

**TABLE 7.3-1  
SUBSISTENCE HARVESTS BY MAJOR RESOURCE CATEGORY**

Harvest	Resource					
	Marine Mammals	Terrestrial Mammals	Fish	Birds	Other Resources	Total
<b>Barrow<sup>1, 2, 3</sup></b>						
Annual Usable Pounds Harvested	386,153	211,861	79,355	24,720	572	702,660
Percent of Households Harvesting Resources	48	54	41	53	7	68
<b>Nuiqsut<sup>3, 4</sup></b>						
Annual Usable Pounds Harvested	85,216	87,390	90,490	4,325	396	267,818
Percent of Households Harvesting Resources	37	76	81	76	61	90
<b>Kaktovik<sup>3, 5</sup></b>						
Annual Usable Pounds Harvested	115,645	28,867	22,952	3,249	227	170,940
Percent of Households Harvesting Resources	40	68	81	64	32	89

Notes: 1 = Three years of study: April 1, 1987 - March 31, 1990. Percentage of households harvesting is a cumulative total for the three study years rather than an annual average.

Sources: 2 = SRB&A and ISER, 1993:64  
3 = Braund, 1997:54, 82, and 100  
4 = Pedersen, 1995b:XXII-28-30  
5 = Based on a 1992/1993 study - Pedersen, 1995a:XXI-22-24

**TABLE 7.3-2**  
**DOCUMENTED ANNUAL LANDED BOWHEAD WHALES**  
**1964 - 1995**

Year	Barrow	Nuiqsut <sup>1</sup>	Kaktovik	Year	Barrow	Nuiqsut	Kaktovik
1964	11	--	2	1980	9	0	1
1965	4	--	0	1981	4	0	3
1966	7	--	0	1982	0	1	1
1967	3	--	1	1983	2	0	1
1968	10	--	0	1984	4	0	1
1969	11	--	0	1985	5	0	0
1970	16	--	0	1986	8	1	3
1971	12	--	0	1987	7	1	0
1972	20	--	1	1988	11	0	1
1973	17	1	3	1989	10	2	3
1974	9	0	2	1990	11	0	2
1975	10	0	0	1991	13	1	0
1976	23	0	2	1992	22	2	3
1977	20	0	2	1993	23	3	3
1978	4	0	2	1994	16	0	3
1979	3	0	5	1995	21	4	4

Notes: 1 = The community of Nuiqsut was not re-settled until 1973.  
 -- = Not Applicable

Source: Braund, 1997:35, 36

**TABLE 7.3-3  
BOWHEAD WHALE QUOTA AND HARVEST, 1978-1991<sup>1</sup>**

<b>Year</b>	<b>Quota (struck/landed)</b>	<b>Landed</b>	<b>Struck-but-lost</b>	<b>Total Strikes</b>
1978	20/14	12	6	18
1979	27/18	12	15	27
1980	26/18	16	28	44
1981	65/45	17	11	28
1982	No more than 17 landed per year	8	11	19
1983		9	9	18
1984	43 strikes	12	13	25
1985	No more than 27 landed per year	11	6	17
1986	32 strikes	20	8	28
1987	32 strikes	22	9	31
1988	35 strikes	23	6	29
1989	44/41 per year, 3 strike carry over per year	18	8	26
1990		30	14	44
1991		28	19	47

Note: 1 = For the nine communities which engaged in subsistence bowhead whaling prior to 1995 and ten communities after 1995 with the inclusion of Little Diomede.

Source: Braund and Moorehead, 1995:257-258; Suydam et al., 1995:336.

**TABLE 7.3-4  
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON SUBSISTENCE RESOURCES**

<b>Action/Event</b>	<b>Frequency</b>	<b>Duration</b>	<b>Scope</b>	<b>Direct Impacts</b>	<b>Indirect Impacts</b>
Ice Roads – Construction	Once	All winter	N/A	None - Ice roads would not remain to impede fall whale migration or subsistence harvesting.	None anticipated.
Ice Roads – Operations	Annually	All winter	N/A	None - Ice roads would not remain to impede fall whale migration or subsistence harvesting.	None anticipated.
Island – Construction	Once	3 Months	Western part of Nuiqsut whaling area between Cross Island and Seal Island, approximately 300 square miles (777 km <sup>2</sup> ).	<p>Minor - To bowhead whaling if impacts were only from small boat operations; migration pattern would be deflected no more than 6 mi (9.7 km), which would have little effect on whaling from the Cross Island harvest area.</p> <p>Significant - To Nuiqsut’s bowhead whale harvest. Possible deflection of whales of up to 25 miles (40 km) due to noise from construction activities and vessel traffic occurring during fall migration could result in a reduction in bowheads being harvested. Additional travel could result in meat spoilage and increased risk to hunters. An increase in unsuccessful whale strikes due to project-related disturbance could have an adverse effect on IWC whale harvest quotas.</p>	A significant reduction or elimination of bowheads being harvested during an annual hunting season would have a significant but short-term sociocultural impact, resulting in the unavailability of food of great cultural importance to the Inupiat. There would be related impacts on the sharing of culturally important foods and cultural events associated with the harvest of bowhead whales.
Island – Operation/Maintenance	Annually	15 years	Western part of Nuiqsut whaling area between Cross Island and Seal Island, approximately 300 square miles (777 km <sup>2</sup> ).	<p>Minor - To bowhead harvest if long-term displacement from operations/maintenance noise did not occur.</p> <p>Significant - To Nuiqsut’s bowhead harvest if long-term displacement of migrating whales due to noise from island slope maintenance and boat and helicopter activities were to occur during fall migration. Additional travel could result in meat spoilage and increased risk to hunters. An increase in unsuccessful whale strikes due to project-related disturbance could have an adverse effect on IWC whale harvest quotas. Displacement distance of whales due to colors, flares, and facility lighting is unknown, but may occur.</p>	A significant reduction or elimination of bowheads being harvested during an annual hunting season would have a significant but short-term sociocultural impact, resulting in the unavailability of food of great cultural importance to the Inupiat. There would be related impacts on the sharing of culturally important foods and cultural events associated with the harvest of bowhead whales.

**TABLE 7.3-4 (Cont.)  
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON SUBSISTENCE RESOURCES**

<b>Action/Event</b>	<b>Frequency</b>	<b>Duration</b>	<b>Scope</b>	<b>Direct Impacts</b>	<b>Indirect Impacts</b>
Offshore Pipeline – Construction	Once	3 Months (Winter)	N/A	None - Winter construction would not affect subsistence harvesting.	None anticipated.
Offshore Pipeline - Operation/ Maintenance	Rare	15 years	N/A	None - No additional noise or vessel traffic related to offshore pipeline operation and routine maintenance.	None anticipated.
Onshore Pipeline – Construction	Once	6 Months (Winter)	N/A	None - Onshore pipeline construction would take place in the winter; caribou calving and migration would not be affected; caribou are not expected to be impacted by helicopter traffic.	None anticipated.
Onshore Pipeline - Operation/ Maintenance	Weekly	15 years	N/A	None – The pipeline would not restrict caribou migration and availability of caribou for subsistence harvest would not be impacted; caribou are not expected to be impacted by helicopter traffic.	None anticipated.
Gravel Mining Construction  Operation	Once  Occasionally	3 Months (Winter) Unknown	N/A	None - Onshore gravel mining would take place in the winter and would not affect subsistence harvesting.	None anticipated.
Large Oil Spill	Rare	Unknown	Barrow, Nuiqsut, and Kaktovik hunting and fishing areas contacted by an oil spill.	Minor - An onshore oil spill could reduce subsistence harvesting in hunting and fishing areas near the project area.  Significant - An offshore oil spill and spill response activities could cause partial or complete suspension of subsistence harvesting due to destruction of habitat or displacement of marine mammals, fish, and waterfowl.	Minor – Localized disturbance from icebreaking barge activities during broken/thin ice conditions may occur even though an oil spill has not.  Significant - Reduced or discontinued use of subsistence resources for years after a spill due to fears of resource contamination. Any effect on the bowhead whale population or reduction in hunting success could be reflected in reduced IWC harvest quotas for bowheads.

**TABLE 7.3-4 (Cont.)  
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON SUBSISTENCE RESOURCES**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Abandonment	Once	3 to 6 Months	Western part of Nuiqsut whaling area between Cross Island and Seal Island, approximately 300 square miles (777 km <sup>2</sup> ).	<p>Beneficial - To Nuiqsut hunters due to the possible reuse of the project facilities during severe weather while traveling to Cross Island.</p> <p>Significant - To Nuiqsut's bowhead whale harvest from possible deflection of whales due to noise from abandonment activities. Type and level of noise generated and the deflection of whales is unknown. If activities occurred during fall migration, bowhead harvest could be unsuccessful.</p>	A significant reduction or elimination of bowheads being harvested during an annual hunting season would have a significant but short term sociocultural impact, resulting in the unavailability of food of great cultural importance to the Inupiat. There would be related impacts on the sharing of culturally important foods and cultural events associated with the harvest of bowhead whales.

Notes: IWC = International Whaling Commission  
 km = Kilometers  
 km<sup>2</sup> = Square kilometers  
 N/A = Not applicable

**TABLE 7.4-1  
CULTURAL/ARCHAEOLOGICAL RESOURCES NEAR THE PROJECT AREA**

<b>Site</b>	<b>Vicinity of</b>	<b>Resource</b>
HAR-001	Thetis Island	Prehistoric houses, artifacts; by 1979, site most likely destroyed by a storm
XBP-002	Anxiety Point	Hunting camp
XBP-003	Beechey Point	Ahvakana home
XBP-004	Kavearak Point	Sod houses
XBP-005	Prudhoe Bay	Semi-subterranean houses and driftwood cabin
XBP-006	Heald Point	Site destroyed by Niakuk oil field development
XBP-007	Prudhoe Bay	Fire hearths and lithic scatters from the Arctic Small Tool, Archaic, and Paleoarctic Traditions
XBP-008	Central Creek Pingo	Artifacts from the Arctic Small Tool Tradition
XBP-009	Cross Island	Cabins, house depressions, present whaling camp
XBP-010	Milne Point	Sod houses and other structures
XBP-011	Pingok Island	Naval Arctic Research Laboratory station
XBP-012	Pingok Island	Old village dating from A.D. 1500
XBP-013	Peet Island	Sod houses; by 1983, site almost entirely destroyed by natural forces
XBP-014	Cottle Island	Driftwood structures; whalebone
XBP-015	Back Point	Sod houses; scattered graves
XBP-016	Gwydyr Bay	Historic house ruin
XBP-017	Kuparuk River	Sod houses
XBP-018	Long Island	Whaling boat
XBP-019	Point McIntyre	Sod houses
XBP-020	Sagavanirktok River	Sod/wooden house
XBP-021	Sagavanirktok River	Small boat
XBP-030	Pingok Island	Grave site
XBP-034	Pingok Island	Historic or prehistoric houses
XBP-035	Spy Islands	Sod houses and graves
XBP-038	Ugnuravik Pingo	Prehistoric and historic artifacts
XBP-040	Point Storkerson	DEW Line station
XBP-043	Beechey Point	Artifacts from the Arctic Small Tool Tradition
XBP-045	East Creek Pingo	Artifacts from short-term camp





**TABLE 7.4-2  
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON CULTURAL/ARCHAEOLOGICAL RESOURCES**

<b>Action/Event</b>	<b>Frequency</b>	<b>Duration</b>	<b>Scope</b>	<b>Direct Impacts</b>	<b>Indirect Impacts</b>
Ice Roads - Construction	Once	All winter	No known resources in area.	None anticipated.	None anticipated.
Ice Roads - Operations	Annually	All winter	No known resources in area.	None anticipated.	None anticipated.
Island - Construction	Once	3 Months	No known resources in area.	Minor – To potential offshore cultural resources.	None anticipated.
Island - Operation/Maintenance	Annually	15 years	No known resources in area.	None anticipated.	None anticipated.
Offshore Pipeline - Construction	Once	3 Months (Winter)	No known resources in area.	Minor – To potential offshore cultural resources.	None anticipated.
Offshore Pipeline - Operation/Maintenance	Rare	15 years	No known resources in area.	None anticipated.	None anticipated.
Onshore Pipeline - Construction	Once	6 Months (Winter)	DEW Line Site Sod House Ruins Putuligayuk River Delta Overlook Site	None - Pipeline construction would avoid known cultural resource sites.	None anticipated.
Onshore Pipeline - Operation/Maintenance	Weekly	15 years	DEW Line Site Sod House Ruins Putuligayuk River Delta Overlook Site	None anticipated.	None anticipated.
Gravel Mining Construction  Operation	Once  Occasionally	3 Months (Winter) Unknown	No known resources in area.	None anticipated.	None anticipated.
Large Oil Spill	Rare	Unknown	Any of the identified sites or unknown cultural resources in the area that are contacted by oil.	Significant - Irreparable damage to historic artifacts and interference with radiocarbon dating tests from contact with spilled oil.	Significant - Onshore spill response activities could damage integrity of coastal and onshore sites.
Abandonment	Once	3 to 6 Months	No known resources in area.	None anticipated.	None anticipated.

Notes: DEW = Distant Early Warning

km = Kilometers

**TABLE 7.5-1  
NORTH SLOPE BOROUGH LAND MANAGEMENT REGULATIONS**

<b>NSB Municipal Code</b>	<b>Summary of Policy</b>	<b>Application to Project</b>
19.70.040 (E)	“All nonessential boat, barge and air traffic associated with drilling activity shall occur prior to or after the period of whale migration through the area. Essential traffic (traffic that could not reasonably occur prior to or after the period of whale migration) shall avoid disrupting the whale migration, subsistence activities and be coordinated with the Alaska Eskimo Whaling Commission.”	Compliance with the obligations in this policy likely will be through the development of the Master Plan for rezoning.
19.70.050 (A)	Drilling would be conducted from bottom-founded structures. NSBMC 19.20.020 (9) defines the term “bottom-founded structures” as including “gravel and grounded ice islands, single steel drilling caissons (SSDC), concrete island drilling systems (CIDS), and other offshore drilling platforms which rest on and are supported by the ocean floor, and have primary blowout preventors above the surface of the water.”	The project will be drilled from an artificial island that satisfies requirements for a bottom-founded structure under the first section of this policy.
19.70.050 (B)	Drilling above threshold depth may occur year-round. The policy affirms that drilling may take place above the threshold depth at any time. “Threshold depth” is defined in NSBMC Section 19.20.020 (66) as “the depth below surface as such a significant accumulation of oil and gas can reasonably be expected to be encountered while drilling the well.”	The proposed drilling program will be in compliance with this policy.
19.70.050 (C)	Drilling below threshold depth in the Beaufort Sea shall be conducted during winter (November 1 through April 15) and be completed as early as possible.	The project may conflict with compliance unless the policy is eliminated or modified through the Master Plan process.
19.70.050 (D)	Confirmation, extension drilling, well testing, and other well completion activities in the Beaufort Sea shall be completed by June 15. Consistent with NSBMC 19.70.050 (C), any additional drilling or other activities would not penetrate any new oil or gas bearing formation, or significantly increase the risk of an oil spill.	The project may conflict with compliance with this policy unless the policy is eliminated or modified through the Master Plan process.
19.70.050 (F)	Year-round drilling can occur following the unitization and approval of the Plan of Operations, NSB approval of a Master Plan, and rezoning to the Resource Development District for the proposed development.	This policy, in combination with the previous policies on drilling, indicates that in order to allow drilling outside of the November 1 through April 15 window, the area will have to be rezoned from a Conservation District to Resource Development District.
19.70.050 I.2	Similar to NSB CMP policy 2.4.4 (b), this policy requires “offshore structures must be able to withstand geophysical hazards and forces which may occur at the drill site,” and that structures ‘must have monitoring programs and safety systems capable of securing wells in case unexpected geophysical hazards or forces are encountered.’	Residents of Nuiqsut have expressed concern based on Traditional Knowledge whether the facility on Seal Island can withstand sea ice hazards and forces that may occur at the site. Compliance with this policy will be determined during state consistency review and development of the Master Plan for rezoning.

**TABLE 7.5-1 (Cont.)  
NORTH SLOPE BOROUGH LAND MANAGEMENT REGULATIONS**

<b>NSB Municipal Code</b>	<b>Summary of Policy</b>	<b>Application to Project</b>
1970.050 I.7	Similar to NSB CMP policy 2.4.4 (g), this policy requires “offshore drilling activities, offshore petroleum storage, and transportation facilities...to have an oil spill control and clean-up plan.”	Residents of Nuiqsut have expressed concern based on Traditional Knowledge whether spilled oil cannot be detected or recovered under certain types of sea ice. Compliance with this policy likely will be through state and federal approval of the ODPCP, and during state consistency review.
1970.050 I.8	Similar to NSB CMP policy 2.4.4 (h), this policy requires “offshore oil transport systems (including pipelines) must be specifically designed to withstand geophysical hazards, specifically sea ice.”	Residents of Nuiqsut have expressed concern based on Traditional Knowledge whether the facility on Seal Island can withstand sea ice hazards and forces that may occur at the site. Compliance with this policy will be determined during state consistency review and development of the Master Plan for rezoning.
1970.050 (d)	Similar to NSB CMP policy 2.4.3 (d), it requires “development not preclude reasonable subsistence user access to a subsistence resource.”	Compliance with obligations in this policy likely will be through development of the Master Plan for rezoning.
1970.050 J.2	Similar to NSB CMP policy 2.4.5.1 (b), it requires “development that restricts subsistence user access to a resource meet three criteria”: 1) that there is a significant public need associated with the proposed activity; 2) that all feasible and prudent alternatives have been rigorously explored and objectively evaluated, and cannot comply with the policy; and 3) that all feasible and prudent steps have been taken to avoid any adverse effect that the policy was intended to prevent.	Compliance with obligations in this policy likely will be through development of the Master Plan for rezoning.
1970.050 (a)	Similar to NSB CMP policy 2.4.3 (a), this policy addresses “extensive adverse impacts to a subsistence resource that are likely and cannot be avoided or mitigated...development shall not deplete subsistence resources below the subsistence needs of local residents of the Borough.”	Compliance with obligations in this policy likely will be through development of the Master Plan for rezoning.
1970.050 I.1	Similar to NSB CMP policy 2.4.4 (a), it requires “vehicles, vessels, and aircraft that are likely to cause significant disturbance must avoid areas where species that are sensitive to noise or movement are concentrated when such species are concentrated.”	Compliance with obligations in this policy likely will be through development of the Master Plan for rezoning.
1970.050 J.1	Similar to NSB CMP policy 2.4.5.1 (a), this policy addresses “development that will likely result in significantly decreased productivity of subsistence resources and their ecosystems.”	Compliance with obligations in this policy likely will be through development of the Master Plan for rezoning.

Notes: CMP = Coastal Management Program  
NSB = North Slope Borough

NSBMC = North Slope Borough Municipal Code

**TABLE 7.5-2  
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON LAND AND WATER USE**

<b>Action/Event</b>	<b>Frequency</b>	<b>Duration</b>	<b>Scope</b>	<b>Direct Impacts</b>	<b>Indirect Impacts</b>
Ice Roads - Construction	Once	All winter	N/A	None anticipated.	None anticipated.
Ice Roads - Operations	Annually	All winter	N/A	None anticipated.	None anticipated.
Island - Construction	Once	3 Months	Northstar Unit - Offshore marine waters	Negligible - To traditional water use boat traffic access due to vessel traffic associated with construction activities.  Rezoning of the unit from Conservation District to Resource Development District will be required prior to project construction.	None anticipated.
Island - Operation/Maintenance	Annually	15 years	Northstar Unit - Offshore marine waters	Negligible - To traditional water use boat traffic access due to potential conflicts between barges and work boats and whaling vessels.	None anticipated.
Offshore Pipeline - Construction	Once	3 Months (Winter)	N/A	None anticipated.	None anticipated.
Offshore Pipeline - Operation/Maintenance	Rare	15 years	N/A	None anticipated.	None anticipated.
Onshore Pipeline - Construction	Once	6 Months (Winter)	Onshore pipeline route	Negligible - To traditional land uses due to encroachment of project facilities on Native Allotments; to traditional use offshore boat access from operations boat traffic.  Minor - To onshore transportation, pipeline, and utility uses as a result of pipeline construction across existing right-of-ways and facilities; zoning would be changed from Conservation District to Resource Development District.  Minor – Alternative 2 and a portion of Alternative 3 would add a pipeline across a currently undeveloped area.  Minor – Alternative 5 may require an agreement among the owners if need to widen West Dock causeway.  Minor – Alternatives 3, 4, and 5 could disrupt access, utility services, and existing pipeline operations in the areas near West Dock and CCP. Offshore zoning would be changed from Conservation to Resource Development District.	None anticipated.

**TABLE 7.5-2 (Cont.)  
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON LAND AND WATER USE**

<b>Action/Event</b>	<b>Frequency</b>	<b>Duration</b>	<b>Scope</b>	<b>Direct Impacts</b>	<b>Indirect Impacts</b>
Onshore Pipeline - Operation/ Maintenance	Weekly	15 years	N/A	None anticipated.	None anticipated.
Gravel Mining Construction  Operation	Once  Occasionally	3 Months (Winter) Unknown	N/A	None anticipated.	None anticipated.
Large Oil Spill	Rare	Unknown	Marine waters, shorelines, or tundra contacted by oil - up to hundreds of miles from the release site.	Negligible – Change in land use due to disturbance or damage to tundra, vegetation, or surface water bodies as a result of contamination.	Negligible – Restricted access to areas for other activities during spill responses and cleanup mobilization during the summer.
Abandonment	Once	3 to 6 Months	Northstar Unit	Minor - Rezoning may be required following removal of onshore and offshore facilities. Some areas may revert to land uses in place prior to project construction.	None anticipated.

Notes: CCP = Central Compressor Plant  
N/A = Not applicable

**TABLE 7.6-1  
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON SOCIOECONOMICS**

<b>Action/Event</b>	<b>Frequency</b>	<b>Duration</b>	<b>Scope</b>	<b>Direct Impacts<sup>1,2</sup></b>	<b>Indirect Impacts</b>
Ice Roads – Construction	Once	All winter	State of Alaska; NSB	Beneficial - Total project construction revenues estimated at \$478.6 and \$306.3 million in state and federal, respectively, taxes and royalties, and \$64.3 and \$3 million in NSB and MOA, respectively, taxes and royalties; 730 Alaska construction jobs (\$51.6 million in wages).  Negligible - Temporary increase in population in Anchorage and Fairbanks due to construction jobs.	Expect at least a one-to-one correlation of direct and indirect man-hours.
Ice Roads - Operations	Annually	All winter	State of Alaska; NSB	Beneficial – 100 annual Alaska operation jobs (\$255 million in total wages).	Expect at least a one-to-one correlation of direct and indirect man-hours.
Island - Construction	Once	3 Months	State of Alaska; NSB	Beneficial - Total project construction revenues estimated at \$478.6 and \$306.3 million in state and federal, respectively, taxes and royalties, and \$64.3 and \$3 million in NSB and MOA, respectively, taxes and royalties; 730 Alaska construction jobs (\$51.6 million in wages).  Negligible – Temporary increase in population in Anchorage and Fairbanks due to construction jobs.	Expect at least a one-to-one correlation of direct and indirect man-hours
Island - Operation/ Maintenance	Annually	15 years	State of Alaska; NSB	Beneficial – 100 annual Alaska operation jobs (\$255 million in total wages).	Expect at least a one-to-one correlation of direct and indirect man-hours.
Offshore Pipeline – Construction	Once	3 Months (Winter)	State of Alaska; NSB	Beneficial – Total project construction revenues estimated at \$478.6 and \$306.3 million in state and federal, respectively, taxes and royalties, and \$64.3 and \$3 million in NSB and MOA, respectively, taxes and royalties; 730 Alaska construction jobs (\$51.6 million in wages).  Negligible – Temporary increase in population in Anchorage and Fairbanks due to construction jobs.	Expect at least a one-to-one correlation of direct and indirect man-hours.

**TABLE 7.6-1 (Cont.)**

**IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON SOCIOECONOMICS**

<b>Action/Event</b>	<b>Frequency</b>	<b>Duration</b>	<b>Scope</b>	<b>Direct Impacts<sup>1,2</sup></b>	<b>Indirect Impacts</b>
Offshore Pipeline - Operation/ Maintenance	Rare	15 years	State of Alaska; NSB	Beneficial – 100 annual Alaska operation jobs (\$255 million in total wages).	Expect at least a one-to-one correlation of direct and indirect man-hours.
Onshore Pipeline – Construction	Once	6 Months (Winter)	State of Alaska; NSB	Beneficial – Total project construction revenues estimated at \$478.6 and \$306.3 million in state and federal, respectively, taxes and royalties, and \$64.3 and \$3 million in NSB and MOA, respectively, taxes and royalties; 730 Alaska construction jobs (\$51.6 million in wages).  Negligible – Temporary increase in population in Anchorage and Fairbanks due to construction jobs.	Expect at least a one-to-one correlation of direct and indirect man-hours.
Onshore Pipeline - Operation/ Maintenance	Weekly	15 years	State of Alaska; NSB	Beneficial – 100 annual Alaska operation jobs (\$255 million in total wages).	Expect at least a one-to-one correlation of direct and indirect man-hours.
Gravel Mining Construction  Operation	Once  Occasionally	3 Months (Winter) Unknown	State of Alaska; NSB	Beneficial - Total project construction revenues estimated at \$478.6 and \$306.3 million in state and federal, respectively, taxes and royalties, and \$64.3 and \$3 million in NSB and MOA, respectively, taxes and royalties; 730 Alaska construction jobs (\$51.6 million in wages).  Negligible - Temporary increase in population in Anchorage and Fairbanks due to construction jobs.	Expect at least a one-to-one correlation of direct and indirect man-hours.
Large Oil Spill	Rare	Unknown	State of Alaska, NSB, Anchorage, Fairbanks	Significant - Loss of revenues and increased costs; sudden increase in high wage paying jobs and subsequent inflation due to hiring of local labor for cleanup operations; reduced access to community services due to rapid expansion of workforce needed for cleanup operations.	None anticipate.

**TABLE 7.6-1 (Cont.)  
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON SOCIOECONOMICS**

Action/Event	Frequency	Duration	Scope	Direct Impacts <sup>1,2</sup>	Indirect Impacts
Abandonment	Once	3 to 6 Months	Seal Island and pipeline route, depending on abandonment method.	Negligible Beneficial – From in place abandonment and/or reuse of a substantial portion of the facilities.  Minor Beneficial – From removal of the facilities and infrastructure.	Expect at least a one-to-one correlation of direct and indirect man-hours.

- Notes: 1 = Construction impacts (jobs and wages) reflect totals for the project, including: ice road construction, island construction, onshore and offshore pipeline construction, and gravel mining.
- 2 = Operation impacts (jobs and wages) reflect totals for the project, including: island operation/maintenance and onshore pipeline operation/maintenance.
- MOA = Municipality of Anchorage
- NSB = North Slope Borough



**TABLE 7.6-2  
STATE AND FEDERAL REVENUES FROM THE NORTHSTAR PROJECT AT 158 MILLION BARRELS**

<b>Component</b>	<b>2000</b>	<b>2001</b>	<b>2002</b>	<b>2003</b>	<b>2004</b>	<b>2005</b>
Oil Production Rate (thousands of barrels per day)	32,065	65,000	65,000	65,000	61,935	43,700
ANS Market Price for Oil (\$/Barrel)	\$13.27	\$15.90	\$16.23	\$16.66	\$17.13	\$17.61
ANS Wellhead (\$/Barrel)	\$9.07	\$11.49	\$11.74	\$12.10	\$12.52	\$12.27
<b>Gross Revenues</b>	<b>\$106,152,786</b>	<b>\$272,600,250</b>	<b>\$278,531,500</b>	<b>\$287,072,500</b>	<b>\$283,030,563</b>	<b>\$195,712,635</b>
<b>State Revenues</b>						
State Royalty	\$17,108,777	\$43,935,324	\$44,891,271	\$46,267,834	\$45,616,390	\$31,543,250
State Supplemental Royalty	\$2,472,753	\$6,350,027	\$6,488,191	\$6,687,148	\$6,592,994	\$4,558,985
Net Profit Share Lease	\$0	\$0	\$0	\$0	\$0	\$0
State Share of Federal Royalty	\$1,069,299	\$2,745,958	\$2,805,704	\$2,891,740	\$2,851,024	\$1,971,453
Severance Tax	\$3,876,207	\$9,954,097	\$10,170,678	\$10,482,556	\$10,334,963	\$7,146,518
Spill & Conservation Tax	\$200,493	\$514,867	\$526,070	\$542,201	\$534,567	\$369,647
Ad Valorem Tax	\$515,250	\$491,308	\$467,366	\$443,424	\$419,482	\$395,540
Income Tax	\$1,603,948	\$4,118,937	\$4,208,557	\$4,337,609	\$4,276,537	\$2,957,180
<b>Total State Revenues</b>	<b>\$26,846,728</b>	<b>\$68,110,517</b>	<b>\$69,557,837</b>	<b>\$71,652,513</b>	<b>\$70,625,957</b>	<b>\$48,942,574</b>
<b>Federal Revenues</b>						
Royalty (net of state share)	\$2,940,432	\$7,551,027	\$7,715,323	\$7,951,908	\$7,839,947	\$5,421,240
Income Tax	\$14,373,087	\$36,910,074	\$37,713,165	\$38,869,617	\$38,322,338	\$26,499,491
<b>Total Federal Revenues</b>	<b>\$17,313,519</b>	<b>\$44,461,101</b>	<b>\$45,428,488</b>	<b>\$46,821,525</b>	<b>\$46,162,285</b>	<b>\$31,920,731</b>

**TABLE 7.6-2 (Cont.)  
STATE AND FEDERAL REVENUES FROM THE NORTHSTAR PROJECT AT 158 MILLION BARRELS**

<b>Component</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>2011</b>
Oil Production Rate (thousands of barrels per day)	30,834	21,755	15,350	10,831	7,642	5,392
ANS Market Price for Oil (\$/Barrel)	\$18.10	\$18.62	\$19.16	\$19.72	\$20.31	\$20.91
ANS Wellhead (\$/Barrel)	\$12.61	\$13.00	\$13.36	\$13.76	\$13.58	\$13.94
<b>Gross Revenues</b>	<b>\$141,918,110</b>	<b>\$103,227,475</b>	<b>\$74,852,740</b>	<b>\$54,397,614</b>	<b>\$37,879,101</b>	<b>\$27,435,035</b>
<b>State Revenues</b>						
State Royalty	\$22,873,119	\$16,637,301	\$12,064,110	\$8,767,332	\$6,105,022	\$4,421,739
State Supplemental Royalty	\$3,305,881	\$2,404,610	\$1,743,641	\$1,267,153	\$882,366	\$639,079
Net Profit Share Lease	\$0	\$0	\$0	\$0	\$0	\$0
State Share of Federal Royalty	\$1,429,570	\$1,039,831	\$754,007	\$547,958	\$381,564	\$276,359
Severance Tax	\$5,182,191	\$3,769,389	\$2,733,275	\$1,986,349	\$1,383,169	\$1,001,800
Spill & Conservation Tax	\$268,044	\$194,968	\$141,376	\$102,742	\$71,543	\$51,817
Ad Valorem Tax	\$371,598	\$347,656	\$323,714	\$299,772	\$275,830	\$251,889
Income Tax	\$2,144,355	\$1,559,747	\$1,131,010	\$821,937	\$572,346	\$414,538
<b>Total State Revenues</b>	<b>\$35,574,758</b>	<b>\$25,953,503</b>	<b>\$18,891,133</b>	<b>\$13,793,243</b>	<b>\$9,671,841</b>	<b>\$7,057,222</b>
<b>Federal Revenues</b>						
Royalty (net of state share)	\$3,931,132	\$2,859,401	\$2,073,421	\$1,506,814	\$1,049,251	\$759,950
Income Tax	\$19,215,712	\$13,977,000	\$10,135,061	\$7,365,437	\$5,128,830	\$3,714,704
<b>Total Federal Revenues</b>	<b>\$23,146,844</b>	<b>\$16,836,401</b>	<b>\$12,208,482</b>	<b>\$8,872,251</b>	<b>\$6,178,081</b>	<b>\$4,474,654</b>

**TABLE 7.6-2 (Cont.)**  
**STATE AND FEDERAL REVENUES FROM THE NORTHSTAR PROJECT AT 158 MILLION BARRELS**

Component	2012	2013	2014	Total
Oil Production Rate (thousands of barrels per day)	3,804	2,684	1,894	<b>158,003,390</b>
ANS Market Price for Oil (\$/Barrel)	\$21.52	\$22.15	\$22.80	N/A
ANS Wellhead (\$/Barrel)	\$14.61	\$14.96	\$15.31	N/A
<b>Gross Revenues</b>	<b>\$20,285,401</b>	<b>\$14,655,714</b>	<b>\$10,583,956</b>	<b>\$1,908,335,380</b>
<b>State Revenues</b>				
State Royalty	\$3,269,423	\$2,362,080	\$1,705,829	<b>\$307,568,802</b>
State Supplemental Royalty	\$472,534	\$341,394	\$246,546	<b>\$44,453,303</b>
Net Profit Share Lease	\$0	\$0	\$0	<b>\$0</b>
State Share of Federal Royalty	\$204,339	\$147,630	\$106,614	<b>\$19,223,050</b>
Severance Tax	\$740,729	\$535,159	\$386,477	<b>\$69,683,557</b>
Spill & Conservation Tax	\$38,314	\$27,681	\$19,990	<b>\$3,604,322</b>
Ad Valorem Tax	\$227,947	\$204,005	\$180,063	<b>\$5,214,844</b>
Income Tax	\$306,508	\$221,445	\$159,922	<b>\$28,834,575</b>
<b>Total State Revenues</b>	<b>\$5,259,794</b>	<b>\$3,839,393</b>	<b>\$2,805,441</b>	<b>\$478,582,453</b>
<b>Federal Revenues</b>				
Royalty (net of state share)	\$561,906	\$405,963	\$293,176	<b>\$52,860,890</b>
Income Tax	\$561,906	\$405,963	\$293,176	<b>\$253,485,560</b>
<b>Total Federal Revenues</b>	<b>\$1,123,811</b>	<b>\$811,927</b>	<b>\$586,351</b>	<b>\$306,346,450</b>

Notes: Methodology: State and federal revenues for 158 million barrels of total production were estimated using ratios calculated from the model published by the ADNR Oil & Gas Division 1996 Northstar Economic Evaluation. Gross revenue was estimated using a total production of 158 million barrels and the Fall 1998 Base Price Forecast for ANS Wellhead oil prices for the period 2000 to 2014. Ad Valorem tax was estimated from data provided by Hanley, 1997a.

ADNR = Alaska Department of Natural Resources

ANS = Alaska North Slope

N/A = Not applicable

Source: Dames & Moore production scenario for 158 million barrels production, November 1998

**TABLE 7.6-3  
PROJECTED ESTIMATED ALASKA EMPLOYMENT**

<b>Material/Service</b>	<b>Average No. of Personnel</b>	<b>Estimated Duration (months)</b>	<b>Primary Contractor</b>	<b>Location of Workforce</b>	<b>Estimated Direct Man-hours</b>	<b>Estimated Wages (total \$)</b>
<b>Construction</b>						
Engineering	40	8	Veco/PN&D	Anc/NS	70,000	\$2,228,800
Anc Fabrication	250	17	D	Anc	900,000	\$18,912,600
NS Island Construction	60	10	Veco/APC	NS	180,000	\$3,782,520
NS Pipeline Construction	200	6	AIC	NS	360,000	\$7,565,040
NS Facilities Installation	90	4	HCC/AIC	NS	110,000	\$2,224,420
NS Drilling	50	21	Veco	NS	320,000	\$8,896,000
BPXA Directs	40	27	Nabors N/A	Anc	200,000	\$7,984,000
Subtotal	730	N/A	N/A	N/A	2,140,000	\$51,594,380
<b>Operation</b>						
BPXA Operation	100	180	N/A	NS	N/A	\$255,000,000
<b>TOTAL</b>	<b>830</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>\$306,594,380</b>

Notes: AIC = Alaska Interstate Construction  
 Anc = Anchorage  
 APC = Alaska Petroleum Contractors  
 BPXA = BP Exploration (Alaska) Inc.  
 HCC = Houston Contracting Co.  
 N/A = Not applicable  
 Nabors = Nabors Alaska Drilling  
 NS = North Slope  
 PN&D = PN&D, Inc. Engineering Consultants  
 Veco = Veco Operations Inc.

Source: BPXA, 1997:Table 1.2-4; Hanley, 1997b

**TABLE 7.7-1  
NUMBER OF SEALIFT BARGES, 1968-1996**

<b>Year</b>	<b>Number Barges</b>	<b>Year</b>	<b>Number Barges</b>
1975	47	1986	27
1976	21	1987	6
1977	7	1988	0
1978	10	1989	3
1979	2	1990	3
1980	10	1991	1
1981	14	1992	0
1982	15	1993	3
1983	26	1994	4
1984	11	1995	0
1985	13	1996	0

Source: Toruga - Pers. Comm., 1996

**TABLE 7.7-2  
ANNUAL AVERAGE DAILY TRAFFIC ALONG THE DALTON HIGHWAY <sup>1</sup>**

Highway Section	Number of Vehicles			
	1992	1993	1994	1995
Yukon Crossing (Milepost 55.6)	225	200	200	269
Bonanza Creek (Milepost 124.7)	N/A	N/A	N/A	154
Dietrich Camp (Milepost 209.1)	N/A	N/A	N/A	147
Kuparuk River (Milepost 288.8)	100	100	100	143

Notes: 1 = During visitor traffic season  
N/A = Not applicable

Source: Robbe, 1996:70

**TABLE 7.7-3  
IMPACTS OF ALTERNATIVES 2, 3, 4, and 5 ON TRANSPORTATION**

<b>Action/Event</b>	<b>Frequency</b>	<b>Duration</b>	<b>Scope</b>	<b>Direct Impacts</b>	<b>Indirect Impacts</b>
Ice Roads - Construction	Once	All winter	N/A	None anticipated.	None anticipated.
Ice Roads - Operations	Annually	All winter	N/A	None anticipated.	None anticipated.
Island - Construction	Once	3 Months	Freight through Ports of Anchorage, Whittier, and Seward; traffic along the Dalton Highway; passengers through Anchorage, Fairbanks, and Deadhorse airports; personnel and materials by helicopter, boat, barge, and bus in the Prudhoe Bay area; module barges from Anchorage.	Minor - From overall project construction activities to ports resulting from 1% to 26% increase in freight traffic; <2% increase in freight traffic along the Dalton Highway; <4% increase in passenger traffic through Anchorage, Fairbanks, and Deadhorse airports; module barges from Anchorage.	None anticipated.
Island - Operation/Maintenance	Annually	15 years	Freight levels at Ports of Anchorage, Whittier, and Seward; traffic on the Dalton Highway; passengers by air; personnel and materials by helicopter, boat, barge, and bus in the Prudhoe Bay area.	Negligible – Increase (over current levels) in freight traffic at ports and along the Dalton Highway; increase (over current levels) in passenger and freight traffic through Anchorage, Fairbanks, and Deadhorse airports; increase in local helicopter, barge, boat, and bus passenger and freight traffic within the Prudhoe Bay area.	Beneficial impact associated with production of crude oil volumes representing approximately 4% of Trans Alaska Pipeline System throughput.
Offshore Pipeline - Construction	Once	3 Months (Winter)	Freight through Ports of Anchorage, Whittier, and Seward; traffic along the Dalton Highway; passengers through Anchorage, Fairbanks, and Deadhorse airports.	Minor – From overall project construction activities to Ports resulting from 1% to 26% increase in freight traffic; <2% increase in freight traffic along the Dalton Highway; and <4% increase in passenger and freight traffic through Anchorage, Fairbanks, and Deadhorse airports.	None anticipated.
Offshore Pipeline - Operation/Maintenance	Rare	15 years	Local transportation of personnel and materials within the Prudhoe Bay industrial complex.	Negligible – Increase (over current levels) in freight traffic at ports and along the Dalton Highway; increase (over current levels) in passenger and freight traffic through Anchorage, Fairbanks, and Deadhorse airports; increase local helicopter, barge, boat, and bus passenger and freight traffic within the Prudhoe Bay area.	None anticipated.

**TABLE 7.7-3 (Cont.)**





**TABLE 7.8-1  
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON VISUAL/AESTHETIC CHARACTERISTICS**

<b>Action/Event</b>	<b>Frequency</b>	<b>Duration</b>	<b>Scope</b>	<b>Direct Impacts</b>	<b>Indirect Impacts</b>
Ice Roads – Construction	Once	All winter	Within a few miles of the construction activities associated with each alternative.	Minor - To oil field personnel from intrusion of equipment and lighting for ice road construction; to Nuiqsut residents due to a faint glow on the horizon as a result of lighting from construction activities.	None anticipated.
Ice Roads – Operations	Annually	All winter	6 to 9 miles (9.7 to 14.5 km) offshore route.	Minor - To oil field personnel from intrusion of equipment and lighting for ice road construction; to Nuiqsut residents due to a faint glow on the horizon as a result of lights from equipment for ice road construction.	None anticipated.
Island – Construction	Once	3 Months	Within a few miles of the construction activities associated with each alternative.	Minor – To Nuiqsut residents due to a faint glow on the horizon as a result of lighting from construction activities; to oil field workers from intrusion of equipment; area subjected to minor visual impacts of the island and facilities.	None anticipated.
Island – Operation/Maintenance	Annually	15 years	Within 20 miles (32 km) of Seal Island.	Minor – To oil field workers and subsistence hunters from intrusion of equipment, personnel, the island, facilities, and the flare; to Nuiqsut residents as a faint glow on the horizon from lights.  Negligible - To bowhead whales from visual impact as a result of infrequent flare operation.	None anticipated.
Offshore Pipeline – Construction	Once	3 Months (Winter)	Within a few miles of the construction activities associated with each alternative.	Minor – To oil field personnel from intrusion of equipment and lighting for pipeline installation; to Nuiqsut residents due to a faint glow on the horizon as a result of lighting from construction activities.	None anticipated.
Offshore Pipeline - Operation/Maintenance	Rare	15 years	Within a few miles of the construction activities associated with each alternative.	None anticipated.	None anticipated.

**TABLE 7.8-1 (Cont.)  
IMPACTS OF ALTERNATIVES 2, 3, 4, and 5 ON VISUAL/AESTHETIC CHARACTERISTICS**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Onshore Pipeline – Construction	Once	6 Months (Winter)	Within a few miles of the construction activities associated with each alternative.	Minor - To oil field personnel from intrusion of equipment and lighting during construction.	None anticipated.
Onshore Pipeline - Operation/ Maintenance	Weekly	15 years	Within a few miles of the construction activities associated with each alternative.	Minor - To oil field workers and subsistence harvesters from creation of the onshore pipeline approach and valve station and, for Alternatives 2 and 3, a new pipeline corridor through previously undeveloped areas.	None anticipated.
Gravel Mining Construction  Operation	Once  Occasionally	3 Months (Winter)	Immediate vicinity of gravel mine site.	Minor - To oil field workers from intrusion of equipment and lighting; to Nuiqsut residents due to a faint glow on the horizon as a result of lighting from construction activities.	None anticipated.
Large Oil Spill	Rare	Unknown	Areas contacted by oil.	Negligible (Winter) - Reduction of quality of visual resources if spill occurred when viewer sensitivity would be low due to darkness and reduced level of outdoor activities; impacts would include staining of shoreline and presence of oil on the water.  Minor (Summer) – Degradation of quality of visual resources if spill occurred when subsistence activities were ongoing (viewer sensitivity would be high). Visual impacts would include heavy equipment, staining of shoreline and tundra, plus presence of oil on the water.	None anticipated
Abandonment	Once	3 to 6 Months	Seal Island and pipeline route, depending on abandonment method.	Beneficial - If all equipment and facilities were removed and the island protection removed.  Minor - During the abandonment process, impacts would be similar, but less than those of construction.	None anticipated.

Notes: km = Kilometers  
N/A = Not applicable

**TABLE 7.9-1  
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON RECREATION**

<b>Action/Event</b>	<b>Frequency</b>	<b>Duration</b>	<b>Scope</b>	<b>Direct Impacts</b>	<b>Indirect Impacts</b>
Ice Roads – Construction	Once	All winter	N/A	None - No recreational activities occur in the project area during the winter.	None - No additional materials would be transported along the Dalton Highway.
Ice Roads – Operations	Annually	All winter	N/A	None - No recreational activities occur in the project area during the winter.	None - No additional materials would be transported along the Dalton Highway.
Island – Construction	Once	3 Months	N/A	None - Recreational activities do not occur in the project area.	Minor - To enjoyment of recreational activities along the Dalton Highway due to less than 2% increase in traffic for transporting equipment and construction materials.
Island - Operation/ Maintenance	Annually	15 years	N/A	None - Recreational activities do not occur in the project area.	None anticipated.
Offshore Pipeline – Construction	Once	3 Months (Winter)	N/A	None - No recreational activities occur in the project area during the winter.	None anticipated.
Offshore Pipeline – Operation/ Maintenance	Rare	15 years	N/A	None - Recreational activities do not occur in the project area.	None anticipated.
Onshore Pipeline – Construction	Once	6 Months (Winter)	N/A	None - No recreational activities occur in the project area during the winter.	None anticipated.
Onshore Pipeline – Operation/ Maintenance	Weekly	15 years	N/A	None - Recreational activities do not occur in the project area.	None anticipated
Gravel Mining Construction Operation	Once Occasionally	3 Months (Winter)	N/A	None - No recreational activities occur in the project area during the winter.	None anticipated.
Large Oil Spill	Rare	Unknown	N/A	None anticipated	Negligible – Reduced enjoyment of recreational activities due to increased vehicle traffic along the Dalton Highway.

**TABLE 7.9-1 (Cont.)  
IMPACTS OF ALTERNATIVES 2, 3, 4, AND 5 ON RECREATION**

Action/Event	Frequency	Duration	Scope	Direct Impacts	Indirect Impacts
Abandonment	Once	Winter 3 to 6 Months	N/A	None anticipated.	<p>Negligible - For in-place abandonment, to recreational activities along the Dalton Highway due to the possible increase (% unknown) in traffic for transporting materials from the North Slope.</p> <p>Minor - For facility removal, to recreational activities along the Dalton Highway due to the increase (% unknown) in traffic expected for transporting materials from the North Slope.</p>

Notes: N/A = Not applicable  
% = Percent