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Table 3.1.1-1 Alaska North Slope Oil and Gas Discoveries as of May 2008

	Name	Location of Field or Pool	Production Oil, Gas	Location of Production Facility	Discovery	Production Began	Category	Ranking Criteria
Past Development And Production								
1	South Barrow	Onshore	Gas	Onshore	1949	1950	Field	When Production Began
2	Prudhoe Bay	Onshore	Oil	Onshore	1967	1977	Field	
3	Lisburne	Onshore	Oil	Onshore	1967	1981	Field	
4	Kuparuk	Onshore	Oil	Onshore	1969	1981	Field	
5	East Barrow	Onshore	Gas	Onshore	1974	1981	Field	
6	Milne Point	Onshore	Oil	Onshore	1969	1985	Field	
7	Endicott	Offshore	Oil	Offshore	1978	1986	Field	
8	Sag Delta	Offshore	Oil	Onshore	1976	1989	Field	
9	Sag Delta North	Offshore	Oil	Offshore	1982	1989	Satellite ¹	
10	Schrader Bluff	Onshore	Oil	Onshore	1969	1991	Satellite ²	
11	Walakpa	Onshore	Gas	Onshore	1980	1992	Field	
12	Point McIntyre	Offshore	Oil	Onshore	1988	1993	Field	
13	North Prudhoe Bay	Onshore	Oil	Onshore	1970	1993	Field	
14	Niakuk	Offshore	Oil	Onshore	1985	1994	Field	
15	Sag River	Onshore	Oil	Onshore	1969	1994	Satellite ³	
16	West Beach	Onshore	Oil	Onshore	1976	1994	Field	
17	Cascade	Onshore	Oil	Onshore	1993	1996	Field	
18	West Sak	Onshore	Oil	Onshore	1969	1997	Satellite ²	
19	Badami	Offshore	Oil	Onshore	1990	1998	Field	
20	Eider	Offshore	Oil	Offshore	1998	1998	Satellite ¹	
21	Tarn	Onshore	Oil	Onshore	1991	1998	Field	
22	Tabasco	Onshore	Oil	Onshore	1992	1998	Satellite ²	
23	Midnight Sun	Onshore	Oil	Onshore	1998	1999	Satellite ⁴	
24	Alpine	Onshore	Oil	Onshore	1994	2000	Field	
25	Northstar	Offshore	Oil	Offshore	1984	2001	Field	
26	Aurora	Onshore	Oil	Onshore	1999	2001	Satellite ⁴	
27	NW Eileen/Borealis	Onshore	Oil	Onshore	1999	2001	Field	
28	Polaris	Onshore	Oil	Onshore	1999	2001	Satellite	
29	Meltwater	Onshore	Oil	Onshore	2000	2001	Pool	
30	Palm	Onshore	Oil	Onshore	2001	2002	Pool	
31	Orion	Onshore	Oil	Onshore	2000	2003	Satellite	
32	Raven	Onshore	Oil	Onshore	?	2006	Pool	
33	Fiord (CD 3)	Onshore	Oil	Onshore	1992	2006	Pool	
34	Nanuq (CD 4)	Onshore	Oil	Onshore	1996	2006	Pool	
35	Oooguruk	Offshore	Oil	Offshore	2003	(2008)	Pool	
Present Development								
36	Nikaitchuq	Offshore	Oil	Offshore & Onshore	2004	(2009)	Pool	When Production Is Expected
37	Alpine West (CD 5)	Onshore	Oil	Onshore	1998	(2010)	Pool	
38	Liberty	Offshore	Oil	Offshore	1983	(2011)	Pool	
Reasonably Foreseeable Future Development								
39	Lookout (CD 6)	Onshore	Oil	Onshore	2001	(2013)	Pool	
40	Sivuliiq (Hammerhead)	Offshore	Oil	Offshore	1985	—	Pool	
41	Tuvaag	Offshore	Oil	Offshore	2005	—	Prospect	
42	Spark (CD 7)	Onshore	Gas & Oil	Onshore	2000	—	Pool	
43	Carbon	Onshore	Oil & Gas	Onshore	2004	—	Prospect	
44	Moose's Tooth	Onshore	Gas & Oil	Onshore	2001	—	Prospect	
45	Rendezvous	Onshore	Gas & Oil	Onshore	2000	—	Pool	
46	Kalubik	Offshore	Oil	Onshore	1992	—	Prospect	
47	Thetis Island	Offshore	Oil	Offshore	1993	—	Prospect	
48	Sikulik	Onshore	Gas	Onshore	1988	—	Pool	
49	Gwydyr Bay	Offshore	Oil	Onshore	1969	—	Pool	
50	Point Thomson	Onshore	Gas & Oil	Onshore	1977	—	Pool	
51	Pete's Wicked	Onshore	Oil	Onshore	1997	—	Prospect	
52	Sandpiper	Offshore	Gas & Oil	Offshore	1986	—	Pool	
53	Mikkelson	Onshore	Oil	Onshore	1978	—	Prospect	
54	Sourdough	Onshore	Oil	Onshore	1994	—	Show	

Table 3.1.1-1 Alaska North Slope Oil and Gas Discoveries as of May 2008 (cont'd)

Name	Location of Field or Pool	Production Oil, Gas	Location of Production Facility	Discovery	Production Began	Category	Ranking Criteria
Reasonably Foreseeable Future Development (Continued)							
55	Yukon Gold	Onshore	Oil	Onshore	1994	—	Show
56	Flaxman Island	Offshore	Oil	Offshore	1975	—	Prospect
57	Stinson	Offshore	Oil	Offshore	1990	—	Prospect
58	Kuvlum	Offshore	Oil	Offshore	1987	—	Prospect
Speculative Future Development							
59	Paktoa	Offshore	Oil	Offshore	2006	—	Prospect
60	Klondike	Offshore	Oil	Offshore	1990	—	Prospect
61	Burger	Offshore	Gas & Oil	Offshore	1990	—	Prospect
62	Hemi Springs	Onshore	Oil	Onshore	1984	—	Pool
63	Ugnu	Onshore	Oil	Onshore	1984	—	Pool
64	Umiat	Onshore	Oil	Onshore	1946	—	Pool
65	Fish Creek	Onshore	Oil	Onshore	1949	—	Show
66	Simpson	Onshore	Oil	Onshore	1950	—	Prospect
67	East Kurupa	Onshore	Gas	Onshore	1976	—	Show
68	Meade	Onshore	Gas	Onshore	1950	—	Prospect
69	Wolf Creek	Onshore	Gas	Onshore	1951	—	Show
70	Gubik	Onshore	Gas	Onshore	1951	—	Pool
71	Square Lake	Onshore	Gas	Onshore	1952	—	Show
73	East Umiat	Onshore	Gas	Onshore	1964	—	Prospect
74	Kavik	Onshore	Gas	Onshore	1969	—	Show
75	Kemik	Onshore	Gas	Onshore	1972	—	Show

Insufficient Information to Estimate Chance of Development

Notes:

Field information is taken from State of Alaska, Dept. of Natural Resources Annual Report December 2004 and Petroleum News

Footnotes for Satellites identify the associated production unit:

- ¹Duck Island Unit;
- ²Kuparuk River Unit;
- ³Milne Point Unit;
- ⁴Prudhoe Bay Unit.

Parentheses indicate when production startup is expected.

Definitions:

Field—infrastructure (pads/wells/facilities) installed to produce one or more pools.

Satellite—a pool developed from an existing pad.

Pool—petroleum accumulation with defined limits.

Prospect—a discovery tested by several wells.

Show—a one-well discovery with poorly defined limits and production capacity.

Table 3.1.1-2 Present Development: Estimated Reserve Data

Unit or Area	Field	Type (Oil, Gas)	Discovery	Status	Oil Reserves (MMbbl)
Nikaichuq	Nikaichuq	Oil	2004	Present Development	70-180
Colville River	Alpine West CD 5	Oil	2002?	Present Development	50
Endicott	Liberty	Oil	1983	Present Development	105
Total for All Units or Areas		—	—	—	225-335

Source: Anchorage Daily News (2007); USDO, MMS, (2007a); ENI (2008)

Table 3.1.1-3 Future Lease Sales

Sale	Proposed Sale Date(s)	Area/Description	Resources or Hydrocarbon Potential
Federal			
2007-2012 Beaufort Sea OCS Sales 209 and 217	2009 and 2011, respectively		0.5-1.0 Bbbl
2007-2012 Chukchi Sea OCS Sales 212, and 221	2010 and 2012, respectively		1.0 Bbbl
Northeast NPR-A	Fall 2008		2.0-4.05 Bbbl
Northwest NPR-A	Fall 2008		
State Of Alaska			
North Slope Areawide	October 2008-2012	As much as 5,100,000 acres of State-owned lands between the Canning and Colville rivers and north of the Umiat Baseline (about 69° 20' N.).	Moderate to High
Beaufort Sea Areawide	October 2008-2012	Unleased State-owned tide- and submerged lands between the Canadian border and Point Barrow and some coastal uplands acreage located along the Beaufort Sea between the Canning and Colville rivers. The gross proposed sale area is in excess of 2,000,000 acres and is divided into 576 tracts.	Moderate to High
North Slope Foothills Areawide	February 2008-2012	State-owned lands lying between the National Petroleum Reserve-Alaska and the Arctic National Wildlife Refuge south of the Umiat Baseline and north of the Gates of the Arctic National Park and Preserve. The gross proposed sale area is in excess of 7,000,000 acres.	Moderate
Canada			
Beaufort Sea and Central Mackenzie Valley	June 2008	One (1) parcel of land are located in the Central Mackenzie Valley region of the Northwest Territories and five (5) in the Beaufort Sea / Mackenzie Delta. The parcels in the Central Mackenzie Valley cover 82,100 hectares, more or less. The parcels located in the Beaufort Sea / Mackenzie Delta covers 849,194 hectares.	

Source: ADNR (2008) 2007-2012 5-Year Oil and Gas Leasing Program; USDO, MMS (2007c)

Table 3.1.1-4 Past Development: 2007 Production and Reserve Data

Unit or Area	Field	Type (Oil or Gas)	Discovery	Began	Gas (Bcf)	Produced		Reserves ²		
						2007 Oil (MMbbl) ¹	Production to	Oil (MMbbl) ¹	Gas (Bcf)	
Duck Island										
—	Endicott	O	1973	1987	—	466.240308	Endicott	—	—	
—	Sag Delta North ²	O	1989	1989	—	—	Endicott	—	—	
—	Sag Delta ²	O	1976	1989	—	—	Endicott	—	—	
—	Eider	O	1998	1998	—	2.753886	Endicott	—	—	
—	Ivishak	O	—	—	—	8.178075	Endicott	"1	"1	
Duck Isl. Unit	—	—	—	—	—	—	—	120	843	
Prudhoe Bay										
—	Prudhoe Bay	O	1967	1977	—	11,003.663154	Prudhoe	2,240	23,000	
—	Lisburne	O	1968	1981	—	149.716030	Lisburne	71	1,000	
—	Niakuk	O	1985	1994	—	86.248596	Lisburne	15	26	
—	West Beach	O	1976	1994	—	3.361555	Lisburne	—	—	
—	N. Prudhoe Bay	O	1970	1993	—	1.985,858	Lisburne	—	—	
—	Point McIntyre	O	1988	1993	—	404,422,480	Lisburne	164	500	
—	Prudhoe Bay	O	—	—	—	—	—	—	—	
—	IPA's	—	—	—	—	—	—	—	—	
—	Midnight Sun	O	1998	1999	—	16,611,817	Prudhoe	15	—	
—	Aurora	O	1999	2001	—	22,124,009	Prudhoe	43	—	
—	NW	O	1999	2001	—	—	Prudhoe	117	—	
—	Eileen/Borealis	—	—	—	—	—	—	—	—	
—	Polaris	O	1999	2001	—	6,526,597	Prudhoe	91	—	
—	Orion	O	1968	2003	—	11,374,804.00	Prudhoe	232	—	
—	P. Bay Satellites	O	—	—	—	—	Prudhoe	504	—	
Kuparuk River										
—	Kuparuk River	O	1969	1981	—	2113.536142	Kuparuk	799	1,000	
—	Tabasco	O	1992	1998	—	13.746126	Kuparuk	8	—	
—	Tarn	O	1992	1998	—	86.031076	Kuparuk	41	50	
—	West Sak	O	1969	1998	—	32.732285	Kuparuk	403	100	
—	Meltwater	O	—	2001	—	12.238532	Kuparuk	—	—	
—	Palm	O	—	2002	—	—	Kuparuk	—	—	
Milne Point										
—	Milne Point	O	1969	1985	—	16.746	Milne Point	—	—	
—	Cascade ⁴	O	1993	1996	—	—	Milne Point	—	—	
—	Schrader Bluff	O	1969	1991	—	53.3039580	Milne Point	—	—	
—	Sag River	O	1968	1994	—	—	Milne Point	—	—	
Milne Point Unit	—	—	—	—	—	—	—	331	14	
Badami	Badami	O&G	1990	1998	—	5.198420	TAPS	2	—	
Colville River	Alpine	O	1994	2000	—	274.431633	Kuparuk	252	400	
	Nanuq	—	—	2006	—	—	—	203	—	
Northstar NPR-A¹	Fiord	—	—	2006	—	—	—	—	—	
	Northstar	O	1984	2001	—	122.390552	TAPS	97	450	
—	East Barrow	G	1974	1981	0.081	—	Barrow	—	5	
—	South Barrow	G	1949	1950	0.2.2	—	Barrow	—	4	
—	Walakpa	G	1980	1993	5 7	1.516	Barrow	—	25	
All Units or Areas Total						—	—	—	15,129.288761	5.9 35

Notes:

¹ Production information is from State of Alaska, Oil and Gas Conservation Commission (December 2007). Production includes oil and NGLs. Oil and Gas Reserves are from State of Alaska, DNR (2007)

² Reserves were estimated by subtracting 2005 production in State of Alaska, Oil and Gas Conservation Commission (2005) from the Reserve Data in ADNR (2006a).

³ Endicott includes Endicott, Sag Delta, and Sag Delta North. Prudhoe Bay satellites include Midnight Sun, Aurora, Borealis, Polaris, and Orion

⁴ Cascade is included in Milne Point.

Table 3.2.1-1 Undiscovered Oil and Gas Resources of Arctic Alaska Petroleum Province*

Assessment Area	Total Energy Endowment (billions of barrels equivalent)	Oil and Natural Gas Liquids (billions of barrels)	Natural Gas (trillions of cubic feet)	Percentage (energy-equivalent basis)
Chukchi Sea Planning Area ¹	29.04	15.38	76.77	32
Beaufort Sea Planning Area ¹	13.14	8.22	27.64	15
Northern Alaska Province ²	48.20	27.00	119.15	53
Totals	90.38	50.60	223.57	100

Notes:

*Mean, risked, undiscovered, technically recoverable oil and gas resources, Chukchi Sea and Beaufort Sea Planning Areas and Northern Alaska Province

Sources: ¹USDOJ, MMS (2006), Arctic Offshore Planning Areas; ²Houseknecht and Bird (20-5:Table 4, p. 9); BOE calculated by author (Sherwood) using 5,620 cubic feet of gas = 1 barrel oil-equivalent

Table 3.2.1-2 Arctic Alaska Developed Oil and Gas Fields, Remaining Reserves, Production, and Original Reserves¹

Unit or Area (Developed Fields)	Oil Reserves as of 1/2007 (MMbbl)	Gas Reserves as of 1/2007 (Bcfg)	Oil Production (Net) as of 12/2006	Gas Production (Net) as of 12/2006 ²	Original Oil Reserves (MMbbl)	Original Gas Reserves (Bcfg)
Badami Unit	2	0	4.828	7.811	6.828	7.811
Barrow						
East Barrow	Nr ⁶	5	nr	8.181	nr	13.181
South Barrow	nr	4	nr	22.640	nr	26.640
Walakpa	nr	25	nr	16.411	nr	41.411
Total Barrow	nr	34	nr	47.232	nr	81.232
Colville River Unit						
Alpine	252	nr	226.407	62.311	478.407	nr
CRU Satellites	203	nr	2.553	1.630	205.553	nr
Total CRU	455	400	228.960	63.941	683.960	463.941
Duck Island Unit	120	843	471.743	250.228	591.743	1093.228
Kuparuk River Unit						
Kuparuk	799	1000	2070.510	526.059	2869.510	1526.059
West Sak	403	100	26.428	10.892	429.428	110.892
Tabasco	8	nr	12.682	2.009	20.682	nr
Tarn	41	50	80.226	-20.189	121.226	29.811
Meltwater	6	nr	11.146	-7.600	17.146	nr
Other KRU Satellites	nr	nr	nr	nr	nr	nr
Total KRU	1256	1150	2200.992	511.171	3456.992	1661.171
Milne Point Unit	331	14	249.294	52.673	580.294	66.673
Northstar³	97	450	108.517	-120.770	205.517	570.770
Prudhoe Bay Unit						
Prudhoe IPA ⁴	2240	23000	11381.435	4516.341	13621.435	27516.341
PBU Satellites ⁵	504	nr	91.776	131.688	595.776	nr
Lisburne	71	1000	160.682	15.553	231.682	1015.553
Niakuk	15	26	85.675	72.183	100.675	98.183
North Prudhoe Bay	nr	nr	2.071	6.652	nr	nr
West Beach	nr	nr	3.641	17.424	nr	nr
Point McIntyre	164	500	404.871	125.048	568.871	625.048
Total PBU	2995	24526	12130.152	4884.889	15125.152	29410.889
Totals	5256	27417	15394.485	5697.175	20644.773	33205.542

Notes:

¹Data for onshore unitized and developed fields and Point Thomson area from State of Alaska (2007).

²A negative entry indicates that greater amounts were injected than produced.

³Northstar field extends from State of Alaska waters into Federal OCS waters. As of November 2007, 17.840% of Northstar reserves are considered to underlie Federal OCS leases (http://www.mms.gov/alaska/fo/North_Star/Northstar_production_table.pdf).

⁴Prudhoe Bay Initial Participating Area includes the main Ivishak oil pool, gas, gas liquids, gas cap gas, and injected gas.

⁵Includes Aurora, Borealis, Orion, Polaris, Midnight Sun, and Raven pools.

⁶nr = not reported

Table 3.2.1-3 Arctic Alaska Undeveloped Oil and Gas Discoveries and Estimated Resources

Unit or Area	Oil Resources as of 1/2007 (MMbbl)*	Gas Resources as of 1/2007 (Bcfg)*	Oil Production (Net) as of 12/2006	Gas Production (Net) as of 12/2006	Original Oil Resources (MMbbl)	Original Gas Resources (Bcfg)
Undeveloped Fields – Onshore and State of Alaska Waters						
East Kurupa	nr*	nr	0	0	nr	nr
East Umiat ¹	nr	4	0	0	nr	4
Fish Creek (NPRA)	nr	nr	0	0	nr	nr
Gubik ¹	nr	600	0	0	nr	600
Gwydyr Bay ¹	30-60	nr	0	0	30-60	nr
Hemi Springs	nr	nr	0	0	nr	nr
Kavik ²	nr	95-173	0	0	nr	95-173
Kemik	nr	nr	0	0	nr	nr
Lookout (NPRA)	nr	nr	0	0	nr	nr
Meade (NPRA) ¹	nr	20	0	0	nr	20
Mikkelsen	nr	nr	0	0	nr	nr
Moose's Tooth (NPRA)	nr	nr	0	0	nr	nr
Nikaitchuq	nr	nr	0	0	nr	nr
Oooguruk ³	70-90	nr	0	0	70-90	nr
Point Thomson Area ⁴	295	8,000	0	0	295	8,000
Rendezvous (NPRA)	nr	nr	0	0	nr	nr
Sikulik (Barrow area)	nr	nr	0	0	nr	nr
Simpson (NPRA)	nr	nr	0	0	nr	nr
Spark (NPRA)	nr	nr	0	0	nr	nr
Square Lake (NPRA)	nr	58	0	0	nr	58
Stinson	nr	nr	0	0	nr	nr
Sourdough ⁵	100?	nr	0	0	100?	nr
Umiat (NPRA) ⁵	70	nr	0	0	70	nr
Wolf Creek (NPRA)	nr	nr	0	0	nr	nr
Undeveloped Fields – Federal Offshore (OCS)						
Liberty (Beaufort Sea) ⁶	105	nr	0	0	105	nr
Sivulliq/Hammerhead (Beaufort Sea) ⁸	100-200	nr	0	0	100-200	nr
Kuvlum (Beaufort Sea) ⁸	160-300	nr	0	0	160-300	nr
Sandpiper (Beaufort Sea) ⁹	47	nr	0	0	47	nr
Burger (Chukchi Sea) ¹⁰	107-3,370	2,400-63,200	0	0	107-3,370	2,400-63,200

Sources: ¹Thomas et al. (1991); ²Verma et al. (2006); ³Petroleum News Alaska (2007); ⁴ADNR, Div. Oil and Gas (2007d); Estimate includes the "Flaxman" pool; ⁵Alaska Report (1997); ⁶Molenaar (1982); ⁷BPXA (2007); ⁸Petroleum News Alaska (2003); ⁹Petroleum News Alaska (1998); ¹⁰Estimates of discovered resources by MMS based on limited well date.

<http://www.mms.gov/alaska/re/Burger/Resources/Burger%20Fact%20Sheet.pdf>. Most likely gas resource = 14038 Bcf; most likely liquids resource = 724 MMbbl condensate.

*nr = not reported

Table 3.2.2-1 Temperature Trend for Barrow and Kotzebue (1949-2007)

Station Location	Total Change, °F (1949-2007)				
	Annual	Winter	Spring	Summer	Autumn
Barrow	4.2	6.3	4.3	2.9	3.0
Kotzebue	3.3	7.0	1.8	2.7	1.8

Notes: Barrow is located at 71°17' N., 156°46' W. at an elevation of 30.8 feet. Kotzebue is located at 66°53' N., 162°32' W. at an elevation of 9.8 feet.

Source: <http://climate.gi.alaska.edu/ClimTrends/Change/TempChange.html>

Table 3.2.3-1 Average Monthly Discharge in the Beaufort Sea from Gauged Rivers

River Name	Jan.	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Record Length
Colville River at Umiat AK	16	3.6	0.21	0.00	16,400	51,000	17,500	22,400	10,900	4,420	414	83	2003-2007
Colville River near Nuiqsut, Alaska	--	--	--	--	--	21,600	22,500	14,800	--	--	--	--	1977
Ikpikpuk River, Fry Creek	0.00	0.00	0.00	0.00	445	5,670	449	784	138	86	2.7	0.00	2005-2007
Judy Creek near Nuiqsut, Alaska	0.00	0.00	0.00	0.00	11	1,350	167	75 54	34	2.4	0.00		2005-2007
Kuparuk River near Deadhorse, Alaska	0.87	0.83	0.83	0.83	1,700	10,200	1,200	1,700	1,530	291	27	3	1971-2007
Meade River At Atkasuk, Alaska	0.00	0.00	0.00	0.00	780	4,180	896	1,450	270	154	5.3	0.00	1977, 2005-2007
Miguakiak River near Teshekpuk Lake near Lonely, Alaska						120	980	724					1977
Nunavak Creek near Barrow, Alaska	0.00	0.00	0.00	0.00	0.26	8.6	2.1	0.89	1.0	0.03	0.00	0.00	1972-2004
Putuligayuk River near Deadhorse, Alaska	0.00	0.00	0.00	0.00	4.1	451	21	9.4	15	1.8	0.00	0.00	1971-1986
Sagavanirktok River near Pump Station 3, Alaska	54	37	31	30	1,250	5,700	4,780	3,960	1,820	626	235	99	1982-2007
Mackenzie River at Arctic Red River	3,886	3,480	3,241	3488	13,633	20,457	17,140	13,767	11,286.07	8997.5	4,525	3,481	1973-2000

Notes: -- = No Data, Peak flow indicated in grey.

Source: USGS (2008) and R-ArcticNet (2008)

Table 3.2.4-1 Mean Occurrence Dates (1996-2004) for Landfast Ice Conditions

		Mahoney et al., 2007; Eicken et al., 2006				Barry, Moritz, and Rogers, 1979		
		Zone 1 Wainwright to Pt. Barrow	Zone 2 Pt Barrow to Barter Isl.	Zone 3 Barter Isl to Herschel Isl.	Zone 4 Mackenzie Delta	Central Chukchi Sea	Central Beaufort Sea	
First Ice*	Mean	Dec 01	Oct 25	Nov 04	Nov 9	Early November	Mid- October	First continuous fast ice
	σ'	31.8	9.6	11.4	17.5			
Stable Ice	Mean	Feb 23	Jan 22	Jan 28	Jan 27	February	January February	Stable ice inside of 15-m isobath
	σ'	41.9	30.1	32.6	34.9			
Breakup	Mean	Jun 04	Jun 11	Jun 04	May 26	June 10	June 30	First openings and movement
	σ'	13.9	14.2	13.7	12.6			
Ice Free	Mean	Jun 18	Jun 24	Jun 24	Jun 06	July 05	August 01	Nearshore largely free of fast ice
	σ'	12.7	8.4	12.6	10.2			

Oasis and D.F. Dickins Associates Ltd., 2006							
	Pt Barrow to Drew Pt	Drew Pt to Cape Halkett	Cape Halkett to Oliktok	Oliktok to Bullen Pt	Bullen Pt to Brownlow Pt	Brownlow Pt. to Barter Isl.	Barter Isl to Demarcation Pt.
Median Freezeup	Oct 4-22	Oct 4-22	Oct 4-22	Oct 4-15	Oct 4-15	Oct 8-1 5	Oct 8-1 5
Ice 30-46cm	Nov 3	Oct 30	Oct 30	Oct 30	Oct 30	Nov 3	Nov 3
Ice 46-76 cm	Nov 19-Dec 2	Dec2–Dec 20	Nov 15-22	Nov 15-22	Dec 5	Dec 5	Nov 27-Dec 9
Overflood	May 25	NA	Ma 27-28	May 27-29	Jun 11	May 23-Jul 2	NA
Start Breakup	Jun 21-Jul 1	Jun 20–Jul 4	Jun 12–Jul 6	Jun 12-Jun 25	Jun 25-Jul 2	Jun 2-Jul 2	Jul 1-9
End Breakup	Jul 9-Aug 30	Jul 23-Aug 27	Jun 25-Aug 29	Jun 25-Aug 29	Jul 16- Aug 15	Jul 16-Aug 15	Aug 1-13

Sources: Oasis Environmental and D.F. Dickins Associates Ltd. (2006); Mahoney et al. (2007); Eicken et al. (2006); Barry, Moritz, and Rogers (1979).

Table 3.2.6-1 Ambient Air Quality Standards Relevant to the Chukchi Sea Planning Area

Ambient Air Quality Standards				
Pollutant	Averaging Period ¹	Alaska Standards	National Standards ²	Standard Type
Carbon Monoxide	8-hour	10 mg/m ³	9 ppm (10 mg/m ³)	Primary
	1-hour	40 mg/m ³	35 ppm(40 mg/m ³)	Primary
Nitrogen Dioxide	Annual	100 µg/m ³	.053 ppm (100 µg/m ³)	Primary & Secondary
Ozone	1-hour	235 µg/m ³	—	—
	8-hour	—	.08 ppm (157 µg/m ³)	Primary & Secondary
Lead	Quarterly	1.5 µg/m ³	1.5 µg/m ³	Primary & Secondary
Particulate Matter (PM ₁₀)	Annual	50 µg/m ³	50 µg/m ³	Primary & Secondary
	24-hour	150 µg/m ³	150 µg/m ³	Primary & Secondary
Particulate Matter (PM _{2.5})	Annual	—	15 µg/m ³	Primary & Secondary
	24-hour	—	65 µg/m ³	Primary & Secondary
Sulfur Dioxide	Annual	80 µg/m ³	.03 ppm (80 µg/m ³)	Primary
	24-hour	365 µg/m ³	.014 ppm (365 µg/m ³)	Primary
	3-hour	1300 µg/m ³	.5 ppm (1300 µg/m ³)	Secondary
Reduced Sulfur Compounds	30-minute	50 µg/m ³	—	—
Ammonia	8-hour	2.1 µg/m ³	—	—

Notes:

(a dash [—] indicates that no standards have been established)

mg/m³ = milligrams per cubic meter

µg/m³ = micrograms per cubic meter

Footnotes:

¹National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth high 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM₁₀, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m³ is ≤1. For PM_{2.5}, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.

²Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25 °C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25 °C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

Source: ADEC (2005), 18 AAC 50.010; Environmental Protection Agency (40 CFR Part 50)

Table 3.2.6-2 Measured Air Pollutant Concentrations at Prudhoe Bay, Alaska 1990-1996¹

Pollutant	Monitor Sites					NAAQS ²	Class II Increments
	CPF-1	DS1F	CCP	WPA	GC1		
O₃							
Max 1-hr	0.05-0.06	0.05	0.04-0.06	0.05-0.09	0.04-0.05	0.075	--
NO₂							
Annual	13-16	4-5	16-26	8-12	16-20	100	25
PM₁₀							
Annual	--	--	--	--	--	--	17
Max 24-hr	--	--	12-29	--	55-155	150	30
SO₂							
Annual	4-5	3	3	--	3-4	80	20
Max 24-hr	16-26	5-13	8-10	--	8-39	365	91
Max 3-hr	29-44	13-55	10-13	--	21-101	1,300	512

Notes:

¹O₃ concentrations are in parts per million (ppm); all others are in micrograms per cubic meter

²The NAAQS for O₃ is based on an 8-hour average concentration; it is not directly comparable to the measured values; the 8-hour average concentrations will be lower than the 1-hour average values

CPF-1 Central Compressor Plant

DS1F Drill Site 1F

CCP Central Compressor Plant

WPA Well Pad A

GC1 Gathering Center 1

Table 3.2.7-1 A Comparison of Most Common Sound Levels from Various Sources

Source	Activity	Decibels at Source
Vessel Activity		
	Tug Pulling Barge	171
	Fishing Boat	151-158
	Zodiac (outboard)	156
	Supply Ship	181
	Tanker	169-180
	Freighter	172
Icebreaking		
	Ice Management	171-191
	Icebreaking	193
Dredging		
	Clamshell Dredge	150-162
	Aquarius (cutter-suction dredge)	185
	Beaver Mackenzie Dredge	172
Drilling		
	Kulluk (conical drillship)	185
	Explorer II (drillship)	174
	Gravel Island	125
	Ice Island (in shallow water)	86
Seismic and Acoustics		
	Airgun Array	235-259
	Single Airgun	216-232
	Vibroseis	187-210
	Water Gun	217-245
	Sparker	221
	Boomer	212
	Depth Sounder	180
	Sub-Bottom Profiler	200-230
	Side-Scan Sonar	220-230
	Military	200-230
Ambient Noise		
	Ambient Noise	65-133

Source: Reprinted from USDO, MMS, 2007d

Table 3.4.1-1 Estimated Number of Jobs by Sector, North Slope Borough Residents Only

	1980	1988	1993	1998	2003
Federal Government	100	83	37	39	61
State Government	12	20	25	35	26
City Government	—	71	61	57	66
NSB Government	642	1,087	893	989	777
NSB School District	—	419	345	289	409
Private Construction	201	95	21	66	43
Regional/Village Corporation		311	304	407	383
Transportation	107	122	45	43	53
Oil Industry	30	46	21	16	23
Service	71	84	53	83	108
Other	176	168	138	368	242
Total	1,689	2,506	1,943	2,392	2,191

Sources: 1980 Data from Alaska Consultants, Inc. (1981); remaining data from North Slope Borough Economic Profile and Census Reports.

Table 3.4.1-2 Employment of Residents by Sector, North Slope Communities, 2003

Sector	Anaktuvuk Pass	Atqasuk	Barrow	Kaktovik	Nuiqsut	Pt. Hope	Pt. Lay	Wainwright
Federal Gov't.	1	0	45	1	0	10	2	2
State Gov't.	2	0	22	0	1	0	1	0
City. Gov't.	12	1	21	3	5	14	2	8
NSB Gov't.	51	20	464	27	29	44	24	48
NSB School District	30	20	194	21	27	62	29	44
NSB CIP	0	0	4	0	2	0	1	3
Oil Industry	3	0	14	1	3	2	0	0
Private Construction	4	0	23	5	3	1	4	4
ASRC	3	0	60	5	3	1	4	3
Village Corp.	19	27	87	18	37	60	9	38
Finance	0	0	5	0	0	0	1	0
Transportation	0	0	48	0	1	3	1	1
Communication	0	0	8	0	0	0	0	0
Trade	0	1	27	0	0	2	0	1
Service	4	0	103	0	0	0	1	0
Ilkisagvik College	0	0	58	0	0	2	1	1
Other	2	3	132	3	10	25	5	18
Total	131	72	1,334	83	121	226	85	170

Notes: NSB = North Slope Borough; CIP = Capital Improvements Project; ASRC = Arctic Slope Regional Corp.

Source: NSB, Dept. of Planning and Community Service (2003)

Table 3.4.1-3 Employment Estimates (in thousands) (nonagricultural wage and salary employment)

	1995	1996	1997	1998	1999	2000	2005
Anchorage-MatSu Region	131	132	135	141	144	148	157
Kenai Peninsula Borough	16	16	16	17	17	17	16
Fairbanks North Star Borough	31	31	32	33	33	34	36
Total for three areas	176	179	183	191	194	189	209
Alaska Total	261	262	269	275	278	284	292

Source: State of Alaska, Dept. of Labor and Workforce Dev., Research and Analysis Section

Table 3.4.2-1 Subsistence Resources Used in Point Lay, Wainwright, Barrow, Atkasuk, and Nuiqsut (English, Inupiaq, and Scientific Names)

Resource	Inupiaq Name	Scientific Name					
			PL ¹	W ²	B ³	K ⁴	N ⁵
Marine Mammals							
Bearded seal	Ugruk	<i>Erignathus barbatus</i>	X	X	X	X	X
Ringed seal	Natchiq	<i>Phoca hispida</i>	X	X	X	X	X
Spotted seal	Qasigiaq	<i>Phoca largha</i>	X	X	X	X	X
Ribbon seal	Qaigulik	<i>Phoca fasciata</i>	X	X	X	X	—
Beluga whale	Quilalugaq	<i>Delphinapterus leucas</i>	X	X	X	X	—
Bowhead whale	Agviq	<i>Balaena mysticetus</i>	X	X	X	X	X
Polar bear	Nanuq	<i>Ursus maritimus</i>	X	X	X	X	X
Walrus	Aiviq	<i>Odobenus rosmarus</i>	X	X	X	X	—
Terrestrial Mammals							
Caribou	Tuttu	<i>Rangifer tarandus</i>	X	X	X	X	X
Moose	Tuttuvak	<i>Alces alces</i>	—	X	X	X	X
Brown bear	Aklaq	<i>Ursus arctos</i>	X	X	X	X	X
Dall sheep	Imnaiq	<i>Ovis dalli</i>	—	X	X	X	X
Muskox	Uminmaq	<i>Ovibus moschatus</i>	—	X	—	X	X
Arctic fox (blue)	Tigiganniaq	<i>Alopex lagopus</i>	X	X	X	X	X
Red fox ⁶	Kayuqtuq	<i>Vulpes fulva</i>	X	X	X	X	X
Porcupine	Qinagluk	<i>Erethizon dorsatum</i>	—	X	X	—	—
Ground squirrel	Siksrik	<i>Spermophilus parryii</i>	X	X	X	X	X
Wolverine	Qavvik	<i>Gulo gulo</i>	X	X	X	X	X
Weasel	Itigliaq	<i>Mustela erminea</i>	—	X	—	X	X
Wolf	Amaguk	<i>Canis lupus</i>	X	X	X	X	X
Marmot	Siksriqpak	<i>Marmota broweri</i>	X	X	—	X	X
Fish							
Salmon (ns)	—	—	X	X	X	X	X
Chum	Iqalugruaq	<i>Oncorhynchus keta</i>	X	X	X	—	X
Pink (humpback)	Amaqtuuq	<i>O. gorbuscha</i>	—	X	X	X	X
Silver (coho)	Iqalugruaq	<i>O. kisutch</i>	—	—	—	— ⁷	—
King (chinook)		<i>O. tshawytscha</i>	—	—	—	—	—
Sockeye (red)		<i>O. nerka</i>	—	—	—	—	—
Whitefish (ns)	Aanaakliq	<i>Coregonus sp.</i>	—	X	X	X	—
Round whitefish	Aanaakliq	<i>Prosopium cylindraceum</i>	—	X	X	—	—
Broad whitefish	Aanaakliq	<i>Coregonus nasus</i>	—	X	X	X	X
Humpbackwhitefish	Pikuktuuq	<i>C. clupeaformis</i>	—	X	X	X	X
Least cisco	Iqalusaaq	<i>C. sardinella</i>	—	X	X	X	X
Bering Arctic cisco	Qaaktaq	<i>C. autumnalis</i>	X	X	X	X	X
Other Freshwater Fish							
Arctic grayling	Sulukpaugaq	<i>Thymallus arcticus</i>	X	X	X	X	X
Arctic char	Iqalukpik	<i>Salvelinus alpinus</i>	X	X	X	X	X
Burbot (ling cod)	Tittaaliq	<i>Lota lota</i>	—	X	X	X	X
Lake trout	Iqaluaqpak	<i>Salvelinus namaycush</i>	—	X	X	X	X
Northern pike	Siulik	<i>Esox lucius</i>	—	X	X	—	—
Other coastal fish							
Capelin	Pagmaksraq	<i>Mallotus villosus</i>	—	—	—	—	—
Rainbow smelt	Ilhuagniq	<i>Osmerus mordax</i>	X	X	X	—	X
Arctic cod	Iqalugaq	<i>Boreogadus saida</i>	—	X	X	X	X
Tomcod	Uugaq	<i>Eleginus gracilis</i>	X	X	X	X	—
Flounder	Nataagnaq	<i>Liopsetta glacialis</i>	—	—	—	—	—

Table 3.4.2-1 Subsistence Resources Used in Point Lay, Wainwright, Barrow, Atqasuk, and Nuiqsut (English, Inupiaq, and Scientific Names) (cont'd.)

Resource	Inupiaq Name	Scientific Name					
			PL ¹	W ²	B ³	K ⁴	N ⁵
Birds							
Snowy owl	Ukpik	<i>Nyctea scandiaca</i>	—	X	—	—	X
Red-throated loon	Qaqsaupiagruk	<i>Gavia stellata</i>	X	X	X	—	—
Tundra swan	Qugruk	<i>Cygnus columbianus</i>	—	X	—	X	X
Eider							
Common eider	Amauligruaq	<i>Somateria mollissima</i>	X	X	X	X	X
King eider	Qinalik	<i>Somateria spectabilis</i>	X	X	X	X	X
Spectacled eider	Tuutalluk	<i>Somateria fischeri</i>	X	X	X	—	—
Steller's eider	Igriqauqtuq	<i>Polysticta stelleri</i>	X	X	X	—	—
Other ducks (ns)							
	Qaugak	—	—	X	X	X	—
Pintail	Kurugaq	<i>Anas acuta</i>	X	X	—	X	—
Long-tailed duck	Aaqhaaliq	<i>Clangula hyemalis</i>	X	X	X	X	—
Surf scoter	Aviluktuk	<i>Melanitta perspicillata</i>	—	X	X	—	—
Geese							
Brant	Niglingaq	<i>Branta bernicla n.</i>	X	X	X	X	X
White-fronted goose	Niglivialuk	<i>Anser albifrons</i>	X	X	X	X	X
Snow goose	Kanuq	<i>Chen caerulescens</i>	X	X	X	X	X
Canada goose	Iqragutilik	<i>Branta canadensis</i>	X	X	X	X	X
Ptarmigan (ns)							
	Aqargiq	<i>Lagopus sp.</i>	—	X	X	X	X
Willow ptarmigan	Nasaullik	<i>L. lagopus</i>	X	X	X	—	—
Other Resources							
Berries (ns)							
	—	—	X	X	X	X	X
Blueberry	Asiaq	<i>Vaccinium uliginosum</i>	X	X	X	—	—
Cranberry	Kimminnaq	<i>V. vitisidaea</i>	—	X	X	—	—
Salmonberry	Aqpik	<i>Rubus spectabilis</i>	—	X	X	—	—
Bird eggs (ns)							
	Mannik	—	X	X	X	X	—
Gull eggs	—	—	—	X	—	X	—
Goose eggs	—	—	—	X	—	X	—
Eider eggs	—	—	—	X	X	X	—
Greens/roots (ns)							
	—	—	—	X	X	X	X
Wild rhubarb	Qunulliq	<i>Oxyric digyna</i>	—	X	X	—	—
Wild chives	Quagaq	<i>Allium schoenoprasum</i>	—	X	X	—	—
Clams	Imaniq	—	X	X	X	—	—
Crab	Puyyugiaq	—	X	X	—	X	X
Wood	—	—	—	—	—	X	X
Freshwater	Imiq	—	—	X	X	—	—
Freshwater Ice	Sikutaq	—	—	X	X	—	—
Sea ice	Siku	—	—	X	X	—	—

Notes:¹Point Lay resources used, 1987;²Wainwright resources used, 1987-1990³Barrow resources used, 1987-1990⁴Atqasuk resources used, 1992-1993⁵Nuiqsut resources used, 1993⁶Red fox (Cross, Silver)⁷Harvest of silver, king, and sockeye salmon is rare

ns. = unspecified

— = not available or not applicable

An unchecked box might mean a resource was not used or, especially in the case of "Other Resources," the resource might have been used but use was reported as "berries" rather than "blueberries," for example.

Sources: S.R. Braund and Assocs. and UAA, ISER (1993a,b); Pedersen (1995a); S.R. Braund and Assocs. (1996)

Table 3.4.2-2 Proportion of Iñupiat Household Food Obtained from Subsistence Activities, 1977, 1988, 1993, 1998

All Surveyed Households in the North Slope Borough				
Proportion	1977	1988	1993	1988
None	13	20	18	2
Less than half	42	31	25	29
Half	15	14	15	22
More than half	30	35	42	47

Source: North Slope Borough (1999)

Table 3.4.2-3 Kaktovik 1992 Subsistence-Harvest Summary for Marine Mammals, Terrestrial Mammals, Fish, and Birds

	Edible Pounds Harvested			
	Total Number Harvested	Total	Household Harvest Mean	Per Capita
Marine Mammals				
Total marine mammals	—	115,645	1,835.64	599.13
Bowhead whale	—	108,160	1,716.82	560.35
Beluga whale	0	0	0.00	0.00
Walrus	47*	52	0.81	0.27
Polar bear	3	1,330	21.10	6.89
Bearded seal	24*	4,246	67.40	22.00
Ringed seal	42	1,689	26.80	8.75
Spotted seal	4*	169	2.68	0.88
Terrestrial Mammals				
Total large land mammals	212	28,705	455.63	148.71
Brown bear	0	0	0.00	0.00
Caribou	158	19,136	303.74	99.14
Moose	4	2,011	31.91	10.42
Muskox	5	3,179	50.46	16.47
Dall sheep	44	4,379	69.51	22.69
Total small land mammals/furbearers	213	162	2.56	0.84
Arctic fox	36**	0	0.00	0.00
Red fox	11**	0	0.00	0.00
Marmot	21	107	1.70	0.55
Mink	0	0	0.00	0.00
Parka squirrel	133	54	0.86	0.28
Weasel	0	0	0.00	0.00
Wolf	3**	0	0.00	0.00
Wolverine	9**	0	0.00	0.00
Fish				
Total fish	18,468	22,952	364.32	118.91
Total salmon	50	105	1.66	0.54
Total nonsalmon	18,415	22,847	362.65	118.37
Smelt	—	—	—	—
Cod	3,673	300	4.76	1.55
Burbot	—	—	—	—
Char	5,741	16,337	259.31	84.64
Grayling	176	158	2.50	0.82
Total Whitefish	8,823	6,051	96.04	31.35
Cisco	8,809	6,027	95.66	31.22
Bering cisco	8,103	5,672	90.03	29.39
Least cisco	697	349	5.53	1.81
Birds				
Total birds and eggs	1,796	3,249	51.56	16.83
Total Migratory birds	970	2,702	42.88	14.00
Ducks	369	553	8.77	2.86
Eiders	248	372	5.90	1.93
Long-tailed ducks	106	159	2.52	0.82
Geese	601	2,135	33.89	11.06
Brant	378	1,134	18.00	5.87
Canada Goose	164	736	11.68	3.81
White-fronted goose	50	223	3.54	1.16
Swan	1	13	0.21	0.07
Ptarmigan	769	539	8.54	2.79
Bird eggs	56	8	0.13	0.04

Notes: Of 91 households, 62 participated in the survey.

Source: ADF&G (1995b) **Footnotes:** *some not eaten; **not eaten

Table 3.4.2-4 Number of Surveyed Households in Kaktovik in Each of Four Seasons, December 1994 to November 1995

Activity Code Reported	Number of Surveyed Households in Each Surveyed Season			
	Winter	Spring	Summer	Fall
	12/1/94-3/31/95	4/1/95-6/30/95	7/1/95-9/30/95	10/1/95-11/30/95
Harvest	17	22	42	13
Attempted Harvest but Not Successful	7	3	2	13
Did Not Attempt to Harvest	48	40	24	41
Out Hunting	0	0	1	0
Out of Town	1	7	2	3
Could Not Contact	0	0	1	0
Did Not Want to be Interviewed	0	0	0	0
Other (any activity not mentioned above)	0	1	1	0
Total	73	73	73	70

Source: ADF&G (1995b)

Table 3.4.2-5 Kaktovik Subsistence Harvest by Month (total number taken), December 1994 to November 1995*

Harvest Items	1994	1995											Unk.*	Reported for All Survey Sessions
	Fall	Winter			Spring			Summer			Fall			
	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	July	Aug.	Sept.	Oct.	Nov.		
Dolly Varden	100	0	0	2	160	0	16	708	748	0	7	124	10	1,875
Arctic cisco	0	0	0	0	0	0	0	1,128	1,230	0	0	0	0	2,358
Arctic cod	0	0	0	0	0	0	0	40	0	0	0	0	0	40
Arctic flounder	0	0	0	0	0	0	0	13	0	0	0	0	0	13
Chum salmon	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Grayling	2	0	0	0	1	0	0	0	0	0	0	1	0	4
Sculpin	0	0	0	0	0	0	0	60	75	0	0	0	0	135
Bowhead whale	0	0	0	0	0	0	0	0	0	3	0	0	0	3
Beluga whale	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Polar bear	1	0	0	0	0	1	0	0	0	0	0	0	0	2
Bearded seal	0	0	0	0	0	0	0	18	3	0	0	0	0	21
Ringed seal	0	0	0	0	0	5	3	5	1	2	0	0	0	16
Spotted seal	0	0	0	0	0	0	0	0	2	1	0	0	0	3
Brown bear	0	0	0	0	1	0	0	0	0	0	0	0	0	1
Moose	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Muskox	0	0	0	4	0	0	0	0	0	0	4	1	0	9
Caribou	9	5	1	0	2	0	0	50	5	3	3	0	0	78
Dall sheep	7	0	5	3	0	0	0	0	0	0	0	11	0	30
Wolf	1	1	1	2	2	0	0	0	0	0	0	1	0	8
Wolverine	0	0	1	0	0	0	0	0	0	0	0	0	0	1
Arctic fox	0	0	0	0	0	0	0	0	0	0	0	0	5	5
Ground squirrel	0	0	0	0	30	0	0	0	0	0	0	0	15	45
Goose unidentified	0	0	0	0	0	1	8	0	4	0	0	0	0	13
Canada goose	0	0	0	0	0	0	18	0	0	1	0	0	0	19
Snow goose	0	0	0	0	0	0	1	1	0	0	0	0	0	2
Brant	0	0	0	0	0	0	207	3	29	0	0	0	0	239
King eider	0	0	0	0	0	0	39	2	6	0	0	0	0	47
Common eider	0	0	0	0	0	0	21	27	10	0	0	0	0	64
Common loon	0	0	0	0	0	0	1	1	0	0	0	0	0	2
Long-tailed duck	0	0	0	0	0	0	10	2	13	0	0	0	0	25
Ptarmigan	25	25	0	0	20	0	15	0	0	10	14	10	0	119
Grand Total	146	31	8	11	216	13	339	2,058	2,127	21	32	148	30	5,180

Note:

*During this 12-month period, 31 different harvest items were taken. **Unk = unknown month (included in total).

Source: Brower, Olemaun, and Hepa (2000)

Table 3.4.2-6 Annual Polar Bear Harvest for Barrow, Nuiqsut, Wainwright, Point Lay, Point Hope, and Kivalina, 1983-2005

Harvest Season*	Number of Bears					
	Barrow	Nuiqsut	Wainwright	Point Lay	Point Hope	Kivalina
1983/1984	27	0	34	8	30	3
1984/1985	33	1	18	0	18	3
1985/1986	14	4	8	6	17	2
1986/1987	18	2	13	4	13	1
1987/1988	15	4	9	2	9	5
1988/1989	29	4	14	2	9	1
1989/1990	14	0	9	1	23	5
1990/1991	14	0	6	3	18	3
1991/1992	22	2	3	0	9	2
1992/1993	26	0	8	3	17	1
1993/1994	30	4	19	1	8	1
1994/1995	11	1	7	1	20	2
1995/1996	18	1	14	1	7	0
1996/1997	40	0	9	6	14	0
1997/1998	18	2	6	3	12	0
1998/1999**	16	3	2	0	18	3
1999/2000	17	7	5	4	10	0
2000/2001	28	5	10	1	15	1
2001/2002	25	3	2	1	9	0
2002/2003	20	3	5	1	12	1
2003/2004	10	2	13	3	10	0
2004/2005	2	2	5	4	9	2

Notes:

*Harvest runs from July 1 to June 20.

**Atqasuk harvested 2 bears during the 1988-1989 season.

Sources: Amstrup and Garner (1995); Schliebe (2006).

Table 3.4.2-7 Nuiqsut 1993 Subsistence-Harvest Summary

	Edible Pounds Harvested			Per Capita
	Total Number Harvested	Total	Household Harvest Mean	
Marine Mammals				
Total Marine Mammals	113	85,216	936.44	236.01
Bowhead whale	3	76,906	845.12	213.00
Polar bear	1*	0	0.00	0.00
Bearded seal	6	1,033	11.35	2.88
Ringed seal	98	7,277	79.96	20.15
Spotted seal	4*	0	0.00	0.00
Terrestrial Mammals				
Total Large Land Mammals	691	87,306	959.40	241.80
Brown bear	10*	734	8.06	2.03
Caribou	672	82,169	902.95	227.57
Moose	9	4,403	48.38	12.19
Muskox	0	0	0.00	0.00
Dall sheep	0	0	0.00	0.00
Total Small Land Mammals/Furbearers	599**	84	0.92	0.23
Arctic fox	203	0	0.00	0.00
Red fox	63	0	0.00	0.00
Marmot	0	0	0.00	0.00
Mink	0	0	0.00	0.00
Parka squirrel	336	84	0.92	0.23
Weasel	10	0	0.00	0.00
Wolf	31	0	0.00	0.00
Wolverine	19	0	0.00	0.00
Fishes				
Total Fish	71,897	90,490	994.39	250.62
Total Salmon	272	1,009	11.08	2.79
Total Nonsalmon	71,626	89,481	983.30	247.83
Smelt	304	42	0.46	0.12
Cod	62	7	0.07	0.02
Burbot	1,416	5,949	65.37	16.48
Char	618	1,748	19.20	4.84
Grayling	4,515	4,063	44.65	11.15
Total Whitefish	64,711	77,671	853.53	215.12
Cisco	51,791	34,943	383.98	96.78
Arctic cisco	45,237	31,666	347.97	87.70
Least cisco	6,553	3,277	36.00	9.08
Birds				
Total Birds and Eggs	3,558	4,325	47.53	11.98
Total Migratory Birds	2,238	3,540	38.90	9.80
Ducks	772	1,152	12.66	3.19
Eiders	662	1,059	11.63	2.93
Geese	1,459	2,314	25.43	6.41
Brant	296	356	3.91	0.99
Canada goose	691	830	9.11	2.30
White-fronted goose	455	1,092	12.00	3.02
Swan	7	73	0.80	0.20
Ptarmigan	973	681	7.48	1.89

Notes:

*not eaten

**some not eaten

Of 91 households, 62 participated in the survey.

Source: ADF&G (1995b)

Table 3.4.2-8 Nuiqsut Subsistence Harvest by Month, July 1994 to June 1995

Item	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.	Total 71 HHs	Est. Total 83 HHs
Arctic char	0	8	0	0	0	0	0	0	0	0	0	0	8	8
Arctic cisco*	0	0	37	5,737	2,400	1,050	262	0	0	0	0	0	9,486	9,842
Broad whitefish	1,535	25	75	855	500	0	0	0	0	0	0	130	3,210	3,237
Burbot	0	0	0	9	76	3	0	0	0	0	0	0	88	91
Fish Unidentified	0	0	0	0	0	0	0	0	0	0	0	75	75	78
Grayling	0	24	225	110	84	0	0	0	0	0	0	2	445	462
Humpback salmon	10	0	0	0	0	0	0	0	0	0	0	0	10	10
Humpback whitefish*	0	0	0	150	25	0	0	0	0	0	0	0	175	182
Least cisco	0	0	0	0	0	750	0	0	0	0	0	0	750	778
Northern pike	0	0	0	0	0	0	0	0	0	0	0	18	18	19
Whitefish unidentified	0	0	0	50	425	0	0	0	0	0	0	0	475	493
Caribou	63	32	6	80	13	4	9	5	13	7	2	15	249	258
Moose	1	1	1	1	0	0	1	0	0	0	0	0	5	5
Wolf	0	0	0	0	1	1	3	0	12	1	0	0	18	19
Wolverine	0	0	0	0	1	1	2	1	1	2	0	0	8	8
Arctic fox	0	0	0	0	0	1	1	1	3	0	0	0	6	6
Fox unidentified	0	0	0	0	4	0	0	0	0	0	0	0	4	4
Red fox	0	0	0	0	0	1	1	1	1	1	0	0	5	5
Polar bear	0	0	0	0	1	0	0	0	0	0	0	0	1	1
Tundra swan	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Goose unidentified	0	0	0	0	0	0	0	0	0	0	409	48	457	474
Eider unidentified	0	0	0	0	0	0	0	0	0	0	50	40	90	93
Ptarmigan	0	0	0	0	0	0	0	0	0	33	23	0	56	58
Sandhill crane	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Ringed seal	2	10	0	0	0	0	0	0	0	6	0	5	23	24
Salmonberries**	0	9	0	0	0	0	0	0	0	0	0	0	9	9
Cranberries*	0	0.5		0	0	0	0	0	0	0	0	0	0.5	1
Blueberries*	0	2.5		0	0	0	0	0	0	0	0	0	2.5	1
Blackberries*	0	0.5		0	0	0	0	0	0	0	0	0	0.5	1

Notes:

HH = households

*The harvest of arctic cisco and humpback whitefish is under-represented; one household provided evidence of a significant but unquantifiable harvest by saying that "sled loads" were harvested "every couple of days during October and November."

**gallons

Sources: Brower and Opie (1997); Brower and Hepa (1998)

Table 3.4.2-9 Annual Bowhead Whale Subsistence Harvest for Beaufort and Chukchi Sea Villages 1982-2005 (Kaktovik, Nuiqsut, Barrow, Wainwright, Point Hope, Kivalina)

Year	Kaktovik	Nuiqsut	Barrow	Wainwright	Point Hope	Kivalina
1982	1	1	0	2	1	0
1983	1	0	2	2	1	0
1984	1	0	4	2	2	1
1985	0	0	5	2	1	0
1986	3	1	8	3	2	0
1987	0	1	7	4	5	1
1988	1	0	11	4	5	0
1989	3	2	10	2	0	0
1990	2	0	11	5	3	0
1991	2	1	12	4	6	1
1992	3	2	22	0	2	1
1993	3	3	23	5	2	0
1994	3	0	16	4	5	2
1995	4	4	19	5	1	1
1996	1	2	24	3	3	0
1997	4	3	30	3	4	0
1998	3	4	25	3	3	0
1999	3	3	24	5	2	0
2000	3	4	18	5	3	0
2001	4	3	27	6	4	0
2002	3	4	22	1	0	0
2003	3	4	16	5	4	0
2004	3	3	21	4	3	0
2005	3	1	29	3	7	0

Sources: S.R. Braund and Assocs. (1984, 2002); Stoker and Krupnik (1993); AEWG (1993, 1995); Philo et al. (1994); Suydam et al. (1995); S.R. Braund and Assocs. and North Slope Borough (2006)

Table 3.4.2-10 Annual Beluga Whale Harvest for Barrow, Wainwright, Point Lay, Point Hope, and Kivalina, 1980-2006

Year	Number of Whales				
	Barrow	Wainwright	Point Lay	Point Hope	Kivalina
1980	0	0	15-16	23-35	3-5
1981	5	0	29-38	4-7	10-15
1982	3-5	0	28-33	17	4-5
1983	3	0	18	20-31	24
1984	0	0	0	30	27
1985	0	0	18	30	120-200
1986	0	5	33	30	7
1987	0	47	22-35	40	4
1988	0	3	40	59	6
1989	1	0	16	17	0
1990	0	0	62	16	1
1991	1	5	35	39	1
1992	0	20	24	15	10
1993	2	0	77	79	3
1994	5	0	56	53	3
1995	0	0	31	40	3
1996	2	0	41	15	7
1997	8	4	3	32	1
1998	1	38	48	52	0
1999	1	3	47	33	1
2000	1	0	0	16	44
2001	1	23	34	24	0
2002	1	37	47	23	3
2003	2	38	36	34	0
2004	1	0	53	29	1
2006	7	1	41	?	2

Sources: Alaska Beluga Whale Committee (2002, 2006); Fuller and George (1997); Lowry, Burns, and Frost (1989); Burns and Frost (1989); Impact Assessment, Inc. (1989); Burns and Seaman (1986); Braund and Burnham (1984)

Table 3.4.2-11 Annual Walrus Harvest for Barrow, Wainwright, Point Lay, Point Hope, and Kivalina 1985-2005

Harvest Season	Number of Walruses				
	Barrow	Wainwright	Point Lay	Point Hope	Kivalina
1985	—	—	—	—	—
1986	—	—	—	—	—
1987	54	—	6	—	—
1988	1-62	0-59	0	—	—
1989	14	43	0	2	46
1990	7	0	0	5	0
1991	23	32	0	0	0
1992	26	48	0	5	1
1993	27	44	1	5	12
1994	16	68	1	6	16
1995	12	83	4	0	38
1996	13	24	4	0	13
1997	48	50	0	3	2
1998	24	69	7	5	0
1999	17	48	8	5	0
2000	19	36	6	6	0
2001	37	94	3	2	0
2002	39	119	11	16	0
2003	51	29	9	12	0
2004	52	47	5	20	0
2005	5	21	5	0	4

Sources: USDO, FWS (1997, 2002, Tagging Database, 1989-2005); Braund (1993); Braund and Burnham (1984); ADF&G (1996); Fuller and George (1997)

Table 3.4.2-12 Species Harvested by Barrow Residents, 1987-1990

Species	Year 1	Year 2	Year 3	3-Year Average
Bowhead whale	7	11	10	9
Walrus	84	61	101	81
Bearded seal	236	179	109	174
Ringed seal	466	388	328	394
Spotted seal	2	4	4	3
Polar bear	12	11	39	21
Beluga whale	0	0	0	0
Caribou	1,595	1,533	1,656	1,595
Moose	52	53	40	48
Dall sheep	12	12	9	11
Brown bear	1	1	0	1
Porcupine	5	0	0	2
Ground squirrel	24	0	17	14
Wolverine	4	2	1	2
Arctic fox	192	146	48	129
Red fox	8	4	2	5
Wolf	0	0	0	0
Ermine	0	0	0	0
Whitefish	27,366	20,628	38,053	28,683
Nonspecified	5,108	173	0	1,760
Round	2,122	721	16	953
Broad-river and lake	10,579	11,431	30,047	17,352
Humpback	1,225	647	3,648	1,840
Least cisco	7,024	7,505	2,929	5,819
Arctic cisco	1,309	151	1,413	958
Grayling	12,664	8,684	8,392	9,914
Arctic char	38	76	135	83
Burbot	1,086	392	550	676
Lake trout	153	72	216	147
Northern pike	2	0	10	4
Salmon	196	80	2,089	788
Nonspecified	66	3	439	169
Chum	11	5	529	182
Pink	12	1	261	92
Silver	103	70	828	334
King	4	1	31	12
Capelin	3,960	0	346	1,435
Rainbow smelt	97	0	1,480	526
Arctic cod	0	7,945	17,018	8,321
Arctic flounder	0	0	0	0
Tomcod	0	194	0	65
Sculpin	0	11	0	4
Geese	2,873	3,334	3,943	3,384
Nonspecified	329	69	34	144
Brant	127	221	973	440
White-fronted	2,417	3,035	2,932	2,795
Snow	0	8	4	4
Canada	0	1	1	1
Eiders	5,173	4,499	8,590	6,087
Ptarmigan	2,454	1,350	329	1,378
Other birds	79	0	9	30

Source: Adapted from S.R. Braund and Assocs. (1993)

Table 3.4.2-13 Barrow 1989 Subsistence-Harvest Summary for Marine Mammals, Terrestrial Mammals, Fish, and Birds

	Edible Pounds Harvested				
	Total Number Harvested	Total	Household Harvest Mean	Per Capita	Household Percent Participation
Marine Mammals					
Total Marine Mammals	591	508,181	542.35	168.5	45.0
Bowhead whale	10	377,647	403.04	125.21	45.0
Beluga whale	0	0	0.00	0.00	0.0
Walrus	101	77,987	83.23	25.86	13.0
Polar bear	39	19,471	20.78	6.46	4.0
Bearded seal	109	19,152	20.44	6.35	11.0
Ringed seal	328	13,774	14.70	4.57	11.0
Spotted seal	4	151	0.16	0.05	*
Terrestrial Mammals					
Total Large Land Mammals	1,705	214,676	229.11	71.18	39.0
Brown bear	0	0	0.00	0.00	0.0
Caribou	1,656	193,744	206.77	64.24	39.0
Moose	40	20,014	21.36	6.64	6.0
Muskox	0	0	0.00	0.00	0.0
Dall sheep	9	918	0.98	0.30	2.0
Total Small Land Mammals/Furbearers	68	7	0.01	0.00	2.0
Arctic fox	48**	0	0.00	0.00	*
Red fox	2**	0	0.0	0.00	*
Marmot	0	0	0.00	0.00	0.0
Mink	0	0	0.00	0.00	0.0
Parka squirrel	17	7	0.01	0.00	*
Weasel	0	0	0.00	0.00	0.0
Wolf	0	0	0.00	0.00	0.0
Wolverine	1	0	0.00	0.00	*
Fish					
Total fish	68,287	118,471	126.44	39.28	61.0
Total salmon	2,088	12,244	13.07	4.06	10.0
Total nonsalmon	66,199	106,226	113.37	35.22	13.0
Smelt	1,825	247	0.26	0.08	2.0
Cod	17,018	3,404	3.63	1.13	5.0
Burbot	550	2,202	2.35	0.73	7.0
Char	350	1,239	1.32	0.41	5.0
Grayling	8,393	6,714	7.17	2.23	9.0
Total whitefish	38,054	92,399	98.61	30.64	18.0
Broad whitefish	30,047	78,921	84.23	26.17	—
Cisco	2,929	2,929	3.13	0.97	3.0
Humpback whitefish	3,648	9,119	9.73	3.02	10.0
Birds					
Total birds and eggs	12,869	29,446	31.43	9.76	41.0
Migratory birds	12,539	29,215	31.18	9.69	37.0
Ducks	8,589	12,883	13.75	4.27	37.0
Eiders	8,585	12,877	13.74	4.27	37.0
Geese	3,944	16,289	17.38	5.40	13.0
Brant	973	2,920	3.12	0.97	4.0
Snow goose	4	19	0.02	0.01	0.0
White-fronted goose	2,932	13,193	14.08	4.37	12.0
Seabirds and loons	3	9	0.01	0.00	*
Ptarmigan	329	231	0.25	0.08	5.0
Bird eggs	—	—	—	—	—

Notes: Of 937 households, 101 participated in the survey

Footnotes: *percent harvested less than 0.1%

**not eaten

Source: ADF&G (1995b)

Table 3.4.2-14 Atqasuk 1988 Subsistence Participation Levels by Household¹

Household Ethnicity and Household Harvest	Level of Subsistence Participation ²			
	Minimal	Moderate	Active	All Households
Inupiat	26,250	17,500	30,556	—
Non-Inupiat	85,000	57,500	45,000	—
All households	43,529	27,500	32,000	36,431
Cases	17	4	20	41
Average Household Size (number of persons per household)				
Inupiat	4.2	4.5	4.8	—
Non-Inupiat	3.2	2.0	2.0	—
All households	3.9	4.0	4.6	4.3
Cases	17	5	23	45
Average Meat and Fish Consumption from Own Household Subsistence (by percent)				
Inupiat	13.8	35.0	78.1	—
Non-Inupiat	6.0	25.0	75.0	—
All households	11.5	33.0	77.8	47.8
Cases	17	5	23	45
Average Meat and Fish Consumption from Other Household Subsistence (by percent)				
Inupiat	12.9	5.0	17.7	—
Non-Inupiat	0.0	0.0	0.0	—
All households	9.1	4.0	20.5	14.4
Cases	17	5	23	45
Average Meat and Fish Harvested and Given Away (by percent)				
Inupiat	5.4	10.0	18.3	—
Non-Inupiat	2.0	0.0	34.0	—
All households	4.4	8.0	20.7	13.1
Cases	17	5	23	45
Average Proportion of Household Income in Village (by percent)				
Inupiat	77.5	62.5	82.6	—
Non-Inupiat	13.0	25.0	65.0	—
All households	58.5	55.0	81.1	69.7
Cases	17	5	23	45

Notes:¹Total available households = 55²Degree of subsistence participation based on how much meat and fish consumed from own household subsistence activity. Levels of subsistence defined as:

Minimal = under 20% meat and fish from own household subsistence

Moderate = 20-40% meat and fish from own household subsistence

Active = over 40% meat and fish from own household subsistence

Source: Adapted from Impact Assessment, Inc. (1990b)

Table 3.4.2-15 Atqasuk Subsistence Harvest by Month, July 1994 to June 1995

Subsistence Resource	Numbers of Animals Harvested												Total 51 HHs	Est. Total 56 HHs	
	1994						1995								
	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	Jun.			
Arcti-c char	0	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Arctic cisco	0	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Broad whitefish	0	100	1,050	130	0	0	0	0	0	0	0	0	350	1,630	1,790
Burbot	0	0	10	130	22	0	0	0	0	0	0	0	0	163	175
Rainbow trout	0	0	0	15	0	0	0	0	0	0	0	0	0	15	16
Grayling	100	850	2,078	2,463	225	0	0	0	0	0	0	0	0	5,716	6,276
Silver salmon	0	0	0	10	0	0	0	0	0	0	0	0	0	10	11
Humpback whitefish	0	13	150	1122	150	0	0	0	0	0	0	0	75	500	549
Least cisco	0	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Northern pike	0	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Whitefish unidentified	0	88	100	1,087	125	0	0	0	0	0	0	0	0	1,400	1,537
Caribou	31	43	43	25	22	7	1	9	2	0	3	1	187	205	
Moose	0	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Wolf	0	0	0	1	0	0	0	0	1	0	0	0	2	2	
Wolverine	0	0	0	0	3	0	0	4	3	0	0	0	19	11	
Arctic fox	0	0	0	0	0	0	0	0	0	0	0	0	0	—	—
Geese unidentified	0	0	0	0	0	0	0	0	0	0	168	0	168	184	
Eider unidentified	0	0	0	0	0	0	0	0	0	0	12	0	12	13	
White-fronted goose	0	0	0	0	0	0	00	0	0	0	76	0	76	83	
Canada goose	0	0	0	0	0	0	0	0	0	0	2	0	2	2	
Brant	0	0	0	0	0	0	0	0	0	0	0	1	1	1	
Ptarmigan	0	0	0	0	0	0	0	0	0	0	16	0	16	18	
Ringed seal	4	0	0	0	0	0	0	0	0	0	0	0	4	4	
Bearded seal	40	0	0	0	0	0	0	0	0	0	0	0	4	4	
Salmonberries*	0	72	0	0	0	0	0	0	0	0	0	0	72	79	
Cranberries*	0	0	0	0	0	0	0	0	0	0	0	0	—	—	
Blueberries*	2	0	10	0	0	0	0	0	0	0	0	0	12	13	

Notes: *in gallons

Source: Opie, Brower, and Bates (1997)

Table 3.4.2-16 Wainwright 1989 Subsistence-Harvest Summary for Marine Mammals, Terrestrial Mammals, Fish, and Birds

Subsistence Resource	Total Number Harvested	Edible Pounds Harvested			Household Participation 'by Percent
		Total (in pounds)	Household Harvest (Mean Pounds)	Per Capita (In Pounds)	
Marine Mammals					
Total marine mammals	— ²	243,595	2,047.01	520.50	78.0
Bowhead whale	2	102,132	858.25	218.23	66.0
Pacific walrus	153	118,370	994.71	252.93	37.0
Polar bear	12	5,952	50.02	12.72	8.0
Bearded seal	74	13,025	109.45	27.83	34.0
Ringed seal	86	3,612	30.35	7.72	28.0
Spotted seal	12	505	4.24	1.08	6.0
Terrestrial Mammals					
Total Large land mammals	713	83,387	700.73	178.18	66.0
Brown bear	2	200	1.68	0.43	2.0
Caribou	711	83,387	699.05	177.75	66.0
Total Small land mammals/furbearers	47	2	0.02	0.00	—
Arctic fox	8 ³	0	0.00	0.00	6.0
Red fox	22 ³	0	0.00	0.00	2.0
Land otter	1 ³	0	0.00	0.00	1.0
Parka squirrel	7	2	0.02	0.00	1.0
Weasel	9 ³	0	0.00	0.00	4
Wolf	2 ³	0	0.00	0.00	2.0
Wolverine	7 ³	0	0.00	0.00	2.0
Fish					
Total fish	64,567	17,385	146.09	37.15	62.0
Total salmon	180	1,044	8.77	2.23	7.0
Chum salmon	68	415	3.49	0.89	4.0
Chum salmon (other gear)	51	306	2.57	0.65	5.0
Chinook salmon	9	162	1.36	0.35	4.0
Pink salmon	52	161	1.35	0.34	4.0
Total nonsalmon	64,387	16,341	137.32	34.92	—
Rainbow smelt	54,083	6,490	54.54	13.87	53.0
Pacific tomcod	134	134	1.13	0.29	1.0
Flounder	4	2	0.02	0.00	3.0
Sculpin	7	5	0.04	0.01	2.0
Burbot	51	203	2.35	0.73	10.0
Grayling	3,006	2,405	20.21	5.14	28.0
Total whitefish	7,102	7,102	59.68	15.18	23.0
Cisco	7,102	7,102	59.68	15.18	—
Bering cisco	426	426	3.58	0.91	3.0
Least cisco	6,676	6,676	56.10	14.26	22.0
Birds					
Total birds and eggs	2,735	7,211	60.60	15.41	57.0
Migratory birds	2,539	7,075	59.45	15.12	—
Ducks	1,099	1,648	13.85	3.52	48.0
Eider	1,097	1,646	13.83	3.52	48.0
Common eider	29	44	1.37	0.09	7.0
King eider	816	1,225	10.29	2.62	36.0
Spectacled eider	246	369	3.10	0.79	26.0
Steller's eider	3	5	0.04	0.01	3.0
Unknown eider	3	5	0.04	0.01	1.0

Table 3.4.2-16 Wainwright 1989 Subsistence-Harvest Summary for Marine Mammals, Terrestrial Mammals, Fish, and Birds (cont'd.)

Subsistence Resource	Total Number Harvested	Edible Pounds Harvested			Household Participation (by percent)
		Total (in pounds)	Household Harvest (mean pounds)	Per Capita (in pounds)	
Long-tailed duck	2	4	0.03	0.01	1.0
Geese	1,439	5,425	45.59	11.59	45.0
Brant	700	2,100	17.65	4.49	36.0
Canada goose	2	10	0.08	0.02	1.0
Snow goose	7	31	0.26	0.07	4.0
White-fronted goose	730	3,286	27.61	7.02	29.0
Seabirds and loons	1	4	0.03	0.01	1.0
Ptarmigan	196	137	1.15	0.29	15.0

Notes:¹Percentage of households participating in subsistence harvest²Not calculated in report³Not eaten

All 119 households in the community participated in the survey.

— = Data not available

Source: ADF&G (1995b, 1996)

Table 3.4.2-17 Point Lay 1997 Subsistence-Harvest Summary for Marine Mammals, Terrestrial Mammals, Fish, and Birds

Subsistence Resource	Number Harvested	Edible Pounds Harvested			Household Participation (by percent) ²
		Total (in pounds) ¹	Household Harvest (mean pounds)	Per Capita (in pounds)	
Marine Mammals					
Total marine mammals	— ³	76,853	1,787.27	637.41	79.6
Beluga whale	—	64,929 ⁴	1,509.98	538.52	74.0
Pacific walrus	6	4,603	107.04	38.18	19.0
Polar bear	1	661	15.38	5.48	3.1
Bearded seal	13	2,341	54.44	19.42	26.7
Ringed seal	49	2,078	48.32	17.23	27.0
Spotted seal	53	2,241	52.12	18.59	29.2
Terrestrial Mammals					
Total Large Land mammals	167	21,309	495.56	176.74	71.9
Brown bear ⁴	4	4.27	9.92	3.54	9.9
Caribou	157	18,418	428.33	152.76	71.8
Moose	5	2,464	57.31	20.44	15.6
Small Land Mammals/Furbearers					
Arctic fox	0	0	0.00	0.00	0.0
Red fox	0	0	0.00	0.00	0.0
Marmot	0	0	0.00	0.00	0.0
Parka squirrel	285	117	2.72	0.97	22.7
Weasel	0	0	0.00	0.00	0.0
Wolf	0	0	0.00	0.00	0.0
Wolverine	7 ⁴	0	0.00	0.00	6.5
Fish					
Total Fish	2,807	2,983	69.38	24.74	49.1
Total Salmon	147	425	9.88	3.52	26.4
Chum salmon	40	242	5.64	2.01	19.5
Pink salmon	107	182	4.24	1.51	16.4
Total nonsalmon	2,660	2,559	59.50	21.22	49.1
Herring	27	5	0.11	0.04	3.1
Smelt	265	37	0.86	0.31	6.8
Flounder	192	96	2.35	0.73	7.0
Arctic char	167	552	12.83	4.58	23.3
Grayling	1,985	1,786	41.54	14.81	36.6
Broad whitefish	24	83	1.92	0.69	5.6
Birds					
Total Birds and Eggs	3,531	5,836	135.73	48.40	77.4
Migratory Birds	1,871	5,327	123.88	44.18	77.4
Ducks	933	1,399	32.54	11.60	65.2
Eider	702	1,054	24.50	8.74	65.2
Long-tailed duck	221	331	7.69	2.75	19.3
Pintail	10	15	0.34	0.12	5.6

Table 3.4.2-17 Point Lay 1997 Subsistence-Harvest Summary for Marine Mammals, Terrestrial Mammals, Fish, and Birds (cont'd.)

Subsistence Resource	Number Harvested	Edible Pounds Harvested			Household Participation (in percent) ²
		Total (in pounds) ¹	Household Harvest (mean pounds)	Per Capita (in pounds)	
Geese	3,944	15,289	17.38	5.40	13.0
Brant	499	2,096	48.73	17.38	55.9
Canada goose	435	1,826	42.46	15.14	52.8
Seabirds and loons	4	7	0.15	0.06	3.4
Murre	4	7	0.15	0.06	3.4
Ptarmigan	473	331	7.70	2.75	51.6
Eggs	1,188	178	4.14	1.48	54.2

Notes:

¹Household harvests were unknown but were estimated from the known community harvest. This introduces an artificially high variance into the total pounds statistics.

²Percentage of households participating in subsistence harvest.

³Not calculated in the report.

⁴Not eaten

— = Data not available.

Of 43 households, 25 participated in the survey.

Source: ADF&G (1995b, 1996)

Table 3.4.2-18 Point Lay 1992 Subsistence Participation Rates and Resources*

Activity	Number of Households				Percentage of Households			
	Often	Sometimes	Vacation	Not At All	Often	Sometimes	Vacation	Not At All
Fall whaling	2	2	0	36	5	5	0	90
Fish	23	13	0	4	58	33	0	1
Helped whaling crew	9	5	0	26	23	13	0	65
Hunt caribou	31	5	0	4	78	13	0	10
Hunt moose, bear, or sheep	6	13	1	20	15	33	3	50
Hunt seal	24	6	0	10	60	15	0	25
Hunt walrus	19	11	0	10	48	28	0	25
Hunt waterfowl and eggs	25	10	0	5	63	25	0	13
Make sleds or boats	12	18	0	10	30	45	0	25
Pick berries	14	11	0	15	35	28	0	63
Sew skins, make parkas	7	8	0	25	18	20	0	63
Spring whaling	7	4	0	29	18	10	0	73
Trap	4	7	0	29	10	18	0	73

Note:

*Of 58 households, 40 participated in the survey.

Source: Fuller and George (1992)

Table 3.4.2-19 Point Hope 1992 Breakdown of Total Harvest by Subsistence-Harvest Category

Subsistence-Harvest Category	Total Weight	Pounds Per Household	Pounds Per Capita
Birds	9,429	60	13
Fish	30,589	196	44
Invertebrates	88	1	0
Marine Mammals	262,009	1,680	375
Plants	2,720	17	4
Terrestrial Mammals	35,548	228	51
TOTAL	340,383	2,182	487

Source: Fuller and George (1997)

Table 3.4.2-20 Point Hope 1992 Top Five Species Harvested

Species	Edible Pounds Harvested	Number Harvested	Pounds per Household	Pounds Per Capita	Percent of Total Harvest
Beluga whale	137,172	98	879	196	40.3
Walrus	55,797	72	358	80	16.4
Bearded seal	28,242	160	181	40	8.3
Caribou	26,303	225	169	38	7.7
Bowhead whale	23,365	3	150	33	6.9

Source: Fuller and George (1997)

Table 3.4.2-21 Point Hope 1992 Participation in Subsistence-Harvest Activities*

Activity	Number of Households				Percentage of Households			
	Often	Sometimes	Vacation	Not At All	Often	Sometimes	Vacation	Not At All
Fall whaling	4	5	0	133	3	4	0	94
Fish	86	29	1	26	61	20	1	18
Helped whaling crew	92	27	2	21	65	19	1	15
Hunt caribou	71	27	1	43	50	19	1	30
Hunt moose, bear, or sheep	35	27	2	78	25	19	1	23
Hunt seal	78	29	0	35	55	20	0	25
Hunt walrus	70	33	0	39	49	23	0	27
Hunt waterfowl and eggs	81	27	1	33	57	19	1	23
Make sleds or boats	53	26	0	63	37	18	0	44
Pick berries	81	39	1	21	57	27	1	15
Sew skins, make parkas	49	35	0	58	35	25	0	41
Spring whaling	98	16	4	24	69	11	3	17
Trap	14	22	0	106	10	15	0	75

Note:

*Of 156 households, 142 participated in the survey.

Source: Fuller and George (1997)

Table 3.4.2-22 Point Hope Amount of Subsistence Food Consumed that is Harvested from Local Sources*

Amount	1998		2003	
	Number	Percent	Number	Percent
None	4	2.9	10	7.0
Very little	11	8.2	16	11.3
Less than half	23	17.2	23	16.2
Half	34	25.4	28	19.7
More than half	34	25.4	30	21.1
Nearly all	19	14.2	15	10.6
All	9	6.7	20	14.1
Total	134	100	142	100

Note:

*Results include only those households responding to the census survey and the query about the amount of subsistence harvested by the household.

Source: Fuller and George (1997)

Table 3.4.2-23 Point Hope Money Spent on Subsistence Activities*

Amount	Number	Percent
\$0 to \$100	27	22.5
\$200 to \$400	9	7.5
\$500 to \$700	10	8.3
\$800 to \$1,200	11	9.2
\$1,200 to \$3,000	22	18.3
\$3,100 to \$9,500	18	15.1
\$9,600 to \$20,000	1	0.8
Total	120	100%

Note:

*Results include only those households responding to the census survey and the questions.

Source: Fuller and George (1997)

Table 3.4.2-24 Kivalina Subsistence Harvests for 1964-1965, 1965-1966, 1982-1983, 1983-1984, and 1991-1992

Resource	Number Taken				
	1964-1965	1965-1966	1982-1983	1983-1984	1991-1992
Marine Mammals					
Bearded seal	153	119	134	60	139
Spotted seal	4	1	1	1	30
Ringed seal	908	467	172	109	110
Ribbon seal	NR	NR	1	NR	8
Walrus	0	3	51	4	28
Beluga	6	12	27	28	10
Bowhead whale*	0	0	0	1	1
Gray whale	0	0	0	part of carcass	0
Polar bear	NR	1	NR	2	8
Terrestrial Mammals					
Large Land Mammals					
Caribou	256	1,010	346	564	351
Moose	NR	4	6	6	17
Grizzly bear	1	2	NR	2	3
Small Land Mammals					
Fox	6	19	47	58	21
Sheep	NR	NR	2	NR	U
Wolf	1	1	NR	1	9
Wolverine	17	21	12	10	23
Lynx	NR	6	1	NR	0
Porcupine	1	1	1	NR	0
Mink	NR	1	NR	NR	2
Otter	NR	NR	1	NR	2
Hare	NR	NR	NR	NR	0
Squirrel	NR	NR	3	53	10
Fish					
Char	93,995	28,140	69,059	68,467	69,792
Cod	NR	6,955	9	4,299	6,095
Burbot	NR	2	2	2	516
Grayling	NR	40	290	968	644
Salmon	1,425	116	464	2,107	5,081
Whitefish	2,500	13	100	1,608	4,662
Sculpin	ND	ND	9	9	ND
Smelt	ND	ND	ND	20	22
Birds					
Geese	ND	ND	215	387	944
Ducks	ND	ND	134	210	609
Ptarmigan	ND	16	46	242	637
Cranes	ND	ND	4	4	12
Snowy owl	ND	ND	15	26	29
Swan	ND	ND	1	NR	0
Murres	ND	10	ND	18	ND

Notes:

*Two additional bowhead whales were taken in 1994.

NR = None reported.

ND = No data collected.

Source: NANA Regional Strategy, Community Service (1978) as cited in U.S. Army Corps of Engineers (1984a,b)

Table 3.4.2-25 Importance of Subsistence Foods to Households in the NANA Region

Response	Kivalina	Noatak	Kotzebue
"All of our food"	5.6%	—	5.6%
"Most of our food"	16.7%	57.1%	14.9%
"Half of our food"	38.9%	28.6%	16.1%
"Some of our food"	38.9%	14.3%	49.1%
"None of our food"	—	—	14.3%
Total	100.0%	100.0%	100.0%

Source: NANA Regional Strategy, Community Service (1978) as cited in U.S. Army Corps of Engineers (1984a,b)

Table 3.4.4-1 Shipwrecks in the Beaufort Sea Planning Area

Vessel Name	Type of Vessel	Tons	Date of Wreck	Location	Cause of Wreck
<i>St. George</i>	Whaling ship	392	8/27/1876	Between Pt. Barrow and Pt. Tangent	Caught in ice and abandoned.
<i>Acors Barnes</i>	Whaling bark	296	9/5/1876	20-30 mi N of Cape Simpson	Caught in ice and abandoned; later burned by Inupiat Eskimos.
<i>Camilla</i>	Whaling bark	328	9/5/1876	20-30 mi N of Cape Simpson	Caught in ice and abandoned.
<i>Cornelius Howland</i>	Whaling ship	333	9/5/1876	20-30 mi N of Cape Simpson	Caught in ice and abandoned.
<i>Desmond</i>	Whaling bark	301	9/5/1876	20-30 mi N of Cape Simpson	Caught in ice and abandoned.
<i>Java 2nd</i>	Whaling bark	290	9/5/1876	20-30 mi N of Cape Simpson	Caught in ice and abandoned.
<i>Marengo</i>	Whaling ship	478	9/5/1876	20-30 mi N of Cape Simpson	Caught in ice and abandoned.
<i>Onward</i>	Whaling bark	339	9/5/1876	20-30 mi N of Cape Simpson	Caught in ice and abandoned.
<i>James Allen</i>	Whaling ship	349	9/5/1876	20-30 mi N of Cape Simpson	Caught in ice and abandoned.
<i>Young Phoenix</i>	Whaling bark	355	8/3/1888	30 mi E of Point Barrow	Lost in ice and gale; crew picked up by steam bark <i>Beluga</i> and rescued later by steamer <i>Bear</i> , 3/9/1888. Still drifting in ice 1 year later.
<i>Reindeer</i>	Whaling bark	340	8/4/1894	On Reindeer Island, Midway Islands	Ice came in very quickly, and ship was forced ashore. Reindeer Island (westernmost of Midway Islands) was named after this vessel. All hands were saved.
<i>Duchess of Bedford</i>	Expedition schooner	60	4/11/1907	Off Flaxman Island	Caught in ice and crushed.
<i>Elvira</i>	Gas schooner	109	9/23/1913	5 mi offshore of Humphrey Point, E of Barter Island, off Icy Reef	Crushed in ice, then lost in an autumn gale. Crew wintered aboard the whaler <i>Belvedere</i> . Capt. Pedersen walked 400 mi to Fairbanks, then traveled to San Francisco to take charge of the <i>Herman</i> for the 1914 whaling season.
<i>Duxbury</i>	Gas trading schooner	38	6/5/1925	½ mi NE of Cape Halkett	Caught in icefloe and crushed.
<i>Baychimo</i>	Trading/supply steamer	1,322	11/24/1931	Just S of Point Barrow	Caught in ice and abandoned. Vessel drifted for years in arctic ice, was sighted and was even boarded a number of times, but finally disappeared. It was officially listed as lost in 1934. After a number of years, the cargo of furs was recovered by Leslie Melvin, who sighted the hulk while traveling by dogsled. Sightings in the Beaufort Sea as late as the 1960s were reported by local Inupiat.
Unnamed	Native whaling boat	?	9/11/1988	30 mi N of Cross Island	Boat lost while whaling. Seventy people began searching. The two whalers, Burton Rexford and his son Mike, managed to make their way to a barge underway off Barrow.
Unnamed	Native whaling boat	?	9/13/1988	Off Kaktovik	Aluminum whaling boat struck ice while whaling off the village of Kaktovik in the Beaufort Sea. One crewman, Simon Tagarook, Jr., suffered head injuries and died; two others were injured.
Unnamed	Native whaling boat	?	9/28/1991	30 mi N. of Cross Island	Nuiqsut whaling captain Eli Nukapigak and his crew of four lost their whaling boat after a bowhead whale they had struck pulled their 18-foot boat underwater. The men were hauled aboard whaling boat of Nuiqsut whaling captain Frank Long, which was following close behind. No one was lost.
Unnamed	Native whaling boat	?	9/28/1991	25 mi NE of Cross Island	Captain Archie Ahkiviana and crew lost a whale and their whaling boat in rough seas while towing the whale back to Cross Island. Ahkiviana and his crew were rescued by another whaling boat in the vicinity. No one was lost.

Table 3.4.4-2 Shipwrecks in the Chukchi Sea Planning Area

Vessel Name	Type	Tons	Date Wrecked	Location	Cause of Wreck
<i>Caulaincourt</i>	French whaling ship	657	9/5/1861	At Point Belcher	Stove by ice; was quickly full of water and lost.
<i>Henry Kneeland</i>	Whaling ship	304	6/22/1864	In the Chukchi Sea	Struck an ice cake, filled instantly and lost.
<i>Gratitude</i>	Whaling bark	337	7/2/1865	40 mi from Cape Lisburne	Stove by ice and sank while trying to escape the C.S.S. <i>Shenandoah</i> and get into the protection of grounded ice.
<i>Ontario</i>	Whaling bark	489	9/27/1866	In the Chukchi Sea	Abandoned after colliding with the <i>Helen Mar</i> in a gale on 9/27/1866. With the vessel in damaged condition, the crew refused duty, and she was abandoned with 1,050 barrels of whale oil aboard.
<i>Hae Hawaii</i>	Whaling bark	368	9/22/1868	In the Seahorse Islands off Point Franklin	Anchors dragged in a gale; the vessel went ashore and was lost.
<i>Eagle</i>	Whaling bark	336	9/30/1869	On Seahorse Shoal off Point Franklin	Grounded and lost; crew rescued by the vessel <i>John Carver</i> .
<i>Almira</i>	Whaling ship	310	8/26/1870	Near Point Barrow	Stove by ice and lost.
<i>Hiernia</i>	Whaling ship	256	8/28/1870	About 2 mi SW of Point Barrow	Ice stove hole in bow and vessel ran aground. Sold at auction for \$150.
<i>Comet</i>	Whaling brig	255	9/2/1871	Between Point Franklin and Seahorse Islands	Crushed between grounded floe and moving pack ice and lost.
<i>Roman</i>	Whaling bark	358	9/7/1871	In the Seahorse Islands off Point Franklin	Crushed between grounded floe and moving pack ice. Vessel sank less than an hour after being carried off by the ice. Crew escaped over the ice.
<i>Awashonks</i>	Whaling bark	380	9/8/1871	S of Wainwright Inlet	Crushed and lost after being pushed partly onto the ice. Wreck was still visible in 1872.
<i>Julian</i>	Whaling ship	356	9/8/1871	S of Wainwright Inlet	Crushed in ice and abandoned.
<i>Kohola</i>	Whaling brig	270	9/8/1871	2 mi NE of Wainwright Inlet	Abandoned after being trapped in ice. In 1872, found high and dry S of Point Belcher.
<i>Carlotta</i>	Whaling bark	480	9/12/1871	Point Belcher near Wainwright Inlet	Abandoned after being trapped in ice.
<i>Fanny</i>	Whaling bark	391	9/13/1871	6 mi S of Point Belcher, ¼ mi from shore	Abandoned after being trapped in ice and crushed.
<i>Monticello</i>	Whaling bark	356	9/13/1871	4 mi S of Point Belcher	Trapped in ice and abandoned. In 1872, vessel's hull was identified; bow and stern were ½ mi apart.
<i>Champion</i>	Whaling ship	367	9/14/1871	Point Belcher near Wainwright Inlet	Abandoned after being trapped in ice.
<i>Concordia</i>	Whaling bark	368	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice, abandoned, burned by Inupiaq Eskimos.
<i>Contest</i>	Whaling bark	341	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned.
<i>Elizabeth Swift</i>	Whaling bark	327	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned.

Table 3.4.4-2 Shipwrecks in the Chukchi Sea Planning Area (cont'd.)

Vessel Name	Type	Tons	Date Wrecked	Location	Cause of Wreck
<i>Emily Morgan</i>	Whaling bark	365	9/14/1871	1 mi N of Point Belcher	Abandoned after being trapped in ice and crushed. By 1872, wreck had drifted 1 mi N of Point Belcher, and in 1873, wreck was still visible.
<i>Eugenia</i>	Whaling bark	315	9/14/1871	Point Belcher near Wainwright Inlet	Ice snapped rudder; vessel was abandoned after it became trapped in ice. It was later crushed.
<i>Florida</i>	Whaling ship	470	9/14/1871	In the Seahorse Islands off Point Franklin	Abandoned after being trapped and forced ashore by ice. In 1872, the vessel was found ashore at Seahorse Islands and was burned to water's edge by Inupiaq Eskimos. Some accounts have the vessel drifting N to Barrow.
<i>Gay Head</i>	Whaling ship	300	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned. In 1872, vessel was found burned by Inupiaq Eskimos.
<i>George</i>	Whaling bark	259	9/14/1871	Point Belcher near Wainwright Inlet	Abandoned after being trapped in ice and crushed.
<i>George Howland</i>	Whaling bark	361	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned.
<i>Henry Taber</i>	Whaling bark	296	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned.
<i>James D. Thompson</i>	Whaling bark	432	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned.
<i>John Wells</i>	Whaling bark	357	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned.
<i>Mary</i>	Whaling ship	373	9/14/1871	S of Wainwright Inlet	Trapped in ice, crushed, and abandoned.
<i>Massachusetts</i>	Whaling bark	356	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned. In 1872, hull had been carried around Point Barrow by ice.
<i>Navy</i>	Whaling bark	385	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned.
<i>Oliver Crocker</i>	Whaling bark	305	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned.

Table 3.4.4-2 Shipwrecks in the Chukchi Sea Planning Area (cont'd.)

Vessel Name	Type	Tons	Date Wrecked	Location	Cause of Wreck
<i>Palea</i>	Whaling bark	386	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned.
<i>Reindeer</i>	Whaling ship	332	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned. In 1872, found 5 mi S of Point Belcher.
<i>Seneca</i>	Whaling bark	328	9/14/1871	Point Belcher near Wainwright Inlet	Trapped in ice and abandoned. Vessel survived the crush of 1871 and was taken by tow by the bark <i>Florence</i> in July 1872. Later, it was cut adrift in bad weather, ran aground, and was lost.
<i>Thomas Dickason</i>	Whaling bark	461	9/14/1871	N of Wainwright Inlet	Trapped in ice; abandoned and lost. In 1872, vessel was found 2 mi N of Wainwright Inlet with water flowing in and out of her.
<i>Victoria</i>	Trading brig	149	9/14/1871	S of Wainwright Inlet	Trapped in ice; abandoned and lost.
<i>William Rotch</i>	Whaling ship	290	9/14/1871	S of Wainwright Inlet	Forced ashore by ice and abandoned.
<i>Roscoe</i>	Whaling bark	313	8/19/1872	Off Point Barrow	Stove while at anchor and abandoned.
<i>Arctic</i>	Whaling bark	431	7/7/1876	18 mi from the "Bend" (Point Belcher)	Crushed in ice and abandoned. Crew reached shore and was rescued by the vessel <i>Onward</i> .
<i>Three Brothers</i>	Whaling bark	357	9/11/1877	Off Point Barrow	Abandoned in ice and lost; whale catch saved.
<i>W.A. Farnsworth</i>	Whaling bark	432	9/15/1877	Near Point Barrow	Stove by ice, filled with water, capsized, sank
<i>William H. Allen</i>	Trading brig	157	8/2/1878	Off Cape Smyth	Stove by ice and sank.
<i>Florence</i>	Whaling bark	245	8/8/1878	4 mi S of Point Barrow	Stove by ice and sank.
<i>Daniel Webster</i>	Whaling bark	327	7/12/1881	5 mi S of Point Barrow	Crushed by ice and sank rapidly. Crew escaped to Point Barrow, and some walked to Icy Cape and sailed in the bark <i>Coral</i> .
<i>North Star</i>	Steam whaling bark	489	7/8/1882	Off Point Barrow 2-1/2 mi from shore	Crushed by ice on maiden voyage under command of L.C. Owen, and the "force of ice was so great that the cracking of her timbers could be heard on shore." Crew made its way over ice to U.S. Army Signal Service Station.
<i>John Howland</i>	Whaling bark	384	7/17/1883	S of Point Hope	Stove by ice and condemned. Ship burned on July 20 and sank on July 21.
<i>Cyane</i>	Whaling bark	295	8/23/1883	S of Point Hope	Vessel stranded in fog and heavy SW gale and went to pieces.
<i>Louisa</i>	Whaling bark	304	8/23/1883	Off Point Hope	Struck ice in a gale and sank.

Table 3.4.4-2 Shipwrecks in the Chukchi Sea Planning Area (cont'd.)

Vessel	Type	Tons	Date Wrecked	Location	Cause of Wreck
<i>Bowhead</i>	Steam whaling bark	533	8/11/1884	Blossom Shoals near Icy Cape	Made fast to grounded ice to clean boilers. She was struck and holed by a piece of drifting ice and sank quickly. Crew was rescued by the nearby steam whalers <i>Narwhal</i> and <i>Balaena</i> .
<i>George and Susan</i>	Whaling bark	343	8/10/1885	9 mi N of Wainwright Inlet	Driven ashore and wrecked in SW gale after parting anchor chain and colliding with the bark <i>Mabel</i> . All crew but 3 rescued by the revenue cutter <i>Corwin</i> .
<i>Mabel</i>	Whaling bark	199	8/10/1885	At Wainwright Inlet	After being fouled by the whaler <i>George and Susan</i> in a gale, the vessel went ashore and was stranded. It became a total wreck. The revenue cutter <i>Corwin</i> tried to get a hawser on board, but failed. The <i>Corwin</i> was able to rescue the crews. Hulk still on beach in 1886.
<i>Clara Light</i>	Whaling schooner/tender	179	8/31/1886	15 mi N of Point Franklin	Abandoned in ice and lost.
<i>Fleetwing</i>	Whaling bark	328	8/3/1888	1 mi NE of Point Barrow	Chain cable parted in heavy SW gale, and vessel went ashore on shoal. Ship was abandoned by crew, sold at auction, and gear salvaged. Remains were burned by Inupiaq Eskimos on Aug. 15.
<i>Mary and Susan</i>	Whaling bark	327	8/3/1888	4 mi S of Point Barrow	Lost on outlying reef in a gale. Crew rescued by the cutter <i>Bear</i> the same day. Vessel burned on Aug. 4.
<i>Ino</i>	Schooner	98	8/8/1888	At Cape Smyth	Driven ashore in sudden SW gale and stranded when anchors dragged.
<i>Ohio</i>	Whaling bark	206	10/3/1888	At Point Hope	Ship was driven onto the beach in a heavy gale and snowstorm and grounded. The vessel broke up and was a total loss. After 8 months, some of the crew were rescued; 25 were lost.
<i>Thomas Pope</i>	Whaling bark/tender	226	7/28/1890	Off Point Hope	Masts were cut away in a gale. Vessel was stove by ice and stranded. Crew and cargo were taken off by steamer <i>William Lewis</i> and brig <i>F.A. Barstow</i> .
<i>Spy</i>	Sloop	17	11/25/1890	At Point Barrow	Caught in ice and crushed while heading for winter quarters.
<i>William Lewis</i>	Steam bark	463	10/3/1891	At Point Barrow	Ran ashore in gale and snowstorm and piled up on a snow-covered sand spit when captain mistook it for slush ice. Crew and cargo were rescued by steamer <i>Nararch</i> . On 3/20/1892, the wreck was accidentally burned by salvagers.

Table 3.4.4-2 Shipwrecks in the Chukchi Sea Planning Area (cont'd.)

Vessel	Type	Tons	Date Wrecked	Location	Cause of Wreck
<i>Emily Schroeder</i>	Schooner	?	10/13/1893	Marryatt Inlet, Point Hope Lagoon	Cragged anchor and driven ashore in storm. Seen hard aground as late as 1896.
<i>Hidalgo</i>	Brig	174	7/24/1896	8 mi W of Cape Thompson within 1 mi of Jabbertown	Forced ashore by ice and broken up by sea and ice. Cutter <i>Bear</i> took crew to Unalaska.
<i>Navarch</i>	Steam whaling bark	494	8/12/1997	Off Blossom Shoals near Icy Cape	Lost off Blossom Shoals but later drifted in ice to Point Barrow
<i>Orca</i>	Steam whaling bark	628	9/21/1897	N of Seahorse Islands off Point Franklin	Ice tore away propeller and rudder, and part of the stern was crushed between two immense icefloes. At the time, the <i>Orca</i> was the world's largest steam whaler. The steam whaler <i>Belvedere</i> rescued all hands, and the crew later walked 100 mi to Barrow to overwinter.
<i>Jessie H. Freeman</i>	Steam whaling bark	516	9/22/1897	No of Seahorse Islands off Point Franklin	Crushed in ice and abandoned on 9/24. Vessel was later burned accidentally by Inupiaq Eskimos and sank. The crew escaped to the steam whaler <i>Belvedere</i> and later walked to Point Barrow to overwinter.
<i>Rosario</i>	Schooner	141	7/2/1898	3/4 mi SW of Point Barrow	Crushed in pack ice near Point Barrow. Crew rescued by the revenue cutter <i>Bear</i> .
<i>Grampus</i>	Steam whaling bark	326	7/18/1901	Point Barrow	Nipped in ice. Vessel was beached and condemned. All hands were saved.
<i>Laura Madsen</i>	Whaling schooner	345	10/14/1905	At anchorage off Point Barrow	Caught in ice and crushed.
<i>Ivy</i>	Schooner	142	9/1/1908	At Point Barrow	Driven ashore by pack ice. Crew took passage to Seattle on schooner <i>Volente</i> . Vessel was salvaged but sank the next year near Barrow.
<i>Helen Johnson</i>	Gas schooner	39	7/29/1910	7 mi E of Point Hope	Pounded to pieces by ice in a strong SE gale. Crew was rescued by the cutter <i>Bear</i> .
<i>Transit</i>	Schooner	547	8/25/1913	5 mi SW of Cape Smyth	Wrecked when ice pushed it ashore. On 7/20/1914, vessel was located on the beach 10 mi S of Cape Smyth. Captain and crew escaped over ice to Barrow and returned S on the schooner <i>Hetty B</i> .
<i>Arctic</i>	Auxiliary gas schooner	669	8/10/1924	16 mi S of Point Barrow	Crushed in ice while on a trading and whaling voyage. Crew was rescued by the vessel <i>Boxer</i> . The <i>Arctic</i> was the former <i>H.D. Bendixsen</i> .
<i>Lady Kindersly</i>	Canadian power schooner	?	8/31/1924	Off Point Barrow	Caught in ice and crushed. Crew rescued by vessel <i>Boxer</i> . The ship carried cargo of machinery and stores for northern outposts.

Table 3.4.4-2 Shipwrecks in the Chukchi Sea Planning Area (cont'd.)

Vessel	Type	Tons	Date Wrecked	Location	Cause of Wreck
<i>Lettie</i>	Gas screw	33	9/9/1924	½ mi NE of Wainwright Inlet and ½ mi from shore	Vessel got out of channel, stranded, and was lost.
<i>Baychimo</i>	Canadian trading/supple steamer	1,322	11/24/1931	Just S of Point Barrow	Caught in ice and abandoned. Vessel drifted for years in arctic ice, was sighted and even boarded a number of times. It finally disappeared and considered a ghost ship. It was officially listed as lost in 1934.
<i>Arnold Liebes</i>	Gas boat	?	1/1/1934	Off Point Barrow	Wrecked.
<i>C.B. Brower</i>	Gas boat	?	1/1/1934	Off Point Barrow	Wrecked.
<i>Eli-Yuk</i>	Oil screw	35	9/2/1963	Off Wainwright	Foundered.
<i>Basiil</i>	Diesel boat	28	9/7/1950	At Cape Lisburne	Stranded on the beach and lost.

Source: USDOI, MMS, Alaska OCS Region (2007, Alaska shipwreck database)

Table 3.4.5-1 Ethnic Composition of Kaktovik, Nuiqsut, Barrow, Atqasuk, Wainwright, Point Lay, and Point Hope – Percent by Race

	Total	Hispanic or Latino	Not Hispanic or Latino	Population of One Race	White	Black or African American	American Indian or Alaskan Native	Asian	Native Hawaiian and Pacific Islander	Some Other Race	Two or More Races
State of Alaska											
Population	626,932	25,852	601,080	570,626	423,788	21,073	96,505	24,741	3,181	1,388	30,454
Percent		4.1	95.9	91.0	67.6	3.4	15.4	3.9	0.5	0.2	4.9
Kaktovik											
Population	293	0	293	267	43	0	221	1	0	2	26
Percent		0.0	100.0	91.1	14.7	0.0	75.4	0.3	0.0	0.7	8.9
Nuiqsut											
Population	433	1	432	429	44	1	382	2	0	0	4
Percent		0.2	99.8	99.1	10.2	0.2	88.2	0.5	0.0	0.0	0.9
Barrow											
Population	4,681	153	4,428	4,063	972	44	2,558	429	59	1	365
Percent		3.3	96.7	88.7	21.2	1.0	55.8	9.4	1.3	0.0	8.0
Atqasuk											
Population	228	0	228	227	11	0	215	1	0	0	1
Percent		0.0	100.0	99.6	4.8	0.0	94.3	0.4	0.0	0.0	0.4
Wainwright											
Population	546	0	546	531	37	1	493	0	0	0	15
Percent		0.0	100.0	97.2	6.7	0.2	90.2	0.0	0.0	0.0	2.7
Point Lay											
Population	247	6	241	233	28	0	204	1	0	0	14
Percent		2.4	97.5	94.3	11.3	0.0	82.5	0.4	9.9	0.0	5.6
Point Hope											
Population	757	13	744	728	66	1	659	1	0	1	29
Percent		1.7	98.2	96.1	8.7	0.1	87.0	0.1	0.0	0.1	3.8

Source: Census Table SF-1 http://146.63.75.45/census2000/Census_1v2.asp

Table 3.4.5-2 Median Household, Median Family, Per-Capita Incomes; Number of People in Poverty; Percent of the Total Borough or Native Subsistence-based Community Population

Community	Median Household Income	Median Family Income	Per-Capita Income	Number of People in Poverty (Percent of Community Population)
North Slope Borough	\$63,173	\$63,810	\$20,540	663 (9.1%)
Kaktovik	55,625	60,417	22,031	18 (6.6)
Nuiqsut	48,036	46,875	14,876	10 (2.4)
Barrow	67,097	68,203	22,902	390 (8.6)
Wainwright	54,722	58,125	16,710	70 (12.5)
Point Lay	68,750	75,833	18,003	18 (7.4)
Point Hope	63,125	66,250	16,641	112 (14.8)
Northwest Arctic Borough	45,796	45,230	15,286	1,243 (17.4)
Kivalina	30,833	30,179	8,360	99 (26.4)
Kotzebue	57,163	58,068	18,289	401 (13.1)
Noorvik	51,964	52,708	12,020	51 (7.6)
Buckland	38,333	40,000	9,624	49 (11.9)
Deering	33,333	43,438	11,000	8 (5.8)
Nome Census Area	41,250	44,189	15,476	1,569 (17.4)
Diomedes	23,750	24,583	9,944	56 (35.4)
Shishmaref	30,714	29,306	10,487	89 (16.3)
Wales	33,333	39,583	14,877	28 (18.3)

Source:

USDOC, Bureau of the Census, (2000).

Table 3.4.5-3 Summary of Available Socioeconomic Indicators Relevant to Public Health

Indicator	Alaska	NSB	Barrow	Point Hope	Point Lay	Wainwright	Nuiqsut	Kaktovik
Economic								
Below poverty line ^a	6.7%	8.6%	11.6%	15.1%	11.1%	15.6%	6.4%	6.6%
Per capita income ^a	\$22,600	\$20,540	\$22,902	\$16,641	\$18,003	\$16,710	\$14,876	\$22,031
Dependency ratio ^b			0.67	0.90	0.94	0.78	0.94	0.70
Income inequality								
Unemployment rate (2003) ^c	8		19%	18%	16%	19%	17%	16%
Average household expenditure on subsistence ^d			\$3,787 (median 925)	(range <\$200- 20,000)	(30% spent \$500, 40% spent \$3100-9,500)	\$4,504	\$6,700	\$4,788
Economically Distressed?	N/A	N/A	No	Yes	No	No	No	No
2. Education								
Graduation rate (average of last 5 years)	61% (3-year average)	55%	55%	66%	49%	57%	33%	86%
School failure 2005-6 (grades 7-12 dropout rate)	5.8%	5.9%	7.0%	5.0%	3.1%	3.2%	15.7%	0.0%
Reading: proficient or advanced 2007 ^c (composite of all grades unless specified)	Grade 10: 85%	Grade 10: 62%	Grades 9-10: 77%	56%	42%	56%	57%	69%
Writing: proficient or advanced 2007 (all grades) (composite of all grades unless specified)	Grade 10: 63%	Grade 10: 61%	Grades 9-10: 63%	47%	39%	42%	38%	62%
Math: Proficient or advanced 2007 (all grades) (composite of all grades unless specified)	Grade 10: 69%	Grade 10: 46%	Grades 9-10: 55%	54%	33%	52%	51%	64%
3. Access to Health Care								
Health Professional Shortage Area designation ^b	N/A	13/25* - mental health 16/25* - primary care	N/A	N/A	N/A	N/A	N/A	N/A
Medically underserved ^b	N/A	56/100**	N/A	N/A	N/A	N/A	N/A	N/A
Geographic Isolation Score ^{b***}	N/A	N/A	3	1	1	1	1	1
4. Cultural Continuity								
Households participating in subsistence activities ^d			91	93	77	92	81	93
"Language other than English"		49%	N/A	N/A	N/A	N/A	N/A	N/A

Table 3.4.5-3 Summary of Available Socioeconomic Indicators Relevant to Public Health (cont'd.)

Indicator	Alaska	NSB	Barrow	Point Hope	Point Lay	Wainwright	Nuiqsut	Kaktovik
Ability to speak indigenous language very or relatively well ^f	44% ^g							
Ability to Understand indigenous language very or relatively well ^f	54% ^g	54% (excluding Barrow)	64%					
Households participating in artisan crafts sales			N/A	21%	20%	More than 20%	23%	19%

Notes:

^aData from USDOC, Bureau of the Census (2002); updated figures available for regions but not villages.

^bReported in Alaska Health Care Data Book (2007)

^cState of Alaska, Dept. of Education Report Cards to the Public: Standards Based Assessment. Results are aggregated for all grades for small village schools due to small numbers of students. All-grade aggregate results are not available for district and State levels.

^dNorth Slope Borough (2003a); Shepro and Maas, from NSB Comprehensive Plan Village Profiles (<http://www.north-slope.org/NSB/CompPLAN/PtLayVillageProfile06.pdf>)

^eDenali Commission

^fSLiCA

^gAreas surveyed in Alaska include North Slope, NANA, and Bering Straits regions only.

*A score of 25 indicates the most severe shortage.

**A score of 100 indicates the most severe shortage.

***A score of 1 indicates the most medically isolated communities.

Table 3.4.5-4 Social and Psychological Health Problems, North Slope Borough

Indicator	U.S.	Alaska	NSB	Pt. Hope	Pt. Lay	Wainwright	Nuiqsut	Kaktovik	Barrow
Health Determinants (see also Health Determinants in Table 3.4.6-5)									
Village school policy	N/A	N/A	N/A	Dry	Dry	Dry	Dry	Dry	Damp
Village police staffing (# of officers)	N/A	N/A	N/A	1	1	1	1	1	
Village access	N/A	N/A	N/A	Air	Air	Air	Air, ice road	Air	Air
Health Outcomes									
Reports of domestic violence 2003 ^a (per 1,000 population)	N/A	3	19.6	31.7	28.3*	16.4*	39.2*	13.6*	20
Protective orders issued 2003 ^a (per 1,000 population)	N/A	10	9						
OCS reports 2003 ^b (per 1,000 population)	N/A	22	28						
DV/sexual assault incidents 2006 ^c (per 1,000 population)	N/A	11.9	97.7						
2004 rape rate (per 100,000 women) ^b	62	173	332						
2004 rate of assaults per 100,00 women) ^b	279	465	557						
2005-6 (2-year average) violent crime rate ^d (per 100,000 population)	472	660	886						
2005-6 (2-year average) property crime rate ^d (per 100,000 population)	3,383	3,608	2,203						

Notes:

^aDomestic Violence Impact and Needs in North Slope Borough Communities Report: January to December 2003. Denominator based on 2000 Census. Not age adjusted.

^bU.S. Dept. of Health and Human Services: Office on Women's Health Quick Health Data Online.

^cAlaska Council on Domestic Violence and Sexual Assault: Annual Report Fiscal Year 2006.

^dU.S. Dept. of Justice: 2006 Crime in the United States. Rates are not age adjusted. Caution must be taken in making comparisons in rates, given demographic differences and community size.

*Rates based on fewer than 20 incidents; rates are, therefore, less reliable.

Table 3.4.5-5 Summary of Available Indicators on Food, Nutrition, and Physical Activity

Indicator	Alaska	NSB	Barrow	Pt. Hope	Pt. Lay	Wainwright	Nuiqsut	Kaktovik
Health Determinants								
Weekly food cost, family of 4 (children 6-11) ^a	\$186 ^b	N/A	\$289	N/A	N/A	N/A	N/A	N/A
Subsistence food harvest per capita ^c (in pounds per person)	N/A	434	289	N/A	890	751	742	886
Households reporting at least half of calories from subsistence resources ^d	N/A	N/A	66%	66%	75%	73% (83% of Iñupiat)	63%	68%
Food sharing networks: receiving traditional food from others	92% ^e	91% (excluding Barrow)	94%					
Population's calories from subsistence resources ^c	N/A	40%						
Very or somewhat satisfied with amount of fish and game available locally ^f	76% ^e	87%						
Adults experiencing food insecurity (with or without hunger) 2006	11% (20% in rural Alaska)							
Children experiencing food insecurity (with or without hunger) 2006	15% (24% in rural Alaska)							

Notes:^aLuick (2008)^bAverage of 19 Alaskan cities surveyed.^cfrom Alaska Dept. of Fish and Game, Subsistence Div.^dNorth Slope Borough (2003a); Shepro and Maas, from NSB Comprehensive Plan Village Profiles (<http://www.north-slope.org/NSB/CompPLAN/PtLayVillageProfile06.pdf>)^eAreas surveyed in Alaska include NSB, NANA, and Bering Straits regions only.^fSLiCA

Table 3.4.5-6 Summary of Available indicators of Maternal Child Health

Indicator	Alaska	North Slope Borough	NWAB*
Health Determinants			
Self-reported drinking	2.1%	3.9%	3.8%
Self-reported smoking	15.5%	43%	42.3%
Less than 12 years education	14.4%	26.7%	36.2%
Inadequate prenatal care	16.6%	32.3%	28.4%
Breastfeeding at 4 weeks	79.6%	69.5%*	69.5%*
Health Outcomes			
Less than 15 teen pregnancy rate	0.1%	0.8%	0.4%
Low birth rate	6.0%	6.2%	5.9%
Premature deliveries	10.9%	15.5%	9.4%
Unintended pregnancy	45.4%	54.0%	N/A
Infant mortality	6.2/1,000	10.2/1,000**	12.5/1,000

Source: State of Alaska, Dept. of Health and Human Services (2008)

*Perham-Hester, Wiens, and Schoellhorn (2005)

**Based on less than 10 events and, therefore, the calculated rate is less reliable.

Table 3.4.5-7 Number of North Slope Borough Households with Piped Water and Flush Toilets

Indicator	Pt. Hope	Pt. Lay	Wainwright	Nuiqsut	Kaktovik	Barrow
Houses with piped water	N/A	60% (40% 250-gallon holding tank)	94%	88%	90%	92%
Households with flush toilets	90%	No data	93%	90%	90%	Approx. 90%

Source: North Slope Borough (2005)

Table 3.4.5-8 North Slope Borough Region Emission Summary

Permitted	Facility	Date Issued	Total PTE	Potential to Emit (PTE)*						Notes
				NO _x ¹	CO ²	PM ₁₀ ³	SO ₂ ⁴	VOC ⁵	HAPs ⁶	
AIC	Deadhorse Soil Remediation Unit	9/24/2002	314	107	25	14	163	6	0	
APSC ⁷	TAP* Pump Station No. 1	11/22/2002	1,501	NP**	NP	NP	NP	NP	NP	Only total emissions reported
APSC	TAP Pump Station No. 2	11/22/2002	1,465	NP	NP	NP	NP	NP	NP	Only total emissions reported
APSC	TAP Pump Station No. 3	10/22/2007	1,426	695	526	108	83	14	NP	
APSC	Tap Pump Station No. 4	11/22/2002	1,256	571	495	97	79	14	NP	
BPXA ⁸	Crude Oil Topping Unit	7/29/2002	456	118	132	139	56	11	NP	
BPXA	Prudhoe Bay Operating Center/Main Construction Camp	10/4/2002	498	231	151	46	52	19	NP	
BPXA	Prudhoe Bay, Grind and Eject Facility	12/2/2002	33	16	13	1	2	1	NP	
BPXA	Prudhoe Bay, Central Power Station	1/7/2003	7,672	6,110	1,165	150	63	184	20	
BPXA	Milne Point, C-Pad	1/21/2003	227	90	75	4	8	50	5	
BPXA	Prudhoe Bay, Flow Station No. 3	3/31/2003	5,564	4,235	1,171	100	42	16	NP	
BPXA	Prudhoe Bay, Flow Station No. 1	3/31/2003	3,910	2,872	889	84	35	30	18	
BPXA	Milne Point Production Facility	4/14/2003	1,481	707	448	36	77	213	NP	
BPXA	Prudhoe Bay, Seawater Treatment Plant	7/22/2003	763	395	280	35	28	25	13	
BPXA	Prudhoe Bay, Central Compressor Plant	8/4/2003	16,446	14,238	1,630	347	147	84	54	
BPXA	Prudhoe Bay, Central Gas Facility	8/4/2003	13,265	10,968	1,779	305	125	88	59	
BPXA	Lisburne Production Center	1/11/2007	3,421	2,280	776	58	265	41	13	
BPXA	Endicott Production Facility	10/14/2003	5,243	3,756	972	120	346	49	18	
BPXA	Prudhoe Bay, Gathering Center No. 1	10/20/2003	6,485	4,912	1,374	107	48	44	22	
BPXA	Prudhoe Bay, Gathering Center No. 2	12/29/2006	3,239	2,389	688	86	33	43	15	
BPXA	Prudhoe Bay, Flow Station No. 2	10/20/2003	4,974	3,663	1,108	91	83	29	15	
BPXA	Badami Development Facility	11/10/2003	822	278	382	12	67	83	NP	
BPXA	Prudhoe Bay, Base Operations Center	10/27/2003	1,674	1,165	266	37	171	35	<1	
BPXA	Prudhoe Bay, Gathering Center No. 3	11/28/2003	3,779	2,873	778	69	33	226	15	
BPXA	Prudhoe Bay, Seawater Injection Plant East	10/27/2003	2,740	2,175	494	42	20	9	8	
BPXA	Transportable Drilling Rigs, unaggregated well pads	11/17/2003	3,420	2,376	600	96	252	96	<25	12 concurrent drill rigs authorized
BPXA	Northstar Production Facility	Proposed 4/2008	2,253	562	1,153	331	57	150	9	
CPAI ⁹	Kuparuk, Central Production Facility No. 2	11/25/2002	3,986	2,777	907	86	185	31	NP	

Table 3.4.5-8 North Slope Borough Region Emission Summary (cont'd.)

Permitted	Facility	Date Issued	Total PTE	Potential to Emit (PTE)*						Notes
				NO _x ¹	CO ²	PM ₁₀ ³	SO ₂ ⁴	VOC ⁵	HAPs ⁶	
CPAI	Kuparuk, Central Production Facility No. 3	12/2/2002	3,355	2,340	758	72	167	18	NP	
CPAI	Kuparuk, Central Production Facility No. 1	4/28/2003	5,385	3,529	1,232	146	324	154	32	
CPAI	Alpine, Central Processing Facility	7/1/2003	3,692	2,732	614	56	202	88	23	
CPAI	Transportable Drilling Rigs, Kuparuk River Unit	11/30/2007	4,588	2,772	835	46	298	637	18	
CPAI	Kuparuk, Seawater Treatment Plant	Proposed 4/2008	527	292	157	20	50	8	7	
Eni	Nikaichuq Development	5/5/2006	703	225	225	8	84	161	NP	
Halliburton	Deadhorse Facility (Halliburton)	5/11/2006	314	249	59	2	2	2	NP	
Pioneer	Oooguruk Development Project	12/4/2006	634	240	237	33	72	52	NP	
NSB ¹⁰	Service Area 10 Incinerator	10/23/2001	145	36	39	23	33	14	NP	
NSB	Barrow Utilities	9/2/2005	532	NP	NP	NP	NP	NP	NP	Only total emissions reported
NSB	Thermal Oxidation System	7/22/2005	79	30	15	15	18	1	11	
TDX NS Generating	Deadhorse Power Plant	12/6/2005	611	243	240	14	10	104	NP	
Subtotals			118,875	83,248	22,687	3,034	3,778	2,630	400	

Notes:

Table compiled by North Slope Borough using Alaska Dept. of Environmental Conservation data records available on State website; updated August 2008.

¹nitrous oxide; ²carbon monoxide; ³particulate matter less than 10 microns in diameter; ⁵volatile organic compound; ⁶hazardous air pollutant; ⁷Alyeska Pipeline Service Co.; ⁸BP Exploration (Alaska), Inc.; ⁹ConocoPhillips Alaska, Inc.; ¹⁰North Slope Borough.

*This is the estimated maximum emissions used for permitting a facility; actual emissions should be less than PTE.

**HAP emission estimates were not provided in permitting documentation for many sources; therefore, HAP emissions likely are underestimated.

Table 3.4.5-8 North Slope Borough Region Emission Summary (cont'd).

In addition to the large emission sources listed above, other smaller permitted sources of emissions on the North Slope include:

ACS	Various locations on the North Slope	Open Burn Permit
BPXA	GPB T-Pad Fire Training Grounds	Open Burn Permit
BPXA	Prudhoe Bay Eastern Operating Area Fire Training	Open Burn Permit
BPXA	Badami Development Area Fire Training	Open Burn Permit
BPXA	Milne Point Fire Training Site at D-Pad	Open Burn Permit
CPAI	Alpine Oil Field Drill Site CD1	Open Burn Permit
NSB	Anaktuvuk Pass Power	Fuel use of up to 330,000 gallons
NSB	Atqasuk Power Plant	Fuel use of up to 330,000 gallons
NSB	Kaktovik Power Plant	Fuel use of up to 330,000 gallons
NSB	Point Lay Power Plant	Fuel use of up to 330,000 gallons
NSB	Nuqsut Power Plant	Operating under Fuel Limited Diesel Electric Generating Facilities General Permit
NSB	Point Hope Power Plant	Operating under Fuel Limited Diesel Electric Generating Facilities General Permit
NSB	Wainwright Power Plant	Operating under Fuel Limited Diesel Electric Generating Facilities General Permit

Notes:

1. Mobile Sources of Emissions, such as seismic units, trucks, cranes, vessels and other construction and maintenance equipment are not included in this emission estimate, and are significant sources of air pollution in the North Slope Borough.
2. Hazardous Air Pollutants are not quantified for some facilities, and test data and verification is limited. These numbers are estimates only and require additional work to verify accuracy.
3. Exploratory Mining Operation, emission sources are not included in this summary. Coal exploration is ongoing in the western North Slope Borough region.
4. Exploratory Drilling Operations, emissions sources for operators other than BPXA or CPAI are not included in this summary; additional emissions may occur as projects are proposed by other operators.

Table 4.3.2-1 Beaufort Sea Cumulative Oil-Spill-Occurrence Estimates ≥ 500 Barrels or $\geq 1,000$ Barrels Resulting from Oil Development over the Assumed 20-Year Production Life of Sale 209 or 217

Category	Crude Oil Spills					
	Reserves and Resources (Bbbl)	Spill Rate (spills/Bbbl)	Size Category (bbl)	Assumed Size (bbl)	Mean Number of Spills	Assumed Number of Spills for Analysis
Offshore						
Past, Present, and Reasonably Foreseeable	0.96	0.58	$\geq 1,000$		0.56	0
Alternatives for Sale 209 or 217	0.50	0.58	$\geq 1,000$		0.3	0
Total	1.46	0.58	$\geq 1,000$		0.85	0
Onshore						
Past, Present, and Reasonably Foreseeable	8.4	0.61	≥ 500	675	5.1	5
Alternatives for Sale 209 of 217	0.5	0.17	≥ 500	675	0.09	0
Total	8.9	0.17	≥ 500	675	5.2	5
TAPS Pipeline						
Past, Present, and Reasonably Foreseeable	9.4	0.11	≥ 500	4,600	1.03	1
Alternatives for Sale 209 or 217	0.5	0.11	≥ 500	4,600	0.06	0
Total	9.9	0.11	≥ 500	4,600	1.09	1

Source: USDO, MMS, Alaska OCS Region (2008)

Table 4.3.2-2 Chukchi Sea Cumulative Oil-Spill-Occurrence Estimates ≥ 500 Barrels or $\geq 1,000$ Barrels Resulting from Oil Development over the Assumed 25-Year Production Life of Sale 212 or 221

Category	Crude Oil Spill					
	Reserves and Resources (Bbbl)	Spill Rate (spills/Bbbl)	Size Category (bbl)	Assumed Size (bbl)	Mean Number of Spills	Assumed Number of Spills for Analysis
Offshore						
Past, Present, and Reasonably Foreseeable	0.96	0.51	$\geq 1,000$		0.48	0
Alternatives for Sale 212 or 221	1.0	0.51	$\geq 1,000$		0.51	0
Total	1.96		$\geq 1,000$		0.99	0
Onshore						
Past, Present, and Reasonably Foreseeable	8.4	0.61	≥ 500	675	5.1	5
Alternatives for Sale 212 or 221	1.0	0.17	≥ 500	675	0.17	0
Total	9.4	0.17	≥ 500	675	5.27	5
TAPS Pipeline						
Past, Present, and Reasonably Foreseeable	9.4	0.11	≥ 500	4,600	1.03	1
Alternatives for Sale 212 or 221	1.0	0.11	≥ 500	0	0.11	0
Total	10.4	0.11	≥ 500	4,600	1.14	1

Source: USDO, MMS (2008)

Notes: Assumed spill sizes are median spill size in that size category.

Table 4.3.3-1 Oil Spill Response Organization (OSRO) Classifications

Classifications	M and W1	W2 and W3
	Only resources located at equipment sites capable of being mobilized and en route to the scene of a spill within 2 hours of notification are counted toward M and W1 classifications. Because of the potential for nondedicated resources to be committed to other functions, only dedicated resources are presumed to be able to mobilize within these time requirements.	Any type resource owned or contracted, dedicated or nondedicated, is allowed for W2 and W3 classification.

Response Times. In addition to resource quantities, OSROs are required to meet certain response times (33 CFR 154.1045(d)-(f) and 33 CFR 155.1050(a)-(h)). The response times for classifications were derived from the regulations and standardized for classification through a series of workshops.

Response Times in Hours for Boom, EDRC and TSC Resources

Operating Area	M	W1	W2	W3
Nearshore	12	12	36	60
Offshore	12	12	36	60
Open Ocean	12	12	36	60

Notes: **EDRC.** Effective Daily Recovery Capacity **TSC.** Temporary Storage Capacity

Source: Guidelines for U.S. Coast Guard Oil Spill Removal Organization Program

To receive an M, W1, W2, or W3 classification, an OSRO must meet all boom, EDRC, and TSC amounts to obtain a single classification and each classification is determined independently for each operating area (Tables A, B, and C below).

A. Boom Amounts in Feet for OSRO Classifications

Area	Configuration	M	W1	W2	W3
Rivers/Canals	Protective	4,000	25,000	25,000	25,000
Great Lakes	Protective	6,000	30,000	30,000	30,000
Inland	Protective	6,000	30,000	30,000	30,000
Nearshore	Protective	8,000	30,000	30,000	30,000
Offshore	Protective	8,000	15,000	15,000	15,000
Open Ocean	Protective	0	0	0	0

B. EDRC Amounts in Barrels per Day for OSRO Classifications

Area	M	W1	W2	W3
Rivers/Canals	1,200	1,875	3,750	7,500
Great Lakes	1,200	6,250	12,500	25,000
Inland	1,200	12,500	25,000	50,000
Nearshore	1,200	12,500	25,000	50,000
Offshore	1,200	12,500	25,000	50,000
Open Ocean	1,200	12,500	25,000	50,000

C. TSC Amounts in Barrels for OSRO Classifications

Area	M	W1	W2	W3
Rivers/Canals	2,400	3,750	7,500	15,000
Great Lakes	2,400	12,500	25,000	50,000
Inland	2,400	25,000	50,000	100,000
Nearshore	2,400	25,000	50,000	100,000
Offshore	2,400	25,000	50,000	100,000
Open Ocean	2,400	25,000	50,000	100,000

Table 4.3.3-2 Travel Times to Deadhorse, Alaska in Hours

Coming From	Heavy Transport Fixed-Wing Aircraft (300 mph*)	Light Transport Fixed-Wing Aircraft (150 mph)	Helicopter (100 mph)	Vehicle (35 mph)
Anchorage	2.1	4.3	6.4	23.9
Fairbanks	1.3	2.7	4.0	13.7
Kenai	2.4	4.8	7.2	28.2
Valdez	2.2	4.3	—	24.1
Seattle, Washington	7.0	14.0	—	—

Source: Alaska Clean Seas Technical Manual, Vol. I

Table 4.4.1.10-1 Estimated Areal Extent of Direct and Indirect Effects on Tundra Vegetation during Potential Development of Oil Resources on Existing Beaufort Sea OCS Leases

Facility	Gravel Footprint	
	Km ² *	Acres
Staging Area	0.20	50
Shore Base	0.20	50
Road/Pipeline Corridor (0.03 km x 0 km)	2.45	606
Gravel-Extraction Sites (2 at 0.2km ² each)	0.40	99
Pump Station	0.16	40
Total	3.41	845

Notes: *square kilometers

Source: USDO, MMS, Alaska OCS Region

Table 4.4.2.2-1 Estimated Air Emissions from OCS Activities from a Lease Sale in the Beaufort Sea (Sale 209 or 217)

Activity	Pollutant (tons/year)				
	NO _x	SO ₂	PM ₁₀ /PM _{2.5}	CO	VOC
Exploration Wells	735-980	53-71	21-28	144-192	35-47
Platform Construction/Removal	821	66	58	184	65
Pipelining Vessels	149-223	13-84	11-71	34-227	12-77
Production Well Drilling	292-584	17-35	2-5	48-95	2-4
Production Platforms	631-2,828	20-87	28-121	244-1,025	98-399
Support Vessels	46-69	8-12	1-2	6-9	1
Helicopters	0.4-11	0-1	0.1-1	1.6-48	0.6-18
Total	2,675-5,507	177-354	121-285	661-1,736	213-595

Note: Emissions for each activity are for the year of peak activity in that category; total emissions for all activities in any given year would be lower.

Table 4.4.2.2-2 Projected Greenhouse Gas Emissions from Proposed Beaufort Sea and Chukchi Sea Lease Sales

Greenhouse Gas	Million Metric Tons CO ₂ Equivalent	Total 2005 U.S. Emissions, Million Metric Tons CO ₂ Equivalent	Arctic Multiple-Sale Program as Percentage of Total U.S. Emissions
Beaufort Sea			
CO ₂	0.344-1.276	6,089	0.006-0.02
CH ₄	0.0006-0.003	539	0.0001-0.0005
CO ₂ + CH ₄	0.345-1.278	6,628	0.005-0.02
Chukchi Sea			
CO ₂	0.341-0.482	6,089	0.006-0.008
CH ₄	0.0006-0.0020	539	0.0001-0.0004
CO ₂ + CH ₄	0.342-0.484	6,628	0.005-0.007

Estimates of emissions from the 2007-2012 5-Year Leasing Program (USDO, MMS, 2006d) were not made for these compounds, but they are assumed to be very small.

Table 4.4.2.6.2-1 Estimated Areal Extent of Direct and Indirect Effects on Eider Nesting Habitats and Associated Incidental Take of Spectacled and Steller’s Eiders during Potential Development of Oil Resources on Existing Beaufort Sea OCS Leases

Facility	Gravel Footprint		200-M Influence Zone		Total Area	
	Square kilometers	Acres	Square kilometers	Acres	Square Kilometers	Acres
Staging area	0.20	50	0.51	126	0.71	175
Shore base	0.20	50	0.51	126	0.171	175
Road/pipeline corridor (0.3 km x 80 km)	2.45	606	32.20	7,957	35.00	8,566
Gravel extraction sites (2 at 0.2 km ² each)	0.40	99	N/A - Winter operation		0.40	99
Pump station	0.16	40	0.48	118	0.64	158
Total Area	3.41	845	32.68	8,327	37.46	9,173
Spectacled eiders affected at 1.1/km ²	4		36		42	
Steller’s eiders affected at 1.1/km ²	1		2		3	

Source: USDO, MMS, Alaska OCS Region, 2003

Table 4.4.2.6.2-2 Combined Probabilities (Expressed As Percent Chance) Of One Or More Spills Greater Than Or Equal To 1,000 Barrels Originating in the Beaufort Sea Occurring And Contacting The Two Most Important Environmental Resource Areas For ESA-Listed Birds (See Maps In Appendix A) Over the Assumed Production Life Of The Sale Area Within Varying Time Periods, Beaufort Sea Sales 209, 217.

Environmental Resource Area	3 Days	10 Days	30 Days	60 Days	180 Days	360 Days
ERA 10 Ledyard Bay Critical Habitat Area	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
ERA 19 Spring Lead system	<0.5	<0.5	<0.5	<0.5	<0.5	1

Source: Appendix A, Table A2-157

Table 4.4.2.6.3-1 Summer Conditional Probabilities (Expressed As Percent Chance) That A Large Spill Starting At Launch Areas 1-25 Or Pipeline Segments 1-17 Will Contact Certain Important Fall Feeding And Denning Areas For Polar Bears In The Beaufort Sea Within 30 Or 360 Days.

ERA ID	ERA Name	30 Days LAs 1-25	30 Days PLs 1-17	360 Days LAs 1-25	360 Days PLs 1-17
55	Pt. Barrow, Plover area	<0.5-38%	<0.5-29%	<0.5-40%	<0.5-32%
92	Thetis, Jones, Cottle, and Return Islands	<0.5-11%	<0.5-11%	<0.5-12%	<0.5-12%
93	Cross and No Name Islands	<0.5-6%	<0.5-7%	<0.5-7%	<0.5-7%
94	Maguire, Flaxman, and Barrier Islands	<0.5-6%	<0.5-9%	<0.5-7%	<0.5-10%
95	Arey and Barter, and Bernard Spit	<0.5-5%	<0.5-3%	<0.5-5%	<0.5-3%

Source: Appendix A, Tables A.2-65, A.2-66, A.2-71 and A.2-72.

Table 4.4.2.6.3-2 Winter Conditional Probabilities (Expressed As Percent Chance) That A Large Spill Starting At Launch Areas 1-25 Or Pipeline Segments 1-17 Will Contact Certain Important Fall Feeding And Denning Areas For Polar Bears In The Beaufort Sea Within 30 Or 360 Days.

ERA ID	ERA Name	30 Days LAs 1-25	30 Days PLs 1-17	360 Days LAs 1-25	360 Days PLs 1-17
55	Pt. Barrow, Plover area	<0.5-4%	<0.5-3%	<0.5-4%	<0.5-4%
92	Thetis, Jones, Cottle, and Return Islands	<0.5-3%	<0.5-3%	<0.5-14%	<0.5-11%
93	Cross and No Name Islands	<0.5-1%	<0.5-1%	<0.5-1%	<0.5-1%
94	Maguire, Flaxman, and Barrier Islands	<0.5-2%	<0.5-3%	<0.5-9%	<0.5-10%
95	Arey, Barter, and Bernard Spit	<0.5%	<0.5%	<0.5-1%	<0.5-1%

Source: Appendix A, Tables A.2-65, A.2-66, A.2-71 and A.2-72.

Table 4.4.2.11-1 Chukchi Employment and Personal Income Effects

Area of Residence/Phase of OCS Activity	Employment Annual Average Jobs			Total Personal Income Annual Average in Millions of Constant 2006 \$		
	Direct	Indirect and Induced	Total	For Direct Workers	For Indirect and Induced Workers	Total
North Slope Borough (a)						
Exploration	5	2	7	.7	.3	1
Development	10	3	13	1.3	.4	1.7
Production	7	2	9	.9	.3	1.2
South Central Alaska and Fairbanks (b)						
Exploration	440	220	660	59	30	89
Development	960	480	1,440	111	55	166
Production	520	260	780	70	35	105

Source: Jack Faucett Associates, Inc. (2000).

Table 4.4.2.11-2 Beaufort Employment and Personal Income Effects

Area of Residence// Phase of OCS Activity	Employment Annual Average Jobs			Total Personal Income Annual Average in Millions of Constant 2006 \$		
	Direct	Indirect and Induced	Total	For Direct Workers	For Indirect and Induced Workers	Total
North Slope Borough (a)						
Exploration	7	3	10	.9	.4	1.3
Development	12	6	18	1.6	.8	2.4
Production	9	4	13	1.2	.6	1.8
South Central Alaska and Fairbanks (b)						
Exploration	600	300	900	81	40	121
Development	1,140	670	1,810	131	65	196
Production	700	350	1,050	95	48	143

Source: Jack Faucett Associates, Inc. (2000).

Table 4.5.1.6.2-1 Estimated Areal Extent of Direct and Indirect Effects on Eider Nesting Habitats and Associated Incidental Take of Spectacled and Steller's Eiders during Development of Oil Resources following Lease-Sale 193.

Facility	Gravel Footprint		200-Meter Influence Zone		Total Area	
	Km ²	Acres	Km ²	Acres	Km ²	acres
Staging Area	0.20	50	0.51	126	0.71	175
Shore Base	0.20	50	0.51	236	0.71	175
Road/Pipeline Corridor (0.03 km x 483 km)	14.72	3,636	193.20	47,740	208.00	51,397
Gravel Extraction Sites (8 at 0.2 km ² ea)	1.60	395	N/A Winter Operation		1.60	395
Pump Stations (4 at 40 acres ea)	0.65	160	1.91	472	2.56	632
Total	17.37	4,291	196.13	48,464	213.58	52,774
Spectacled Eiders Affected at 1.1/km ²	19		216		235	
Steller's Eiders Affected at 0.06/km ²	1		12		13	

Source: USDOI, MMS (2007)

Table 4.5.2.2-1 Estimated Air Emissions from OCS Activities from a Lease Sale in the Chukchi Sea (Sale 212 or 221)

Activity	Pollutant (tons/year)				
	NO _x	So ₂	PM ₁₀ /PM _{2.5}	CO	VOC
Exploration Wells	490-735	35-53	14-21	96-144	24-35
Platform Construction/Removal	821	66	58	184	65
Pipelaying Vessels	298-298	25	21	68	23
Production Well Drilling	328-511	20-31	3-4	54-83	2-4
Production Platforms	1,099-1,994	31-57	43-80	320-607	109-213
Support Vessels	92-138	16-23	2-3	12-18	2-3
Helicopters	0.4-11	0-1	0.1-1	1.6-48	0.6-18
Total	3,128-4,498	192-255	142-188	736-1,110	225-344

Note: Emissions for each activity are for the year of peak activity in that category. Total emissions for all activities in any given year would be lower than total of peak year emissions for all activities.

Table 4.5.2.6.2-1 Combined Probabilities (expressed as percent Chance) of One or More Spills Greater than or Equal to 1,000 Barrels Originating in the Chukchi Sea Occurring and Contacting the Two Most Important Environmental Resource Areas for ESA-Listed Birds (see maps, Appendix A) over the Assumed Production Life of the Lease-Sale Area with Varying Time Periods, Chukchi Sea.

Environmental Resource Area	3 Days	10 Days	30 Days	60 Days	180 Days	360 Days
ERA 10 Ledyard Bay Critical Habitat Area	3	4	5	6	6	6
ERA 19 Spring Lead System	2	3	5	6	7	7

Source: Appendix A, Table A3-79

Table 4.5.2.6.3-1. Summer Conditional Probabilities (Expressed As Percent Chance) That A Large Spill Starting At Launch Areas 1-15 Or Pipeline Segments 1-11 Will Contact Certain Important Fall Feeding And Denning Areas For Polar Bears In The Chukchi Sea Within 30 Or 360 Days.

ERA ID	ERA Name	30 Days LAs 1-15	30 Days PLs 1-11	360 Days LAs 1-15	360 Days PLs 1-11
ERA 11	Wrangel Island with 12 NM Buffer	<0.5-2	<0.5-2	<0.5-2	<0.5-2
ERA 19	Chukchi Sea spring lead System	<0.5-9	<0.5-14	<0.5-10	<0.5-14
ERA 39	Pt. Lay/ Chukchi Sea polynya area	<0.5-16	<0.5-41	<0.5-19	<0.5-44
ERA 40	Wainwright/ Chukchi Sea polynya area	<0.5-19	<0.5-51	<0.5-26	<0.5-57
ERA 55	Pt. Barrow, Plover Islands	<0.5-3	<0.5-1	<0.5-7	<0.5-3
ERA 58	Chukchi Sea polynya area offshore	1-84	4-82	2-85	6-82
ERA 59	Ostrov Kolyuchin	<0.5-2	<0.5-2	<0.5-2	<0.5-2
ERA 66	Herald island	<0.5-1	<0.5-1	<0.5-1	<0.5-1
LS 85	Barrow, Browerville, Elson Lagoon	<0.5-8	<0.5-4	<0.5-13	<0.5-8
GLS 142 ¹	Russian Chukchi Sea coastline	<0.5-20	<0.5-20	1-20	<0.5-20
GLS 143 ¹	U. S. Chukchi Sea coastline	<0.5-22	<0.5-35	1-31	3-43
GLS 144 ¹	U. S. Beaufort Sea coastline	<0.5-10	<0.5-5	<0.5-23	<0.5-13

Note¹: Most contacts to GLS 143 occur to LSs 64-85 (Pt. Hope to Barrow). We use GLS 142, 143 and 144 as a proxy to represent potentially available coastal denning habitat.

Source: Appendix A, Tables A.3-33, A.3-36, A.3-39, A.3-42, A.3-45 and A.3-48.

Table 4.5.2.6.3-2. Winter Conditional Probabilities (Expressed As Percent Chance) That A Large Spill Starting At Launch Areas 1-15 Or Pipeline Segments 1-11 Will Contact Certain Important Fall Feeding And Denning Areas For Polar Bears In The Chukchi Sea Within 30 Or 360 Days.

ERA ID	ERA Name	30 Days LAs 1-15	30 Days PLs 1-11	360 Days LAs 1-15	360 Days PLs 1-11
ERA 11	Wrangel Island with 12 NM Buffer	<0.5	<0.5	<0.5	<0.5
ERA 19	Chukchi Sea spring lead System	<0.5-16	<0.5-23	<0.5-26	<0.5-35
ERA 39	Pt. Lay/ Chukchi Sea polynya area	<0.5-16	<0.5-32	<0.5-25	<0.5-39
ERA 40	Wainwright/ Chukchi Sea polynya area	<0.5-8	<0.5-38	<0.5-18	<0.5-52
ERA 55	Pt. Barrow, Plover Islands	<0.5	<0.5	<0.5-3	<0.5-3
ERA 58	Chukchi Sea polynya area offshore	<0.5-18	<0.5-19	2-33	2-37
ERA 59	Ostrov Kolyuchin	<0.5	<0.5	<0.5	<0.5
ERA 66	Herald island	<0.5	<0.5	<0.5-1	<0.5-1
LS 85	Barrow, Browerville, Elson Lagoon	<0.5-2	<0.5-1	<0.5-6	<0.5-6
GLS 142 ¹	Russian Chukchi Sea coastline	<0.5-8	<0.5-8	<0.5-8	<0.5-9
GLS 143 ¹	U. S. Chukchi Sea coastline	<0.5-13	<0.5-21	<0.5-28	2-38
GLS 144 ¹	U. S. Beaufort Sea coastline	<0.5	<0.5-1	<0.5-11	<0.5-10

Note¹: Most contacts to GLS 143 occur to LSs 64-85 (Pt. Hope to Barrow). We use GLS 142, 143 and 144 as a proxy to represent potentially available coastal denning habitat.

Source: Appendix A, Tables A.3-33, A.3-36, A.3-39, A.3-42, A.3-45 and A.3-48.

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally-owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. Administration.



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