS1R4 = Support sector employment in Southcentral ( $10^3$  persons)  
EMG9R4 = Total government sector employment ( $10^3$  persons)

SOURCE: MAP Model Projections.

TABLE 57. PROJECTED REAL AND REAL PER CAPITA PERSONAL  
 INCOME: SOUTHCENTRAL, 1980-2000  
 (Millions of 1980 Dollars and  
 1980 Dollars Respectively)

	PIRR4	PIRPCR4
1980	441.658	8389.87
1981	451.362	9197.1
1982	518.026	10253.1
1983	519.509	11859.1
1984	913.494	16152.7
1985	1128.02	18755.5
1986	1136.84	17370.
1987	1044.74	15570.8
1988	1026.17	15330.6
1989	1028.76	15310.9
1990	1053.36	15621.
1991	1037.06	15390.1
1992	1125.01	16431.1
1993	1165.72	16812.1
1994	1147.95	16615.4
1995	1188.58	16376.7
1996	1262.44	17621.1
1997	1343.57	18253.7
1998	1393.43	18515.7
1999	1395.23	18307.2
2000	1487.56	18619.5

---

PIRR4 = Real personal income in Southcentral (millions of 1980 dollars)  
 PIRPCR4 = Real per capita personal income in Southcentral (1980 dollars)

SOURCE: MAP Model Projections.

#### IV. PROJECTED IMPACTS OF THE PROPOSED BEAUFORT SALE

##### Introduction

Four scenarios of OCS development in Harrison Bay of the Beaufort Sea are included in the following discussion of projected impacts. Estimates of economically recoverable reserves for each development scenario are shown in Table 58. In general, the exploration, construction, and development phases would occur over the same intervals for each scenario. Shore-based facilities are constructed in 1984 and exploration would extend from 1985 to 1988, followed by a 2-year lapse until platform and pipeline construction would begin in 1990. Oil and gas production would begin in 1993 for all scenarios and continue beyond the forecast interval which terminates in 2000. Estimates of direct SEAR adjusted, OCS resident employment for the low, mean, high, and Simpson deletion scenarios are shown in Table 59. Direct OCS employment adjusted for Alaska residency constitutes the primary source of impact of OCS development on the Alaska economy. The remaining OCS impact would occur from state property taxes revenues that accrue from three miles of additional pipeline (valued at \$30 million for each scenario) within state boundaries. These extra property tax revenues (including the portion going to the North Slope Borough) are shown in Table 60.

Projections of sale impacts are developed by adjusting the non-OCS base case to include direct impacts (primarily employment) of the low, mean, high, and Simpson deletion development scenarios and re-running

TABLE 59. PROJECTED DIRECT OCS EMPLOYEES THAT WILL RESIDE  
IN ALASKA

<u>Year</u>	<u>Scenarios</u>			
	<u>Low</u>	<u>Mean</u>	<u>High</u>	<u>Simpson Deletion</u>
1983	0	0	0	0
1984	37	37	37	37
1985	39	39	39	39
1986	46	69	85	66
1987	46	71	88	66
1988	23	69	85	66
1989	0	0	0	0
1990	64	76	76	72
1991	461	1282	2319	152
1992	470	1479	2524	1075
1993	492	1641	2732	1336
1994	457	1757	2978	1426
1995	393	1771	3069	1297
1996	401	1541	3180	1062
1997	401	1333	2940	1067
1998	398	1333	2772	1069
1999	396	1348	2628	1069
2000	401	1359	2499	1062

SOURCE: Alaska OCS Office; SEAR adjustment performed at ISER (see Appendix C).

the statewide and regional MAP model. A comparison of each modified OCS development case run is then made with the non-OCS base case projections of the previous section. The difference in the values of the respective variables of each development case and the non-OCS base case provides a measure of the impact of the OCS development scenarios. Projections are developed for the 1980-2000 period.

### The Mean-find Scenario

#### STATEWIDE IMPACTS

##### Population

Over the projection period there is a net increase of about 11,000 people above what would have occurred in the absence of the mean case (700.9 thousand versus 690.1 thousand). This is equivalent to 1.6 percent of the base case projected population. The bulk of this increase would not occur until after production begins in 1990, as shown in Tables 61 and 62.

Net in-migration contributes most to year-by-year population increase through the early part of the production phase. After 1995, natural increase contributes a greater share to annual population increments. Net out-migration would occur from 1996 to 1998 in response to an absolute decline in direct OCS employment from a peak of 1771 employees in 1995. (See Table 61.) Over the entire projection period net migration adds about 8400 persons to the total state population. By comparison, natural increase expands total population by 2400 persons

TABLE 62. PROJECTED STATEWIDE POPULATION IMPACTS  
 PERCENTAGE DIFFERENCES: MEAN CASES  
 (Percent)

	POPTST	MIGNET	NATINC
1980	0.	0.	0.
1981	0.	0.	0.
1982	0.	0.	0.
1983	0.	0.	0.
1984	0.027	0.468	0.
1985	0.054	0.41	0.096
1986	0.071	0.637	0.16
1987	0.078	-0.893	0.197
1988	0.082	-0.247	0.213
1989	0.054	8.686	0.224
1990	0.08	14.113	0.111
1991	0.683	119.488	0.207
1992	1.164	62.734	2.486
1993	1.439	23.908	4.085
1994	1.616	17.717	4.772
1995	1.727	10.447	5.088
1996	1.701	-2.093	5.14
1997	1.598	-5.819	4.609
1998	1.552	-2.388	3.85
1999	1.558	0.77	3.411
2000	1.572	1.547	3.235

---

POPTST = State population  
 MIGNET = Net migration  
 NATINC = Civilian non-native natural increase

SOURCE: MAP Model Projections.

TABLE 63. PROJECTED STATEWIDE EMPLOYMENT IMPACTS  
 ABSOLUTE VALUES: MEAN CASE  
 (Thousands of Persons)

	EM99ST	EM98ST	EMB1ST	EMS1ST	EMG9ST
1980	0.	0.	0.	0.	0.
1981	0.	0.	0.	0.	0.
1982	0.	0.	0.	0.	0.
1983	0.	0.	0.	0.	0.
1984	0.089	0.085	0.048	0.042	-0.004
1985	0.159	0.154	0.046	0.09	0.018
1986	0.209	0.202	0.068	0.099	0.035
1987	0.22	0.212	0.07	0.105	0.038
1988	0.226	0.218	0.07	0.109	0.04
1989	0.116	0.112	0.009	0.072	0.032
1990	0.216	0.209	0.099	0.102	0.008
1991	2.63	2.546	1.535	0.784	0.227
1992	4.44	4.299	1.771	1.891	0.638
1993	5.424	5.255	1.849	2.545	0.861
1994	6.016	5.832	1.9	2.939	0.993
1995	6.354	6.163	1.951	3.133	1.078
1996	6.155	5.973	1.707	3.162	1.104
1997	5.676	5.511	1.464	2.993	1.055
1998	5.492	5.336	1.462	2.856	1.019
1999	5.541	5.386	1.491	2.86	1.035
2000	5.68	5.524	1.525	2.931	1.068

---

EM99ST = Total employment ( $10^3$  persons)  
 EM98ST = Wage and salary employment ( $10^3$  persons)  
 EMB1ST = Proportion of employment in the basic sector ( $10^3$  persons)  
 EMS1ST = Proportion of employment in the support sector  
 EMG9ST = Proportion of employment in the government sector

SOURCE: MAP Model Projections.

### Income, Wages, and Prices

Total personal income in 1980 dollars (PIRST) rises about \$8 million above base case levels during mean case exploration and construction. This income impact is not significant when expressed as a percent of total base case personal income or in absolute real per capita terms (Table 65). Not until the development phase commences in 1990 does the impact of OCS development on real personal income increase notably, rising to a peak impact of \$236 million (or 2.3 percent) in 1995. As a percent of base case real per capita personal income, the impact of mean case OCS development does not exceed 1 percent over the projection period (see Table 66).

The real wage and salary payments shown in Tables 67 and 68 follow the same general pattern as personal income. The smallest differences are seen in the government wage bill (WSG9RST), where the difference grows from about 9.2 million dollars in 1984 to 31.5 million dollars in 1996 (a 0.9 percent increase above the base case). After this peak, the differences drop slightly before increasing gradually to about \$33.8 million by the year 2000. The average percentage difference over the period remains less than 1 percent.

The difference in total support sector real wages (WSS1RST) grows from \$1.6 million in 1984 to \$68 million in 1996 (a 2.2 percent increase above the base case). Thereafter, the percentage difference averages less than 2.0 percent. Basic sector wage bills (WSB1RST) closely approximate those of the support sector, although the average wage and

TABLE 66. PROJECTED STATEWIDE REAL AND REAL PER CAPITA PERSONAL  
 INCOME IMPACTS, PERCENTAGE DIFFERENCES: MEAN CASE  
 (Percent)

	PIRST	PIRPCST
1980	0.	0.
1981	0.	0.
1982	0.	0.
1983	0.	0.
1984	0.1	0.073
1985	0.086	0.033
1986	0.084	0.013
1987	0.095	0.017
1988	0.095	0.012
1989	0.035	-0.018
1990	0.171	0.092
1991	1.396	0.708
1992	1.917	0.744
1993	2.115	0.666
1994	2.238	0.612
1995	2.283	0.546
1996	2.07	0.363
1997	1.8	0.199
1998	1.706	0.151
1999	1.694	0.134
2000	1.675	0.102

---

PIRST = Personal income  
 PIRPCST = Real per capita personal income

SOURCE: MAP Model Projections.

TABLE 68. PROJECTED STATEWIDE REAL WAGE AND SALARY IMPACTS,  
 PERCENTAGE DIFFERENCES: MEAN CASE  
 (Percent)

	WSB1RST	WSS1RST	WSG9RST
1980	0.	0.	0.
1981	0.	0.	0.
1982	0.	0.	0.
1983	0.	0.	0.
1984	0.194	0.086	0.01
1985	0.099	0.097	0.037
1986	0.119	0.074	0.04
1987	0.161	0.086	0.041
1988	0.165	0.094	0.043
1989	0.018	0.061	0.035
1990	0.365	0.157	0.035
1991	3.801	0.704	0.27
1992	4.106	1.542	0.629
1993	4.064	1.974	0.792
1994	4.147	2.223	0.881
1995	4.128	2.292	0.938
1996	3.397	2.211	0.939
1997	2.77	1.994	0.876
1998	2.697	1.822	0.829
1999	2.748	1.769	0.825
2000	2.679	1.747	0.835

---

WSB1RST = Basic sector wages and salaries  
 WSS1RST = Support sector wages and salaries  
 WSG9RST = Government sector wages and salaries

SOURCE: MAP Model Projections.

salaries are higher and the peak occurs one year earlier. Basic sector total wages in the OCS case are about 4.1 percent above the base case in the peak year (1995), but the percentage difference drops steadily until the end of the projection period, at which time the difference is 2.7 percent.

Real annual wage rate impacts shown in Tables 69 and 70 are greatest in the basic sector (WRB1RST). From a difference of 42 dollars in 1984, the wage rate impact grows to 321 dollars in 1995, a 0.8 percent difference over the base case. After a 2-year period of decline, wage rates impacts gradually increase to about 277 dollars by the end of the projection period. Differences in the wage rates for the support sector (WRS1RST) and government sector (WRG9RST) are generally negative over most of the projection period.

Direct OCS and indirect high-wage employment increases in the basic sector create additional low wage jobs in the support and government sectors.

Changes in the Alaska Relative Price Index (RPI) are minimal. A negligible increase over the base case of approximately 0.01 percent occurs in the early part of the project, but before the project peaks the differential becomes negative. Statistically, the differences are probably not significant and for all intents and purposes there is no real effect on the index. Data on the index are included in Table 71.

TABLE 71. PROJECTED STATEWIDE RELATIVE PRICE INDEX IMPACTS,  
ABSOLUTE AND PERCENTAGE DIFFERENCES: MEAN CASE

	RPI	RPI
1980	0.	0.
1981	0.	0.
1982	0.	0.
1983	0.	0.
1984	0.082	0.016
1985	0.119	0.022
1986	0.116	0.02
1987	0.111	0.018
1988	0.115	0.017
1989	0.144	0.02
1990	0.189	0.024
1991	0.34	0.04
1992	-0.313	-0.035
1993	-0.791	-0.081
1994	-1.031	-0.098
1995	-1.15	-0.102
1996	-1.267	-0.104
1997	-1.236	-0.094
1998	-0.983	-0.069
1999	-0.755	-0.05
2000	-0.604	-0.037

---

RPI = Alaska Relative Price Index

SOURCE: MAP Model projections.

### Government Revenue and Expenditure

The difference in total state government revenue (REVGFR) between the base case and the mean OCS development shown in Table 72 is negative until 1992, after oil and gas production begins. The decline is caused by the marginally higher price level brought about by OCS development. (See Table 71.) The nominal direct and indirect revenue effects of economic expansion in both the petroleum and endogenous sectors are neutral until state and borough petroleum property tax receipts accrue with the onset of production. Expressed in 1980 dollars, total state government revenue (REVGFR), petroleum taxes (RP9SR), and other (nonpetroleum) state government revenues (RNDSR) including state corporate income taxes and earnings on the general and permanent fund balances decline modestly in real terms through 1991 at less than 0.02 percent below base case revenues (Table 73). Further, although real property tax receipts grow steadily after 1990 (Table 60) the present value of their real impact in future years expressed in 1980 dollars, diminishes as the forecast period progresses. By the second half of the projection period all state government revenue impacts shown in Table 72 remain positive. The absolute value of other state government revenues (RNDSR) are more strongly impacted by OCS activity than are federal government revenues (RFDSR) or petroleum revenues. Note, however, that as a percent of base case revenue, federal government revenue (RFDSR) would be the only revenue category having a greater-than-1 percent increase over base case levels. By 1996 the difference in total state government revenue approaches \$11 million or 0.3 percent of base case state government revenue.

TABLE 74. PROJECTED STATEWIDE REAL AND REAL PER CAPITA GOVERNMENT  
 EXPENDITURE IMPACTS, ABSOLUTE VALUES:  
 MEAN CASE  
 (Millions of 1980 Dollars and 1980 Dollars, Respectively)

	E99SR	E99SRPC
1980	0.	0.
1981	0.	0.
1982	0.	0.
1983	0.	0.
1984	0.504	0.013
1985	0.993	-0.015
1986	1.403	-0.016
1987	1.623	-0.022
1988	1.811	-0.022
1989	1.303	0.02
1990	1.951	-0.022
1991	18.119	0.01
1992	32.706	0.019
1993	42.734	-0.019
1994	50.897	0.017
1995	57.475	-0.031
1996	59.994	0.018
1997	59.646	0.015
1998	61.338	0.016
1999	65.07	-0.03
2000	69.516	0.019

---

E99SR = Total state expenditures  
 E99SRPC = Real per capita state expenditures

SOURCE: MAP Model projections.

TABLE 75. PROJECTED STATEWIDE REAL AND REAL PER CAPITA GOVERNMENT EXPENDITURE IMPACTS, PERCENTAGE DIFFERENCES:  
MEAN CASE

	E99SR	E99SRPC
1980	0.	0.
1981	0.	0.
1982	0.	0.
1983	0.	0.
1984	0.028	0.001
1985	0.052	-0.001
1986	0.069	-0.001
1987	0.076	-0.002
1988	0.081	-0.002
1989	0.055	0.001
1990	0.078	-0.002
1991	0.683	0.001
1992	1.165	0.001
1993	1.438	-0.001
1994	1.617	0.001
1995	1.725	-0.002
1996	1.702	0.001
1997	1.599	0.001
1998	1.553	0.001
1999	1.557	-0.002
2000	1.573	0.001

---

E99SR = Total state expenditures  
E99SRPC = Real per capita state expenditures

SOURCE: MAP Model projections.

TABLE 77. PROJECTED PERCENTAGE DIFFERENCES IN CURRENT-  
AND 1980- DOLLAR FUND BALANCES: MEAN CASE

	FUND	FUNDR
1980	0.	0.
1981	0.	0.
1982	0.	0.
1983	0.	0.
1984	-0.006	-0.022
1985	-0.011	-0.034
1986	-0.016	-0.036
1987	-0.02	-0.038
1988	-0.024	-0.041
1989	-0.026	-0.046
1990	-0.029	-0.053
1991	-0.077	-0.117
1992	-0.141	-0.106
1993	-0.209	-0.128
1994	-0.287	-0.189
1995	-0.377	-0.275
1996	-0.47	-0.366
1997	-0.566	-0.472
1998	-0.678	-0.609
1999	-0.814	-0.765
2000	-0.977	-0.941

---

FUND = Total fund balance (millions of current dollars)  
 FUNDR = Total fund balance (millions of 1980 dollars)

SOURCE: MAP Model projections.

level expansion in the absence of a compensating rise in state government revenues. For example, in 1995 when the difference in general fund revenues peaked at \$14.5 million (1980), the difference in (i.e., impact) on) state expenditures was \$57.5 million (1980), nearly four times the size of general fund revenue impacts. In general, direct and indirect state government revenue increases from OCS development do not match the rise in state government expenditures needed to accommodate OCS-induced economic expansion.

## REGIONAL IMPACTS

### Introduction

We have assumed that OCS development in the Beaufort 71 lease sale will not have any direct employment impact on the North Slope region. All Beaufort employment will permanently reside in the Fairbanks, Anchorage, and Southcentral regions during rotation leave. Consequently, the population, employment, and personal income impacts that are projected in the North Slope would result from the disbursement of North Slope Borough property tax receipts through local government wages and salaries and local capital improvement projects.

### Regional Population Impacts

Absolute and percentage differences between the base and mean case population projections for the North Slope (R1), Southcentral (R4), Anchorage (R5), and Fairbanks (R7) regions are shown in Tables 78 and 79. Anchorage undergoes the greatest population expansion with the difference between the mean and base cases growing from 82 persons in

TABLE 80. PROJECTED REGIONAL TOTAL EMPLOYMENT IMPACTS,  
ABSOLUTE VALUES: MEAN CASE  
(Thousands of Persons)

	EM99R1	EM99R4	EM99R5	EM99R7
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	0.001	0.01	0.055	0.023
1985	0.001	0.016	0.093	0.037
1986	0.001	0.023	0.121	0.048
1987	0.001	0.026	0.127	0.049
1988	0.001	0.026	0.129	0.049
1989	0.002	0.013	0.056	0.02
1990	0.002	0.028	0.134	0.039
1991	0.007	0.089	2.297	0.196
1992	0.025	0.291	3.239	0.535
1993	0.034	0.404	3.76	0.728
1994	0.04	0.469	4.079	0.845
1995	0.044	0.501	4.259	0.903
1996	0.047	0.478	4.098	0.827
1997	0.046	0.425	3.808	0.708
1998	0.044	0.402	3.725	0.673
1999	0.045	0.403	3.762	0.681
2000	0.047	0.419	3.838	0.701

---

EM99R1 = Total employment in the North Slope region  
EM99R4 = Total employment in the Southcentral region  
EM99R5 = Total employment in the Anchorage region  
EM99R7 = Total employment in the Fairbanks region

SOURCE: MAP Model projections.

TABLE 81. PROJECTED REGIONAL TOTAL EMPLOYMENT IMPACTS,  
PERCENTAGE DIFFERENCE: MEAN CASE

	EM99R1	EM99R4	EM99R5	EM99R7
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	0.032	0.038	0.051	0.049
1985	0.037	0.053	0.076	0.071
1986	0.021	0.074	0.095	0.096
1987	0.033	0.079	0.1	0.108
1988	0.042	0.081	0.102	0.109
1989	0.05	0.04	0.044	0.043
1990	0.073	0.084	0.103	0.085
1991	0.22	0.26	1.735	0.412
1992	0.741	0.837	2.378	1.094
1993	0.977	1.134	2.676	1.448
1994	1.114	1.32	2.823	1.64
1995	1.198	1.377	2.859	1.701
1996	1.23	1.266	2.652	1.509
1997	1.157	1.082	2.368	1.246
1998	1.073	0.993	2.233	1.147
1999	1.065	0.982	2.188	1.13
2000	1.076	0.965	2.16	1.131

---

EM99R1 = Total employment in the North Slope region  
 EM99R4 = Total employment in the Southcentral region  
 EM99R5 = Total employment in the Anchorage region  
 EM99R7 = Total employment in the Fairbanks region

SOURCE: MAP Model projections.

base cases for Southcentral (R4), Anchorage (R5), and Fairbanks (R7) strongly resembles the pattern of direct OCS employment shown in Table 59, as well as the regional population impacts just discussed; employment impacts gradually increase to peak levels in 1995, followed by modest cyclical changes thereafter. Again, the Anchorage region accepts the bulk of the statewide employment impact (77 percent in 2000) followed by Fairbanks (1+ percent), Southcentral (8 percent), and the North Slope (1 percent). As with regional population, the largest regional employment impacts occur outside the North Slope region where OCS development takes place. This reflects two important assumptions discussed above. First, nonresident enclave employment is not included in the development scenarios. Second, the employment data reflect place of residence rather than place of work. In the case of Anchorage (R5), part of employment expansion represents the direct (and indirect) impact of headquarters employment.

Differences in basic sector employment (EMBI) for the peak year 1995 are: 10, 123, 1599, and 165 for regions R1, R4, R5, and R7, respectively. The comparable percentage differentials are 2 percent or less for all regions except Anchorage (R5) which experiences a peak basic sector employment impact of nearly 8 percent over base case levels (see Tables 82 and 83).

Support sector peak employment differences occur in 1996, reflecting a slight lag in support sector response to direct economic expansion. In absolute terms these impacts are: 9, 248, 2131, and 529 for R1, R4,

TABLE 84. PROJECTED REGIONAL SUPPORT SECTOR EMPLOYMENT  
 IMPACTS, ABSOLUTE VALUES: MEAN CASE  
 (Thousands of Persons)

	EMS1R1	EMS1R4	EMS1R5	EMS1R7
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	0.	0.002	0.026	0.013
1985	0.	0.007	0.055	0.023
1986	-0.	0.008	0.062	0.027
1987	0.	0.009	0.066	0.028
1988	0.	0.009	0.067	0.028
1989	0.	0.007	0.04	0.013
1990	0.001	0.009	0.067	0.019
1991	-0.	0.	0.74	0.069
1992	0.004	0.107	1.384	0.291
1993	0.006	0.179	1.772	0.431
1994	0.007	0.222	2.009	0.516
1995	0.007	0.237	2.127	0.551
1996	0.009	0.248	2.131	0.529
1997	0.009	0.24	2.025	0.473
1998	0.008	0.224	1.956	0.445
1999	0.008	0.222	1.967	0.446
2000	0.008	0.229	2.012	0.456

---

EMS1R1 = Support sector employment in the North Slope region  
 EMS1R4 = Support sector employment in the Southcentral region  
 EMS1R5 = Support sector employment in the Anchorage region  
 EMS1R7 = Support sector employment in the Fairbanks region

SOURCE: MAP Model projections.

TABLE 85. PROJECTED REGIONAL SUPPORT SECTOR EMPLOYMENT IMPACTS,  
PERCENTAGE DIFFERENCES: MEAN CASE

	EMS1R1	EMS1R4	EMS1R5	EMS1R7
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	0.054	0.031	0.054	0.08
1985	0.041	0.069	0.092	0.115
1986	-0.009	0.072	0.096	0.128
1987	0.003	0.077	0.104	0.141
1988	0.02	0.083	0.109	0.143
1989	0.065	0.061	0.065	0.067
1990	0.115	0.079	0.105	0.094
1991	-0.035	0.001	1.131	0.339
1992	0.649	0.908	2.038	1.382
1993	0.884	1.474	2.501	1.96
1994	1.007	1.794	2.73	2.267
1995	1.114	1.861	2.782	2.327
1996	1.232	1.876	2.659	2.135
1997	1.18	1.732	2.397	1.812
1998	1.032	1.556	2.204	1.629
1999	0.996	1.482	2.131	1.573
2000	1.005	1.457	2.095	1.553

---

EMS1R1 = Support sector employment in the North Slope region  
 EMS1R4 = Support sector employment in the Southcentral region  
 EMS1R5 = Support sector employment in the Anchorage region  
 EMS1R7 = Support sector employment in the Fairbanks region

SOURCE: MAP Model projections.

TABLE 87. PROJECTED REGIONAL GOVERNMENT SECTOR EMPLOYMENT  
 IMPACTS, PERCENTAGE DIFFERENCES: MEAN CASE

	EMG9R1	EMG9R4	EMG9R5	EMG9R7
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	-0.012	-0.01	-0.003	-0.004
1985	0.034	0.036	0.017	0.017
1986	0.063	0.065	0.032	0.033
1987	0.064	0.066	0.033	0.034
1988	0.066	0.067	0.034	0.035
1989	0.053	0.053	0.027	0.028
1990	0.013	0.011	0.007	0.007
1991	0.335	0.35	0.191	0.197
1992	0.933	0.983	0.518	0.54
1993	1.249	1.284	0.69	0.719
1994	1.402	1.43	0.78	0.813
1995	1.479	1.511	0.833	0.868
1996	1.478	1.515	0.84	0.876
1997	1.376	1.41	0.792	0.825
1998	1.287	1.319	0.751	0.782
1999	1.265	1.296	0.746	0.777
2000	1.27	1.304	0.757	0.788

---

EMG9R1 = Total government sector employment in the North Slope region  
 EMG9R4 = Total government sector employment in the Southcentral region  
 EMG9R5 = Total government sector employment in the Anchorage region  
 EMG9R7 = Total government sector employment in the Fairbanks region

SOURCE: MAP Model projections.

TABLE 89. PROJECTED REGIONAL REAL PERSONAL INCOME IMPACTS,  
PERCENTAGE DIFFERENCES: MEAN CASE

	PIRR1	PIRR4	PIRR5	PIRR7
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	0.125	0.126	0.104	0.123
1985	0.064	0.08	0.103	0.089
1986	-0.003	0.074	0.107	0.093
1987	0.022	0.091	0.114	0.12
1988	0.035	0.092	0.112	0.119
1989	0.047	0.03	0.034	0.036
1990	0.225	0.223	0.182	0.198
1991	0.507	0.683	2.379	0.749
1992	0.993	1.178	2.918	1.355
1993	1.142	1.375	3.121	1.642
1994	1.287	1.567	3.238	1.833
1995	1.387	1.633	3.265	1.89
1996	1.394	1.411	2.972	1.628
1997	1.289	1.135	2.628	1.314
1998	1.204	1.068	2.523	1.235
1999	1.221	1.098	2.501	1.239
2000	1.233	1.092	2.472	1.238

---

PIRR1 = Real personal income in the North Slope region  
PIRR4 = Real personal income in the Southcentral region  
PIRR5 = Real personal income in the Anchorage region  
PIRR7 = Real personal income in the Fairbanks region

SOURCE: MAP Model projections.

TABLE 90. PROJECTED REGIONAL REAL PER CAPITA PERSONAL INCOME  
 IMPACTS, ABSOLUTE VALUES: MEAN CASE  
 (1980 Dollars)

	PIRPCR1	PIRPCR4	PIRPCR5	PIRPCR7
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.	0.	0.
1984	29.086	16.562	9.555	17.809
1985	12.762	5.703	6.141	4.672
1986	-6.246	0.855	3.355	-0.699
1987	-2.035	2.523	2.77	2.559
1988	-1.152	2.059	1.699	1.797
1989	-3.461	-2.617	-3.242	-2.832
1990	38.047	22.855	12.004	21.113
1991	146.289	101.242	140.109	103.637
1992	131.012	106.531	149.562	112.062
1993	112.824	93.242	136.531	102.898
1994	118.168	90.395	124.109	98.008
1995	123.301	85.215	112.965	89.047
1996	106.309	51.859	82.09	59.402
1997	92.172	19.039	53.418	30.184
1998	97.207	12.027	46.312	20.18
1999	107.266	12.602	43.562	15.191
2000	110.176	8.477	39.484	7.48

---

PIRPCR1 = Real per capita personal income in the North Slope region  
 PIRPCR4 = Real per capita personal income in the Southcentral region  
 PIRPCR5 = Real per capita personal income in the Anchorage region  
 PIRPCR7 = Real per capita personal income in the Fairbanks region

SOURCE: MAP Model projections.

TABLE 92. SUMMARY OF LOW SCENARIO IMPACTS

Variable	Peak Cyclical Impact		Year	Impact in the Year 2000	
	Absolute Value (Persons)	Percentage Difference (Percent)		Absolute Value (Persons)	Percentage Difference (Percent)
POPTST	2730	0.47	1994	3088	0.45
MIGNET	1203	43.8	1991	47	0.44
EM99ST	1681	0.56	1993	1597	0.43
EMB1ST	511	1.01	1991	305	0.51
EMS1ST	881	0.68	1994	867	0.51
EMG9ST	286	0.28	1994	301	0.26
	(Millions of 1980 Dollars)			(Millions of 1980 Dollars)	
PIRST	\$58.9	0.62	1993	\$61.9	0.46
REVGFR	\$ 3.95	0.45	1993	\$ 0.37	0.01
E99SR	\$19.82	0.45	2000	\$19.82	0.45
FUNDR	-\$83.2	-0.31	2000	-\$83.2	-0.31

POPTST = Population  
 MIGNET = Net migration  
 EM99ST = Total employment  
 EMB1ST = Proportion of employment in the basic sector  
 EMS1ST = Proportion of employment in the support sector  
 EMG9ST = Proportion of employment in the government sector  
 PIRST = Personal income  
 REVGFR = Total general fund revenue  
 E99SR = Total state expenditures  
 FUNDR = Total fund balance

SOURCE: MAP Model projections.

TABLE 93. REGIONAL DISTRIBUTION OF LOW-FIND IMPACTS  
IN THE YEAR 2000

	<u>Population</u>		<u>Employment</u>		<u>Personal Income</u>	
	<u>Persons</u>	<u>Percent</u>	<u>Persons</u>	<u>Percent</u>	<u>Dollars<sup>a</sup></u>	<u>Percent</u>
North Slope (R1)	18	0.6	13	0.8	0.7	1.1
Southcentral (R4)	27	0.9	135	8.5	5.2	8.4
Anchorage (R5)	1,963	63.6	1033	64.7	39.3	63.5
Fairbanks (R7)	439	14.2	234	14.7	20.1	16.3
Statewide	3,088	100.0	1597	100.0	61.9	100.0

<sup>a</sup>Million of 1980 dollars.

Table Note: Regional percentages do not sum to 100 since other regions not included in this table are also affected by OCS development.

SOURCE: MAP Model.

TABLE 94. SUMMARY OF HIGH SCENARIO IMPACTS

Variable	Peak Cyclical Impact			Impact in the Year 2000		
	Absolute Difference (Persons)	Percentage Difference (Percent)	Year	Absolute Difference (Persons)	Percentage Difference (Percent)	
POPTST	20,642	2.99	2000	20,642	2.99	
MIGNET	5,895	214.65	1991	- 375	-3.54	
EM99ST	11,722	3.56	1996	10,944	2.86	
EMBIST	3,440	6.06	1994	2,893	3.82	
EMS1ST	5,940	3.98	1997	5,683	3.35	
EMG9ST	2,091	1.90	1998	2,069	1.80	
	(Millions of 1980 Dollars)			(Millions of 1980 Dollars)		
PIRST	445.1	3.82	1997	430.3	3.2	
REVGFR	24.1	0.46	1995	12.6	0.28	
E99SR	132.3	2.99	2000	132.3	2.99	
FUNDR	-468.2	1.75	2000	-468.2	1.75	

POPTST = Population  
 MIGNET = Net migration  
 EM99ST = Total employment  
 EMBIST = Proportion of employment in the basic sector  
 EMS1ST = Proportion of employment in the support sector  
 EMG9ST = Proportion of employment in the government sector  
 PIRST = Personal income  
 REVGFR = Total general fund revenue  
 E99SR = Total state expenditures  
 FUNDR = Total fund balance

SOURCE: MAP Model.

As with the mean- and low-find scenarios, the high-find scenario impacts are relatively modest until after the development phase commences in 1990. By 1991 net immigration expands to 5895 persons which accounts for 93 percent of population increase in that year. Population impacts continue to grow steadily without experiencing an intermediate cyclical peak prior to termination of the projection period in 2000. The 20,642 extra persons in 2000 represents a 3 percent increase in base case population of 690,057. The pattern of total and sectoral employment impacts suggest that, in contrast to the more concentrated low and mean scenario impacts, the high-find impacts are more dispersed throughout the projection period. Although the total employment impact occurs in 1996 (the same year of peak direct OCS employment) basic sector employment peaks two years earlier in 1994 while support and government sector employment are lagged one and two years behind, respectively. As a percent of base case employment in each industry sector, the basic sector peak impact increases by more than 6 percent, and government sector at 1.9 percent above respective base case levels.

Further evidence of a more widely distributed impact than that of previous development scenarios is reflected in the distribution of maximum impact for real personal income (PIRST) and total state government revenue (REVGFR). A comparison between the low- and high-find peak-cyclical impacts on various aggregate indicators (excluding state expenditures and general fund balance) in Tables 92 and 93 indicate that, whereas low-find impacts occur between 1991 and 1994, high-find

TABLE 96. SUMMARY OF SIMPSON-DELETION IMPACTS

Variable	Peak Cyclical Impact			Impact in the Year 2000		
	Absolute Difference (Persons)	Percentage Difference (Percent)	Year	Absolute Difference (Persons)	Percentage Difference (Percent)	
POPTST	7710	1.3	1995	8123	1.2	
MIGNET	2367	86.2	1991	86	0.8	
EM99ST	4754	1.5	1995	4296	1.1	
EMB1ST	1434	2.5	1994	1069	1.4	
EMS1ST	2485	1.8	1995	2308	1.4	
EMG9ST	819	0.8	1995	801	0.7	
	(Millions of 1980 Dollars)			(Millions of 1980 Dollars)		
PIRST	172.6	1.7	1994	167.1	1.2	
REVGFR	11.6	0.2	1995	3.5	0.07	
E99SR	52.1	1.2	2000	52.1	1.2	
FUNDR	-190.3	0.7	2000	-190.3	0.7	

POPTST = Population  
 MIGNET = Net migration  
 EM99ST = Total employment  
 EMB1ST = Proportion of employment in the basic sector  
 EMS1ST = Proportion of employment in the support sector  
 EMG9ST = Proportion of employment in the government sector  
 PIRST = Personal income  
 REVGFR = Total general fund revenue  
 E99SR = Total state expenditures  
 FUNDR = Total fund balance

SOURCE: MAP Model.

TABLE 97. REGIONAL DISTRIBUTION OF SIMPSON DELETION IMPACTS  
IN THE YEAR 2000

	<u>Population</u>		<u>Employment</u>		<u>Personal Income</u>	
	<u>Persons</u>	<u>Percent</u>	<u>Persons</u>	<u>Percent</u>	<u>Dollars<sup>a</sup></u>	<u>Percent</u>
North Slope (R1)	48	0.6	35	0.8	1.9	1.2
Southcentral (R4)	659	8.1	338	7.9	12.8	7.6
Anchorage (R5)	5,238	64.5	2,856	66.5	109.6	65.6
Fairbanks (R7)	1,041	12.8	570	13.3	24.5	14.7
Statewide	8,123	100.0	4,296	100.0	167.1	100.0

<sup>a</sup>Million of 1980 dollars.

Table Note: Regional percentages do not sum to 100 since other regions not included in this table are also affected by OCS development.

SOURCE: MAP Model.

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APPENDIX A  
OCS LEASE SALE EMPLOYMENT IN THE BASE CASE

TABLE A1. LOWER COOK INLET MINING EMPLOYMENT

	EP9CI4	EP9CI5	EMP9CI
1977	0.	0.	0.
1978	0.196	0.021	0.217
1979	0.16	0.037	0.197
1980	0.169	0.032	0.201
1981	0.166	0.037	0.203
1982	0.132	0.024	0.156
1983	0.061	0.024	0.085
1984	0.226	0.037	0.263
1985	0.898	0.077	0.975
1986	1.224	0.134	1.358
1987	1.239	0.153	1.392
1988	1.103	0.141	1.244
1989	0.963	0.135	1.098
1990	0.923	0.133	1.056
1991	0.936	0.133	1.069
1992	0.974	0.133	1.107
1993	0.974	0.133	1.107
1994	0.913	0.133	1.046
1995	0.86	0.133	0.993
1996	0.825	0.133	0.958
1997	0.825	0.133	0.958
1998	0.825	0.133	0.958
1999	0.825	0.133	0.958
2000	0.825	0.133	0.958

---

EP9CI4 = Mining employment in Southcentral region  
 EP9CI5 = Mining employment in Anchorage region  
 EMP9CI = Total mining employment

SOURCE: Alaska OCS Office

TABLE A3. BEAUFORT SEA MINING EMPLOYMENT, STATE AND FEDERAL JOINT LEASE SALE

	EP9BF4	EP9BF5	EP9BF7	EMP9BF
1977	0.	0.	0.	0.
1978	0.	0.	0.	0.
1979	0.	0.	0.	0.
1980	0.	0.	0.	0.
1981	0.003	0.017	0.003	0.023
1982	0.008	0.05	0.01	0.068
1983	0.008	0.05	0.01	0.068
1984	0.009	0.058	0.012	0.079
1985	0.003	0.018	0.003	0.024
1986	0.007	0.031	0.008	0.046
1987	0.02	0.074	0.024	0.118
1988	0.034	0.131	0.04	0.205
1989	0.045	0.179	0.052	0.276
1990	0.044	0.185	0.052	0.281
1991	0.041	0.168	0.047	0.256
1992	0.039	0.164	0.046	0.249
1993	0.036	0.147	0.041	0.224
1994	0.036	0.148	0.042	0.226
1995	0.036	0.149	0.042	0.227
1996	0.036	0.149	0.043	0.228
1997	0.035	0.144	0.041	0.22
1998	0.034	0.14	0.039	0.213
1999	0.034	0.14	0.039	0.213
2000	0.034	0.14	0.039	0.213

---

EP9BF4 = Mining employment in Southcentral region  
 EP9BF5 = Mining employment in Anchorage region  
 EP9BF7 = Mining employment in Fairbanks region  
 EMP9BF = Total mining employment

SOURCE: Alaska OCS Office

TABLE A5. NORTHERN GULF (SALE 55) MINING EMPLOYMENT

	EP9554	EP9555	EMP955
1977	0.	0.	0.
1978	0.	0.	0.
1979	0.	0.	0.
1980	0.	0.	0.
1981	0.041	0.004	0.045
1982	0.081	0.009	0.09
1983	0.081	0.009	0.09
1984	0.075	0.008	0.083
1985	0.034	0.004	0.038
1986	0.	0.	0.
1987	0.081	0.009	0.09
1988	0.161	0.018	0.179
1989	0.306	0.034	0.34
1990	0.3	0.033	0.333
1991	0.309	0.034	0.343
1992	0.263	0.029	0.292
1993	0.274	0.031	0.305
1994	0.276	0.031	0.307
1995	0.279	0.031	0.31
1996	0.279	0.031	0.31
1997	0.279	0.031	0.31
1998	0.279	0.031	0.31
1999	0.279	0.031	0.31
2000	0.279	0.031	0.31

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EP9554 = Mining employment in Southcentral region  
 EP9555 = Mining employment in Anchorage region  
 EMP955 = Total mining employment

SOURCE: Alaska OCS Office

TABLE A7. LOWER COOK INLET (SALE 60) MINING EMPLOYMENT

	EP9604	EP9605	EMP960
1977	0.	0.	0.
1978	0.	0.	0.
1979	0.	0.	0.
1980	0.	0.	0.
1981	0.	0.	0.
1982	0.083	0.	0.083
1983	0.09	0.	0.09
1984	0.09	0.	0.09
1985	0.084	0.	0.084
1986	0.206	0.002	0.208
1987	0.354	0.004	0.358
1988	0.354	0.015	0.369
1989	0.354	0.031	0.385
1990	0.365	0.046	0.411
1991	0.379	0.053	0.432
1992	0.377	0.053	0.43
1993	0.377	0.053	0.43
1994	0.377	0.053	0.43
1995	0.377	0.053	0.43
1996	0.377	0.053	0.43
1997	0.377	0.053	0.43
1998	0.377	0.053	0.43
1999	0.377	0.053	0.43
2000	0.377	0.053	0.43

---

EP9604 = Mining employment in Southcentral region  
 EP9605 = Mining employment in Anchorage region  
 EMP960 = Total mining employment

SOURCE: Alaska OCS Office

TABLE A9. BERING-NORTON (SALE 57) MINING EMPLOYMENT

	EP9574	EP9575	EP9576	EMP957M
1977	0.	0.	0.	0.
1978	0.	0.	0.	0.
1979	0.	0.	0.	0.
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.026	0.097	0.018	0.141
1984	0.083	0.316	0.059	0.458
1985	0.14	0.537	0.097	0.774
1986	0.098	0.36	0.066	0.524
1987	0.112	0.395	0.012	0.519
1988	0.146	0.561	0.022	0.729
1989	0.156	0.597	0.022	0.776
1990	0.138	0.538	0.022	0.698
1991	0.135	0.534	0.022	0.691
1992	0.132	0.53	0.022	0.684
1993	0.132	0.534	0.022	0.689
1994	0.13	0.541	0.022	0.694
1995	0.127	0.534	0.022	0.684
1996	0.126	0.535	0.022	0.683
1997	0.125	0.536	0.022	0.684
1998	0.126	0.54	0.022	0.688
1999	0.125	0.546	0.022	0.694
2000	0.126	0.536	0.022	0.684

---

EP9574 = Mining employment in Southcentral region  
 EP9575 = Mining employment in Anchorage region  
 EP9576 = Mining employment in Bering-Norton region  
 EMP957 = Total mining employment

SOURCE: Alaska OCS Office

TABLE A11. BERING-NORTON (SALE 57) CONSTRUCTION EMPLOYMENT

	ECX574	ECX575	ECX576	ECONX57M
1977	0.	0.	0.	0.
1978	0.	0.	0.	0.
1979	0.	0.	0.	0.
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.016	0.061	0.077	0.155
1984	0.	0.	0.	0.
1985	0.008	0.031	0.	0.038
1986	0.016	0.061	0.	0.077
1987	0.074	0.261	0.188	0.523
1988	0.089	0.316	0.25	0.654
1989	0.03	0.107	0.125	0.262
1990	0.018	0.064	0.063	0.144
1991	0.	0.	0.	0.
1992	0.	0.	0.	0.
1993	0.	0.	0.	0.
1994	0.	0.	0.	0.
1995	0.	0.	0.	0.
1996	0.	0.	0.	0.
1997	0.	0.	0.	0.
1998	0.	0.	0.	0.
1999	0.	0.	0.	0.
2000	0.	0.	0.	0.

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ECX574 = Construction employment in Southcentral region  
 ECX575 = Construction employment in Anchorage region  
 ECX576 = Construction employment in Bering-Norton region  
 ECONX57M = Total construction employment

SOURCE: Alaska OCS Office

TABLE A13. ST. GEORGE (SALE 70) TRANSPORTATION EMPLOYMENT

	ETX702	ETX704	ETX705	EMT9X70M
1977	0.	0.	0.	0.
1978	0.	0.	0.	0.
1979	0.	0.	0.	0.
1980	0.	0.	0.	0.
1981	0.	0.	0.	0.
1982	0.	0.	0.	0.
1983	0.	0.012	0.046	0.057
1984	0.	0.018	0.072	0.091
1985	0.015	0.03	0.117	0.162
1986	0.045	0.044	0.165	0.254
1987	0.09	0.059	0.214	0.363
1988	0.332	0.062	0.222	0.616
1989	0.565	0.068	0.247	0.88
1990	0.51	0.043	0.158	0.711
1991	0.51	0.043	0.158	0.711
1992	0.51	0.042	0.159	0.711
1993	0.51	0.042	0.159	0.711
1994	0.51	0.041	0.16	0.711
1995	0.51	0.041	0.16	0.711
1996	0.51	0.041	0.16	0.711
1997	0.51	0.041	0.16	0.711
1998	0.51	0.04	0.161	0.711
1999	0.51	0.04	0.161	0.711
2000	0.51	0.041	0.16	0.711

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ETX702 = Transportation employment in St. George region  
 ETX704 = Transportation employment in Southcentral region  
 ETX705 = Transportation employment in Anchorage region  
 EMT9X70M = Total transportation employment

SOURCE: Alaska OCS Office

APPENDIX B  
A PROCEDURE TO DETERMINE THE SHARE OF OCS EMPLOYMENT  
THAT RESIDE IN ALASKA (SEAR)

The direct total employment estimates made by Dames and Moore and the Alaska OCS Office Studies Program for several OCS petroleum scenarios have been refined to reflect resident/nonresident composition of this employment. Resident, in the context of these refinements, refers to an individual that resides in Alaska for the duration of employment (including offsite). Resident employees do not need to live in Alaska before the project begins. Resident employment is assumed to have full impact on the Alaska economy, while the impact of nonresident employees is assumed to be negligible. To assist in the determination of the share of employment to Alaska residents (SEAR), a cross section of information regarding the classification, structure, duration, and impact of OCS petroleum development-related employment is presented in Table B1, "Characteristics of OCS Employment by Task," which accompanies this appendix.

A brief outline of the table's format and information content will precede a discussion of the assumptions used to provide consistency and accuracy in the interpretation of this information.

## TABLE NOTES

### Characteristics of OCS Employment by Task

1. These are the employment sectors (or tasks) requested by Tom Smythe of Alaska Consultants in his November 21 correspondence with Richard Schmidt of Peat, Marwick, Mitchell and Co.
2. Dames and Moore, "Alaska OCS Socioeconomic Studies Program, Northern Gulf of Alaska, Petroleum Development Scenarios," Draft Report, Task 9BA, October 24, 1978, Table 5-4, pages 119-122.
3. Ibid.
4. Based on discussions found in Planning for Offshore Oil Development, Gulf of Alaska OCS Handbook, Division of Community Planning, ADCRA, 1978, pages 40-41 and 223-224. Note: P = permanent; T = temporary.
5. Interview: Max Beazley, Staff Engineer at Mobil Oil Corporation, Exploration and Producing. Mr. Beazley is currently working in the Prudhoe Unit, a planning team for future development in Prudhoe Bay.
6. "Planning for Offshore Oil Development," Division of Community Planning, ADCRA, October 1977, Table 12, pages 17-18.
7. The factors to the right of the multipliers are the ratios of respective task-specific multiplier increments (multiplier - 1) to the statewide basic sector employment multiplier ( $1.5 - 1 = .5$ ). (See note 6, above.)
8. "A Social and Economic Impact Study of Offshore Petroleum and Natural Gas Development in Alaska: Phase II," Mathematics Science Northwest, Inc., and Alaska Consultants, Inc., for BLM, October 1976, page 19.
9. Amendments suggested by Ed Phillips, Alaska DNR.
10. Concrete Platform Construction is not considered feasible in the Gulf of Alaska.

to capture the socioeconomic impacts of OCS petroleum development in the Yakutat area. (See table note 8.) The values associated with table note 9 are adjustments suggested to compensate for a bias toward higher payment allocation to Alaska residents that was introduced to facilitate interregional effects. An even distribution of skills across resident and nonresident groups is required in order to reinterpret the payment allocation coefficients in the context of employment and residency. This assumption is, perhaps, unrealistic during exploration and petroleum field development. Under this interpretation, the payment allocation coefficients will overstate the SEAR for tasks relevant to those phases of development.

#### METHODOLOGY AND ASSUMPTIONS

The task-specific information just outlined has been mapped into a final SEAR estimate (in column eight) for each task using the following methodology:

1. The SEAR estimates contained in columns five, six, and seven are used to bracket a reasonable SEAR range for each task. For example, the SEAR range for offshore platform installation (task 14) extends from .1 to .25.
2. In the interest of consistency, an additional set of general, phase-specific SEAR guidelines are developed. Here, a given employment task is examined in the context of its phase of development.

Tasks subsumed under exploration (Onshore: service base, helicopter service; Offshore: surveys, rigs, supply-anchor-tugboats) are temporary, require "extreme specialization," and usually embrace a

During production, employment is generally permanent and oriented toward less specialized, more routine entry-level positions. These employment characteristics appear to be compatible with Alaska residency. Overall, we attach a SEAR of 1.0 to tasks subsumed under the production phase.

Table B2 summarizes the general SEAR guidelines outlined above.

TABLE B2. PHASE-SPECIFIC SEAR GUIDELINE

	<u>Onshore</u>	<u>Offshore</u>
Exploration	.1 - .2	.1 - .2
Development	.4 - .5	.1 - .2
Production	1.0	1.0

Additionally, there are two principal relationships which influence the trend in the share of OCS employment to Alaska residents (SEAR). First, the internal supply of labor that is qualified to perform the variety of tasks delineated in column one of Table B1 is assumed to increase in response to earlier "layers" of OCS petroleum development, as a function of other mining activity, and to more general growth in the Alaska economy. Second, for those OCS employees that initially accept nonresident status, it is likely that a certain percentage shift to Alaska residency over time. We consolidate the combined effects of these employment dynamics into an assumption calling for a one percent annual average rate of growth in the SEAR for all tasks having an initial SEAR of less than one. For simplicity, the continuous compounding of growth per period

APPENDIX C

DIRECT AND SEAR ADJUSTED EMPLOYMENT FOR  
THE BEAUFORT SEA SALE 71

TABLE C.1. OCS TOTAL DIRECT AND SEAR ADJUSTED EMPLOYMENT  
MEAN CASE, BEAUFORT SEA SALE 71

Year	<u>Mining</u>		<u>Construction</u>		<u>Transportation</u>		<u>HQTS</u>	<u>Total</u>	
	<u>Total</u>	<u>SEAR</u>	<u>Total</u>	<u>SEAR</u>	<u>Total</u>	<u>SEAR</u>		<u>Total</u>	<u>SEAR</u>
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0
1984	0	0	75	37	0	0	0	75	37
1985	135	32	0	0	17	7	0	152	40
1986	206	52	0	0	39	17	0	246	69
1987	207	53	0	0	43	18	0	251	72
1988	206	52	0	0	39	17	0	246	69
1989	0	0	0	0	0	0	0	0	0
1990	0	0	443	76	0	0	0	443	76
1991	1808	297	522	77	0	0	908	2330	1282
1992	2258	445	300	35	92	90	0	2651	1478
1993	2298	485	0	0	252	247	0	2550	1640
1994	2298	485	0	0	372	363	0	2670	1756
1995	2343	500	0	0	0	0	0	2715	1771
1996	1646	270	0	0	0	0	0	2017	1541
1997	1016	62	0	0	0	0	0	1387	1333
1998	1016	62	0	0	0	0	0	1387	1333
1999	1061	77	0	0	0	0	0	1432	1348
2000	1092	88	0	0	372	363	908	1464	1358

SOURCE: Alaska OCS Office.

TABLE C.3. OCS TOTAL DIRECT AND SEAR ADJUSTED EMPLOYMENT  
HIGH CASE, BEAUFORT SEA SALE 71

Year	<u>Mining</u>		<u>Construction</u>		<u>Transportation</u>		<u>HQTS</u>	<u>Total</u>	
	<u>Total</u>	<u>SEAR</u>	<u>Total</u>	<u>SEAR</u>	<u>Total</u>	<u>SEAR</u>		<u>Total</u>	<u>SEAR</u>
1980	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	0	0	0
1982	0	0	0	0	0	0	0	0	0
1983	0	0	0	0	0	0	0	0	0
1984	0	0	75	37	0	0	0	75	37
1985	135	32	0	0	17	7	0	152	40
1986	272	67	0	0	44	18	0	316	85
1987	274	68	0	0	48	20	0	322	89
1988	272	67	0	0	44	18	0	316	85
1989	0	0	0	0	0	0	0	0	0
1990	0	0	443	76	0	0	0	443	76
1991	3155	445	447	69	0	0	1805	3601	2319
1992	3605	594	300	35	92	90	1805	3997	2523
1993	3605	594	300	35	305	298	1805	4210	2732
1994	3945	733	225	26	425	414	1805	4595	2978
1995	3945	733	0	0	545	531	1805	4490	3068
1996	4012	755	0	0	637	620	1805	4650	3018
1997	3285	515	0	0	637	620	1805	3922	2940
1998	2775	347	0	0	637	620	1805	3412	2772
1999	2340	203	0	0	637	620	1805	2977	2628
2000	1905	75	0	0	637	620	1805	2587	2500

SOURCE: Alaska OCS Office.

APPENDIX D

ASSUMPTIONS FOR THE NORTH SLOPE RESIDENT ADJUSTMENT

Appendix D shows the allocation of employment before and after the North Slope resident adjustment for the six projects discussed in the text. The overall effect of the North Slope resident adjustment is summarized in Tables D.1 and D.2. Table D.1 shows the amount of North Slope employment that was transferred to regions 4, 5, and 7 to more accurately reflect the geographic residence distribution of North Slope employment. In Table D.2, the amount of project North Slope project employment that I assume will reside in the North Slope workplace location is shown by industry classification. Tables D.3 through D.18 provide detailed assumptions on the North Slope resident adjustment. Note region 1 is the North Slope.

TABLE D.2. NORTH SLOPE EMPLOYMENT THAT RESIDES IN THE  
NORTH SLOPE BY INDUSTRY CLASSIFICATION

<u>Year</u>	<u>Mining</u>	<u>Transportation</u>	<u>Construction</u>	<u>Total</u>
1980	27	1	0	28
1981	29		0	30
1982	52		0	53
1983	61		11	73
1984	58		34	93
1985	33		73	107
1986	30		78	109
1987	32		57	90
1988	31		38	70
1989	31		16	48
1990	31		27	59
1991	31		55	87
1992	31		59	91
1993	33		59	93
1994	32			92
1995	32			92
1996	32			92
1997	32			92
1998	34			94
1999	33			93
2000	33	1	59	93

TABLE D.4. BEAUFORT JOINT FEDERAL/STATE MINING EMPLOYMENT  
AFTER NORTH SLOPE RESIDENT ADJUSTMENT.

<u>Year</u>	<u>Total</u> <sup>a</sup>	<u>Region 4</u>	<u>Region 5</u> <sup>b</sup>	<u>Region 7</u>
1980	0	0	0	0
1981	23	3	17	3
1982	68	8	50	10
1983	68	8	50	10
1984	79	9	58	12
1985	24	3	18	3
1986	46	7	31	8
1987	118	20	74	24
1988	206	34	131	40
1989	276	45	179	52
1990	281	44	185	52
1991	256	41	168	47
1992	249	39	164	46
1993	224	36	147	41
1994	226	36	148	42
1995	227	36	149	42
1996	228	36	149	43
1997	220	35	144	41
1998	213	34	140	39
1999	213	34	140	39
2000	213	34	140	39

<sup>a</sup>These projections are based on the SEAR adjustment which determines statewide residency, and the North Slope resident adjustment which determines the regional resident allocation of OCS employment. The application of SEAR reduced original mining employment (Table D.1) by the following proportion by phase of development:

<u>Phase</u>	<u>Resident Proportion of Total Direct Employment</u> (Percent)
Exploration 1981-86	25
Development 1986-96	33
Operations	50

<sup>b</sup>Includes headquarters.

TABLE D.6. PRUDHOE BAY MINING EMPLOYMENT ORIGINAL  
REGIONAL ALLOCATION

<u>Year</u>	<u>Region 1</u>
1980	2044
1981	2155
1982	4337
1983	5134
1984	4684
1985	2217
1986	1802
1987	
1988	
1989	
1990	
1991	
1992	
1993	
1994	
1995	
1996	
1997	
1998	
1999	
2000	1802

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SOURCE: Porter, Edward, Alaska OCS Socioeconomic Studies Program  
Bering-Norton Petroleum Development Scenarios Economic and  
Demographic Analysis, Institute of Social and Economic Re-  
search, 1980, pp. 78-81.

TABLE D.8. NPRA CONSTRUCTION AND MINING EMPLOYMENT  
ORIGINAL REGIONAL ALLOCATION

Year	Region 1	
	Construction	Mining
1982	0	0
1983	75	0
1984	75	0
1985	363	88
1986	987	176
1987	1099	230
1988	765	443
1989	314	354
1990	541	374
1991	1092	354
1992	1174	408
1993	765	533
1994	314	444
1995	541	464
1996	1092	444
1997	1174	498
1998	765	623
1999	314	534
2000	541	554

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SOURCE: Office of Minerals Policy and Research Analysis, U.S. Department of the Interior, Final Report of the 105(b) Economic and Policy Analysis, 1979. Based on the mean scenario order management plan 4.

TABLE D.10. NPRA MINING EMPLOYMENT REGIONAL ALLOCATION  
AFTER NORTH SLOPE RESIDENT ADJUSTMENT

<u>Year</u>	<u>Total</u>	<u>Region 1</u>	<u>Region 4</u>	<u>Region 5</u>	<u>Region 7</u>
1984	0	0	0	0	0
1985	88	1	16	52	19
1986	176	2	32	104	38
1987	230	3	42	136	49
1988	443	5	82	261	95
1989	354	4	65	209	76
1990	374	4	69	221	80
1991	354	4	65	209	76
1992	408	4	75	241	88
1993	533	6	98	314	115
1994	444	5	82	262	95
1995	464	5	85	274	100
1996	444	5	82	262	95
1997	498	5	92	294	107
1998	623	7	115	368	134
1999	534	6	98	315	115
2000	554	6	102	327	119

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Note: Allocation based on proportion of population in each region.

TABLE D.12. TAPS TRANSPORTATION EMPLOYMENT ORIGINAL REGIONAL ALLOCATION

<u>Year</u>	<u>Total</u>	<u>Region 1</u>	<u>Region 4</u>	<u>Region 5</u>	<u>Region 7</u>
1980	1500	50	569	529	352
1981					
1982					
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990					
1991					
1992					
1993					
1994					
1995					
1996					
1997					
1998					
1999					
2000	1500	50	569	529	352

SOURCE: Alaska Department of Labor, Alaska Economic Trends, October 1978.

TABLE D.14. TAPS TRANSPORTATION EMPLOYMENT RESIDENT ALLOCATION  
AFTER NORTH SLOPE RESIDENT ADJUSTMENT

<u>Year</u>	<u>Total</u>	<u>Region 1</u>	<u>Region 4</u>	<u>Region 5</u>	<u>Region 7</u>
1980	1500	1	577	559	363
1981					
1982					
1983					
1984					
1985					
1986					
1987					
1988					
1989					
1990					
1991					
1992					
1993					
1994					
1995					
1996					
1997					
1998					
1999					
2000	1500	1	577	559	363

Note: Of the fifty original region 1 employees (see Table D.12), one was allocated to the North Slope according to the North Slope population proportion. The forty-nine additional employees going to regions 4, 5, and 7 were distributed according to population proportions in those regions; they incremented the original levels in those regions.

TABLE D.16. ALCAN MINING TRANSPORTATION AND CONSTRUCTION EMPLOYMENT REGIONAL ALLOCATION  
AFTER NORTH SLOPE RESIDENT ADJUSTMENT

Year	Mining <sup>a</sup>					Transportation <sup>b</sup>	Construction <sup>c</sup>				
	Total	Region 1	Region 4	Region 4	Region 7	Total	Total	Region 1	Region 4	Region 5	Region 7
1980	0	0	0	0	0	0	0	0	0	0	0
1981	0	0	0	0	0	0	217	0	2	5	210
1982	0	0	0	0	0	0	563	0	7	23	533
1983	0	0	0	0	0	0	2435	7	122	392	1914
1984	0	0	0	0	0	0	7103	30	497	1592	4984
1985	160	2	29	94	35	0	10589	55	924	2962	6648
1986	200	2	37	118	43	119	5074	29	483	1549	3013
1987							468	2	33	108	325
1988							0	0	0	0	0
1989											
1990											
1991											
1992											
1993											
1994											
1995											
1996											
1997											
1998											
1999											
2000	200	2	37	118	43	119	0	0	0	0	0

TABLE D.17. OTHER MINING EMPLOYMENT ORIGINAL REGIONAL ALLOCATION<sup>a</sup>

<u>Year</u>	<u>Total</u>	<u>Region 1</u>	<u>Region 2</u>	<u>Region 3</u>	<u>Region 4</u>	<u>Region 5</u>	<u>Region 6</u>	<u>Region 7</u>
1980	2945	451	34	53	350	1618	136	303
1981								
1982								
1983								
1984								
1985								
1986								
1987								
1988								
1989								
1990								
1991								
1992								
1993								
1994								
1995								
1996								
1997								
1998								
1999								
2000	2945	451	34	53	350	1618	136	303

<sup>a</sup>"Other" mining refers to nonpetroleum mining employment primarily hard rock minerals.

SOURCE: Alaska Annual Planning Information, FY 1980. Assume 1980 value remains constant throughout the forecast period.

