

# Chapter Five: Current and Projected Uses in the Beaufort Sea Area

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## Chapter Five: Current and Projected Uses in the Beaufort Sea Area



S. Hadwin, USFWS

Woman and girl ice fishing.

AS 38.05.035(g) directs that best interest findings consider and discuss the current and projected uses in the area, including uses and value of fish and wildlife. The Beaufort Sea area provides important habitat for freshwater and marine fishes, many species of birds, and terrestrial and marine mammals. The fish and wildlife of the area provide the resource base for subsistence fishing and hunting, and for several small sport fisheries and sport hunting. There are no commercial fisheries for marine species in the Beaufort Sea area although there is a very limited commercial fishery on whitefish. The area is used to a small extent for recreation and tourism. The primary industrial use of the area is for oil and gas development.

### **A. Uses and Value of Fish, Wildlife, and Plants**

The fishes, birds, mammals, and plants of the Beaufort Sea area have been used by area residents for centuries, forming the resource base for the fishing, hunting, and gathering activities that are integral to the history, culture, and economy of the area. The primary use of these resources is for subsistence

which, in the broad sense, refers to “any harvest or use of fish, wildlife, and wild plants for home use. It also incorporates the noncommercial exchange or sharing of resources...” (Fall et al. 2004).

Management of fish and wildlife in the Beaufort Sea area can fall under the authority of either the state or federal government, or international treaties or agreements. Management authorities and types of harvest activities may overlap. Sport and state subsistence hunting and fishing are managed by ADF&G. Subsistence hunting on federal lands, and subsistence fishing on federal waters or waters adjacent to federal lands, are managed by the Federal Subsistence Management Program. Management of marine mammals falls under federal jurisdiction or the International Whaling Commission (IWC). Migratory birds are federally managed. Local residents serve on a number of advisory committees that provide input to state or federal management agencies, and local residents are also members of commissions that participate in co-management of marine mammals or migratory birds.

## **1. Subsistence Fishing, Hunting, and Gathering**

Subsistence fishing, hunting, and gathering are important to the residents of the Beaufort Sea area, both culturally and as important sources of food. Sharing of subsistence foods is an important part of the culture (Bacon et al. *Unpublished*). Harvests are routinely shared with elders, other households, and between villages. Subsistence harvests are also traded and bartered, for gasoline and equipment for example.

Although bowhead whale harvests tend to make up the largest proportion of total subsistence harvests, other species are also seasonally important, more so than their actual proportions may imply (EDAW/AECOM 2007). These other species become even more important in years when few or no whales are harvested.

Subsistence species tend to be migratory and seasonally abundant. Successful hunts require knowing when and where to intercept these resources as they migrate. For species that migrate through the area over a relatively short period, adverse weather conditions or equipment problems may result in missing the entire migration (Braund and ISER 1993).

### **a. Community Subsistence Characteristics**

#### ***i. Barrow***

The Barrow area has an abundant diversity of fish, wildlife, and other natural resources because of its location at the convergence of the Chukchi and Beaufort seas (Braund and ISER 1993). The area, which usually has some open water year round, is rich in migrating marine resources including bowhead whales, beluga whales, walrus, bearded seals, ringed seals, and eider ducks. Terrestrial species include caribou, fox, wolf, and wolverine. Many species of migrating birds nest in the Barrow area, and there are several fish species in local rivers, especially during summer and fall migrations to spawning areas. Although marine mammals, and bowhead whales in particular, are the main focus of Barrow subsistence harvests (URS Corp. 2005a), most of these fish, wildlife, and bird species are important for subsistence in the Barrow area (Braund and ISER 1993; Table 5.1).

Although Barrow has a cash economy, traditional subsistence activities remain fundamental to the local economy and culture (Braund and ISER 1993). In 2003, over 91 percent of Alaska Native households in Barrow participated in local subsistence activities, and for 66 percent of the households, at least half of their diet consisted of local subsistence resources (EDAW/AECOM 2007 citing to Circumpolar Research Associates 2004). For non-Alaska Native households, one-third used wild resources obtained from hunting, fishing, or gathering. In Barrow, bowhead whale hunting is the main subsistence activity, resulting in large concentrations of effort, time, money, group symbolism, and significance. It also provides much of the organization for social community relations (EDAW/AECOM 2007).

**Table 5.1. Harvest of several species of wildlife and birds in the Barrow area.**

12-mo Period	Caribou	Large Whitefish <sup>a</sup>	Geese <sup>b</sup>	Walrus	Eiders <sup>c</sup>	Bearded Seals
1995-1996	2,155	12,084	2,599	74	12,114	431
1996-1997	1,158	7,657	1,856	78	2,572	192
1999-2000 <sup>d</sup>	3,359	23,213	7,550	115	2,572	729
2000-2001 <sup>d</sup>	1,820	2,177	4,893	123	2,201	327
2002-2003 <sup>d</sup>	2,092	8,899	3,321	313	4,773	776

Source: Bacon et al. *Unpublished*.

- <sup>a</sup> Includes broad whitefish, humpback whitefish and unidentified whitefish.
- <sup>b</sup> Includes greater white-fronted goose, Canada goose, snow goose and brant.
- <sup>c</sup> Includes common eider, king eider, spectacled eider and Steller's eider.
- <sup>d</sup> Estimates are from full calendar year surveys.

The subsistence hunting zone for Barrow is the largest in the region, extending beyond Wainwright in the west, to the Kuparuk River in the east, and south to the Avuna River (EDAW/AECOM 2007). Inland, the area stretches beyond the Colville River to the foothills of the Brooks Range. Although many residents from throughout the NSB have relocated to Barrow, many continue to hunt in the areas where they were raised (Braund and ISER 1993). For example, Barrow residents with ties to Nuiqsut may return there for subsistence activities because they continue to share use rights to cabins, camps, and allotments in the area (EDAW/AECOM 2007).

Although changes in subsistence patterns have occurred as Barrow transitioned to a cash economy, many residents balance wage employment with seasonal subsistence activities. Studies have shown that higher levels of household cash income are correlated with higher levels of subsistence activities and harvest. However, time constraints imposed by wage jobs may result in residents limiting subsistence activities to the most desired species (EDAW/AECOM 2007). In Barrow, the average expenditure on subsistence activities is \$3,787, the median is \$925, and 59 percent of households spend less than \$2,000 per year on subsistence expenses such as fuel and ammunition (URS Corp. 2005a citing to Shepro et al. 2003).

Other changes include use of more efficient and reliable technology, such as all-terrain vehicles, snow machines, and outboard motors, which is possible because of increased financial resources. Recent economic declines may have resulted in increased reliance on subsistence resources (URS Corp. 2005a). Some studies have shown that young adults participate in subsistence at the same rate as older generations, and that students exposed to Western influences are more interested in subsistence activities than those who have not been (EDAW/AECOM 2007).



C. Lensink, USFWS

Beluga whale subsistence harvest.

**ii. Nuiqsut**

At Nuiqsut, subsistence activities are important to the economy and to the local culture and identity (EDAW/AECOM 2007; Table 5.2). Bowhead whales are an important subsistence resource. Other fish and game are also harvested, including ringed, spotted, and bearded seals; polar bears; birds and eggs; caribou; moose; furbearers such as wolf and wolverine; and freshwater and marine fishes. Berries, plants, Eskimo potato, medicinal plants, and greens are also important for subsistence (EDAW/AECOM 2007).

**Table 5.2. Harvest of several species of wildlife and birds in the Nuiqsut area.**

12-mo Period	Caribou	Large Whitefish <sup>a</sup>	Geese <sup>b</sup>	Walrus	Eiders <sup>c</sup>	Bearded Seals
1994-1995	258	3,419	474	0	90	0
1995-1996	362	3,419	381	0	287	17
2000-2001	496	5,533	1,172	0	86	1

Source: Bacon et al. *Unpublished*.

<sup>a</sup> Includes broad whitefish, humpback whitefish, and unidentified whitefish.

<sup>b</sup> Includes greater white-fronted goose, Canada goose, snow goose and brant.

<sup>c</sup> Includes common eider, king eider, spectacled eider, and Steller's eider.

<sup>d</sup> Estimates are from full calendar year surveys.

Patterns of subsistence hunting, fishing, and gathering have changed at Nuiqsut in recent years (EDAW/AECOM 2007). In 1998, subsistence resources made up at least half the food consumed for 73 percent of households; this decreased to 63 percent of households in 2003 (URS Corp. 2005c, citing to Shepro et al. 2003). There are many factors that may contribute to these changes. For example, the greater availability of cash resources through sources such as employment and dividends for the purchase of food and supplies may decrease the need for subsistence harvests (EDAW/AECOM 2007). In 2003, Nuiqsut households spent an average of \$6,700 on subsistence activities, and the community as a whole expended 20 percent of its gross income on subsistence activities (URS Corp. 2005c).

Seasonal employment is generally available for those desiring work, and many Nuiqsut residents prefer seasonal work because it allows easier participation in subsistence activities (EDAW/AECOM 2007). However, non-subsistence activities may result in subsistence activities being compressed into shorter seasons. Another factor affecting subsistence patterns is that the CAA (Conflict Avoidance Agreement) now supplies logistical support for whaling in Nuiqsut which reduces the need for additional subsistence activities. Also at Nuiqsut, the distance of Cross Island from Nuiqsut, from where the community’s whaling is staged, increases the expense of whaling and results in separation from family, resulting in compression of the whaling season (EDAW/AECOM 2007).

**iii. Kaktovik**

Residents of Kaktovik have a unique set of natural resources available for subsistence. Because of Kaktovik’s location, hunters have access to terrestrial, riparian, and marine resources. Subsistence activities, particularly those surrounding the bowhead whale hunt, are central to the structural organization and cultural identity of Kaktovik residents. Although the bowhead whale is the primary marine mammal subsistence species, seals and polar bears are also important. Residents harvest both marine and freshwater fishes. Caribou are the most important terrestrial subsistence resource, but sheep, muskox, and grizzly bears are also harvested (Galginaitis and Koski 2002). Bird species harvested include geese and ptarmigan (URS Corp. 2005b; Table 5.3).

**Table 5.3. Harvest of several species of wildlife and birds in the Kaktovik area.**

12-mo Period	Caribou	Large Whitefish <sup>a</sup>	Geese <sup>b</sup>	Walrus	Eiders <sup>c</sup>	Bearded Seals
1994-1995 <sup>d</sup>	78	0	273	0	111	21
2002-2003	112	3	479	0	38	8

Source: Bacon et al. *Unpublished*.

- <sup>a</sup> Includes broad whitefish, humpback whitefish, and unidentified whitefish.
- <sup>b</sup> Includes greater white-fronted goose, Canada goose, snow goose and brant.
- <sup>c</sup> Includes common eider, king eider, spectacled eider and Steller’s eider.
- <sup>d</sup> Estimates are from full calendar year surveys.

Subsistence patterns in Kaktovik have also changed in recent years. In 1998, subsistence resources made up at least half the food consumed for 83 percent of households; this decreased to 69 percent of households in 2003 (URS Corp. 2005b, citing to Shepro et al. 2003). Residents have noted that they are involved in a wider range of activities and responsibilities, and that they travel away from the village more often for a wide variety of reasons (EDAW/AECOM 2007). These lifestyle changes

may limit their subsistence activities and constrain the timing of subsistence activities. Residents have noted that winter subsistence is minimal and that overall, hunting trips are shorter. Studies of these changes have found that “aspects of the hunt other than the actual harvest are becoming increasingly important as cultural identity value markers and for the maintenance of mental health, especially as the time available for subsistence activities becomes less” (EDAW/AECOM 2007).

In Kaktovik, wage jobs are important for maintaining subsistence activities. The average household expended \$4,788 on subsistence, and overall, the community spent approximately 10 percent of its total income on subsistence activities (URS Corp. 2005b, citing to Shepro et al. 2003). Seasonal employment is available to most Kaktovik residents desiring work. Some residents prefer seasonal work because it allows them to participate more fully in subsistence activities (EDAW/AECOM 2007). Kaktovik residents working at permanent jobs are generally able to take time off for activities that require larger blocks of time, such as whaling, fishing, and hunting birds and sheep. Whaling is generally conducted as day trips out of the village, but other types of hunting and fishing usually require travel and overnight camping. Many residents participate in fishing and birding, while some types of hunting, such as sheep hunting, is done by only a few specialized hunters (EDAW/AECOM 2007). Relatively little moose and muskox hunting is done by Kaktovik residents.

Residents with higher incomes are able to afford more equipment and supplies, such as snowmobiles, boats, outboard motors, rifles, ammunition, and gas, which helps to make up for less time available for subsistence activities. Although residents employed full-time may not necessarily participate in subsistence activities as much as other residents, they may support others in the community who are more active (EDAW/AECOM 2007). Residents with lower incomes also participate in subsistence activities that do not require as much cash input, such as fishing or sealing near the village.

**b. Plant Harvests**

Various types of plants provide subsistence foods to residents of the Beaufort Sea area (Table 5.4). Root species are generally harvested in August, while late summer and early fall are important times for gathering berries. Residents often pick berries in conjunction with other subsistence activities such as caribou hunting and fishing (Bacon et al. *Unpublished*). Berries and plants may be available for only a short time. They are found along raised banks of streams and rivers and in areas of wet tundra (EDAW/AECOM 2007).

**Table 5.4. Estimated subsistence harvest and standard error (SE) of plants (gallons), by species, for Barrow, Nuiqsut, and Kaktovik.**

Species	Barrow 2003 <sup>a</sup>		Nuiqsut 2000-2001 <sup>b</sup>		Kaktovik 2002-2003 <sup>c</sup>
	Harvest	SE	Harvest	SE	Harvest
Berries					2
Blueberries	14	8	1	0	
Crowberries	5	3			
Wild Rhubarb	2	1			1
Roots	4	2			2
Salmonberries	33	15	1	0	1
Sour Dock					3
Wild Spinach	2	1			
Willow Leaves	2	1			

Source: Bacon et al. *Unpublished*.

<sup>a</sup> Calendar year.

<sup>b</sup> July 2000 - June 2001.

<sup>c</sup> July 2002 - June 2003. No standard error (SE) because survey was a census.

**c. Fish Harvests**

Fish harvests are an important food staple for residents of the Beaufort Sea area (Table 5.5). Whitefish species are particularly important and are used for dog food as well as for human consumption. Species such as broad whitefish, which are considered the preferred fish by many residents, are generally harvested in the summer and fall with gillnets. They are filleted and dried, or stored in ice cellars. Arctic grayling and Dolly Varden are also highly prized (Bacon et al. *Unpublished*). Subsistence harvests also occur through the ice on overwintering concentrations of whitefish and Arctic grayling (EDAW/AECOM 2007). Arctic cod are available year round.

**Table 5.5. Estimated subsistence harvest and standard error (SE) of fish and invertebrates, by species, for Barrow, Nuiqsut, and Kaktovik.**

Species	Barrow 2003 <sup>a</sup>		Nuiqsut 2000-2001 <sup>b</sup>		Kaktovik 2002-2003 <sup>c</sup>
	Harvest	SE	Harvest	SE	Harvest
<b>FISH</b>					
Arctic Char	270	97	38	2	1,162
Arctic Cisco	62	24	18,222	377	1,051
Arctic Cod	0	0			46
Arctic Flounder	44	16			
Arctic Grayling	3,514	809	1,537	47	70
Broad Whitefish	8,207	1,237	2,968	80	3
Burbot	405	242	182	36	1
Capelin	5,285	3,475			
Chum Salmon <sup>d</sup>	272	182			
Dog Salmon <sup>d</sup>	1,345	683			
Humpback Salmon <sup>d</sup>	798	458			
Humpback Whitefish	569	297	1,628	113	
King Salmon	439	404	2	0	
Lake Trout	65	40			20
Least Cisco	1,337	503	630	38	
Northern Pike	37	23			1
Pink Salmon <sup>d</sup>	1,050	383			
Rainbow Smelt	193	185			
Salmon spp.	44	29	3	0	
Silver Salmon	845	308	5	0	
Tom Cod					9
Whitefish spp.	122	80	937	60	
Fish spp.			403	36	
<b>INVERTEBRATES</b>					
Clams	1,733	949			3

Source: Bacon et al. *Unpublished*.

<sup>a</sup> Calendar year.

<sup>b</sup> July 2000 - June 2001.

<sup>c</sup> July 2002 - June 2003. No standard error (SE) because survey was a census.

<sup>d</sup> Chum and dog salmon are the same species; humpback salmon and pink salmon are the same species.

**d. Bird Harvests**

Birds and bird eggs are an important component of the subsistence harvests in the Beaufort Sea area (Table 5.6). Hunting of other migratory birds is regulated under the Migratory Bird Treaty Act. Subsistence hunting of spectacled eiders is closed, and non-toxic lead shot must be used for all waterfowl hunting (USFWS 1999). Although they make up only a small proportion of total harvests by weight, they may be important seasonally, and participation in bird hunting is high (EDAW/AECOM 2007). Hunting corresponds to the spring migration and the molt and fall migration. Eiders, geese, and ptarmigan are particularly important (Bacon et al. *Unpublished*), with over 2,500 eiders and over 3,300 geese taken in Barrow in 2003 (Table 5.6). Ptarmigan are important in the early spring because they are found in flocks and are one of the few sources of fresh meat available at that time (EDAW/AECOM 2007). In Barrow, eider harvests generally occur in July. In some communities, birds are an important component of whaling events, when it is not uncommon for 200 ducks and geese to be used.

**Table 5.6. Estimated subsistence harvest and standard error (SE) of birds, by species, for Barrow, Nuiqsut, and Kaktovik.**

Species	Barrow 2003 <sup>a</sup>		Nuiqsut 2000-2001 <sup>b</sup>		Kaktovik 2002-2003 <sup>c</sup>
	Harvest	SE	Harvest	SE	Harvest
American Widgeon					2
Brant	88	30			277
Canada Goose	3	2			33
Common Eider	317	67			12
Duck spp.	505	130			8
Eider spp.	2,568	707	55	4	18
Eider Eggs					30
Goose spp.	220	85	319	79	
King Eider	937	325	30	3	8
Mallard	86	83			1
Long-tailed Duck	25	14			5
Northern Pintail	18	12			2
Ptarmigan spp.	426	139	23	3	370
Sandhill Crane	2	1			1
Snow Goose	3	2			20
Spruce Grouse	18	12			
Steller's Eider	14	9			
Tundra Swan	2	1			
White-fronted Goose	3,314	487	787	188	149
White-fronted Goose Eggs	44	19			
Yellow-billed Loon	18	8			

Source: Bacon et al. *Unpublished*.

<sup>a</sup> Calendar year.

<sup>b</sup> July 2000 - June 2001.

<sup>c</sup> July 2002 through June 2003. No standard error (SE) because survey was a census.



USFWS

Caribou harvest.

### **e. Terrestrial Mammal Harvests**

Terrestrial mammals, particularly caribou, are an important component of subsistence harvests in the Beaufort Sea area (Table 5.7). However, their importance is not always reflected in reports giving the percent weight they contribute to total subsistence harvests because in some years, large bowhead whales harvests dominate the total harvest even if the actual number of whales taken is small (Bacon et al. *Unpublished*).

Caribou are generally available year round in the Beaufort Sea area. Caribou is the main terrestrial animal harvested for subsistence in Barrow, where harvests peak from February through early April, and from late June through late October (EDAW/AECOM 2007). In terms of participation, caribou hunting is the most important hunting activity in Barrow, perhaps because of high participation by non-Natives (Bacon et al. *Unpublished*). Harvests fluctuate from year to year, depending on proximity of overwintering caribou to Barrow. In 2003, 2,092 caribou were harvested by Barrow residents (Table 5.7).

Nuiqsut residents may hunt caribou year round, but caribou are particularly important when there is an immediate need for meat (EDAW/AECOM 2007). Caribou comprise the majority of the terrestrial mammal resources harvested for subsistence at Nuiqsut (Bacon et al. *Unpublished*). Nuiqsut residents harvested almost 500 caribou from July 2000 through June 2001 (Table 5.7). At Kaktovik, caribou can also be hunted throughout the year, but harvests fluctuate because movements of the Porcupine and Central Arctic caribou herds are unpredictable (EDAW/AECOM 2007). Kaktovik residents harvested 112 caribou from July 2002 through June 2003 (Table 5.7).

Barrow residents may hunt moose along the Colville River during the summer (EDAW/AECOM 2007). However relatively few or no moose are taken in years when hunting is restricted or closed by regulation (Bacon et al. *Unpublished*). In Barrow, most moose hunting is conducted by non-Natives (Bacon et al. *Unpublished*). Nuiqsut residents hunt moose by boat on the Colville, Chandler, and Itkillik rivers during August (EDAW/AECOM 2007). Few Kaktovik residents hunt for moose.

Dall sheep are hunted by Kaktovik residents. Dall sheep are second to caribou in importance of terrestrial mammals (Bacon et al. *Unpublished*).

Barrow residents harvest furbearers in the winter (Bacon et al. *Unpublished*). Nuiqsut residents may hunt for wolf and wolverine by snow machine in March and April, and may take them opportunistically while hunting for other species during the winter (Bacon et al. *Unpublished*; EDAW/AECOM 2007). Little trapping occurs in Kaktovik, although wolf and wolverine are hunted, usually in March and April.

**Table 5.7. Estimated subsistence harvest and standard error (SE) of terrestrial mammals, by species, for Barrow, Nuiqsut, and Kaktovik.**

Species	Barrow 2003 <sup>a</sup>		Nuiqsut 2000-2001 <sup>b</sup>		Kaktovik 2002-2003 <sup>c</sup>
	Harvest	SE	Harvest	SE	Harvest
Arctic Fox	4	2	69	38	4
Brown Bear	2	1			
Caribou	2,092	221	496	17	112
Cross Fox	11	4			1
Dall Sheep					18
Ground Squirrel	17	11	5	0	48
Moose			6	0	
Muskox			2	0	
Red Fox	26	9	3	0	
Reindeer	5	2			
Weasel spp.	2	1			
Wolf	14	5	5	2	1
Wolverine	10	4	27	6	2

Source: Bacon et al. *Unpublished*.

<sup>a</sup> Calendar year.

<sup>b</sup> July 2000 - June 2001.

<sup>c</sup> July 2002 - June 2003. No standard error (SE) because survey was a census.

## **f. Marine Mammal Harvests**

For most communities of the Beaufort Sea area, marine mammals tend to be the focus of subsistence harvests. Marine mammals harvested for subsistence include polar bears, whales, seals, and walrus.

### ***i. Polar Bears***

Polar bears are generally available anytime ice is present. They are taken occasionally, but harvested polar bears are primarily nuisance bears that are attracted to locations of where whales are being butchered (EDAW/AECOM 2007). In 2003, 21 polar bears were harvested in Barrow, 1 was harvested in Nuiqsut from July 2000 through June 2001, and 2 were harvested in Kaktovik from July 2002 through June 2003 (Bacon et al. *Unpublished*).

On May 15, 2008, the USFWS published a Final Rule in the Federal Register listing the polar bear as a threatened species under the federal Endangered Species Act (73 FR 28212-28303). The USFWS based its listing on the loss of sea ice, which it says threatens and will likely continue to threaten polar bear habitat. The USFWS believes that this loss of habitat puts polar bears at risk of becoming endangered in the foreseeable future, the standard established by the Endangered Species Act for

designating a threatened species. This final rule activates the consultation provisions of Section 7 of the Act for the polar bear. The special rule for the polar bear, also published in the May 15, 2008, edition of the Federal Register, sets out the prohibitions and exceptions that apply to this species. It recognizes the adequacy of the existing regulatory structure in protecting polar bears.

The State of Alaska has challenged the listing (Office of the Governor 2008). The state maintains that there is insufficient evidence to support a listing of the polar bear as threatened for any reason at this time. Polar bears are currently well-managed and have dramatically increased over 30 years as a result of conservation measures enacted through international agreements and the Marine Mammal Protection Act.

## ***ii. Whales***

Whales are an important marine mammal species to residents along the Beaufort Sea, particularly the coastal communities of Barrow, Nuiqsut, and Kaktovik, where the Inupiat have a long history of subsistence whaling (AEWC 2009). The thousands of pounds of whale meat harvested annually are shared throughout the community. Whaling is also an important cultural component, and the entire community participates in subsistence whaling and associated activities (AEWC 2009). Contemporary whaling in Kaktovik dates from 1964, and from 1973 in Nuiqsut (EDAW/AECOM 2007; Galginaitis and Koski 2002). During the 1960s and 1970s, subsistence whaling increased by more than 50 percent in Barrow because of increased opportunities for high-paying jobs. People interested in whaling could earn enough to purchase a new complete set of gear for a whaling operation in as little as six months (EDAW/AECOM 2007, citing to BLM 2005, Bockstoce 1977, and Brower 2004). Most whaling captains, who are expected to provide most of the equipment and supplies for their whaling crews, have other full-time employment or may be retired from full-time employment (EDAW/AECOM 2007).

Whales are managed worldwide by the International Whaling Commission (IWC), under the International Convention for the Regulation of Whaling, of which the U.S. is a member (NOAA 2009). The purpose of the IWC, which dates from 1946, is to “provide for the proper conservation of whale stocks and thus make possible the orderly development of the whaling industry” (IWC 2009b). The IWC sets quotas and size limits for whale harvests, harvest seasons and areas, and other necessary regulations. Within the U.S., whales are under federal jurisdiction, through the Whaling Act of 1949, the Marine Mammal Protection Act, and the Endangered Species Act, and are cooperatively managed through cooperative agreements with local Alaska Native organizations (AEWC 2009). The State of Alaska does not have management jurisdiction over whales. In the Beaufort Sea area, whales are managed cooperatively between NMFS and the Alaska Eskimo Whaling Commission (AEWC), and local associations of whaling captains. The AEWC is composed of registered whaling captains, who may vote, and their non-voting crew members (EDAW/AECOM 2007). Whaling captains must register with the AEWC and their local village whaling association: Barrow Whaling Captains Association, Nuiqsut Whaling Captains Association, or the Kaktovik Whaling Captains Association. Fifty-five whaling captains from Barrow are registered with the AEWC, eight captains from Kaktovik, and eight from Nuiqsut (EDAW/AECOM 2007). Some management practices that have been implemented by the AEWC to reduce wastage, increase success, and improve safety include a prohibition on taking females with calves, guidelines on the size of whales, and sanctions for violations (Galginaitis 2008).

***Bowhead whale*** harvests are regulated by quotas set by the IWC (Angliss and Outlaw 2008). The AEWC is responsible for allocating the quota among Alaska whaling communities, which include Barrow, Nuiqsut, and Kaktovik within the Beaufort Sea area, as well as other coastal communities of the North Slope and western Alaska (NOAA 2009). In 2008, the quota for Alaska Eskimos was 75 strikes, which were allocated among the 11 Alaska whaling communities by the AEWC ([50 CFR Part 230](#)).



MMS

Eskimo whale hunt.

Bowhead harvests provide one of the main sources of meat for many of the communities of the Beaufort Sea area (EDAW/AECOM 2007). Bowhead harvests are often shared with other North Slope residents and with friends and relatives in other areas such as Fairbanks and Anchorage. Baleen is bartered and used in making traditional arts and crafts.

Subsistence whaling is highly correlated with the ice pack. Hunting for bowhead whales occurs when bowheads migrate relatively close to whaling communities (see Maps 4.5 and 4.6 in Chapter Four). This occurs during two seasons, spring (April-May) and fall (September-October). Most whaling communities located on the Bering and Chukchi seas (outside the lease sale area) whale in the spring when whales follow open leads in the ice (Galginaitis 2008). Residents of Nuiqsut and Kaktovik, located on the Beaufort Sea, whale only in the fall because leads do not open up near these villages in the spring. Barrow residents whale in the spring and fall because Barrow is located where the Chukchi and Beaufort seas meet. At Barrow, whaling peaks from the last week of April to the last week of May (Braham et al. 1980).

A broad variety of equipment is required for whaling. The type of boat used depends on the season. In spring, traditional skin boats may be used when it is important to avoid noise. In the fall, wood, aluminum, and fiberglass boats are used because rougher seas and floating ice are more likely to be encountered, and because speed is needed to pursue whales successfully in open water (Galginaitis 2008). The AEWG requires that “traditional weapons” be used for whale hunting. However, they have broad authority in defining “traditional”, and may approve any weapon that improves the efficiency of the bowhead whale harvest (EDAW/AECOM 2007). Generally, black powder explosive bombs, darting guns, and lances are used in contemporary whaling. Other equipment used during bowhead whale hunting includes float-incorporated radio transmitters and portable receivers to locate struck and lost whales, butchering tools, sleds, stoves and lanterns, global positioning units, VHF radios, snow machines, and equipment for setting up and maintaining a camp (EDAW/AECOM 2007). Radio transmitters attached to floats, designed to locate struck and lost whales, are now rarely used and only in Kaktovik. Since 2001, the WIP Committee has concentrated

their work on the modification and development of the penthrite-loaded projectile for the hand-held darting gun. Field trials of the penthrite projectile continued in Barrow through 2004 and 2005. During the 2005 spring hunt, two whales were taken in Barrow with the penthrite projectile and modified darting gun. One whale, shot near the base of the skull on the left side, appeared to die “instantaneously”, supporting the thought that penthrite projectiles may improve the time to death and increase success (IWC 2008).

The butchering process can require 20-25 people, and it may take 6-7 hours to butcher an average sized whale. The whaling season is marked with several celebrations for the entire town, and most residents are involved in whaling activities to some extent, particularly in the smaller villages (EDAW/AECOM 2007). After the whale is butchered, it is stored in ice cellars or chest freezers, or in some communities such as Kaktovik, it may be stored in walk-in freezers provided by the oil and gas industry (EDAW/AECOM 2007).

In Barrow, whales begin to be spotted in the spring in mid-April (EDAW/AECOM 2007). Most of the annual whale harvest is taken during the spring season. Hunting is based from 30-40 whaling camps stationed along the edges of landfast ice, usually located south of Barrow. Hunting is conducted from umiaqs (open boats made of skin stretched over a wooden frame), and usually occurs 1-3 miles from shore in leads in the ice. In the fall, whaling may begin in mid-August, continuing into October. During this season, whaling is shore-based, with crews leaving from town daily rather than from camps. Aluminum skiffs with outboard motors are used because hunting takes place in open water. Crews may travel up to 30 miles per day, and towing a whale back to shore can take 12-14 hours (EDAW/AECOM 2007). Longer towing distances increases the risk to whalers and the potential for meat spoilage (EDAW/AECOM 2007).

Barrow hunting crews are generally composed of five to ten people, and may include people from other communities. In particular, Nuiqsut residents, who have close family ties to Barrow residents, participate in Barrow’s spring whale hunt (EDAW/AECOM 2007).

At Nuiqsut, whaling occurs from early September through mid or late September as bowhead whales migrate west (EDAW/AECOM 2007). Whaling is staged from Cross Island, a low sandy barrier island located about 100 miles by boat east of Nuiqsut near Prudhoe Bay (Table 5.8; Maps 4.5 and 4.6 in Chapter Four). The island is 3 miles long, but only about 150 yards wide. An area on the island was built up of gravel during exploratory oil and gas drilling and now provides a location for setting up a whaling camp and other land-based activities associated with whaling such as butchering. Whaling is conducted from open, motorized aluminum or fiberglass boats. Nuiqsut generally has three to five active whaling crews.

The oil and gas industry provides Nuiqsut whalers significant logistical support through a Conflict Avoidance Agreement (CAA), previously called the Oil/Whalers Agreement (EDAW/AECOM 2007). This logistical support includes low-cost conex units that are used as seasonal cabins; a diesel-powered winch and loader to haul whales to Cross Island and for maneuvering whales during the butchering process; assistance with reliable gasoline supplies; a generator system to supply electricity to cabins during the whaling season; diesel fuel; water and other supplies; transportation of butchered whale product to Nuiqsut; some phone service; assistance with mobilization and demobilization of the Cross Island camp; availability of an emergency system; and a communications system to coordinate whaling with oil and gas activities to minimize conflicts. Most of the funding for this logistical infrastructure comes from BP, ConocoPhillips, and Shell Oil (EDAW/AECOM 2007).

Transporting whale harvests from Cross Island to Nuiqsut poses significant challenges. In most whaling villages, the first part of the whale harvest is traditionally shared with the entire village (EDAW/AECOM 2007). Because of the distance involved with Nuiqsut whaling, the first part of butchered whale harvest is sent to Nuiqsut by air, which may be funded by AEWC or through the

CAA. Most of the remaining butchered whale product is taken to West Dock where it is stored at an Alaska Clean Seas cold storage facility. The harvest is then flown or barged to Nuiqsut. Some of the harvest may also be trucked from West Dock to Oliktok Point where it is picked up by Nuiqsut residents and transported by boat or snow machine to Nuiqsut. Most of these transportation costs are paid for by oil and gas companies through the CAA (EDAW/AECOM 2007).

In Kaktovik, whaling occurs in the fall, from late August through late September or early October (EDAW/AECOM 2007). The core whaling area stretches from the Okpilak and Hulahula rivers east to Tapkaurak Point. Whaling activities, which are staged from the village rather than from camps, use motorized boats. When a whaling crew is successful, the whale is towed back to Kaktovik for butchering. Because it takes so long to tow the whale, risk of spoilage can be significant. After the whale arrives in Kaktovik, heavy equipment is used to maneuver the it onto the beach, shift it during the butchering process, and transport the butchered meat to storage locations in the village (EDAW/AECOM 2007).

Up to 11 whaling captains operate in Kaktovik (EDAW/AECOM 2007). Most crews are composed of four to five crew members, and female family members sometimes participate on the crews. Although anyone from Kaktovik may join a whaling crew, most crews are based on kinship relationships. All crews work cooperatively in the whaling operations, and most people of the village participate in whaling activities in some role (EDAW/AECOM 2007).

About 83 percent of the Kaktovik harvest is taken during September (Galginaitis and Koski 2002). Kaktovik hunters use a core whaling area that extends from the Hulahula River in the west to Tapkaurak Point in the east and offshore as far as about 20 miles, although most whaling occurs within 12 miles of the village. The average distance of harvest locations from Kaktovik has not changed from the 1970s to present (Galginaitis and Koski 2002).

Because the Kaktovik harvest occurs in the fall, the village can often get unused strike quotas from spring whaling villages (EDAW/AECOM 2007). However, Kaktovik's quota of three whales usually provides enough meat for the entire village. Kaktovik residents trade whale meat for caribou from Anaktuvuk Pass residents.

Through general meetings of whaling captains the AEWC allocates the quota established by the IWC among the various whaling villages and also establishes the formal rules of the hunt in terms of allowable equipment and other general guidelines. The IWC determines the quotas on an annual basis and the AEWC determines and manages the distribution among villages. Whaling must cease whenever a number of whales landed or the number of strikes made reaches the specified number, whichever comes first (EDAW/AECOM 2007).

Alaska Native subsistence hunts take about 0.1-0.5 percent of the bowhead whale population annually (Angliss and Outlaw 2008). The number of whales landed at each village varies widely, and is influenced by village size, and ice and weather conditions. The size of whales landed also varies, probably due to differences in hunter selectivity and availability of whales (Angliss and Outlaw 2008). Canadian and Russian Natives also take some whales. From 1998-2008, an average of 24 bowhead whales were landed in Barrow, ranging from 16-29 (Table 5.9). The harvest averaged three whales at Nuiqsut, and three whales at Kaktovik. Additional whales were struck and lost but are not included in these statistics.

**Table 5.8. Use of Cross Island for whaling by Nuiqsut residents, 2001-2006.**

Year	Number of Active Whaling Crews	Number of Scouting Boats <sup>a</sup>	Average Number of People on Cross Island <sup>b</sup>
2001	4	7	28
2002	3	9	27
2003	4	10	20
2004	4	8	19
2005	5	8	30
2006	4	7	29

Notes: Cross Island is the primary staging location for whaling by Nuiqsut residents.

Source: Galginaitis 2008.

<sup>a</sup> Not all boats were used all the time.

<sup>b</sup> People involved with whaling activities.

**Beluga whales** are harvested for subsistence uses in the Beaufort Sea area. Subsistence hunting of beluga whales is managed cooperatively through an agreement between NMFS and the Alaska Beluga Whale Committee (ABWC) (NMFS 1999). ABWC represents Alaska Natives who subsistence hunt the eastern Bering, Bristol Bay, eastern Chukchi, and Beaufort Sea stocks of beluga whales. The ABWC also cooperates with Canadian subsistence hunters due to the fact that the Beaufort Sea stock’s habitat continues into Canadian territory. In addition, belugas from the eastern Chukchi Sea stock can also sometimes be found in the Beaufort Sea (NMFS 1997). Also represented on the ABWC are federal, state, and local governments, and beluga scientists. The purpose of the ABWC is to conserve beluga whale populations, protect subsistence hunting, promote research, and support provisions of the Marine Mammal Protection Act. The ABWC also obtains harvest information and biological samples (NMFS 1999).

From 1999-2003, 27-117 beluga whales of the Beaufort Sea stock were taken in subsistence hunts (Table 5.10). Subsistence harvest ranged from 24-66 during that period.

**Gray whales** of the eastern North Pacific stock were traditionally harvested by subsistence hunters in Alaska and Russia (Angliss and Outlaw 2008). This stock is now harvested in subsistence hunts by the Makah Tribe of Washington state and by the Chukotka people of Russia. In 1997, the IWC approved a 5-year quota for 1998-2002 of 620 gray whales, with an annual cap of 140, for aboriginals of Russia and the U.S. Makah Indian Tribe. The quota was shared, with an average annual quota of 120 whales for Russia and 4 whales for the Makah Indian Tribe (Angliss and Outlaw 2008). For 2008-2012, the quota is set at a total of up to 620 (total for the period), with no more than 140 whales harvested annually (IWC 2009a). The last harvest of gray whales in Alaska occurred in 1995 when two whales were harvested (Table 5.11 ;Angliss and Outlaw 2008).

**Table 5.9. Number of bowhead whales landed in Barrow, Nuiqsut, and Kaktovik, 1974-2007.**

Year	Barrow	Nuiqsut	Kaktovik	Year	Barrow	Nuiqsut	Kaktovik
1974	9	0	2	1991	12	1	2
1975	10	0	0	1992	22	2	3
1976	23	0	2	1993	23	3	3
1977	20	0	2	1994	16	0	3
1978	4	0	2	1995	19	4	4
1979	3	0	5	1996	24	2	1
1980	9	0	1	1997	30	3	4
1981	4	0	3	1998	25	4	3
1982	0	1	1	1999	24	3	3
1983	2	0	1	2000	18	4	3
1984	4	0	1	2001	27	3	4
1985	5	0	0	2002	22	4	3
1986	8	1	3	2003	16	4	3
1987	7	1	0	2004	21	3	3
1988	11	0	1	2005	29	1	3
1989	10	2	3	2006	22	4	3
1990	11	0	2	2007	20	3	3
				2008	21	4	3

Note: Includes only bowhead whales landed; additional whales may have been struck and lost.

Sources: Suydam and George 2004; Suydam et al. 2005-2007, 2008a-b.

**Table 5.10. Subsistence harvest of beluga whales of the Beaufort Sea stock, 1999-2003.**

Year	Reported total number taken	Reported number harvested	Estimated number struck and lost
1999	45+	35	10+
2000	117	66	51
2001	43	25	18
2002	27	24	3
2003	34	34	unknown

Source: 1999-2003 from Angliss and Outlaw 2008;

**Table 5.11. Subsistence harvest of gray whales by Alaska, Russia, and Makah Tribe (Washington state) Natives, 1995-2003.**

Year	Alaska	Russia	Makah Tribe
1995	2		
1996		43	
1997		79	
1999		121 <sup>a</sup>	1
2000		113 <sup>a</sup>	
2001		112	
2002		131	
2003		126 <sup>a</sup>	

Source: Angliss and Outlaw 2008.

<sup>a</sup> +2 struck and lost.

**iii. Seals**

At Barrow, bearded seals are an important subsistence resource because they are preferred for food, and they are also the preferred material for covering skin boats used in whaling (EDAW/AECOM 2007). Harvest of bearded seals usually takes place during the spring and summer from powerboats during the open water season (EDAW/AECOM 2007; Bacon et al. *Unpublished*), and while pursuing other marine mammals. Some Barrow hunters specialize in seal hunting based on sea ice, with peak hunting occurring in February (Bacon et al. *Unpublished*). At Barrow, 776 bearded seals, 413 ringed seals, and 12 spotted seals were harvested in 2003 (Table 5.12).

At Nuiqsut, ringed, spotted, and bearded seals are important subsistence resources. They are harvested along the coast, and offshore from Cape Halkett in the west to Foggy Island Bay in the east. In the spring, seals are shot in the water and on the ice edge. In the summer, ringed and spotted seals are harvested from powerboats in the Colville River as far south as Ocean Point (EDAW/AECOM 2007; Bacon et al. *Unpublished*). One bearded seal and 25 ringed seals were harvested from July 2000 through June 2001 (Table 5.12).

At Kaktovik, hunting for seals can occur throughout the year. Hunting for seals does not generally occur concurrently with whale hunting because Kaktovik hunters tend to focus on whaling during the whaling season (EDAW/AECOM 2007). Eight bearded seals and 17 ringed seals were harvested at Kaktovik from July 2002 through June 2003 (Table 5.12).

**iv. Walrus**

Harvest levels during the 1990s were lower than the 1980s, but it is unknown if the change is related to walrus abundance or hunting effort (Angliss and Outlaw 2008). Harvest levels may have been influenced by the cessation of Russian commercial walrus harvests after 1991, political, economic, and social conditions in Alaska and Chukotka, and weather and ice conditions. In 1997, subsistence hunters gained more participation in the conservation and management of walrus stocks in Alaska through a cooperative agreement between the USFWS and the Alaska Eskimo Walrus Commission (Angliss and Outlaw 2008).

In Barrow, harvest of walrus varies greatly from year to year depending on their abundance and distribution (Bacon et al. *Unpublished*). Since 1989, harvests have ranged from four walrus in 1994 to 51 walrus in 2003 (Table 5.13). Walrus harvests take place in June and July as they drift north

with the flow ice, and they are also harvested if the pack ice moves close enough to Barrow (EDAW/AECOM 2007).

Walrus are usually not available around Kaktovik, and Cross Island, although Nuiqsut residents sometimes travel to Barrow to harvest walrus (EDAW/AECOM 2007). From 1989-2008, only two walrus were harvested from Kaktovik, and none by Nuiqsut residents at Cross Island (USFWS 2009).

**Table 5.12. Estimated subsistence harvest and standard error (SE) of seals, by species, for Barrow, Nuiqsut, and Kaktovik.**

Species	Barrow 2003 <sup>a</sup>		Nuiqsut 2000-2001 <sup>b</sup>		Kaktovik 2002-2003 <sup>c</sup>
	Harvest	SE	Harvest	SE	Harvest
Bearded Seal	776	266	1	0	8
Ringed Seal	413	79	25	1	17
Spotted Seal	12	4			

Source: Bacon et al. *Unpublished*.

<sup>a</sup> Calendar year.

<sup>b</sup> July 2000 - June 2001.

<sup>c</sup> July 2002 - June 2003. No standard error (SE) because survey was a census.

**Table 5.13. Reported subsistence harvest of Pacific walrus in Barrow, 1989-2008.**

Year	Harvest	Year	Harvest
1989	12	1999	12
1990	7	2000	6
1991	22	2001	36
1992	7	2002	35
1993	7	2003	51
1994	4	2004	46
1995	5	2005	11
1996	13	2006	8
1997	37	2007	14
1998	25	2008	20

Notes: Only walrus for which the harvest date was known are included.

Source: USFWS 2009.

## 2. Sport Fishing

Sport fishing in the Beaufort Sea area is minimal, averaging less than 5,000 angler-days annually for the entire region, and most of that takes place on freshwaters outside the lease sale area (Table 5.14; Table 5.15). Sport fishing effort in saltwater averaged only 374 angler-days from 1998-2007 (Table 5.15).

Most sport harvest in the Beaufort Sea area is of Dolly Varden and Arctic grayling, with smaller harvests of salmon, lake trout, whitefish, northern pike, and burbot. Dolly Varden and Arctic char are grouped together for sport fishing regulatory purposes because of the difficulty in distinguishing the

species based on external characteristics (Scanlon 2008). Dolly Varden and Arctic char populations can generally support only low rates of exploitation. The Sagavanirktok River is one of the primary rivers for sport fishing for these species. Anglers access the Sagavanirktok River by the Dalton Highway which parallels much of the river. The Sagavanirktok River is the only specific location for which sport effort and harvest estimates are available: effort averaged 1,232 angler-days, harvest of Dolly Varden averaged 272 fish, and harvest of Arctic grayling averaged 205 fish from 1998-2007 (Table 5.16). Although the Sagavanirktok River flows into the Beaufort Sea, most of the river itself is outside the lease sale area.

Anglers also occasionally fish for Dolly Varden and Arctic char on the Anaktuvuk River, a tributary of the Colville River. These anglers are mainly Barrow residents who fly into the area and land at a nearby private airstrip. Some sport fishing occurs on the Kongakut River which is a destination for recreationists making float trips in the eastern part of the Alaska National Wildlife Refuge (Scanlon 2008).

Fishing effort and harvest of Arctic char, Dolly Varden, Arctic grayling, and lake trout were expected to increase when the entire Dalton Highway was opened to the public in 1994, and again when improvements were made to the road south of Atigun Pass in 2001 and 2002. However, effort and harvest statistics show that this has not occurred (Scanlon 2008; Table 5.14). Increases in catch and harvest are expected from increased visitors floating rivers of the Alaska National Wildlife Refuge, particularly the Kongakut, Hulahula, and Canning rivers (Scanlon 2008).

### **3. Commercial Fisheries**

There are no commercial fisheries for salmon on the North Slope (Scanlon 2008). A commercial fishery for whitefish on the Colville River dates from 1964 (Hayes et al. 2008). Fish are harvested with set gillnets under the ice. The fishery historically occurred during late June and July for broad and humpback whitefish, and October through early December for Arctic cisco and least cisco. Most fishing now occurs during October and November for Arctic cisco and least cisco. Some fish harvested under commercial permits are retained for subsistence.

Total harvest of all whitefish species from the Colville River ranged from 7,267 fish in 2004 to 36,038 fish in 1995 (Table 5.17). In 2007, a commercial whitefish permit was issued but no commercial sales were reported for the Colville River; in 2008, no commercial whitefish permits were issued (ADF&G 2008).

### **4. Sport Hunting and Trapping**

ADF&G manages and monitors sport harvest of wildlife in the Beaufort Sea area. Harvests are estimated by management year which is defined as July 1 through June 30, or by calendar year. ADF&G Game Management Unit 26 encompasses the terrestrial portion of the Beaufort Sea lease sale area as well as a large portion of land outside the lease sale area. Sport hunting of big game in Unit 26 occurs for brown bear, moose, muskox, sheep, wolf, and two caribou herds. The Teshekpuk herd occurs in Unit 26A, and the Central Arctic herd occurs in Units 26B and 26C. Sport harvest of most big game is low, averaging less than 100 animals annually, except for caribou for which harvest averaged almost 4,000 for the Teshekpuk herd and 687 for the Central Arctic herd (Table 5.18).

**Table 5.14. Sport fishing effort and harvest in the Beaufort Sea area, 1998-2007.**

Year	Anglers	Trips	Angler Days	Chinook Salmon	Pink Salmon	Coho Salmon	Lake Trout	Dolly Varden/ Arctic Char	Arctic Grayling	White-fish	Northern Pike	Burbot
1998	1,300	2,068	3,653	0	13	0	221	1,454	1,182	0	0	25
1999	1,044	3,344	5,230	0	0	0	77	929	1,206	68	0	0
2000	1,250	2,232	4,739	0	648	763	18	1,178	934	71	0	0
2001	865	3,817	6,032	0	0	0	37	1,589	846	26	0	18
2002	1,165	3,262	4,770	0	66	5	217	773	2,215	19	51	0
2003	834	1,756	2,710	0	49	0	98	193	1,122	304	22	22
2004	747	1,970	3,311	0	75	13	75	180	868	1,509	14	70
2005	1,469	2,085	4,352	0	0	0	96	493	1,313	0	32	0
2006	833	2,314	3,463	26	134	195	10	273	594	258	0	0
2007	907	2,975	4,154	0	0	0	0	151	572	0	0	0
Avg.	1,041	2,582	4,241	3	99	98	85	721	1,085	226	12	14

Source: Jennings et al. 2004, 2006a, b, 2007; *In prep.-a, b, c*

Notes: North Slope Brooks Range drainages (Statewide Harvest Survey Area Z), including all Alaskan waters, including drainages, north of the Brooks Range and flowing into the Beaufort and Chukchi Seas to the north and east of Point Hope. Does not include Point Hope. Includes waters outside the Beaufort Sea lease sale area.

**Table 5.15. Sport effort and harvest in saltwater, Beaufort Sea area, 1998-2007.**

Year	Anglers	Trips	Days	Chinook Salmon	Pink Salmon	Coho Salmon	Dolly Varden	Arctic Grayling	White-fish
1998	155	358	408	0	13	0	17	0	0
1999	119	319	403	0	0	0	176	0	68
2000	88	96	743	0	648	763	702	0	0
2001	86	508	635	0	0	0	238	17	0
2002	163	481	558	0	66	5	222	0	0
2003	48	76	82	0	49	0	0	0	0
2004	50	96	96	0	0	0	0	0	0
2005 <sup>a</sup>									
2006	87	358	359	26	134	195	38	290	0
2007	38	85	83	0	0	0	0	0	0
Avg.	93	264	374	3	101	107	155	34	8

<sup>a</sup> Too few surveys specific to saltwater were returned to make estimates in 2005.

Source: Jennings et al. 2004, 2006a, b, 2007; *In prep.-a, b, c*

Notes: Total saltwater (shore and boat fishing) of Statewide Harvest Survey Area Z (North Slope Brooks Range drainages).

**Table 5.16. Sport effort and harvest at the Sagavanirktok River, 1998-2007.**

Year	Anglers	Trips	Angler Days	Dolly Varden	Arctic Grayling	Burbot
1998	374	620	840	812	370	0
1999	367	1,844	2,055	330	181	0
2000	459	742	1,108	105	107	0
2001	359	1,615	2,537	757	206	7
2002	322	922	1,162	257	282	0
2003	242	375	423	0	163	22
2004	316	315	437	105	23	50
2005	614	535	1,042	51	354	0
2006 <sup>a</sup>						
2007	391	1,281	1,482	30	158	0
Average	383	917	1,232	272	205	9

<sup>a</sup> Too few surveys specific to the Sagavanirktok River were returned to make estimates in 2006.

Source: Jennings et al. 2004, 2006a, b, 2007; *In prep.*-a, b, c

Notes: The Sagavanirktok River drains into the Beaufort Sea, but most of the river itself is outside the lease sale area.

**Table 5.17. Commercial harvest and sales of freshwater whitefish, Colville River, 1995-2004.**

Year	Number of Whitefish Harvested Intended for Commercial Sale <sup>a</sup>				Estimated Commercial Sale Based on Fish Tickets <sup>b</sup>	
	Humpback Whitefish	Least Cisco ("herring")	Arctic Cisco ("kaktok")	Total	Arctic Cisco	Whitefish Species <sup>c</sup>
1995	33,794 <sup>d</sup>	-	-	33,794	13,921	6,000
1996	6,425 <sup>e</sup>	7,796	21,817	36,038	9,076	4,127
1997	1,721 <sup>e</sup>	10,754	9,403	21,878	9,403	4,760
1998	4,881 <sup>e</sup>	9,936	7,019	21,836	5,648	7,105
1999	6,875 <sup>e</sup>	7,430	8,832	23,137	7,095	6,170
2000	3,706 <sup>e</sup>	5,758	2,619	12,083	2,809	6,569
2001	6,078 <sup>e</sup>	2,839	1,740	10,657	1,779	7,306
2002	4,183 <sup>e</sup>	5,503	3,935	13,621	899	4,093
2003	6,463 <sup>e</sup>	4,777	5,627	16,867	0	1,292
2004	1,145 <sup>e</sup>	3,061	3,061	7,267	2,412 <sup>f</sup>	476

Source: Hayes et al. 2008.

Notes: dashes indicate information is not available.

a Reported on daily catch form returned to ADF&G. Catch reports were returned to the department following the fishing season. All fish reported on the catch report were harvested with the intent to sell.

b Fish tickets were often not generated at the time of sale. Since 1990, the commercial harvest is based on fish ticket information.

c Whitefish species include mostly humpback whitefish and least cisco with some broad whitefish.

d Humpback whitefish harvest includes undetermined amounts of broad whitefish, least cisco, and Arctic cisco.

e Humpback whitefish harvest includes undetermined amounts of broad whitefish.

f Mixed commercial harvest of mostly Arctic cisco along with humpback and broad whitefish, and least cisco. Estimated commercial harvest sales based on 1995 to 2001 combined average of \$1.07/lb. for whitefish species and Arctic cisco.

**Table 5.18. Sport harvest of big game in Game Management Unit 26, regulatory years 2002-2003 through 2006-2007.**

Regulatory Year	Species						
	Brown Bear	Caribou Herd		Moose	Muskox	Sheep	Wolf
		Teshekpuk <sup>a</sup>	Central Arctic <sup>b</sup>				
2002-2003	28	2,700	760	12	7	58	8
2003-2004	30	2,700	311	5	3	75	19
2004-2005	32	4,642	625	6	8	93	10
2005-2006	19	4,460	687	14	4	92	16
2006-2007	30	4,050	1,050	19	0	77	35
Average	28	3,710	687	11	4	79	18

<sup>a</sup> Game Management Unit 26A. Harvest for this herd was estimated by the area management biologist.

<sup>b</sup> Game Management Units 26B and 26C. The 2006-2007 harvest was estimated by the area management biologist.

Source: ADF&G 2007.

Notes: Most of these harvest totals do not include unreported harvest which may be substantial and can even exceed the reported harvest for certain caribou herds. In addition most harvest totals do not include harvest from federal hunts. Harvest estimates for the 2006-2007 regulatory year are considered preliminary.

## B. Oil and Gas

Oil and gas exploration, development, and production have been ongoing in the Beaufort Sea since the late 1970s. Chapter Six provides a detailed description of the history of the oil and gas industry on the North Slope and in the Beaufort Sea.

## C. Recreation and Tourism

The Beaufort Sea area is used relatively little for recreation and tourism. The attractions for this area are its unusual location, the northern lights, the dramatic contrast of a modern petroleum industry side-by-side with the Arctic wilderness, abundant wildlife, unique scenery, national parks and wildlife refuges, and the distinct Inupiat Eskimo culture (NSB *Undated*). However, the extreme climate, remote location, and distance from major tourism corridors that increase expense and time required to reach and travel within the region, are obstacles to increased recreation and tourism (NSB *Undated*).

Although the area is relatively undeveloped for tourism, most North Slope communities have hotel or lodge accommodations for guests, cafe or restaurant facilities, and local guide services (NSB *Undated*). Of the three communities along the Beaufort Sea, Barrow has relatively more infrastructure to support recreation and tourism. Northern Tours of Alaska has recently begun to offer daily flights and tours of Barrow during the summer months (Northern Alaska Tour Company 2009). Barrow is served by passenger jet service from Anchorage and Fairbanks (City of Barrow 2009). The community has phone, mail, a public radio station, Internet capability and cable TV (NSB *Undated*). Four hotels, eight restaurants, a dry cleaner, fur shop and a bank operate in Barrow, along with a grocery and merchandise store and three convenience stores. Visitors to Barrow can visit the Inupiat Heritage Center, which also offers them the opportunity to purchase Alaska Native



R. St. Amour, DCED

Inupiat Heritage Center, Barrow.

arts and crafts such as baleen boats, etched baleen, carved ivory, masks, parkas and fur mittens (City of Barrow 2009).

Cultural heritage tourism, wilderness adventure travel, and ecotourism offer the greatest potential for expanding tourism on the North Slope (NSB *Undated*). However, although the existing infrastructure may be able to support modest increases in the service industry, it probably cannot accommodate large increases in visitors (NSB *Undated*).

Visitor statistics specific to the communities of Barrow, Nuiqsut, and Kaktovik are limited. For the entire North Slope region, excluding Nome, an estimated 41,000 visitors came to the region in 2006 (McDowell Group 2007). Including Nome, visitors stayed in the region for an average of 6.1 nights, longer than most other Alaska destinations. These visitors' total stay in Alaska averaged 15.4 nights. Most (76 percent) visitors to the North Slope area came for vacation or pleasure. Visitors participated in a variety of activities: 52 percent purchased multi-day packages; 35 percent participated in an adventure tour package; 20 percent stayed at a wilderness lodge; 71 percent took part in wildlife viewing; 68 percent went shopping; 54 percent went on day cruises; 51 percent went sightseeing; 50 percent visited museums; and 38 percent participated in Native cultural tours and attractions (McDowell Group 2007).

Many visitors to the North Slope are adventure travelers seeking wilderness experiences such as camping, float trips, wildlife viewing, and sport fishing and hunting (NSB *Undated*). However, visitors also come on package tours that include the North Slope as an add-on to a primary itinerary such as an Alaska cruise. These visitors want to experience the area's unique geographical features, Native history and culture, and wildlife. The primary tours of this type are "Top of the World" tours to Barrow, an oil field tour to Prudhoe Bay, or a village tour (NSB *Undated*).

People visiting the North Slope region tend to differ from visitors to other parts of Alaska in several ways. North Slope visitors generally stay in Alaska almost a week longer than the average visitor, and they travel widely to other Alaskan destinations. They are relatively more likely to participate in Native cultural experiences and visit museums and historical attractions, and they are less likely to

sport fish or visit friends and relatives. Visitors to the North Slope come from all regions of the U.S. and other countries, they tend to be repeat visitors to Alaska, and they plan well in advance (McDowell Group 2007).

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