

ANWR AND THE ALASKA ECONOMY ***AN ECONOMIC IMPACT ASSESSMENT***

PREPARED FOR:

SUPPORTING ALASKA FREE ENTERPRISE
(SAFE)



Research-Based Consulting

Juneau
Anchorage

SEPTEMBER 2002

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EXECUTIVE SUMMARY

The purpose of this study is to assess the potential economic impacts in Alaska from oil development in the coastal plain of the Arctic National Wildlife Refuge. Key findings of this study are summarized below.

- Based on \$22 per barrel oil (West Coast), annual Alaska revenues from ANWR oil production could peak at over \$800 million. This includes royalties (assuming a 50/50 state/federal royalty split), severance taxes, property taxes and corporate income taxes. This is based on the “mean” resource volume estimate of 10 billion barrels of technically recoverable oil in ANWR.
- Five years after the first barrel of ANWR oil is pumped, annual state revenues would total approximately \$300 million and after ten years, \$600 million. Peak revenues are reached after approximately 17 years. In addition, lease bonus revenues would add an estimated \$1.5 billion to state coffers.
- With higher oil prices, total annual state revenues could peak at about \$1.3 billion (\$24 per barrel oil). The price of ANS West Coast oil currently stands at about \$27 per barrel.

State of Alaska Revenues from ANWR Oil Production Peak Annual Values (millions of dollars)

	West Coast Price (\$/bbl)	\$20.00	\$22.00	\$24.00
Royalties (50/50 state/federal split)		\$130	\$200	\$320
Royalties (90/10 state/federal split)		230	360	570
Severance Taxes		270	420	660
Corporate Income Taxes		60	100	160
Property Taxes		80	100	140
Total Alaska Revenues (50/50 royalty split)		\$540	\$830	\$1,280
Total Alaska Revenues (90/10 royalty split)		\$650	\$990	\$1,530

Subtotals may not add to totals due to rounding.

- Based on \$22 per barrel oil, development of ANWR’s oil resources could create approximately 25,000 jobs in Alaska and \$1.7 billion in labor income (assuming a 50/50 royalty split).
- Five years after the first barrel of ANWR oil is pumped, Alaska employment gains would total approximately 10,000 jobs and after ten years, 19,000 jobs. Peak employment would be reached after approximately 17 years.
- With higher oil prices, total Alaska employment could peak at just over 38,000 jobs and \$2.6 billion in labor income (\$24 per barrel oil).

Employment and Labor Income Impacts of Oil Development in ANWR
Peak Annual Employment and Labor Income

West Coast Price (\$/bbl)	\$20.00	\$22.00	\$24.00
Peak Employment			
Oil Industry	9,000	14,000	21,000
State and Local Governments	7,000	11,000	17,000
Peak ANWR-Related Employment	17,000	25,000	38,000
Peak Labor Income (millions)			
Oil Industry	\$800	\$1,200	\$1,900
State and Local Governments	300	500	800
Peak ANWR-Related Income	\$1,200	\$1,700	\$2,600

Subtotals may not add to totals due to rounding.

- To place these employment figures in perspective, Alaska’s economy now includes approximately 280,000 wage and salary jobs, accounting for \$9.7 billion in total annual payroll.
- This analysis focuses primarily on economic impacts after production begins. However, in a five-year construction and development phase, employment and labor income could peak at 11,000 jobs and just over \$500 million.
- Additional jobs and income will be created in the Alaska economy through ANWR-related contributions to the Permanent Fund. Contributions to the Permanent Fund from ANWR revenues could total just under \$3 billion over the first 15 years of ANWR production, based on \$22/barrel oil.
- ANWR-related Permanent Fund dividends paid to Alaskans would reach an accumulated total in excess of \$300 million after 15 years of ANWR production. In-state spending of those dividends would create approximately 700 jobs annually (jobs not included in the table above).

The purpose of this study is to estimate potential economic impact in Alaska from oil production from the coastal plain of the Arctic National Wildlife Refuge (ANWR). Several studies have been conducted on the potential volume of technically recoverable oil contained in Area 1002 and adjacent areas. The United States Geological Survey (USGS) conducted the most comprehensive assessment of the economically recoverable oil contained in Area 1002.¹ However, this is the first effort to predict the economic benefits that could accrue to Alaska as a result of oil development in ANWR.

It is important that readers of this report understand the uncertainty inherent in this type of analysis. Following are several of the critical sources of uncertainty:

- *The volume of ANWR oil that is technically recoverable.* As described later in this report, geologists estimate that ANWR contains between 6 billion and 15 billion barrels of technically recoverable oil. The potential economic benefits from ANWR development could be similarly divergent. Added to this uncertainty is the potential for technological advances, which most certainly will occur over the multi-decade potential productive life of the ANWR fields. Such advances would increase the volume of technically recoverable oil. They can also increase the volume of oil that is economically recoverable. The nature and timing of such advances, however, is impossible to predict.
- *Future oil prices.* The price of oil is the key factor in determining how much oil could be economically produced from ANWR. With oil prices subject to occasionally wild swings, the volume of ANWR oil in the ground that is “economic” may in six months be double what it is today, or conversely, half of what it is today.
- *Cost factors.* The cost of production, including royalty rates and taxes, is at this time uncertain with regard to ANWR. Royalty rates could be between 12.5 percent and 16.7 percent, the difference of course representing millions of dollars to state and federal government, and potentially thousands of jobs in Alaska. The effect of other cost and revenue factors are similarly difficult to foresee, such as the Economic Limit Factor (ELF, applied to severance tax calculations) which depends on the number of producing wells and the volume of oil produced during any given period.

In addition to the questions surrounding the volume and value of the ANWR oil resource, there is significant uncertainty about how production would translate into economic benefits for Alaska. Economists use models to predict the number of jobs and income that would be created by increased spending in an economy, whether from new oil development, a new fish processing plant, or increased tourism. However, even the most sophisticated model represents a gross simplification of the highly complex, real-world economy.

¹ *Economics of Undiscovered Oil in the 1002 Area of the Arctic National Wildlife Refuge*, Chapter EA (Economic Analysis), Emil D. Attanasi, 1999, U.S. Geological Survey, Open File Report 98-34.

While recognizing this uncertainty, every effort has been made to incorporate reasonable, and generally conservative, assumptions into this analysis. The assessment is intended to add more information to the ANWR debate. As better data becomes available in the future, the assumptions made here can be refined, and a clearer picture of the potential economic benefits of ANWR presented.

This economic analysis focuses primarily on the Alaska employment and labor income effects of ANWR development. The analysis included use of IMPLAN Pro version 2.0, a software package that provides a predictive model of local and state economies.

The results of this analysis are time-dependent only to the extent that economic linkages between sectors of the Alaska economy change over time. In other words, employment and labor income estimates are based on present-day multipliers. Ten years from now, for example, Alaska's economy will likely have changed, and economic relationships, represented by multipliers, may be different. Otherwise, oil prices and cost factors have been held constant.

CHAPTER I: ANWR OIL RESERVES

ANWR Oil Resources

In May 1998, the United States Geological Survey (USGS) released a report regarding the oil and gas potential for the 1002 area of the Arctic National Wildlife Refuge (ANWR). This report provided an update of a USGS assessment conducted ten years earlier. The new report, entitled "The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge 1002 Area, Alaska," used data generated from wells drilled, oil discoveries made near ANWR, improved technological processes and interpretative methodologies to generate updated oil and gas resource estimates.

The entire coastal plain area includes 1.5 million acres of Federal 1002 land. Within the area there are approximately 92,000 acres of subsurface estate owned by the Arctic Slope Regional Corporation (ASRC), which are subject to Refuge regulations.² There are also more than 10,000 acres of other privately owned Native allotments within ANWR that are not subject to Refuge regulations. The area includes State land between the coast and the three-mile off-shore boundary. It is estimated that 74 percent of technically recoverable oil is located on Federal land, with the remaining 26 percent divided between the private and State lands.³

In-Place Oil Resources

The 1998 USGS report estimated in-place oil resources within the Federal 1002 area at between 11.6 and 31.5 billion barrels (95 and 5 percent probabilities, respectively), with a mean value of 20.7 billion barrels.⁴ This estimate differs from the 1987 in-place oil resource assessment of 4.8 and 29.4 billion barrels (95 and 5 percent probabilities), with a mean value of 13.8 billion barrels of oil. In-place oil resources represent the estimated natural endowment or occurrence of oil resources based upon geologic knowledge and theory. It does not take into account the recoverability of the resource.

Table 1
In-Place ANWR Oil Resources, 1987 and 1998 USGS Assessments

Statistical Estimate	1987 USGS Federal 1002 Area Assessment (BBO) ¹	1998 USGS Federal 1002 Area Assessment (BBO) ¹	1998 USGS Entire Coastal Plain Area Assessment (BBO)
95% (19 in 20 chance)	4.8	11.6	15.6
Mean Value	13.8	20.7	27.8
5% (1 in 20 chance)	29.4	31.5	42.3

1 – *The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge 1002 Area, Alaska (May, 1998).*

² The surface estate is owned by Kaktovik Inupiat Corporation (KIC), an Alaska Native village corporation.

³ Technically recoverable oil is the volume of oil that can be recovered with existing technology, regardless of cost.

⁴ A 95 percent probability means that there is a 19 in 20 chance of finding this volume of oil. A 5 percent probability means there is a 1 in 20 chance.

Technically Recoverable Resources

Technically recoverable resources are that volume of the resource that may be recoverable given current technology while disregarding the cost of recovery. This can also be interpreted as estimating the supply of oil given current recovery technology, without regard to the demand, or the amount that could be profitably produced at a given market price. The 1998 USGS report estimated the technically recoverable petroleum resources of the Federal 1002 area between 4.3 and 11.8 billion barrels (95 and 5 percent probabilities), with a mean value of 7.7 billion barrels of oil. The amount of technically recoverable resources within the entire coastal plain area is estimated to be between 5.7 and 16 billion barrels (95 and 5 percent probabilities), with a mean value of 10.3 billion barrels of oil.

Table 2
Technically Recoverable Oil Resources in Federal 1002 Area and the Entire ANWR Coastal Plain

Statistical Estimate	Federal 1002 Area (BBO) ²	Entire ANWR Coastal Plain (BBO) ¹
95% (19 in 20 chance)	4.3	5.7
Mean Value	7.7	10.3
5% (1 in 20 chance)	11.8	16.0

1 – *Potential Oil Production from the Coastal Plain of the Arctic National Wildlife Refuge: Updated Assessment*, (May, 2000), Energy Information Administration, U.S. Department of Energy.

2 – *The Oil and Gas Resource Potential of the Arctic National Wildlife Refuge 1002 Area, Alaska: Economic Analysis* (1999). U.S. Geological Survey, Open File Report 98-34.

Economically Recoverable Resources

Both in-place and technically recoverable resources are static numbers (not considering technological advances). A third measure of oil resources is highly dynamic. Economically recoverable resources are those resources that would be produced given a certain market price. Economically recoverable resources are therefore a function of price. Given the volatility of oil prices, it is difficult to predict clearly how much oil would be produced at any given time. For the Federal 1002 area of ANWR, given a market price of \$15 a barrel (1996 dollars, West Coast delivery, or about \$16.60 in current dollars), no oil production would occur, according to the USGS assessment. When the market price increases to \$20 (1996 dollars), 3.2 billion barrels or 42 percent of the estimated mean amount of technically recoverable oil is economic to produce. When the market price increases to \$24 a barrel (1996 dollars), the economically recoverable amount of oil increases to 5.2 billion barrels, or 68 percent of the estimated mean value of 7.7 billion barrels of oil.

Table 3
Economically Recoverable Oil Resources in ANWR
At Various Oil Price Levels
Federal 1002 Area¹

Incremental Cost or Market Price of a Barrel of Oil	Economically Recoverable Oil (billion barrels)	Percent of Mean Value for Federal 1002 Area of ANWR
15.2	00.0	00.0
15.3	0.8	10.3
16	1.1	14.1
17	1.8	23.9
18	2.4	31.1
19	2.6	34.3
20	3.2	41.6
21	4.0	51.8
22	4.4	56.6
23	5.0	65.4
24	5.2	68.1
25	5.6	73.2
26	5.8	75.5
27	6.1	78.5
28	6.2	80.7
29	6.3	81.8
30	6.3	81.9

1 – E. Attanasi USGS (August, 2002). Prices in 1996 dollars, West Coast delivery.

ANWR Oil Production Rates

The Energy Information Administration (EIA), within the U.S. Department of Energy, estimates that the period of time required from approval to conduct lease sales to production of oil from ANWR would be between seven and 12 years (the EIA authors assume nine years in their analysis).

Regarding production rates, the EIA formulated production schedules based on technically recoverable resource estimates. Assuming a one-year lag between developments, the EIA estimated 40-year production schedules with new fields coming online each year for 25 years. Given this production schedule for technically recoverable oil resources, oil production would occur over 65 years. For purposes of this analysis, this production schedule is independent of price.

The production schedules postulated by the EIA are based upon increasing field production rates for the first two years, followed by a peak production rate in the third year. Beginning the fourth year, production would decline. The assumptions made in this production schedule differ from the schedule produced by the EIA two years later. In February of 2002 the EIA suggested that there would be a two-year lag between fields coming online. Further, production rates would increase for three to four years before peaking and going into decline.

In this study, the production rates predicted by the EIA in 2002 were used, though the rates were applied to estimates of the economically recoverable oil, not all technically recoverable oil. Production rates are provided in the appendices to this report and are based on three price scenarios; \$20, \$22 and \$24 per barrel, West Coast delivery, in 2001 dollars. These prices are approximately equivalent to \$18, \$20 and \$22 per barrel oil in 1996 dollars, as presented in Table 3. ANS West Coast oil prices as of August 29, 2002, were at \$27.40 per barrel. Since 1990, real (inflation-adjusted) ANS West Coast prices have averaged about \$22 per barrel.

CHAPTER II: STATE OF ALASKA REVENUES FROM ANWR DEVELOPMENT AND PRODUCTION

Introduction

There would be four major sources of State revenues from oil development in ANWR—State and Federal mineral lease revenues, property taxes, production taxes, and corporate income tax. There have been no significant changes since 1995 in the State or Federal statutes governing these sources. This section of the report describes these revenue sources and the assumptions made to estimate revenues for ANWR.

Mineral Lease Revenues

Mineral lease revenues include cash bonuses, lease rentals, and royalties. This economic impact analysis focuses only on royalties. Lease rentals are generally an insignificant source of revenue compared to royalties. Bonuses can be very significant, but unpredictable. The potential lease bonus revenue from ANWR has been estimated at \$1.5 billion.⁵

The State Division of Oil and Gas, Department of Natural Resources has an ongoing leasing program in the State waters off ANWR, out to the 3-mile boundary of State jurisdiction. All State lease sales off ANWR have used a fixed 12.5 percent royalty.

Federal lease sales in ANWR's 1002 Area could include royalties as high as 16.7 percent. Recent lease sales in the National Petroleum Reserve – Alaska (NPRA) have used a 12.5 percent royalty in areas with low petroleum potential, and a 16.7 percent royalty in high potential areas. The total volume of ANWR's technically recoverable oil is comparable to NPRA. But, it is concentrated in larger accumulations in an area 1/12 the size of NPRA, close to existing feeder pipelines. ANWR recovery is potentially far more economic than even NPRA's high potential acreage.⁶

The USGS economic analysis of ANWR assumed a 16.7 percent royalty (on Federal lands).⁷

Legislative bill H.R. 4, which authorizes ANWR 1002 Area development, passed the U.S. House August 2, 2001. It is now in conference with the Senate-passed version of H.R. 4, which contains no ANWR development authorization. Section 6506(a)(1) of H.R. 4, as passed by the House, provides that ANWR leases shall have a minimum royalty of 12.5 percent.

Under the Alaska Statehood Act, the State is entitled to 90 percent of Federal mineral lease revenues. However, Congressional authorization of oil and gas leasing in ANWR is likely to reduce that to 50 percent. Section 6512 of H.R. 4 provides for a 50-50 State/Federal split of bonuses, lease rentals, and royalties. The 50/50 split is the

⁵ From the Energy Information Administration web site t http://www.eia.doe.gov/oiaf/aeo/leg_reg.html

⁶ U.S. Geological Survey 2002 *Petroleum Assessment of the National Petroleum Reserve in Alaska (NPRA)*, USGS, May 2002.

⁷ *Economics of Undiscovered Oil in the 1002 Area of the Arctic National Wildlife Refuge*, Chapter EA (Economic Analysis), Emil D. Attanasi, 1999 in U.S. Geological Survey, Open File Report 98-34.

most likely division of revenues if ANWR development is authorized. This economic analysis is based on the 50/50 split, though the impacts of a 90/10 split on state revenues are considered.

Property Tax

Under AS 43.56, the State levies a 20-mill tax (2 percent) on the assessed value of all oil and gas exploration, production, and transportation tangible property. Municipalities may also levy a tax on the property, up to 20 mills. Taxpayers are allowed a credit against their tax liability to the State for any property taxes paid to municipalities. In FY 2001, the North Slope Borough's property tax levy left about 5 percent of the total authorized tax to the State. In other words, the Borough levied a tax of about 19 mills, leaving one mill for the State after the credit.⁸

Property tax revenues to the state and local governments will depend on the schedule and value of investments made in development and production from ANWR. The USGS has made estimates of rates of development, and has formulated cost factors in its ANWR economic analysis. However, specific development schedules and associated costs are not available. In this analysis, a flat rate of \$0.50 per barrel of oil produced is used to estimate total property tax revenues. This includes tax revenues to the state and local governments. This rate was used in a recent NPRA economic assessment.⁹

Statewide, property taxes on tangible oil and gas property have produced revenues ranging from about \$0.60 to \$0.75 per barrel (2001 dollars) over the past 12 years.¹⁰

Production (Severance) Taxes

Under AS 43.55, the State levies a tax on the production of oil, excluding the Federal or State government's royalty share of production. The tax is the higher of a percent of value or a cents per barrel tax, in both cases multiplied by the economic limit factor (ELF). For ANWR, the tax would be 12.25 percent of the gross value of production at the wellhead for the first five years of production and 15 percent thereafter. The cents per barrel tax is 80 cents, adjusted for crude oil API gravity.

The cents per barrel tax can be ignored. USGS' latest analysis¹¹ indicates no commercial development of ANWR would occur if oil prices were below \$13 in 1996 dollars. In today's dollars the minimum threshold would be even greater. The 80 cents per barrel tax would be effective only with wellhead prices below \$6.53 during the first five years of production or below \$5.33 thereafter.

The ELF formula for oil production is

$$\text{ELF} = (1 - (300 \times \text{Wells}) / \text{Volume})^{\left((150,000 / \text{Volume})^{1.5333} \right)}$$

⁸ *Spring 2002 Revenue Sources Book*, Alaska Department of Revenue, Tax Division, page 73, <http://www.tax.state.ak.us/SourcesBook/2002SpringSources/index.htm>.

⁹ *NPRA Final Integrated Activity Plan/Environmental Impact Statement*, US Department of Interior, Bureau of Land Management and Minerals Management Service, August 1998. <http://aurora.ak.blm.gov.NPRA/final/html>.

¹⁰ Based on data provided in DOR's *Spring 2002 Revenue Sources Book* and earlier editions of the same publication.

¹¹ *Arctic National Wildlife Refuge, 1002 Area, Petroleum Assessment, 1998, Including Economic Analysis*, USGS, April 2001.

Where “Wells” is the number of producing wells in the field and “Volume” is the total daily production for the field. The ELF reduces the production tax on wells as their productivity declines. It also reduces the tax on small fields. In this study an ELF is assumed to be 1.0 for the first 17 years of ANWR production (until production peaks), then it is assumed to decline at an annual rate of 2 percent (0.02) annually thereafter.

There is also a State Hazardous Release Surcharge on production taxes. The money is to be used for prevention of, and emergency response to, hazardous substance spills. The tax rate is 3 cents per barrel on all oil production, except Federal and State royalty production. The tax rate is 5 cents per barrel when the balance in the State’s Oil and Hazardous Substance Release Prevention and Response Fund falls below \$50 million. During Fiscal Year 2001, the fund balance exceeded \$50 million. Because this is a minor tax, it is not included in this analysis.

Corporate Income Tax

Under AS 43.20.072, the State levies a corporate income tax on oil and gas production and transportation. It is based on a 2- or 3-factor apportionment of a corporation’s worldwide income from oil and gas activities. The factors are Alaska’s proportion of worldwide production, property, and sales. Petroleum producers are apportioned based on production and property, including intangible as well as tangible drilling and development costs. Pipeline operators are apportioned based on property and sales, including tariffs. Producers and pipeline operators are apportioned based on all three factors. The tax is a graduated rate on taxable income up to \$90,000. The marginal rate on income above \$90,000 is 9.4 percent.

Since 1985, corporate income taxes paid by the oil industry in Alaska have averaged 25 percent of total royalty payments. This is purely a statistical relationship; however, in the absence of better data it provides a starting point for estimating ANWR-related corporate income tax revenues.

Summary

The following table provides estimated Alaska revenues from ANWR, under various price scenarios (West Coast delivery price). These estimates include revenues to local government from property taxes, as well as estimated royalties to private ANWR landowners. Detailed annual estimates are provided in the appendix.

Table 4
Alaska Revenues from ANWR Oil Production
Peak Annual Values (millions of dollars)

West Coast Price (\$/bbl)	\$20.00	\$22.00	\$24.00
Royalties (50/50 state/federal split)	\$130	\$200	\$320
Royalties (90/10 state/federal split)	230	360	570
Severance Taxes	270	420	660
Corporate Income Taxes	60	100	160
Property Taxes	80	100	140
Total Alaska Revenues (50/50 royalty split)	\$540	\$830	\$1,280
Total Alaska Revenues (90/10 royalty split)	\$650	\$990	\$1,530

CHAPTER III:

ECONOMIC IMPACT IN ALASKA FROM ANWR PRODUCTION

Economic Impacts During Exploration and Development

Before oil begins to flow from ANWR, seven to 12 years of exploration and development work would be required. During this period, the economic impact in Alaska of ANWR development would include lease bonuses and employment stemming from exploration and construction activity. These impacts are addressed below.

Pre-Production Revenues to the State

The Congressional Budget Office estimated that a total \$3.0 billion in bonus bids would be received from ANWR.¹² Assuming a 50/50 state/federal split, Alaska's share would total \$1.5 billion. The timing of when these bonuses would be received is somewhat uncertain, but it is likely to occur within three to four years of the date that ANWR development is authorized.

Half of the state's \$1.5 billion share would be deposited in the Permanent Fund. Also, 0.5 percent would be deposited in the Public School Fund Trust. The balance would go to the state's general fund where it would be spent on a range of public services or capital projects. Because these bonus revenues would be a one-time contribution to the general fund it is not appropriate to attribute a specific number of jobs to the ANWR revenues. However, including direct, indirect and induced effects, this \$740 million in general fund money would translate into an equivalent amount of payroll for Alaskan workers.¹³

Other than the lease bonuses, there are no significant pre-production revenues to state government. There would be rental incomes generated between the time that the bids occur and production (while exploration and development is taking place); however, these per-acre rental incomes would be insignificant from a state budgeting perspective. Property tax revenues would also begin flowing pre-production, mostly to the North Slope Borough.

Oil Industry Pre-Production Employment and Labor Income

Thousands of jobs will be created during the pre-production phase of ANWR's development. This includes wildcat drilling, development drilling, pipeline construction and construction of field facilities (drill pads, flow lines from drilling sites, the central processing unit, and facilities for housing workers).

Because most of ANWR's oil is apparently contained in a number of moderate-size and smaller fields (rather than one "elephant" field), investment will be incremental, beginning with the largest, lowest-cost fields followed by the smaller, higher-cost

¹² "Budget Options", issued February 2001, Congressional Budget Office <http://www.cbo.gov/>.

¹³ Based on labor income per dollar of output ratio for state and local government of about 1 to 1, as indicated by the IMPLAN model.

fields, as market conditions allow. In any case, very little data exists on initial investment and manpower requirements for ANWR oil development. The USGS estimates that construction of an 85-mile pipeline from the TAPS to a central location in the Western Area of Area 1002 would cost \$378 million in 1996 dollars.¹⁴ This includes cost of materials, pipe, installation, pump stations and construction of a parallel gravel haul road. Another \$198 million pipeline would be required to link the Eastern Area, but presumably this investment would occur well after the Western Area was at or near full production.

Drilling costs are estimated to average \$8 to \$10 million per wildcat well. Drilling and completion costs per production wells for depths to 5,000 feet are assumed at \$2.2 million, 5,000 to 10,000 feet \$2.73 million, 10,000 to 15,000 feet \$3.31 million, greater than 15,000 feet, \$5.76 million (all in 1996 dollars).¹⁵

The greatest cost associated with ANWR development would be in facilities investment, which is dependent on the size of fields being developed. Facilities investment costs range from over \$4 per barrel for fields of under 100 million barrels to around \$1 per barrel for large fields (1 billion barrels), according to the USGS. It is not possible to predict with any degree of certainty the intensity of the initial ANWR development effort; however, it is reasonable to assume that facilities to produce one-third of the economic oil reserves – about a billion barrels of oil – would be constructed. Assuming an average cost of \$2 per barrel, initial investment in facilities would cost approximately \$2 billion total. Add to that pipeline construction costs and drilling costs, and the initial investment could total approximately \$3 billion.

This investment, which would occur over several years, would translate into substantial employment and labor income impacts. Based on the assumed investment schedule shown in the following table, this construction and development phase employment would peak at 11,000 jobs with labor income of just over \$500 million.¹⁶

Table 5
Pre-Production ANWR Investment, Employment and Labor Income

Fiscal Year	Investment (millions)	Employment	Labor Income (millions)
Years 1 - 4	–	–	–
Year 5	\$300	4,000	\$170
Year 6	400	6,000	260
Year 7	600	8,000	350
Year 8	700	10,000	430
Year 9	900	11,000	520

Source: McDowell Group estimates, includes direct and indirect employment and income.

¹⁴ USGS Open-File Report 98-34, page EA-37.

¹⁵ Ibid, page EA-39.

¹⁶ IMPLAN multipliers for New Industrial and Commercial Buildings were used to estimate total employment impacts.

Oil Industry Employment and Income Impacts from ANWR Production

This section provides estimates of oil industry employment and payroll associated with ANWR oil production. These jobs include employment associated with finding, developing, and producing ANWR oil. Indirect and induced jobs are also considered. Indirect jobs are those created in the many businesses that provide goods and services to the oil industry. Induced impacts occur through in-state spending of employee payroll dollars. Multipliers generated by the IMPLAN model are used to estimate these impacts. These multipliers are shown in Table 5.

Table 6
IMPLAN Multipliers for Oil and Gas Production in Alaska

	Direct	Indirect	Induced	Total
Employment dollars of output (1)	2.66	2.127	3.237	8.024
Labor Income (2)	0.2734	0.1044	0.1066	0.4847

1 - Based on 1998 dollars, jobs per million dollars of output.

2 - Labor income per dollar of output.

These multipliers suggest that for each million dollars of output (oil produced) a total of eight jobs are created in Alaska. For every million dollars in output, \$480,000 in direct, indirect and induced labor income is created.

Direct employment and labor income multipliers are applied to the value of ANWR oil at the Valdez terminal (well-head plus transportation to the TAPS, plus the TAPS tariff). To avoid potential double counting of jobs created by state spending of ANWR revenue, indirect and induced employment are based on Valdez value less taxes and royalties.

It should be noted that these IMPLAN multipliers are based on 1998 dollars. Therefore, the revenue estimates were adjusted to 1998 dollars before the multipliers were applied.¹⁷

Annual oil industry employment estimates due to ANWR production are provided in the Appendix to this report. Oil industry-related employment, including direct, indirect and induced employment, steadily increases from initial production to a peak of approximately 14,000 jobs.¹⁸

State Government Revenue-Related Employment and Payroll

The economic impact of state revenues derived from ANWR production would depend on several factors. Most important is how the money is used. ANWR revenue would be split along three paths: to the Alaska Permanent Fund, to the state operating budget, or the state capital projects budget. The next section describes how ANWR revenue to the state is likely to be distributed among these three categories. Then the employment and payroll impacts of state spending of ANWR

¹⁷ The Producer Price Index (PPI) for crude petroleum, domestic production, as published by the Bureau of Labor Statistics, was used to convert 2001 oil values to 1998 oil values.

¹⁸ Based on an average price of \$22 per barrel oil.

revenue are described (based on the assumptions made about the distribution of ANWR-related revenue into various state coffers).

Distribution of State Revenue from ANWR

For fields leased prior to 1980, at least one-quarter (25 percent) of all mineral lease rentals, royalties, royalty sale proceeds, federal mineral revenue sharing payments and bonuses received by the State of Alaska must be deposited in the Permanent Fund.¹⁹ For fields leased after 1980, a 50 percent contribution to the Permanent Fund is required. In addition, a contribution of 0.5% of all royalties and bonuses must be deposited in the Public School Fund Trust.

Of the balance, 95 percent of revenues are assumed to be spent through the state operating budget. Over the past five fiscal years, the unrestricted General Fund split between operating and capital budgets has between 95 percent and 97 percent operating and 3 to 5 percent capital.²⁰

Table 7
Alaska State Operating and Capital Projects
Enacted Budgets, FY 1997 to FY 2001 (millions of dollars)

Fiscal Year	Operating Expenditures	Capital Expenditures	Percent Operating
1997	\$2,046.2	\$100.0	95%
1998	\$2,033.6	\$97.7	95%
1999	\$2,022.8	\$89.9	96%
2000	\$1,973.9	\$81.5	96%
2001	\$2,014.0	\$71.8	97%

Source: Alaska State Legislature, Legislative Finance Division.

Employment and Payroll from Operating Budget Expenditures

IMPLAN splits state and local government into two components: education and non-education. In this analysis it is assumed that 35 percent of the ANWR revenues spent through the operating budget would be spent on education.²¹

Direct, indirect, induced and total multipliers are provided in the following table. The education component of government has relatively high direct multipliers because payroll is (usually by far) a school district's single largest budget item.

IMPLAN reports a zero indirect multiplier for state and local government. While a low indirect multiplier would be expected, a zero multiplier clearly understates actual indirect impacts. Nevertheless, the IMPLAN multipliers taken as a whole appear reasonable and are used in this analysis.

¹⁹ *Spring 2002 Revenue Source Book*, Alaska Department of Revenue, Tax Division, page 75.
<http://www.tax.state.ak.us/SourcesBook/2002SpringSources/index.htm>.

²⁰ Based on data provided by the Legislative Finance Division at <http://www.legfin.state.ak.us/>. This distribution does not include "Statewide" expenditures, such as supplemental appropriations, debt retirement and fund capitalization. In the economic impact analysis Statewide expenditures are treated as operating expenditures.

²¹ Based on the FY 2001 budget, Summary of Appropriation, Legislative Finance Division, <http://www.legfin.state.ak.us/>.

Table 8
IMPLAN Multipliers for State and
Local Government Operations in Alaska

	Direct	Indirect	Induced	Total
Employment (1)				
State and Local Government - Education	22.313	0	6.368	28.681
State and Local Government - Non-Education	14.917	0	5.019	19.936
Weighted Average (35% Education)	17.506	0	5.491	22.997
Labor Income (2)				
State and Local Government - Education	1.000	0	0.1830	1.183
State and Local Government - Non-Education	0.784	0	0.1446	0.929
Weighted Average (35% Education)	0.860	0	0.1580	1.0179

1 - Based on 1998 dollars, jobs per million dollars of output.

2 - Labor income per dollar of output.

These multipliers indicate that state revenue spent on education generates a total of 28.7 jobs per million dollars of output (or expenditure). State spending on other operating budget items creates a total of approximately 20 jobs per million dollars. To estimate total state and local government employment impacts from ANWR revenue to state government, a weighted average of 23 jobs per million dollars was used. Revenue estimates, made in 2001 dollars, were adjusted to 1998 dollars before the multipliers were applied.²²

Labor income multipliers are also provided in Table 8. These multipliers indicate that for every dollar of ANWR revenue that flows to the state operating budget, a total of \$1.02 of labor income will be created.

Employment and Payroll from Capital Budget Expenditures

Though a relatively small part of the overall impact, the employment and income effects of capital budget expenditures must be considered separately because of significantly different multiplier effects. Table 9 provides IMPLAN multipliers for two categories of construction, New Highways and Streets, and New Government Facilities. For purposes of this analysis, it was assumed that 80 percent of the capital project budget would be spent on highway construction-related projects. This assumption results in a total multiplier of 13.6 jobs per million dollars. Labor income totals \$600,000 per million dollars of expenditure.

²² Adjustment from 2001 dollars to 1998 dollars was based on the Anchorage Consumer Price Index.

Table 9
IMPLAN Multipliers for Capital Projects in Alaska

	Direct	Indirect	Induced	Total
Employment (1)				
New Highways and Streets	7.813	2.622	3.376	13.810
New Government Facilities	5.494	3.688	3.599	12.781
Weighted Average (80% Highways)	7.349	2.835	3.4206	13.604
Labor Income (2)				
New Highways and Streets	0.408	0.0875	0.01	0.595
New Government Facilities	0.402	0.124	0.106	0.633
Weighted Average (80% Highways)	0.407	0.0947	0.029	0.603

1 - Based on 1998 dollars, jobs per million dollars of output.

2 - Labor income per dollar of output.

It is important to recognize that the assessment of capital budget-related employment and labor income effects does not consider the federal match on State of Alaska capital projects. The case could be made that ANWR revenue would leverage additional federal dollars into Alaska and therefore the economic impact of ANWR includes jobs and income created through expenditure of federal matching money. This analysis, however, considers expenditure of the state portion only.

Permanent Fund Dividend-Related Employment and Payroll

Fifty percent of royalties and severance taxes generated from ANWR would be deposited in the Permanent Fund. These deposits will create additional dividends for Alaskans and spending of those dividends will create jobs and income in the state's economy. Dividends are assumed to equal half of an assumed real 4 percent annual earnings on the Permanent Fund.

The economic impact of the Permanent Fund Dividend program was addressed in a study by Scott Goldsmith in 1989.²³ That study found that the dividend created approximately 13 jobs per million dollars, in 1988 dollars. Since 1988, Alaska's economy has undergone significance support sector expansion, meaning that relatively more of the dividend may be spent in Alaska today than in 1988. On the other hand, inflation has been at work, and in 2001 dollars, the 13 jobs per million spent translates to about nine jobs per million. It is assumed that these two factors are approximately equal and off-setting, and a 13 jobs per million estimate is used here.

²³ *The Economic Impact of the Alaska Permanent Fund Dividend*, prepared by Institute of Social and Economic research, University of Alaska Anchorage, for the Alaska Permanent Fund Corporation.

Summary of Production Impacts

Table 10 summarizes the employment and labor income impacts in Alaska stemming from oil development in ANWR. The table provides peak employment and income, which occurs about 17 years after the first barrel of oil is pumped. These estimates are based on a 50/50 royalty split.

Table 10
Employment and Labor Income Impacts of Oil Development in ANWR
Peak Annual Employment and Labor Income

West Coast Price (\$/bbl)	\$20.00	\$22.00	\$24.00
Peak Employment			
Oil Industry	9,000	14,000	21,000
State and Local Governments	7,000	11,000	17,000
Peak ANWR-Related Employment (1)	17,000	25,000	38,000
Peak Labor Income (millions)			
Oil Industry	\$800	\$1,200	\$1,900
State and Local Governments	300	500	800
Peak ANWR-Related Income (1)	\$1,200	\$1,700	\$2,600

1 - Subtotals may not add to totals due to rounding.

These totals do not include jobs and income generated through ANWR-related Permanent Fund Dividends. The employment and income effects related to the Permanent Fund Dividend increase over time, as annual deposits add to the principal of the fund and dividends increase. After 30 years, ANWR will have generated \$5 billion in contributions to the principal, based on \$22 per barrel oil. In-state spending of dividends paid to Alaskans would create hundreds of jobs in the Alaska economy. After 30 years of ANWR production, spending of ANWR generated dividends would be responsible for over 1,000 jobs a year in the Alaska economy. This employment and payroll is not included in Table 10.

Appendix

Revenue, Employment and Labor Income Impacts of ANWR Production (\$24/barrel)

50/50 Royalty Split, \$24 Per Barrel Average Price (all dollar values in 000s of 2001 dollars)

Year	Volume Mbbbls/Day	Tech Volume Mbbbls/Year	Production Mbbbls/Year	ANWR Wellhead Value (000s)	ANWR Value Validez (000s)	Total Royalties	States Royalties 90/10	States Royalties 50/50	Severance Tax	ELF	Property Tax	State Corporate Income Tax	Total state revenue 90/10	Total state revenue 50/50	Permanent Fund Contribution	Total Unrestricted State Revenues	Revenues to Operating Budget
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	40	14,600	8,354	150,706	186,594	18,838	16,954	9,419	16,154	1.0	4,177	4,710	41,995	34,459	12,786	21,673	20,589
2	115	41,975	24,017	433,280	536,457	54,160	48,744	27,080	46,442	1.0	12,008	13,540	120,735	99,071	36,710	62,310	59,194
3	265	96,725	55,343	988,429	1,236,184	124,804	112,323	62,402	107,019	1.0	27,322	31,201	278,215	228,293	84,710	143,563	136,044
4	401	146,265	83,689	1,509,796	1,863,323	188,774	169,852	94,362	161,831	1.0	41,844	47,181	420,709	345,219	128,097	217,122	206,266
5	524	191,090	109,336	1,972,500	2,442,210	246,563	221,806	123,281	211,427	1.0	54,668	61,641	549,642	451,017	167,354	283,663	269,450
6	635	231,650	132,544	2,391,172	2,960,580	298,897	269,007	149,448	313,841	1.0	66,272	74,724	723,844	600,282	231,645	371,641	354,009
7	735	268,350	153,542	2,770,002	3,425,621	342,621	311,625	173,125	363,563	1.0	76,771	86,563	838,522	700,022	266,344	431,678	410,009
8	826	301,558	172,543	3,112,782	3,854,027	389,098	350,188	194,549	408,553	1.0	86,271	97,274	932,866	806,266	301,551	485,097	460,842
9	909	331,605	189,735	3,422,942	4,238,045	427,868	385,081	213,934	449,261	1.0	94,868	106,967	1,036,177	865,029	331,598	533,432	506,760
10	983	363,793	205,291	3,703,586	4,585,519	462,948	416,653	231,474	486,096	1.0	102,684	123,673	1,189,003	1,000,126	363,385	577,168	548,309
11	1,050	393,394	219,367	3,957,524	4,899,926	484,690	445,221	247,345	519,423	1.0	109,684	130,653	1,267,598	1,056,193	403,644	616,741	585,904
12	1,111	425,654	232,104	4,187,236	5,184,414	523,412	471,071	261,708	548,583	1.0	116,082	137,350	1,350,449	1,110,734	435,644	652,549	619,922
13	1,167	452,795	243,628	4,395,202	5,441,829	549,400	494,460	274,700	576,870	1.0	121,814	143,229	1,438,970	1,203,935	464,949	684,949	650,702
14	1,216	484,020	254,056	4,583,324	5,674,746	572,915	515,624	286,458	601,362	1.0	127,028	148,548	1,538,970	1,291,263	484,009	740,793	703,753
15	1,262	460,510	263,491	4,753,543	5,885,501	594,193	534,774	297,066	623,303	1.0	131,745	153,361	1,635,594	1,375,435	480,499	714,266	678,553
16	1,340	488,932	279,753	5,046,928	6,248,750	630,866	552,104	306,723	644,118	1.0	136,014	157,716	1,727,482	1,454,420	475,420	784,796	726,556
17	1,340	488,932	279,753	5,046,928	6,248,750	630,866	552,104	306,723	644,118	1.0	136,014	157,716	1,727,482	1,454,420	475,420	784,796	726,556
18	1,333	486,549	278,389	5,022,323	6,212,286	627,790	565,011	313,895	662,409	0.9	139,195	156,948	1,782,866	1,502,209	483,579	749,721	712,235
19	1,288	470,228	269,051	4,853,851	6,009,695	606,731	546,058	303,366	660,620	0.88	134,525	151,683	1,724,886	1,454,420	463,579	749,721	712,235
20	1,166	425,480	243,447	4,391,946	5,437,797	548,993	494,094	274,497	495,741	0.86	121,724	137,248	1,538,866	1,291,263	431,993	644,091	611,886
21	1,055	384,990	220,280	3,973,997	4,920,322	496,750	447,075	244,375	438,133	0.84	110,140	124,187	1,392,866	1,119,535	343,254	577,562	548,702
22	954	348,353	199,318	3,595,821	4,452,092	449,478	404,530	224,739	387,000	0.82	99,659	112,369	1,248,866	920,835	305,870	517,898	492,003
23	864	315,203	180,350	3,253,633	3,928,191	332,961	331,201	184,001	341,632	0.80	90,175	101,676	1,093,558	823,767	272,492	464,343	441,126
24	781	295,207	163,168	2,944,009	3,645,064	368,001	329,683	166,491	324,105	0.78	81,594	92,000	989,516	736,835	242,697	416,391	395,476
25	707	258,056	147,658	2,663,850	3,298,326	301,294	299,663	150,647	265,719	0.76	73,829	83,245	893,245	658,988	216,105	373,179	354,520
26	640	233,500	133,607	2,410,351	2,984,326	272,622	245,360	136,311	206,102	0.72	66,803	75,323	806,064	586,879	192,136	334,503	317,778
27	579	211,187	120,892	2,180,976	2,700,330	242,679	222,011	123,339	181,309	0.70	60,446	68,155	722,477	526,879	171,207	299,808	284,818
28	474	172,897	98,978	1,785,652	2,210,643	223,204	200,884	111,602	159,366	0.68	54,694	61,670	591,683	421,012	152,324	268,688	255,253
29	429	156,525	89,559	1,615,707	2,000,454	201,963	181,767	100,982	139,961	0.66	49,489	55,801	516,988	362,213	120,471	240,775	228,736
30	388	141,630	81,037	1,461,952	1,810,085	182,744	164,470	91,372	122,804	0.64	44,780	50,491	465,541	328,213	107,088	215,742	204,955
31	351	128,152	73,325	1,322,829	1,637,833	165,354	148,818	82,677	107,645	0.62	38,662	44,338	416,988	288,323	95,161	193,292	183,628
32	318	115,957	66,347	1,196,945	1,481,973	149,618	134,656	74,809	94,259	0.60	33,174	37,405	373,478	268,323	84,534	173,162	164,504
33	287	104,922	60,033	1,083,040	1,340,944	135,380	121,842	67,890	82,446	0.58	30,017	33,845	299,494	239,647	76,068	155,112	147,357
34	260	94,937	54,320	979,976	1,213,336	122,497	110,247	61,248	72,028	0.56	27,160	30,624	240,888	191,061	66,638	124,423	118,202
35	235	85,903	49,151	886,719	1,097,872	110,840	99,756	55,240	62,846	0.54	24,576	27,710	214,888	170,552	59,133	111,419	105,848
36	213	77,728	44,242	802,336	993,396	100,292	90,263	50,146	54,759	0.52	22,237	25,073	192,332	152,215	52,453	99,763	94,775
37	193	70,331	40,242	725,984	898,862	90,748	81,673	45,374	47,643	0.50	20,121	22,687	172,124	135,824	46,508	89,316	84,650
38	174	63,638	36,412	656,897	813,324	82,112	73,901	41,056	41,385	0.48	18,206	20,528	154,020	121,175	41,220	79,594	75,957
39	158	57,582	32,947	594,365	735,926	74,298	66,868	37,149	38,888	0.46	16,474	18,575	137,802	108,083	36,518	71,566	67,967
40	143	51,436	29,687	528,604	658,156	67,558	60,268	32,778	32,778	0.44	14,844	16,689	122,720	96,187	32,778	66,518	62,518
41	127	45,962	26,687	472,604	583,156	59,448	52,778	27,479	27,479	0.42	13,322	15,000	108,083	84,148	27,479	56,699	53,148
42	111	40,586	24,133	428,604	518,156	52,778	46,448	24,133	24,133	0.40	11,844	13,322	96,187	73,175	24,133	49,048	45,699
43	96	36,412	21,687	383,604	463,156	47,298	41,385	21,687	21,687	0.38	10,444	11,844	84,148	65,187	21,687	43,148	40,148
44	81	32,947	19,237	338,604	408,156	41,385	36,868	19,237	19,237	0.36	9,044	10,444	73,175	56,699	19,237	38,148	35,699
45	66	29,687	16,787	293,604	353,156	36,412	32,778	16,787	16,787	0.34	7,644	8,844	65,187	49,048	16,787	33,148	30,148
46	51	26,687	14,337	248,604	298,156	31,298	28,149	14,337	14,337	0.32	6,244	7,244	56,699	42,127	14,337	28,148	25,699
47	36	23,687	11,887	203,604	243,156	26,303	23,687	11,887	11,887	0.30	4,844	5,644	47,298	35,699	11,887	23,148	21,148
48	21	20,687	9,437	158,604	188,156	21,353	19,237	9,437	9,437	0.28	3,444	4,044	38,148	28,148	9,437	18,148	16,699
49	6	17,687	6,987	113,604	133,156	16,403	14,337	6,987	6,987	0.26	2,044	2,444	29,048	21,687	6,987	13,148	12,148
50	1	14,687	4,537	68,604	88,156	11,453	10,048	4,537	4,537	0.24	644	764	19,237	14,337	4,537	10,148	9,148
Total		10405723	5953860			67,104	6,975	3,387	427	0.06	1,502	1,684	9,720	7,010	1,907	5,103	4,848

Variables
 % Economically Recoverable 57.2%
 Well-Head Price (2001\$) \$16.04
 Royalty rate 12.50%
 Property tax (per bbl) \$0.50
 Corp. inc. 25.0%
 Tax, % of Royalties

Revenue, Employment and Labor Income Impacts of ANWR Production (\$24/barrel)

Revenues to Capital Budget	State Spending-Related Jobs (operating)	State Spending-Related Jobs (capital)	Oil Industry Employment (Direct Only)	Indirect and Induced Oil Industry Employment	State Spending-Related Labor Income (operating)	State Spending-Related Labor Income (capital)	Oil Industry Labor Income (Direct Only)	Oil Industry Labor Income (Indirect and Induced)	Permanent Fund-Related Employment	Permanent Fund-Related Labor Income	Total ANWR-Related Employment	Total ANWR-Related Labor Income
0	0	0	0	0	0	0	0	0	0	0	0	0
1,084	448	14	256	395	20,958	653	26,318	30,106	3	83	1,116	76,118
3,115	1,288	40	736	1,135	60,254	1,878	75,665	86,554	3	85	3,204	224,435
7,179	2,969	92	1,696	2,616	138,845	4,327	174,359	199,451	13	325	7,387	517,307
10,856	4,490	140	2,565	3,956	209,958	6,543	263,660	301,604	35	885	11,187	782,651
14,183	5,866	183	3,351	5,169	274,304	8,549	344,464	394,036	70	1,740	14,638	1,023,992
18,632	7,706	240	4,063	6,107	360,345	11,230	417,578	465,534	115	2,862	18,230	1,257,550
21,584	8,927	278	4,706	7,074	417,435	13,009	483,734	539,288	177	4,412	21,182	1,457,878
24,255	10,031	312	5,289	7,950	469,091	14,619	543,595	606,024	249	6,217	23,831	1,639,546
26,672	11,031	343	5,816	8,742	515,831	16,076	597,759	666,406	330	8,249	26,262	1,804,323
28,855	11,935	372	6,293	9,459	558,124	17,394	646,769	721,047	420	10,484	28,478	1,993,818
30,637	12,753	397	6,724	10,107	596,392	18,957	691,115	770,485	516	12,905	30,498	2,085,484
32,527	13,494	420	7,114	10,694	631,018	19,666	731,241	815,219	620	15,493	32,343	2,212,637
34,247	14,164	441	7,468	11,225	662,349	20,642	767,548	855,696	730	16,232	34,027	2,324,468
35,713	14,770	460	7,787	11,706	690,699	21,528	800,400	892,322	845	17,108	35,568	2,426,055
37,040	15,319	477	8,077	12,140	716,351	22,325	830,126	925,461	965	18,009	36,977	2,518,371
38,240	15,815	492	8,338	12,534	739,561	23,049	857,023	955,447	1,089	19,220	38,289	2,602,301
39,326	16,264	506	8,575	12,890	760,563	23,703	881,351	982,580	1,218	20,433	39,453	2,678,641
37,486	15,503	483	8,247	12,008	724,984	22,594	877,064	991,695	1,350	21,739	38,879	2,650,076
35,910	14,852	462	8,247	11,440	694,504	21,644	847,643	961,117	1,473	23,818	37,642	2,561,726
32,205	13,319	415	7,462	10,380	622,839	19,411	766,979	872,086	1,591	25,748	34,227	2,321,064
28,679	11,944	333	6,752	9,419	558,524	17,407	693,992	791,287	1,695	27,368	31,143	2,103,587
25,895	10,709	298	6,110	8,419	500,810	15,608	627,949	717,986	1,789	28,360	28,360	1,907,056
23,217	9,602	268	5,528	7,546	449,022	13,994	568,192	651,463	1,872	29,847	25,847	1,729,454
20,515	8,503	240	5,002	6,884	402,355	12,546	514,122	591,098	1,946	30,498	23,579	1,566,958
18,659	7,717	215	4,526	6,384	360,866	11,247	465,196	536,323	2,071	31,531	21,531	1,423,920
16,725	6,917	193	4,095	5,792	289,916	10,081	420,927	486,619	2,124	32,078	19,663	1,292,852
13,434	5,556	173	3,706	5,255	259,822	8,097	380,871	441,519	2,170	32,078	18,014	1,174,408
10,787	4,461	139	3,034	4,768	232,831	6,097	344,626	400,596	2,248	32,078	16,507	1,067,373
9,665	3,997	124	2,745	4,326	208,623	4,525	311,830	363,463	2,248	32,078	15,147	970,648
8,658	3,581	111	2,484	3,925	186,915	3,259	282,156	329,770	2,281	32,078	13,920	883,240
7,756	3,208	100	2,034	3,561	167,448	2,519	255,305	299,197	2,310	32,078	12,812	804,252
6,946	2,873	89	1,840	3,231	149,994	1,875	209,026	246,288	2,338	32,078	11,811	732,872
6,221	2,573	80	1,685	2,959	134,346	1,487	189,135	223,450	2,369	32,078	10,908	668,368
5,571	2,304	72	1,507	2,659	120,317	1,150	171,136	202,729	2,380	32,078	10,093	610,078
4,988	2,063	64	1,363	2,419	107,742	836	154,650	183,927	2,396	32,078	9,357	557,403
4,466	1,847	58	1,233	2,189	96,471	607	140,114	166,989	2,414	32,078	8,693	509,803
3,998	1,653	51	1,116	1,966	86,369	452	126,781	151,391	2,428	32,078	8,093	466,788
3,578	1,480	46	1,010	1,802	77,316	331	114,716	137,348	2,441	32,078	7,552	427,917
594	246	8	201	1,635	69,204	2,157	103,799	124,607	2,452	32,078	7,064	392,790
510	211	7	174	1,497	61,853	1,588	90,615	109,278	2,452	32,078	6,623	361,048
435	180	6	151	1,363	54,807	1,150	78,918	94,415	2,527	32,078	6,317	316,618
368	152	5	129	1,222	48,407	836	68,478	80,618	2,527	32,078	6,163	283,154
308	127	4	110	1,086	42,317	607	59,941	70,618	2,528	32,078	6,063	253,154
255	106	3	92	957	36,834	434	44,665	53,618	2,529	32,078	5,963	223,154

Revenue, Employment and Labor Income Impacts of ANWR Production (\$22/barrel)

50/50 Royalty Split, \$22 Per Barrel Average Price (all dollar values in 000s of 2001 dollars)

Year	Volume Mbbbls/Day	Tech Volume Mbbbls/Year	Production Mbbbls/Year	ANWR Wellhead Value (000\$)	ANWR Value Validez (000\$)	Total Royalties	State Royalties 90/10	State Royalties 50/50	Severance Tax	ELF	Property Tax	State Corporate Income Tax	Total state revenue 90/10	Total state revenue 50/50	Permanent Fund Contribution	Total Unrestricted State Revenues	Revenues to Operating Budget
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	40	14,600	6,075	96,173	122,273	12,022	10,819	6,011	10,308	1.0	3,038	3,005	27,171	22,362	8,160	14,203	13,493
2	115	41,975	17,467	275,486	351,534	34,562	31,106	17,281	29,637	1.0	8,733	8,641	78,117	64,151	23,459	40,833	38,791
3	265	96,725	40,250	637,143	810,055	79,693	71,679	38,821	66,294	1.0	20,125	19,911	180,008	148,252	54,058	84,953	80,389
4	401	146,265	60,864	965,074	1,224,944	120,434	108,390	56,217	103,272	1.0	30,432	30,108	272,003	224,030	81,744	142,283	136,171
5	524	191,090	79,517	1,286,743	1,600,351	157,343	141,609	76,671	134,922	1.0	39,759	38,336	355,625	292,687	106,797	185,891	176,596
6	635	231,650	96,395	1,592,917	1,940,032	190,740	171,666	95,700	153,922	1.0	48,198	47,685	441,825	391,529	147,823	243,706	231,521
7	735	268,350	111,667	1,767,666	2,242,389	220,958	198,862	110,479	202,277	1.0	55,834	55,240	541,942	453,559	171,243	282,316	268,200
8	826	301,558	125,466	1,985,410	2,525,497	248,301	223,471	124,151	226,716	1.0	62,743	62,075	609,006	509,685	192,433	311,389	301,420
9	909	331,605	137,989	2,184,337	2,777,139	273,042	245,738	136,521	286,694	1.0	68,995	68,261	669,687	560,470	211,608	348,863	331,420
10	1,050	358,793	149,303	2,365,429	3,004,835	295,429	265,886	147,714	310,200	1.0	74,651	73,857	724,594	606,423	224,957	377,466	358,592
11	1,111	405,654	168,803	2,672,107	3,397,284	334,013	300,612	167,007	350,714	1.0	84,401	83,503	819,231	685,623	248,967	403,347	383,179
12	1,167	425,795	177,184	2,804,782	3,565,965	350,598	315,538	175,299	368,128	1.0	88,592	87,649	859,907	719,668	258,960	426,765	405,427
13	1,216	444,020	184,768	2,924,831	3,718,993	365,604	329,043	182,802	383,894	1.0	92,364	91,401	896,712	750,447	271,713	447,955	425,557
14	1,262	460,510	191,630	3,033,455	3,859,698	379,182	341,264	189,591	398,141	1.0	95,815	94,955	930,015	778,342	283,343	467,128	443,771
15	1,303	475,431	197,839	3,153,174	3,981,660	391,468	352,321	195,734	411,041	1.0	98,919	97,867	960,148	803,562	293,866	484,476	460,253
16	1,340	488,932	202,457	3,220,678	4,094,730	402,565	362,326	200,192	422,714	1.0	101,728	100,648	987,415	826,381	303,388	500,174	475,165
17	1,383	498,549	205,465	3,204,976	4,074,767	400,622	360,560	200,311	422,714	1.0	101,728	100,648	987,415	826,381	303,388	500,174	475,165
18	1,428	470,228	195,673	3,097,466	3,938,080	387,183	348,465	193,592	357,757	0.86	97,837	96,796	900,865	780,287	289,449	490,837	466,296
19	1,466	425,480	177,053	2,807,703	3,563,322	350,338	315,304	175,169	316,355	0.86	88,526	87,584	807,770	667,635	245,742	470,307	446,792
20	1,055	384,990	160,204	2,535,991	3,224,227	316,989	285,299	158,499	278,593	0.84	80,102	79,250	724,244	597,444	219,046	378,398	359,478
21	954	348,353	144,958	2,294,659	2,917,402	286,832	258,149	143,416	246,963	0.82	72,479	71,708	648,299	534,566	193,046	339,377	322,408
22	864	315,203	131,164	2,076,294	2,639,774	259,537	233,583	129,768	218,011	0.80	65,582	64,884	582,080	478,245	173,890	304,356	289,138
23	781	285,207	118,682	1,878,708	2,389,566	232,839	211,355	117,419	192,333	0.78	59,341	58,710	521,738	427,603	154,876	272,927	259,280
24	707	258,066	107,368	1,699,926	2,161,264	212,491	191,242	106,245	169,568	0.76	53,694	53,123	467,626	382,630	137,906	244,723	232,487
25	640	233,508	97,169	1,538,156	1,955,593	192,270	173,043	96,135	149,393	0.74	48,594	48,067	419,088	342,180	122,764	219,416	208,445
26	579	211,287	87,922	1,391,781	1,769,494	173,973	156,575	86,986	131,523	0.72	43,961	43,493	375,553	305,964	109,255	196,709	186,873
27	524	191,160	79,555	1,259,336	1,601,104	157,417	141,675	78,708	115,701	0.70	39,777	39,354	336,508	273,542	97,205	176,337	167,520
28	474	172,967	71,994	1,139,494	1,448,739	142,437	128,193	71,218	101,700	0.68	35,992	35,609	301,494	244,520	86,459	158,060	150,157
29	429	156,525	65,134	1,031,057	1,310,873	128,882	115,994	64,441	89,315	0.66	32,567	32,221	270,087	218,544	76,878	141,666	134,582
30	388	141,630	59,936	932,939	1,186,127	116,617	104,956	58,309	78,367	0.64	29,468	29,154	241,945	195,298	68,338	126,960	120,612
31	351	128,152	53,327	844,158	1,073,252	105,520	94,968	52,750	68,693	0.62	26,664	26,300	216,705	174,497	60,727	113,770	108,082
32	318	115,957	48,252	763,826	971,119	95,478	85,930	47,739	60,151	0.60	24,126	23,870	194,077	155,866	53,945	101,941	96,844
33	287	104,922	43,661	691,138	878,704	86,392	77,753	43,196	52,613	0.58	21,930	21,598	173,794	139,237	47,905	91,333	86,766
34	260	94,937	39,506	625,368	795,085	78,171	70,354	39,085	45,985	0.56	19,753	19,543	155,614	124,346	42,525	81,821	77,730
35	235	85,903	35,746	565,856	719,422	70,732	63,659	35,366	40,105	0.54	17,673	17,683	139,320	111,027	37,396	73,292	69,627
36	213	77,728	32,345	512,008	650,960	64,001	57,601	32,000	34,945	0.52	16,172	16,000	124,718	99,118	33,473	65,645	62,363
37	193	70,331	29,267	463,284	589,013	57,910	52,119	28,955	30,403	0.50	14,633	14,478	111,633	88,469	29,679	58,790	55,851
38	174	63,638	26,462	419,196	532,961	52,400	47,160	26,200	26,409	0.48	13,241	13,100	99,910	78,950	26,305	52,645	50,013
39	158	57,562	23,961	379,305	482,243	47,413	42,672	23,707	22,901	0.46	11,981	11,853	89,406	70,441	23,304	47,138	44,781
40	144	52,521	21,185	34,586	43,972	4,323	3,891	2,162	272	0.06	1,092	1,081	6,337	4,607	1,217	3,390	3,221
Total		10,405,723	4,330,080														

Variables
 % Economically Recoverable 41.6%
 Well-Head Price (2001\$) \$15.83
 Royalty rate 12.50%
 Property tax (per bbl) \$0.50
 Corp. Tax % of 25.0%
 Royalties

Revenue, Employment and Labor Income Impacts of ANWR Production (\$22/barrel)

Revenues to Capital Budget	State Spending-Related Jobs (operating)	State Spending-Related Jobs (capital)	Oil Industry Employment (Direct Only)	Indirect and Induced Oil Industry Employment	State Spending-Related Labor Income (operating)	State Spending-Related Labor Income (capital)	Oil Industry Labor Income (Direct Only)	Oil Industry Labor Income (Indirect and Induced)	Permanent Fund-Related Employment	Permanent Fund-Related Labor Income	Total ANWR-Related Employment	Total ANWR-Related Labor Income
0	0	0	0	0	0	0	0	0	0	0	0	0
710	294	9	168	260	13,734	428	17,246	19,808	2	53	19,808	51,269
2,042	844	26	482	747	39,486	1,231	49,582	56,948	2	54	2,102	147,301
4,705	1,946	61	1,112	1,681	90,989	2,836	114,255	131,229	8	208	4,848	339,516
7,114	2,942	92	1,681	2,603	137,590	4,288	172,773	198,440	23	565	7,341	513,657
9,295	3,844	120	2,196	3,401	179,757	5,602	225,723	259,256	44	1,110	9,605	671,449
12,185	5,040	157	2,662	4,021	235,665	7,345	273,634	306,639	73	1,826	11,953	895,008
14,116	5,838	182	3,084	4,658	273,001	8,508	316,985	355,103	113	2,815	13,875	956,412
15,863	6,560	204	3,466	5,235	306,784	9,561	316,985	355,103	159	3,967	15,624	1,075,569
17,443	7,214	225	3,811	5,756	337,952	10,514	391,704	436,607	211	5,284	17,217	1,163,641
18,873	7,803	243	4,123	6,228	365,011	11,376	423,620	474,785	266	6,691	18,668	1,281,662
20,167	8,341	260	4,406	6,655	390,036	12,156	452,679	507,338	330	8,235	19,981	1,370,647
21,398	8,823	275	4,682	7,042	412,684	12,861	479,173	536,794	396	9,887	21,199	1,451,399
23,398	9,263	288	4,894	7,391	433,174	13,500	502,965	563,447	466	11,635	22,302	1,524,721
25,356	9,660	301	5,103	7,708	451,715	14,078	524,493	587,563	539	13,470	23,310	1,591,319
27,199	10,018	312	5,292	7,994	468,491	14,601	543,972	609,385	616	15,384	24,232	1,651,833
28,224	10,337	322	5,464	8,253	483,671	15,074	561,597	629,130	695	17,370	25,077	1,706,842
29,519	10,637	331	5,619	8,487	497,406	15,502	577,545	646,996	777	19,421	25,852	1,756,869
30,636	10,903	336	5,792	8,652	510,000	15,874	592,729	662,715	862	21,530	26,482	1,798,409
31,684	11,150	340	5,942	8,828	523,150	16,200	607,450	677,450	940	23,495	27,422	1,836,444
32,664	11,384	343	6,084	9,000	535,350	16,480	621,650	691,150	1,015	25,365	28,374	1,871,116
33,584	11,604	346	6,216	9,168	546,600	16,716	635,400	704,850	1,082	27,037	29,456	1,902,116
34,444	11,812	349	6,336	9,336	556,900	16,908	648,700	717,600	1,142	28,527	30,608	1,929,116
35,244	12,008	351	6,444	9,504	566,250	17,058	661,600	730,000	1,195	29,855	31,823	1,952,116
35,984	12,184	353	6,544	9,668	574,650	17,168	674,100	742,000	1,242	31,036	33,195	1,976,116
36,664	12,344	355	6,636	9,828	582,100	17,234	686,100	753,500	1,284	32,091	34,727	1,997,116
37,284	12,488	357	6,720	9,984	588,600	17,264	697,600	764,500	1,322	33,029	36,359	2,015,116
37,844	12,616	358	6,792	10,136	594,150	17,258	708,100	775,000	1,355	33,864	38,084	2,029,116
38,344	12,728	359	6,848	10,284	598,750	17,214	717,600	784,500	1,385	34,608	39,912	2,040,116
38,784	12,824	360	6,896	10,428	602,400	17,136	726,100	793,000	1,411	35,269	41,843	2,048,116
39,164	12,904	361	6,936	10,560	605,100	17,024	733,600	800,500	1,435	35,857	43,875	2,054,116
39,484	12,968	362	6,968	10,680	606,850	16,878	740,100	807,000	1,456	36,380	46,007	2,058,116
39,744	13,016	363	6,992	10,788	607,650	16,698	745,600	812,500	1,474	36,845	48,242	2,060,116
39,944	13,048	364	7,008	10,884	607,500	16,484	750,100	817,000	1,491	37,258	50,584	2,060,116
40,084	13,064	365	7,016	10,968	606,400	16,236	753,600	820,500	1,506	37,625	53,031	2,059,116
40,164	13,068	366	7,016	11,040	604,350	15,954	756,100	823,000	1,519	37,951	55,584	2,056,116
40,184	13,060	367	7,008	11,100	601,350	15,636	757,600	824,500	1,530	38,241	58,242	2,050,116
40,144	13,040	368	6,984	11,148	597,400	15,284	758,100	825,000	1,541	38,497	61,007	2,042,116
40,044	13,004	369	6,944	11,184	592,500	14,904	757,600	824,500	1,550	38,725	63,875	2,031,116
39,884	12,952	370	6,888	11,208	586,650	14,496	756,100	823,000	1,558	38,927	66,859	2,017,116
39,664	12,884	371	6,816	11,224	579,850	14,064	753,600	820,500	1,565	39,106	70,007	1,999,116
39,384	12,796	372	6,720	11,232	572,100	13,608	750,100	817,000	1,611	40,253	73,502	1,976,116
39,044	12,688	373	6,600	11,232	563,500	13,132	745,600	812,500	1,612	40,274	77,471	1,941,116
38,644	12,552	374	6,456	11,220	554,000	12,636	740,100	807,000	1,612	40,292	81,540	1,897,116
38,184	12,388	375	6,288	11,196	543,600	12,112	733,600	800,500	1,613	40,307	85,719	1,844,116
37,664	12,196	376	6,036	11,160	531,150	11,556	726,100	793,000	1,613	40,320	90,007	1,782,116
37,084	11,968	377	5,784	11,112	516,650	10,972	717,600	784,500	1,614	40,330	94,507	1,716,116
36,444	11,704	378	5,520	11,040	500,100	10,364	708,100	775,000	1,614	40,330	99,242	1,647,116
35,744	11,408	379	5,248	10,948	481,500	9,732	700,100	764,500	1,614	40,330	104,116	1,574,116
34,984	11,084	380	4,968	10,836	460,850	9,084	693,600	753,500	1,614	40,330	109,116	1,497,116
34,164	10,732	381	4,672	10,704	438,150	8,424	688,100	742,000	1,614	40,330	114,242	1,417,116
33,284	10,352	382	4,360	10,560	413,500	7,748	684,100	730,000	1,614	40,330	119,516	1,334,116
32,344	9,944	383	4,032	10,400	386,850	7,056	681,600	717,600	1,614	40,330	124,940	1,249,116
31,344	9,504	384	3,688	10,224	358,100	6,348	680,100	704,500	1,614	40,330	130,516	1,164,116
30,284	9,032	385	3,320	10,032	327,300	5,624	680,100	691,000	1,614	40,330	136,242	1,078,116
29,164	8,528	386	2,936	9,824	294,450	4,884	681,600	677,500	1,614	40,330	142,116	994,116
27,984	7,984	387	2,536	9,592	258,550	4,128	684,100	664,000	1,614	40,330	148,116	911,116
26,744	7,408	388	2,112	9,336	219,650	3,360	688,100	651,500	1,614	40,330	154,242	830,116
25,444	6,792	389	1,664	9,060	177,750	2,584	693,600	640,000	1,614	40,330	160,516	752,116
24,084	6,136	390	1,192	8,760	132,850	1,712	700,100	629,500	1,614	40,330	167,007	678,116
22,664	5,448	391	768	8,432	84,900	824	708,100	620,000	1,614	40,330	173,742	609,116
21,184	4,728	392	320	8,076	37,000	240	717,600	612,500	1,614	40,330	180,742	546,116
19,644	3,976	393	120	7,692	0	0	728,100	607,000	1,614	40,330	188,007	489,116
18,044	3,184	394	40	7,284	0	0	737,600	602,500	1,614	40,330	195,516	438,116
16,384	2,352	395	8	6,852	0	0	748,100	600,000	1,614	40,330	203,242	393,116
14,664	1,488	396	0	6,400	0	0	760,100	599,500	1,614	40,330	211,242	354,116
12,884	640	397	0	5,928	0	0	773,600	600,000	1,614	40,330	219,516	321,116
11,044	0	398	0	5,436	0	0	788,100	602,500	1,614	40,330	228,007	294,116
9,144	0	399	0	4,924	0	0	804,100	607,000	1,614	40,330	236,742	272,116
7,184	0	400	0	4,392	0	0	821,600	613,500	1,614	40,330	245,742	251,116
5,164	0	401	0	3,840	0	0	840,100	622,000	1,614	40,330	255,007	231,116
3,084	0	402	0	3,268	0	0	860,100	632,500	1,614	40,330	264,516	212,116
984	0	403	0	2,676	0	0	882,100	645,000	1,614	40,330	274,242	194,116
0	0	404	0	2,064	0	0	906,100	659,500	1,614	40,330	284,242	177,116
0	0	405	0	1,432	0	0	932,100	676,000	1,614	40,330	294,516	161,116
0	0	406	0	760	0	0	960,100	694,500	1,614	40,330	305,242	146,116
0	0	407	0	184	0	0	990,100	715,000	1,614	40,330	316,516	132,116
0	0	408	0	0	0	0	1,022,100	737,500	1,614	40,330	328,242	119,116
0	0	409	0	0	0	0	1,056,100	762,000	1,614	40,330	340,516	107,116
0	0	410	0	0	0	0	1,092,100	788,500	1,614	40,330	353,242	96,116
0	0	411	0	0	0	0	1,130,100	816,000	1,614	40,330	366,516	86,116
0	0	412	0	0	0	0	1,170,100	845,500	1,614	40,330	380,242	77,116
0	0	413	0	0	0	0	1,212,100	877,000	1,614	40,330	394,516	69,116
0	0	414	0	0	0	0	1,256,100	910,500	1,614	40,330	409,242	62,116
0	0	415	0	0	0	0	1,302,100	946,000	1,614	40,330	424,516	56,116
0	0	416	0	0	0	0	1,350,100	983,500	1,614	40,330	440,242	51,116
0	0	417	0	0	0	0	1,400,100	1,024,000	1,614	40,330	456,516	47,116
0	0	418	0	0	0	0	1,452,100					

Revenue, Employment and Labor Income Impacts of ANWR Production (\$20/barrel)

50/50 Royalty Split, \$20 Per Barrel Average Price (all dollar values in 000s of 2001 dollars)

Year	Volume Mbls/Day	Tech Volume Mbls/Year	Production Mbls/Year	ANWR Wellhead Value (000s\$)	ANWR Value Valdez (000s\$)	Total Royalties	State Royalties 90/10	State Royalties 50/50	Severance Tax	ELF	Property Tax	State Corporate Income Tax	Total state revenue 90/10	Total state revenue 50/50	Permanent Fund Contribution	Total Unrestricted State Revenues	Revenues to Operating Budget
1	40	14,600	4,557	62,055	81,631	7,757	6,981	3,878	6,652	1.0	2,278	1,939	17,950	14,748	5,265	9,483	9,008
2	115	41,975	13,100	178,410	234,688	22,301	11,151	19,123	11,151	1.0	6,550	5,575	51,320	42,389	15,137	27,262	25,899
3	265	96,725	30,187	411,118	540,802	51,390	46,251	25,695	44,067	1.0	15,094	12,947	118,236	97,703	34,861	64,892	59,661
4	401	146,265	45,648	621,681	817,786	77,710	69,939	38,855	66,536	1.0	22,824	19,428	178,827	147,743	52,746	94,997	90,248
5	524	191,090	59,638	812,206	1,068,411	101,526	91,373	50,763	87,058	1.0	29,819	25,381	233,632	193,022	68,911	124,111	117,906
6	635	231,650	72,287	1,088,411	1,285,187	123,075	110,768	61,538	110,768	1.0	36,148	30,769	306,913	257,663	86,300	162,300	154,185
7	735	268,560	83,757	1,285,187	1,500,361	142,574	128,316	70,187	149,702	1.0	41,875	35,643	359,537	298,508	110,495	188,013	178,613
8	826	301,558	94,114	1,281,734	1,686,048	160,217	144,195	80,108	166,228	1.0	47,057	40,054	399,534	335,447	124,168	211,279	200,715
9	909	331,605	103,492	1,409,447	1,854,048	176,181	158,563	88,090	184,990	1.0	51,746	44,045	439,344	368,871	136,540	232,331	220,715
10	983	358,793	111,977	1,525,006	2,006,060	190,626	171,563	95,313	200,157	1.0	55,989	47,656	475,365	399,115	147,735	252,331	238,811
11	1,050	383,394	119,655	1,629,569	2,143,606	203,896	183,326	101,848	213,881	1.0	59,827	50,924	507,959	426,480	157,864	288,616	265,185
12	1,111	405,654	126,602	1,724,181	2,268,063	215,523	193,970	107,761	226,299	1.0	63,301	53,981	537,451	451,242	167,030	284,212	270,001
13	1,167	425,795	132,888	1,809,789	2,380,676	226,224	203,601	113,112	237,535	1.0	66,248	56,556	564,136	473,647	175,323	298,323	283,407
14	1,216	444,020	138,576	1,887,251	2,492,573	235,906	212,316	117,953	247,702	1.0	69,288	58,977	588,282	493,919	182,827	311,092	285,537
15	1,262	460,510	143,722	1,957,341	2,574,773	242,668	220,201	122,334	256,901	1.0	71,861	61,167	610,130	512,263	189,617	322,645	306,513
16	1,303	475,431	148,379	2,020,762	2,658,199	252,595	227,336	126,298	265,225	1.0	74,190	63,149	629,939	528,861	195,761	333,100	316,445
17	1,340	488,932	152,593	2,078,147	2,733,666	259,768	233,792	129,884	272,757	1.0	76,296	64,942	647,787	543,879	201,320	342,559	325,431
18	1,373	498,549	151,849	2,068,015	2,720,359	258,502	232,652	129,251	244,284	0.9	75,924	64,825	617,486	514,085	186,768	327,318	310,952
19	1,288	470,228	146,755	1,998,644	2,629,105	249,831	224,847	124,915	230,843	0.88	73,378	62,458	591,526	491,584	177,878	313,715	298,029
20	1,055	384,990	120,153	1,636,352	2,182,529	204,544	184,090	102,272	200,408	0.84	60,076	51,136	475,710	383,892	158,578	281,487	267,413
21	954	346,353	108,719	1,460,632	1,947,669	185,079	168,571	92,540	189,353	0.82	54,359	46,270	426,553	352,522	141,340	252,552	239,925
22	864	315,203	96,373	1,339,731	1,762,342	167,466	150,720	83,733	140,672	0.80	49,186	41,867	382,445	315,458	125,946	226,575	215,247
23	781	285,207	89,011	1,212,239	1,594,633	151,530	136,377	75,765	124,103	0.78	44,506	37,892	342,868	282,256	112,203	203,252	193,093
24	707	259,066	80,541	1,096,879	1,442,863	137,110	123,999	68,555	109,414	0.76	40,270	34,277	307,361	252,517	99,934	182,326	173,206
25	640	233,508	72,876	992,497	1,305,575	124,062	111,656	62,031	96,396	0.74	36,438	31,016	275,906	225,881	88,984	163,532	155,356
27	579	211,287	65,941	898,049	1,108,914	112,256	101,030	56,128	84,866	0.72	32,971	28,064	246,931	202,028	79,214	146,667	139,334
28	524	191,180	59,666	812,588	1,068,914	101,574	91,416	50,787	74,657	0.70	29,833	25,393	221,399	180,670	70,457	131,532	124,955
29	474	172,987	53,988	735,260	967,194	91,908	82,717	45,954	65,622	0.68	26,994	22,977	196,310	161,547	62,722	117,948	112,051
30	429	156,525	48,851	665,291	875,153	83,161	74,845	41,581	57,691	0.66	24,101	20,998	177,692	144,427	55,768	105,759	100,471
31	388	141,630	44,202	601,980	791,871	75,248	67,723	37,624	50,586	0.64	22,101	18,812	159,202	129,103	44,095	85,008	80,757
32	351	128,152	39,985	544,694	716,151	68,087	61,276	34,004	44,324	0.62	19,998	17,022	142,622	115,387	39,184	76,203	72,393
33	318	115,957	36,189	492,860	646,329	61,507	55,447	30,804	38,813	0.60	18,095	15,402	127,756	103,113	34,808	68,305	64,890
34	287	104,922	32,745	443,958	586,633	55,745	50,170	27,872	33,949	0.58	16,373	13,936	114,428	92,130	30,910	61,219	58,158
35	260	94,937	29,629	403,519	530,807	50,440	45,396	25,220	29,659	0.56	14,815	12,610	102,479	82,303	27,439	54,864	52,121
36	235	85,903	26,810	365,119	480,294	45,640	41,076	22,820	25,878	0.54	13,405	11,410	91,769	73,513	24,349	49,164	46,706
37	213	77,728	24,258	330,374	434,588	41,297	37,167	20,648	22,548	0.52	12,129	10,324	82,168	66,650	21,598	44,052	41,849
38	193	70,331	21,950	298,934	393,232	37,367	33,630	18,683	19,618	0.50	9,931	8,453	73,564	58,618	19,150	39,467	37,464
39	174	63,638	19,861	270,487	355,811	33,811	30,430	16,905	17,041	0.48	8,986	7,648	65,854	52,329	16,973	35,556	33,569
40	158	57,582	17,971	244,747	321,951	30,593	27,534	15,297	14,777	0.46	8,086	6,986	58,945	46,707	15,037	31,671	30,087
41	144	51,436	16,569	218,507	284,507	27,367	24,747	13,959	13,038	0.44	7,351	6,351	52,329	42,329	13,959	28,371	27,371
42	131	45,945	15,297	196,260	252,260	24,811	22,316	12,610	12,129	0.42	6,706	5,706	47,428	38,706	12,610	25,528	24,028
43	119	41,630	14,202	181,153	231,153	22,820	20,648	11,410	11,410	0.40	6,149	5,149	43,934	35,149	11,410	22,733	21,524
44	108	37,892	13,103	167,466	210,153	21,523	19,397	10,776	10,776	0.38	5,617	4,617	40,270	32,617	10,776	20,326	19,303
45	99	34,638	12,103	151,530	194,153	20,462	18,555	9,934	9,934	0.36	5,116	4,116	37,892	30,462	9,934	18,326	17,306
46	91	31,016	11,256	142,863	179,153	19,110	17,466	9,186	9,186	0.34	4,643	3,643	34,277	28,443	9,186	16,353	15,356
47	83	28,064	10,324	130,575	168,153	18,062	16,530	8,555	8,555	0.32	4,202	3,202	32,971	26,906	8,555	15,356	14,356
48	76	25,393	9,416	124,062	157,153	17,110	15,656	8,031	8,031	0.30	3,789	2,789	30,736	25,517	7,814	14,667	13,667
49	70	22,977	8,723	112,256	146,153	16,256	14,866	7,576	7,576	0.28	3,396	2,396	28,064	23,617	7,576	13,532	12,532
50	64	20,998	8,161	101,030	135,153	15,574	14,151	7,041	7,041	0.26	3,038	2,038	26,994	22,028	7,041	12,955	12,051
51	59	19,180	7,524	91,908	124,153	14,845	13,723	6,723	6,723	0.24	2,728	1,728	25,393	20,670	6,723	12,495	11,495
52	54	17,428	7,041	82,717	114,153	14,151	12,915	6,351	6,351	0.22	2,410	1,410	24,101	19,670	6,351	12,051	11,051
53	49	15,652	6,530	75,248	106,153	13,405	12,103	5,934	5,934	0.20	2,101	1,101	22,101	18,101	5,934	11,748	10,748
54	44	14,163	6,019	68,087	98,153	12,748	11,581	5,581	5,581	0.18	1,812	812	20,998	16,998	5,581	11,495	10,495
55	40	12,610	5,547	61,507	90,153	12,256	11,030	5,186	5,186	0.16	1,538	538	19,998	15,998	5,186	11,203	10,203
56	36	11,256	5,040	55,745	83,153	11,710	10,530	4,845	4,845	0.14	1,281	281	18,812	14,812	4,845	10,952	9,952
57	33	10,076	4,540	50,440	76,153	11,256	10,030	4,554	4,554	0.12	1,038	38	17,872	13,872	4,554	10,706	9,706
58	30	9,186	4,076	45,396	70,153	10,776	9,530	4,260	4,260	0.10	812	12	16,812	12,812	4,260	10,459	9,459
59	27	8,453	3,811	41,076	64,153	10,272	9,031	4,001	4,001	0.08	617	17	15,812	11,812	4,001	10,211	9,211
60	24	7,765	3,593	37,167	58,153	9,723	8,453	3,723	3,723	0.06	467	13	14,812	10,812	3,723	9,967	8,967
Total	10,405,723	3,247,560															

Variables
 % Economically Recoverable 31.2%
 Well-Head Price (2001\$) \$13.62
 Royalty rate 12.50%
 Property tax (per bbl) \$0.50
 Corp Inc Tax 25.0%
 % of Royalties

Revenue, Employment and Labor Income Impacts of ANWR Production (\$20/barrel)

Revenues to Capital Budget	State Spending-Related Jobs (operating)	State Spending-Related Jobs (capital)	Oil Industry Employment (Direct Only)	Indirect and Induced Oil Industry Employment	State Spending-Related Labor Income (operating)	State Spending-Related Labor Income (capital)	Oil Industry Labor Income (Direct Only)	Oil Industry Labor Income (Indirect and Induced)	Permanent Fund-Related Employment	Permanent Fund-Related Labor Income	Total ANWR-Related Employment	Total ANWR-Related Labor Income
474	0	0	0	0	0	0	0	0	0	0	0	0
196	112	174	112	174	9,174	286	11,514	13,291	1	34	480	34,294
1,363	322	501	322	501	26,363	822	33,102	38,211	1	35	1,406	96,532
3,141	1,299	1,742	1,299	1,742	60,749	1,893	76,278	88,052	5	134	3,242	227,106
4,750	1,964	2,822	1,964	2,822	91,863	2,863	115,345	133,149	15	365	4,909	343,585
6,206	2,566	3,740	2,566	3,740	120,016	3,740	150,695	173,955	29	716	6,423	449,123
8,115	3,356	4,891	3,356	4,891	186,945	4,891	211,623	248,497	47	1,178	7,986	551,575
9,401	3,888	5,666	3,888	5,666	211,623	5,666	248,497	288,917	73	1,817	9,289	639,412
10,564	4,369	6,361	4,369	6,361	237,810	6,361	288,011	336,715	102	2,560	10,437	719,056
11,617	4,804	6,866	4,804	6,866	264,008	7,002	316,008	365,715	136	3,396	11,500	791,285
12,569	5,198	7,254	5,198	7,254	284,666	7,576	340,743	398,947	173	4,317	12,469	856,604
13,431	5,555	7,642	5,555	7,642	302,347	8,095	360,743	420,743	213	5,314	13,352	916,252
14,211	5,877	7,979	5,877	7,979	319,901	8,565	378,427	438,148	255	6,379	14,157	970,206
14,916	6,169	8,267	6,169	8,267	335,785	8,991	395,785	456,526	300	7,502	14,893	1,019,190
15,555	6,433	8,507	6,433	8,507	350,157	9,375	394,624	474,824	348	8,682	15,585	1,063,676
16,132	6,672	8,688	6,672	8,688	363,161	9,724	409,280	492,820	397	9,927	16,179	1,104,825
16,655	6,888	8,848	6,888	8,848	374,928	10,039	422,541	510,541	449	11,208	16,742	1,140,825
17,128	7,084	9,004	7,084	9,004	385,575	10,324	434,541	528,541	501	12,531	17,257	1,174,227
16,866	6,769	8,748	6,769	8,748	363,696	9,864	414,541	486,541	556	13,892	17,016	1,162,118
15,666	6,487	8,487	6,487	8,487	330,364	9,454	370,825	444,557	607	15,160	16,473	1,123,360
14,074	5,821	7,821	5,821	7,821	272,199	8,483	335,536	385,157	655	16,367	14,974	1,017,742
12,628	5,222	7,222	5,222	7,222	244,219	7,611	303,606	349,410	698	17,445	12,399	836,028
11,329	4,685	6,685	4,685	6,685	219,100	6,828	274,714	316,979	737	19,264	12,999	836,028
10,163	4,203	6,203	4,203	6,203	196,549	6,126	248,571	287,557	771	19,264	11,295	758,068
9,116	3,770	5,770	3,770	5,770	176,306	5,495	224,916	260,863	801	20,027	10,298	687,608
8,177	3,382	5,382	3,382	5,382	158,137	4,928	203,513	236,646	829	20,707	9,400	623,931
7,333	3,033	4,928	3,033	4,928	141,828	4,420	184,146	214,676	853	21,312	8,588	566,392
6,577	2,720	4,555	2,720	4,555	127,192	3,964	166,622	194,744	874	21,851	7,855	514,373
5,897	2,439	4,237	2,439	4,237	114,056	3,555	150,766	178,662	894	22,331	7,193	467,369
5,288	2,187	3,927	2,187	3,927	102,269	3,187	136,419	160,257	911	22,757	6,595	424,890
4,741	1,961	3,707	1,961	3,707	91,693	2,858	123,437	145,375	926	23,137	6,056	386,499
4,250	1,758	3,507	1,758	3,507	82,203	2,562	111,690	131,874	939	23,474	5,569	351,804
3,810	1,576	3,297	1,576	3,297	73,689	2,297	101,061	119,626	951	23,774	5,129	320,448
3,415	1,412	3,142	1,412	3,142	66,051	2,059	91,444	108,515	962	24,041	4,732	292,110
3,061	1,266	2,991	1,266	2,991	59,199	1,845	82,742	98,436	972	24,278	4,373	266,500
2,743	1,135	2,728	1,135	2,728	53,054	1,653	74,868	89,292	980	24,488	4,050	245,355
2,458	1,017	2,663	1,017	2,663	47,542	1,482	67,744	80,997	987	24,675	3,757	222,438
2,203	911	2,596	911	2,596	42,596	1,328	61,297	73,472	994	24,841	3,494	203,535
1,973	816	2,540	816	2,540	38,165	1,189	55,464	66,646	1,000	24,988	3,255	188,451
1,768	731	2,488	731	2,488	34,190	1,066	50,186	60,453	1,005	25,118	3,040	171,012
1,584	655	2,442	655	2,442	30,626	954	45,410	54,636	1,010	25,233	2,846	157,059
867	110	148	110	148	5,157	161	9,018	11,294	1,039	25,973	1,389	51,603
229	95	129	95	129	4,429	138	7,839	9,840	1,040	25,987	1,343	48,232
195	81	111	81	111	3,779	118	6,171	8,520	1,040	25,999	1,301	45,187
165	68	96	68	96	3,200	100	5,805	7,322	1,041	26,008	1,264	42,436
139	57	82	57	82	2,685	84	4,831	6,235	1,041	26,016	1,230	39,951
115	48	69	48	69	2,226	69	4,141	5,247	1,041	26,023	1,200	37,706