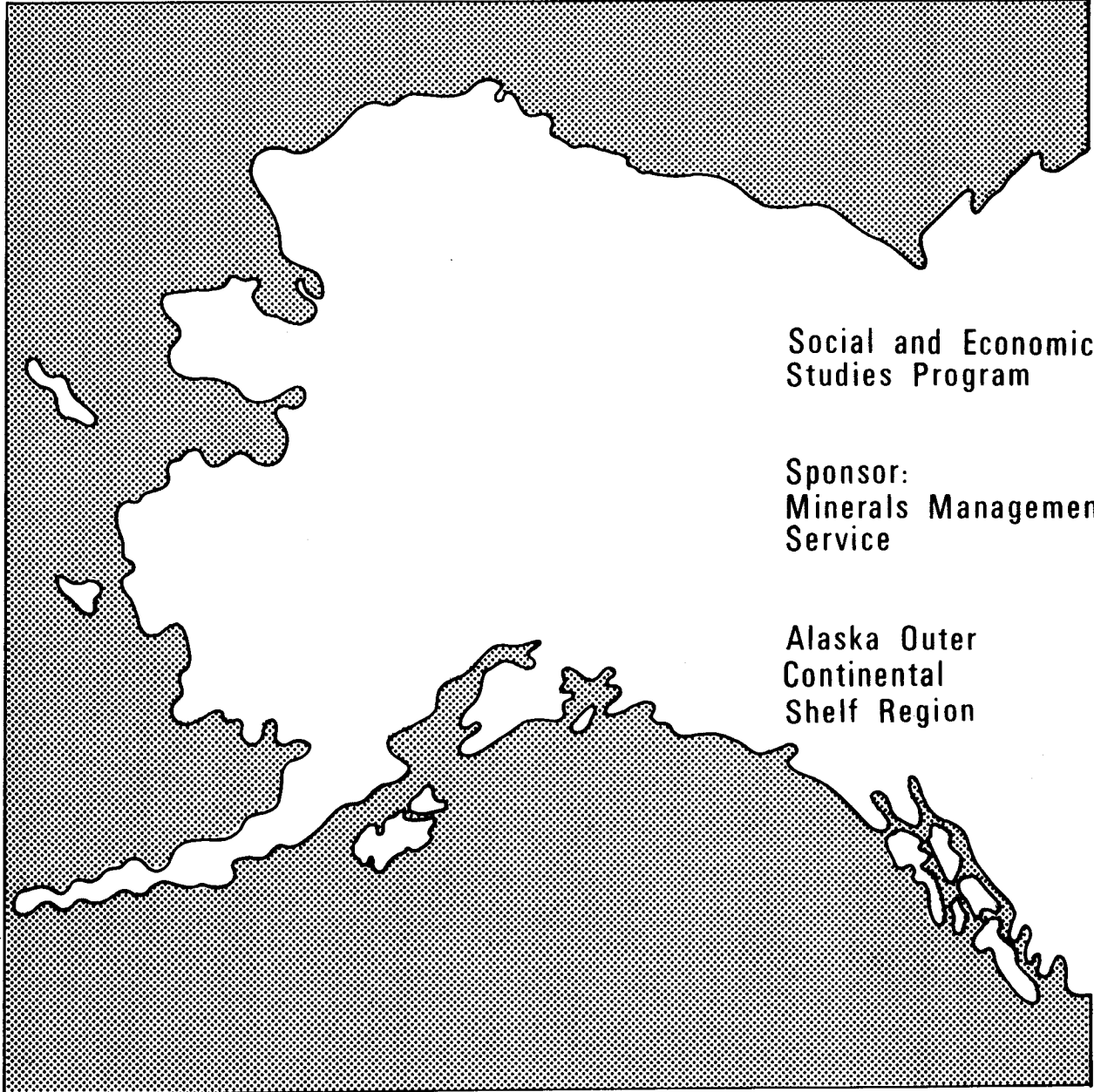Social and Economic
Studies Program

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Minerals Management
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Alaska Outer
Continental
Shelf Region

Alaska Statewide And Regional
Economic And Demographic Systems:
Effects Of OCS Exploration And Development

ALASKA STATEWIDE AND REGIONAL ECONOMIC AND
DEMOGRAPHIC SYSTEMS: EFFECTS OF OCS
EXPLORATION AND DEVELOPMENT

Social and Economic Studies Program
Technical Report Number 106

Prepared for

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ABSTRACT

This report discusses projections of the cumulative demographic and economic impacts expected from the federal Outer Continental Shelf (OCS) oil and gas lease sale program in Alaska. Econometric modeling techniques are used to develop base case and impact projections for the State of Alaska, Anchorage, and the Southcentral Region.

The projected cumulative impact of the OCS program includes an increase of approximately 10 percent in state population and employment and a modest decline in real per capita state expenditures. The statewide impact accrues as OCS development proceeds but does not diminish when construction employment declines in the late 1990s. The impacts on Anchorage and on the Southcentral Region are even slower to peak, continuing to increase after 2000 to match nearly the same percentage increases in population and employment as observed for the state as a whole. The delayed reaction is due to the importance of the support sector in projected Alaska economic growth, especially in the Southcentral Region, including Anchorage.

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I. INTRODUCTION

This report contains projections of cumulative economic and demographic impacts of the federal Outer Continental Shelf (OCS) oil and gas leasing program in Alaska. We have prepared projections of the impacts for Anchorage and for the Southcentral Region as well as for the state as a whole. For this study, the Southcentral Region includes the Seward, Kenai-Cook Inlet, and Matanuska-Susitna Census Divisions as well as Anchorage, but it excludes the Valdez and Copper River areas.

We have projected economic and demographic impacts using the Man-in-the-Arctic Program (MAP) system of econometric models developed at the University of Alaska, Institute of Social and Economic Research (ISER). Chapter II provides a summary of the MAP model system and discusses the manner in which we have used the models to project economic and demographic variables.

In order to analyze impacts of OCS oil and gas development, we first prepare a base case, consisting of a set of projections excluding future OCS activity. The impact case projections derive from the same set of assumptions as the base case, except that the OCS activity is included. For the purpose of analyzing possible cumulative impacts of the entire OCS program, we assume in the base case that there is no development and no further exploration, even on areas already under lease. The impact case assumes a scenario of

plausible petroleum exploration and development activities occurring in areas included in the five-year lease sale schedule as well as on currently leased acreage. Thus, the terms base case and impact case have a slightly different interpretation than they do when one analyzes, for example, the impact of a hypothetical future project.

Chapter III reviews the assumptions used for the MAP statewide model and presents the base case economic and demographic projections for Alaska. Chapter IV discusses the statewide impact projections, analyzing the cumulative impact of the OCS program on the state. Regional projections are the subject of Chapter V. This chapter presents base case and impact case projections for Anchorage and for the Southcentral Region.

Chapter VI reviews the results of the statewide and regional projections shown in Chapters III-V. The appendixes contain additional supporting information, including details of model simulation assumptions and results.

II. METHODOLOGY

This chapter describes the methodology used to project statewide and regional economic and demographic impacts of Alaska OCS development. There are many possible development impacts to analyze. We focus attention principally on projection of changes in total population and total employment. This makes the results of the cumulative impacts study readily comparable to those of other studies; i.e. impact analyses of individual sales. It also allows a straight-forward assessment of the absolute and relative importance of the OCS program to the state's overall economic size and performance.

Despite the apparent simplicity of the results of the analysis, the projections are the product of a complex modeling process. The Man-in-the-Arctic Program (MAP) model system is the principal modeling tool for our economic and demographic projections. The model has been used extensively in the past to make projections and for impact studies, including studies of OCS lease sales. For example, Porter, 1982, analyzed the economic and demographic effects on Alaska of a previous version of the five-year OCS oil and gas leasing schedule, using the MAP statewide model.

The model system includes a statewide econometric model and a regional model allocating economic activities, employment, and population within the state. These models were developed at ISER and have been refined and extended periodically over the years.

Goldsmith et al., 1983, contains a description and complete documentation of the model system. We shall, however, briefly review how each of the two models projects the main economic, demographic, and fiscal variables.

Statewide Projections

The MAP statewide econometric model has three main components--an economic model, a population model, and a fiscal model. The economic model determines the level of economic activity and employment in each industry as well as prices, wages, and total income. The population model projects values for numerous demographic variables in order to determine total population and total households. The fiscal component models the revenue and spending patterns of Alaska state and local governments. The three components of the MAP model are interdependent, with linkages as shown in Figure 1. Understanding the nature of this interdependence is helpful for recognizing the powers and limitations of the model for making economic and demographic projections.

The link between the economic model and population model is the notion of a labor market. The population model produces a potential labor supply while the economic model produces the demand for labor, e.g., jobs. The supply and demand for labor are balanced by net migration flows, as discussed in Berman, 1982. One link between the fiscal model and the economic model reflects the ability of government to stimulate or depress the economy through expenditures and tax policy. On the other hand, the level of government revenues

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Figure 1

The MAP Model


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                    ┌─────────────┐
                    │  Economic   │
            ┌──────▶│             │◀──────┐
            │       │    Model    │       │
            │       └─────────────┘       │
            │                             │
            │                             │
            ▼                             ▼
    ┌─────────────┐               ┌─────────────┐
    │ Population  │               │   Fiscal    │
    │             │──────────────▶│             │
    │    Model    │               │    Model    │
    └─────────────┘               └─────────────┘
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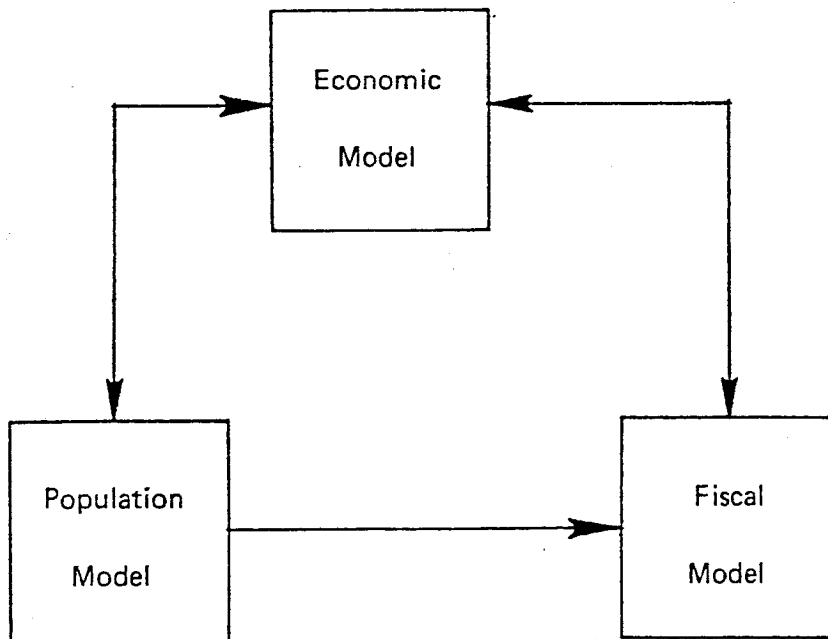
depends on the level of economic activity, especially activity in the petroleum industry.

In addition to these major links among the three components of the MAP model, there are minor interdependencies such as the use of population figures in the economic and fiscal models to compute per capita income and per capita public spending. This last ratio is significant in the near term for computing state spending under the expenditure limitation initiative, although under current revenue projections, the limit is not attainable beyond the end of the decade even in relatively optimistic scenarios.

The economic model classifies all economic activity as exogenous or endogenous. Exogenous activities produce goods or services for a primarily national or international market while endogenous activities produce to satisfy local or state demand. Forest and fisheries products, petroleum and other mining, and federal government are the major exogenous industries. Most services sector employment is endogenous, although a portion derived from tourism is considered exogenous. Manufacturing, construction, and transportation also contain both endogenous and exogenous components, depending on the assumed location of the market for their products. State and local government spending is endogenous but depends on revenues with major exogenous components (petroleum revenues and federal transfers). Agriculture, while produced mainly for local markets, is exogenous since its growth is closely tied to state policy.

The notion of exogenous and endogenous economic activity in the MAP statewide economic model is, in many ways, similar to the basic and support sectors in an economic base model. In an economic base model, the so-called basic industries are exogenous (set outside the model), and the support industries are endogenous (computed by the model). The MAP model goes beyond the concept of the basic versus support industries by taking into account the fact that data available for various industries in Alaska to estimate and calibrate the model include both exogenous and endogenous components. Thus, some industries usually considered basic in a base model, such as manufacturing, have an endogenous component while some support services, for example, have an exogenous tourism component.

Given the levels of exogenous economic activity, the MAP statewide model solves simultaneously for all the endogenous activities as well as for total disposable income, total population, and total employment. Though the process is much more complex than in an economic base model, the MAP model implicitly derives an "employment multiplier," defined as the equilibrium change in total employment following a change in exogenous employment, other things equal. One may readily observe the multiplier process working in MAP model projections. However, it is difficult to determine the size of the multiplier because other variables affecting total employment such as state spending, wage rates, and other exogenous industry employment are never constant.

Regional Projections

The MAP regional model allocates MAP statewide model projections for population and basic, support, and government employment among 20 regions, given the regional distribution of exogenous industry employment. The MAP model regions correspond exactly to 1970 census divisions, except that the unincorporated portion of the Bristol Bay Region is combined with the borough census division in one region, and all census divisions in Southeast Alaska are combined into one region.

The methodology of the regional model is based upon the use of two large matrixes. One relates basic employment in each region to support sector employment in that and in other regions while the other matrix relates employment in each region to population in that and in other regions. The model also distributes government employment to regions based upon population and past trends. The model begins with proportions determined by 1980 population and employment, but changes in basic employment in a region in general will affect support sector employment and population in other regions.

III. ALASKA ECONOMIC GROWTH WITHOUT
OCS EXPLORATION AND DEVELOPMENT

This chapter contains a discussion of the base case projection for the Alaska economy in the absence of future exploration and development of OCS oil and gas resources. First, we discuss the assumptions used for the base case. Then we present the results of the base case projection, using the MAP statewide model.

Base Case Assumptions

Using the MAP model to project the Alaska economy and population requires an input scenario containing four types of assumptions. These are (1) national economic variable assumptions relevant to Alaska's economy, (2) projections for exogenous employment in various projects and industries, (3) a projection of the number of visitors to Alaska, and (4) assumptions regarding Alaska State revenues and spending policy. Table 1 summarizes the assumptions we used for the MAP base case projections, following the outline of the four categories.

The base case assumptions represent, in the aggregate, a median outcome for future demographic, economic, and fiscal conditions affecting the Alaska economy. This means that we consider it equally likely that the value is higher or lower than the assumed value. Since it is unlikely but possible that a very high level may result for some base case assumptions, the median value generally is lower than the average level of all possible outcomes (the mean).

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TABLE 1. SUMMARY OF BASE CASE ASSUMPTIONS
FOR MAP MODEL, CUMULATIVE OCS IMPACTS STUDY

ASSUMPTIONS	DESCRIPTION(a)
National Variables Assumptions	
U.S. Inflation Rate	Consumer prices rise at 6.5 percent annually after 1985.
Real Average Weekly Earnings	Growth in real average weekly earnings averages 1 percent annually.
Real Per Capita Income	Growth in real per capita income averages 1.5 percent annually after 1984.
Unemployment Rate	Long-run rate of 6 percent.
Exogenous Employment Assumptions	
Trans-Alaska Pipeline	Operating employment remains constant at 1,100 through 2010 (TAP.F83).
North Slope Petroleum Production	Construction and operating employment developing Prudhoe Bay, Kuparuk, and other state North Slope fields, including Prudhoe Bay and Kuparuk waterflood projects, levels off at 4,500 and remains at that level through 2010 (NSO.F83).
Upper Cook Inlet Petroleum Production	Employment in exploration and development of oil and gas in the Upper Cook Inlet area declines gradually beginning in 1983 by approximately 2.5 percent per year (UPC.F83).
OCS Development	The base base assumes no further exploration or development of the federal Outer Continental Shelf.
Oil Industry Headquarters	Oil company headquarters employment in Anchorage rises by 1,150 between 1983 and 1986 to remain at around 4,600 through 2010 (OHQ.F83).

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(a) Codes in parentheses indicate ISER names for MAP Model SCEN_ case files.

North Slope Gas	Tertiary oil recovery project utilizing North Slope natural gas occurs in early 1990s with a peak annual employment of 2,000 (NSO.TRC).
Beluga Chuitna Coal Production	Development of 4.4 million ton/year mine for export beginning in 1990 provides total employment of 524 (BCL.04T(-4)).
U.S. Borax	The U.S. Borax mine near Ketchikan is brought into production with operating employment of 790 beginning in 1989 (BXM.F83).
Greens Creek Mine	Production from the Greens Creek Mine on Admiralty Island results in employment of 315 people from 1986 through 1996 (GCM.082).
Red Dog Mine	The Red Dog Mine in the Western Brooks Range reaches full production with operating employment of 448 by 1988 (RED.PJH).
Other Mining Activity	Mining employment not included in special projects increases from a 1982 level of 742 at 1 percent annually (OMN.F83).
Agriculture	Moderate state support results in expansion of employment in agriculture by 4 percent per year (AGR.F83).
Logging and Sawmills	Employment expands to over 3,200 by 1990 before beginning to decline gradually to about 2,800 after 2000 (FLL.F83).
Pulp Mills	Employment declines at a rate of 1 percent per year after 1983 (FPU.F83).
Commercial Fishing-Nonbottomfish	Employment levels in traditional fisheries harvest remain constant at 7,500 through 2010 (TCF.F83).
Commercial Fish Processing - Nonbottomfish	Employment in processing traditional fisheries harvests remains at the level of the average figure for the period 1978-1982, or around 7,300 (TFP.F83).

Commercial Fishing–Bottomfish	The total U.S. bottomfish catch expands at a constant rate to allowable catch in 2000, with Alaska resident harvesting employment rising to 733. Onshore processing capacity expands in the Aleutians and Kodiak census divisions to provide total resident employment of 971 by 2000 (BCF.183).
Federal Military Employment	Employment declines at 1.7 percent per year, consistent with the long-term trend since 1960 (GFM.F83).
Federal Civilian Employment	Rises at 0.5 percent annual rate consistent with the long-term trend since 1960 (GFC.F83).
Tourism Assumptions	Number of visitors to Alaska increases by 50,000 per year to over 2 million by 2010 (TRS.F83).

State Revenue and Expenditure Assumptions

Revenues	State petroleum royalty and severance tax projections are based upon Alaska Department of Revenue 50 percent probability projections released in December of 1983. Oil and gas corporate income tax revenues are projected to grow at a real rate of 0.5 percent per year after 1985. Other petroleum revenues are extrapolated forward to 2010 from projections published by the Department of Revenue in the fall of 1983 (DOR.F83).

Expenditures

State Fiscal Policy	State expenditures are at the levels allowed by the recently-passed spending limit, with subsidies and capital expenditures equalling one-third of total expenditures. As revenue growth slows, the income tax is reinstated, subsidies are eliminated, the Permanent Fund dividend program is phased out, and proportional cuts in the operating and capital budgets are made to keep total

expenditures equal to total revenues. Also at that time, all Permanent Fund earnings are transferred to the general fund.

State Hydroelectric Projects

Construction employment from Alaska Power Authority projects peaks at over 700 in 1990 for construction of several projects in Southcentral and Southeast Alaska (SHP.F83).

Goldsmith et al., 1983 (Appendix K, Section K.1) discuss this problem in greater detail.

The national variable assumptions define the benchmarks used by the MAP model for the national economy. These are important for our projections because Alaskan prices, earnings, and labor market conditions are, in the long run, determined mainly by national economic trends. In the current study, we assume a long-run U.S. inflation rate approaching 6.5 percent, a long-run U.S. unemployment rate of 6 percent, and slowly growing real wage and real per-capita income levels. Changing the rate of inflation has little effect on projections in constant dollars. A different long-run unemployment rate would affect the ratio of population-to- employment in Alaska without changing the projected employment levels significantly. If one were to assume a higher rate of growth of U.S. wage rates and per-capita income, projected Alaska support- sector employment would increase at a faster rate due to the increased spending power that the model would project for Alaska. A slower growth in U.S. earnings would result in projections with reduced growth in Alaska's support industries.

Exogenous employment assumptions for the base case scenario are either assumptions about special projects or assumptions about industries. The industry employment assumptions summarized in Table 1 show a general pattern of modest growth. We project baseline employment to increase in forest products, mining, fishing

and processing, transportation, and agriculture, based upon supply and demand for these products. Federal government employment assumptions follow the trends established over the past two decades of a slightly increasing civilian employment offset by a slowly declining military employment.

In addition to these baseline industry assumptions, we include a number of special projects. Our method is to include some projects that might occur, while excluding others that might also occur. We seek to project the pattern of total exogenous employment in the industry, using actual proposed projects as examples of the type of economic activity that might take place. As such, we are not passing judgment on the viability of certain specific projects as opposed to others. Rather, we develop a scenario of possible development consistent with our expectations for overall growth in the industry.

We aggregate industry and special project assumptions into ten categories of exogenous employment. These are employment in agriculture, mining, commercial fishing, exogenous transportation, high-wage and low-wage exogenous construction and manufacturing, active-duty military, and federal civilian government. Most construction and manufacturing employment is included in the "low wage" category. We associate the "high wage" construction and manufacturing employment categories only with specific activities likely to pay wages substantially above the prevailing average scale

for the industry. Examples of high wage construction and manufacturing would be pipeline construction and petroleum processing on the North Slope.

Table 2 presents the exogenous employment assumptions for the base case scenario in the ten categories for the forecast period, 1983 to 2010. For the sake of consistency with past reports discussing exogenous employment assumptions for the MAP statewide model, the figures for exogenous construction (low wage) include primarily employment resulting from state-sponsored hydroelectric projects as noted under state revenue and expenditure assumptions in Table 1.

Fluctuations in year-to-year totals in some categories of employment exhibited in Table 2 reflect the timing of employment assumed for individual projects. While changes in the timing of particular projects could affect considerably the employment assumptions for certain years, such fluctuations have a relatively minor impact upon long-term projections of total employment and total population. Low-wage exogenous construction employment disappears in the 1990s, reflecting a projected continuation of the historical decline in the importance of exogenous (relative to endogenous) construction. High-wage exogenous construction assumptions reflect an arbitrary division of North Slope onshore oil and gas operations between construction and mining employment in an attempt to provide consistency with historical Alaska Department of Labor employment figures.

TABLE 2. EXOGENOUS EMPLOYMENT ASSUMPTIONS FOR MAP STATEWIDE MODEL
BASE CASE FOR CUMULATIVE OCS IMPACTS STUDY

(thousands of employees)

	Agricultural Employment	Mining Employment	High Wage Exogenous Construction Employment	Low Wage Exogenous Construction Employment	Exogenous Transportation Employment
1980	0.286	6.283	0.090	0.050	1.100
1981	0.330	8.609	0.090	0.163	1.100
1982	0.355	8.693	0.691	0.442	1.100
1983	0.370	8.848	1.000	0.687	1.100
1984	0.385	9.204	1.000	0.462	1.100
1985	0.400	9.443	1.000	0.597	1.100
1986	0.416	9.979	1.000	1.061	1.100
1987	0.435	10.014	1.000	1.500	1.100
1988	0.454	10.436	1.000	0.918	1.100
1989	0.475	11.517	1.000	0.955	1.100
1990	0.496	12.058	1.000	1.025	1.100
1991	0.520	13.100	1.000	1.275	1.100
1992	0.544	13.133	1.000	1.375	1.100
1993	0.573	12.291	1.000	0.563	1.100
1994	0.601	11.994	1.000	0.100	1.153
1995	0.633	11.697	1.000	0.000	1.205
1996	0.668	11.691	1.000	0.000	1.205
1997	0.704	11.370	1.000	0.000	1.205
1998	0.744	11.366	1.000	0.000	1.205
1999	0.788	11.361	1.000	0.000	1.205
2000	0.834	11.357	1.000	0.000	1.205
2001	0.866	11.353	1.000	0.000	1.205
2002	0.899	11.350	1.000	0.000	1.205
2003	0.935	11.347	1.000	0.000	1.205
2004	0.971	11.385	1.000	0.000	1.205
2005	1.008	11.383	1.000	0.000	1.205
2006	1.047	11.381	1.000	0.000	1.205
2007	1.089	11.380	1.000	0.000	1.205
2008	1.132	11.379	1.000	0.000	1.205
2009	1.176	11.378	1.000	0.000	1.205
2010	1.223	11.378	1.000	0.000	1.205

SOURCE: SCENARIOSBOCS.83--CREATED DECEMBER 1983

TABLE 2 (continued)

	High Wage Exogenous Manufacturing Employment	Low Wage Exogenous Manufacturing Employment	Fish Harvesting Employment	Active Duty Military Employment	Civilian Federal Employment
1980	0.000	11.545	7.620	22.707	17.820
1981	0.000	11.280	7.783	22.451	17.474
1982	0.000	9.794	7.538	22.103	17.641
1983	0.000	10.490	7.558	21.727	17.729
1984	0.000	10.847	7.581	21.358	17.818
1985	0.000	11.064	7.608	20.995	17.907
1986	0.000	11.256	7.636	20.638	17.996
1987	0.000	11.452	7.664	20.287	18.086
1988	0.000	11.559	7.681	19.942	18.177
1989	0.000	11.622	7.716	19.603	18.268
1990	0.000	11.673	7.729	19.270	18.359
1991	0.000	11.680	7.745	18.942	18.451
1992	0.000	11.692	7.766	18.620	18.543
1993	0.000	11.712	7.792	18.304	18.636
1994	0.000	11.743	7.826	17.992	18.729
1995	0.000	11.789	7.868	17.687	18.823
1996	0.000	11.854	7.921	17.386	18.917
1997	0.000	11.947	7.988	17.090	19.011
1998	0.000	12.078	8.072	16.800	19.106
1999	0.000	12.261	8.178	16.514	19.202
2000	0.000	12.493	8.233	16.233	19.298
2001	0.000	12.439	8.233	15.958	19.394
2002	0.000	12.408	8.233	15.686	19.491
2003	0.000	12.377	8.233	15.420	19.589
2004	0.000	12.346	8.233	15.157	19.687
2005	0.000	12.315	8.233	14.900	19.785
2006	0.000	12.188	8.233	14.646	19.884
2007	0.000	12.001	8.233	14.397	19.984
2008	0.000	11.993	8.233	14.153	20.083
2009	0.000	11.986	8.233	13.912	20.184
2010	0.000	11.979	8.233	13.676	20.285

SOURCE: SCENARIOSBOCS.83--CREATED DECEMBER 1983

Not included in the exogenous employment assumptions for the MAP model is employment resulting from tourism. Table 3 presents the projected number of visitors to Alaska through the period of analysis, using the tourism assumption summarized in Table 1. This projection of visitors results in strong growth in employment in tourist-related services, which can be considered almost as another category of exogenous employment in the MAP model.

TABLE 3. EXOGENOUS TOURISM ASSUMPTIONS
FOR MAP STATEWIDE MODEL
BASE CASE FOR CUMULATIVE OCS IMPACTS STUDY

(thousands of tourists)

	Tourists Visiting Alaska		Tourists Visiting Alaska
1980	566.100	1996	1380.000
1981	640.000	1997	1430.000
1982	690.000	1998	1480.000
1983	730.000	1999	1530.000
1984	780.000	2000	1580.000
1985	830.000		
1986	880.000	2001	1630.000
1987	930.000	2002	1680.000
1988	980.000	2003	1730.000
1989	1030.000	2004	1780.000
1990	1080.000	2005	1830.000
1991	1130.000	2006	1880.000
1992	1180.000	2007	1930.000
1993	1230.000	2008	1980.000
1994	1280.000	2009	2030.000
1995	1330.000	2010	2080.000

SOURCE: SCENARIOSBOGS.83--CREATED DECEMBER 1983

Assumptions about state fiscal policy, as noted in Table 1, follow the rule given by the expenditure limit while there is sufficient revenue to support spending at that level. Where unrestricted revenues fall below the limit, we assume that permanent fund dividends and loan subsidies are eliminated first and that the personal income tax is reinstated two years after curtailment of the dividend program. After the adjustments, expenditures are also reduced to match revenues. The base case scenario assumes construction of a number of state-funded hydroelectric projects, but not the Susitna Dam. If the Susitna Dam is constructed, we assume that a corresponding decline in state expenditures would occur elsewhere, most likely in the capital budget. Thus, the increase in exogenous construction from the proposed Susitna Dam would be offset by reductions in other state capital expenditures (included in endogenous construction).

Petroleum revenue assumptions for the model are based upon Alaska Department of Revenue 50 percent probability projections released in December 1983. Our base case assumptions for the five types of petroleum revenues are shown in Table 4.

Appendix D details the exogenous employment assumptions for each of the special projects and industries summarized in Table 1. Appendix E describes a review of the base case assumptions and of certain other assumptions used in the MAP statewide model base case projections.

TABLE 4. EXOGENOUS REVENUE ASSUMPTIONS FOR MAP STATEWIDE MODEL
BASE CASE FOR CUMULATIVE OCS IMPACTS STUDY

(millions of current dollars)

	State Production Tax Revenue	State Royalty Income	State Bonus Payment Revenue	State Property Tax Revenue	State Corporate Petroleum Tax Revenue
1980	506.500	688.200	456.500	168.900	547.500
1981	1170.200	1118.500	10.100	143.000	860.100
1982	1590.000	1530.000	6.700	142.700	668.900
1983	1480.000	1430.000	72.400	152.600	236.200
1984	1350.000	1300.000	2.800	180.000	250.000
1985	1370.000	1370.000	23.000	200.000	280.000
1986	1450.000	1480.000	24.610	214.000	310.000
1987	1630.000	1670.000	26.333	228.980	337.745
1988	1520.000	1820.000	28.176	245.008	361.387
1989	1730.000	2080.000	30.148	262.159	386.684
1990	1770.000	2140.000	32.259	280.510	413.751
1991	1540.000	1950.000	34.517	300.145	442.714
1992	1460.000	1940.000	36.933	321.155	473.704
1993	1430.000	1940.000	39.518	343.636	506.863
1994	1370.000	1900.000	42.284	367.690	542.343
1995	1270.000	1770.000	45.244	393.428	580.306
1996	1100.000	1650.000	48.411	420.968	620.927
1997	1140.000	1700.000	51.800	450.435	664.392
1998	1150.000	1750.000	55.426	481.966	710.899
1999	1150.000	1770.000	59.306	515.703	760.662
2000	1140.000	1780.000	63.457	551.802	813.907
2001	1140.000	1807.590	67.899	590.427	870.881
2002	1140.000	1835.608	72.652	631.757	931.842
2003	1140.000	1864.060	77.738	675.980	997.070
2004	1140.000	1892.952	83.179	723.298	1066.865
2005	1140.000	1922.293	89.002	773.929	1141.545
2006	1140.000	1952.089	95.232	828.103	1221.453
2007	1140.000	1982.346	101.898	886.070	1306.954
2008	1140.000	2013.073	109.031	948.094	1398.440
2009	1140.000	2044.275	116.663	1014.461	1496.331
2010	1140.000	2075.961	124.830	1085.472	1601.073

SOURCE: SCENARIOSBOCS.83--CREATED DECEMBER 1983

Statewide Base Case Projections

Table 5 summarizes projections of the Alaska economy to 2010, using the MAP model and the base case exogenous employment, revenue, fiscal, and tourism assumptions. Appendix A contains additional information about this simulation, including projections of twenty-three important variables.

The figures in Table 5 show growth in total population from 475,000 in 1983 to 627,000 in 2010, or 32 percent over the period. Total employment grows from 248,000 in 1983 (including military and self-employed) to 318,000 in 2010, or 28 percent. Growth is much faster in the first and last decades of the period than in the decade of the 1990s. In fact, while employment rises at an average annual rate of 1.3 percent per year to 1991, it then stays essentially constant in the base case for ten years. By the turn of the century, employment is rising again at approximately 1.3 percent annually. Population still grows slowly during the 1990s, but the overall pattern of growth rates follows that of employment. Natural increase can account for nearly all the projected population growth, with net emigration in the 1990s balancing net immigration in the remaining years of the 1980s.

TABLE 5.   MAP MODEL STATEWIDE BASE CASE PROJECTIONS:
SUMMARY

	Total Population (000)	Total Employment (000)	Per Capita Government Revenues (1982 $)	Per Capita General Fund Expenditures (1982 $)	Per Capita Combined Funds Balance (1982 $)
1983	474.606	248.164	7224.508	6640.859	11934.180
1984	486.117	253.477	6577.551	6869.484	11624.630
1985	497.789	261.413	6344.938	6890.023	11084.050
1986	508.583	268.253	6206.395	6901.227	10462.640
1987	516.829	272.369	6292.016	6942.742	9975.630
1988	518.816	269.053	5942.531	5942.520	10347.320
1989	523.512	270.504	6434.707	6529.785	10604.920
1990	528.510	272.216	6629.992	6510.227	10120.760
1991	533.835	274.441	6017.223	6017.293	9910.720
1992	537.019	274.065	5722.406	5722.246	9722.290
1993	538.150	271.698	5509.816	5509.789	9549.080
1994	539.918	271.097	5247.086	5247.031	9342.620
1995	541.814	270.814	4929.230	4929.184	9099.980
1996	543.813	270.903	4588.883	4588.832	8837.664
1997	546.522	272.241	4513.375	4513.324	8571.418
1998	549.945	274.422	4417.719	4417.664	8303.262
1999	553.889	276.931	4307.816	4307.754	8031.293
2000	558.335	279.799	4192.035	4191.980	7755.629
2001	563.038	282.666	4094.393	4094.337	7482.992
2002	568.284	285.890	3998.445	3998.397	7210.336
2003	574.060	289.391	3905.311	3905.267	6938.770
2004	580.448	293.230	3814.393	3814.355	6668.332
2005	587.395	297.277	3726.032	3725.997	6400.516
2006	594.518	301.048	3641.892	3641.857	6140.031
2007	601.917	304.705	3560.890	3560.856	5885.902
2008	609.790	308.773	3482.110	3482.164	5636.695
2009	618.258	313.023	3405.887	3405.867	5392.047
2010	627.212	317.516	3332.046	3332.030	5153.391

SOURCE: MAP MODEL SIMULATION SBOCS.39--CREATED JANUARY 1984

VARIABLES: POP, EM99, PCREV, DF.EXGFP, AND DF.BAL9P

Approximately three-fourths of the net new jobs created in the base case projection between 1983 and 2010 are in the services sector. The average wage in this industry is lower and is projected to grow more slowly than wages in the basic and government sectors. More detailed information on the base case projection is included in Appendix A.

The continued growth projected for the services sector, despite a slowing of basic sector growth, results to a considerable extent from the assumption of modest, steady growth in average national real wages and per capita incomes. While we believe these assumptions are reasonable, the MAP model projections are affected by the values chosen for these variables. Higher or lower values would strongly affect Alaska wage scales and incomes, thereby influencing the demand for services. Using an earlier version of the MAP model, Goldsmith et al., 1983, reported (Appendix J) that varying the rate of growth in the U.S. real wage rate from 0.5 percent a year to 1.5 percent increased the number of households by approximately 4 percent by 2000.

There are two principal reasons for the slowdown in the Alaska economy projected for the 1990s in our base case projection. One is the massive decline in state expenditures projected to begin in 1991 as a result of declining petroleum revenues. Real per capita revenues, expenditures, and the combined permanent, general, and other special funds balance--shown in Table 5--outline the

deteriorating fiscal position included in the base case projection. The base case presents a scenario of rising tax rates, reduced public services, and reduced state and local government employment.

The other main factor is the curtailment of growth in the petroleum industry. We project a gradual shift of exploration and development of new fields in Alaska to the federal OCS from onshore and state offshore areas. We define the base case for the current study to exclude all this potential OCS activity. Consequently, the base case projection without OCS development shows an absence of growth in the 1990s in the petroleum sector that most analysts believe is likely to occur.

IV. STATEWIDE ECONOMIC AND DEMOGRAPHIC

EFFECTS OF OCS DEVELOPMENT

This chapter contains a discussion of the projection of the Alaska economy, assuming a scenario of exploration and development of petroleum resources on the federal Outer Continental Shelf. We use this projection to analyze the cumulative economic and demographic impacts of the OCS program in Alaska. First, we discuss the assumptions used for the impact case. Then we review the impact case projection using the MAP statewide model.

Direct Employment and Revenue Effects

Table 6 summarizes the employment and revenue assumptions for the scenario of OCS exploration and development. We used employment assumptions provided to us by the Minerals Management Service Alaska OCS office. We did not adjust the employment figures for Alaska residency since the MAP model bases its computations on historical relationships estimated from employment data unadjusted for residency.

Production of oil and gas from the federal Outer Continental Shelf does not provide the state of Alaska with any shared royalties or severance tax revenue. The state and local governments can, however, tax petroleum property. We assumed new exploration, production, and pipeline property for OCS development would be built either in the North Slope Borough or along the coast of western

TABLE 6. EMPLOYMENT AND REVENUE ASSUMPTIONS: CUMULATIVE OCS IMPACTS CASE

(thousands of employees)
(millions of current $)

	High-Wage Exogenous Construction Employment	Mining Employment	Exogenous Transportation Employment	State Property Tax Revenue
1983	0.645	0.344	0.118	0.000
1984	1.075	0.399	0.138	0.000
1985	1.180	0.781	0.271	0.260
1986	1.904	1.598	0.590	1.640
1987	2.214	1.760	0.659	3.420
1988	1.672	1.457	0.540	9.560
1989	0.514	1.190	0.395	9.760
1990	1.450	3.278	1.116	27.220
1991	2.286	5.539	2.045	41.860
1992	1.382	6.592	2.358	45.380
1993	2.217	5.965	1.878	79.560
1994	0.717	6.675	1.907	82.920
1995	1.655	8.253	2.517	104.260
1996	0.783	8.286	2.395	133.540
1997	1.821	8.379	2.414	201.360
1998	0.783	7.905	2.084	268.760
1999	0.336	7.029	1.603	304.080
2000	0.336	6.255	1.223	308.380
2001	0.336	6.396	1.232	312.060
2002	0.336	6.435	1.232	314.880
2003	0.336	6.474	1.232	316.700
2004	0.336	6.493	1.232	317.460
2005	0.336	6.513	1.232	316.960
2006	0.336	6.523	1.232	315.120
2007	0.336	6.533	1.232	311.640
2008	0.336	6.533	1.232	306.400
2009	0.336	6.533	1.232	299.100
2010	0.336	6.533	1.232	289.660

SOURCE: MAP MODEL CASE OCS.CM3

VARIABLES: EMCNX1 EMP9 EMT9X RPPS

Alaska. In the former case, we assumed the borough was already receiving the statutory limit placed on local revenue from taxation of onshore property; while in the latter, facilities would be built outside the boundaries of organized local government. In both cases, then, we assumed the state would collect the entire tax of 20 mills on the depreciated inflation-adjusted construction cost. the figures for state property tax revenue in Table 6 assume a life of twenty-five years for all assets. We used assumptions for timing and construction cost provided to us by the Alaska OCS office.

Projection of Statewide Growth with OCS Development

Tables 7 and 8 summarize statewide impact projections for total population and total employment, respectively. The impact case projection uses exactly the same set of assumptions as described in Chapter III for the base case but with the addition of the OCS employment and revenue assumptions shown in Table 6. Appendix B displays projections of a number of additional important economic and demographic variables, comparing the impact case projections to the base case projections.

The figures in Table 7 show a steadily increasing impact on population from OCS development. The projection of cumulative impacts rises rapidly between 1990 and 1997, leveling off at approximately 10 percent of state population by the end of the century. total population with OCS development approaches 700 thousand by 2010, or 46 percent more than in 1983. The

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TABLE 7. MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
TOTAL POPULATION

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	474.606	476.217	1.611	0.339
1984	486.117	489.723	3.605	0.742
1985	497.789	503.451	5.662	1.137
1986	508.583	518.245	9.662	1.900
1987	516.829	530.157	13.328	2.579
1988	518.816	532.852	14.036	2.705
1989	523.512	536.696	13.184	2.518
1990	528.510	546.747	18.237	3.451
1991	533.835	559.289	25.454	4.768
1992	537.019	567.289	30.270	5.637
1993	538.150	572.160	34.010	6.320
1994	539.918	576.033	36.115	6.689
1995	541.814	584.568	42.753	7.891
1996	543.813	589.733	45.919	8.444
1997	546.522	597.570	51.048	9.340
1998	549.945	602.960	53.016	9.640
1999	553.889	607.421	53.532	9.665
2000	558.335	612.099	53.764	9.629
2001	563.038	618.131	55.093	9.785
2002	568.284	624.691	56.407	9.926
2003	574.060	631.646	57.585	10.031
2004	580.448	639.194	58.746	10.121
2005	587.395	647.366	59.971	10.210
2006	594.518	655.677	61.159	10.287
2007	601.917	664.255	62.338	10.357
2008	609.790	673.451	63.661	10.440
2009	618.258	683.147	64.890	10.496
2010	627.212	693.371	66.159	10.548

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED
DECEMBER 1983

VARIABLE: POP

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TABLE 8. MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
TOTAL EMPLOYMENT

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	248.164	250.206	2.042	0.823
1984	253.477	256.893	3.416	1.348
1985	261.413	266.311	4.898	1.874
1986	268.253	276.873	8.620	3.213
1987	272.369	282.857	10.488	3.851
1988	269.053	278.040	8.987	3.340
1989	270.504	277.457	6.953	2.570
1990	272.216	285.405	13.188	4.845
1991	274.441	294.418	19.978	7.279
1992	274.065	296.195	22.130	8.075
1993	271.698	295.720	24.021	8.841
1994	271.097	295.004	23.907	8.819
1995	270.814	301.241	30.427	11.236
1996	270.903	301.598	30.695	11.331
1997	272.241	306.605	34.364	12.623
1998	274.422	307.479	33.056	12.046
1999	276.931	308.132	31.201	11.267
2000	279.799	309.369	29.570	10.568
2001	282.666	312.347	29.681	10.500
2002	285.890	315.639	29.750	10.406
2003	289.391	319.251	29.860	10.318
2004	293.230	323.356	30.126	10.274
2005	297.277	327.897	30.620	10.300
2006	301.048	332.208	31.160	10.351
2007	304.705	336.457	31.752	10.420
2008	308.773	341.165	32.392	10.491
2009	313.023	346.149	33.126	10.583
2010	317.516	351.415	33.899	10.676

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED
DECEMBER 1983

VARIABLE: EM99

employment figures in Table 8 also show a rapidly growing impact between 1989 and 1997, with a slight decline thereafter.

The projected effect of OCS development on the Alaska economy, as shown in Tables 7 and 8, is substantial. The timing of impacts from cumulative OCS development assumed for Alaska coincides with the slowdown in the state economy due to other factors. Thus, the projections, including development occurring as a result of the OCS oil and gas leasing program, show steady although modest growth in employment and population throughout the 1990s as well as in the other years.

Population growth in the impact case is still largely attributable to natural increase. OCS development stimulates relatively little net immigration, but rather reduces projected emigration, particularly in the 1990s. Employment growth in excess of that projected in the base case begins with expansion of the basic sector as a direct result of OCS activity. However, the indirect effects of OCS development add twice as many new jobs in the services and government sectors as in the basic sector by the year 2010. In a general sense, the type of labor market growth projected to result from OCS development is similar to that which occurred at a much faster rate over the past decade. Appendix B contains a more detailed discussion, along with supporting information about the projected employment and income effects.

We project OCS development to bring a modest increase in state revenues. However, population growth (from reducing net emigration after 1990) places demand on public services in excess of new revenues. As a result of this impact, state and local governments must raise tax rates or reduce services, or both, in a period already characterized by fiscal retrenchment. We project the principal effect to be an additional reduction in per capita government services. Projections of variables tracking the adverse impact on the state's fiscal situation are included in Tables B.9 to B.13 in Appendix B.

V. REGIONAL IMPACTS OF OCS DEVELOPMENT ON
ANCHORAGE AND SOUTHCENTRAL ALASKA

In this chapter, we discuss economic and demographic projections for certain regions within the state of Alaska. We project economic and demographic effects of OCS development on Alaska regions, using the MAP regional model as outlined in Chapter II. The regional model requires a set of assumptions regarding exogenous basic industry and federal government employment for each of twenty regions of the state. Next, we discuss the exogenous employment assumptions for the regional base case and OCS development scenarios. Then, we present our projections of regional growth in the base case and in the impact case.

Regional Base Case and OCS Development Assumptions

Other studies have analyzed impacts of potential oil and gas development on the regions that would receive the main direct impacts of individual OCS lease sales. For example, see Nebesky and Huskey, 1981, and Knapp et al., 1983.

We consider here cumulative regional impacts of the OCS program on Southcentral Alaska and on Anchorage, the major city of the region and the state's business center. The Southcentral Region is interesting to analyze in this context because we assume that the entire impact of the OCS program on the region is indirect. Thus, the regional analysis for this study is analogous to the analysis in Knapp, 1983, of potential impacts from an individual lease sale.

For the purpose of the regional analysis, we attribute all direct employment impacts to the coastal census division closest to the location of projected development in the Bering and Beaufort Seas. While future exploration of federal waters could occur from bases in Southcentral Alaska, we assume that such ventures have a negligible impact on the region. We do not assume a relationship between future OCS activity and the level of oil industry headquarters employment in Anchorage. It is likely that some of current and planned industry staff in Anchorage are assigned to supervise and support ongoing OCS exploration programs and that staff levels may increase as development occurs. To this extent, our projections underestimate both the statewide and the Southcentral Region impacts of OCS development.

Our regional exogenous employment assumptions follow the implications of the statewide assumptions summarized in Table 1. In general, we assume the regional distribution of federal government and baseline industry employment maintains recent shares of the total. Special projects, of course, change the shares of statewide exogenous employment assumed for each region, as do differing rates of growth projected for different industries, given the uneven distribution of employment by industry among Alaska regions. The complete set of regional base case exogenous employment assumptions appears in Appendix D.

Regional Projections

Tables 9 and 10 show projections of total population and total employment, respectively, for Anchorage, using the MAP regional model. Tables 11 and 12 show projections of the same two variables for the Southcentral Region, which includes Anchorage. The figures for these four tables come from two simulations of the regional model, one with the base case assumptions and no OCS development and the other with the base case assumptions plus the scenario of cumulative OCS development. Appendix C displays projections for a number of additional economic variables in the regional model base case and impact case simulations.

Since we assume that all of this development occurs outside of the Southcentral Region, the exogenous employment assumptions for Anchorage and for the Southcentral Region are the same in the impact case as in the base case. But since exogenous employment assumptions differ in other regions (specifically, in the regions experiencing direct OCS developent impacts), there are indirect impacts on Anchorage and on the Southcentral Region. More detail on the pattern of these indirect effects is contained in Appendix C.

The regional population and employment projections shown in Tables 9 through 12 show that the indirect effects of OCS development on Southcentral Alaska can indeed be substantial. Total population in Anchorage rises in the base case by 34 percent by 2010, growing at 0.6 percent per year even during the relatively sluggish 1990s.

TABLE 9. MAP REGIONAL MODEL PROJECTIONS
CUMULATIVE OCS IMPACTS
ANCHORAGE
TOTAL POPULATION

(thousands))

	Base Case	Impact Case	Difference	Percent Difference
1983	211.749	212.809	1.059	0.500
1984	215.997	218.131	2.134	0.988
1985	221.220	224.423	3.203	1.448
1986	225.140	230.068	4.928	2.189
1987	228.401	234.236	5.835	2.555
1988	228.725	235.581	6.856	2.997
1989	229.350	235.000	5.650	2.463
1990	231.708	239.690	7.983	3.445
1991	233.674	246.274	12.600	5.392
1992	234.363	247.518	13.155	5.613
1993	235.687	245.972	10.284	4.364
1994	236.877	249.172	12.296	5.191
1995	237.566	247.094	9.528	4.011
1996	238.755	253.029	14.274	5.978
1997	240.326	257.651	17.325	7.209
1998	242.121	262.992	20.871	8.620
1999	244.221	264.468	20.247	8.290
2000	246.586	267.705	21.119	8.565
2001	249.160	271.131	21.971	8.818
2002	251.976	274.528	22.552	8.950
2003	255.031	278.101	23.070	9.046
2004	258.325	281.999	23.674	9.164
2005	261.921	286.242	24.321	9.285
2006	265.819	290.776	24.957	9.389
2007	269.949	295.551	25.603	9.484
2008	274.231	300.548	26.316	9.596
2009	278.813	305.810	26.998	9.683
2010	283.636	311.337	27.701	9.766

SOURCE: REGIONAL MODEL SIMULATIONS CBOCS.39 AND CIOCS.39--CREATED DECEMBER 1983

VARIABLE: P.02

TABLE 10. MAP REGIONAL MODEL PROJECTIONS
CUMULATIVE OCS IMPACTS
ANCHORAGE
TOTAL EMPLOYMENT

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	116.750	117.449	0.700	0.599
1984	118.945	120.190	1.245	1.047
1985	122.774	124.566	1.793	1.460
1986	125.511	128.455	2.944	2.346
1987	127.146	130.671	3.526	2.773
1988	125.450	128.788	3.338	2.661
1989	125.187	127.847	2.660	2.125
1990	125.885	130.245	4.360	3.463
1991	126.283	132.888	6.606	5.231
1992	125.750	132.953	7.202	5.727
1993	125.417	132.750	7.333	5.847
1994	125.514	133.314	7.800	6.215
1995	125.534	134.174	8.640	6.882
1996	125.715	135.625	9.910	7.883
1997	126.562	138.075	11.513	9.097
1998	127.715	139.867	12.152	9.515
1999	129.049	140.763	11.714	9.077
2000	130.581	142.080	11.499	8.806
2001	132.233	143.798	11.566	8.746
2002	134.054	145.661	11.607	8.658
2003	136.013	147.689	11.675	8.584
2004	138.114	149.964	11.850	8.580
2005	140.352	152.494	12.142	8.651
2006	142.594	155.062	12.468	8.743
2007	144.855	157.683	12.828	8.856
2008	147.241	160.458	13.217	8.976
2009	149.732	163.389	13.657	9.121
2010	152.354	166.474	14.120	9.268

SOURCE: REGIONAL MODEL SIMULATIONS CBOCS.39 AND CIOCS.39--CREATED DECEMBER 1983

VARIABLE: M.02

TABLE 11.   MAP REGIONAL MODEL PROJECTIONS
CUMULATIVE OCS IMPACTS
SOUTHCENTRAL REGION
TOTAL POPULATION

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	266.039	267.342	1.303	0.490
1984	271.624	274.263	2.639	0.972
1985	278.268	282.242	3.974	1.428
1986	283.529	289.662	6.133	2.163
1987	287.812	295.084	7.273	2.527
1988	288.968	297.458	8.490	2.938
1989	291.690	298.757	7.067	2.423
1990	295.218	305.172	9.954	3.372
1991	298.201	313.815	15.613	5.236
1992	299.026	315.306	16.281	5.445
1993	298.590	311.303	12.713	4.258
1994	299.197	314.458	15.261	5.101
1995	300.665	312.442	11.778	3.917
1996	302.051	319.709	17.658	5.846
1997	304.023	325.431	21.408	7.041
1998	306.188	332.014	25.826	8.435
1999	308.699	333.774	25.074	8.123
2000	311.526	337.698	26.172	8.401
2001	314.673	341.901	27.227	8.653
2002	318.112	346.045	27.933	8.781
2003	321.861	350.413	28.552	8.871
2004	325.900	355.173	29.273	8.982
2005	330.325	360.370	30.044	·9.095
2006	335.084	365.880	30.796	9.191
2007	340.116	371.669	31.554	9.277
2008	345.313	377.710	32.397	9.382
2009	350.878	384.074	33.196	9.461
2010	356.736	390.758	34.022	9.537

SOURCE: REGIONAL MODEL SIMULATIONS CBOCS.39 AND CIOCS.39--CREATED
DECEMBER 1983

VARIABLE: P.AG

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TABLE 12.   MAP REGIONAL MODEL PROJECTIONS
CUMULATIVE OCS IMPACTS
SOUTHCENTRAL REGION
TOTAL EMPLOYMENT

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	132.428	133.147	0.719	0.543
1984	135.000	136.304	1.304	0.966
1985	139.407	141.294	1.888	1.354
1986	142.649	145.746	3.097	2.171
1987	144.579	148.328	3.750	2.593
1988	142.942	146.495	3.553	2.486
1989	143.356	146.267	2.912	2.031
1990	144.340	148.985	4.645	3.218
1991	144.927	151.851	6.924	4.778
1992	144.290	151.901	7.611	5.275
1993	143.156	151.039	7.883	5.507
1994	142.960	151.382	8.422	5.891
1995	143.244	152.607	9.362	6.536
1996	143.415	154.159	10.744	7.491
1997	144.377	156.839	12.462	8.631
1998	145.659	158.864	13.206	9.066
1999	147.133	159.962	12.829	8.720
2000	148.826	161.450	12.625	8.483
2001	150.681	163.360	12.679	8.414
2002	152.724	165.439	12.714	8.325
2003	154.928	167.708	12.779	8.248
2004	157.290	170.252	12.962	8.241
2005	159.808	173.087	13.278	8.309
2006	162.318	175.949	13.631	8.398
2007	164.844	178.865	14.021	8.505
2008	167.502	181.945	14.443	8.623
2009	170.276	185.200	14.924	8.765
2010	173.196	188.625	15.430	8.909

SOURCE: REGIONAL MODEL SIMULATIONS CBOCS.39 AND CIOCS.39--CREATED
DECEMBER 1983

VARIABLE: M.AG

Total employment, however, remains virtually constant from 1986 through 1996. Thereafter, it resumes its upward course, rising approximately 1.4 percent per year. One can see the impact of OCS developent on Anchorage population from Table 9 as rising rapidly in the early 1990s, falling somewhat around 1995, then rising again. The employment impact levels off rather than falling in the 1990s, before rising again. The cumulative impact on both population and employment rises to over 9 percent of the region total by the end of the projection period.

The pattern for the Southcentral Region is similar to that of Anchorage, with population and employment impacts of around 9 percent by 2010. Although the absolute magnitude of the projected impacts are somewhat larger and the percentage impact somewhat less, the general picture shown in Tables 11 and 12 is similar to that shown in Tables 9 and 10. By 2000, the indirect effects of OCS development include 11,500 support sector jobs in the Southcentral Region, 10,000 of them in Anchorage.

One interesting result shown in the regional projections is that the impacts on the Southcentral Region occur later on the average than the statewide impacts. This is due to the nature of the Southcentral Region impacts; they are indirect, stemming primarily from expansion of the support sector in response to the basic sector growth occurring elsewhere. The support sector responds to the growth in income from the direct effects of OCS development in a manner

analogous to a multiplier process. The support sector continues to grow in the base case projection through the 1990s even though there is no growth in the basic sector. Thus, one could say that the impact of OCS development on the Southcentral Region is to accelerate support industry growth by perhaps as much as a decade over that which would eventually occur without OCS development.

Table 13 contains the shares of the net growth in statewide employment and population projected to occur in Anchorage and the Southcentral Region. The figures show that during the period 1983-1996, approximately 40 percent of new jobs and population in the base case will be located in Anchorage, and nearly one-half in the Southcentral Region. However, only around one-third of the impact employment (measured as the difference between the impact case and the base case) occurs in the Southcentral Region during this period.

As OCS development moves more into the operation phase from the construction phase, this pattern changes. In the base case, we project that the majority of new new jobs occurring from 1996 to 2010 will be located in the Southcentral Region. The figures in Table 13 show that more than 100 percent of the projected impact jobs will occur in Southcentral Alaska. This means that the cumulative impact of OCS development includes a decline in employment outside the Southcentral Region after 1996. The shares of impact population occurring in Anchorage and the Southcentral

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Region during this period are high but less than 100 percent. This reflects the assumption that some of the impact jobs which disappeared in rural areas after 1996 were held by Southcentral residents.

TABLE 13. SHARE OF PROJECTED STATEWIDE EMPLOYMENT AND POPULATION GROWTH, ANCHORAGE AND SOUTHCENTRAL REGION

Projection	Percent of Change in Statewide Employment		Percent of Change in Statewide Population	
	Anchorage	Southcentral Region	Anchorage	Southcentral Region
1983-1996				
Base Case	39	48	39	52
Impact Case	35	41	36	47
Difference*	32	35	31	38
1996-2010				
Base Case	56	64	54	66
Impact Case	62	69	56	69
Difference*	132	146	66	81
1983-2010				
Base Case	50	59	47	60
Impact Case	48	55	45	57
Difference*	42	46	42	51

*Difference between base case and impact case

SOURCE: Tables 7, 8, 9, 10, 11, 12

Another interesting result from Tables 9 through 12 is the difference between the timing of the population impact and that of the employment impact. In particular, there seems to be a tendency for the projected impact on population to fluctuate despite stable employment in the early 1990s. This result comes from the residence-adjusting mechanism for population, given regional employment growth, computed by the regional model. We assume all jobs are filled, but not necessarily by local residents. The model reallocates population growth each year to regions using place-of-work to place-of-residence factors based upon historical data. Currently, a large proportion of North Slope workers live in Southcentral Alaska; while most workers in Western Alaska live either near their place of work or outside the state. Shifts in OCS activity from the Beaufort Sea to the Bering Sea cause the reduction in projected population relative to employment in the impact projections for Anchorage and for the Southcentral Region.

VI. CONCLUSIONS

Figures 2 and 3 illustrate our projection of the cumulative economic and demographic impacts of the OCS oil and gas leasing program on Alaska. Figure 2 shows that the impact on Alaska statewide population rises steadily to around a 10 percent difference before the end of the century. For the Southcentral Region of the state, the cumulative indirect impact of OCS development rises more slowly, but again reaches nearly as large a percentage difference by 2010, the end year for the projection.

We project these impacts to occur on a statewide and regional economy characterized by modest, steady growth in the 1980s and 2000s, but with virtually no growth in the 1990s. For the state as a whole, as shown in Figure 2, the combined direct and indirect effects of OCS development serve to smooth out the growth gap projected in the base case. In this sense, cumulative OCS development may help to stabilize the Alaska economy in the 1990s. The indirect impacts on the Southcentral Region and on Anchorage--the region's major urban center--do not appear to be so successful in stabilizing the regional economy in the early 1990s. The timing and magnitude of population impacts on Southcentral Alaska stemming from OCS activity may contribute to instability, depending on residence location for OCS construction workers. Further research is needed to verify the robustness of this finding to changes in regional modeling assumptions.

Figure 2. Base Case and Impact Case Projections, Alaska Population
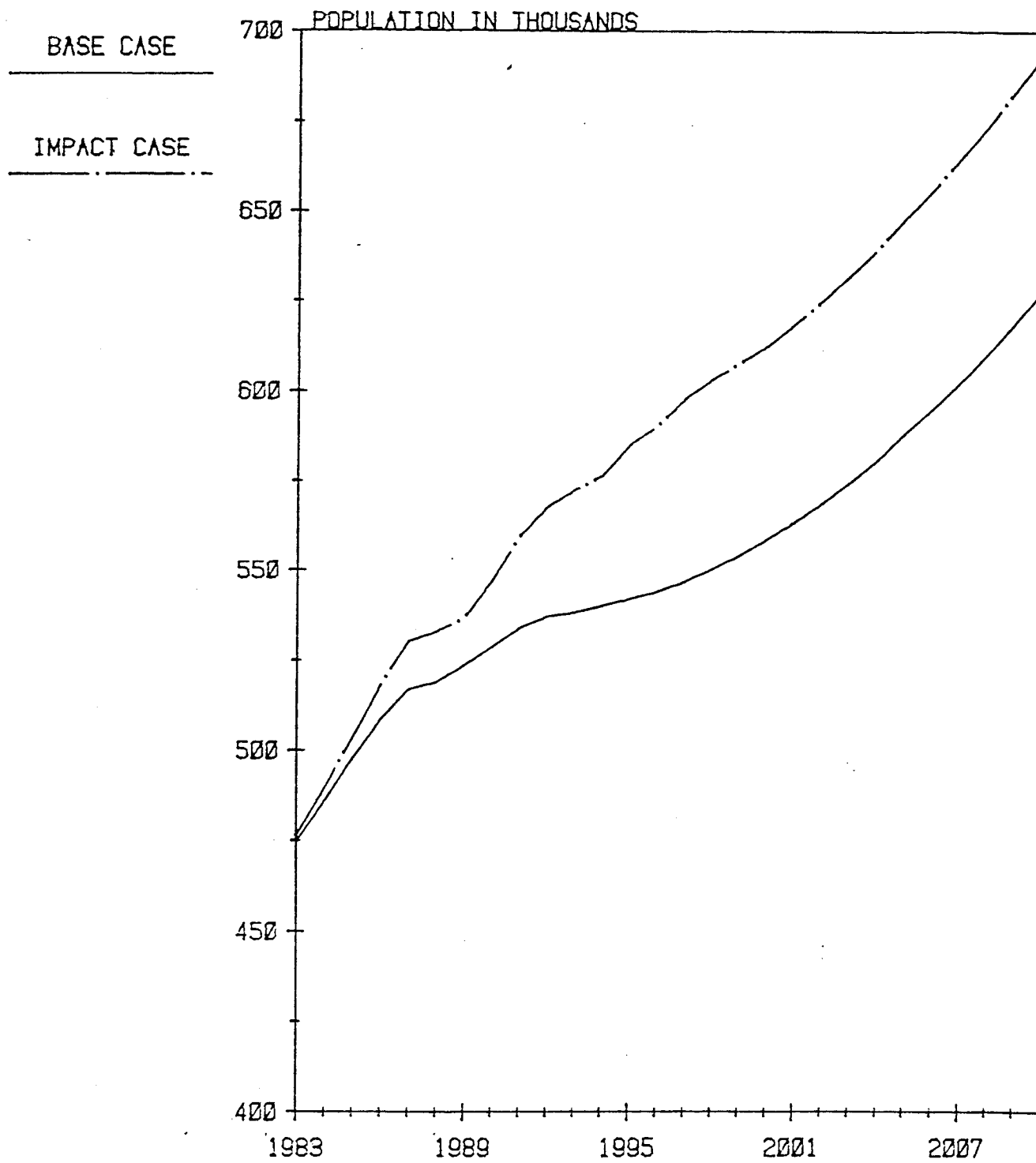
Figure 3. Base Case and Impact Case Projections, Southcentral Region Population
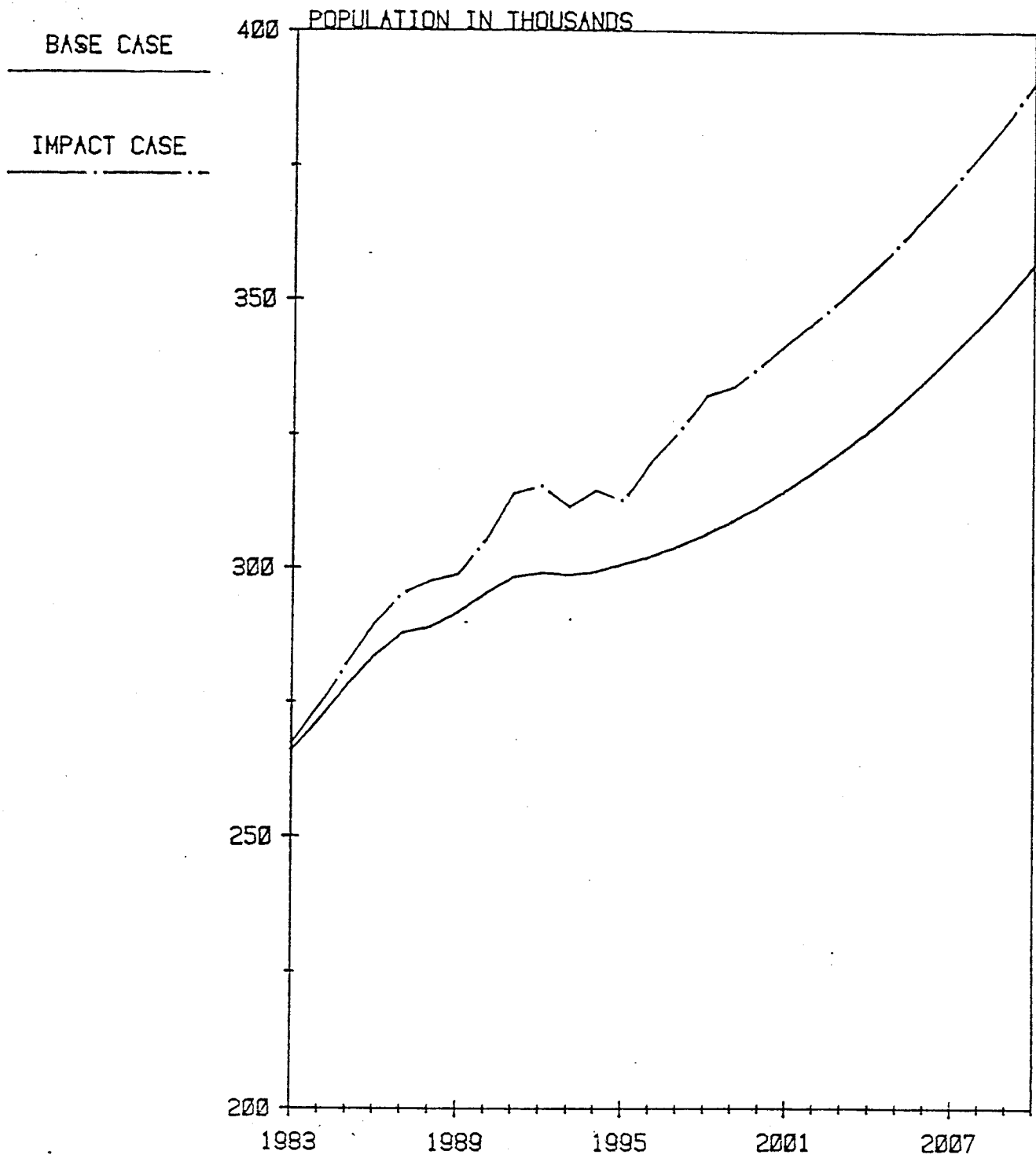
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APPENDIX A.   STATEWIDE BASE CASE PROJECTIONS

Appendix A contains information from the base case projection, using the MAP statewide econometric model.   Table A.1 presents base case demographic trends.   Table A.2 shows growth in various employment categories while Tables A.3 and A.4 contain projections for real income and wage rates.   Tables A.5 through A.7 display the pattern of Alaska State government revenues and spending projected in the base case.

Table A.1 shows that base case population grows throughout the projection period, 1983 to 2010.   However, growth is uneven, with rapid growth occurring in the first five years, slowing practically to zero in the 1990s, then picking up again around 2000.   Natural increase remains stable at around 8,000 persons per year.   Net migration is positive until 1988, then turns negative (signifying net emigration), approaching zero around the turn of the century. Considering the entire projection period, total emigrants exceed total immigrants in the base case.   Note that the sum of natural increase and net migration does not match the change in total population.   This is due to the fact that total population includes military population, while natural increase and migration are defined in Table A.1 to include only the civilian population.

From Tables A.1 and A.2, one can see that we expect the ratio of employment to population to decline from 52.3 percent to 50.6 percent by 2010.   This is due to a decline in the fraction of

the population projected to be in the labor force, as elderly and children increase their shares of the population. Table A.2 also illustrates the changing sectoral composition of employment in the base case projection. Government sector employment rises until 1987, then declines steadily due to declining state revenues to a level 6 percent below the 1983 level. Total employment increases from growth in jobs in the basic and services sectors. Employment in service industries rises by approximately 60 percent by 2010, and basic sector employment increases by around 20 percent.

Real income and wage rates in Tables A.4 and A.5 also show an uneven pattern of growth. Total real personal income in Alaska increases by 55 percent in the base case by 2010. However, on a per capita basis, the level of personal income earned in 1983 is not exceeded until 1999. We project most of the new jobs to occur in the services sectors, in which wages are lower and increasing more slowly than in the basic or government sectors.

From Tables A.5 through A.7, one can view the relationships between declining petroleum revenues and other fiscal variables. Petroleum revenues decline to one-third of their constant-dollar 1983 level. Even after applying permanent fund earnings to general fund expenditures, per capita spending falls by 50 percent. The combined real permanent fund and general fund balances fall from $12,000 per capita to $5,000 per capita in order to help sustain the reduced level of state services.

TABLE A.1. MAP MODEL STATEWIDE BASE CASE PROJECTIONS: POPULATION AND COMPONENTS OF CHANGE

(thousands)

	Total Population	Change in Population	Net Migration	Natural Increase
1983	474.606		6.597	8.013
1984	486.117	11.511	4.104	8.185
1985	497.789	11.672	4.135	8.296
1986	508.583	10.794	3.130	8.406
1987	516.829	8.246	0.477	8.485
1988	518.816	1.987	-5.891	8.493
1989	523.512	4.696	-2.905	8.333
1990	528.510	4.998	-2.540	8.277
1991	533.835	5.326	-2.318	8.235
1992	537.019	3.183	-4.443	8.212
1993	538.150	1.131	-6.599	8.138
1994	539.918	1.769	-5.887	8.020
1995	541.814	1.896	-5.695	7.939
1996	543.813	1.999	-5.542	7.870
1997	546.522	2.709	-4.601	7.815
1998	549.945	3.422	-3.878	7.787
1999	553.889	3.945	-3.366	7.784
2000	558.335	4.446	-2.895	7.798
2001	563.038	4.702	-2.683	7.829
2002	568.284	5.247	-2.192	7.867
2003	574.060	5.776	-1.732	7.921
2004	580.448	6.387	-1.204	7.989
2005	587.395	6.947	-0.742	8.072
2006	594.518	7.123	-0.677	8.168
2007	601.917	7.399	-0.515	8.267
2008	609.790	7.873	-0.031	8.371
2009	618.258	8.468	0.301	8.486
2010	627.212	8.955	0.645	8.614

NOTE: TOTALS MAY NOT ADD DUE TO ROUNDING

SOURCE: MAP MODEL SIMULATION SBOCS.39--CREATED JANUARY 1984

VARIABLES: POP, DELPOP, POPMIG, AND POPNI9

TABLE A.2. MAP MODEL STATEWIDE BASE CASE PROJECITONS:
EMPLOYMENT

(thousands)

	Basic Sector Employment	Services Sector Employment	Government Sector Employment	Total Wage and Salary Employment	Total Employment
1983	60.428	108.560	79.176	229.403	248.164
1984	60.874	111.043	81.560	234.386	253.477
1985	63.862	114.331	83.220	241.833	261.413
1986	67.079	116.878	84.296	248.245	268.253
1987	69.958	117.928	84.483	252.092	272.369
1988	68.911	117.195	82.948	248.957	269.053
1989	70.523	116.859	83.122	250.290	270.504
1990	72.189	117.723	82.305	251.889	272.216
1991	72.888	119.348	82.205	253.966	274.441
1992	71.129	120.806	82.130	253.594	274.065
1993	68.341	122.006	81.352	251.344	271.698
1994	67.294	123.273	80.531	250.747	271.097
1995	66.610	124.743	79.460	250.442	270.814
1996	66.371	126.228	78.304	250.478	270.903
1997	66.173	127.978	78.090	251.675	272.241
1998	66.633	130.173	77.617	253.651	274.422
1999	67.201	132.639	77.091	255.914	276.931
2000	67.815	135.348	76.636	258.561	279.799
2001	68.102	138.235	76.329	261.256	282.666
2002	68.471	141.305	76.113	264.288	285.890
2003	68.890	144.525	75.976	267.579	289.391
2004	69.405	147.908	75.917	271.187	293.230
2005	69.922	151.428	75.927	274.990	297.277
2006	70.347	155.053	75.647	278.532	301.048
2007	70.726	158.745	75.235	281.968	304.705
2008	71.345	162.576	74.853	285.789	308.773
2009	71.995	166.531	74.496	289.779	313.023
2010	72.692	170.638	74.186	293.997	317.516

SOURCE: MAP MODEL SIMULATION SBOCS.39--CREATED JANUARY 1984

VARIABLES: EMNS, EMSP, EMG9, EM98, AND EM99

TABLE A.3. MAP MODEL STATEWIDE BASE CASE PROJECTIONS:
REAL PERSONAL INCOME

	Personal Income (millions of 1982 $)	Per Capita Personal Income (1982 $)
1983	7477.742	15755.680
1984	7380.680	15182.920
1985	7537.617	15142.180
1986	7651.074	15043.900
1987	7684.797	14869.110
1988	7483.418	14424.020
1989	7654.219	14620.910
1990	7743.773	14652.090
1991	7921.035	14837.970
1992	8007.648	14911.300
1993	8029.754	14921.040
1994	8117.426	15034.540
1995	8207.066	15147.370
1996	8312.984	15286.460
1997	8447.414	15456.670
1998	8624.020	15681.610
1999	8813.719	15912.410
2000	9017.140	16150.050
2001	9226.710	16387.380
2002	9449.520	16628.160
2003	9683.190	16867.890
2004	9931.170	17109.490
2005	10187.420	17343.380
2006	10450.750	17578.520
2007	10720.890	17811.230
2008	11006.640	18049.880
2009	11302.290	18280.880
2010	11609.680	18509.970

SOURCE: MAP MODEL SIMULATION SBOCS.39--CREATED JANUARY 1984

VARIABLES: DF.PI AND DF.PIP

TABLE A.4. MAP MODEL STATEWIDE BASE CASE PROJECTIONS:
REAL WAGE RATES

(1982 dollars)

	Basic Sector	Services Sector	Government Sector
1983	39904.610	22121.350	23530.110
1984	37664.850	21461.000	23794.290
1985	35870.020	20791.550	24029.280
1986	34181.520	20147.560	24224.710
1987	32472.390	19547.880	24369.630
1988	33098.220	19744.440	24404.730
1989	33958.750	19948.330	24570.930
1990	34781.460	20143.580	24664.940
1991	35638.470	20337.870	24777.680
1992	36285.110	20533.270	24904.940
1993	36754.380	20733.870	24978.580
1994	37385.380	20943.400	25046.700
1995	38035.230	21153.070	25099.270
1996	38770.040	21361.690	25146.830
1997	39431.080	21571.600	25263.640
1998	40194.940	21781.700	25455.630
1999	40954.190	21992.700	25673.860
2000	41711.650	22205.460	25889.660
2001	42587.350	22420.280	26109.020
2002	43475.100	22637.480	26327.380
2003	44381.300	22857.090	26544.700
2004	45323.980	23079.190	26762.250
2005	46270.930	23303.870	26979.570
2006	47274.790	23531.460	27317.100
2007	48323.880	23762.220	27722.850
2008	49322.750	23995.900	28135.870
2009	50341.940	24232.340	28555.250
2010	51380.090	24471.750	28983.330

SOURCE: MAP MODEL SIMULATION SBOCS.39--CREATED JANUARY 1984

VARIABLES: DF.WRNS, DF.WRSP, AND DF.WRG9

TABLE A.5. MAP MODEL STATEWIDE BASE CASE PROJECTIONS:
STATE GOVERNMENT REVENUES

(millions of 1982 dollars)

	Petroleum Revenues	Federal Grants	Interest Earnings	Other Revenues	Total Revenues
1983	3204.145	190.148	147.674	393.313	3428.796
1984	2755.194	192.313	497.593	224.251	3197.461
1985	2719.130	195.518	508.697	222.087	3158.443
1986	2734.136	198.650	499.452	225.320	3156.469
1987	2847.132	201.580	513.527	227.887	3251.900
1988	2723.521	204.301	464.510	228.915	3083.082
1989	2880.988	207.120	484.132	367.072	3368.646
1990	2664.536	200.484	475.125	478.235	3504.016
1991	2303.719	203.537	482.418	492.589	3212.208
1992	2145.890	206.611	474.525	498.778	3073.041
1993	2028.202	209.699	469.213	495.692	2965.108
1994	1888.080	212.843	461.069	490.174	2832.999
1995	1705.721	216.063	451.871	489.795	2670.729
1996	1518.609	219.336	436.692	490.731	2495.498
1997	1489.773	222.686	425.788	493.173	2466.660
1998	1450.841	226.150	415.194	497.034	2429.501
1999	1400.326	229.704	404.842	503.477	2386.054
2000	1346.623	233.343	394.493	510.567	2340.563
2001	1304.338	237.059	384.089	518.139	2305.297
2002	1264.472	240.853	373.781	525.620	2272.255
2003	1226.871	244.721	363.579	533.597	2241.884
2004	1191.420	248.665	353.499	542.021	2214.056
2005	1157.983	252.683	343.550	550.891	2188.653
2006	1126.436	256.769	333.737	559.815	2165.170
2007	1096.654	260.920	324.065	568.654	2143.362
2008	1068.584	265.144	314.555	577.557	2123.355
2009	1042.145	269.445	305.213	587.155	2105.716
2010	1017.254	273.825	296.054	596.954	2089.901

SOURCE: MAP MODEL SIMULATION SBOCS.39--CREATED JANUARY 1984

VARIABLES: DF.RP9S, DF.RSFD, DF.RSIN, DF.RSEN, AND DF.RSGF

TABLE A.6.   MAP MODEL STATEWIDE BASE CASE PROJECTIONS:
STATE GOVERNMENT EXPENDITURES

	Total (millions of 1982 $)	Per Capita (1982 $)
1983	3151.794	6640.859
1984	3339.376	6869.484
1985	3429.782	6890.023
1986	3509.848	6901.227
1987	3588.215	6942.742
1988	3083.077	5942.520
1989	3418.421	6529.785
1990	3440.720	6510.227
1991	3212.246	6017.293
1992	3072.955	5722.246
1993	2965.092	5509.789
1994	2832.968	5247.031
1995	2670.705	4929.184
1996	2495.470	4588.832
1997	2466.635	4513.324
1998	2429.473	4417.664
1999	2386.022	4307.754
2000	2340.532	4191.980
2001	2305.267	4094.337
2002	2272.227	3998.397
2003	2241.859	3905.267
2004	2214.034	3814.355
2005	2188.632	3725.997
2006	2165.149	3641.857
2007	2143.342	3560.856
2008	2123.389	3482.164
2009	2105.704	3405.867
2010	2089.890	3332.030

SOURCE: MAP MODEL SIMULATION SBOCS.39--CREATED JANUARY 1984

VARIABLES: DF.EXGF AND DF.EXGFP

TABLE A.7. MAP MODEL STATEWIDE BASE CASE PROJECTIONS:
COMBINED FUNDS BALANCE

	Total (millions of 1982 $)	Per Capita (1982 $)
1983	5664.035	11934.180
1984	5650.934	11624.630
1985	5517.523	11084.050
1986	5321.121	10462.640
1987	5155.699	9975.630
1988	5368.359	10347.320
1989	5551.801	10604.920
1990	5348.922	10120.760
1991	5290.695	9910.720
1992	5221.055	9722.290
1993	5138.836	9549.080
1994	5044.250	9342.620
1995	4930.504	9099.980
1996	4806.043	8837.664
1997	4684.473	8571.418
1998	4566.336	8303.262
1999	4448.449	8031.293
2000	4330.242	7755.629
2001	4213.207	7482.992
2002	4097.523	7210.336
2003	3983.274	6938.770
2004	3870.621	6668.332
2005	3759.632	6400.516
2006	3650.360	6140.031
2007	3542.828	5885.902
2008	3437.202	5636.695
2009	3333.674	5392.047
2010	3232.271	5153.391

SOURCE: MAP MODEL SIMULATION SBOCS.39--CREATED JANUARY 1984

VARIABLES: DF.BAL99 AND DF.BAL9P

APPENDIX B. STATEWIDE IMPACT PROJECTIONS

Appendix B includes projections for the base case and for the impact case, with the absolute and percent difference between the value projected for the two cases. Tables B.1, B.2, and B.3 show the projections for the three main types of employment. Tables B.4 through B.8 show impacts on income and wage rates for various sectors. The projection of five main state fiscal variables for the two cases is included in Tables B.9 through B.13. These latter tables show how the model projects higher total revenues and spending in the impact case than in the base case, but lower per capita spending and wealth.

Basic sector employment, shown in Table B.1, is 22 percent larger in the impact case than in the base case in 1997, and still 16 percent larger in 2010. Tables B.2 and B.3 show that services and government employment increase continuously to 11 percent and 4 percent more than the base case, respectively, by 2010. Including base case growth, total basic sector employment increases by around 35 percent above the 1983 level; services employment increases by around 70 percent; and government employment still declines slightly.

Tables B.4 and B.5 show that we project that OCS development increases real personal income by 12 percent above base case levels in 2010. However, there is almost no change in projected per capita real personal income. This means that population growth (mainly from net migration) absorbs nearly 100 percent of the growth in

personal income. We project that OCS development raises basic sector wages by around 6 percent since wage scales in petroleum-related industries are higher than the average wage in that sector. We project no significant changes in services and government sector wage rates as a result of OCS development.

Tables B.9 and B.10 show that there is an increase in real state expenditures above the base case level by an amount that matches almost exactly the increase in revenues. Most of the projected revenue increase is attributable to petroleum property taxes collected from onshore facilities. Real general fund expenditures per capita decline by around 100 dollars, as illustrated in Table B.11. Population growth from the impact of OCS development thus exceeds the increase in available new tax revenues. Real per capita combined permanent and general funds balance declines 10 percent by 1996, also due mainly to population growth, as shown in Tables B.11 and B.12.

Note that new state revenue obtained from OCS development may be diminished if organized local governments are able to collect property tax revenue from onshore petroleum facilities under the provisions of AS 43.56. If local governments were to use this revenue to reduce their level of local taxation without changing service levels, this might diminish further the state per capita revenue and spending. If local governments increased spending, however, local spending increases might offset the economic effects of reduced state revenue.

TABLE B.1. MAP MODEL STATEWIDE IMPACT PROJECTIONS: CUMULATIVE OCS IMPACTS STUDY BASIC SECTOR EMPLOYMENT

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	60.428	61.680	1.252	2.072
1984	60.874	62.917	2.043	3.356
1985	63.862	66.680	2.819	4.414
1986	67.079	71.952	4.872	7.263
1987	69.958	75.701	5.744	8.210
1988	68.911	73.559	4.648	6.745
1989	70.523	73.421	2.898	4.109
1990	72.189	78.866	6.677	9.250
1991	72.888	83.564	10.676	14.647
1992	71.129	82.215	11.085	15.585
1993	68.341	79.779	11.438	16.736
1994	67.294	78.059	10.766	15.998
1995	66.610	80.493	13.883	20.842
1996	66.371	79.615	13.244	19.954
1997	66.173	80.946	14.773	22.325
1998	66.633	79.943	13.310	19.975
1999	67.201	78.826	11.625	17.299
2000	67.815	78.396	10.580	15.601
2001	68.102	78.843	10.741	15.773
2002	68.471	79.275	10.804	15.778
2003	68.890	79.769	10.879	15.792
2004	69.405	80.359	10.955	15.784
2005	69.922	80.983	11.061	15.819
2006	70.347	81.512	11.165	15.871
2007	70.726	82.005	11.279	15.948
2008	71.345	82.735	11.390	15.965
2009	71.995	83.513	11.518	15.998
2010	72.692	84.344	11.651	16.028

SOURCE: MAP MODEL SIMULATIONS SBOCS.39 AND SIOCS.39--CREATED DECEMBER 1983

VARIABLE: EMNS

TABLE B.2. MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
SERVICES SECTOR EMPLOYMENT

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	108.560	109.329	0.769	0.708
1984	111.043	112.277	1.234	1.112
1985	114.331	116.154	1.823	1.594
1986	116.878	120.141	3.262	2.791
1987	117.928	121.977	4.048	3.433
1988	117.195	121.078	3.884	3.314
1989	116.859	120.029	3.170	2.712
1990	117.723	123.119	5.397	4.584
1991	119.348	127.734	8.386	7.027
1992	120.806	130.673	9.867	8.168
1993	122.006	133.001	10.995	9.012
1994	123.273	134.531	11.259	9.133
1995	124.743	139.015	14.271	11.440
1996	126.228	141.091	14.864	11.775
1997	127.978	144.608	16.629	12.994
1998	130.173	146.604	16.431	12.623
1999	132.639	148.689	16.050	12.100
2000	135.348	150.762	15.415	11.389
2001	138.235	153.637	15.402	11.142
2002	141.305	156.797	15.492	10.964
2003	144.525	160.157	15.632	10.816
2004	147.908	163.790	15.882	10.738
2005	151.428	167.703	16.275	10.748
2006	155.053	171.770	16.717	10.781
2007	158.745	175.950	17.205	10.838
2008	162.576	180.307	17.731	10.906
2009	166.531	184.852	18.320	11.001
2010	170.638	189.572	18.934	11.096

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED
          DECEMBER 1983

VARIABLE: EMSP

TABLE B.3. MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
GOVERNMENT EMPLOYMENT

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	79.176	79.196	0.021	0.026
1984	81.560	81.699	0.139	0.170
1985	83.220	83.477	0.257	0.309
1986	84.296	84.781	0.485	0.575
1987	84.483	85.179	0.696	0.824
1988	82.948	83.403	0.455	0.548
1989	83.122	84.007	0.885	1.065
1990	82.305	83.419	1.114	1.353
1991	82.205	83.120	0.916	1.114
1992	82.130	83.307	1.177	1.433
1993	81.352	82.940	1.589	1.953
1994	80.531	82.414	1.883	2.338
1995	79.460	81.734	2.273	2.861
1996	78.304	80.892	2.588	3.305
1997	78.090	81.051	2.962	3.792
1998	77.617	80.932	3.315	4.271
1999	77.091	80.616	3.526	4.573
2000	76.636	80.211	3.575	4.665
2001	76.329	79.867	3.538	4.635
2002	76.113	79.567	3.454	4.538
2003	75.976	79.325	3.349	4.408
2004	75.917	79.206	3.289	4.333
2005	75.927	79.211	3.284	4.325
2006	75.647	78.925	3.278	4.333
2007	75.235	78.502	3.267	4.343
2008	74.853	78.123	3.271	4.369
2009	74.496	77.784	3.288	4.413
2010	74.186	77.499	3.313	4.466

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED
        DECEMBER 1983

VARIABLE: EMG9

TABLE B.4. MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
REAL PERSONAL INCOME

(millions of 1982 $)

	Base Case	Impact Case	Difference	Percent Difference
1983	7477.742	7531.414	53.672	0.718
1984	7380.680	7463.227	82.547	1.118
1985	7537.617	7657.648	120.031	1.592
1986	7651.074	7849.578	198.504	2.594
1987	7684.797	7911.730	226.934	2.953
1988	7483.418	7691.469	208.051	2.780
1989	7654.219	7847.102	192.883	2.520
1990	7743.773	8101.684	357.910	4.622
1991	7921.035	8478.391	557.355	7.036
1992	8007.648	8678.313	670.664	8.375
1993	8029.754	8731.082	701.328	8.734
1994	8117.426	8891.020	773.594	9.530
1995	8207.066	9178.700	971.629	11.839
1996	8312.984	9338.910	1025.930	12.341
1997	8447.414	9575.720	1128.309	13.357
1998	8624.020	9758.680	1134.664	13.157
1999	8813.719	9903.850	1090.133	12.369
2000	9017.140	10061.660	1044.512	11.584
2001	9226.710	10300.550	1073.832	11.638
2002	9449.520	10547.570	1098.043	11.620
2003	9683.190	10807.900	1124.715	11.615
2004	9931.170	11087.960	1156.789	11.648
2005	10187.420	11384.460	1197.047	11.750
2006	10450.750	11690.880	1240.137	11.866
2007	10720.890	12007.330	1286.438	11.999
2008	11006.640	12341.820	1335.188	12.131
2009	11302.290	12689.920	1387.629	12.277
2010	11609.680	13052.390	1442.715	12.427

SOURCE: MAP MODEL SIMULATIONS SBOCS.39 AND SIOCS.39--CREATED
DECEMBER 1983

VARIABLE: DF.PI

TABLE B.5. MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
REAL PER CAPITA PERSONAL INCOME

(1982 $)

	Base Case	Impact Case	Difference	Percent Difference
1983	15755.68	15815.09	59.41	0.38
1984	15182.92	15239.70	56.78	0.37
1985	15142.18	15210.31	68.13	0.45
1986	15043.90	15146.47	102.57	0.68
1987	14869.11	14923.36	54.25	0.36
1988	14424.02	14434.52	10.50	0.07
1989	14620.91	14621.13	0.22	0.00
1990	14652.09	14817.98	165.89	1.13
1991	14837.97	15159.22	321.25	2.17
1992	14911.30	15297.88	386.58	2.59
1993	14921.04	15259.86	338.82	2.27
1994	15034.54	15434.92	400.38	2.66
1995	15147.37	15701.67	554.30	3.66
1996	15286.46	15835.84	549.38	3.59
1997	15456.67	16024.43	567.77	3.67
1998	15681.61	16184.61	503.00	3.21
1999	15912.41	16304.75	392.34	2.47
2000	16150.05	16437.95	287.90	1.78
2001	16387.38	16664.03	276.64	1.69
2002	16628.16	16884.45	256.29	1.54
2003	16867.89	17110.70	242.81	1.44
2004	17109.49	17346.78	237.29	1.39
2005	17343.38	17585.83	242.45	1.40
2006	17578.52	17830.24	251.72	1.43
2007	17811.23	18076.38	265.14	1.49
2008	18049.88	18326.24	276.36	1.53
2009	18280.88	18575.67	294.79	1.61
2010	18509.97	18824.55	314.58	1.70

SOURCE: MAP MODEL SIMULATIONS SBOCS.39 AND SIOCS.39—CREATED DECEMBER 1983

VARIABLE: DF.PIP

TABLE B.6.   MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
BASIC SECTOR REAL WAGE RATE

(1982 $)

	Base Case	Impact Case	Difference	Percent Difference
1983	39904.61	40532.71	628.10	1.57
1984	37664.85	38595.01	930.16	2.47
1985	35870.02	36816.12	946.10	2.64
1986	34181.52	35490.47	1308.95	3.83
1987	32472.39	33770.29	1297.90	4.00
1988	33098.22	34163.83	1065.61	3.22
1989	33958.75	34424.16	465.41	1.37
1990	34781.46	35957.22	1175.76	3.38
1991	35638.47	37452.43	1813.96	5.09
1992	36285.11	37988.53	1703.42	4.69
1993	36754.38	38929.52	2175.14	5.92
1994	37385.38	39124.70	1739.32	4.65
1995	38035.23	40590.48	2555.25	6.72
1996	38770.04	41053.44	2283.40	5.89
1997	39431.08	42355.68	2924.61	7.42
1998	40194.94	42643.88	2448.95	6.09
1999	40954.19	43085.77	2131.58	5.20
2000	41711.65	43747.18	2035.54	4.88
2001	42587.35	44740.83	2153.48	5.06
2002	43475.10	45723.68	2248.58	5.17
2003	44381.30	46727.32	2346.02	5.29
2004	45323.98	47758.49	2434.50	5.37
2005	46270.93	48799.50	2528.57	5.46
2006	47274.79	49894.43	2619.64	5.54
2007	48323.88	51035.02	2711.14	5.61
2008	49322.75	52125.97	2803.23	5.68
2009	50341.94	53238.00	2896.07	5.75
2010	51380.09	54369.93	2989.84	5.82

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED
DECEMBER 1983

VARIABLE: DF.WRNS

TABLE B.7. MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
SERVICES SECTOR REAL WAGE RATE

(1982 $)

	Base Case	Impact Case	Difference	Percent Difference
1983	22121.35	22136.61	15.26	0.07
1984	21461.00	21483.37	22.37	0.10
1985	20791.55	20821.71	30.16	0.15
1986	20147.56	20197.30	49.74	0.25
1987	19547.88	19598.64	50.77	0.26
1988	19744.44	19784.45	40.01	0.20
1989	19948.33	19970.22	21.89	0.11
1990	20143.58	20215.09	71.51	0.35
1991	20337.87	20473.38	135.51	0.67
1992	20533.27	20679.09	145.82	0.71
1993	20733.87	20842.25	108.38	0.52
1994	20943.40	21044.87	101.47	0.48
1995	21153.07	21290.20	137.13	0.65
1996	21361.69	21481.93	120.24	0.56
1997	21571.60	21693.14	121.54	0.56
1998	21781.70	21874.26	92.56	0.42
1999	21992.70	22042.51	49.81	0.23
2000	22205.46	22228.38	22.93	0.10
2001	22420.28	22447.40	27.12	0.12
2002	22637.48	22665.96	28.49	0.13
2003	22857.09	22886.95	29.86	0.13
2004	23079.19	23109.88	30.69	0.13
2005	23303.87	23334.68	30.81	0.13
2006	23531.46	23562.05	30.59	0.13
2007	23762.22	23792.40	30.18	0.13
2008	23995.90	24025.50	29.60	0.12
2009	24232.34	24261.17	28.82	0.12
2010	24471.75	24499.68	27.94	0.11

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED
DECEMBER 1983

VARIABLE: DF.WRSP

TABLE B.8. MAP MODEL STATEWIDE IMPACT PROJECTIONS: CUMULATIVE OCS IMPACTS STUDY GOVERNMENT SECTOR REAL WAGE RATE

(1982 $)

	Base Case	Impact Case	Difference	Percent Difference
1983	23530.11	23531.73	1.62	0.01
1984	23794.29	23805.73	11.43	0.05
1985	24029.28	24048.23	18.95	0.08
1986	24224.71	24257.78	33.07	0.14
1987	24369.63	24415.12	45.49	0.19
1988	24404.73	24429.34	24.61	0.10
1989	24570.93	24623.74	52.80	0.21
1990	24664.94	24732.13	67.19	0.27
1991	24777.68	24828.13	50.44	0.20
1992	24904.94	24969.89	64.95	0.26
1993	24978.58	25063.93	85.34	0.34
1994	25046.70	25142.20	95.51	0.38
1995	25099.27	25212.88	113.61	0.45
1996	25146.83	25277.20	130.37	0.52
1997	25263.64	25409.29	145.64	0.58
1998	25455.63	25618.10	162.48	0.64
1999	25673.86	25843.40	169.55	0.66
2000	25889.66	26056.08	166.42	0.64
2001	26109.02	26269.47	160.45	0.61
2002	26327.38	26482.18	154.80	0.59
2003	26544.70	26693.06	148.36	0.56
2004	26762.25	26904.96	142.71	0.53
2005	26979.57	27117.49	137.92	0.51
2006	27317.10	27455.86	138.77	0.51
2007	27722.85	27865.20	142.35	0.51
2008	28135.87	28282.15	146.28	0.52
2009	28555.25	28705.61	150.36	0.53
2010	28983.33	29138.07	154.75	0.53

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED DECEMBER 1983

VARIABLE: DF.WRG9

.TABLE B.9.   MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
TOTAL REAL STATE GOVERNMENT REVENUES

(millions of 1982 $)

	Base Case	Impact Case	Difference	Percent Difference
1983	3428.796	3431.714	2.918	0.085
1984	3197.461	3203.801	6.340	0.198
1985	3158.443	3166.739	8.296	0.263
1986	3156.469	3169.725	13.256	0.420
1987	3251.900	3270.440	18.540	0.570
1988	3083.082	3103.104	20.022	0.649
1989	3368.646	3389.884	21.239	0.630
1990	3504.016	3541.838	37.822	1.079
1991	3212.208	3278.801	66.593	2.073
1992	3073.041	3164.424	91.383	2.974
1993	2965.108	3079.793	114.685	3.868
1994	2832.999	2943.754	110.755	3.909
1995	2670.729	2797.507	126.778	4.747
1996	2495.498	2645.219	149.721	6.000
1997	2466.660	2642.813	176.153	7.141
1998	2429.501	2627.811	198.309	8.163
1999	2386.054	2582.034	195.980	8.214
2000	2340.563	2522.091	181.528	7.756
2001	2305.297	2477.284	171.987	7.461
2002	2272.255	2440.485	168.230	7.404
2003	2241.884	2405.976	164.092	7.319
2004	2214.056	2374.290	160.234	7.237
2005	2188.653	2345.428	156.775	7.163
2006	2165.170	2318.731	153.561	7.092
2007	2143.362	2293.746	150.385	7.016
2008	2123.355	2270.713	147.357	6.940
2009	2105.716	2250.055	144.339	6.855
2010	2089.901	2231.283	141.383	6.765

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED
DECEMBER 1983

VARIABLE: DF.RSGF

TABLE B.10.   MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
REAL STATE GOVERNMENT GENERAL FUND EXPENDITURES

(millions of 1982 $)

	Base Case	Impact Case	Difference	Percent Difference
1983	3151.794	3153.928	2.134	0.068
1984	3339.376	3360.829	21.454	0.642
1985	3429.782	3463.687	33.905	0.989
1986	3509.848	3567.839	57.991	1.652
1987	3588.215	3668.338	80.123	2.233
1988	3083.077	3103.117	20.041	0.650
1989	3418.421	3497.377	78.956	2.310
1990	3440.720	3549.767	109.047	3.169
1991	3212.246	3278.809	66.563	2.072
1992	3072.955	3164.427	91.471	2.977
1993	2965.092	3079.826	114.733	3.869
1994	2832.968	2943.793	110.825	3.912
1995	2670.705	2797.515	126.810	4.748
1996	2495.470	2645.253	149.782	6.002
1997	2466.635	2642.820	176.185	7.143
1998	2429.473	2627.818	198.345	8.164
1999	2386.022	2582.037	196.015	8.215
2000	2340.532	2522.098	181.565	7.757
2001	2305.267	2477.290	172.023	7.462
2002	2272.227	2440.490	168.263	7.405
2003	2241.859	2405.982	164.123	7.321
2004	2214.034	2374.297	160.262	7.238
2005	2188.632	2345.422	156.790	7.164
2006	2165.149	2318.725	153.575	7.093
2007	2143.342	2293.740	150.398	7.017
2008	2123.389	2270.708	147.319	6.938
2009	2105.704	2250.049	144.346	6.855
2010	2089.890	2231.279	141.388	6.765

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED
DECEMBER 1983

VARIABLE: DF.EXGF

TABLE B.11. MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY

REAL PER CAPITA STATE GOVERNMENT
GENERAL FUND EXPENDITURES

(1982 $)

	Base Case	Impact Case	Difference	Percent Difference
1983	6640.86	6622.88	-17.98	-0.27
1984	6869.48	6862.72	-6.77	-0.10
1985	6890.02	6879.88	-10.14	-0.15
1986	6901.23	6884.46	-16.76	-0.24
1987	6942.74	6919.34	-23.41	-0.34
1988	5942.52	5823.59	-118.93	-2.00
1989	6529.79	6516.49	-13.29	-0.20
1990	6510.23	6492.52	-17.70	-0.27
1991	6017.29	5862.45	-154.84	-2.57
1992	5722.25	5578.16	-144.09	-2.52
1993	5509.79	5382.80	-126.99	-2.30
1994	5247.03	5110.46	-136.57	-2.60
1995	4929.18	4785.61	-143.57	-2.91
1996	4588.83	4485.51	-103.32	-2.25
1997	4513.32	4422.61	-90.71	-2.01
1998	4417.66	4358.19	-59.48	-1.35
1999	4307.75	4250.82	-56.94	-1.32
2000	4191.98	4120.40	-71.58	-1.71
2001	4094.34	4007.71	-86.62	-2.12
2002	3998.40	3906.71	-91.68	-2.29
2003	3905.27	3809.07	-96.20	-2.46
2004	3814.36	3714.52	-99.84	-2.62
2005	3726.00	3623.02	-102.97	-2.76
2006	3641.86	3536.38	-105.48	-2.90
2007	3560.86	3453.10	-107.76	-3.03
2008	3482.16	3371.75	-110.42	-3.17
2009	3405.87	3293.65	-112.22	-3.29
2010	3332.03	3218.02	-114.02	-3.42

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED
DECEMBER 1983

VARIABLE: DF.EXGFP

TABLE B.12. MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
REAL COMBINED FUNDS BALANCE

(millions of 1982 $)

	Base Case	Impact Case	Difference	Percent Difference
1983	5664.035	5667.816	3.781	0.067
1984	5650.934	5641.770	-9.164	-0.162
1985	5517.523	5486.320	-31.203	-0.566
1986	5321.121	5253.859	-67.262	-1.264
1987	5155.699	5035.883	-119.816	-2.324
1988	5368.359	5257.258	-111.102	-2.070
1989	5551.801	5388.922	-162.879	-2.934
1990	5348.922	5140.059	-208.863	-3.905
1991	5290.695	5105.984	-184.711	-3.491
1992	5221.055	5053.660	-167.395	-3.206
1993	5138.836	4986.473	-152.363	-2.965
1994	5044.250	4903.082	-141.168	-2.799
1995	4930.504	4807.910	-122.594	-2.486
1996	4806.043	4693.359	-112.684	-2.345
1997	4684.473	4584.418	-100.055	-2.136
1998	4566.336	4472.660	-93.676	-2.051
1999	4448.449	4360.164	-88.285	-1.985
2000	4330.242	4246.281	-83.961	-1.939
2001	4213.207	4134.719	-78.488	-1.863
2002	4097.523	4024.344	-73.179	-1.786
2003	3983.274	3915.120	-68.154	-1.711
2004	3870.621	3807.357	-63.263	-1.634
2005	3759.632	3701.200	-58.432	-1.554
2006	3650.360	3596.495	-53.865	-1.476
2007	3542.828	3493.288	-49.541	-1.398
2008	3437.202	3391.795	-45.407	-1.321
2009	3333.674	3292.120	-41.554	-1.246
2010	3232.271	3194.308	-37.963	-1.174

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED
DECEMBER 1983

VARIABLE: DF.BAL99

TABLE B.13.   MAP MODEL STATEWIDE IMPACT PROJECTIONS:
CUMULATIVE OCS IMPACTS STUDY
REAL PER CAPITA COMBINED FUNDS BALANCE

(1982 $)

	Base Case	Impact Case	Difference	Percent Difference
1983	11934.18	11901.75	-32.43	-0.27
1984	11624.63	11520.33	-104.30	-0.90
1985	11084.05	10897.42	-186.63	-1.68
1986	10462.64	10137.80	-324.84	-3.10
1987	9975.63	9498.84	-476.79	-4.78
1988	10347.32	9866.25	-481.07	-4.65
1989	10604.92	10040.92	-564.00	-5.32
1990	10120.76	9401.17	-719.59	-7.11
1991	9910.72	9129.41	-781.30	-7.88
1992	9722.29	8908.45	-813.84	-8.37
1993	9549.08	8715.17	-833.91	-8.73
1994	9342.62	8511.81	-830.81	-8.89
1995	9099.98	8224.72	-875.26	-9.62
1996	8837.66	7958.45	-879.22	-9.95
1997	8571.42	7671.76	-899.66	-10.50
1998	8303.26	7417.83	-885.43	-10.66
1999	8031.29	7178.16	-853.14	-10.62
2000	7755.63	6937.24	-818.39	-10.55
2001	7482.99	6689.07	-793.93	-10.61
2002	7210.34	6442.13	-768.20	-10.65
2003	6938.77	6198.28	-740.49	-10.67
2004	6668.33	5956.50	-711.84	-10.67
2005	6400.52	5717.32	-683.20	-10.67
2006	6140.03	5485.16	-654.87	-10.67
2007	5885.90	5258.95	-626.95	-10.65
2008	5636.70	5036.44	-600.26	-10.65
2009	5392.05	4819.05	-573.00	-10.63
2010	5153.39	4606.92	-546.47	-10.60

SOURCE: MAP   MODEL   SIMULATIONS   SBOCS.39   AND   SIOCS.39--CREATED
DECEMBER 1983

VARIABLE: DF.BAL9P

APPENDIX C.   REGIONAL BASE CASE AND IMPACT PROJECTIONS

Appendix C contains additional information relating to projections using the MAP regional model. In order to run the regional model to project employment and population for any one region of Alaska, one must supply the model with exogenous employment assumptions for all twenty regions included in the model. Table C.1 presents our base case exogenous employment assumptions by region. The totals by region are added directly from the individual industry and special project assumptions by region, discussed in Appendix D.

Exogenous employment assumptions for the impact case projection are identical to those of the base case, but adding the OCS development scenario. The regional OCS employment assumptions, supplied by the Alaska OCS office, are shown in Table C.2.

Tables C.3 and C.4 summarize the regional projections for Anchorage in the base case and the impact case. Tables C.5, C.6, and C.7 present the absolute and percent difference between the two projections for the three main types of employment. Note that since all the effects on Anchorage are indirect (no difference in exogenous employment between the base case and impact case), the impact on the basic sector occurs on elements considered endogenous; that is, these are industries such as manufacturing, supplying markets within the state of Alaska, but not necessarily within Anchorage.

Tables C.8 and C.9 summarize the base case and impact projections for the Southcentral Region. We define this region to include the Kenai Peninsula and Matanuska-Susitna Boroughs (including the Seward census division) as well as Anchorage. Tables C.10, C.11, and C.12 show the absolute and percent difference between the two projections for the three main types of employment in the Southcentral Region.

TABLE C.1. REGIONAL MODEL EXOGENOUS EMPLOYMENT ASSUMPTIONS BASE CASE FOR CUMULATIVE OCS IMPACTS STUDY

(thousands)

	Aleutian Islands	Anchorage	Barrow/ North Slope	Bethel	Bristol Bay
1981	3.060	4.731	3.969	0.449	1.832
1982	2.583	5.001	4.409	0.351	1.702
1983	2.667	5.399	4.609	0.354	1.736
1984	2.687	5.765	4.609	0.354	1.736
1985	2.711	6.038	4.609	0.354	1.736
1986	2.736	6.208	4.609	0.354	1.736
1987	2.762	6.217	4.609	0.354	1.736
1988	2.781	6.226	4.609	0.354	1.736
1989	2.816	6.236	5.109	0.354	1.736
1990	2.836	6.246	5.609	0.354	1.736
1991	2.862	6.256	6.609	0.354	1.736
1992	2.896	6.267	6.609	0.354	1.736
1993	2.941	6.278	5.609	0.354	1.736
1994	3.001	6.289	5.109	0.354	1.736
1995	3.079	6.301	4.609	0.354	1.736
1996	3.182	6.314	4.609	0.354	1.736
1997	3.319	6.326	4.609	0.354	1.736
1998	3.500	6.339	4.609	0.354	1.736
1999	3.741	6.353	4.609	0.354	1.736
2000	3.999	6.367	4.609	0.354	1.736
2001	3.999	6.382	4.609	0.354	1.736
2002	3.999	6.397	4.609	0.354	1.736
2003	3.999	6.413	4.609	0.354	1.736
2004	3.999	6.429	4.609	0.354	1.736
2005	3.999	6.446	4.609	0.354	1.736
2006	3.999	6.464	4.609	0.354	1.736
2007	3.999	6.482	4.609	0.354	1.736
2008	3.999	6.501	4.609	0.354	1.736
2009	3.999	6.521	4.609	0.354	1.736
2010	3.999	6.541	4.609	0.354	1.736

SOURCE: SCENARIO CBOCS.83--CREATED DECEMBER 1983

VARIABLES: B01, B02, B04, B05, AND B06

TABLE C.1. (continued)

	Cordova/ McCarthy	Fairbanks	Southeast Alaska	Kenai/ Cook Inlet	Kobuk
1981	0.611	0.385	6.716	2.461	0.296
1982	0.497	0.380	6.634	2.471	0.233
1983	0.509	0.390	7.000	2.492	0.235
1984	0.509	0.398	7.137	2.473	0.345
1985	0.593	0.408	7.425	2.583	0.381
1986	0.699	0.418	8.196	2.657	0.436
1987	0.791	0.429	8.773	2.684	0.381
1988	0.777	0.442	8.263	2.846	0.658
1989	0.739	0.456	8.534	3.259	0.658
1990	0.739	0.469	8.541	3.394	0.658
1991	0.739	0.485	8.678	3.478	0.658
1992	0.739	0.502	8.913	3.412	0.658
1993	0.739	0.522	8.769	2.886	0.658
1994	0.739	0.542	8.760	2.671	0.658
1995	0.739	0.564	8.751	2.817	0.658
1996	0.739	0.589	8.743	2.804	0.658
1997	0.739	0.616	8.419	2.790	0.658
1998	0.739	0.645	8.411	2.776	0.658
1999	0.739	0.677	8.402	2.764	0.658
2000	0.716	0.713	8.394	2.751	0.658
2001	0.670	0.732	8.386	2.740	0.658
2002	0.647	0.753	8.377	2.728	0.658
2003	0.624	0.774	8.369	2.717	0.658
2004	0.601	0.797	8.401	2.705	0.658
2005	0.578	0.821	8.393	2.695	0.658
2006	0.509	0.845	8.385	2.684	0.658
2007	0.509	0.871	8.378	2.674	0.658
2008	0.509	0.898	8.370	2.663	0.658
2009	0.509	0.926	8.362	2.654	0.658
2010	0.509	0.955	8.355	2.644	0.658

SOURCE: SCENARIO CBOCS.83--CREATED DECEMBER 1983

VARIABLES: B08, B09, B11, B12, AND B14

TABLE C.1. (continued)

	Kodiak	Kuskokwim	Matanuska/ Susitna	Nome	Seward
1981	2.629	0.171	0.272	0.188	0.489
1982	2.456	0.045	0.244	0.129	0.502
1983	2.768	0.045	0.298	0.131	0.515
1984	2.613	0.045	0.323	0.132	0.515
1985	2.537	0.045	0.250	0.133	0.515
1986	2.557	0.046	0.253	0.134	0.515
1987	2.581	0.046	0.255	0.135	0.515
1988	2.603	0.046	0.257	0.136	0.515
1989	2.628	0.046	0.259	0.137	0.517
1990	2.636	0.046	0.261	0.139	0.517
1991	2.642	0.046	0.264	0.140	0.517
1992	2.650	0.046	0.266	0.141	0.517
1993	2.660	0.046	0.269	0.142	0.517
1994	2.674	0.046	0.271	0.143	0.517
1995	2.693	0.046	0.274	0.145	0.517
1996	2.717	0.047	0.276	0.146	0.517
1997	2.749	0.047	0.278	0.147	0.517
1998	2.791	0.047	0.281	0.148	0.517
1999	2.848	0.047	0.283	0.150	0.518
2000	2.908	0.047	0.286	0.151	0.518
2001	2.908	0.047	0.289	0.152	0.518
2002	2.908	0.047	0.291	0.154	0.518
2003	2.909	0.047	0.294	0.155	0.518
2004	2.909	0.047	0.296	0.156	0.518
2005	2.909	0.048	0.299	0.158	0.518
2006	2.859	0.048	0.302	0.159	0.518
2007	2.680	0.048	0.304	0.160	0.519
2008	2.680	0.048	0.308	0.162	0.519
2009	2.680	0.048	0.310	0.163	0.519
2010	2.682	0.048	0.312	0.165	0.519

SOURCE: SCENARIO CBOCS.83--CREATED DECEMBER 1983

VARIABLES: B15, B16, B17, B18, AND B21

TABLE C.1. (continued)

	Southeast Fairbanks	Upper Yukon	Valdez/ Chitina/ Whittier	Wade Hampton	Yukon/ Koyukuk
1981	0.027	0.038	0.318	0.441	0.272
1982	0.027	0.025	0.390	0.348	0.186
1983	0.027	0.025	0.301	0.351	0.201
1984	0.027	0.026	0.301	0.351	0.233
1985	0.027	0.026	0.301	0.351	0.189
1986	0.027	0.026	0.301	0.351	0.190
1987	0.027	0.026	0.301	0.351	0.191
1988	0.027	0.027	0.301	0.351	0.192
1989	0.027	0.027	0.301	0.351	0.194
1990	0.027	0.027	0.301	0.351	0.195
1991	0.027	0.027	0.301	0.351	0.196
1992	0.027	0.028	0.301	0.351	0.197
1993	0.027	0.028	0.301	0.351	0.198
1994	0.027	0.028	0.301	0.351	0.199
1995	0.027	0.028	0.301	0.351	0.200
1996	0.027	0.029	0.301	0.351	0.202
1997	0.027	0.029	0.301	0.351	0.203
1998	0.027	0.029	0.301	0.351	0.204
1999	0.027	0.030	0.301	0.351	0.205
2000	0.027	0.030	0.301	0.351	0.206
2001	0.027	0.030	0.301	0.351	0.208
2002	0.027	0.031	0.301	0.351	0.209
2003	0.027	0.031	0.301	0.351	0.210
2004	0.027	0.031	0.301	0.351	0.211
2005	0.027	0.031	0.301	0.351	0.213
2006	0.027	0.032	0.301	0.351	0.214
2007	0.027	0.032	0.301	0.351	0.215
2008	0.027	0.032	0.301	0.351	0.217
2009	0.027	0.033	0.301	0.351	0.218
2010	0.027	0.033	0.301	0.351	0.219

SOURCE: SCENARIO CBOCS.83--CREATED DECEMBER 1983

VARIABLES: B24, B25, B26, B27, AND B29

TABLE C.2.   REGIONAL EMPLOYMENT ASSUMPTIONS
CUMULATIVE OCS IMPACTS CASE

(thousands of employees)

	Barrow/ North Slope	Nome
1980	0.000	0.000
1981	0.452	0.000
1982	1.101	0.000
1983	1.107	0.000
1984	1.611	0.000
1985	2.219	0.012
1986	3.863	0.229
1987	4.031	0.603
1988	3.380	0.289
1989	1.726	0.373
1990	5.145	0.699
1991	9.242	0.629
1992	8.941	1.391
1993	6.832	3.228
1994	6.587	2.711
1995	7.120	5.305
1996	7.534	3.930
1997	8.795	3.818
1998	8.133	2.638
1999	6.220	2.748
2000	5.485	2.329
2001	5.717	2.247
2002	5.735	2.267
2003	5.745	2.297
2004	5.764	2.297
2005	5.784	2.297
2006	5.794	2.297
2007	5.804	2.297
2008	5.804	2.297
2009	5.804	2.297
2010	5.804	2.297

SOURCE: MAP MODEL CASE OCS.CM3

VARIABLES: B04 B18

TABLE C.3. MAP REGIONAL MODEL PROJECTIONS
BASE CASE FOR CUMULATIVE OCS IMPACTS STUDY
ANCHORAGE

(thousands)

	Total Population	Total Employment	Basic Sector Employment	Support Sector Employment	Government Sector Employment
1983	211.749	116.750	23.887	59.001	33.862
1984	215.997	118.945	24.320	59.994	34.630
1985	221.220	122.774	26.031	61.590	35.153
1986	225.140	125.511	27.434	62.597	35.480
1987	228.401	127.146	28.799	62.840	35.507
1988	228.725	125.450	28.390	62.108	34.951
1989	229.350	125.187	28.751	61.460	34.976
1990	231.708	125.885	29.447	61.772	34.665
1991	233.674	126.283	29.216	62.468	34.599
1992	234.363	125.750	28.254	62.954	34.542
1993	235.687	125.417	27.732	63.438	34.248
1994	236.877	125.514	27.671	63.903	33.940
1995	237.566	125.534	27.594	64.391	33.549
1996	238.755	125.715	27.526	65.059	33.130
1997	240.326	126.562	27.629	65.903	33.030
1998	242.121	127.715	27.888	66.983	32.844
1999	244.221	129.049	28.162	68.247	32.640
2000	246.586	130.581	28.460	69.659	32.462
2001	249.160	132.233	28.773	71.125	32.335
2002	251.976	134.054	29.118	72.697	32.239
2003	255.031	136.013	29.487	74.356	32.171
2004	258.325	138.114	29.887	76.098	32.129
2005	261.921	140.352	30.308	77.932	32.113
2006	265.819	142.594	30.732	79.863	31.998
2007	269.949	144.855	31.164	81.852	31.840
2008	274.231	147.241	31.627	83.922	31.693
2009	278.813	149.732	32.107	86.070	31.555
2010	283.636	152.354	32.609	88.311	31.433

SOURCE: REGIONAL MODEL SIMULATION CBOCS.39--CREATED JANUARY 1984

VARIABLES: P.02, M.02, B.02, S.02, AND G.02

TABLE C.4. MAP REGIONAL MODEL PROJECTIONS
IMPACT CASE FOR CUMULATIVE OCS IMPACTS STUDY
ANCHORAGE

(thousands)

	Total Population	Total Employment	Basic Sector Employment	Support Sector Employment	Government Sector Employment
1983	212.809	117.449	24.023	59.557	33.869
1984	218.131	120.190	24.622	60.891	34.677
1985	224.423	124.566	26.487	62.839	35.240
1986	230.068	128.455	28.157	64.654	35.644
1987	234.236	130.671	29.737	65.192	35.742
1988	235.581	128.788	29.196	64.487	35.105
1989	235.000	127.847	29.384	63.187	35.275
1990	239.690	130.245	30.467	64.735	35.043
1991	246.274	132.888	30.702	67.278	34.909
1992	247.518	132.953	29.872	68.140	34.941
1993	245.972	132.750	29.419	68.546	34.786
1994	249.172	133.314	29.425	69.312	34.578
1995	247.094	134.174	29.643	70.212	34.319
1996	253.029	135.625	29.686	71.932	34.006
1997	257.651	138.075	29.990	74.052	34.033
1998	262.992	139.867	30.285	75.615	33.966
1999	264.468	140.763	30.366	76.564	33.834
2000	267.705	142.080	30.520	77.888	33.672
2001	271.131	143.798	30.843	79.423	33.532
2002	274.528	145.661	31.199	81.053	33.408
2003	278.101	147.689	31.587	82.797	33.305
2004	281.999	149.964	32.016	84.705	33.243
2005	286.242	152.494	32.482	86.788	33.224
2006	290.776	155.062	32.955	88.999	33.108
2007	295.551	157.683	33.440	91.297	32.946
2008	300.548	160.458	33.961	93.697	32.800
2009	305.810	163.389	34.506	96.215	32.668
2010	311.337	166.474	35.078	98.841	32.555

SOURCE: REGIONAL MODEL SIMULATION CIOCS.39--CREATED JANUARY 1984

VARIABLES: P.02, M.02, B.02, S.02, AND G.02

TABLE C.5. MAP REGIONAL MODEL PROJECTIONS
CUMULATIVE OCS IMPACTS
ANCHORAGE
BASIC SECTOR EMPLOYMENT

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	23.887	24.023	0.136	0.570
1984	24.320	24.622	0.302	1.241
1985	26.031	26.487	0.456	1.753
1986	27.434	28.157	0.723	2.634
1987	28.799	29.737	0.938	3.257
1988	28.390	29.196	0.805	2.836
1989	28.751	29.384	0.633	2.202
1990	29.447	30.467	1.020	3.464
1991	29.216	30.702	1.486	5.086
1992	28.254	29.872	1.618	5.726
1993	27.732	29.419	1.687	6.083
1994	27.671	29.425	1.754	6.338
1995	27.594	29.643	2.049	7.426
1996	27.526	29.686	2.160	7.848
1997	27.629	29.990	2.361	8.546
1998	27.888	30.285	2.397	8.597
1999	28.162	30.366	2.203	7.824
2000	28.460	30.520	2.060	7.238
2001	28.773	30.843	2.070	7.193
2002	29.118	31.199	2.081	7.147
2003	29.487	31.587	2.100	7.122
2004	29.887	32.016	2.129	7.124
2005	30.308	32.482	2.174	7.172
2006	30.732	32.955	2.222	7.231
2007	31.164	33.440	2.276	7.304
2008	31.627	33.961	2.334	7.379
2009	32.107	34.506	2.399	7.473
2010	32.609	35.078	2.469	7.570

SOURCE: REGIONAL MODEL SIMULATIONS CBOCS.39 AND CIOCS.39--CREATED DECEMBER 1983

VARIABLE: B.02

TABLE C.6.   MAP REGIONAL MODEL PROJECTIONS
CUMULATIVE OCS IMPACTS
ANCHORAGE
SUPPORT SECTOR EMPLOYMENT (000)

	Base Case	Impact Case	Difference	Percent Difference
1983	59.001	59.557	0.556	0.943
1984	59.994	60.891	0.897	1.495
1985	61.590	62.839	1.249	2.029
1986	62.597	64.654	2.058	3.287
1987	62.840	65.192	2.352	3.743
1988	62.108	64.487	2.379	3.830
1989	61.460	63.187	1.727	2.811
1990	61.772	64.735	2.963	4.796
1991	62.468	67.278	4.810	7.699
1992	62.954	68.140	5.186	8.238
1993	63.438	68.546	5.108	8.052
1994	63.903	69.312	5.409	8.465
1995	64.391	70.212	5.821	9.040
1996	65.059	71.932	6.873	10.565
1997	65.903	74.052	8.149	12.365
1998	66.983	75.615	8.632	12.887
1999	68.247	76.564	8.317	12.186
2000	69.659	77.888	8.229	11.813
2001	71.125	79.423	8.298	11.667
2002	72.697	81.053	8.356	11.495
2003	74.356	82.797	8.441	11.353
2004	76.098	84.705	8.607	11.310
2005	77.932	86.788	8.856	11.364
2006	79.863	88.999	9.135	11.439
2007	81.852	91.297	9.445	11.540
2008	83.922	93.697	9.775	11.648
2009	86.070	96.215	10.145	11.786
2010	88.311	98.841	10.530	11.923

SOURCE: REGIONAL MODEL SIMULATIONS CBOCS.39 AND CIOCS.39--CREATED
DECEMBER 1983

VARIABLE: S.02

TABLE C.7. MAP REGIONAL MODEL PROJECTIONS
CUMULATIVE OCS IMPACTS
ANCHORAGE
GOVERNMENT SECTOR EMPLOYMENT

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	33.862	33.869	0.007	0.021
1984	34.630	34.677	0.047	0.136
1985	35.153	35.240	0.087	0.247
1986	35.480	35.644	0.164	0.463
1987	35.507	35.742	0.236	0.664
1988	34.951	35.105	0.154	0.440
1989	34.976	35.275	0.300	0.857
1990	34.665	35.043	0.377	1.088
1991	34.599	34.909	0.310	0.896
1992	34.542	34.941	0.399	1.154
1993	34.248	34.786	0.538	1.571
1994	33.940	34.578	0.637	1.878
1995	33.549	34.319	0.770	2.295
1996	33.130	34.006	0.876	2.645
1997	33.030	34.033	1.003	3.036
1998	32.844	33.966	1.122	3.418
1999	32.640	33.834	1.194	3.657
2000	32.462	33.672	1.210	3.729
2001	32.335	33.532	1.198	3.704
2002	32.239	33.408	1.169	3.627
2003	32.171	33.305	1.134	3.525
2004	32.129	33.243	1.114	3.467
2005	32.113	33.224	1.112	3.462
2006	31.998	33.108	1.110	3.469
2007	31.840	32.946	1.106	3.475
2008	31.693	32.800	1.107	3.494
2009	31.555	32.668	1.113	3.528
2010	31.433	32.555	1.122	3.569

SOURCE: REGIONAL MODEL SIMULATIONS CBOCS.39 AND CIOCS.39--CREATED
DECEMBER 1983

VARIABLE: G.02

TABLE C.8. MAP REGIONAL MODEL PROJECTIONS
BASE CASE FOR CUMULATIVE OCS IMPACTS STUDY
SOUTHCENTRAL REGION

(thousands)

	Total Population	Total Employment	Basic Sector Employment	Support Sector Employment	Government Sector Employment
1983	266.039	132.428	30.399	64.871	37.158
1984	271.624	135.000	30.873	66.002	38.125
1985	278.268	139.407	32.824	67.790	38.793
1986	283.529	142.649	34.481	68.948	39.220
1987	287.812	144.579	36.058	69.241	39.280
1988	288.968	142.942	35.773	68.539	38.630
1989	291.690	143.356	36.613	68.057	38.686
1990	295.218	144.340	37.549	68.458	38.333
1991	298.201	144.927	37.408	69.242	38.277
1992	299.026	144.290	36.295	69.763	38.232
1993	298.590	143.156	35.204	70.055	37.897
1994	299.197	142.960	34.944	70.471	37.545
1995	300.665	143.244	35.029	71.125	37.090
1996	302.051	143.415	34.964	71.850	36.600
1997	304.023	144.377	35.092	72.785	36.500
1998	306.188	145.659	35.399	73.966	36.294
1999	308.699	147.133	35.725	75.342	36.066
2000	311.526	148.826	36.076	76.882	35.868
2001	314.673	150.681	36.447	78.502	35.731
2002	318.112	152.724	36.853	80.238	35.633
2003	321.861	154.928	37.289	82.072	35.568
2004	325.900	157.290	37.758	83.997	35.535
2005	330.325	159.808	38.253	86.024	35.532
2006	335.084	162.318	38.751	88.157	35.409
2007	340.116	164.844	39.259	90.354	35.232
2008	345.313	167.502	39.802	92.632	35.068
2009	350.878	170.276	40.365	94.997	34.914
2010	356.736	173.196	40.953	97.462	34.781

SOURCE: REGIONAL MODEL SIMULATION CBOCS.39--CREATED JANUARY 1984

VARIABLES: P.AG, M.AG, B.AG, S.AG, AND G.AG

TABLE C.9. MAP REGIONAL MODEL PROJECTIONS
IMPACT CASE FOR CUMULATIVE OCS IMPACTS STUDY
SOUTHCENTRAL REGION

(thousands)

	Total Population	Total Employment	Basic Sector Employment	Support Sector Employment	Government Sector Employment
1983	267.342	133.147	30.556	65.424	37.167
1984	274.263	136.304	31.218	66.904	38.182
1985	282.242	141.294	33.346	69.050	38.899
1986	289.662	145.746	35.309	71.017	39.420
1987	295.084	148.328	37.131	71.630	39.568
1988	297.458	146.495	36.695	70.983	38.817
1989	298.757	146.267	37.338	69.878	39.051
1990	305.172	148.985	38.722	71.469	38.793
1991	313.815	151.851	39.119	74.076	38.655
1992	315.306	151.901	38.161	75.022	38.718
1993	311.303	151.039	37.152	75.334	38.553
1994	314.458	151.382	36.968	76.092	38.323
1995	312.442	152.607	37.401	77.177	38.029
1996	319.709	154.159	37.462	79.027	37.669
1997	325.431	156.839	37.824	81.291	37.724
1998	332.014	158.864	38.169	83.032	37.663
1999	333.774	159.962	38.274	84.166	37.522
2000	337.698	161.450	38.461	85.645	37.345
2001	341.901	163.360	38.844	87.323	37.193
2002	346.045	165.439	39.263	89.115	37.060
2003	350.413	167.708	39.721	91.034	36.952
2004	355.173	170.252	40.224	93.133	36.895
2005	360.370	173.087	40.771	95.427	36.889
2006	365.880	175.949	41.327	97.858	36.764
2007	371.669	178.865	41.897	100.387	36.582
2008	377.710	181.945	42.507	103.019	36.419
2009	384.074	185.200	43.146	105.781	36.273
2010	390.758	188.625	43.815	108.661	36.150

SOURCE: REGIONAL MODEL SIMULATION CIOCS.39--CREATED JANUARY 1984

VARIABLES: P.AG, M.AG, B.AG, S.AG, AND G.AG

TABLE C.10.   MAP REGIONAL MODEL PROJECTIONS
CUMULATIVE OCS IMPACTS
SOUTHCENTRAL REGION
BASIC SECTOR EMPLOYMENT

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	30.399	30.556	0.157	0.517
1984	30.873	31.218	0.345	1.118
1985	32.824	33.346	0.521	1.589
1986	34.481	35.309	0.828	2.402
1987	36.058	37.131	1.073	2.976
1988	35.773	36.695	0.921	2.575
1989	36.613	37.338	0.725	1.979
1990	37.549	38.722	1.173	3.124
1991	37.408	39.119	1.711	4.575
1992	36.295	38.161	1.866	5.141
1993	35.204	37.152	1.948	5.533
1994	34.944	36.968	2.024	5.791
1995	35.029	37.401	2.372	6.771
1996	34.964	37.462	2.498	7.144
1997	35.092	37.824	2.732	7.784
1998	35.399	38.169	2.770	7.824
1999	35.725	38.274	2.549	7.135
2000	36.076	38.461	2.384	6.609
2001	36.447	38.844	2.396	6.575
2002	36.853	39.263	2.410	6.540
2003	37.289	39.721	2.432	6.523
2004	37.758	40.224	2.467	6.533
2005	38.253	40.771	2.518	6.583
2006	38.751	41.327	2.575	6.646
2007	39.259	41.897	2.638	6.719
2008	39.802	42.507	2.705	6.796
2009	40.365	43.146	2.781	6.890
2010	40.953	43.815	2.862	6.988

SOURCE: REGIONAL   MODEL   SIMULATIONS   CBOCS.39   AND   CIOCS.39--CREATED
DECEMBER 1983

VARIABLE: B.AG

TABLE C.11. MAP REGIONAL MODEL PROJECTIONS
CUMULATIVE OCS IMPACTS
SOUTHCENTRAL REGION
SUPPORT SECTOR EMPLOYMENT

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	64.871	65.424	0.553	0.853
1984	66.002	66.904	0.902	1.366
1985	67.790	69.050	1.260	1.859
1986	68.948	71.017	2.069	3.000
1987	69.241	71.630	2.389	3.450
1988	68.539	70.983	2.444	3.566
1989	68.057	69.878	1.821	2.676
1990	68.458	71.469	3.011	4.399
1991	69.242	74.076	4.834	6.982
1992	69.763	75.022	5.259	7.538
1993	70.055	75.334	5.279	7.536
1994	70.471	76.092	5.621	7.976
1995	71.125	77.177	6.051	8.508
1996	71.850	79.027	7.177	9.989
1997	72.785	81.291	8.506	11.687
1998	73.966	83.032	9.066	12.258
1999	75.342	84.166	8.824	11.711
2000	76.882	85.645	8.763	11.398
2001	78.502	87.323	8.821	11.236
2002	80.238	89.115	8.877	11.064
2003	82.072	91.034	8.963	10.921
2004	83.997	93.133	9.137	10.877
2005	86.024	95.427	9.403	10.931
2006	88.157	97.858	9.701	11.004
2007	90.354	100.387	10.033	11.104
2008	92.632	103.019	10.387	11.213
2009	94.997	105.781	10.785	11.353
2010	97.462	108.661	11.199	11.491

SOURCE: REGIONAL MODEL SIMULATIONS CBOCS.39 AND CIOCS.39--CREATED
DECEMBER 1983

VARIABLE: S.AG

TABLE C.12. MAP REGIONAL MODEL PROJECTIONS
CUMULATIVE OCS IMPACTS
SOUTHCENTRAL REGION
GOVERNMENT SECTOR EMPLOYMENT

(thousands)

	Base Case	Impact Case	Difference	Percent Difference
1983	37.158	37.167	0.009	0.023
1984	38.125	38.182	0.057	0.151
1985	38.793	38.899	0.106	0.274
1986	39.220	39.420	0.200	0.511
1987	39.280	39.568	0.288	0.732
1988	38.630	38.817	0.188	0.486
1989	38.686	39.051	0.366	0.945
1990	38.333	38.793	0.460	1.201
1991	38.277	38.655	0.378	0.988
1992	38.232	38.718	0.486	1.272
1993	37.897	38.553	0.656	1.732
1994	37.545	38.323	0.778	2.072
1995	37.090	38.029	0.939	2.533
1996	36.600	37.669	1.069	2.922
1997	36.500	37.724	1.224	3.353
1998	36.294	37.663	1.370	3.774
1999	36.066	37.522	1.457	4.039
2000	35.868	37.345	1.477	4.118
2001	35.731	37.193	1.462	4.091
2002	35.633	37.060	1.427	4.005
2003	35.568	36.952	1.384	3.891
2004	35.535	36.895	1.359	3.825
2005	35.532	36.889	1.357	3.819
2006	35.409	36.764	1.355	3.825
2007	35.232	36.582	1.350	3.832
2008	35.068	36.419	1.351	3.854
2009	34.914	36.273	1.359	3.891
2010	34.781	36.150	1.369	3.936

SOURCE: REGIONAL MODEL SIMULATIONS CBOCS.39 AND CIOCS.39--CREATED
DECEMBER 1983

VARIABLE: G.AG

APPENDIX D. BASE CASE EMPLOYMENT ASSUMPTIONS BY REGION

1. Trans-Alaska Oil Pipeline

Trans-Alaska Pipeline Service (TAPS) employment through 1977 included only the exogenous construction employment engaged in the initial construction of the pipeline. After completion in 1977, employment has been of two types. First, there has been additional construction of four pump stations (see Oil and Gas Journal, 2/25/80, p. 72), and second, there is exogenous transportation sector employment associated with operation of the line. This is projected to be constant through 2010.

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

Operations employment from staff, Alyeska Pipeline Service Company, November 1983.

TABLE D.1. TRANS-ALASKA PIPELINE

(thousands of employees)

		Regions		
	Anchorage	Barrow/ North Slope	Fairbanks	Southeast Fairbanks
1980	0.600	0.109	0.118	0.027
1981	0.600	0.109	0.028	0.027
1982	0.600	0.109	0.028	0.027
1983	0.600	0.109	0.028	0.027
1984	0.600	0.109	0.028	0.027
1985	0.600	0.109	0.028	0.027
1986	0.600	0.109	0.028	0.027
1987	0.600	0.109	0.028	0.027
1988	0.600	0.109	0.028	0.027
1989	0.600	0.109	0.028	0.027
1990	0.600	0.109	0.028	0.027
1991	0.600	0.109	0.028	0.027
1992	0.600	0.109	0.028	0.027
1993	0.600	0.109	0.028	0.027
1994	0.600	0.109	0.028	0.027
1995	0.600	0.109	0.028	0.027
1996	0.600	0.109	0.028	0.027
1997	0.600	0.109	0.028	0.027
1998	0.600	0.109	0.028	0.027
1999	0.600	0.109	0.028	0.027
2000	0.600	0.109	0.028	0.027
2001	0.600	0.109	0.028	0.027
2002	0.600	0.109	0.028	0.027
2003	0.600	0.109	0.028	0.027
2004	0.600	0.109	0.028	0.027
2005	0.600	0.109	0.028	0.027
2006	0.600	0.109	0.028	0.027
2007	0.600	0.109	0.028	0.027
2008	0.600	0.109	0.028	0.027
2009	0.600	0.109	0.028	0.027
2010	0.600	0.109	0.028	0.027

SOURCE: MAP MODEL CASE TAP.F83

VARIABLES: B02 B04 B09 B24

TABLE D.1 (Continued)

| | Regions | | Alaska | |
	Valdez/ Chitina/ Whittier	Yukon/ Koyukuk	High-Wage Exogenous Construction Employment	Exogenous Transportation Employment
1980	0.254	0.082	0.090	1.100
1981	0.254	0.172	0.090	1.100
1982	0.344	0.082	0.090	1.100
1983	0.254	0.082	0.000	1.100
1984	0.254	0.082	0.000	1.100
1985	0.254	0.082	0.000	1.100
1986	0.254	0.082	0.000	1.100
1987	0.254	0.082	0.000	1.100
1988	0.254	0.082	0.000	1.100
1989	0.254	0.082	0.000	1.100
1990	0.254	0.082	0.000	1.100
1991	0.254	0.082	0.000	1.100
1992	0.254	0.082	0.000	1.100
1993	0.254	0.082	0.000	1.100
1994	0.254	0.082	0.000	1.100
1995	0.254	0.082	0.000	1.100
1996	0.254	0.082	0.000	1.100
1997	0.254	0.082	0.000	1.100
1998	0.254	0.082	0.000	1.100
1999	0.254	0.082	0.000	1.100
2000	0.254	0.082	0.000	1.100
2001	0.254	0.082	0.000	1.100
2002	0.254	0.082	0.000	1.100
2003	0.254	0.082	0.000	1.100
2004	0.254	0.082	0.000	1.100
2005	0.254	0.082	0.000	1.100
2006	0.254	0.082	0.000	1.100
2007	0.254	0.082	0.000	1.100
2008	0.254	0.082	0.000	1.100
2009	0.254	0.082	0.000	1.100
2010	0.254	0.082	0.000	1.100

SOURCE: MAP.MODEL CASE TAP.F83

VARIABLES: B26 B29 EMCNX1 EMT9X

2.   North Slope Petroleum Development

North Slope developments include employment associated with primary recovery operations from the Sadlerochit formation, secondary recovery (using waterflooding) of that formation, development of the Kuparuk formation west of Prudhoe Bay, the permanent work force of Atlantic Richfield Company (ARCO) and British Petroleum (BP) at the main Prudhoe base headquarters, and a variety of exploration and development efforts on state leases outside of the Sadlerochit and Kuparuk areas.   The key assumptions serving as the basis for the employment forecasts are the following:

- A total of nine rigs continue to drill approximately 50-55 wells at the Prudhoe Bay field and 50 wells at the Kuparuk field a year through 1985.

- The Prudhoe waterflood project is completed in 1984, adding 300 new permanent operating employees.

- Construction employment for additional recovery facilities at Kuparuk and Prudhoe as well as for developing production facilities at other North Slope oil fields under state lease maintains total construction employment at 1,000 through 2010.

SOURCE: U.S. Army Corps of Engineers, Final EIS, Prudhoe Bay Oilfield Waterflood Project, pp. 2-60; and personal communication, D. A. Casey, ARCO Oil and Gas Co.

TABLE D.2. NORTH SLOPE PETROLEUM PRODUCTION

(thousands of employees)

| | Region | Alaska | |
	Barrow/ North Slope	High-Wage Exogenous Construction Employment	Mining Employment
1980	2.762	0.000	2.762
1981	3.860	0.000	3.860
1982	4.300	0.601	3.699
1983	4.500	1.000	3.500
1984	4.500	1.000	3.500
1985	4.500	1.000	3.500
1986	4.500	1.000	3.500
1987	4.500	1.000	3.500
1988	4.500	1.000	3.500
1989	4.500	1.000	3.500
1990	4.500	1.000	3.500
1991	4.500	1.000	3.500
1992	4.500	1.000	3.500
1993	4.500	1.000	3.500
1994	4.500	1.000	3.500
1995	4.500	1.000	3.500
1996	4.500	1.000	3.500
1997	4.500	1.000	3.500
1998	4.500	1.000	3.500
1999	4.500	1.000	3.500
2000	4.500	1.000	3.500
2001	4.500	1.000	3.500
2002	4.500	1.000	3.500
2003	4.500	1.000	3.500
2004	4.500	1.000	3.500
2005	4.500	1.000	3.500
2006	4.500	1.000	3.500
2007	4.500	1.000	3.500
2008	4.500	1.000	3.500
2009	4.500	1.000	3.500
2010	4.500	1.000	3.500

SOURCE: MAP MODEL CASE NSO.F83

VARIABLES: B04 EMCNX1 EMP9

3. Upper Cook Inlet Petroleum Production

Petroleum sector employment in the Kenai-Cook Inlet census division was 791 in 1982 (four-quarter average employment from Alaska Department of Labor), consisting of exploration, development, and production associated with the Kenai oil and gas fields. Currently, the 120,000 barrels per day output of oil is expected to decline drastically over the forecast period, possibly as fast as 15-to-20 percent per year. The decline may be partially slowed, however, by a possible redrilling program being considered by the operators (see Oil and Gas Journal, 2/4/80, p. 36). We assume a gradual employment decline of 2.5 percent per year as oil wells are abandoned. Gas production is assumed to remain relatively stable at around 5,000 mmcf/day.

SOURCE: Oil and Gas Journal, 2/4/80; and personal communication, D. A. Casey, ARCO Oil and Gas Co.

TABLE D.3. UPPER COOK INLET
PETROLEUM PRODUCTION

(thousands of employees)

	Region	Alaska
	Kenai/ Cook Inlet	Mining Employment
1980	0.755	0.755
1981	0.781	0.781
1982	0.791	0.791
1983	0.771	0.771
1984	0.752	0.752
1985	0.733	0.733
1986	0.715	0.715
1987	0.697	0.697
1988	0.680	0.680
1989	0.663	0.663
1990	0.646	0.646
1991	0.630	0.630
1992	0.614	0.614
1993	0.599	0.599
1994	0.584	0.584
1995	0.569	0.569
1996	0.555	0.555
1997	0.541	0.541
1998	0.528	0.528
1999	0.514	0.514
2000	0.501	0.501
2001	0.489	0.489
2002	0.477	0.477
2003	0.465	0.465
2004	0.453	0.453
2005	0.442	0.442
2006	0.431	0.431
2007	0.420	0.420
2008	0.410	0.410
2009	0.399	0.399
2010	0.389	0.389

SOURCE: MAP MODEL CASE UPC.F83

VARIABLES: B12 EMP9

4. <u>Anchorage Oil Headquarters</u>

Opening of the new ARCO headquarter building will lead a trend established over the past several years as ARCO and other oil companies with extensive Alaska operations shift supervisory personnel to Anchorage from outside the state. We expect a permanent addition of 1,150 to mining employment in Anchorage by 1986 to continue to 2010.

SOURCE: Municipality of Anchorage, <u>Quarterly Economic Indicators</u>, Fourth Quarter 1981; and Alaska Department of Labor, <u>Alaska Economic Trends</u>, March 1983.

TABLE D.4. OIL INDUSTRY HEADQUARTERS

(thousands of employees)

| | Region | Alaska |
	Anchorage	Mining Employment
1980	2.507	2.507
1981	3.121	3.121
1982	3.436	3.436
1983	3.802	3.802
1984	4.160	4.160
1985	4.424	4.424
1986	4.586	4.586
1987	4.586	4.586
1988	4.586	4.586
1989	4.586	4.586
1990	4.586	4.586
1991	4.586	4.586
1992	4.586	4.586
1993	4.586	4.586
1994	4.586	4.586
1995	4.586	4.586
1996	4.586	4.586
1997	4.586	4.586
1998	4.586	4.586
1999	4.586	4.586
2000	4.586	4.586
2001	4.586	4.586
2002	4.586	4.586
2003	4.586	4.586
2004	4.586	4.586
2005	4.586	4.586
2006	4.586	4.586
2007	4.586	4.586
2008	4.586	4.586
2009	4.586	4.586
2010	4.586	4.586

SOURCE: MAP MODEL CASE OHQ.F83

VARIABLES: B02 EMP9

5. Tertiary Recovery of North Slope Oil

There is currently no firm plan for the disposition of North Slope natural gas, and recent studies have demonstrated the various problems faced by all the current proposals (for example, Booz, Allen and Hamilton, Inc., report to the State of Alaska, 1983; and "Use in Alaska of North Slope Natural Gas," Alaska Review of Social and Economic Conditions, April 1983). In light of the dim prospects for transport of the gas to market, an alternative use would be in tertiary recovery of North Slope oil. A pilot tertiary recovery project is currently underway at Prudhoe Bay involving the reinjection of natural gas liquids in a small portion of the field. Alternative tertiary recovery methods are technically feasible but have yet to be attempted in severe Arctic conditions. (See Options for North Slope Gas Utilization, Michael Economides and Russell Osterman, April 1982, for State of Alaska Division of Energy and Power Development.)

This case assumes tertiary recovery project for Pruhoe Bay oil. Since the dimensions of such a project have yet to be worked out, the case is generic in its employment assumptions. Employment is assumed to be on the same order of magnitude as the waterflooding project.

TABLE D.5. NORTH SLOPE ENHANCED OIL RECOVERY

(thousands of employees)

	Region	Alaska
	Barrow/ North Slope	Mining Employment
1980	0.000	0.000
1981	0.000	0.000
1982	0.000	0.000
1983	0.000	0.000
1984	0.000	0.000
1985	0.000	0.000
1986	0.000	0.000
1987	0.000	0.000
1988	0.000	0.000
1989	0.500	0.500
1990	1.000	1.000
1991	2.000	2.000
1992	2.000	2.000
1993	1.000	1.000
1994	0.500	0.500
1995	0.000	0.000
1996	0.000	0.000
1997	0.000	0.000
1998	0.000	0.000
1999	0.000	0.000
2000	0.000	0.000
2001	0.000	0.000
2002	0.000	0.000
2003	0.000	0.000
2004	0.000	0.000
2005	0.000	0.000
2006	0.000	0.000
2007	0.000	0.000
2008	0.000	0.000
2009	0.000	0.000
2010	0.000	0.000

SOURCE: MAP MODEL CASE NSO.TRC

VARIABLES: B04 EMP9

6. Beluga-Chuitna Coal Production

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

Some scenarios for development of coal resources in this area have discussed an 11-million-ton-per-year coal mine for export or use as input to a synthetic fuel production process becoming operational as early as 1986. We assume a more modest export program implemented on a slower timetable. Production begins in 1994 and eventually reaches 4.4 million tons per year. Construction begins in 1989, with peak employment of 400 in 1991. Operations employment is 524 distributed 80 percent in mining and 20 percent in transportation.

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

TABLE D.6. BELUGA CHUITNA COAL PRODUCTION

(thousands of employees)

| | Region | Alaska | | |
	Kenai/ Cook Inlet	Low-Wage Exogenous Construction Employment	Mining Employment	Exogenous Transportation Employment
1980	0.000	0.000	0.000	0.000
1981	0.000	0.000	0.000	0.000
1982	0.000	0.000	0.000	0.000
1983	0.000	0.000	0.000	0.000
1984	0.000	0.000	0.000	0.000
1985	0.000	0.000	0.000	0.000
1986	0.000	0.000	0.000	0.000
1987	0.000	0.000	0.000	0.000
1988	0.000	0.000	0.000	0.000
1989	0.150	0.150	0.000	0.000
1990	0.300	0.300	0.000	0.000
1991	0.400	0.400	0.000	0.000
1992	0.350	0.350	0.000	0.000
1993	0.200	0.200	0.000	0.000
1994	0.363	0.100	0.210	0.053
1995	0.524	0.000	0.419	0.105
1996	0.524	0.000	0.419	0.105
1997	0.524	0.000	0.419	0.105
1998	0.524	0.000	0.419	0.105
1999	0.524	0.000	0.419	0.105
2000	0.524	0.000	0.419	0.105
2001	0.524	0.000	0.419	0.105
2002	0.524	0.000	0.419	0.105
2003	0.524	0.000	0.419	0.105
2004	0.524	0.000	0.419	0.105
2005	0.524	0.000	0.419	0.105
2006	0.524	0.000	0.419	0.105
2007	0.524	0.000	0.419	0.105
2008	0.524	0.000	0.419	0.105
2009	0.524	0.000	0.419	0.105
2010	0.524	0.000	0.419	0.105

SOURCE: MAP MODEL CASE BCL.04T

VARIABLES: B12 EMCNX2 EMP9 EMT9X

7. U.S. Borax Mine near Ketchikan

The U.S. Borax molybdenum mine near Ketchikan is developed and brought into production by 1987. The world market for molybdenum remains somewhat soft, so the mine does not initially operate at full capacity. Beginning in 1987, 40,000 tons per day are mined, employing 700 miners and 90 support personnel through 2010.

SOURCE: Personal communication: Don Finney, U.S. Borax, Ketchikan.

TABLE D.7. U. S. BORAX MOLYBDENUM MINE

(thousands of employees)

| | Region | Alaska | |
	Southeast	Low-Wage Exogenous Construction Employment	Mining Employment
1980	0.000	0.000	0.000
1981	0.000	0.000	0.000
1982	0.000	0.000	0.000
1983	0.000	0.000	0.000
1984	0.000	0.000	0.000
1985	0.090	0.090	0.000
1986	0.630	0.565	0.065
1987	1.125	1.010	0.115
1988	0.555	0.435	0.120
1989	0.790	0.080	0.710
1990	0.760	0.000	0.760
1991	0.906	0.150	0.810
1992	1.150	0.300	0.850
1993	1.015	0.000	1.015
1994	1.015	0.000	1.015
1995	1.015	0.000	1.015
1996	1.015	0.000	1.015
1997	1.015	0.000	1.015
1998	1.015	0.000	1.015
1999	1.015	0.000	1.015
2000	1.015	0.000	1.015
2001	1.015	0.000	1.015
2002	1.015	0.000	1.015
2003	1.015	0.000	1.015
2004	1.055	0.000	1.055
2005	1.055	0.000	1.055
2006	1.055	0.000	1.055
2007	1.055	0.000	1.055
2008	1.055	0.000	1.055
2009	1.055	0.000	1.055
2010	1.055	0.000	1.055

SOURCE: MAP MODEL CASE BXM.F83

VARIABLES: B11 EMCNX2 EMP9

8. Greens Creek Mine

Production of the Greens Creek Mine on Admiralty Island begins by 1986. Mining employment averages 315 from 1986 through 1996 while construction employment in mine development peaks at 190 in 1985. This assumes an eleven-year life, for the mine and housing for miners in Juneau (Greens Creek Mine Draft EIS, pp. 4-102, 2-42).

SOURCE: Greens Creek Mine Draft EIS, U.S.D.A. Forest Service, August 1982, pp. 4-93.

TABLE D.8. GREENS CREEK MINE

(thousands of employees)

| | Region | Alaska | |
	Southeast	Low-Wage Exogenous Construction Employment	Mining Employment
1980	0.000	0.000	0.000
1981	0.000	0.000	0.000
1982	0.000	0.000	0.000
1983	0.015	0.015	0.000
1984	0.120	0.120	0.000
1985	0.190	0.190	0.000
1986	0.315	0.000	0.315
1987	0.315	0.000	0.315
1988	0.315	0.000	0.315
1989	0.315	0.000	0.315
1990	0.315	0.000	0.315
1991	0.315	0.000	0.315
1992	0.315	0.000	0.315
1993	0.315	0.000	0.315
1994	0.315	0.000	0.315
1995	0.315	0.000	0.315
1996	0.315	0.000	0.315
1997	0.000	0.000	0.000
1998	0.000	0.000	0.000
1999	0.000	0.000	0.000
2000	0.000	0.000	0.000
2001	0.000	0.000	0.000
2002	0.000	0.000	0.000
2003	0.000	0.000	0.000
2004	0.000	0.000	0.000
2005	0.000	0.000	0.000
2006	0.000	0.000	0.000
2007	0.000	0.000	0.000
2008	0.000	0.000	0.000
2009	0.000	0.000	0.000
2010	0.000	0.000	0.000

SOURCE: MAP MODEL CASE GCM.F83

VARIABLES: B11 EMCNX2 EMP9

9. Red Dog Mine

The Red Dog lead, zinc, and silver mine is expected to be developed jointly by NANA and COMINCO in the Western Brooks Range. We assume construction beginning in 1984, with average annual employment of 150-200 in the Kobuk census division. Full production by 1988 will employ approximately 450.

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SOURCE: Personal communication: Bradford Tuck.

TABLE D.9. RED DOG MINE

(thousands of employees)

	Region	Alaska	
	---	Low-Wage Exogenous Construction Employment	Mining Employment
	Kobuk		
1980	0.025	0.000	0.025
1981	0.025	0.000	0.025
1982	0.025	0.000	0.025
1983	0.025	0.000	0.025
1984	0.135	0.100	0.035
1985	0.171	0.150	0.021
1986	0.226	0.200	0.026
1987	0.171	0.150	0.021
1988	0.448	0.000	0.448
1989	0.448	0.000	0.448
1990	0.448	0.000	0.448
1991	0.448	0.000	0.448
1992	0.448	0.000	0.448
1993	0.448	0.000	0.448
1994	0.448	0.000	0.448
1995	0.448	0.000	0.448
1996	0.448	0.000	0.448
1997	0.448	0.000	0.448
1998	0.448	0.000	0.448
1999	0.448	0.000	0.448
2000	0.448	0.000	0.448
2001	0.448	0.000	0.448
2002	0.448	0.000	0.448
2003	0.448	0.000	0.448
2004	0.448	0.000	0.448
2005	0.448	0.000	0.448
2006	0.448	0.000	0.448
2007	0.448	0.000	0.448
2008	0.448	0.000	0.448
2009	0.448	0.000	0.448
2010	0.448	0.000	0.448

SOURCE: MAP MODEL CASE RED.PJH

VARIABLES: B14 EMCNX2 EMP9

10. Other Mining

In 1982, the latest year for which complete figures are available, 1,050 people were employed in mining in addition to work on the special projects discussed above. This employment consists of a broad combination of administrative personnel in Anchorage associated with minerals industries, a variety of petroleum and hard-rock mineral exploration activities located around the state, and ongoing hard-rock mining.

We assume that such employment increases at 1 percent annually through 2010, maintaining the current regional distribution of employment.

SOURCE: Alaska Department of Labor, Statistical Quarterly, and unpublished data.

TABLE D.10. OTHER MINING ACTIVITY

(thousands of employees)

	Regions			
	Anchorage	Fairbanks	Kuskokwim	Matanuska/ Susitna
1980	0.153	0.047	0.000	0.034
1981	0.177	0.274	0.006	0.098
1982	0.136	0.259	0.009	0.100
1983	0.137	0.262	0.009	0.101
1984	0.139	0.264	0.009	0.102
1985	0.140	0.267	0.009	0.103
1986	0.142	0.270	0.009	0.104
1987	0.143	0.272	0.009	0.105
1988	0.144	0.275	0.010	0.106
1989	0.146	0.278	0.010	0.107
1990	0.147	0.280	0.010	0.108
1991	0.149	0.283	0.010	0.109
1992	0.150	0.286	0.010	0.110
1993	0.152	0.289	0.010	0.112
1994	0.153	0.292	0.010	0.113
1995	0.155	0.295	0.010	0.114
1996	0.156	0.298	0.010	0.115
1997	0.158	0.301	0.010	0.116
1998	0.159	0.304	0.011	0.117
1999	0.161	0.307	0.011	0.118
2000	0.163	0.310	0.011	0.120
2001	0.164	0.313	0.011	0.121
2002	0.166	0.316	0.011	0.122
2003	0.168	0.319	0.011	0.123
2004	0.169	0.322	0.011	0.124
2005	0.171	0.326	0.011	0.126
2006	0.173	0.329	0.011	0.127
2007	0.174	0.332	0.012	0.128
2008	0.176	0.335	0.012	0.130
2009	0.178	0.339	0.012	0.131
2010	0.180	0.342	0.012	0.132

SOURCE: MAP MODEL CASE OMN.F83

VARIABLES: B02 B09 B16 B17

TABLE D.10 (Continued)

	Regions			Alaska
	Nome	Upper Yukon	Yukon/ Koyukuk	Mining Employment
1980	0.000	0.000	0.000	0.234
1981	0.129	0.038	0.100	0.822
1982	0.109	0.025	0.104	0.742
1983	0.110	0.025	0.105	0.749
1984	0.111	0.026	0.106	0.757
1985	0.112	0.026	0.107	0.764
1986	0.113	0.026	0.108	0.772
1987	0.115	0.026	0.109	0.780
1988	0.116	0.027	0.110	0.788
1989	0.117	0.027	0.112	0.796
1990	0.118	0.027	0.113	0.803
1991	0.119	0.027	0.114	0.812
1992	0.120	0.028	0.115	0.820
1993	0.122	0.028	0.116	0.828
1994	0.123	0.028	0.117	0.836
1995	0.124	0.028	0.118	0.844
1996	0.125	0.029	0.120	0.853
1997	0.127	0.029	0.121	0.861
1998	0.128	0.029	0.122	0.870
1999	0.129	0.030	0.123	0.879
2000	0.130	0.030	0.124	0.888
2001	0.132	0.030	0.126	0.896
2002	0.133	0.031	0.127	0.905
2003	0.134	0.031	0.128	0.914
2004	0.136	0.031	0.129	0.924
2005	0.137	0.031	0.131	0.933
2006	0.138	0.032	0.132	0.942
2007	0.140	0.032	0.133	0.952
2008	0.141	0.032	0.135	0.961
2009	0.143	0.033	0.136	0.971
2010	0.144	0.033	0.137	0.980

SOURCE: MAP MODEL CASE OMN.F83

VARIABLES: B18 B25 B29 EMP9

11. Agriculture

Agriculture experiences moderate growth. In light of declining state revenues, state support of agriculture declines. Development is limited to the Delta region in the Tanana Valley, with marginal development taking place in the Nenana area. Growth in the Matanuska Valley is minimal, and Point MacKenzie development in dairy farming will also be minimal. Dairy price supports, politically vulnerable, will be reduced, making long-run competition for Alaska dairy products very difficult. No growth takes place in the Susitna Valley.

Eighty thousand acres of the Delta projects as well as half of the average of the Nenana projects (87,500 acres) are assumed to be brought into production gradually by the year 2000. The employment figures for that acreage are determined assuming that two agricultural jobs are created by each 1,000 acres brought into grain production. This yields a 10.6 percent rate of growth over the 20-year period. Beyond the year 2000, a 3 percent rate of growth is assumed.

Total production in the Matanuska-Susitna region is assumed to grow by 2 percent per year. Dairy farms and truck farms at Point MacKenzie grow marginally. Agricultural services, located primarily in Anchorage, grow by 4 percent per year.

SOURCE: State of Alaska, Agricultural Action Council, First Report; and Mike Herker, Financing Agricultural Projects in Alaska; Alaska Department of Labor.

TABLE D.11. AGRICULTURE

(thousands of employees)

	Regions			
	Aleutian Islands	Anchorage	Fairbanks	Kenai/ Cook Inlet
1980	0.013	0.103	0.044	0.008
1981	0.013	0.142	0.048	0.008
1982	0.013	0.161	0.053	0.008
1983	0.013	0.167	0.060	0.009
1984	0.013	0.174	0.066	0.009
1985	0.013	0.181	0.073	0.009
1986	0.013	0.188	0.080	0.009
1987	0.013	0.196	0.089	0.010
1988	0.013	0.204	0.099	0.010
1989	0.013	0.212	0.110	0.010
1990	0.013	0.220	0.121	0.011
1991	0.013	0.229	0.134	0.011
1992	0.013	0.238	0.148	0.011
1993	0.013	0.248	0.165	0.012
1994	0.013	0.258	0.182	0.012
1995	0.013	0.268	0.201	0.012
1996	0.013	0.279	0.223	0.013
1997	0.013	0.290	0.247	0.013
1998	0.013	0.302	0.273	0.013
1999	0.013	0.314	0.302	0.014
2000	0.013	0.326	0.335	0.014
2001	0.013	0.339	0.351	0.015
2002	0.013	0.353	0.369	0.015
2003	0.013	0.367	0.387	0.016
2004	0.013	0.382	0.407	0.016
2005	0.013	0.397	0.427	0.017
2006	0.013	0.413	0.448	0.017
2007	0.013	0.429	0.471	0.018
2008	0.013	0.446	0.495	0.018
2009	0.013	0.464	0.519	0.019
2010	0.013	0.483	0.545	0.019

SOURCE: MAP MODEL CASE AGR.F83

VARIABLES: B01 B02 B09 B12

TABLE D.11 (Continued)

| | Regions | | Alaska |
	Kodiak	Matanuska/Susitna	Agricultural Employment
1980	0.005	0.113	0.286
1981	0.005	0.114	0.330
1982	0.005	0.115	0.355
1983	0.005	0.116	0.370
1984	0.006	0.117	0.385
1985	0.006	0.118	0.400
1986	0.006	0.120	0.416
1987	0.006	0.121	0.435
1988	0.006	0.122	0.454
1989	0.007	0.123	0.475
1990	0.007	0.124	0.496
1991	0.007	0.126	0.520
1992	0.007	0.127	0.544
1993	0.007	0.128	0.573
1994	0.007	0.129	0.601
1995	0.008	0.131	0.633
1996	0.008	0.132	0.668
1997	0.008	0.133	0.704
1998	0.008	0.135	0.744
1999	0.009	0.136	0.788
2000	0.009	0.137	0.834
2001	0.009	0.139	0.866
2002	0.009	0.140	0.899
2003	0.010	0.142	0.935
2004	0.010	0.143	0.971
2005	0.010	0.144	1.008
2006	0.010	0.146	1.047
2007	0.011	0.147	1.089
2008	0.011	0.149	1.132
2009	0.011	0.150	1.176
2010	0.012	0.151	1.223

SOURCE: MAP MODEL CASE AGR.F83

VARIABLES: B15 B17 EMAGRI

12. <u>Forest and Lumber Products</u>

Employment in the forest and lumber products industry expands to over 3,200 by 1990, remains stable for a decade, and then declines to 2,800 by the year 2010. Timber harvests in national forests (primarily, Tongass in Southeast) remains at its long-run sustained yield at 450 MMBF annually. The harvest on national forest land is the only harvest that contributes to jobs in the processing side of the industry, as most other harvesting has no primary processing requirements. The major harvest, other than that in Tongass National Forest, comes from Native regional and village corporation land located in Southeast, the Prince William Sound area, and on Afognak Island. Total harvestable timber on these lands, which is mature timber, is approximately 18.4 MMMBF, of which most will be harvested by the year 2010. All that will remain to be harvested of this timber is about 3 MMMBF in Southeast Alaska, which will be harvested over the 2010-2020 decade. Employment in the areas outside of these major areas is expected to grow according to local needs, which will be moderate. Over the next three decades most local domestic lumber needs, aside from a few rough cut mills, will be supplied by imported kiln-dried lumber.

SOURCE: Alaska Department of Labor, <u>Alaska Economic Trends</u>; J. Mehrkens, <u>1983 Timber Supply and Demand</u>, Draft, U.S.F.S., Juneau, December 1983; <u>Land Settlement Alternatives for the Chugach Region</u>, ISER, October 1981; and E. L. Arobio, A. F. Gasbarro, and W. G. Workman, <u>Chugach Land Management Plan: Supply and Demand Assessment for Resources of the Chugach National Forest</u>, U.S.F.S., June 1979.

TABLE D.12. LOGGING AND SAWMILLS

(thousands of employees)

Regions

	Anchorage	Cordova/ McCarthy	Fairbanks	Southeast	Kenai/ Cook Inlet
1980	0.142	0.025	0.030	1.874	0.050
1981	0.242	0.025	0.035	1.657	0.050
1982	0.180	0.025	0.040	1.650	0.042
1983	0.180	0.025	0.040	1.800	0.040
1984	0.180	0.025	0.040	2.126	0.040
1985	0.180	0.071	0.040	2.264	0.040
1986	0.180	0.140	0.040	2.379	0.040
1987	0.180	0.232	0.040	2.471	0.040
1988	0.180	0.255	0.040	2.540	0.040
1989	0.180	0.255	0.040	2.586	0.040
1990	0.180	0.255	0.040	2.632	0.040
1991	0.180	0.255	0.040	2.632	0.040
1992	0.180	0.255	0.040	2.632	0.040
1993	0.180	0.255	0.040	2.632	0.040
1994	0.180	0.255	0.040	2.632	0.040
1995	0.180	0.255	0.040	2.632	0.040
1996	0.180	0.255	0.040	2.632	0.040
1997	0.180	0.255	0.040	2.632	0.040
1998	0.180	0.255	0.040	2.632	0.040
1999	0.180	0.255	0.040	2.632	0.040
2000	0.180	0.232	0.040	2.632	0.040
2001	0.180	0.186	0.040	2.632	0.040
2002	0.180	0.163	0.040	2.632	0.040
2003	0.180	0.140	0.040	2.632	0.040
2004	0.180	0.117	0.040	2.632	0.040
2005	0.180	0.094	0.040	2.632	0.040
2006	0.180	0.025	0.040	2.632	0.040
2007	0.180	0.025	0.040	2.632	0.040
2008	0.180	0.025	0.040	2.632	0.040
2009	0.180	0.025	0.040	2.632	0.040
2010	0.180	0.025	0.040	2.632	0.040

SOURCE: MAP MODEL CASE FLL.F83

VARIABLES: B02 B08 B09 B11 B12

| | Regions | | | Alaska |
	Kodiak	Matanuska/ Susitna	Seward	Low-Wage Exogenous Manufacturing Employment
1980	0.250	0.050	0.085	2.506
1981	0.100	0.060	0.010	2.179
1982	0.060	0.029	0.010	2.036
1983	0.100	0.029	0.010	2.224
1984	0.140	0.029	0.010	2.590
1985	0.180	0.029	0.010	2.814
1986	0.194	0.029	0.010	3.012
1987	0.212	0.029	0.010	3.214
1988	0.230	0.029	0.010	3.324
1989	0.249	0.029	0.012	3.391
1990	0.249	0.029	0.012	3.437
1991	0.249	0.029	0.012	3.437
1992	0.249	0.029	0.012	3.437
1993	0.249	0.029	0.012	3.437
1994	0.249	0.029	0.012	3.437
1995	0.249	0.029	0.012	3.437
1996	0.249	0.029	0.012	3.437
1997	0.249	0.029	0.012	3.437
1998	0.249	0.029	0.012	3.437
1999	0.249	0.029	0.013	3.438
2000	0.249	0.029	0.013	3.415
2001	0.249	0.029	0.013	3.369
2002	0.249	0.029	0.013	3.346
2003	0.249	0.029	0.013	3.323
2004	0.249	0.029	0.013	3.300
2005	0.249	0.029	0.013	3.277
2006	0.199	0.029	0.013	3.158
2007	0.019	0.029	0.014	2.979
2008	0.019	0.029	0.014	2.979
2009	0.019	0.029	0.014	2.979
2010	0.020	0.029	0.014	2.980

SOURCE: MAP MODEL CASE FLL.F83

VARIABLES: B15 B17 B21 EMMX2

13. <u>Pulp Mill Employment</u>

Capacity in the two pulp mills in the Southeast region remains at
its current level, with no new plants likely to be feasible anywhere
in the state. Assured timber supplies through the Ketchikan and
Sitka long-term contracts as well as low-quality logs harvested from
Native corporation lands should provide sufficient supplies of
low-cost raw material to keep the existing mills running profitably
at near full capacity through 2010. A gradual decline in employment
of 1 percent per year, beginning in 1984, results from the continued
introduction of new labor-saving equipment.

SOURCE: J. Mehrkens, <u>1983 Timber Supply and Demand</u>, Draft,
U.S.F.S., Juneau, December 1983; and Alaska Department
of Labor, <u>Statistical Quarterly</u>.

TABLE D.13. PULP MILLS

(thousands of employees)

| | Region | Alaska |
	Southeast	Low-Wage Exogenous Construction Employment
1980	1.044	1.044
1981	0.985	0.985
1982	0.820	0.820
1983	0.980	0.980
1984	0.970	0.970
1985	0.960	0.960
1986	0.951	0.951
1987	0.941	0.941
1988	0.932	0.932
1989	0.923	0.923
1990	0.913	0.913
1991	0.904	0.904
1992	0.895	0.895
1993	0.886	0.886
1994	0.877	0.877
1995	0.869	0.869
1996	0.860	0.860
1997	0.851	0.851
1998	0.843	0.843
1999	0.834	0.834
2000	0.826	0.826
2001	0.818	0.818
2002	0.810	0.810
2003	0.802	0.802
2004	0.794	0.794
2005	0.786	0.786
2006	0.778	0.778
2007	0.770	0.770
2008	0.762	0.762
2009	0.755	0.755
2010	0.747	0.747

SOURCE: MAP MODEL CASE FPU.F83

VARIABLES: B11 EMMX2

14. Commercial Fishing (Nonbottomfish)

Existing fisheries harvesting employment returns to and remains constant at the average annual level for the period 1978-1981.

SOURCE: G. Rogers and R. Listowski, Measuring the Socioeconomic
          Impacts of Alaska's Fisheries, ISER, April 1980; and Alaska
          Department of Labor, Alaska Economic Trends.

TABLE D.14. COMMERCIAL FISHING-NONBOTTOMFISH

(thousands of employees)

Regions

	Aleutian Islands	Bethel	Bristol Bay	Cordova/ McCarthy	Southeast
1980	1.226	0.322	1.045	0.229	2.177
1981	1.337	0.324	1.139	0.238	2.021
1982	1.188	0.296	1.012	0.240	2.100
1983	1.188	0.296	1.012	0.240	2.100
1984	1.188	0.296	1.012	0.240	2.100
1985	1.188	0.296	1.012	0.240	2.100
1986	1.188	0.296	1.012	0.240	2.100
1987	1.188	0.296	1.012	0.240	2.100
1988	1.188	0.296	1.012	0.240	2.100
1989	1.188	0.296	1.012	0.240	2.100
1990	1.188	0.296	1.012	0.240	2.100
1991	1.188	0.296	1.012	0.240	2.100
1992	1.188	0.296	1.012	0.240	2.100
1993	1.188	0.296	1.012	0.240	2.100
1994	1.188	0.296	1.012	0.240	2.100
1995	1.188	0.296	1.012	0.240	2.100
1996	1.188	0.296	1.012	0.240	2.100
1997	1.188	0.296	1.012	0.240	2.100
1998	1.188	0.296	1.012	0.240	2.100
1999	1.188	0.296	1.012	0.240	2.100
2000	1.188	0.296	1.012	0.240	2.100
2001	1.188	0.296	1.012	0.240	2.100
2002	1.188	0.296	1.012	0.240	2.100
2003	1.188	0.296	1.012	0.240	2.100
2004	1.188	0.296	1.012	0.240	2.100
2005	1.188	0.296	1.012	0.240	2.100
2006	1.188	0.296	1.012	0.240	2.100
2007	1.188	0.296	1.012	0.240	2.100
2008	1.188	0.296	1.012	0.240	2.100
2009	1.188	0.296	1.012	0.240	2.100
2010	1.188	0.296	1.012	0.240	2.100

SOURCE: MAP MODEL CASE TCF.F83

VARIABLES: B01 B05 B06 B08 B11

TABLE D.14 (Continued)

			Regions		
	Kenai/ Cook Inlet	Kobuk	Kodiak	Kuskokwim	Nome
1980	0.755	0.191	1.053	0.035	0.009
1981	0.785	0.193	1.094	0.035	0.009
1982	0.792	0.176	1.104	0.032	0.008
1983	0.792	0.176	1.104	0.032	0.008
1984	0.792	0.176	1.104	0.032	0.008
1985	0.792	0.176	1.104	0.032	0.008
1986	0.792	0.176	1.104	0.032	0.008
1987	0.792	0.176	1.104	0.032	0.008
1988	0.792	0.176	1.104	0.032	0.008
1989	0.792	0.176	1.104	0.032	0.008
1990	0.792	0.176	1.104	0.032	0.008
1991	0.792	0.176	1.104	0.032	0.008
1992	0.792	0.176	1.104	0.032	0.008
1993	0.792	0.176	1.104	0.032	0.008
1994	0.792	0.176	1.104	0.032	0.008
1995	0.792	0.176	1.104	0.032	0.008
1996	0.792	0.176	1.104	0.032	0.008
1997	0.792	0.176	1.104	0.032	0.008
1998	0.792	0.176	1.104	0.032	0.008
1999	0.792	0.176	1.104	0.032	0.008
2000	0.792	0.176	1.104	0.032	0.008
2001	0.792	0.176	1.104	0.032	0.008
2002	0.792	0.176	1.104	0.032	0.008
2003	0.792	0.176	1.104	0.032	0.008
2004	0.792	0.176	1.104	0.032	0.008
2005	0.792	0.176	1.104	0.032	0.008
2006	0.792	0.176	1.104	0.032	0.008
2007	0.792	0.176	1.104	0.032	0.008
2008	0.792	0.176	1.104	0.032	0.008
2009	0.792	0.176	1.104	0.032	0.008
2010	0.792	0.176	1.104	0.032	0.008

SOURCE: MAP MODEL CASE TCF.F83

VARIABLES: B12 B14 B15 B16 B18

TABLE D.14 (Continued)

		Regions		Alaska
	Seward	Valdez/Chitina/ Whittier	Wade Hampton	Fish Harvesting Employment
1980	0.229	0.023	0.313	7.620
1981	0.238	0.024	0.316	7.753
1982	0.240	0.024	0.288	7.500
1983	0.240	0.024	0.288	7.500
1984	0.240	0.024	0.288	7.500
1985	0.240	0.024	0.288	7.500
1986	0.240	0.024	0.288	7.500
1987	0.240	0.024	0.288	7.500
1988	0.240	0.024	0.288	7.500
1989	0.240	0.024	0.288	7.500
1990	0.240	0.024	0.288	7.500
1991	0.240	0.024	0.288	7.500
1992	0.240	0.024	0.288	7.500
1993	0.240	0.024	0.288	7.500
1994	0.240	0.024	0.288	7.500
1995	0.240	0.024	0.288	7.500
1996	0.240	0.024	0.288	7.500
1997	0.240	0.024	0.288	7.500
1998	0.240	0.024	0.288	7.500
1999	0.240	0.024	0.288	7.500
2000	0.240	0.024	0.288	7.500
2001	0.240	0.024	0.288	7.500
2002	0.240	0.024	0.288	7.500
2003	0.240	0.024	0.288	7.500
2004	0.240	0.024	0.288	7.500
2005	0.240	0.024	0.288	7.500
2006	0.240	0.024	0.288	7.500
2007	0.240	0.024	0.288	7.500
2008	0.240	0.024	0.288	7.500
2009	0.240	0.024	0.288	7.500
2010	0.240	0.024	0.288	7.500

SOURCE: MAP MODEL CASE TCF.F83

VARIABLES: B21 B26 B27 EMFISH

15. Fish Processing (Nonbottomfish)

Processing employment returns to its average annual level for the period 1978-1982. This assumes any increase in the productivity of fisheries can be matched by corresponding increases in productivity in food processing.

SOURCE: Alaska Department of Labor, Statistical Quarterly, and Alaska Economic Trends.

TABLE D.15. COMMERCIAL FISH PROCESSING – NONBOTTOMFISH

(thousands of employees)

| | Regions | | | | |
	Aleutian Islands	Anchorage	Bethel	Bristol Bay	Cordova/ McCarthy
1980	1.720	0.370	0.055	1.476	0.277
1981	1.684	0.449	0.125	0.693	0.348
1982	1.348	0.488	0.055	0.690	0.232
1983	1.415	0.512	0.058	0.725	0.244
1984	1.415	0.512	0.058	0.725	0.244
1985	1.415	0.512	0.058	0.725	0.244
1986	1.415	0.512	0.058	0.725	0.244
1987	1.415	0.512	0.058	0.725	0.244
1988	1.415	0.512	0.058	0.725	0.244
1989	1.415	0.512	0.058	0.725	0.244
1990	1.415	0.512	0.058	0.725	0.244
1991	1.415	0.512	0.058	0.725	0.244
1992	1.415	0.512	0.058	0.725	0.244
1993	1.415	0.512	0.058	0.725	0.244
1994	1.415	0.512	0.058	0.725	0.244
1995	1.415	0.512	0.058	0.725	0.244
1996	1.415	0.512	0.058	0.725	0.244
1997	1.415	0.512	0.058	0.725	0.244
1998	1.415	0.512	0.058	0.725	0.244
1999	1.415	0.512	0.058	0.725	0.244
2000	1.415	0.512	0.058	0.725	0.244
2001	1.415	0.512	0.058	0.725	0.244
2002	1.415	0.512	0.058	0.725	0.244
2003	1.415	0.512	0.058	0.725	0.244
2004	1.415	0.512	0.058	0.725	0.244
2005	1.415	0.512	0.058	0.725	0.244
2006	1.415	0.512	0.058	0.725	0.244
2007	1.415	0.512	0.058	0.725	0.244
2008	1.415	0.512	0.058	0.725	0.244
2009	1.415	0.512	0.058	0.725	0.244
2010	1.415	0.512	0.058	0.725	0.244

SOURCE: MAP MODEL CASE TFP.F83

VARIABLES: B01 B02 B05 B06 B08

TABLE D.15 (Continued)

		Regions			
	Southeast	Kenai/ Cook Inlet	Kobuk	Kodiak	Kuskokwim
1980	1.721	0.668	0.010	1.544	0.000
1981	1.890	0.837	0.078	1.424	0.130
1982	1.734	0.838	0.032	1.167	0.004
1983	1.821	0.880	0.034	1.225	0.004
1984	1.821	0.880	0.034	1.225	0.004
1985	1.821	0.880	0.034	1.225	0.004
1986	1.821	0.880	0.034	1.225	0.004
1987	1.821	0.880	0.034	1.225	0.004
1988	1.821	0.880	0.034	1.225	0.004
1989	1.821	0.880	0.034	1.225	0.004
1990	1.821	0.880	0.034	1.225	0.004
1991	1.821	0.880	0.034	1.225	0.004
1992	1.821	0.880	0.034	1.225	0.004
1993	1.821	0.880	0.034	1.225	0.004
1994	1.821	0.880	0.034	1.225	0.004
1995	1.821	0.880	0.034	1.225	0.004
1996	1.821	0.880	0.034	1.225	0.004
1997	1.821	0.880	0.034	1.225	0.004
1998	1.821	0.880	0.034	1.225	0.004
1999	1.821	0.880	0.034	1.225	0.004
2000	1.821	0.880	0.034	1.225	0.004
2001	1.821	0.880	0.034	1.225	0.004
2002	1.821	0.880	0.034	1.225	0.004
2003	1.821	0.880	0.034	1.225	0.004
2004	1.821	0.880	0.034	1.225	0.004
2005	1.821	0.880	0.034	1.225	0.004
2006	1.821	0.880	0.034	1.225	0.004
2007	1.821	0.880	0.034	1.225	0.004
2008	1.821	0.880	0.034	1.225	0.004
2009	1.821	0.880	0.034	1.225	0.004
2010	1.821	0.880	0.034	1.225	0.004

SOURCE: MAP MODEL CASE TFP.F83

VARIABLES: B11 B12 B14 B15 B16

TABLE D.15 (Continued)

| | Regions | | | | Alaska |
	Nome	Seward	Valdez/ Chitina/ Whittier	Wade Hampton	Low-Wage Exogenous Manufacturing Employment
1980	0.008	0.100	0.026	0.020	7.995
1981	0.050	0.241	0.040	0.125	8.114
1982	0.012	0.252	0.022	0.060	6.934
1983	0.013	0.265	0.023	0.063	7.281
1984	0.013	0.265	0.023	0.063	7.281
1985	0.013	0.265	0.023	0.063	7.281
1986	0.013	0.265	0.023	0.063	7.281
1987	0.013	0.265	0.023	0.063	7.281
1988	0.013	0.265	0.023	0.063	7.281
1989	0.013	0.265	0.023	0.063	7.281
1990	0.013	0.265	0.023	0.063	7.281
1991	0.013	0.265	0.023	0.063	7.281
1992	0.013	0.265	0.023	0.063	7.281
1993	0.013	0.265	0.023	0.063	7.281
1994	0.013	0.265	0.023	0.063	7.281
1995	0.013	0.265	0.023	0.063	7.281
1996	0.013	0.265	0.023	0.063	7.281
1997	0.013	0.265	0.023	0.063	7.281
1998	0.013	0.265	0.023	0.063	7.281
1999	0.013	0.265	0.023	0.063	7.281
2000	0.013	0.265	0.023	0.063	7.281
2001	0.013	0.265	0.023	0.063	7.281
2002	0.013	0.265	0.023	0.063	7.281
2003	0.013	0.265	0.023	0.063	7.281
2004	0.013	0.265	0.023	0.063	7.281
2005	0.013	0.265	0.023	0.063	7.281
2006	0.013	0.265	0.023	0.063	7.281
2007	0.013	0.265	0.023	0.063	7.281
2008	0.013	0.265	0.023	0.063	7.281
2009	0.013	0.265	0.023	0.063	7.281
2010	0.013	0.265	0.023	0.063	7.281

SOURCE: MAP MODEL CASE TFP.F83

VARIABLES: B18 B21 B26 B27 EMMX2

16. Catcher-Processor-Dominated Bottomfishing

The total U.S. share of the Alaska bottomfish catch expands at a constant rate until it reaches 100 percent of the allowable harvest by 2000. Seventy percent of the catch will be processed by catcher-processor vessels, and 30 percent by onshore plants. Because catcher-processor vessels operating in Alaska waters are mostly owned and operated by fishermen residing outside the state, the Alaska total employment growth is modest. We assume only 10 percent of fishing employees in joint-venture trawlers and catcher-processor vessels are Alaska residents, while 50 percent of workers in the shore-based processing plants and 50 percent of the fishermen in the shore-based fishery are residents.

Approximately four-fifths of new employment is generated in the Aleutian Islands region, and the remainder in Kodiak. This division reflects the projected distribution of total bottomfish harvest.

SOURCE: <u>Navarin Basin Statewide and Regional Demographic and Economic Systems Impacts Forecast</u>, Technical Report Number 78, Alaska OCS Socioeconomic Studies Program, U.S. Bureau of Land Management, March 1983, Appendix K.

TABLE D.16. COMMERCIAL FISHING-BOTTOMFISH

(thousands of employees)

| | Regions | | Alaska | |
	Aleutian Islands	Kodiak	Fish Harvesting Employment	Low-Wage Exogenous Manufacturing Employment
1980	0.000	0.000	0.000	0.000
1981	0.026	0.006	0.030	0.002
1982	0.034	0.008	0.038	0.004
1983	0.051	0.012	0.058	0.005
1984	0.071	0.016	0.081	0.006
1985	0.095	0.022	0.108	0.009
1986	0.120	0.028	0.136	0.012
1987	0.146	0.034	0.164	0.016
1988	0.165	0.038	0.181	0.022
1989	0.200	0.043	0.216	0.027
1990	0.220	0.051	0.229	0.042
1991	0.246	0.057	0.245	0.058
1992	0.280	0.065	0.266	0.079
1993	0.325	0.075	0.292	0.108
1994	0.385	0.089	0.326	0.148
1995	0.463	0.107	0.368	0.202
1996	0.566	0.131	0.421	0.276
1997	0.703	0.163	0.488	0.378
1998	0.884	0.205	0.572	0.517
1999	1.125	0.261	0.678	0.708
2000	1.383	0.321	0.733	0.971
2001	1.383	0.321	0.733	0.971
2002	1.383	0.321	0.733	0.971
2003	1.383	0.321	0.733	0.971
2004	1.383	0.321	0.733	0.971
2005	1.383	0.321	0.733	0.971
2006	1.383	0.321	0.733	0.971
2007	1.383	0.321	0.733	0.971
2008	1.383	0.321	0.733	0.971
2009	1.383	0.321	0.733	0.971
2010	1.383	0.321	0.733	0.971

SOURCE: MAP MODEL CASE BCF.F83

VARIABLES: B01 B15 EMFISH EMMX2

17. Federal Military

Military employment has declined erratically and slowly over the past 25 years. We assume that future military employment declines at 1.7 percent per year, consistent with historical trends, maintaining the same relative shares around the state as in 1982.

SOURCES: Alaska Department of Labor, Alaska Population Overview, 1982 and Statistical Quarterly; and U.S. Census, 1980.

TABLE D.17. FEDERAL MILITARY EMPLOYMENT

(thousands of employees)

			Regions		
	Aleutian Islands	Anchorage	Barrow/ N. Slope	Bethel	Bristol Bay
1980	2.213	11.299	0.017	0.016	0.329
1981	2.242	10.833	0.018	0.021	0.351
1982	2.218	10.955	0.020	0.017	0.344
1983	2.180	10.769	0.020	0.017	0.338
1984	2.143	10.586	0.019	0.016	0.332
1985	2.107	10.406	0.019	0.016	0.327
1986	2.071	10.229	0.019	0.016	0.321
1987	2.036	10.055	0.018	0.016	0.316
1988	2.001	9.884	0.018	0.015	0.310
1989	1.967	9.716	0.018	0.015	0.305
1990	1.934	9.551	0.017	0.015	0.300
1991	1.901	9.388	0.017	0.015	0.295
1992	1.869	9.229	0.017	0.014	0.290
1993	1.837	9.072	0.017	0.014	0.285
1994	1.806	8.918	0.016	0.014	0.280
1995	1.775	8.766	0.016	0.014	0.275
1996	1.745	8.617	0.016	0.013	0.271
1997	1.715	8.471	0.015	0.013	0.266
1998	1.686	8.327	0.015	0.013	0.261
1999	1.657	8.185	0.015	0.013	0.257
2000	1.629	8.046	0.015	0.012	0.253
2001	1.601	7.909	0.014	0.012	0.248
2002	1.574	7.775	0.014	0.012	0.244
2003	1.547	7.643	0.014	0.012	0.240
2004	1.521	7.513	0.014	0.012	0.236
2005	1.495	7.385	0.013	0.011	0.232
2006	1.470	7.259	0.013	0.011	0.228
2007	1.445	7.136	0.013	0.011	0.224
2008	1.420	7.015	0.013	0.011	0.220
2009	1.396	6.895	0.013	0.011	0.217
2010	1.372	6.778	0.012	0.011	0.213

SOURCE: MAP MODEL CASE GFM.F83

VARIABLES: G01 G02 G04 G05 G06

TABLE D.17 (Continued)

			Regions		
	Cordova/ McCarthy	Fairbanks	Southeast	Kenai/ Cook Inlet	Kobuk
1980	0.046	5.481	0.690	0.050	0.017
1981	0.046	5.529	0.759	0.051	0.018
1982	0.046	5.133	0.722	0.051	0.017
1983	0.045	5.046	0.710	0.050	0.017
1984	0.044	4.960	0.698	0.049	0.016
1985	0.044	4.876	0.686	0.048	0.016
1986	0.043	4.793	0.674	0.048	0.016
1987	0.042	4.711	0.663	0.047	0.016
1988	0.042	4.631	0.651	0.046	0.015
1989	0.041	4.552	0.640	0.045	0.015
1990	0.040	4.475	0.629	0.044	0.015
1991	0.039	4.399	0.619	0.044	0.015
1992	0.039	4.324	0.608	0.043	0.014
1993	0.038	4.251	0.598	0.042	0.014
1994	0.037	4.178	0.588	0.042	0.014
1995	0.037	4.107	0.578	0.041	0.014
1996	0.036	4.038	0.568	0.040	0.013
1997	0.036	3.969	0.558	0.039	0.013
1998	0.035	3.901	0.549	0.039	0.013
1999	0.034	3.835	0.539	0.038	0.013
2000	0.034	3.770	0.530	0.037	0.012
2001	0.033	3.706	0.521	0.037	0.012
2002	0.033	3.643	0.512	0.036	0.012
2003	0.032	3.581	0.504	0.036	0.012
2004	0.032	3.520	0.495	0.035	0.012
2005	0.031	3.460	0.487	0.034	0.011
2006	0.030	3.401	0.478	0.034	0.011
2007	0.030	3.344	0.470	0.033	0.011
2008	0.029	3.287	0.462	0.033	0.011
2009	0.029	3.231	0.454	0.032	0.011
2010	0.028	3.176	0.447	0.032	0.011

SOURCE: MAP MODEL CASE GFM.F83

VARIABLES: G08 G09 G11 G12 G14

TABLE D.17 (Continued)

			Regions		
	Kodiak	Kuskokwim	Matanuska/ Susitna	Nome	Seward
1980	1.098	0.026	0.000	0.041	0.017
1981	1.073	0.026	0.000	0.043	0.017
1982	1.010	0.026	0.000	0.044	0.017
1983	0.993	0.026	0.000	0.043	0.017
1984	0.976	0.025	0.000	0.043	0.016
1985	0.959	0.025	0.000	0.042	0.016
1986	0.943	0.024	0.000	0.041	0.016
1987	0.927	0.024	0.000	0.040	0.016
1988	0.911	0.023	0.000	0.040	0.015
1989	0.896	0.023	0.000	0.039	0.015
1990	0.881	0.023	0.000	0.038	0.015
1991	0.866	0.022	0.000	0.038	0.015
1992	0.851	0.022	0.000	0.037	0.014
1993	0.836	0.022	0.000	0.036	0.014
1994	0.822	0.021	0.000	0.036	0.014
1995	0.808	0.021	0.000	0.035	0.014
1996	0.794	0.020	0.000	0.035	0.013
1997	0.781	0.020	0.000	0.034	0.013
1998	0.768	0.020	0.000	0.033	0.013
1999	0.755	0.019	0.000	0.033	0.013
2000	0.742	0.019	0.000	0.032	0.012
2001	0.729	0.019	0.000	0.032	0.012
2002	0.717	0.018	0.000	0.031	0.012
2003	0.705	0.018	0.000	0.031	0.012
2004	0.693	0.018	0.000	0.030	0.012
2005	0.681	0.018	0.000	0.030	0.011
2006	0.669	0.017	0.000	0.029	0.011
2007	0.658	0.017	0.000	0.029	0.011
2008	0.647	0.017	0.000	0.028	0.011
2009	0.636	0.016	0.000	0.028	0.011
2010	0.625	0.016	0.000	0.027	0.011

SOURCE: MAP MODEL CASE GFM.F83

VARIABLES: G15 G16 G17 G18 G21

Regions

	Southeast Fairbanks	Upper Yukon	Valdez/Chitina/ Whittier	Wade Hampton	Yukon/ Koyukuk
1980	0.801	0.032	0.057	0.012	0.465
1981	0.810	0.032	0.057	0.017	0.508
1982	0.780	0.032	0.041	0.015	0.615
1983	0.767	0.031	0.040	0.015	0.605
1984	0.754	0.031	0.040	0.014	0.594
1985	0.741	0.030	0.039	0.014	0.584
1986	0.728	0.030	0.038	0.014	0.574
1987	0.716	0.029	0.038	0.014	0.564
1988	0.704	0.029	0.037	0.014	0.555
1989	0.692	0.028	0.036	0.013	0.545
1990	0.680	0.028	0.036	0.013	0.536
1991	0.668	0.027	0.035	0.013	0.527
1992	0.657	0.027	0.035	0.013	0.518
1993	0.646	0.026	0.034	0.012	0.509
1994	0.635	0.026	0.033	0.012	0.501
1995	0.624	0.026	0.033	0.012	0.492
1996	0.614	0.025	0.032	0.012	0.484
1997	0.603	0.025	0.032	0.012	0.476
1998	0.593	0.024	0.031	0.011	0.467
1999	0.583	0.024	0.031	0.011	0.459
2000	0.573	0.024	0.030	0.011	0.452
2001	0.563	0.023	0.030	0.011	0.444
2002	0.554	0.023	0.029	0.011	0.436
2003	0.544	0.022	0.029	0.010	0.429
2004	0.535	0.022	0.028	0.010	0.422
2005	0.526	0.022	0.028	0.010	0.415
2006	0.517	0.021	0.027	0.010	0.408
2007	0.508	0.021	0.027	0.010	0.401
2008	0.499	0.020	0.026	0.010	0.394
2009	0.491	0.020	0.026	0.009	0.387
2010	0.483	0.020	0.025	0.009	0.381

SOURCE: MAP MODEL CASE GFM.F83

VARIABLES: G24 G25 G26 G27 G29

18. Federal Civilian

Federal civilian government employment has grown historically in Alaska at about 0.5 percent annually over the past two decades. We assume this trend continues through 2010, with the regional distribution similar to the 1982 distribution.

TABLE D.18. FEDERAL CIVILIAN EMPLOYMENT

(thousands of employees)

			Regions		
	Aleutian Islands	Anchorage	Barrow/ N. Slope	Bethel	Bristol Bay
1980	0.676	9.654	0.249	0.414	0.184
1981	0.686	9.579	0.240	0.395	0.173
1982	0.723	9.829	0.182	0.381	0.154
1983	0.695	9.645	0.245	0.406	0.190
1984	0.698	9.693	0.246	0.408	0.191
1985	0.702	9.741	0.247	0.410	0.192
1986	0.705	9.790	0.248	0.412	0.193
1987	0.709	9.839	0.250	0.414	0.194
1988	0.713	9.888	0.251	0.416	0.194
1989	0.716	9.938	0.252	0.418	0.195
1990	0.720	9.987	0.253	0.420	0.196
1991	0.723	10.037	0.255	0.423	0.197
1992	0.727	10.087	0.256	0.425	0.198
1993	0.731	10.138	0.257	0.427	0.199
1994	0.734	10.189	0.258	0.429	0.200
1995	0.738	10.240	0.260	0.431	0.201
1996	0.742	10.291	0.261	0.433	0.202
1997	0.745	10.342	0.262	0.435	0.203
1998	0.749	10.394	0.264	0.438	0.204
1999	0.753	10.446	0.265	0.440	0.205
2000	0.756	10.498	0.266	0.442	0.206
2001	0.760	10.551	0.268	0.444	0.208
2002	0.764	10.603	0.269	0.446	0.209
2003	0.768	10.656	0.270	0.449	0.210
2004	0.772	10.710	0.272	0.451	0.211
2005	0.776	10.763	0.273	0.453	0.212
2006	0.779	10.817	0.274	0.455	0.213
2007	0.783	10.871	0.276	0.458	0.214
2008	0.787	10.925	0.277	0.460	0.215
2009	0.791	10.980	0.279	0.462	0.216
2010	0.795	11.035	0.280	0.465	0.217

SOURCE: MAP MODEL CASE GFC.F83

VARIABLES: G01 G02 G04 G05 G06

TABLE D.18 (Continued)

			Regions		
	Cordova/ McCarthy	Fairbanks	Southeast	Kenai/ Cook Inlet	Kobuk
1980	0.036	2.304	2.501	0.119	0.218
1981	0.044	2.353	2.278	0.116	0.207
1982	0.039	2.470	2.212	0.122	0.141
1983	0.035	2.292	2.379	0.103	0.245
1984	0.036	2.304	2.391	0.103	0.246
1985	0.036	2.315	2.403	0.104	0.247
1986	0.036	2.327	2.415	0.104	0.248
1987	0.036	2.339	2.427	0.105	0.250
1988	0.036	2.350	2.439	0.105	0.251
1989	0.037	2.362	2.452	0.106	0.252
1990	0.037	2.374	2.464	0.106	0.253
1991	0.037	2.386	2.476	0.107	0.255
1992	0.037	2.398	2.488	0.108	0.256
1993	0.037	2.410	2.501	0.108	0.257
1994	0.037	2.422	2.513	0.109	0.258
1995	0.038	2.434	2.526	0.109	0.260
1996	0.038	2.446	2.539	0.110	0.261
1997	0.038	2.458	2.551	0.110	0.262
1998	0.038	2.470	2.564	0.111	0.264
1999	0.038	2.483	2.577	0.111	0.265
2000	0.039	2.495	2.590	0.112	0.266
2001	0.039	2.508	2.603	0.112	0.268
2002	0.039	2.520	2.616	0.113	0.269
2003	0.039	2.533	2.629	0.114	0.270
2004	0.039	2.545	2.642	0.114	0.272
2005	0.040	2.558	2.655	0.115	0.273
2006	0.040	2.571	2.668	0.115	0.274
2007	0.040	2.584	2.682	0.116	0.276
2008	0.040	2.597	2.695	0.116	0.277
2009	0.040	2.610	2.709	0.117	0.279
2010	0.041	2.623	2.722	0.118	0.280

SOURCE: MAP MODEL CASE GFC.F83

VARIABLES: G08 G09 G11 G12 G14

TABLE D.18 (Continued)

| | | | Regions | | |
	Kodiak	Kuskokwim	Matanuska/ Susitna	Nome	Seward
1980	0.286	0.081	0.111	0.161	0.061
1981	0.257	0.082	0.102	0.144	0.053
1982	0.241	0.069	0.100	0.132	0.047
1983	0.282	0.076	0.096	0.176	0.067
1984	0.283	0.077	0.096	0.176	0.068
1985	0.285	0.077	0.097	0.177	0.068
1986	0.286	0.077	0.097	0.178	0.068
1987	0.288	0.078	0.098	0.179	0.069
1988	0.289	0.078	0.098	0.180	0.069
1989	0.290	0.079	0.099	0.181	0.069
1990	0.292	0.079	0.099	0.182	0.070
1991	0.293	0.079	0.100	0.183	0.070
1992	0.295	0.080	0.100	0.184	0.070
1993	0.296	0.080	0.101	0.184	0.071
1994	0.298	0.081	0.101	0.185	0.071
1995	0.299	0.081	0.102	0.186	0.072
1996	0.301	0.081	0.102	0.187	0.072
1997	0.302	0.082	0.103	0.188	0.072
1998	0.304	0.082	0.103	0.189	0.073
1999	0.305	0.083	0.104	0.190	0.073
2000	0.307	0.083	0.104	0.191	0.073
2001	0.308	0.083	0.105	0.192	0.074
2002	0.310	0.084	0.105	0.193	0.074
2003	0.311	0.084	0.106	0.194	0.074
2004	0.313	0.085	0.106	0.195	0.075
2005	0.315	0.085	0.107	0.196	0.075
2006	0.316	0.086	0.107	0.197	0.076
2007	0.318	0.086	0.108	0.198	0.076
2008	0.319	0.086	0.108	0.199	0.076
2009	0.321	0.087	0.109	0.200	0.077
2010	0.323	0.087	0.110	0.201	0.077

SOURCE: MAP MODEL CASE GFC.F83

VARIABLES: G15 G16 G17 G18 G21

TABLE D.18 (Continued)

			Regions		
	Southeast Fairbanks	Upper Yukon	Valdez/Chitina/ Whittier	Wade Hampton	Yukon/ Koyukuk
1980	0.303	0.034	0.040	0.145	0.243
1981	0.321	0.032	0.035	0.153	0.218
1982	0.410	0.035	0.035	0.083	0.216
1983	0.332	0.034	0.044	0.133	0.255
1984	0.333	0.034	0.045	0.134	0.257
1985	0.335	0.034	0.045	0.134	0.258
1986	0.337	0.034	0.045	0.135	0.259
1987	0.338	0.034	0.045	0.136	0.260
1988	0.340	0.035	0.045	0.136	0.262
1989	0.342	0.035	0.046	0.137	0.263
1990	0.343	0.035	0.046	0.138	0.264
1991	0.345	0.035	0.046	0.138	0.266
1992	0.347	0.035	0.046	0.139	0.267
1993	0.348	0.035	0.047	0.140	0.268
1994	0.350	0.036	0.047	0.140	0.270
1995	0.352	0.036	0.047	0.141	0.271
1996	0.354	0.036	0.047	0.142	0.272
1997	0.356	0.036	0.048	0.143	0.274
1998	0.357	0.036	0.048	0.143	0.275
1999	0.359	0.036	0.048	0.144	0.277
2000	0.361	0.037	0.048	0.145	0.278
2001	0.363	0.037	0.048	0.145	0.279
2002	0.364	0.037	0.049	0.146	0.281
2003	0.366	0.037	0.049	0.147	0.282
2004	0.368	0.037	0.049	0.148	0.283
2005	0.370	0.038	0.049	0.148	0.285
2006	0.372	0.038	0.050	0.149	0.286
2007	0.374	0.038	0.050	0.150	0.288
2008	0.376	0.038	0.050	0.151	0.289
2009	0.377	0.038	0.050	0.151	0.291
2010	0.379	0.039	0.051	0.152	0.292

SOURCE: MAP MODEL CASE GFC.F83

VARIABLES: G24 G25 G26 G27 G29

19. APA Hydro Projects

In addition to the Tyee and Terror Lake projects currently under construction, a number of other state-sponsored power projects are likely to be constructed in the 1980s. These are Swan Lake near Ketchikan (under construction), the power intertie between Talkeetna and Healy in Southcentral Alaska, the Bradley Lake project near Homer, and the Silver Lake project between Cordova and Valdez. Eighty percent of the intertie construction employment is assumed to be in the Matanuska-Susitna region, with 20 percent in the Interior. We assume, as well, that the Chackachamna project on the west side of Cook Inlet is constructed in the early 1990s.

We assume a schedule for construction of the five projects as follows:

Project	Region	Start (year)	Finish (year)	Average Work Force
Swan Lake	Southeast	1981	1984	125
Bradley Lake	Kenai-Cook Inlet	1984	1987	175
Silver Lake	Cordova-McCarthy	1985	1988	75
Chackachamna	Kenai-Cook Inlet	1988	1993	725
Intertie	80% Mat-Su	1983	1984	100
	20% Interior	1983	1984	25

SOURCES: Personal communication: Robert Mohn, Alaska Power Authority; John Stafford, Alaska Power Authority; and Alaska Department of Labor.

TABLE D.19. STATE HYDROELECTRIC PROJECTS

(thousands of employees)

	Regions			
	Cordova/ McCarthy	Southeast	Kenai/ Cook Inlet	Kodiak
1980	0.000	0.050	0.000	0.000
1981	0.000	0.163	0.000	0.000
1982	0.000	0.330	0.000	0.112
1983	0.000	0.284	0.000	0.322
1984	0.000	0.000	0.000	0.122
1985	0.038	0.000	0.129	0.000
1986	0.075	0.000	0.221	0.000
1987	0.075	0.000	0.265	0.000
1988	0.038	0.000	0.445	0.000
1989	0.000	0.000	0.725	0.000
1990	0.000	0.000	0.725	0.000
1991	0.000	0.000	0.725	0.000
1992	0.000	0.000	0.725	0.000
1993	0.000	0.000	0.363	0.000
1994	0.000	0.000	0.000	0.000
1995	0.000	0.000	0.000	0.000
1996	0.000	0.000	0.000	0.000
1997	0.000	0.000	0.000	0.000
1998	0.000	0.000	0.000	0.000
1999	0.000	0.000	0.000	0.000
2000	0.000	0.000	0.000	0.000
2001	0.000	0.000	0.000	0.000
2002	0.000	0.000	0.000	0.000
2003	0.000	0.000	0.000	0.000
2004	0.000	0.000	0.000	0.000
2005	0.000	0.000	0.000	0.000
2006	0.000	0.000	0.000	0.000
2007	0.000	0.000	0.000	0.000
2008	0.000	0.000	0.000	0.000
2009	0.000	0.000	0.000	0.000
2010	0.000	0.000	0.000	0.000

SOURCE: MAP MODEL CASE SHP.F83

VARIABLES: B08 B11 B12 B15

TABLE D.19 (Continued)

| | Regions | | Low-Wage Exogenous |
	Matanuska/ Susitna	Yukon/ Koyukuk	Construction Employment
1980	0.000	0.000	0.050
1981	0.000	0.000	0.163
1982	0.000	0.000	0.442
1983	0.052	0.014	0.672
1984	0.075	0.045	0.242
1985	0.000	0.000	0.167
1986	0.000	0.000	0.296
1987	0.000	0.000	0.340
1988	0.000	0.000	0.483
1989	0.000	0.000	0.725
1990	0.000	0.000	0.725
1991	0.000	0.000	0.725
1992	0.000	0.000	0.725
1993	0.000	0.000	0.363
1994	0.000	0.000	0.000
1995	0.000	0.000	0.000
1996	0.000	0.000	0.000
1997	0.000	0.000	0.000
1998	0.000	0.000	0.000
1999	0.000	0.000	0.000
2000	0.000	0.000	0.000
2001	0.000	0.000	0.000
2002	0.000	0.000	0.000
2003	0.000	0.000	0.000
2004	0.000	0.000	0.000
2005	0.000	0.000	0.000
2006	0.000	0.000	0.000
2007	0.000	0.000	0.000
2008	0.000	0.000	0.000
2009	0.000	0.000	0.000
2010	0.000	0.000	0.000

SOURCE: MAP MODEL CASE SHP.F83

VARIABLES: B17 B29 EMCNX2

20. Petroleum Revenues

In addition to basic employment assumptions, major elements of state petroleum revenues are located in the scenario model files. Royalty and production tax revenue projections are taken from Petroleum Production Revenue Forecast, a quarterly publication of Alaska Department of Revenue, Petroleum Revenue Division, which publishes the results of simulations using the model PETREV. State corporate petroleum tax revenue is assumed to grow at 7 percent nominal growth rate over time (0-to-0.5 percent real growth), consistent with the increasing physical presence of the industry in the state. Non-OCS related state property tax revenue increases at 3.5 percent annually (-3 percent real), reflecting the net effects of both inflation, depreciation of the existing stock of taxable petroleum property within the state. State bonus payment revenue is a function of state lease sales and consequently subject to very substantial year-to-year fluctuation. This source of revenue is assumed to fall to zero over an approximate 15-year period.

21. <u>Tourism</u>

The number of visitors to Alaska has increased by an average of approximately 50,000 per year over the past five years. We project this trend to continue as a linear (rather than exponential) trend through 2010, projected from a 1981 base of 630,000.

SOURCE: Alaska Department of Commerce, Division of Tourism.

APPENDIX E.   REVIEW OF MAP MODEL ASSUMPTIONS AND PARAMETERS

This appendix discusses the major sources of uncertainty inherent in projections of economic variables using the MAP model, along with measures we have taken to address that uncertainty. First is a brief section outlining the principal categories of uncertainty. Following this section is a section describing the procedures used to adjust a number of the parameters of the MAP statewide model. Finally, there is a description of the procedure used to prepare a new set of assumptions for a number of exogenous variables.

Sources of Projection Uncertainty

All projections using economic models are based on a set of assumptions about the values of uncertain and unknown variables and parameters. One can describe the uncertainty of projection due to uncertainty of assumptions as arising from three main sources.

One source of uncertainty is the set of assumptions regarding future levels of variables exogenous to the model. These are contained for the most part in the base case assumptions summarized for this report in Table 1. Other sources of uncertainty are the values assumed for the hundreds of parameters in various relationships specified in the MAP model, chiefly in the economic and the population components. The third source of uncertainty is the reliability of the model structure itself in predicting relationships among the economic variables.

Analysis of the third source, the basic structural validity of the MAP model, is an important goal, but beyond the scope of the present study. We concentrate instead upon the values chosen for numerous parameters and exogenous variables. A previous study reported the results of a large number of sensitivity tests run on the MAP statewide model (O.S. Goldsmith et al., <u>Man-in-the-Arctic Program</u> <u>(MAP) Economic Modeling System Technical Documentation Report</u>, ISER, June 1983, Appendix J). The sensitivity tests disclosed that certain assumptions were far more important than others in contributing to projection uncertainty.

In particular, the values chosen for several parameters in the model appear to be more critical to the simulation results than the asssmptions about individual base case economic variables. Plausible variations around the values chosen for certain of the parameters of the MAP model caused greater fluctuations in the level of a target projection variable, in this case the number of households, than did plausible variations in base case variable assumptions. Most significant of the parameters considered, as applied to the present study, are the labor force participation rate, the elasticity of support sector activity to wealth, and the parameters of the migration equation.

<u>Procedure for Updating Model Parameters</u>
With this consideration in mind, we systematically proceeded to update, review, and adjust the economic model parameters and several

key population model parameters. We derive parameters for relationships in the MAP model in essentially two ways. Most of the main economic model parameters, including those in the migration equation, are derived from econometric analysis of historical data. Others, including those in most demographic relationships, are made by assumption, usually based on one or more historical reference data points.

The procedure for revising the economic model parameters based on econometric techniques involved four steps. First, we systematically revised our historical data base to reflect the most recent information. In most cases, we were able to obtain at least preliminary data for 1982, or two years more than we had been able to use in the past. The second step was to reestimate all of the stochastic equations of the model for which we had new data (nearly all such equations in the model). We tried two alternate specifications for each equation--ordinary least squares regression (OLS) and generalized least squares, assuming first-order autocorrelation (GLS).

We now had three sets of regression coefficients from which to choose the parameters for the model--the new OLS coefficients, the new GLS coefficients, and the original set (also OLS). After reviewing the three sets of individual coefficients for each model equation and examining trial projections with the differing

parameter values, we chose the new OLS coefficients (using the updated data base) universally as the most reliable of the three.

The fourth and last step involved comparing the simulated values for variables in the model for 1982 and 1983 to actual benchmark figures (Alaska Department of Labor, Alaska Economic Trends). While the model with the new parameters produced simulated values that now matched closely with the benchmarks, there were also some discrepancies. In particular, several support-sector industries had larger benchmark data than simulated values. We assumed this discrepancy to be a permanent rise in the level of support industries, given total income and wealth, rather than either a random event or a change in the trend or elasticity. Accordingly, we adjusted the intercept value upward for five main support services so that projections for the initial year more closely matched the Alaska Department of Labor benchmarks.

To begin the review of the demograhpic parameters, we adjusted the starting values for population by age, sex, race, and military service to match so far as was possible data provided by the Alaska Department of Labor (Alaska Population Overview, 1982). Then we reviewed the simulated values for births and deaths, migration, and labor force participation for consistency with published data. The simulated values, using demographic parameters based upon the 1980 U.S. Census, correspond closely to the Alaska Department of Labor benchmark data.

We then discussed our model assumptions with expert demographers, as shown in Table E.1. The position of state demographer is currently vacant, but before leaving that position, the principal author of the Department of Labor's population forecasting model pointed out the main difference in the parameters between his model and the MAP model. The state demographic model uses survival rates constructed from life tables. The MAP population model, on the other hand, uses survival rates constructed from five-year cohort-specific death rates. Both methods begin with the 1980 census age-sex-specific deaths, then adjust them in different ways.

In our judgment, the life-table method is more accurate when data are available to compute the parameters for the table. An attribute of the MAP model that is of vital importance to our demographic projections is the division of the population into three categories, each with separate demographic characteristics and model parameters. These are the civilian non-Native population, the Native population, and the military population (see O.S. Goldsmith et al., MAP Economic Modeling System Technical Documentation Report, ISER, June 1983, Appendix C). Because of the relatively small number of Native men and women born in each year, life-table survival rates are not necessarily accurate. Because of this, we have not changed our methodology based upon this criticism. We may decide to do so in the future, however, as additional data become available.

TABLE E.1. EXTERNAL REVIEWERS FOR MAP MODEL ASSUMPTIONS

Assumptions	Name	Affiliation
1. <u>Demographic Parameters</u>	Dave Swanson	(formerly) Alaska Department of Labor
	Mike Breedlove	Municipality of Anchorage
2. <u>Fiscal Projections</u>	Arlon Tussing	ARTA, Inc., and University of Alaska
	Charles Logsdon	Alaska Department of Revenue
	Vince Wright	Alaska Department of Revenue
	Tom Chester	Office of the Governor
3. <u>Basic Industry Employment-</u> <u>Project Assumptions</u>	John Ratterman	Alyeska Pipeline Service Company
	Greg Huff	Alaska Department of Labor
	Richard Soule	Municipality of Anchorage
	Don Finney	U.S. Borax
	Bradford Tuck	University of Alaska
	Joseph Mehrkens	U.S. Forest Service
	John Pearson	Alaska Department of Commerce
	John Stafford (et al)	Alaska Power Authority
4. <u>Basic Industry Employment-</u> <u>Industry Assumptions</u>	Joseph Mehrkens	U.S. Forest Service
	Arlon Tussing	ARTA, Inc., and University of Alaska
	George Rogers	University of Alaska
	Ed Phillips	Alaska Department of Natural Resources
	Bradford Tuck	University of Alaska
	Richard Soule	Municipality of Anchorage

Procedure for Updating Base Case Assumptions

As mentioned in the report, the four categories of base case assumptions needed to make projections with the MAP statewide model are (1) national variables assumptions, (2) exogenous employment assumptions, (3) exogenous tourism assumptions, and (4) state revenue and spending assumptions. Regional model projections also require regional exogenous employment assumptions. The first step in reviewing the base case assumptions was to compare our assumed levels of employment, revenue, national variables, etc., with recent benchmarks, adjusting them as needed to conform to the actual values. Because of the relatively low sensitivity of model results to plausible changes in the four national variables assumptions, we did not review them further (see O.S. Goldsmith et al., MAP Economic Modeling System Technical Documentation Report, Appendix J).

The remaining exogenous variables assumptions can be divided into two categories: (1) those whose values are principally determined by matters of policy and (2) those whose values are principally determined by market forces. We decided to review only the market-based projections, as there is really no way one can determine who is and who is not an expert in the field of forecasting long-range state and national policy. Readers may judge for themselves whether the outcomes of political debates implicit in the assumptions we have chosen are consistent with their own expectations. The policy variables in this category include employment in federal civilian and military government, agriculture,

federal revenue sharing, and state spending policy. Table 1 of the report summarizes our assumptions for these variables.

For the market-determined variables, we reviewed our assumptions for special projects with individuals especially knowledgeable about these and similar projects. This caused us to revise some of our special project assumptions, but not others. Following this task, we selected in addition a number of highly qualified experts to review overall levels of activity assumed for industries as a whole. The individual reviewers are listed in Table E.1, according to the manner in which they were asked to assist us.

As a result of this process, we derived a completely new set of assumptions for the base case used in this study. While the general direction of each project and industry assumption is consistent with information supplied by the reviewer, the specific assumptions were developed by staff of the Institute of Social and Economic Research.