
This section describes the occurrence of the three ESA-listed species in the Plan Area, as well as general information for the entire North Slope. Additional information is available in recent EISs, environmental assessments, and planning documents, including the Liberty Development and Production Plan (MMS 2002b), the Beaufort Sea Oil and Gas Development/Northstar Project (USACE 1999), the Northeast National Petroleum Reserve-Alaska Final IAP/EIS (BLM and MMS 1998a), and the Environmental Report for the TAPS ROW Renewal (TAPS Owners 2001a).

3.3.5.1 Bowhead Whale

The bowhead whale is classified as endangered under the ESA and as depleted under the MMPA. The bowhead whale was listed as endangered in 1970, but no critical habitat has been designated for this species. Recently Sheldon et al. (2001) suggested that the Bering/Chukchi/Beaufort Sea (BCBS) stock of bowheads should be delisted under the ESA.

NORTH SLOPE

The BCBS stock of bowhead whales is the largest of the five stocks that occur in the Arctic and subarctic. The size of the stock was estimated at 10,400 to 23,000 animals in 1848, before commercial whaling decreased the stock to between 1,000 and 3,000 animals by 1914 (Woodby and Botkin 1993). This stock has slowly increased since 1921 when commercial whaling ended, and now numbers approximately 10,020 whales (George et al. 2003). The population has increased at an annual rate of 3.3 percent from 1978 to 2001 (George et al. 2002).

Bowhead whales occur in seasonally ice-covered seas, generally remaining close to the packice edge. Most of the BCBS bowheads winter in open water areas amid sea ice and along the edges of the pack ice in the western and central Bering Sea (Braham et al. 1984). BCBS bowheads are distributed in summer in a broad area from Amundsen Gulf and the Eastern Beaufort Sea to the eastern part of the East Siberian Sea.

MIGRATION

The spring migration typically begins in late March to early April, depending on ice conditions. During the spring migration, bowheads follow predictable leads that form along the coast of western Alaska to Point Barrow. From Point Barrow eastward to Amundsen Gulf, the leads and the migration occur farther from shore. From April to June most bowheads are distributed along a migration corridor that extends from their Bering Sea wintering grounds to their feeding grounds in the eastern Beaufort Sea (Moore and Reeves 1993). An unknown and probably variable number of bowhead whales could migrate westward to feeding grounds in the western Chukchi Sea (Bogoslovskaya et al. 1982).

BCBS bowheads migrate in pulses, which are groups migrating at different times (Ljungblad et al. 1986). Inupiat traditional knowledge (summarized in Braham et al. 1980) holds that the pulses are segregated by age and sex. The first two pulses are generally adults without calves or subadults, while cows with calves and large males do not arrive until the third and final pulse. The first migrants are usually seen near Point Barrow in mid-April but may arrive later in heavy ice years (Krogman et al. 1989). After passing Point Barrow, most of the bowheads travel east through offshore leads in the continuous pack ice to feeding grounds in the eastern Beaufort Sea (Richardson and Thomson 2002).

Bowheads that have summered in the eastern Beaufort Sea begin the fall migration in late August to September and are usually out of the Beaufort Sea by late October (Treacy 1988-1997, 2000, 2002a, 2002b; Moore and Reeves 1993). The fall migration route extends from the eastern Beaufort Sea, along the continental shelf across the Chukchi Sea, and down the coast of the Chukchi Peninsula (Moore and Reeves 1993). Bowheads often feed opportunistically during the westward migration, sometimes close to shore (Richardson and Thomson 2002; Treacy 2002b).

The bowhead migration route across the Chukchi Sea to the Chukchi Peninsula is less well defined than across the Beaufort Sea. Most whales swim southwest to the coast of Chukotka (Moore and Clarke 1990), but a few sightings north of 72°N suggest that some whales take a more northerly route, perhaps toward Herald and Wrangel islands (Braham et al. 1984).

FORAGING

Examination of stomach contents from whales taken in the Inupiat subsistence harvest indicates that bowhead whales feed on a variety of invertebrates and small fishes (Lowry 1993). A minimum of 62 species of animals were identified, with crustacean zooplankton, primarily copepods and euphausiids, being the most important foods of bowheads in Alaskan waters (Lowry 1993). Generally, bowheads feed preferentially in areas with a higher than average zooplankton concentration (Griffiths et al. 2002b). Bowheads feed throughout the water column in the Beaufort Sea (Würsig et al. 1985).

Feeding in BCBS bowheads appears to be concentrated in the Eastern Beaufort Sea (mostly in the Canadian Beaufort Sea) in the summer and in the Bering Sea in the winter (Würsig et al. 1985; Schell et al. 1987; Schell and Saupe 1993). They appear to feed only occasionally during the spring (Carroll et al. 1987) and fall (Richardson 1987; Richardson and Thomson, 2002) migrations, and it is unclear how important feeding during the migration is. Richardson and Thomson (2002) estimated that bowheads derive, on average, 2.4 percent of their annual energy requirements from the Eastern Alaska Beaufort Sea, where they spend relatively little time. However, the total contribution from this area is highly variable (from <2 percent to 16 percent), depending on the year and the individual whale. Several other aspects of bowhead whale foraging are described by Richardson and Thomson (2002).

REPRODUCTION

BCBS bowheads mate and calve during the spring migration from the Bering Sea to the Beaufort Sea (Nerini et al. 1984), although sexual activity has been observed as early as January and as late as October (Koski et al. 1993; Würsig et al. 1993). Female bowheads probably become sexually mature when they are approximately 13.5 to 14.0 meters long and males when they are 12 to 13 meters long (Koski et al. 1993). The calving interval for bowhead whales appears to be at least 3 years, but could be longer (Koski et al. 1993).

SURVIVAL AND MORTALITY

Commercial and subsistence whaling have been the greatest causes of bowhead mortality for the last several centuries. Currently, Alaskan Inupiat are allowed 67 strikes per year, which, if all were fatal, would result in 0.6 percent mortality of the stock from subsistence activity. The International Whaling Commission considers any strike to be fatal and counts the strike against the quota issued to Inupiat whalers. The Inupiat preferentially hunt immature whales (Philo et al. 1993c). Natural annual mortality in bowheads has been estimated at 3 to 7 percent (Breiwick et al. 1984; Chapman 1984), although it is difficult to estimate natural mortality since few bowheads that die of natural causes are seen.

PLAN AREA

Bowheads are not found in the immediate Plan Area. The residents of Nuiqsut hunt bowheads from camps on Cross Island east of the Plan Area during the fall migration (see Section 3.4.3).

During the spring migration eastward through the Beaufort Sea, the nearshore waters of Harrison Bay are completely ice-covered and bowheads are far offshore of the Colville River Delta following open leads in the sea ice. In years with heavy ice in the fall, bowheads are generally > 60 km offshore and in the years with light or moderate ice conditions bowheads generally occur >30 km from shore (CPAI 2002a, BLM and MMS 2003a).

During the fall migration, bowheads may occur closer to shore than during the spring migration, depending on ice conditions. During annual aerial surveys from 1987 to 2000 in the Beaufort Sea, a few bowheads were sighted in Harrison Bay, shoreward of a line between Oliktok Point and Cape Halkett (Treacy 1988, 1997, 2000, 2002a, 2002b). Other surveys have also shown that bowhead whales are rare nearshore in Harrison Bay and along the barrier islands east of the Colville River Delta (CPAI 2002a, Seaman et al. 1981, Moore and Reeves 1993). In years with light ice in the fall, surveys showed that bowheads occur in waters deeper than 10 meters (33 feet) (BLM and MMS 2003a, Miller, Elliot, and Richardson 1996). Other reports show bowheads are generally restricted to waters 60 feet (18 m) depth (CPAI 2002a, Seaman et al. 1981). The area offshore of the Plan Area is shallow, with the 30 foot depth contour more

than three miles offshore of the Colville Delta. The aerial survey data and preference for deeper water indicate that bowhead whales are unlikely to occur in the shallow nearshore areas north of the Plan Area.

3.3.5.2 Spectacled Eider

The spectacled eider was listed as a threatened species in May 1993 (58 FR 27474) under the ESA throughout their range in the United States and Russia. Areas in Alaska designated by the USFWS as critical habitat include molting areas at Norton Sound and at Ledyard Bay in the southeast Chukchi Sea, the wintering area south of St. Lawrence Island, and the Yukon-Kuskokwim Delta breeding area (66 FR 9146-9185). There are no critical habitats on the North Slope designated by the USFWS for this species.

NORTH SLOPE

POPULATION STATUS AND RANGE

The spectacled eider was listed as a threatened species because of significant declines in the North American breeding population, particularly on the Yukon-Kuskokwim (Y-K) Delta. From the early 1970s to the early 1990s, numbers of pairs on the Y-K Delta declined by 96 percent from 48,000 to 2,000, apparently stabilizing at that low level (Stehn et al. 1993; Ely et al. 1994). On the North Slope, the minimum population estimate of breeding spectacled eiders based on aerial surveys between 1993 and 2002 ranged from a high of almost 9,300 birds in 1993 to a low of 5,800 birds in 1996 and back up to 6,662 birds in 2002 (Larned et al. 2001a; Larned et al. 2003). A minimum (uncorrected for detection bias) long-term average (1992 to 2002) of 6,896 spectacled eiders occupied the surveyed portion of the Arctic Coastal Plain of Alaska (Larned et al. 2003), approximately 2 percent of the estimated 375,000 world population (Larned and Tiplady 1999). High-density nesting areas for spectacled eiders on the Arctic Coastal Plain are generally west of Dease Inlet (Figure 3.3.5.2-1). Nesting concentrations of spectacled eiders in the Plan Area are located in the Colville River Delta and south of Harrison Bay (Figure 3.3.5.2-1).

Most of the world spectacled eider population breeds in arctic Russia. Nonbreeders are not included in the Alaska estimate. They are assumed to remain at sea throughout the year until they attempt to breed at the ages of 2 to 3 years. The size of this population segment is unknown, as is their location during this period. Available life-history information for this species indicates they are long lived with relatively high adult survival and delayed sexual maturity. The North Slope population has shown a nonsignificant decreasing trend of approximately -1.26 percent (slope) from 1993 to 2002 with a corresponding mean growth rate of 0.99 (Larned et al. 2003). Additional details on population status and annual cycle may be found in Petersen et al. (2000).

During the nonbreeding season, from October/December to April, the only known spectacled eider wintering area is among leads in the pack ice southwest of St. Lawrence Island in the Bering Sea (Petersen et al. 1999). Eiders forage there principally by diving to obtain benthic invertebrates at varying depths less than 80 meters. In the marine environment, they feed primarily on clams, but also feed on snails, a variety of crustaceans, and members of various other taxa (Petersen et al. 2000). In recent studies in the northern Bering Sea wintering area, esophagi of sampled eiders contained only clams, mostly *Nuculana radiata*, with no trace of the once-dominant *Macoma calcarea* (Lovvorn et al. 2003). Changes in density of the latter species in the Bering Sea were coincident with an oceanic regime shift to warmer conditions.

Climate change at northern latitudes and associated changes in marine invertebrate communities and ice dynamics in spring may have had important impacts on the spectacled eider population, whose declines of 90 percent or more in western Alaska is essentially unexplained. Reasons for this decline are unknown but may be related to parasites and disease, subsistence harvest, predation, and potential alterations of Bering Sea food resources related to climatic regime shifts. Numerous studies have been conducted to investigate the potential effects of spent lead shot on the Y-K Delta spectacled eider population (Franson et al. 1995; Flint and Grand 1997; Flint et al. 1997; Flint 1998; Grand et al. 1998).

Because few eiders are observed in marine areas along the Beaufort Sea Coast in spring, a majority could migrate to the nesting areas overland from the Chukchi Sea (TERA 2002). Although their location during the 1 to 2 month

period between departure from the wintering area (April) and arrival in the breeding areas (early June) is unknown, it likely contains leads and polynyas nearest to the breeding areas (Lovvorn et al. 2003).

Routes traveled by spectacled eiders during spring migration are not well known. Generally, they have been recorded passing Point Barrow and/or arriving at the breeding areas in late May to early June (Johnson and Herter 1989). Although leads are important for many species migrating in this region, few spectacled eiders have been recorded using the lead system 5 to 6 km offshore extending eastward from Point Barrow (Woodby and Divoky 1982; Suydam et al. 2000). Suydam et al. (1997) recorded 55 spectacled eiders among 213,477 king and common eiders passing Point Barrow in spring 1994. Low numbers (0.5 to 0.7 birds per hour) have been recorded at several points in Simpson Lagoon (Johnson and Richardson 1981), but some of these probably were movements of local birds rather than migrants. Thus, because relatively few spectacled eiders are seen in marine areas, spring migration could be primarily overland from the Chukchi Sea (TERA 2002). Local observations that spectacled eiders flew inland north of Wainwright, reported by Myres (1958), support this view. They arrive on the breeding areas paired, often traveling in small flocks in late May and early June. Spectacled eiders have been observed to fly generally at altitudes less than 50 meters when over (marine) water (Petersen et al. 2000).

HABITAT

Spectacled eiders use a variety of habitats on the North Slope including the Plan Area. The USFWS identified five primary constituent elements considered to be important to this threatened species that could require special management considerations or protection: (1) all deep water bodies; (2) all water bodies that are part of basin wetland complexes; (3) all permanently flooded wetlands containing either *Carex aquatilis*, *Arctophila fulva*, or both; (4) all habitat immediately adjacent to these habitat types; and (5) all marine waters out to 25 miles from shore, the associated aquatic flora and fauna in the water column, and the underlying benthic community (65 FR 6114). However, large-scale landscape features that provide protection from predators such as the arctic fox could be more important indicators of nesting habitat than small-scale habitat features (Pearce et al. 1998).

NESTING, BROOD-REARING, STAGING, AND FALL MIGRATION

Currently the known primary nesting grounds are the Y-K Delta, the Arctic Coastal Plain (Kasegaluk Lagoon to the Sagavanirktok River) of Alaska, and in the Chaun Gulf and the Kolyma, Indigirka, and Yana river deltas of arctic Russia. With the exception of a few scattered areas in the Northwest National Petroleum Reserve-Alaska, spectacled eiders occur at low density on the Arctic Coastal Plain (Larned et al. 2001a, b; Ritchie and King 2002). The highest densities determined from FWS aerial surveys in 1998 to 2001 were found within 70 km of the coast between Barrow and Wainwright, with smaller areas northeast of Teshekpuk Lake (Figure 3.3.5.2-1). Overall density was determined to be 0.24 birds per km² in the Eider Survey area, based on observations of 304 birds in 2001 (Larned et al. 2001a, b), and 0.22 in 2002 (Larned et al. 2003). Before nesting, eiders occupy a variety of wetland and aquatic habitats (Anderson et al. 1996). Available information suggests female spectacled eiders return to the vicinity of previous nests. Spectacled eiders are dispersed nesters (Derksen et al. 1981; Warnock and Troy 1992), occurring at a low density of 0.03 to 0.79 birds per km² (Larned and Balogh 1997) within approximately 70 km of the coast. Higher density nesting and broodrearing areas occur south of Peard Bay, including the Kugrua and Kungok river drainages, south of Barrow; and adjacent to Dease Inlet, including the Meade, Chip, and Inaru river drainages. Tundra-nesting habitat most often includes extensive wetlands (large shallow lakes, lake-basin wetland complexes) with emergent sedges and grasses and vegetated islands (Larned and Balogh 1997; Anderson et al. 1996). On the Colville River Delta, nearly half of the nests located were in salt-killed tundra and aquatic sedge with deep polygons (ABR, Inc. 2002). On the Arctic Coastal Plain, nesting begins in mid-June. Incubation lasts 20 to 25 days (Dau 1974; Kondratev and Zadorina 1992; Harwood and Moran 1993; Moran and Harwood 1994; Moran 1995), and eggs hatch from mid- to late July (Warnock and Troy 1992). Broodrearing in the central Arctic Coastal Plain occurs primarily in waterbodies with margins of emergent grasses and sedges, basin wetlands, and deeper lakes (ARCO Alaska, Inc. et al. 1997). Fledging occurs approximately 50 days posthatch.

On the nesting grounds, spectacled eiders occupy terrestrial wetlands and feed primarily by dabbling in shallow freshwater or brackish ponds, or on flooded tundra (Dau 1974; Kistchinski and Flint 1974). Food items include

mollusks; insect larvae such as crane flies, trichopterans, and chironomids; small, freshwater crustaceans; and plants or seeds (Cottam 1939; Dau 1974; Kistchinski and Flint 1974; Kondratev and Zadorina 1992; Petersen et al. 2000).

Most male spectacled eiders depart the nesting areas from early June to early July (median date June 22 \pm 11 days) typically soon after females begin incubating. The number of pairs peaks in mid-June, and the number of males declines 4 to 5 days later (Anderson and Cooper 1994; Anderson et al. 1995; Smith et al. 1994). Males migrate a median distance of 6.6 km (average 10.1 km) offshore, spending up to a week in marine waters (Petersen et al. 1999a). Locations of satellite-transmitter-equipped males (Petersen et al. 1995) in the Beaufort Sea have been primarily in the western Harrison Bay and western Simpson Lagoon areas. A molt-migration is undertaken to Ledyard Bay molting area along the Chukchi Sea Coast southwest of Point Lay (Larned et al. 1995), and flocks of molting and staging eiders have been observed in Peard Bay, Norton Sound, south of St. Lawrence Island, and the Russian Far East prior to moving to the Bering Sea wintering area from October to December. Initial locations for many of the birds that were captured initially in the Prudhoe Bay area have been in the Chukchi Sea, suggesting they migrated overland or occupied the Beaufort Sea only briefly (TERA 2002). Although most males might make relatively little use of the Beaufort Sea prior to their molt-migration, at least in part due to the existence of little open-water habitat this early in the summer (TERA 2002), for some individuals the Beaufort Sea could be an important staging and migration route for as much as a week or two (Petersen et al. 1999a).

After nesting, most spectacled eider females with broods occupy coastal plain lakes with emergent grasses and sedges, or deep, open-water lakes. Departure from broodrearing sites for marine areas takes place on average August 29 (\pm 10.5 days). However, departure of females takes place over an extended period from the third week of June through September, because females that fail to breed leave the nesting area early, those that lose their nests leave somewhat later, and those that lose broods leave still later (TERA 2002). When females depart the Arctic Coastal Plain, much more of the nearshore zone is ice free than when males depart; this open water in marine habitat allows extensive use of the western Beaufort Sea. Locations of females equipped with satellite transmitters in the Prudhoe Bay area indicate they stage and migrate in the Beaufort Sea and, like some males, use Smith and Harrison bays. Aerial surveys in late August 1999 recorded four spectacled eiders, a female with two young and an individual of unspecified sex in western Harrison Bay (Stehn and Platte 2000). In 2000, 13 female spectacled eiders tracked via satellite telemetry primarily used the western Beaufort (71 percent of all bird-days); however, areas near Stockton Island also were used extensively (17 percent of all bird-days) (Troy 2003). Half the tagged Prudhoe females were relocated twice in the Beaufort Sea, indicating a residence time of at least 4 days. Most previously were thought to spend relatively little time in the Beaufort (TERA 2002); however, these recent satellite-transmitter locations suggest they could remain in the Beaufort Sea for approximately 2 weeks (range 6 to 30 days) (Troy 2003). Although satellite-tagged females have been relocated more than 40 km offshore in the Beaufort Sea (TERA 2002), the median distance for migrating individuals is 16.5 km offshore (average 21.8 km) (Petersen et al. 1999a).

Numbers of spectacled eiders staging in the Beaufort Sea before southward migration generally are unknown. It is likely that relatively few birds occupy this area at any given time. This is suggested by relatively low numbers of birds counted on offshore aerial surveys (estimated densities of 0.01 to 0.16 birds per km²) (Fischer 2001; Stehn and Platte 2000), as well as by the relatively low proportion of initial and repeat locations in the Beaufort Sea (once movement of an individual began) of transmitter-equipped birds that were captured initially in the central Beaufort Sea area. Aerial surveys in the central Beaufort Sea in July 2000 located 143 eiders in the deeper waters of Harrison Bay, including one flock of 100 birds (Fischer et al. 2002). A less intensive USFWS survey (flight lines twice as far apart), covering the entire Beaufort coastline from Point Barrow to Demarcation Point in July 2001, located 15 spectacled eiders off western Simpson Lagoon, in outer Smith Bay, and off the Plover Islands east of Point Barrow (Fig. 3.3.5.2-1) (Fischer 2001). These studies suggest that relatively low numbers of spectacled eiders would be expected to be found in either Beaufort or Chukchi seas during the staging/migration period from late June to September. However, these observations could underestimate numbers, because the limited aerial surveys could not accurately assess use of the entire area, and a substantial proportion of the “unidentified” eiders could have been spectacled. Observations made offshore in the Beaufort Sea by Divoky (1984) suggested that larger flocks might contain hundreds of individuals of this species. Divoky found the largest sitting flocks to contain more than 100 birds and flying flocks more than 300 individuals. During a late June to early July aerial survey in the Chukchi Sea between Peard Bay and Smith Bay, Dau and Anderson (2001) observed 40 spectacled eiders in nearshore waters. In 2002, they observed 10 in this area (Dau and Anderson 2001), and Dau and Hodges (2003) observed 1 in 2003.

PLAN AREA

POPULATION STATUS AND RANGE

A minimum estimated population of 7,149 spectacled eiders were on the Arctic Coastal Plain during 2003 (Larned et al. 2003b). An estimated 92 spectacled eiders used the Plan Area during 2003 (Colville River Delta extrapolated based on reported densities of 0.07 and 0.04 birds/km² [Johnson et al. 2004] and the National Petroleum Reserve-Alaska extrapolated based on a reported density of 0.02 birds/km² [Johnson et al. 2004]). Similar to the trend on the Arctic Coastal Plain, the numbers of nesting spectacled eiders in the Kuparuk oilfield area, just east of the Colville River Delta and the National Petroleum Reserve-Alaska, has remained relatively constant from 1993 to 2003 (Anderson et al. 2003). In contrast, numbers of spectacled eiders in the northeastern portion of the Colville River Delta declined by about 90 percent from 1987 to the mid-1990s (Helmericks 2004).

Spectacled eiders are found throughout the Colville River Delta from late May to early June (Figure 3.3.5.2-2), but most nesting and brood-rearing has been concentrated in the northwest portion of the outer Delta in recent years (Figure 3.3.5.2-3). Studies in Colville River Delta between 1996 and 2003 indicate that spectacled eiders nest primarily on the outer Delta (Figure 3.3.5.2-2) (PAI 2002a; Johnson et al. 2003a, 2004; Burgess et al. 2003a). Spectacled eiders nested historically in the Anachlik Colony and on Dune Island just east of the mouth of the Miluveach River (Helmericks 2004). Spectacled eider surveys during mid June 1993 to 2003 in the National Petroleum Reserve-Alaska portion of the Plan Area indicated that fewer eiders used this area than use the Colville River Delta (Figure 3.3.5.2-4). Spectacled eider nests have been located during ground-based searches at CD-5 (Figure 3.3.5.2-5). Eiders are harvested in the Colville River Delta (28 percent of eider harvest) during spring subsistence hunting primarily using boats to access the Delta and Harrison Bay (Figure 3.4.3.2-18).

NESTING, BROOD-REARING, AND STAGING

Pre-nesting eiders preferred Brackish Water, Salt Marsh, Salt-Killed Tundra, Deep Open Water with Islands, Shallow Open Water with Islands, and Aquatic Sedge Marsh with Deep Polygons in the Colville River Delta (Johnson et al. 2004). Nesting habitats used in the Colville River Delta (greater than or equal to 10 percent of observations) were Aquatic Sedge with Deep Polygons, Unpatterned and Patterned Wet Meadows (Johnson et al. 2004). Nesting habitats historically used in the Anachlik Colony area were Aquatic Sedge with Deep Polygons, Non-patterned Wet Meadow, and Patterned Wet Meadow (Helmericks 2004). Pre-nesting eiders preferred Salt Marsh, Shallow Open Water with Islands and Old Basin Wetland Complex and avoided Moist Tussock Tundra habitats within the portion of the proposed development in the National Petroleum Reserve-Alaska (Johnson et al. 2004). Nesting habitats used in the National Petroleum Reserve-Alaska were Deep Open Water with Islands, Shallow Open Water with Islands, Old Basin Wetland Complex, and Patterned Wet Meadow (Johnson et al. 2004).

Male spectacled eiders begin molt migrations during late June, with few birds (29 percent) using the nearshore Beaufort Sea during molt-migration (Troy 2003). Male spectacled eiders spent a median of 10 days using the area of river discharge offshore of the Colville River Delta (Troy 2003). Female spectacled eiders move from tundra to marine waters in mid to late July, with all females using the Beaufort Sea for an average of almost two weeks, although few remained in the Colville River Delta area for more than a few days (Troy 2003). Few flocks of spectacled eiders were reported during summer offshore surveys between Cape Halkett and Brownlow Point; however, densities were highest in the deep and shallow water Harrison Bay areas in July 2000 and August 2000 (Figure 3.3.5.2-1) (Fischer et al. 2002). Flock sizes ranged from 1 to 100 birds, with the largest flocks in the deep areas of Harrison Bay (Fischer et al. 2002).

The proposed CD-3 area is in the outer Colville River Delta that is used most heavily by spectacled eiders (Johnson et al. 2003b). This area supports some of the highest densities of pre-nesting, nesting, and brood-rearing spectacled eiders in the Colville River Delta (Figure 3.3.5.2-2 and 3.3.5.2-3) (Johnson et al. 2003b, 2004). During pre-nesting, densities of spectacled eiders in the CD-3 area in 2002 (0.20 indicated birds/km²) (Johnson et al. 2003b) were comparable to densities recorded across the Arctic Coastal Plain (0.23 indicated birds/km²) (Larned et al. 2003). Spectacled eiders were reported in 14 of 21 habitats available during the pre-nesting period. 7 to 14 spectacled eider nests were found during nest searches in the proposed CD-3 area during 2000 to 2002, with a mean density of 0.6

nest/km² (Johnson et al. 2003b). A total of 10 nests had been found during ground searches of this area conducted in four previous years (Johnson et al. 2003b). Nests were found in most of the habitat types used during pre-nesting, with 39 percent of all nests in Salt-Killed Tundra, 21 percent in Aquatic Sedge with Deep Polygons, 18 percent in Patterned Wet Meadow, and 11 percent in Nonpatterned Wet Meadow. Surveys for spectacled eider broods have been conducted with less intensity than other surveys, but eiders use the same areas of the Colville River Delta during brood-rearing as during pre-nesting and nesting.

Studies in the CD-4 area in the inner Colville River Delta, as well as CD-5, CD-6, and CD-7 in the National Petroleum Reserve-Alaska, indicate much lower use of these areas by spectacled eiders during pre-nesting, nesting, and brood-rearing periods (Table 3.3.5-1) (Burgess et al. 2003a, 2003b, Johnson et al. 2004). The density of pre-nesting spectacled eiders in the CD-4 area averaged less than 0.01 indicated birds/km². The density of pre-nesting spectacled eiders in the National Petroleum Reserve-Alaska study area (0.02 to 0.04 indicated birds/km²) was 25 to 50 percent of the density in the Kuparuk Oilfield and 10 to 20 percent of the density in the CD-3 area (Burgess et al. 2003b). One nest has been found each year in the CD-4 area for 2 of 3 years of nest searching (Burgess et al. 2003a). Seven nests were found at the National Petroleum Reserve-Alaska sites, four nests at CD-5 in 2002 and 2003, and three nests in a wetland basin in the northwest corner of the National Petroleum Reserve-Alaska study area during 2001 (Figure 3.3.5.2-5) (Burgess et al. 2003b; Johnson et al. 2004). One spectacled eider brood was observed in the National Petroleum Reserve-Alaska area northeast of CD-7 (Figure 3.3.5.2-5) (Burgess et al. 2003b; Johnson et al. 2004).

**TABLE 3.3.5-1 GROUND-BASED SPECTACLED EIDER NEST DENSITIES (NEST/KM²)
IN THE PLAN AREA**

		CD North	CD South	Alpine West	Lookout	Spark	
Spectacled Eider	Alpine (6-year mean)	CD-3 (4-year mean)	CD-4 (3-year mean)	CD-5 (2-year mean)	CD-6 (2-year mean)	CD-7 (2-year mean)	National Petroleum Reserve-Alaska Area (2003)
Nest Densities							
2000		1.1	0.2				
2001		0.4	0.1				
2002		0.4	0	0.2	0	0	
2003		0.7		0.2	0	0	0.1
Average	0.04	0.65	0.09	0.21	0	0	0.1

3.3.5.3 Steller's Eider

The Alaska breeding population of Steller's eider was listed as threatened on June 11, 1997 (62 FR 31748-31757). Historically, this species nested throughout much of western and northern coastal Alaska and in arctic Russia (Kertell 1991; Quakenbush and Cochrane 1993). However, the principal nesting areas now are in arctic Russia, with relatively few Steller's eider nests in Alaska on either the Arctic Coastal Plain or the Y-K Delta (Kertell 1991; Quakenbush and Cochrane 1993; Flint and Herzog 1999). Estimates of nesting Steller's eiders are complicated by the association of nesting with high lemming years (Quakenbush and Suydam 1999), but the numbers of Steller's eiders nesting in Alaska during suitable years is probably on the order of hundreds to 1,000 (Larned et al. 2003).

Areas in Alaska designated by the USFWS as critical habitat for the Alaska-breeding population of Steller's eiders include breeding habitat on the Y-K Delta and molting, wintering and spring staging habitats in marine waters including the Kuskokwim Shoals, Seal Islands, Nelson Lagoon and Izembek Lagoon (66 FR 8849-8884). There are no critical habitats on the North Slope designated by the USFWS for this species.

NORTH SLOPE

POPULATION STATUS AND RANGE

The Alaska-breeding population of Steller's eider was listed as threatened based on a substantial decrease in the species' nesting range in Alaska, a reduction in the number of Steller's eiders nesting in Alaska, and the resulting increased vulnerability of the remaining breeding population to extirpation. Historically, Steller's eiders nested in Alaska in two general regions: western Alaska where the species has been nearly extirpated, and the Arctic Coastal Plain where the species still occurs. In western Alaska, Steller's eiders occurred primarily in the coastal fringe of the Y-K Delta where the species was common at some sites in the 1920s, was still present in the 1960s, but was not recorded as breeding from 1976 to 1994 (Kertell 1991; Flint and Herzog 1999). In 1994 and 1996 to 1998, one to two nests were found at either or both the Tutakoke River and Hock Slough study sites on the Y-K Delta (Flint and Herzog 1999).

On the Arctic Coastal Plain, Steller's eiders historically occurred from Wainwright east, to nearly the United States-Canada border (Brooks 1915). The species might have abandoned the eastern Arctic Coastal Plain in recent decades, but it still occurs at low densities (0.01 per km²) (Larned et al. 2001a; Larned et al. 2003) from Wainwright to at least as far east as Prudhoe Bay (Fig. 3.3.5.3-1). The majority of sightings in the last decade have occurred east of Point Lay, west of Nuiqsut, and within 90 km (56 miles) of the coast (Barrow Triangle). Near Barrow, Steller's eiders still occur regularly, although they do not nest annually. In some years, up to several dozen pairs could breed in a few square km. The species has been found at highest density (0 to 3.0 pairs per km²) during road surveys in the core nesting area near Barrow (Quakenbush, et al. 1995). Intensive aerial surveys in the area between Admiralty Bay and the Chukchi Sea from 1999 to 2001 recorded densities of 0.02 to 0.08 birds per square kilometer (44-112 birds observed during 3 years) (Ritchie and King 2002). In 2002 and 2003, respectively, these investigators recorded an indicated total of 4 birds and 8 birds and a density of less than 0.01 birds per km² (Ritchie and King 2003).

Contemporary aerial breeding-pair surveys conducted in late June indicate a population averaging approximately 1,000 birds from 1986 to 2000 (Mallek 2001). A separate set of aerial surveys, timed in mid-June, indicates a smaller population, averaging approximately 200 birds from 1993 to 2001 (Larned et al. 2001a). These surveys likely underestimate actual population size because an unknown proportion of birds are missed when counting from aircraft, and no species-specific correction factor has been developed and applied. Nonetheless, these observations indicate that hundreds or low thousands of Steller's eiders occur on the Arctic Coastal Plain. These surveys do not demonstrate a significant population trend over the last decade. However, based on the observed interannual variability, it is estimated that it would take 14 years to detect a trend equivalent to a 50 percent change over 10 years (Larned et al. 2001b). Current sampling intensity is too low to provide useful trend data for this very rare species. There is some support for the hypothesis that Steller's eiders have abandoned formerly occupied areas and have reduced their breeding frequency in eastern portions of the Arctic Coastal Plain; if true, this likely indicates that the Alaska breeding population is in decline (Quakenbush et al. 2002).

Steller's eiders spend most of the year in marine habitats. During winter, most of the Steller's eiders concentrate along the Alaska Peninsula from the eastern Aleutian Islands to southern Cook Inlet in shallow, nearshore marine waters (Jones 1965; Petersen 1980). They also occur in the western Aleutian Islands and along the Pacific coast, occasionally to British Columbia, along the Asian coast (from the Commander Islands to the Kuril Islands), and some are found along the north Siberian coast west to the Baltic States and Scandinavia (Palmer 1976; Cramp et al. 1977). In spring, large numbers concentrate in Bristol Bay before migration; in 1992, an estimated 138,000 Steller's eiders congregated there before sea-ice conditions allowed movement northward (Larned et al. 1994).

NESTING HABITAT

In arctic Alaska, Steller's eiders nest and raise broods in areas dominated by low-centered polygons and shallow ponds with emergent grasses and sedges, wet sedge meadows, lakes, and lake basins (Fredrickson 2001). The presence of emergent plants seems to be important to brood-rearing Steller's eiders (Quakenbush and Cochrane 1993). In the Barrow area, water bodies with pendant grass (*Arctophila fulva*) had considerable use by Steller's

TABLE 3.4.1-1 SUMMARY OF SOCIOECONOMIC CHARACTERISTICS

	Population	Median Age	Native Residents	Average Household Size	Per Capita Income	Families in Poverty Status	Households Earning <\$25,000/year
State of Alaska	626,932	32.4	15.6 %	2.74	\$22,660	6.7 %	20.9 %
NSB	7,385	27.0	68.4 %	3.45	\$20,540	8.6 %	17.3 %
Barrow	4,581	28.8	57.2 %	3.27	\$22,902	7.7 %	16.9 %
Nuiqsut	433	23.8	88.2 %	3.93	\$14,876	3.2 %	14.2 %
Atqasuk	228	26.3	94.3 %	4.15	\$14,732	25.0 %	19.6 %
Anaktuvuk Pass	302	25.7	87.6 %	3.36	\$15,283	3.2 %	11.1 %

Source: U.S. Bureau of the Census, Census 2000

Figure 3.4.1.6-1, North Slope Employment By Sector for 2001, shows North Slope employment for 2001, which is the most recent year available, by nine employment sectors. This employment profile includes all wage employment within the NSB and includes both residents and nonresident workers. The largest employment sector for the NSB is mining, which consists almost entirely of oil and gas production. This sector accounts for 46.2 percent of total employment. The next largest sector is government, with 22.5 percent of total jobs. The service sector is the third largest, with 11.3 percent. Trade accounts for 6.3 percent of jobs, while the combined transportation/communications/utilities sector accounts for 5.2 percent of total North Slope employment. Construction accounts for 6.4 percent, and the combined sector of financial/insurance/real estate accounts for 2 percent. Manufacturing is the smallest sector, accounting for 0.1 percent of total jobs. This employment profile is very different from the State of Alaska as a whole, where mining accounts for only 3.9 percent of total jobs (Bureau of the Census 2003) and the largest sectors are government at 27.1 percent and services at 25.2 percent.

The combined communities of Anaktuvuk Pass, Atqasuk, Barrow, and Nuiqsut had a workforce of 2,929, or 77 percent of the total NSB workforce. Nuiqsut, the one community within the Plan Area, had 176 workers, or approximately 5 percent of the regional workforce. The overall composition of the local workforce is shown in Table 3.4.1-2.

TABLE 3.4.1-2 LABOR WORKFORCE BY COMMUNITY – 1998

Employment Status	Total NSB Labor Force	Anaktuvuk Pass	Atqasuk	Barrow	Nuiqsut
Labor Force	3,823	147	98	2,508	176
Permanent/ Full-time	2,114	58	45	1,565	85
Temporary/ Seasonal	523	21	11	287	56
Part-time	222	12	8	91	13

Source: NSB, 1999.

According to State figures, unemployment in the NSB ranged from 3.5 to 9.4 percent during the period of 1975 to 2001 (www.labor.state.ak.us/research). The rate of unemployment for the NSB workforce in 1998 is shown in Table 3.4.1-3. Table 3.4.1-3 shows that within the NSB, unemployment ranges from a low of 7 percent at Anaktuvuk Pass to a high of 40 percent at Atqasuk. The unemployment rate for three of the four communities was less than the overall rate for the NSB, which was 16 percent. These rates of unemployment were considerably higher than the overall State of Alaska unemployment rate.

that the statewide average. The percentage of households earning less than \$25,000 was less than both the statewide and NSB averages.

Barrow is the economic hub of the NSB. In 2000, total employment in Barrow was 1,986 jobs. State, local, and federal government workers accounted for 1,176 jobs, or 59.2 percent of the total. As shown in Table 3.4.1-3, unemployment in Barrow was 10 percent in 1998. While Barrow had an unemployment rate similar to that of Nuiqsut (10 percent) and somewhat higher than Anaktuvuk Pass, it had a much lower underemployment rate than Atqasuk and the NSB as a whole.

ATQASUK

Atqasuk is a traditional Inupiat village approximately 60 miles south of Barrow on the Meade River. Atqasuk's inland location dictates its subsistence preferences, with caribou and fish being the primary subsistence resources. Social ties between Barrow and Atqasuk remain strong, with men from Atqasuk traveling to Barrow to join bowhead-whaling crews. Atqasuk has largely avoided the rapid social and economic changes experienced by Barrow and Nuiqsut brought on by oil development activities, but future change could accelerate as a result of oil exploration and development in the Northwest National Petroleum Reserve-Alaska Planning Area.

The community was repopulated after declining to zero residents in the 1970 census. In 1980, there were 107 residents; the population increased to 216 residents in 1990 and 228 in 2000. Figure 3.4.1.7-1 shows population growth at a rate similar to that of Barrow and Nuiqsut during the period of 1980 to 1990. However, after 1990, growth slowed considerably.

Table 3.4.1-1 shows selected socioeconomic characteristics for Atqasuk. In 2000, the average per capita income for Atqasuk was \$14,732, approximately two-thirds that of the State of Alaska and the rest of the NSB. The median age for Atqasuk residents was 26.3, approximately 6 years younger than the state average but similar to the NSB as a whole. Average household size was 4.15, which was larger than the state average but about the same as the NSB. The percentage of households in poverty status was 25 percent, and 19.6 percent of households earned less than \$25,000 per year. The household poverty rate was three times the NSB average and four times the statewide average. The percentage of households earning less than \$25,000 was less than both the statewide and NSB averages.

Atqasuk had the smallest labor force of the four communities, with only 98 workers. Both the unemployment and underemployment rates in the workforce were the highest of the four communities. Unemployment was 40 percent in 1998 compared to the NSB average of 16 percent, and underemployment was 44 percent.

ANAKTUVUK PASS

Anaktuvuk Pass is a traditional Inupiat village, situated in the central Brooks Range on a divide between the John River and the Anaktuvuk River. Its elevation is 2,200 feet. The community has limited employment opportunity because of its remote location. A high proportion of residents participate in subsistence activities, and caribou is the primary source of meat. Population figures before 1950 show no residents in Anaktuvuk Pass. In 1949, several families returned to repopulate the community.

Table 3.4.1-1 shows selected socioeconomic characteristics for Anaktuvuk Pass. In 2000, the average per capita income for Anaktuvuk Pass was \$15,283, approximately two-thirds that of the State of Alaska and the rest of the NSB. The median age for Anaktuvuk Pass residents was 25.7, approximately 6 years younger than the state average but similar to the NSB as a whole. Average household size was 3.36, larger than the state average but about the same as the NSB. The percentage of households in poverty status was 3.2 percent, and 11.1 percent of households earned less than \$25,000 per year. The household poverty rate was less than one-half the NSB average and approximately one-half the statewide average. The percentage of households earning less than \$25,000 was significantly lower than both the statewide and NSB averages.

Total employment (full-time, temporary, and part-time) in Anaktuvuk Pass is 91 out of the potential workforce of 147. The largest employment category is for government workers, with 69 jobs.

3.4.2 Regional Economy

The economic characteristics of the communities closest to the Plan Area have been described in Section 3.4.1 Socio-Cultural Resources. This section describes the relationship of the oil and gas industry to the North Slope economy, the economy of the State of Alaska, and the nation's economy.

3.4.2.1 Role of Oil Production

Economic activity generated by North Slope crude oil production, transportation, and marketing is the largest sector of the North Slope economy, the second largest sector of the Alaskan economy (after government expenditures), and is an essential element of the national economy.

Oil production from North Slope fields offsets imports of foreign oil and generates substantial tax revenues and royalties for federal and state governments. In addition, North Slope oil supports the marine tanker transportation sector of the economy, since the vast majority of Alaskan oil is delivered to west coast United States ports for refining and distribution.

The United States was able to satisfy domestic demand for oil from domestic supplies until 1950, when the country became a net oil importer. With the continued growth in crude oil demand, dependence on foreign oil has increased; the United States now relies on imported sources for more than 60 percent of domestic demand from other countries (DOE 2001c). The continued development of domestic sources of oil is a national policy.

North Slope production has regularly constituted more than 15 percent of U.S. domestic crude production. Throughout the late 1980s, the fields contributed more than 20 percent, peaking at approximately 25 percent in 1988 (DOE 2001c). Dependence on foreign oil also has implications for the nation's balance of trade with the rest of the world. North Slope production has reduced the U.S. balance of trade deficit by an average of 21 percent over the period 1977 to 2001, reducing the overall trade deficit by an average of 12 percent, with approximately \$446 billion (in 2000 dollars) saved on the cost of U.S. oil imports (DOE 2001c).

Oil production is the dominant revenue-producing sector of the economy of the North Slope. Revenue returned to the NSB and local communities from oil production plays a significant role in the fiscal support of these local governments. Development of the ASDP could increase revenues and employment associated with this sector or extend current levels of revenue and employment into future years. This section describes the relationship of this industry to the state and North Slope economy.

The effects of oil production on the regional and statewide economy are primarily driven by the rate of production and transportation. Alaska state oil exports are dominated by production from the North Slope fields. Minor production also occurs in Cook Inlet, but only averaged 2.5 percent of total Alaska oil production between 1990 and 2000 (Alaska Department of Revenue 2002). Production from the North Slope oilfields and the transportation of crude to Valdez through the TAPS began in 1977. Production and transportation peaked at 2.038 MMbbl per day in 1988; it continues at an average daily production rate of 1.045 MMbbl, approximately 51 percent of its 1988 peak level (DOI 2002, TAPS EIS, Vol. 2 Chapter 3.23, Table 3.23-1).

Oil production and the development of new reserves is highly sensitive to crude oil prices. After peaking in early 1981 at \$70/bbl in 2000 dollars (\$37/bbl in 1981 dollars), oil prices have fluctuated, reaching an all-time low in 1998 of \$13/bbl (in 2000 dollars; \$12/bbl in 1998 dollars), 18 percent of the 1981 peak level (DOI 2002, TAPS EIS, Vol. 2 Chapter 3.23, Table 3.23-1).

Oil prices have rebounded slightly since 1998 and currently stand at \$29/bbl (October 2003).

3.4.2.2 Revenues

Activities of the oil and gas industry provide revenues to federal, state, and regional governments, as well as direct and secondary employment. The sources, and in some cases, the amounts of these revenue streams are listed below.

FEDERAL GOVERNMENT

- Corporate Income Taxes – TAPS pipeline owners, oil producers, and oil industry service companies
- Royalties – oil producers
- Estimated Revenues – Total federal Outer Continental Shelf (OCS) revenues for the Beaufort Sea, including bonuses, royalties, and rents were 1995 – \$1.1 million; 1996 – \$16.1 million; 1997 – \$1.1 million; 1998 – \$7.4 million; 1999 – \$1.4 million; and 2000 – \$1.4 million. The 1999 National Petroleum Reserve-Alaska lease sale resulted in first-year bonus bids of \$114.6 million and the 2002 lease sale in the Northeast National Petroleum Reserve-Alaska resulted in \$31.9 million in first-year bonus bids for the federal government. The 2003 MMS lease sale for the Beaufort Sea resulted in total lease revenue of \$8.9 million.

STATE GOVERNMENT

- Production Severance Tax – oil producers
- Property Tax – oil producers
- Income taxes – oil producers and oil industry service companies
- Royalties, bonuses, lease payments – oil production on state leases
- Distribution of OCS revenues (rents, bonuses, royalties, escrow funds, and settlement payments) – federal government (OCS distribution from Beaufort Sea Lease Sales were 1995 – \$9.4 million; 1996 – \$9.5 million; 1997 – \$17.3 million; 1998 – \$13.6 million; 1999 – \$14.7 million; 2000 – \$13.7 million; and 2001 – \$13.4 million.)

NORTH SLOPE BOROUGH

PROPERTY TAX – OIL PRODUCERS WITH LEASES ON NSB LANDS

The fiscal health of Alaska is closely tied to the fortunes of the oil industry in the state, although that dependence is declining. The balance of general fund revenues comes from corporate income taxes, fees, and licenses. Currently no state income tax or sales tax is levied in Alaska.

State revenues from oil industry activity represented 47 percent of total state revenue in 2002 and are projected to be 35 percent in 2003, as shown in Table 3.4.2-1. This is consistent with the oil industry contribution to state revenues over the past decade. The percent contribution in 1990 was 43 percent, and in 2000 it was 34 percent (DOI 2002, TAPS EIS, Vol. 2 Chapter 3.23, Table 3.23-7.) However, in the period of 1980 to 2000, the oil industry contribution to state revenues has fallen at an average annual rate of -2.9 percent from a high of 82 percent to 34 percent, reflecting the overall decline in oil production.

TABLE 3.4.2-1 ALASKA STATE REVENUES (IN MILLIONS OF DOLLARS)

Revenue Source	Actual FY 2002	Projected FY 2003
Oil revenue	\$1,676	\$1,860
Investment revenue	\$442	\$260
Other revenue	\$756	\$802
Federal revenue	\$1,572	\$2,322
Total state revenues	\$3,562	\$5,244
Oil revenue percent	47 %	35 %

Source: Fall 2002 Revenue Sources Book, Alaska Department of Revenue, Tax Division, November 2002.

General purpose expenditures by state government have tended to exceed revenues collected from the various sources available, meaning that the state has had to draw on cash surpluses accumulated from oil revenues in earlier years (TAPS Owners 2001a). As revenues from oil production fell with declining production and lower world oil prices, the state established the Constitutional Budget Reserve Fund (CBRF) in 1991 to cover year-to-year deficits. The CBRF consists of settlements from oil and gas tax and royalty disputes. In recent years, the gap between state revenues and the budget expenditures has been filled by withdrawals from the CBRF, and those withdrawals are depleting this reserve fund.

While oil industry revenues continue to remain a significant source of income for the state, the reduction in these revenues has been partially offset in some years by the contribution of earnings from the investment of oil revenues. These investment earnings have grown at an average of almost 15 percent each year since 1980. Also offsetting the loss of oil revenues has been the growth in federal grants to Alaska, which increased at an annual average rate of 3.1 percent between 1980 and 2000, and non-oil revenues, which increased at an annual rate of 2.2 percent over the same period. Overall, the state budget grew at an annual rate of 1.4 percent between 1980 and 2000.

NSB revenues from 1992 through 2001 have varied between a low of \$292 million in 2000 and a high of \$320 million in 1996. Revenues by year were (NSB 2001):

- 1992 – \$321 million
- 1993 – \$331 million
- 1994 – \$311 million
- 1995 – \$313 million
- 1996 – \$320 million
- 1997 – \$315 million
- 1998 – \$331 million
- 1999 – \$291 million
- 2000 – \$282 million
- 2001 – \$298 million

Sources of revenue are listed in Table 3.4.2-2. The largest share of NSB revenues comes from general property taxes, mostly from oil production-related real property. The real property assessed valuation of NSB property has steadily declined from 1992 (\$11.5 billion) through 2001 (\$9.4 billion) as a result of depreciation of assets. The NSB has the highest per capita level of bonded indebtedness in Alaska by far, at \$59,439 per capita (ADCED 2003). The borough with the next highest per capita bonded indebtedness is the Northwest Arctic Borough, with \$5,035 per capita. The revenue figures shown in Table 3.4.2-2 include intergovernmental revenues, such as school funding.

The largest share of revenues to the NSB comes from general property taxes. In 2001, more than 94 percent of total property tax revenues were attributed to oil and gas-related property (ADEC, Alaska Taxable, 2001).

TABLE 3.4.2-2 NORTH SLOPE BOROUGH GENERAL GOVERNMENT REVENUES BY SOURCE: 2001

Category	Annual Revenue
General property tax	\$201,963,000
General sales/economic impact assistance	\$4,500,000
Intergovernmental revenues	\$32,816,000
Charges for service	\$9,726,000
Miscellaneous	\$49,505,000
Total general government revenues	\$298,510,000

Source: Comprehensive Annual Financial Report of the North Slope Borough, Alaska, July 1, 2000 – June 30, 2001.s

3.4.2.3 North Slope Borough Government Expenditures

Including debt service, capital programs, and transfers, state expenditures grew at an average rate of 1.9 percent during the period between 1980 and 2000, although overall expenditures fell in the 1990s. Expenditures per capita have fallen significantly since 1990 and are currently lower than they were in 1980, as population growth in the state has outpaced the ability of the state to fund expenditure programs. Nevertheless, state expenditures per capita still are currently the highest in the nation, primarily because the harsh climate, low population density, and the inaccessibility of many communities make the services provided by state agencies very costly. The largest component of state government expenditures is social services, which grew at an average rate of 11 percent between 1980 and 2000 and now constitutes 45 percent of overall state expenditures. Expenditures in other areas, such as public safety, have grown fairly rapidly, while state funding of other areas, such as transportation and environment and housing, have fallen.

NSB expenditures have remained relatively constant during the period from 1992 (\$300 million) through 2001 (\$320 million).

3.4.2.4 Employment and Personal Income

A profile of Alaska's economy is presented on Figure 3.4.2.4-1, State of Alaska 2001 Employment by Sector. Compared with Alaska's early days, the state's current economy is more diverse and mature, with a large proportion of overall employment in the service sector. The largest employment sector shown on Figure 3.4.2.4-1 is the government sector, with 27.1 percent of the 290,000 total wage and salary jobs for 2001. The government sector comprises federal employment (16,800 jobs), state employment (22,900 jobs), and local government (38,800 jobs). The service sector is the next largest, with 73,000, 25.2 percent of total jobs. Trade is the third largest employment sector with 58,200, or 20.1 percent. The fourth largest employment sector is the combined transportation/communications/utilities, which accounts for 28,000 jobs, or 9.6 percent of total employment. Construction contributes 5.1 percent. Manufacturing and the combined financial/insurance/real estate sectors contribute 4.7 percent and 4.4 percent, respectively, to total employment. Mining, which is predominantly oil and gas extraction, is the smallest sector and accounts for 11,200 jobs, or 3.9 percent of the total (ADOL 2003b).

While mining (primarily oil and gas extracting) is one of the smallest sectors of the economy, it has the highest hourly earnings rate. In 2002, average hourly wages for mining were \$28.37 per hour, compared with \$27.67 per hour in construction, \$21.37 per hour for Transportation/Communication/Utilities, \$16.77 per hour for Manufacturing, \$14.70 per hour for Trade, and \$18.58 per hour for Finance/Insurance/Real Estate (ADOL 2003c).

In 2001, Alaska's per capita income was \$30,936, placing fifteenth in the national ranking with all states (Bureau of Economic Analysis 2003). During the past several decades, Alaska's per capita incomes have declined relative to those of other states. In 1960, Alaska's per capita income (\$2,815) was fourth among all states. In 1980, Alaska's per capita income (\$13,875) was first in the nation. By 1990, Alaska's per capita income (\$21,073) had declined to ninth among all states (ADOL 2000).

Employment and income data for the NSB and the four communities in or near the Plan Area were discussed in Section 3.4.1.

3.4.3 Subsistence Harvest and Uses

3.4.3.1 Introduction

This section describes subsistence harvest and uses in the ASDP Area. The methodology and sources of data, the regulatory definition of “subsistence,” and the importance and context of subsistence to past and present resource users are also discussed.

The methodology for evaluating subsistence resource use employed in this analysis includes a review of available literature and data related to communities using the Plan Area for subsistence or using wildlife resources that spend time in the Plan Area.

Data sources for this section include subsistence resource reports published by the NSB Department of Wildlife Management and the ADF&G Division of Subsistence, published and unpublished harvest data from these agencies, technical reports published by the MMS, the general ethnographic and historical literature, relevant correspondence between Inupiat organizations and agencies (Kuukpik Corporation 2002), and the results of field interviews. For quantitative measures of use, the best available and/or most recent subsistence harvest data were acquired from ADF&G, NSB, and MMS reports. These data include information about the number of and amount of subsistence species harvested, the location and timing of subsistence harvests, the extent of past and present subsistence land use, and the cultural importance of subsistence uses. Historical and ethnographic literature from academic and historical sources, published and unpublished, provides additional qualitative data about the use and social context of subsistence resources in the recent past. Fieldwork information derived from key informant interviews provides additional information regarding subsistence resource use and harvest areas in the present and the recent past.

As subsistence is a contentious issue and land ownership in the Plan Area is state, federal and Native, definitions of subsistence used by each of these entities is provided below. Both federal and state statutes govern subsistence activities in Alaska. Under state law “subsistence uses means the noncommercial, customary and traditional uses of wild, renewable resources by a resident domiciled in a rural [sic] area of the state for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation, for the making and selling of handicraft articles out of non-edible by-products of the fish and wildlife resources taken for personal or family consumption, and for customary trade, barter, or sharing for personal or family consumption.” (A.S. 16.05.940[32])

Under federal law, “subsistence uses means the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of non-edible byproducts of fish and wildlife resources taken for personal or family consumption; for barter, or sharing for personal or family consumption; and for customary trade.” (ANILCA Title VIII Section 803)

The Alaska Federation of Natives (AFN) describes subsistence as “the hunting, fishing, and gathering activities which traditionally constituted the economic base of life for Alaska’s Native peoples and which continue to flourish in many areas of the state today. Subsistence is a way of life in rural Alaska that is vital to the preservation of communities, tribal cultures, and economies. Subsistence resources have great nutritional, economical, cultural, and spiritual importance in the lives of rural Alaskans. Subsistence, being integral to our worldview and among the strongest remaining ties to our ancient cultures, is as much spiritual and cultural, as it is physical.” Subsistence activities could include hunting, fishing, trapping, wood gathering, and berry picking.

Subsistence is part of a rural economic system, called a “mixed, subsistence-market” economy, wherein families invest money into small-scale, efficient technologies to harvest wild foods (ADF&G 2000). Fishing and hunting for subsistence provide a reliable economic base for many rural regions. Domestic family groups who have invested in fish wheels, gill nets, motorized skiffs, and snowmobiles conduct these important activities. Subsistence is not oriented toward sales, profits, or capital accumulation (commercial market production), but is focused on meeting

the self-limiting needs of families and small communities. Participants in this mixed economy in rural Alaska augment their subsistence production by cash employment. Cash (from commercial fishing, trapping, and/or wages from public sector employment, construction, fire fighting, oil and gas industry, or other services) provides the means to purchase the equipment, supplies, and gas used in subsistence activities. The combination of subsistence and commercial-wage activities provides the economic basis for the way of life so highly valued in rural communities (Wolfe and Walker 1987).

Subsistence uses are central to the customs and traditions of many cultural groups in Alaska, including the North Slope Inupiat. These customs and traditions encompass sharing and distribution networks, cooperative hunting, fishing, and ceremonial activities. Subsistence fishing and hunting are important sources of non-traditional employment and nutrition in almost all rural communities. The ADF&G estimates that the annual wild food harvest in the arctic area of Alaska is approximately 10,507,255 pounds, or 516 pounds per person per year. Subsistence harvest levels vary widely from one community to the next. Sharing of subsistence foods is common in rural Alaska (ADF&G 2000).

3.4.3.2 Patterns of Subsistence Resource Use

Communities whose residents harvest or rely on subsistence resources in the ASDP Area include Barrow, Nuiqsut, Atqasuk, and Anaktuvuk Pass. Barrow and its environs have a long history of use by Inupiat hunters, with numerous archaeological deposits attesting to a long and continuous occupation. Atqasuk and Nuiqsut represent traditional subsistence use areas and were reestablished more recently as sedentary villages as people who had moved to Barrow from these areas before World War II returned to places where they had historic connections. A large part of these connections was knowledge of the land and subsistence resource availability in those formerly used areas (IAI 1990). This section describes subsistence land uses for the communities of Anaktuvuk Pass, Atqasuk, Barrow, and Nuiqsut for historic and contemporary times.

NUIQSUT SUBSISTENCE ACTIVITIES

A diverse seasonal abundance of terrestrial mammals, fish, birds, and other resources is available in the immediate area surrounding Nuiqsut. Traditional subsistence activities in the Nuiqsut area revolved around caribou, marine mammals, and fish. Moose, waterfowl, and furbearers were secondary but important supplementary resources. Nuiqsut's location on the Colville River, some 35 miles upstream from the Beaufort Sea, has been a prime area for fish and caribou harvests, but is less advantageous for marine mammal harvests (ADCED 2003). The Colville River is the largest river system on the North Slope and supports the largest overwintering areas for whitefish (Craig, 1989).

Twenty-seven families from Barrow permanently resettled Nuiqsut in 1973. The site of Nuiqsut was formerly a place where Inupiat people gathered to trade and fish, maintaining connections between the Nunamiut of the inland areas and the Taremiut of the coast (Brown 1979). ANCSA allowed Inupiat from Barrow who wished to live in a more traditional fashion to select the site for resettlement, and many of those who moved there had some family connection to the area (IAI 1990). Easy access to the main channel of the Colville River for fishing, hunting, and ease of movement between upriver hunting sites and downriver whaling and sealing sites was the primary reason for selection of the site (Brown 1979).

Nuiqsut is one of 10 Alaska Eskimo whaling communities. Many of those who resettled Nuiqsut were experienced whalers and crew who remembered past whale harvests before the temporary abandonment of the settlement (IAI 1990). Nuiqsut whale hunting is based from Cross Island, approximately 70 miles northeast of Nuiqsut and approximately 15 miles from West Dock on the west side of Prudhoe Bay. Nuiqsut whalers travel approximately 100 miles from Nuiqsut to the Cross Island whaling camp. Nuiqsut whaling occurs in the fall when the whales migrate closer to shore, because the spring migration path is too distant from shore for effective hunting with small boats. Nuiqsut residents can also participate in Barrow's spring whale hunt through close family ties in that community (Fuller and George 1999).

Nuiqsut is situated closer to current and foreseeable areas of petroleum development than any other community on the North Slope. This development has deterred subsistence resource users from hunting, fishing, and gathering in their former traditional harvest areas east of the Colville River and at coastal areas such as Oliktok Point (Fuller and George 1999; IAI 1990). According to Circumpolar Research Associates [(CRA) 2002)], during 2000, unemployment appears to have increased, reinforcing the importance of subsistence resource harvests for local residents who have lived there for more than 10 years (since Nuiqsut residents who lived in the community the longest time consumed larger quantities of traditional foods [CRA 2002]). However, a determinative link between household wage income and household subsistence productivity has not been demonstrated; the former was dependent on education levels, and the latter on the number of capable producers in the household (Pederson et al. 2000).

CONTEMPORARY SEASONAL ROUND

The seasonal availability of many important subsistence resources directs the timing of subsistence harvest activities. Fishing occurs year-round, but is most common from break-up (June) through November (Fuller and George 1999). Beginning in March, Nuiqsut residents hunt ptarmigan. Waterfowl hunting begins in the spring, and hunters typically harvest ducks and geese while participating in other subsistence activities such as jigging for burbot or lingcod (IAI 1990). Caribou are harvested primarily during the late summer and fall months but are hunted year-round. Moose hunting takes place in August and September in boat-accessible hunting areas south of Nuiqsut (Fuller and George 1999). August is the primary harvest month for caribou and moose, because water levels are right for traveling upriver or on the coast by boat, and the animals are usually in their best condition. Many Nuiqsut residents participate in subsistence fishing. If weather and ice conditions permit, summer net fishing at fish camps begins in June or July. Bowhead whaling usually occurs in September when the whales migrate closer to the shore. Nuiqsut hunters harvest few polar bears, but if they are harvested it is often during the fall whaling season. Gill netting at campsites is the most productive between October and mid-November. Jigging for grayling and burbot also occurs in the fall. Trappers pursue wolves and wolverines through the winter months, primarily in March and April. Trapping can be undertaken anytime during the winter; however, most hunters avoid going out in the middle of winter because of poor weather conditions and lack of daylight (IAI 1990). Table 3.4.3-1 summarizes Nuiqsut's annual cycle of subsistence activities.

TABLE 3.4.3-1 ANNUAL CYCLE OF SUBSISTENCE ACTIVITIES – NUIQSUT

	Winter					Spring		Summer			Fall	
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Fish	■	■	■	■	■	■	■	■	■	■	■	■
Birds/Eggs	■	■	■	■	■	■	■	■	■	■	■	■
Berries	■	■	■	■	■	■	■	■	■	■	■	■
Moose	■	■	■	■	■	■	■	■	■	■	■	■
Caribou	■	■	■	■	■	■	■	■	■	■	■	■
Furbearers	■	■	■	■	■	■	■	■	■	■	■	■
Polar Bear	■	■	■	■	■	■	■	■	■	■	■	■
Seals	■	■	■	■	■	■	■	■	■	■	■	■
Bowheads	■	■	■	■	■	■	■	■	■	■	■	■

Source: Impact Assessment Inc. 1990; Research Foundation of the State University of New York 1984; SRB&A 2003

Notes:

■	No to Very Low Levels of Subsistence Activity
■	Low to Medium Levels of Subsistence Activity
■	High Levels of Subsistence Activity

SUBSISTENCE HARVESTS

The ADF&G collected subsistence harvest data for Nuiqsut in 1985 and 1993. The ADF&G chose 1993 as the most representative year for subsistence harvest data in Nuiqsut (Tables 3.4.3-1 and 3.4.3-2). Nuiqsut's total annual subsistence harvests ranged from 160,035 pounds in 1985 to 267,818 pounds in 1993 (Table 3.4.3-2). The 1993 harvest of 742 pounds per capita of wild resources represents approximately two pounds per day per person in the community. In 1985, fish and land mammals accounted for 86 percent of Nuiqsut's subsistence harvest and marine mammals contributed eight percent. In 1993, fish, land mammals, and marine mammals accounted for approximately one-third each (Table 3.4.3-2). The importance of subsistence to Nuiqsut residents is further reflected in the high participation rates in households that use (100 percent), harvest (90 percent), try to harvest (94 percent), and share (98 percent) subsistence resources (Table 3.4.3-2).

**TABLE 3.4.3-2 NUIQSUT SUBSISTENCE HARVESTS AND SUBSISTENCE ACTIVITIES
FOR 1985, 1992, AND 1993**

Resource	Percentage of Households					Estimated Harvest				
	Use	Try to Harvest	Harvest	Receive	Give	Number	Total Pounds	Mean HH Pounds	Per Capita Pounds	% Total Harvest
1985										
All Resources	100	98	98	100	95		160,035	2,106	399	100
Fish	100	93	93	78	83	68,153	70,609	929	176	44
Salmon	60	43	40	23	23	441	1,366	18	3	1
Non-Salmon	100	93	93	75	83	67,712	69,243	911	173	43
Land Mammals	100	95	93	70	85	1,224	67,866	893	169	42
Large Land	98	90	90	70	80	536	67,621	890	169	42
Small Land	65	63	58	13	23	688	245	3	1	<1
Marine Mammals	100	48	23	100	30	59	13,355	176	33	8
Birds and Eggs	98	95	95	60	80	3,952	8,035	106	20	5
Vegetation	38	50	18	20	10		169	2	0	0
1992										
All Resources							150,196	1,430	359	100
Fish							51,955	495	124	35
Land Mammals							41,503	395	99	28
Marine Mammals							52,749	502	126	35
Birds and Eggs							3,924	37	9	3
Vegetation							65	1	0	
1993										
All Resources	100	94	90	98	92		267,818	2,943	742	100
Fish	100	81	81	94	90	71,897	90,490	994	251	34
Salmon	71	45	36	47	39	272	1,009	11	3	<1
Non-Salmon	97	79	79	90	87	71,626	89,481	983	248	33
Land Mammals	98	77	76	94	82	1,290	87,390	960	242	33
Large Land	98	76	74	92	82	691	87,306	959	242	33
Small Land	53	45	42	18	27	599	84	1	0	<1
Marine Mammals	97	58	37	97	79	113	85,216	936	236	32
Birds and Eggs	90	77	76	69	73	3,558	4,325	48	12	2
Vegetation	79	71	71	40	27		396	4	1	0

Sources: ADF&G Community Profile Database Version 3.11, March 2001 (for 1985 and 1993); Fuller and George 1999 (for 1992); SRB&A 2003.

In 1985, Nuiqsut did not land any bowhead whales. The community harvested two bowheads in 1992 and three bowheads in 1993. Caribou, whitefish, and bowhead whales contributed 88 percent of Nuiqsut's annual subsistence harvest in terms of edible pounds in 1993 (Table 3.4.3-3).

In 1992, marine resources dominated the subsistence harvest (35.1 percent of the total harvest), largely as the result of a successful bowhead hunt at Cross Island (Tables 3.4.3-2 and 3.4.3-3) (Fuller and George 1999). Other harvested marine mammals included polar bear and bearded and ringed seals. Fish (broad whitefish and least and arctic cisco) comprised 34.6 percent of the total harvest for Nuiqsut in 1992. Approximately 28 percent of the total harvest in 1992 was land mammals (caribou and moose). The harvest of birds (geese and eiders) was approximately 3 percent of the total harvest in 1992. The highest Nuiqsut household participation rates were in fishing, caribou hunting, moose hunting, and bear hunting (Fuller and George 1999).

The data for 1994 to 1995, collected by the NSB Division of Wildlife, were presented in a different format from that used by ADF&G (Brower and Hepa 1998). This was an exceptional year in that Nuiqsut crews harvested no whales. Caribou contributed 58 percent of edible pounds of wild foods for the sampled period, with fish contributing 30 percent, moose and birds each 5 percent, marine mammals 2 percent, and wild plant foods less than 1 percent of edible pounds harvested (Brower and Hepa 1998, p. 15). Nuiqsut residents participating in subsistence harvest activities were in the majority, with 66 percent successful, unsuccessful, or out hunting at the time of the interviews, 21 percent not attempting to harvest, and the balance not wishing to be interviewed (5 percent), out of town (7 percent), or unable to be contacted (1 percent) (Brower and Hepa 1998). Eighty-seven percent of harvest instances resulted in resource sharing (Brower and Hepa 1998).

CONTEMPORARY SUBSISTENCE USE AREAS

Pedersen documented Nuiqsut "lifetime" (Pedersen 1979) and 1973 to 1986 land uses areas (Pedersen, in prep.) (Figure 3.4.3.2-1). Brown (1979) and Hoffman et al. (1988) also documented Nuiqsut subsistence use areas in the 1970s, which are incorporated within the lifetime use areas depicted in Pedersen (1979). Comparing Pedersen's Nuiqsut lifetime use areas (1979) and other earlier documentation of Nuiqsut subsistence use areas (Brown 1979; Hoffman et al. 1988) with Pedersen's (in prep.) 1973 through 1986 subsistence land uses documentation, as depicted on Figure 3.4.3.2-1, shows Nuiqsut resource harvesters using a larger area offshore, a larger area to the west including northwest to Barrow, going to the south to Anaktuvuk Pass, and changes around industrial development to the east. It should be noted that when the 1970s research (for example, Pedersen 1979, and Brown 1979) was conducted, Nuiqsut had only been resettled for a few years (since 1973) and hunters "were relearning the land to a large extent" (IAI 1990) and were not using the entire area formerly used by people originally from the Colville River Delta. Thus, Pedersen (in prep.) shows a larger Nuiqsut subsistence use area for 1973 through 1986 than either Pedersen (1979) shows for lifetime use areas or Brown (1979) depicts for his limited interviews. This change likely reflects Pedersen's continuing research, as well as Nuiqsut hunters' expanding use as residents resettled their traditional area.

Stephen R. Braund & Associates (SRB&A) conducted 21 interviews with subsistence resource users in Nuiqsut in June and July of 2003. SRB&A interviewed a variety of currently active resource users including persons of both genders and several ages, from young hunters starting out, through increasingly active and productive middle-aged hunters, to the active elders who still harvest subsistence foods and train the younger hunters. Figure 3.4.3.2-2 shows the recent (last ten years) subsistence use areas for all resources for the 21 Nuiqsut residents interviewed in 2003.

The 2003 information and the earlier documented Nuiqsut use areas depict a similar use area with some variation. The 2003 interviews did not focus on the area west of Barrow and hence did not capture the travel between Nuiqsut and Barrow and associated hunting. The western extent is similar, with some minor variation that likely reflects the different hunters that were interviewed. During the 2003 interviews, it became apparent that southern extent of Nuiqsut's land uses extended beyond the map used for the interviews. Some formerly used areas depicted in lifetime use area maps and the 1973 through 1986 use areas (for example, the Prudhoe Bay area) are perceived by some residents as being no longer accessible and by many residents as being undesirable because of industrial development, as noted in Pedersen et al. (2000), SRB&A interviews (2003), scoping testimonies, and in ADF&G (2001, Issues section).

**TABLE 3.4.3-3 SELECTED NUIQSUT SUBSISTENCE HARVESTS
FOR 1985, 1992, 1993, AND 1994-1995**

Resource	Estimated Harvest				
	Number	Total Pounds	Mean HH Pounds	Per Capita Pounds	% of Total Harvest
1985					
Caribou	513	60,021	790	150	38
Whitefish	58,733	59,701	786	149	37
Bowhead ¹	0	7,458	98	19	5
Geese	1,345	6,045	80	15	4
Moose	13	6,650	88	17	4
Seals	57	4,431	58	11	3
Burbot	669	2,675	35	7	2
Char	1,083	3,060	40	8	2
Grayling	4,055	3,650	48	9	2
1992					
Bowhead	2	48,715	464	117	32
Caribou	278	32,551	310	78	22
Arctic cisco	22,391	22,391	213	54	15
Broad whitefish	6,248	15,621	149	37	10
Moose	18	8,835	84	21	6
1993					
Caribou	672	82,169	903	228	31
Bowhead	3	76,906	845	213	29
Whitefish	64,711	77,671	854	215	29
Seals	109	8,310	91	23	3
Grayling	4,515	4,063	45	11	2
Moose	9	4,403	48	12	2
Burbot	1,416	5,949	65	16	2
Char	618	1,748	19	5	1
Geese	1,459	2,314	25	6	1
1994-1995					
Caribou	258				
Whitefish	14,532				
Seals	24				
Grayling	462				
Moose	5				
Burbot	91				
Char	8				
Geese	457				
Berries	14				

Source: ADF&G Community Profile Database Version 3.11, March 2001 (for 1985 and 1993); Fuller and George 1999 (for 1992); Brower and Opie 1997 (for 1994-1995); SRB&A 2003.

Notes: ¹ No bowhead were harvested by Nuiqsut in 1985. Pounds of bowhead in 1985 are from receiving shares from other communities.

The 2003 information and the earlier documented Nuiqsut use areas depict a similar use area with some variation. The 2003 interviews did not focus on the area west of Barrow and hence did not capture the travel between Nuiqsut and Barrow and associated hunting. The western extent is similar, with some minor variation that likely reflects the different hunters that were interviewed. During the 2003 interviews, it became apparent that southern extent of

Nuiqsut's land uses extended beyond the map used for the interviews. Some formerly used areas depicted in lifetime use area maps and the 1973 through 1986 use areas (for example, the Prudhoe Bay area) are perceived by some residents as being no longer accessible and by many residents as being undesirable because of industrial development, as noted in Pedersen et al. (2000), SRB&A interviews (2003), scoping testimonies, and in ADF&G (2001, Issues section).

CARIBOU USE AREAS

Harvest location data for caribou collected by the NSB (Brower and Hepa 1998; NSB 2003) and ADF&G (2001, 2003) and hunting area interviews conducted in Nuiqsut for this project indicate that there are several primary harvest areas for caribou (*tuttu*) (Figure 3.4.3.2-3). Going north, these harvest locations include the Nuiqsut area, the Colville River Delta, the Nigliq Channel, and the Fish and Judy creeks area. To the south of Nuiqsut, the Colville River provides access to areas and sites such as Itkillikpaat, Ocean Point, Itkillik River, Umiat, and the confluences of the Anaktuvuk and Chandler rivers. These areas are usually associated with Traditional Land Use Inventory (TLUI) sites, cabins, camps, and native allotments with harvest locations for other species nearby. These harvest locations can be used in winter (October through May), summer (June through September), or both, and they can be accessed by foot, boat, all-terrain vehicle, and snowmobile.

Figure 3.4.3.2-3 shows the recent harvest areas of interviewed hunters for caribou, and Figure 3.4.3.2-4 shows the winter and summer caribou hunting areas. Summer hunting is done by boat after the river ice breaks up, and hunters proceed along the coast from Smith Bay east to the Sagavanirktok River, including Oliktok Point, several barrier islands, and in all channels of the Colville River Delta, Fish Creek, and Judy Creek. Hunters also go south on the Colville River beyond Umiat, passing Itkillikpaat, Ocean Point, Signal Hill, and Umirak en route. These trips upriver are taken by boat in the summer, in the fall when moose and caribou can be harvested, and by snowmobile in the winter in pursuit of caribou and furbearers. Nuiqsut hunters also travel up the Itkillik, Chandler, and Anaktuvuk rivers by boat and snowmobile. There are many camps and cabins in the area of Fish and Judy creeks, throughout the Colville River Delta, and up the Colville River to the south that are used for summer and winter caribou hunting. These camps often have drying racks and ice cellars for processing and storing harvested game, as well as caches of survival gear and supplies.

Cumulative Nuiqsut caribou harvests by month for 1993, 1994 through 1995, 2000, and 2001 are shown on Figure 3.4.3.2-5. There are monthly and seasonal differences in the proportion of caribou harvested, with summer (defined as the open water period, including June, July, August, and September) harvests providing approximately 60 percent of the harvested caribou. For the four data years, July (23 percent) and August (24 percent) are the months with the greatest cumulative caribou harvests. According to several hunters, October (16 percent) is a preferred month for hunting caribou, because the caribou have by then accumulated a thick layer of fat for the winter. September (8 percent) is normally consumed with whaling activity, and meat from caribou hunted in August is provided to whaling crews. March (6 percent) represents the beginning of spring, with longer days and warmer weather encouraging hunters to go out on the land again and harvest caribou.

Summer is the major caribou harvest season by proportion of individual caribou taken, and hunting is undertaken by boat. Large numbers of caribou migrate to the coast and shallow waters of Harrison Bay, and to the Colville River Delta in July to get away from mosquitoes. This behavior allows subsistence hunters to harvest numbers of caribou adequate for subsistence in a relatively short amount of time. Because of the risk of spoilage, the harvested caribou must be processed and stored quickly, whether in ice cellars at camps or brought back to Nuiqsut and put in freezers. Outboard boats provide rapid transportation for the hunters and their harvest. August is a time of increased bot and warble fly activity, and the caribou disperse into smaller groups and go south, as coastal winds provide little relief from flies (SRB&A 2003).

Winter harvests take place after the rivers and lakes have frozen over and snow covers the tundra, allowing for a greater overland hunting range using snowmobiles. Interviewed hunters have ranged from the vicinity of Admiralty Inlet and Teshekpuk Lake in the west, to the Franklin Bluffs area east of the Dalton Highway, south to Anaktuvuk Pass, and along the northern foothills of the Brooks Range (Figure 3.4.3.2-4). Caribou are hunted as needed while hunters pursue wolves, wolverines, and foxes southeast of Teshekpuk Lake, in the Brooks Range foothills, the

Kuparuk Hills, and east of the Colville River. Subsistence caribou hunting independent of the furbearer harvest continues all winter throughout the Fish and Judy creeks area, along the Nigliq Channel, and south along the Colville and Itkillik rivers. During the coldest months, many hunters stay closer to Nuiqsut, venturing farther out as spring approaches (SRB&A 2003).

March represents the beginning of spring as the days grow longer and temperatures increase. Preparations for Nalukataq begin in March as senior whaling crew members hunt caribou and other resources. In April, the snow is often “too rotten” to travel over the tundra, limiting overland travel by snowmobile. Caribou are harvested near the village and along frozen waterways at this time, but as spring approaches the caribou are often thin and not in the best condition (SRB&A 2003).

Figure 3.4.3.2-6 shows harvest locations by season for caribou harvested at known locations in 1993, 1994 through 1995, 2000, and 2001. The greatest proportion of caribou, both summer and winter, were harvested at Fish and Judy creeks, in the Nuiqsut area, and in the Colville River Delta including Nigliq and the Nigliq Channel. The Nuiqsut area itself is the second largest winter harvest location and fourth largest summer harvest location.

There are several reasons for this, including expedience, accessibility in both summer (boat) and winter (snowmobile), coordination with work obligations, efforts to avoid spoiling the meat, lack of transportation or gas money, general availability of caribou in both seasons, and a desire to combine caribou harvesting with fishing, waterfowl hunting, and berry picking. More distant harvest locations for caribou are associated with camps, cabins, and allotments (Figure 3.4.3.2-2) where caribou can be hunted, processed, and stored while other subsistence tasks are undertaken, such as fishing and berry picking. During the summer and winter it is common practice for experienced Nuiqsut hunters to take younger, less experienced hunters to Fish or Judy creeks, Nigliq, the Colville River Delta, or Itkillikpaat to fish and harvest caribou. They stay at a cabin or campsite of their own, or at one that belongs to a friend or relative. These activities provide multiple traditional foods for the community through sharing and distribution upon the hunters’ return. Furthermore, they serve to transfer to younger hunters a multi-generation knowledge of and identification with specific harvest, processing and storage methods, and traditional harvest locations. In summary, these subsistence activities in these specific locations reinforce the cultural identity of the community and residents’ identification with their unique history. As shown on Figure 3.4.3.2-7, 41 percent of the caribou harvested during the 1993, 1994 through 1995, 2000, and 2001 study years were harvested in the Colville River Delta and 25 percent harvested in the Fish and Judy creeks area. Thus, 66 percent of the caribou harvested in this time period were harvested in these two areas.

FISH USE AREAS

Nuiqsut resource users have a long history of subsistence fishing in the Colville River and its tributaries from the Colville River Delta to the confluence with the Ninuluk Creek, the Nigliq Channel and nearby Fish and Judy creeks, and innumerable lakes in the region. Nuiqsut fishermen also use coastal areas east to the Kuparuk River and fish around several barrier islands, including Thetis and Cross islands (Figure 3.4.3.2-8). Many families set nets near Nuiqsut in the Nigliq Channel when time, transportation needs, or funds do not permit longer trips from town, particularly during the school and work year. Cooperative arrangements are made between resource users wherein resources (such as time, equipment, gas, and labor) are pooled in exchange for shares of the harvest. Resource users often fish in conjunction with other subsistence activities, such as caribou and moose hunting and berry picking, especially in harvest areas with camps and cabins. Certain species of fish are only seasonally available, and must be harvested when present in the area. Nuiqsut fishers freeze or dry these fish for later use and barter. Other fish species are available year-round and provide a welcome change in diet and fresh food during the winter and spring (SRB&A 2003).

Fish comprise approximately one-third of the subsistence harvest of Nuiqsut residents (Table 3.4.3-2). This percentage varies with fish availability and the availability of other resources, such as caribou and bowhead whales (Brower and Hepa 1998). Subsistence fishing in Nuiqsut has been the subject of scientific research since 1985, when studies were undertaken in response to harvest failures that resource users associated with the construction of nearshore infrastructure for oil development (Moulton 2000). In addition, the NSB Department of Wildlife

Management has also collected information on Nuiqsut subsistence fish harvests for the years 1994 through 1995, 2000, and 2001 (Brower and Hepa 1998; NSB 2003 [unpublished]).

There are significant differences in sampling in the last 3 years of the 17-year Moulton studies (Moulton 2000, 2002), and in methodology and sampling between the Moulton studies and the NSB studies. From 1985 to 1998, Moulton collected data from five net sites (Upper Nigliq, Nanuq, Nigliq Delta, Outer Delta, and the Main River) in the Colville River Delta on subsistence harvests of Arctic cisco, least cisco, broad whitefish), and humpback whitefish).

Moulton did not conduct the studies in 1999. The Moulton studies resumed in 2000, but in that and subsequent years only the subsistence harvest on the Nigliq Channel sites (for example, Upper Nigliq, Nanuq, and Nigliq Delta) were reported.

The data collected by the NSB is broader in scope, geographically and by species, than the Moulton data. Harvest information collected by the NSB includes data for char (iqalukpik), burbot (tittaaliq), pike (siulik), salmon, and grayling (sulukpaugaq), in addition to the cisco and whitefish species addressed by Moulton. The NSB harvest locations reflect those reported in the 2003 Nuiqsut SRB&A interviews, with summer and winter fishing taking place in the Nigliq Channel, Colville River and Delta, and in Fish and Judy creeks, as well as other locations in specific seasons using both nets and angling gear (Brower and Hepa 1998; SRB&A 2003; Figure 3.4.3.2-8). The relative value of different species to local resource users reported in interviews ranged from valued staples (for example, cisco and whitefish) to the highly prized (such as burbot). Burbot, which are caught by jigging through holes in the ice in the Nigliq Channel and other Colville River Delta channels, the Colville River, and Fish and Judy creeks, are highly prized for their large livers and high fat content in the winter but are harvested in numbers that do not compare with the volume of some other species (SRB&A 2003).

The Moulton data show the highly variable nature of the subsistence fish harvest in the Colville River Delta and Nigliq areas. Arctic cisco harvests range from approximately 6,100 in 1988 to nearly 47,000 in 1993, approximately 7.5 times as many as the low, as shown on Figure 3.4.3.2-9. Fishing effort in net days ranged by area from 19 to 1,407 net days (Figure 3.4.3.2-10), although there is no clear correspondence between the harvest and harvest effort, because low efforts brought more fish, as in 1993, while high efforts as in 2002 resulted in few fish harvested even considering the reduced number of sites sampled.

The NSB subsistence harvest data for 1994 through 1995, 2000, and 2001 show the greatest proportion of fish are harvested in October (54 percent), November (13 percent), July (11 percent), December (4 percent) and September (4 percent) (Figure 3.4.3.2-11). Undated fish harvests (9 percent) are the fourth largest group. The large number of fish harvested reflects the importance of the resource in general, but in particular demonstrates the numerical dominance of Arctic cisco to the fall and winter harvest, as shown on Figure 3.4.3.2-12. The variability in Arctic cisco harvest as shown on Figure 3.4.3.2-9 demonstrates the importance of having alternative species and harvest strategies available should poor fish harvests coincide with reduced terrestrial or marine mammal harvests.

Key fishing areas measured by total harvest for all species, shown on Figure 3.4.3.2-13, include areas around Nuiqsut and throughout the Colville River Delta, including Nigliq and the Nigliq Channel. Arctic cisco harvests were removed from the analysis because of their large proportion in order to examine fish harvested in smaller proportions. Figure 3.4.3.2-14 shows that the Colville River Delta remains an important Nuiqsut fish harvest location, even excluding Arctic cisco. In addition, Nanuq Lake, Fish Creek, and upriver locations are also important for harvesting of fish other than Arctic cisco.

Resource users set nets in the Nigliq Channel for broad whitefish in June and July, as the fishery is accessible on foot, by boat, truck, or all-terrain vehicle. Several interviewed resource users stated that “everybody in town goes down there if they can.” In August and September, fishers set nets and angle in the Nigliq Channel, Nanuq Lake, Fish Creek, and the Colville River Delta, or travel by boat up the Colville River up to and beyond Umiat for grayling, chum salmon, silver salmon, and arctic char. Some fish in the nearshore waters inside the barrier islands, and this is often done by Nuiqsut bowhead whaling crews to support them while they are at Cross Island (Figure 3.4.3.2-8). In the fall and early winter, grayling gather at river mouths, and nets are set under the ice for other fish

migrating out of the rivers for the winter, including whitefish and cisco. Jigging through the ice continues until the coldest months of winter for burbot, grayling, and rainbow trout (SRB&A 2003).

Fishing is an important family activity and is an opportunity for several generations to gather at camps for cooperative fishing and other resource harvests. Elders from the area know the most productive fishing spots, which species are available at which locations, and the best times to fish for them. Angling and jigging is done by children, as well as elders in all seasons, and species harvested by these methods are highly valued. For example, one Nuiqsut resident spoke of the high local value placed on burbot livers when he said, “We all eat that! We get them for the liver; it is rich and the meat is rich.” Net fishing along the Nigliq Channel and at cabins and camps on Fish Creek in the summer are highly valued family activities, as Nuiqsut families cooperate for weeks at camp, catching and drying whitefish for later consumption and distribution. Family members with year-round wage jobs work in town while other family members of all ages work at the camps, with wage workers returning in the evenings or weekends to bring supplies, visit, and participate in subsistence activities (SRB&A 2003).

WATERFOWL USE AREAS

Waterfowl harvested by the Inupiat of Nuiqsut occupy two habitats in the greater area. Ducks, geese, and brant nest and molt in the wet tundra to the north. Eiders nest on the sandy areas of the Colville River Delta and the barrier islands, and molt after their arrival. Both groups of waterfowl raise their young in the area until fall, when they migrate south. Nuiqsut hunters harvest waterfowl in May and June during the migration using snowmobiles and boats. Geese hunting areas include the Fish and Judy creeks area, the Colville River Delta, the area around Nuiqsut extending to the Fish and Judy creeks area, along the Colville River up to Sentinel Hill, the area around Ocean Point, and along the Itkillik River (Figure 3.4.3.2-3).

The hunters harvest the migrating birds from snow blinds built to the south, near Sentinel Hill and Ocean Point, or at Fish Creek. Once the river breaks up, hunters look for birds by boat, and start to look for eiders in the delta and in Harrison Bay at the ice edge as summer approaches. Hunters end the waterfowl harvest when the birds are on their nests (SRB&A 2003).

In earlier times, Inupiat resource users harvested flightless molted birds by cooperatively “herding” them into creeks, then dividing the harvest between the work group members. One resident remembered doing this as recently as the late 1940s at Oliktok Point. Nuiqsut people in the past gathered and stored eggs from waterfowl nests on the tundra. Twenty-one Nuiqsut harvesters interviewed in 2003 stated that they no longer gather eggs, and that they do not harvest certain species of waterfowl for various reasons. Some residents indicated that they do not eat certain varieties of ducks (e.g. old squaws, pintails), while many chose to avoid harvesting black brant and spectacled eiders because they are endangered. Nearly all interviewed resource users harvested geese in May, and most harvested some eiders (SRB&A 2003).

The NSB collected waterfowl harvest data for 1994 through 1995, 2000, and 2001 (Brower and Hepa 1998, NSB 2003). Figure 3.4.3.2-15 shows that 79 percent of geese, including white fronted and Canada, were harvested in the Fish and Judy creeks area (63 percent) and the Colville River Delta (16 percent). Of the remaining 21 percent, most were harvested up the Colville River from Ocean Point to Umirak. A more specific view of goose harvest locations is shown on Figure 3.4.3.2-16, with 47 percent of harvested geese coming from Fish Creek alone, and many of the rest harvested in the Colville River Delta and Nuiqsut areas.

Figures 3.4.3.2-17, 3.4.3.2-18, and 3.4.3.2-19 show harvest locations that reflect the more specialized habitat of eiders. More than half (53 percent) were harvested in the ocean, with Thetis Island, Atigaru Point, and Point Barrow as other maritime harvest locations. The Colville River Delta and its channels were the major freshwater harvest areas for eiders, accounting for 28 percent of the eider harvest. The Kogru-Kalikpik River area comprised 2 percent of the eider harvest.

Waterfowl are an important subsistence food and are the first fresh meat in the spring. Waterfowl are an important food for Nalukataq celebrations held by whaling captains in the early summer, and whaling crew members spend considerable effort in harvesting them. Waterfowl are harvested by hunters walking down the Nigliq Channel after

work or school without investing in fuel and equipment. Waterfowl hunting trips also are sometimes the last overland trips made to cabins and camps on Fish and Judy creeks and along the Nigliq Channel before conditions make it impossible to use snowmobiles for the season. The first boat trips of the year are taken to harvest seals and eiders (SRB&A 2003).

FURBEARER USE AREAS

During the 2003 interviews, Nuiqsut hunters described three species of terrestrial furbearers as being especially important: wolf, wolverine, and fox. Once there is adequate snow in the winter for snowmobile travel, generally by November, hunters begin the pursuit of wolf and wolverine in earnest. The harvest area for furbearers extends from the eastern edge of the Colville River Delta along the coast almost to Admiralty Bay, south along the Ikpikpuk River to the Colville River and eastward to the Toolik River, north and across the Dalton Highway to Franklin Bluffs, and west and north back to the Colville River Delta. The southern extent, in some cases, extended off of the map used for the interviews (Figure 3.4.3.2-8).

A typical furbearer hunt involves one to three hunters who travel over this vast area looking for wolf and wolverine tracks and signs. When the hunters spot tracks, they follow them until the animal can be harvested. Foxes are sometimes trapped, but only a few of the hunters interviewed still set traps. Several hunters considered fox furs harvested inland to be of better quality than those on the coast, particularly those of arctic fox, which feed on seal scraps left by polar bears and get greasy, thus staining their fur (SRB&A 2003).

Wolverine harvest locations reported for 1994 through 1995, 2000, and 2001 are divided evenly between the Colville River Delta and Fish and Judy creeks (48 percent) and other areas (52 percent), as shown on Figure 3.4.3.2-20. Similarly, 55 percent of wolves harvested during these years were harvested in the Fish and Judy creeks area, with the balance harvested elsewhere (Figure 3.4.3.2-21). One hunter, explaining where wolves and wolverines could be found, said, "Wolf, wolverine, and caribou go to the lowest levels, which have the best hiding spots. These are rivers, bluff bases, creeks, frozen ground, and low level places that allow them to hide." (SRB&A 2003)

The relatively small numbers of wolves and wolverines harvested belies their importance to the community in several ways. The pursuit of furbearers is a friendly, competitive pursuit both within the village and between villages, primarily for males, and has important functions in teaching younger hunters the landmarks and resources of a very large area. Occasionally furbearer hunters will encounter people from other villages on the tundra also engaged in furbearer hunting, fostering connections between villages in a mostly male social context. Wolf and wolverine fur continues to be an important and highly valued component in Inupiat clothing. There is an economic interest in fur hunting despite the relatively poor commercial market for fur, with one fur hunter stating that he received \$450 for a good wolverine pelt, and \$600 for a wolf pelt. This allowed him to pay for enough gas for a trip to Barrow (SRB&A 2003).

MOOSE USE AREAS

As depicted on Figure 3.4.3.2-22, moose (are hunted from the Colville River Delta area upstream to Ninuluk Creek, up the drainages of the Itkillik River and Fish and Judy creeks, and up some side streams off the Colville River. One hunter mentioned going almost to the Killik River confluence looking for moose, while several others reported Fish and Judy creeks, the Chandler and Anaktuvuk river confluences, several side streams and channels of the Colville River, and the Itkillik River area as prime moose hunting areas (SRB&A 2003). Although few moose are harvested, they are a valued component of the subsistence harvest in Nuiqsut, and hunters spend considerable effort in their pursuit. From 1994 through 1995, five moose harvests were reported (Brower and Hepa 1998). Moose offer a significant amount of meat per animal harvested because of their relatively large size compared to other terrestrial mammal subsistence resources.

August is the only month for Nuiqsut residents to harvest moose according to subsistence regulations. Many hunters plan their work schedules around this harvest period in order to participate. Moose meat is often supplied to whaling crews who usually head for Cross Island in early September. Trips including extended families and friends, as many as six boats full, travel at this time to Fish and Judy creeks, up the Colville River to the general area of Umiat, or up

the Itkillik River. Camps are set up and cabins and caches cleaned. As with other subsistence activities, these trips provide opportunities for other harvest activities including caribou hunting, fishing, and berry picking. Evenings at camp are a time for visiting, telling stories, and teaching younger people about subsistence practices (SRB&A 2003).

SEAL USE AREAS

Ringed, spotted, and bearded seals are important subsistence resources for Nuiqsut hunters. As depicted on Figure 3.4.3.2-22, seals are harvested along the coast and offshore from Cape Halkett in the west to Foggy Island Bay in the east. In the summer, Nuiqsut hunters harvest ringed and spotted seals in the Colville River as far south as Ocean Point. Hunters usually shoot seals in the water and on the ice edge in the spring (SRB&A 2003).

In April and May, hunters ride out to Harrison Bay on snowmobiles and look for breathing holes, cracks in the ice, and open water where seals could surface to breath. By the second week in June, open waters on the Colville River and much of Harrison Bay allow hunters to take boats out on a route locally called “around the world,” following the Nigliq Channel to Harrison Bay, west to Atigaru Point, then along the ice edge out as far as 28 miles, then to Thetis Island, east to Oliktok Point, then back south through the main channel of the Colville River. Thetis Island is used as a shelter should the weather turn bad, as it is crescent shaped and provides protection from wind in three directions. This route is also used to harvest eiders and occasionally walrus (SRB&A 2003).

Seals are a culturally important subsistence species for food, skin, and barter. In historic times, seal oil lamps provided heat and light for Inupiat dwellings and was used as a condiment for dried foods. Seal is still locally consumed and traded to Anaktuvuk Pass residents for dried caribou and other products. Seal skins are used for handicrafts and other articles, bartered, or sold (SRB&A 2003).

BOWHEAD WHALE USE AREA

The recent Nuiqsut subsistence bowhead whale hunting area is depicted on Figure 3.4.3.2-17. The general Nuiqsut harvest area for bowhead whales is located off the coast between the Kuparuk and Canning rivers. Nuiqsut has been a bowhead whaling community since its reestablishment in 1973. Whalers currently travel to Cross Island to conduct fall bowhead whaling. They have also used Narwhal Island as a base, and still have structures there. Cross Island has cabins and equipment for hauling and butchering the whales. Nuiqsut hunters typically travel out either the Nigliq or the main Colville channel of the Colville River Delta depending on water levels, and travel along the coast inside or just outside the barrier islands. Often they will stop at West Dock for coffee before heading due north for Cross Island. Whalers opportunistically harvest seals, caribou, and polar bears en route. After setting up camp, work groups will start fishing and hunting other species to support the whalers.

BERRIES USE AREA

Berries and plants, as shown on Figure 3.4.3.2-17, are a widely dispersed resource available for a very short time. Berries of numerous varieties are harvested in the Fish and Judy creeks area, and along the Colville, Chandler, Anaktuvuk, and Itkillik rivers. Plants such as masu (Eskimo potato), medicinal plants, and greens are harvested at the same time, usually when families are out at camp hunting and fishing in the late summer. Berry picking is still considered a job primarily for women and children, but many men mentioned picking berries as well. Berry varieties include salmonberries and blueberries. Berries are primarily harvested in August, when many families are moose hunting near the creeks and rivers in the area, and often they will fill buckets or large freezer bags of berries. These are taken home and stored in ice cellars or freezers for later use in akutuq (Eskimo ice cream) made from whipped seal or other fat, sugar, plants, and berries.

SUBSISTENCE USER AVOIDANCE OF DEVELOPED AREAS

Following the reestablishment of Nuiqsut in the Colville River Delta in 1973, community residents began to refamiliarize themselves with the subsistence resources of the area based on the knowledge of elders that had remained in the area or continued to use the area while living in other communities. Their subsistence harvest and

use areas for this period are documented in *Nuiqsut Paisanjich* in a series of maps (Brown 1979), by the NSB as part of its program of traditional land use documents (Hoffman, Spearman, and Libby 1988), and by Pedersen (1979 and In Prep). At that time, oil development was some distance from the community, but its impacts were felt by residents who had ties to the developed area and by residents who wished to use subsistence areas on the east side of the developed area (Brown 1979; Appendix A). These issues and concerns were documented in the early 1980s by researchers working under contract to the MMS for the Social and Economic Studies Program (Institute for Social and Economic Research [ISER] 1983). Chapter 6 of the report documented that the Iñupiat subsistence users perceived that there was a high potential for conflicts between industrial and Inupiat land uses and subsistence access. Figures 7 and 8 of the report showed subsistence use areas overlain on industrial areas closed to subsistence and the vast expanse of land potentially offered for lease. Chapter 7, *Perceived Threats of Oil Development*, outlines the conflicts and concerns between Inupiat subsistence uses and industry (ISER 1983:181-250). No other community in Alaska is as close as Nuiqsut to intensive oil exploration and development, and this proximity is reflected in residents' increased concerns about reduced subsistence access through increased regulations, competition with outsiders, and the imposition of physically obstructive facilities in traditional use areas (ISER 1983:223-225).

Through the 1980s, the industrial developed area expanded overland west from Prudhoe Bay, and the possibility of nearshore and offshore development near Nuiqsut was impending (IAI 1990a). By 1985, development encompassed subsistence and traditional use areas from Oliktok Point south along the Kuparuk River (Pedersen, Wolfe, Scott, and Caulfield 2000: Figure 4). The harvest of marine resources at specific locations was complicated or prevented by onshore development at traditional camps (e.g., Oliktok Point, Niakuk) and by offshore activity (e.g., drilling, seismic testing, and seafloor) (Pedersen et al. 2000).

By 1990, Galginaitis wrote in MMS SESP Special Report 8 that, "Perhaps the most obvious effect of oil development in the Nuiqsut area has been that it has effectively removed certain areas from the Nuiqsut subsistence land uses area." (IAI 1990a:1-43) Subsistence users' reasons for avoiding or not avoiding areas in response to oil development in the late 1980s were similar to those noted in the 1983 ISER study and included regulatory constraints (real or perceived), a perception of restriction, lack of cultural privacy, notice or belief that a resource is contaminated, and physical obstacles and barriers such as low pipelines and steep gravel road sideslopes (IAI 1990a: 1-43-44, ISER 1983).

As shown on Figure 3.4.3.2-2, Nuiqsut subsistence use areas have retreated from the east as development moved westward from Prudhoe Bay to Oliktok Point, particularly in the area of the Kuparuk field. Onshore development displaced subsistence uses east of the Colville River for the majority of Nuiqsut users, and the few who continued to use the area did so primarily for political purposes and did not take many caribou there (IAI 1990a: 1-44). By 1990, the concern in the community of Nuiqsut was that development would continue to encroach on their shrinking subsistence and traditional use areas on the Ikillik and Colville rivers and the Colville River Delta (IAI 1990a: 1-46). At that time, some hunters noted that further development in these subsistence use areas would impose a severe hardship on the community of Nuiqsut (IAI 1990a: 1-46).

In 1993, onshore subsistence harvests and uses east of the Colville River and north of Nuiqsut declined to near zero, and development activity was encroaching on valued traditional use areas (Pedersen et al. 2000). Whaling at Cross Island, the use of onshore camps, and storage of the bowhead harvest at Oliktok Point became deeply entwined with oil company personnel and oversight, as companies sought to minimize the time spent by Iñupiat hunters in the developed areas and to avoid attracting polar bears to Oliktok Point by shipping whale meat and *maktaq* by air to Nuiqsut (Pedersen et al. 2000). This assistance has some advantages in time and convenience for subsistence users; however, this practice reduced the autonomy of the hunters and subjected them to scrutiny and regulation throughout the whaling process, which eliminated the perception of cultural privacy (Pedersen et al. 2000).

The 1993 Nuiqsut caribou harvests within the developed area were at or near zero, four percent were within five miles of developed areas, 17 percent were harvested from six to 15 miles, and 79 percent were harvested more than 16 miles from development (Pedersen et al. 2000:18). The 1994 caribou harvest data were similar (Pedersen et al. 2000) in terms of the percent of caribou harvested in relation to harvest proximity to development. Key informants noted in a 1998 Nuiqsut group session that they no longer used the developed area northeast of Nuiqsut as

intensively as they had in the past due to difficulties of access, lack of privacy, loss of cultural landmarks, uncertainty regarding regulations, and oilfield security enforcement (Pedersen et al. 2000:18).

Harvest locations and amounts for caribou for the study years reported in Pedersen et al. 2000 (i.e., 1993 and 1994) are consistent with the published and unpublished harvest location data from the North Slope Borough Division of Wildlife Management for 1994-95, 2000 and 2001 (Brower and Hepa 1998; North Slope Borough Department of Wildlife Management 2003). Thus, the NSB data and Pedersen et al. (2000) findings support that Iñupiat subsistence users harvest most of their caribou in locations that are distant from developed areas east of the Colville River. This shift applies to most subsistence resources, these changes are ongoing in response to industrial encroachment, and are similar to those predicted in 1990 (Pedersen et al. 2000, IAI 1990a). The main reasons for this avoidance of previously used areas east of the Colville River cited by Pedersen et al. include “difficulties of access, lack of privacy when hunting, loss of cultural landmarks, uncertainty regarding regulations in the area, and oilfield security enforcement” (Pedersen et al. 2000:18).

Pedersen and Taalak (2001) conducted a survey of Nuiqsut households for the June 1999 through May 2000 time period. Caribou were the most widely used terrestrial big game resource in Nuiqsut, with an average of four caribou per household when averaged for all community households. According to an open file draft report by Pedersen and Taalak (2001), 75 percent of the 371 caribou harvested by Nuiqsut hunters from June 1999 through May 2002 with known harvest locations were harvested west of Nuiqsut, 11 percent in the immediate vicinity of the community and only 14 percent to the east. Seventy-eight percent of all known caribou harvests occurred away (6 to greater than 16 miles) from oil production facilities in 1999 and 2000. Twenty-two percent were reported harvested in peripheral areas (0 to 5 miles) to development and there were no reports of harvests during this time period inside the industrial developed area. In general, these findings are consistent with the earlier conclusions for the 1993 and 1994 caribou harvests (Pedersen et al. 2000). However, the 1999 and 2000 caribou harvest distances greater than 16 miles from oil development dropped to 51 percent compared to 79 percent in 1993 and 77 percent in 1994. This change is the result of oil development (Alpine Field) moving west into the Colville River Delta, an area of focused Nuiqsut caribou harvests, especially June through September. Development in this area is too recent and there are insufficient data available to conclude whether or not harvesters will increase their distance from development in response to this relatively new facility. Furthermore, in 1999 and 2000, the Alpine Field footprint was relatively small compared to larger development east of the Colville River, and CPAI has made efforts to work with Nuiqsut to accommodate hunters. Systematic, time series monitoring of subsistence harvests and locations to document any changes to subsistence harvest patterns is being undertaken in Nuiqsut, Barrow, and Atkasuk by the ADF&G and the ICAS (Pedersen 2004:personal communication). Based on Pederson et al. (2000) and Pedersen and Taalak (2001) data, as a consequence of oil development, Nuiqsut caribou harvesters tend to avoid development, with approximately 78 percent of the 1993 and 1994 caribou harvests occurring greater than 16 miles from the development east of the Colville River and 51 percent of the 1999 and 2000 harvests occurring greater than 16 miles, and 27 percent occurring 6 to 15 miles from Alpine Field development.

Further development anticipated in Pedersen et al. (2000) has come to pass with the development of the Alpine Field Meltwater, Tarn, Fiord, and other oilfields in the vicinity of Nuiqsut. This ongoing development has contributed to a feeling of being “boxed in” for Nuiqsut subsistence users (Pedersen et al. 2000:4, 19). The Committee on the Environmental Effects of Oil and Gas Activities on Alaska’s North Slope recently concluded in a National Research Council report that,

“On-land subsistence activities have been affected by the reduction in the harvest area in and around the oilfields. The reductions are greatest in the Prudhoe Bay field, which has been closed to hunting, and in the Kuparuk field, where the high density of roads, drill pads, and pipelines inhibits travel by snow machine. The reduction in area used for subsistence is most significant for Nuiqsut, the village closest to the oilfield complex. Even where access is possible, hunters are often reluctant to enter oilfields for personal, aesthetic, or safety reasons. There is thus a net reduction in the available area, and this reduction continues as the oilfields spread.” (National Research Council 2003:156)

BARROW SUBSISTENCE ACTIVITIES

The Inupiat name for the Barrow area is Utqiagviq, meaning “the place where we hunt snowy owls.” Barrow is situated on a point of land where the sea ice is prone to cracking. The main subsistence focus, however, has been marine mammal hunting, in particular, whaling. Barrow is one of 10 Alaska Eskimo bowhead whaling communities. Bowhead whale hunting is the key activity in the organization of social relations in the community and represents one of the greatest concentrations of effort, time, money, group symbolism, and significance (SRB&A and ISER 1993). Other harvested resources, such as caribou, waterfowl, and several varieties of fish, are vital for subsistence and available near Barrow but have less influence on the organization of social relations. The reliance on subsistence activities remains a key component of the Barrow economy and the local Inupiat culture.

CONTEMPORARY SEASONAL ROUND

Barrow’s seasonal round is related to the timing of subsistence resources. Preparation for bowhead whaling occurs year-round. Barrow hunters harvest caribou in April; however, because of pre-calving and calving, hunters usually refrain from taking caribou until late June. The harvest of eiders and geese begins in early to mid-May, weather and ice conditions permitting. Spring bowhead hunting occurs during April and May, with May generally being the most successful month (SRB&A and ISER 1993). In the past, as they hunted whales, crew members also opportunistically hunted a number of other marine mammals, such as seals and polar bears. Beginning with the whaling season of 1978, bowhead whale quotas instituted by the International Whaling Commission altered traditional spring whaling activities by reducing opportunity for harvesting bowheads and limiting the pursuit of other marine mammals so as not to jeopardize the bowhead hunt.

Once the spring whaling season is over, usually late May or early June, subsistence activities diversify. Some hunters turn their attention to hunting seals, walrus, and polar bears, while others go inland to hunt for waterfowl. In June, Inupiat hunters continue to hunt geese and opportunistically harvest caribou, ptarmigan, and eiders. Barrow residents harvest caribou in July and August when they are available to people hunting from boats. In addition, caribou are in peak condition in August, and Barrow hunters prefer to harvest them at that time (Fuller and George 1999). Barrow hunters also harvest marine mammals, eiders, and fish, and caribou in August, depending on the weather and ice conditions. Bearded seals are harvested principally for their blubber, which is rendered into oil, and for their skins, which are used for boat coverings. Barrow hunters harvest ringed seals primarily for their meat. Walrus are harvested in July and August when they drift north with the floe ice and if the pack ice moves close enough to Barrow. Freshwater fishing occurs from break-up (June) through November (Fuller and George 1999). Residents fish for arctic cod year-round, but broad whitefish, the most heavily harvested species, are harvested from June to October (Fuller and George 1999). Fish harvested in August include whitefish, grayling, salmon, and capelin. When the weather turns warm, Barrow hunters typically harvest caribou by boat along the coastal areas as the caribou move to the coast to escape the heat and insects. Residents of Barrow harvest eiders during the “fall migration” in July at Pigniq or “Duck Camp.” Families may go up the Colville River to harvest moose and berries during moose hunting season in August and early September (Fuller and George 1999).

If ice conditions are favorable, fall bowhead whaling can occur as early as mid-August and continue into October. More recently, Barrow whalers have agreed to start the fall whaling season in early October in order to harvest the smaller preferred whales. Residents of Barrow who have remained inland hunt caribou if the animals are accessible; otherwise, they concentrate on fishing for broad whitefish. The subsistence fish harvest generally peaks in October (under-ice fishery), when whitefish and grayling are concentrated at overwintering areas (Fuller and George 1999). Barrow residents also harvest ground (or parka) squirrels and ptarmigan, and, if weather and ice conditions permit and the animals appear close to town, seals and caribou are harvested during November and December (SRB&A and ISER 1993). During the winter months, residents of Barrow harvest furbearers. Table 3.4.3-4 summarizes Barrow’s annual cycle of subsistence activities.

TABLE 3.4.3-4 ANNUAL CYCLE OF SUBSISTENCE ACTIVITIES – BARROW

	Winter					Spring		Summer			Fall	
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Fish												
Birds												
Berries												
Furbearers												
Caribou												
Polar Bear												
Seals												
Walrus												
Bowhead												

Sources: SRB&A & ISER 1993; SRB&A 2003.

Notes:

	No to Very Low Levels of Subsistence Activity
	Low to Medium Levels of Subsistence Activity
	High Levels of Subsistence Activity

SUBSISTENCE HARVEST ESTIMATES

SRB&A collected Barrow subsistence harvest data for 1987, 1988, and 1989 (SRB&A and ISER 1993). Barrow's total annual subsistence harvests ranged from 621,067 pounds in 1987 to 614,669 pounds in 1988, and 872,092 in 1989 (Table 3.4.3-5). The 1989 harvest of 289 pounds per capita of wild resources represents nearly 1 pound per day per person in the community. Barrow residents rely heavily on large land and marine mammals and fish (Table 3.4.3-5). Marine mammals comprised approximately 55 percent of the total for the three study years, and land mammals contributed 30 percent of the total.

Bowhead whales, caribou, walrus, and whitefish accounted for approximately 85 percent of Barrow's annual subsistence harvest in terms of edible pounds in 1989 (Table 3.4.3-6). In 1992, the total harvest of marine mammals (bowhead whales, walrus, and ringed and bearded seals) accounted for approximately 72.5 percent of the total village harvest of all species, and bowhead whales provided the single greatest contribution of food to the community (Tables 3.4.3-5 and 3.4.3-6) (Fuller and George 1999). The success of bowhead whaling in 1992 resulted in a relative decrease in the harvest of other resources such as fish. Land mammals (caribou, moose, and Dall sheep) contributed approximately 18.5 percent of the total harvest in Barrow in 1992, and caribou was the principal terrestrial resource. Nearly half (45 percent) of Barrow households participated in caribou hunting in 1992 (Fuller and George 1999). In general, caribou is one of the most consistently eaten subsistence resources in Barrow (Fuller and George 1999). In 1992, fish constituted approximately 7 percent of the total harvest in Barrow, with broad whitefish being the most important fish resource. Birds (eiders and geese) contributed less than 2 percent of the total harvest by weight; however, participation in bird hunting was high (Fuller and George 1999).

TABLE 3.4.3.5 BARROW SUBSISTENCE HARVESTS AND SUBSISTENCE ACTIVITIES, 1987-1992

Resource	Percentage of Households					Estimated Harvest				
	Use	Try to Harvest	Harvest	Receive	Give	Number	Total Pounds	Mean HH Pounds	Per Capita Lbs.	% Total Harvest
1987										
All Resources			58				621,067	663	206	100
Fish			33			45,563	68,452	73	23	11
Salmon			3			196	1,190	1	0	<1
Non-Salmon						45,367	67,262	72	22	11
Land Mammals			30			1,893	213,835	228	71	34
Large Land						1,660	213,777	228	71	34
Small Land						233	58	0	0	<1
Marine Mammals			41				316,229	337	105	51
Birds and Eggs			36			10,579	22,335	24	7	4
Vegetation			3				216	0	0	<1
1988										
All Resources			50				614,669	656	204	100
Fish			18			38,085	51,062	54	17	8
Salmon			1			80	490	1	0	<1
Non-Salmon			14			38,005	50,571	54	17	8
Land Mammals			27			1,751	207,005	221	69	34
Large Land			27			1,599	207,005	221	69	34
Small Land						152	0	0	0	<1
Marine Mammals			39			654	334,069	357	111	54
Birds and Eggs			34			9,183	22,364	24	7	4
Vegetation			2				169	0	0	0
1989										
All Resources			61				872,092	931	289	100
Fish			29			68,287	118,471	126	39	14
Salmon			10			2,088	12,244	13	4	1
Non-Salmon			13			66,199	106,226	113	35	12
Land Mammals			43			1,774	214,683	229	71	25
Large Land			39			1,705	214,676	229	71	25
Small Land			2			68	7	0	0	<1
Marine Mammals			45				508,181	542	169	58
Birds and Eggs			41			12,869	29,446	31	10	3
Vegetation							1,312	1	0	<1
1992										
All Resources							1,363,736	1,190	349	100
Fish							96,003	84	25	7
Land Mammals							252,661	220	65	18.5
Marine Mammals							989,348	863	253	72.5
Birds and Eggs							23,866	21	6	2
Invertebrates							694	1	0	<1
Vegetation							1,164	1	0	<1

Sources: SRB&A and ISER 1993 (for 1987-1989); Fuller and George 1999 (for 1992); SRB&A 2003.

TABLE 3.4.3-6 SELECTED BARROW SUBSISTENCE HARVESTS FOR 1987, 1988, 1989, AND 1992

Resource	Estimated Harvest				
	Number	Total Pounds	Mean HH Pounds	Per Capita Pounds	% of Total Harvest
1987					
Caribou	1,595	186,669	199	62	30
Bowhead	7	184,629	197	61	30
Seal	704	61,194	65	20	10
Walrus	84	64,663	69	21	10
Whitefish	27,367	51,253	55	17	8
Moose	52	25,786	28	9	4
Geese	2,873	12,740	14	4	2
Grayling	12,664	10,131	11	3	2
Polar Bear	12	5,744	6	2	1
Duck	5,252	7,878	8	3	1
1988					
Bowhead	11	233,313	249	77	38
Caribou	1,533	179,314	191	59	29
Seal	570	47,890	51	16	8
Walrus	61	47,215	50	16	8
Whitefish	20,630	39,766	42	13	6
Moose	53	26,367	28	9	4
Geese	3,334	14,672	16	5	2
Polar Bear	11	5,650	6	2	1
Duck	4,498	6,747	7	2	1
Grayling	8,684	6,947	7	2	1
1989					
Bowhead	10	377,647	403	125	43
Caribou	1,656	193,744	207	64	22
Whitefish	38,054	92,399	99	31	11
Walrus	101	77,987	83	26	9
Seal	440	33,077	35	11	4
Geese	3,944	16,289	17	5	2
Moose	40	20,014	21	7	2
Polar Bear	39	19,471	21	6	2
Duck	8,589	12,883	14	4	1
Grayling	8,393	6,714	7	2	1
1992					
Bowhead	22	729,952	637	187	54
Caribou	1,993	233,206	203	60	17
Walrus	206	159,236	139	41	12
Bearded Seal	81,471	463	71	21	6
Broad Whitefish	59,993	23,997	52	15	4

Source: SRB&A and ISER 1993 (for 1987-1989); Fuller and George 1999 (for 1992); SRB&A 2003

CONTEMPORARY SUBSISTENCE USE AREAS

The community of Barrow incorporates residents from throughout the NSB. Many residents tend to hunt in the areas where they were raised, which could include the subsistence harvest areas of other communities. Barrow residents

may receive subsistence foods from areas outside of Barrow. Former residents and family members who now reside in Anchorage or Fairbanks may receive subsistence foods from Barrow. Pedersen (1979) documented Barrow subsistence use areas in the 1970s (Figure 3.4.3.2-23) and SRB&A and ISER (1993) conducted a 3-year subsistence harvest study in Barrow for the 1987 to 1989 harvest years (Figure 3.4.3.2-24). With a few exceptions that are generally associated with offshore and furbearer use, the harvest locations for the 1987 to 1989 study period are located within Pedersen's (1979) Barrow lifetime community land uses area, depicted on Figure 3.4.3.2-25. The documented Barrow subsistence use area represents a large geographic area, extending from beyond Wainwright in the west to the Kuparuk River in the east and south to the Avuna River. Inland use areas go beyond the Colville River to the foothills of the Brooks Range. The Barrow subsistence harvest data from both the 1970s and 1980s show Barrow residents using the Colville River Delta area for subsistence activities.

CONTEMPORARY SUBSISTENCE USE AREAS EAST OF THE COMMUNITY

In August 2003, SRB&A interviewed eight subsistence harvesters in Barrow. One purpose of these interviews was to learn whether and to what extent Barrow subsistence harvesters use the Kogru and Kalikpik rivers, Fish and Judy creeks, and Colville River Delta area for subsistence activities. These interviews focused on these three areas and did not represent a comprehensive discussion of Barrow subsistence use areas. SRB&A coordinated these interviews with the ICAS, which identified Barrow subsistence users for these interviews. ICAS chose subsistence hunters who either traveled far to the east of Barrow or who had been raised east of Barrow and returned to their "homeland" for subsistence activities.

As shown on Figure 3.4.3.2-25, the area currently used by the eight interviewed hunters generally coincided with the Barrow lifetime community land uses area east and southeast of Barrow with some exceptions: the interviewed hunters generally did not utilize the formerly used area east of the Itkillik River; they traveled farther south in the vicinity of the Anaktuvuk River; and they made expanded use of the area near the Titaluk and Kigalik rivers approximately 120 miles south of Barrow.

Generally, the interviewed Barrow hunters used the area east of Cape Halkett to pursue wolf, wolverine and caribou. The winter wolf, wolverine and caribou hunting area overlapped, as hunters looking for wolf and wolverine tended to travel over great distances and also harvested caribou on their travels. In summer, the caribou use area extended down the coast from Smith Bay to Cape Halkett, across the coastal areas of Harrison Bay, to the Colville River Delta and up the Colville River as far as Ocean Point. One Barrow interviewee indicated he had hunted moose in the Colville River from south of Umiat to approximately Ocean Point. The interviewed Barrow hunters indicated that they fished as far east as the lakes in the vicinity of Cape Halkett.

Several families now living in Barrow have elders who were born and raised along the coast between Smith Bay and the Colville River Delta. These families had moved to Barrow primarily because of the requirement that children attend school, with some moving to take jobs or access medical care. Most moved to Barrow in the late 1940s. Once they resided in Barrow, each family made special efforts to return to the Smith Bay to Cape Halkett area to continue traditional subsistence activities at traditional family harvest areas. Currently, the third generation of these families continues to use the area, often harvesting resources that are not as available in the Barrow area. These include furbearers (wolf, wolverine, fox, and arctic ground squirrels), caribou, and moose. Seals and fish are harvested closer to Barrow. A Barrow hunter described a recent summer caribou hunt:

"When the Western Arctic Herd are further west from Barrow in Point Lay or Point Hope, that's too far to travel. We had to go east through the ocean to the Cape Halkett area and go into creeks looking for caribou. On nice warm days, you find caribou on the coast and in the water, in the end of July or the first part of August. We go for one week. My uncle has a cabin near Cape Halkett." (SRB&A 2003)

Furbearer hunts are unlike subsistence food resource hunts in that they are competitive but friendly. Furs are not shared in the same way as food resources, and the hunts are conducted over much larger areas. One hunter clearly stated this, saying, in good humor, "We fish closest to our own area, we do not try to step on each others toes with fish, but we have no respect [for territory] when it comes to wolf and wolverines!" Barrow residents from the same families noted for their connections with the Cape Halkett area use a vast area to the south and east of Teshekpuk

Lake for furbearer hunting and go into the Fish and Judy creeks, Ublutuoch River, Itkillik River, and Umiat areas while looking for wolves and wolverines (Figure 3.4.3.2-25). One hunter interviewed said, “I like to go to the south side of Teshekpuk Lake, Inigok, and Umiat before the snow is too soft, to get wolves and wolverines for clothing.” Another hunter, explaining his winter hunting by snowmobile, said,

“From February through March, I travel to the east for furbearers. I go down to Price River, then to Fish and Judy Creek, then through Inigok to the Ikpikpuk, back over to the Colville to Umiat, down through the Itkillik, back and forth in a circle, then up to Teshekpuk Lake. I go on both sides of the river. By April the fur isn’t so great, so I go home.” (SRB&A 2003)

Several Barrow families have relatives living in Nuiqsut, and people move back and forth between the two communities. Barrow residents have ancestral ties to areas between Barrow and Nuiqsut, and people continue to return to those areas for subsistence activities at traditionally used places. Barrow hunters use the Plan Area primarily for caribou, moose, and furbearers (wolf and wolverine). This area is used in both summer (boat) and winter (snowmobile).

According to the 2003 interview data (SRB&A 2003), Barrow hunters occasionally use the Kalikpik-Kogru rivers area for caribou, especially if caribou are not available closer to Barrow. The interviewed hunters traveled by boat as far as the Kogru River. It is likely that other Barrow hunters travel further east. This area is both an historic and current use area for several Barrow families. The Colville River Delta is on the eastern edge of use area. Barrow residents make use of the Fish and Judy creeks area for caribou, wolf, wolverine, and fox. Access to this area is primarily by snowmobile in winter. Hunters use cabins and camps near Teshekpuk Lake and along the Ikpikpuk and Chipp rivers as bases for snowmobile travel.

In addition to the harvest of resources, use of these areas is important to Barrow residents for maintaining connection to family history, graves, structures, caches, ice cellars, campsites and traditional harvest areas. Although there are high costs in fuel, time, equipment, and effort for these trips, the cultural connection to these traditional areas is strong.

ATQASUK SUBSISTENCE ACTIVITIES

The village of Atqasuk is situated on the banks of the Meade River, 60 air miles south of Barrow. Near the site of several former settlements used in prehistoric and historic times, the current village is situated near a coal mine that provided fuel for Barrow during and after World War II, when the village was known as Meade River. The area is rich in caribou, fish, and waterfowl, and hunters access areas of the coast for seals and other marine resources. Some Atqasuk hunters are members of Barrow and Wainwright whaling crews and take part in bowhead whaling and festivities, returning with shares after a successful harvest.

CONTEMPORARY SEASONAL ROUND

Atqasuk subsistence harvests rely on a diversity of seasonally abundant resources that hunters must harvest when available. Some species, like ptarmigan, could be present year-round, but are only harvested when encountered. December and January are often not productive months for subsistence resource pursuits because of the winter weather and seasonal darkness. Between February and April, fur trappers travel along trapline routes to harvest wolves, foxes, and wolverines. In late February and through March, some residents begin fishing under the ice on the Meade River, its tributaries, and any lakes that do not freeze completely. Hunters may harvest caribou if they are encountered at this time, and the need to harvest more caribou could increase through March as late fall supplies are depleted. The harvest of caribou increases as daylight increases and the weather becomes increasingly moderate. Some residents may travel to Barrow or Wainwright to participate in spring whaling. Beginning in May, hunters pursue migrating birds and caribou. The break-up of river ice and lack of snow in June make travel difficult. After the ice goes out, gill-netters harvest fish near the community as the fish move upriver to spawn. The high water on the rivers and lakes of the area in late spring and early summer allows the most extensive boat travel. Later in the summer, the water levels could be too low to allow long-range travel, so community residents plan their travels for late June through July. Subsistence resources are particularly abundant from July through September. Hunters

harvest caribou, grizzly bears, moose, squirrels, and migratory birds throughout the summer. By October, migratory birds have left the area, and hunters shift their focus to caribou and fish. In November, hunters attempt to harvest enough caribou for the upcoming winter, and fish have left most of the lakes for the deep river channels to overwinter. Table 3.4.3-7 depicts the annual cycle of subsistence activities at Atqasuk.

TABLE 3.4.3-7 ANNUAL CYCLE OF SUBSISTENCE ACTIVITIES – ATQASUK

	Winter					Spring		Summer			Fall	
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Fish												
Birds/Eggs												
Berries												
Moose												
Caribou												
Furbearers												

Source: Schneider et al. 1980; SRB&A 2003.

Notes:

	No to Very Low Levels of Subsistence Activity
	Low to Medium Levels of Subsistence Activity
	High Levels of Subsistence Activity

SUBSISTENCE HARVESTS

Atqasuk is similar to Nuiqsut in that residents harvest caribou, fish, and birds locally; however, Atqasuk is more connected to Barrow and Wainwright for marine mammal harvests and membership in whaling crews (Hepa et al. 1997). Limited subsistence harvest data are available for Atqasuk (Tables 3.4.3-7 through 3.4.3-9). Neither the ADF&G nor the MMS have reported these data, and the NSB Department of Wildlife Management has reported only harvest data for one harvest year (1994 to 1995) (Hepa et al. 1997) and only participation data for 1992 (Fuller and George 1999). The NSB has collected 3 years of additional harvest data for Atqasuk that have not been published to date. A final report is expected by the spring of 2005. For 1994 to 1995, 57 percent of the harvest by edible pounds consisted of caribou, with 37 percent fish, 3 percent birds, 2 percent marine mammals, and 1 percent plants. Atqasuk residents harvested caribou primarily within 10 miles of Atqasuk, with the majority harvested between July and December (Hepa et al. 1997, Figures 6 and 8, Appendix 7). Residents harvested fish between June and November, with the greatest number of fish harvested between August and October (Hepa et al. 1997). Subsistence hunters at Atqasuk harvested 279 birds in May, 8 seals in July, and 84 gallons of berries between July and September (Hepa et al. 1997) (Table 3.4.3-8). Other subsistence foods could be received as shares, traded, or bartered within the community and with other villages (Hepa et al. 1997). In 1994 to 1995, 91 percent of Atqasuk households shared their harvested resources (Table 3.4.3-9). Between October and May, hunters of furbearers harvested 2 wolves, 10 wolverines, and 6 ground squirrels (Hepa et al. 1997).

Most Atqasuk residents participated in subsistence activities and shared subsistence resource harvests. Of the interviewed households in 1994 to 1995, 77 percent of residents attempted and/or succeeded in harvesting subsistence resources (Hepa et al. 1997). Fuller and George (1999) report similar participation rate information for the 1992 harvest year. Of those successfully harvesting subsistence resources in 1994 to 1995, 91 percent shared their resources with others and four percent did not. It was not known if the remaining 5 percent of Atqasuk households shared subsistence resources (Hepa et al. 1997).

TABLE 3.4.3-8 ATQASUK SUBSISTENCE HARVEST TOTALS, ACTUAL AND ESTIMATED FOR 1994-1995

Harvest Items	Total Number Harvested for 40 Households	Estimated Total Number Harvested for 56 Households
Whitefish	1,400	1,960
Broad Whitefish	1,630	2,282
Burbot	162	227
Grayling	5,716	8,002
Humpback Whitefish	500	700
Rainbow Trout	15	21
Silver Salmon	10	14
Salmonberries (Gal)	72	101
Blueberries (Gal)	12	17
White Fronted Goose	76	106
Goose Unidentified	168	235
Canada Goose	2	3
Brant	5	7
Eider Unidentified	12	17
Ptarmigan	16	22
Caribou	187	262
Ground Squirrel	6	8
Wolf	2	3
Wolverine	10	14
Ringed Seal	4	6
Bearded Seal	4	6

Sources: Hepa et al. 1997; SRB&A 2003.

TABLE 3.4.3-9 ATQASUK SUBSISTENCE HARVESTS PARTICIPATION FOR 1994-1995

Harvest Participation		Harvest Instances Resulting in Sharing	
Successful Harvest	74%	Shared	91%
Attempted, not Successful	3%	Did Not Share	4%
Did not attempt	23%	Unknown	5%

Sources: Hepa et al. 1997; SRB&A 2003.

CONTEMPORARY SUBSISTENCE USE AREAS

Subsistence hunters at Atqasuk use harvest locations relatively close to the village, with some use of the coast west of Barrow and of Dease Inlet (Hepa, Brower, and Bates 1997: Appendix 7; Schneider, Pederson, and Libbey 1980). The main advantages of Atqasuk's location are access to riverine and lacustrine resources, and position in the migration path of the Teshekpuk caribou herd (Schneider, Pederson, and Libbey 1980: 78-80). Based on Pedersen (1979), Atqasuk's 1970s subsistence use area is shown on Figure 3.4.3.2-26 and extends from northeast of Wainwright to Barrow, along the coast to the vicinity of Smith Bay, south along the Ikpikpuk River to the Titaluk River, and west and north to Peard Bay.

ATQASUK SUBSISTENCE USE AREAS EAST OF THE COMMUNITY

In August 2003, SRB&A interviewed seven subsistence harvesters in Atqasuk. One of the purposes of these interviews was to learn if Atqasuk residents currently used the Kogru and Kalikpik rivers, Fish and Judy creeks, or Colville River Delta for subsistence activities. SRB&A coordinated the interviews with the ICAS, which identified knowledgeable Atqasuk subsistence users for these interviews. The interviews focused on areas east of Atqasuk and did not specifically address current subsistence uses north, south, or west of Atqasuk.

Based on SRB&A interviews of subsistence users in Atqasuk, the recent (last 10 years) use area has expanded as compared to the use area depicted by Pedersen (1979) and extends from the eastern edge of Teshekpuk Lake in the east to the Kaolak River in the west, the Inaru River in the north, and beyond the Colville River in the south (Figure 3.4.3.2-27). Several Atqasuk residents have ties to the Smith Bay-Cape Halkett-Kogru River areas, and some of these residents intensively used the area north and southeast of Teshekpuk Lake in their youth. One hunter stated that there were “numerous small camps and villages along the coast between Drew Point, Smith Bay, and Dease Inlet. It was a [caribou] grazing area.” He explained that there were a lot of ice cellars at spot between Ikpikpuk River and Teshekpuk Lake at a spot named Shubjat. Several families had ice cellars in this area because it was high, dry ground and away from the coast where polar bears, with their keen sense of smell, would dig up the coastal ice cellars (SRB&A 2003).

Based on the 2003 interviews, Atqasuk hunters traveled east as far as Fish and Judy creeks (Figure 3.4.3.2-27). Resources sought in the eastern portion of the current Atqasuk use area include fish in the Ikpikpuk River and lakes west of Teshekpuk Lake, in the winter, and winter wolf, wolverine, and caribou. The harvest of caribou in this eastern area is incidental to the pursuit of wolves and wolverines. This pursuit of wolf and wolverine with incidental caribou harvests takes Atqasuk hunters far from the community on several extended trips each winter. During the summer and fall, subsistence use areas for caribou, fish, berries, and waterfowl are primarily centered around Atqasuk, generally within 50 miles of the community. The harvest of resources near Atqasuk, both in the summer and winter, consists of day trips involving snowmobiles, all-terrain vehicles, and boats, dependent on season. However, one subsistence user who was interviewed said he would go to one harvest area for a week, and then he would go home for a week or two, gas up and go to another harvest area.

It is not uncommon for winter hunters on snowmobiles to encounter hunters from other communities. At these junctures, the hunting area of one community overlaps with the hunting area from another community. One Atqasuk hunter who took several long winter hunting trips said that he does not go to the area above Umiat. He stated that he leaves “that country to those guys in Nuiqsut. They come up and hunt all over that area in moose season.” (SRB&A 2003) The limited Atqasuk interviews indicated that Atqasuk hunters do not hunt currently in the Nuiqsut or Colville River areas but only travel to Nuiqsut for special occasions, such as funerals, and do not use that area for subsistence purposes.

Atqasuk residents harvest most resources near their community. Furbearer hunters travel the furthest from Atqasuk and also harvest incidental caribou during these trips. Atqasuk hunters encounter furbearer and caribou hunters from other communities on these extensive travels. The area of the Kalikpik and Kogru rivers is occasionally used by Atqasuk hunters traveling by snowmobile primarily in search of wolf and wolverine in winter. The area is “homeland” for several Atqasuk families, and in the past they traveled by boat and harvested caribou, birds, and fish in this area. According to the interviews, Atqasuk residents make little use of the Colville River Delta. Atqasuk hunters occasionally use the Fish and Judy creeks area primarily for wolf and wolverine hunting in winter. Caribou could be taken incidental to furbearer hunting. Hunters make use of camps and cabins belonging to hunters, often relatives, from other communities to support their hunting trips.

ANAKTUVUK PASS

Anaktuvuk Pass is just south of the continental divide in a low pass connecting the drainages of the Anaktuvuk and John rivers, 60 miles west of the Dalton Highway. The area has been used by the interior Inupiat people called the Nunamiut for at least 500 years and by Inupiat predecessor groups for at least 4,000 years. The modern village began in 1949 with the establishment of a trading post, followed by a post office in 1951 and a church in 1958.

Residents incorporated as a fourth class city in 1959. A permanent school was established in 1961, and the community was reclassified as a second-class city in 1971 (Hall, Gerlach, and Blackman 1985).

The Nunamiut people of Anaktuvuk Pass are among the few in the NSB without direct access to marine mammals. As a consequence, the Inupiat of this village rely heavily on terrestrial mammals and fish for subsistence. Caribou is the main terrestrial mammal resource, with moose and Dall sheep also important species for hunters. Freshwater fish from area lakes and streams are an important supplement to terrestrial mammals. Terrestrial resources are often bartered with other communities, particularly Nuiqsut and Barrow, for marine resources (Brower and Opie 1996, Fuller and George 1999).

Hall, Gerlach, and Blackman (1985) have divided the history of the people of Anaktuvuk Pass into seven periods: prehistoric (before 1860), protohistoric (1860-1890), pre-removal historic (1890-1920), the coastal hiatus (1920-1934), the return (1934-1949), settlement (1949-1960) and mechanization (1960-1984). This structuring of events revolves around the arrival of Euro-Americans, the historic depopulation of the Brooks Range and interior in response to environmental and historical events, and the resettlement of those areas.

Euro-American contact beginning in the nineteenth century and the cyclical nature of the environment (e.g. fluctuations in caribou herds) worked together to change the Nunamiut way of life from the protohistoric through the coastal hiatus periods. A caribou population crash and the advent of commercial whaling in the latter half of the nineteenth century; sustained contact with Euro-Americans; the introduction of new technology (such as rifles), trade goods (flour, tea, sugar, coffee), and diseases, and the integration of Inupiat people into the world economic system (commercial whaling and later fur trapping) all had effects on the Inupiat of the interior. The result of these changes was that many were drawn to the coast through the Colville River area. Many Nunamiut dispersed along the coast to participate in commercial whaling and fur trapping, and to access the greater abundance and diversity of subsistence and imported resources in the coastal areas. Others moved towards Fort Yukon and the Mackenzie River area, where the porcupine herd was more numerous than the western arctic caribou herd (Hall, Gerlach, and Blackman 1985).

Following the decline of commercial whaling that ended by 1910, falling fur prices in the 1930s, and the steady rebound in western arctic caribou populations, Inupiat people returned to the Brooks Range in the late 1930s. Many followed the Colville River back to Anaktuvuk Pass, a location preferred by Nunamiut people for its ready access to caribou, moose, Dall sheep, and fish. A trading post was built in Anaktuvuk Pass, and then a school, which became the nucleus of a community that drew in Nunamiut people from several communities in the Brooks Range. The maintenance of the subsistence way of life from a sedentary village was partially facilitated by the use of a variety of all terrain vehicles to replace pack dogs. These all terrain vehicles include snowmobiles, four-, six-, and eight-wheeled vehicles, and tracked vehicles (Hall, Gerlach, and Blackman 1985).

CONTEMPORARY SEASONAL ROUND

Caribou hunting is the mainstay of the Nunamiut subsistence hunt, and caribou are hunted year-round as needed, but in particular August through November. The caribou migrate through the Anaktuvuk Pass area twice a year, in the spring and fall, but the number and timing of the caribou migrating through the area vary from year to year. The 1994 to 1995 harvest year was one such anomalous year when the migrations were small and the summer availability was high—a time when the caribou are normally out on the coastal plain for insect relief (Brower and Opie 1996). Dall sheep, brown bear, and moose are hunted in August, September, and October some distance from the village, with Dall sheep the main target and the others secondary (Brower and Opie 1996). Birds and fish are supplementary to terrestrial mammals, but are harvested when available and are more important if caribou numbers are low (Brower and Opie 1996). Berries are seasonally important, with salmonberries and blueberries providing the majority of vegetable foods (Brower and Opie 1996). Table 3.4.3-10 depicts the annual cycle of subsistence activities at Anaktuvuk Pass.

TABLE 3.4.3-10 ANNUAL CYCLE OF SUBSISTENCE ACTIVITIES – ANAKTUVUK PASS

	Winter					Spring		Summer			Fall	
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Caribou												
Sheep												
Moose												
Ptarmigan												
Furbearers												
Fish												
Berries												

Source: Brower and Opie 1996; SRB&A 2003a.

Notes:

	No to Very Low Levels of Subsistence Activity
	Low to Medium Levels of Subsistence Activity
	High Levels of Subsistence Activity

SUBSISTENCE HARVESTS

As mentioned previously, Anaktuvuk Pass is unlike the other NSB communities in that resource users there have no direct access to the marine mammal resource that in many ways defines the Inupiat of the coast. The data below indicate that terrestrial mammals are the most important resource, with nearly three-fourths of the community participating in the harvest of land mammals, which compose 88 to 95 percent of the harvest (Table 3.4.3-11). Caribou are the main terrestrial mammal species harvested, with moose and sheep also harvested in small numbers (Table 3.4.3-12). Fish are a smaller component of the subsistence diet by weight but are an important food source. Fish species harvested include grayling, arctic char, lake trout, burbot, and pike. Birds harvested during the brief migration include a variety of geese and ducks. Preferred species are white-fronted and Canada geese and several species of small ducks such as pintails. Vegetation harvested includes berries and *masu*, or “Eskimo potatoes.” (SRB&A 2003)

TABLE 3.4.3-11 ANAKTUVUK PASS SUBSISTENCE HARVESTS AND SUBSISTENCE ACTIVITIES

Resource	Percentage of Households					Estimated Harvest				
	Use	Try to Harvest	Harvest	Receive	Give	Number	Total Pounds	Mean HH Pounds	Per Capita Pounds	% Total Harvest
1992										
All resources							85,040	1,076	315	100
Fish		67				4,892	6,897	87	26	8
Land mammals		74				771	74,412	942	276	88
Marine mammals		1				0	0	0	0	0
Birds/eggs		21				733	913	12	3	1
Vegetation		68				607	2,818	36	10	3
1994-1995										
All resources		62	61		75					100
Fish						1,282				4
Land mammals						424				95
Marine mammals						0				0
Birds/eggs						196				>1
Vegetation						21				>1

Source: Brower and Opie 1996; Fuller and George 1999; SRB&A 2003

TABLE 3.4.3-12 SELECTED ANAKTUVUK PASS SUBSISTENCE HARVESTS

Study Year	Resource	Estimated Harvest				
		Number	Total Pounds	Mean HH Pounds	Per Capita Pounds	% Total Harvest
1990 ^a	Caribou	592	69,964	985	223	
1991 ^a	Caribou	545	66,712	940	245	
1992 ^a	Caribou	600	70,222	889	260	83
	Dall sheep	32	3,168	40	12	4
	Grayling	3709	2,967	38	11	4
	Lake trout	531	2,124	27	8	3
	Arctic char	640	1,791	23	7	2
1993	Caribou	574	67,713	846	219	
1994-1995	Caribou	322				83
	Dall sheep	27				13
	Grayling	931				1
	Lake trout	80				1
	Arctic char	215				1

Source: ADF&G, 2001; Brower and Opie 1996; Fuller and George 1999; SRB&A 2003

Note: ^a ADF&G surveys for 1990, 1991, and 1993 were confined to caribou.

SUBSISTENCE USE AREAS

Anaktuvuk Pass hunters rely heavily on terrestrial mammals and to a lesser extent on fish. One of the important factors contributing to the resettlement of the area was the seasonal migration of caribou through the pass. A formerly used harvest strategy was herding small groups of the migrating caribou into lakes, streams, or valleys to limit their mobility and then harvesting and processing the caribou in a cooperative group undertaking (Spearman 1979). While waiting for the caribou to be herded through these areas, members of the group would fish in the streams and lakes. Anaktuvuk Pass hunters bartered furs and dried caribou for other resources, such as marine mammal fats and hides, with coastal people at trade fairs in the Colville River Delta, Barrow, and Barter Island. Anaktuvuk Pass people trade subsistence resources and access to traditional subsistence use areas with Nuiqsut people in much the same manner as they did during traditional times, only now they use contemporary transportation (Ahtuanguaruk 2001 [Liberty scoping]; Hall, Gerlach, and Blackman 1985; Spearman 1984).

Harvest areas indicated in the most recent data from the NSB emphasize use areas within approximately 20 miles of Anaktuvuk Pass, with most trips taken in the immediate vicinity of the community (Brower and Opie 1996). Lifetime subsistence use areas (as depicted in Hall, Gerlach, and Blackman 1985) encompass the entire NSB from Aklavik, Canada, to Kivalina and Kotzebue Sound, and north to Point Barrow and Wainwright. Some traveled to Fort Yukon, Wiseman, and Old Crow trapping and working seasonal jobs (Brower and Opie 1996). Travel corridors and trapping areas included the Sagavanirktok and Colville rivers and the coast between the Colville River Delta and Demarcation Point (Hall, Gerlach, and Blackman 1985, Volume II).

In August 2003, SRB&A interviewed 12 subsistence harvesters in Anaktuvuk Pass. One purpose of these interviews was to learn if Anaktuvuk Pass residents used the Colville River Delta area for subsistence activities. SRB&A coordinated with the City of Anaktuvuk Pass, which identified knowledgeable Anaktuvuk Pass subsistence users for these interviews.

Resource users interviewed by SRB&A in Anaktuvuk Pass used the valleys and slopes of the Brooks Range Mountains between the Killik River valley and Itkillik Lake, with some resource users having gone farther east and west on occasion. Most resource users did not go farther south than the Alatna, Hunt Fork, and North Fork Rivers, although some had made trips to Bettles in the past. North of the Brooks Range, resource users traveled by snowmobile and all-terrain vehicle along the front slope of the mountains east to Itkillik Lake, west to Chandler

River, north to Rooftop Ridge, and parallel the Colville River past Umiat to the Chandler and Killik rivers, then headed back south into the mountains. Periodic trips to Nuiqsut were made along the east or west side of the Anaktuvuk River almost to its confluence with the Colville, then headed east towards the Kuparuk hills, and north to Nuiqsut along the cat trail that roughly parallels the Itkillik River (Figure 3.4.3.2-28).

CONTEMPORARY CONNECTIONS TO NUIQSUT, THE COLVILLE RIVER AREA, AND THE BEAUFORT SEA COAST

Anaktuvuk Pass residents have numerous connections to Nuiqsut, the Colville River area, and the Beaufort Sea. These connections include relatives who live in Nuiqsut, persons or persons with relatives who were born and raised along the Colville and now reside in Anaktuvuk Pass, hunting for caribou in the Nuiqsut area during times of scarcity at Anaktuvuk Pass, hunting for wolf and wolverine during trips to Nuiqsut, trading and exchanging with coastal residents, and attending funerals.

Many residents have relatives and friends residing in Nuiqsut, Kaktovik, and Barrow, as well as other North Slope communities. Some Anaktuvuk Pass residents moved into the community at different ages and maintained connections to the communities they came from, including Fort Yukon, Shungnak, Barrow, and Fairbanks. Others grew up or had relatives who grew up along the Colville River and the Beaufort Sea coast and moved to Anaktuvuk Pass after the community was established. Two lifetime Anaktuvuk Pass residents described their several trips to Nuiqsut in the 1970s. They said they mostly went to Nuiqsut for funerals. One of these persons stated, “Our fathers grew up in the flat country, we didn’t, but our fathers did. They could travel anytime, even at night and never get lost. We never grew up in the flats; we are mountain men.” (SRB&A 2003)

Coastal residents trade food, furs, and other goods with Anaktuvuk Pass residents in exchange for dry meat and other Nunamiut specialties. Some Anaktuvuk Pass residents receive marine mammal products from friends and relatives in coastal communities as “care packages.” (SRB&A 2003) Anaktuvuk Pass ties to the coast were particularly evident with one harvester who was born in Barrow and had lived the last 30 years in Anaktuvuk Pass. This person said, “I eat both foods: coastal (seal oil, seal, walrus, white fish) and Nunamiut/inland food (caribou, moose, freshwater fish [grayling, char, lake trout, ling cod], edible plants, and berries.” (SRB&A 2003)

Periodic shortages of caribou and other game have made living inland a difficult proposition for Inupiat people for centuries and required them to follow the caribou migration year-round. In the late 1940s, the Nunamiut settled into Anaktuvuk Pass from Chandler Lake, Killik River, and Tuluḡaq Lake partially in response to the requirement for children to attend school. A result of sedentary life was the increased difficulty resource users experienced in harvesting adequate amounts of subsistence foods, even with modern transportation and other equipment. An added complication was the establishment of the Gates of the Arctic National Park and Preserve, which has restricted the use of certain all-terrain vehicles (such as Argos and four-wheelers) at certain times of the year (snow-free). This has restricted Nunamiut from accessing subsistence areas in snow-free months that they formerly occupied and used (SRB&A 2003).

Several times in the 1970s and 1980s, and as recently as 1994 and 1998, Anaktuvuk Pass residents found it necessary to travel great distances to procure enough caribou to feed their community. The NSB has paid for some trips, using charters and float planes to fly hunters from Anaktuvuk Pass to places like Umiat and Schrader Lake (located approximately 60 miles southwest of Kaktovik) (SRB&A 2003). More recently, hunters have traveled to Nuiqsut to harvest caribou for Anaktuvuk Pass (Figure 3.4.3.2-28), and on other occasions Nuiqsut hunters have provided caribou, fish, and other coastal foods during lean times. Anaktuvuk Pass resource users reciprocate with gifts of dry meat and other Nunamiut specialties.

A lifetime Anaktuvuk Pass hunter, describing his winter trail to Nuiqsut, indicated he traveled in February or March and hunted as he traveled. He said that he generally hunted along the trail and did not go back and forth hunting off the trail, but used his binoculars to look out to the sides of the trail for game. He said he went to Nuiqsut once or twice a year and indicated that he did not do any fishing on the way to Nuiqsut; just wolf and wolverine hunting. He said his trips had a dual purpose: to hunt and to visit relatives that include cousins, aunts, and uncles in Nuiqsut. He generally stayed in Nuiqsut less than a week. He said that he put 6,000 miles on his snowmobile in six months.

Another Anaktuvuk Pass hunter harvested 15 to 20 caribou on a trip to Nuiqsut in 1998. He indicated that he harvested considerable caribou each year and said, “I hunt mostly in the winter time; it is easier. That is when the caribou are pretty fat. I hunt mostly in winter when there is snow on the ground; you can go further. The summer time you cannot go too much unless you have a good Argo. My dad has one.” He said that he received marine mammals from Nuiqsut and Barrow when they send them up. He stated, “Also from Wainwright when they catch a whale; they send some in a box.” (SRB&A 2003)

There is competition between hunters and communities in the pursuit of wolves, wolverines, and foxes. Several Anaktuvuk Pass hunters have traveled north to Nuiqsut, and along the route they hunt wolf, wolverine, and caribou. One hunter said, “I hunted everything on my trip to Nuiqsut.” This hunter described the trip to Nuiqsut as “one camp” away. In other words, he left Anaktuvuk Pass, made camp for one night, and went to Nuiqsut the next day. He said, “It is not that far.” Other hunters remarked similarly on the route, noting important landmarks and features along the way. One hunter had harvested wolf and wolverine near Ocean Point in 1998. While residents of several communities encounter each other while hunting furbearers, it was often noted that “it is better for them to see your tracks than for you to see theirs,” as often the tracks of other hunters was a sign that the animal being sought had already been taken or run off by the other hunter (SRB&A 2003).

In summary, Anaktuvuk Pass residents have hunted caribou, wolf, and wolverine along their winter travel routes north from near the confluence of the Anaktuvuk and Colville rivers all the way to Nuiqsut (Figure 3.4.3.2-28). In summer, Anaktuvuk Pass residents have hunted for caribou along the Colville River, past Ocean Point, and down the Nigliq Channel to the Beaufort Sea. They have also hunted summer caribou down the main channel of the Colville River to Anajuk Point. They have fished in the main channel of the Colville near Ikillikpaat (Figure 3.4.3.2-28).

3.4.4 Environmental Justice

Environmental Justice (EJ) refers to the considerations mandated by Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-income Populations. The Executive Order requires analysis to identify communities characterized by minority and low-income populations that could be subject to disproportionate human health or environmental effects of a proposed federal action, which in this case is approval of the development of the ASDP. Anaktuvuk Pass, Atqasuk, Barrow, and Nuiqsut are North Slope communities that are in proximity to and could be affected by the proposed ASDP.

To determine if the population of these communities would be characterized as minority and low-income populations, the USEPA has defined guidelines for comparing socioeconomic characteristics of the potentially affected communities to a reference population. If the local potentially affected communities have minority or low-income characteristics that are higher than the reference population, then they are further evaluated to determine if potential impacts of the proposed project are disproportionately borne by these same local communities (or populations). Because there are no other larger population centers on the North Slope to serve as a reference population, State of Alaska average socioeconomic characteristics were selected as the reasonable reference population.

The USEPA guidelines suggest that if a community exhibits ethnic or economic characteristics that are a minimum of 1.2 times the state average for these same characteristics, that the community or local population is considered an EJ population (EPA 1998). The ethnic composition of Anaktuvuk Pass, Atqasuk, Barrow, and Nuiqsut are shown in Table 3.4.4-1. This table shows that all four communities would be classed as minority communities on the basis of their proportional American Indian and Alaska Native membership. The statewide population is 15.4 percent American Indian and Alaska Native. The communities considered range from 56 percent in Barrow to 94 percent in Atqasuk, or from approximately 4 to 6 times greater minority composition than the State of Alaska as a whole. This ratio is considerably greater than the minimum guideline of 1.2 suggested by the USEPA. On the basis of the much higher percentage of minority composition in the communities of Anaktuvuk Pass, Atqasuk, Barrow, and Nuiqsut than in the state as a whole, an evaluation of disproportionate impacts of the ASDP is required.

TABLE 3.4.4-1 ETHNIC COMPOSITION OF ANAKTUVUK PASS, ATQASUK, BARROW, AND NUIQSUT IN 2000 – PERCENT BY RACE

	State of Alaska		Anaktuvuk Pass		Atqasuk		Barrow		Nuiqsut	
	Population	Percent	Population	Percent	Population	Percent	Population	Percent	Population	Percent
Total	626,932	100.0%	282	100.0%	228	100.0%	4,581	100.0%	433	100.0%
Hispanic or Latino	25,852	4.1%	2	0.7%	0	0.0%	153	3.3%	1	0.2%
Not Hispanic or Latino:	601,080	95.9%	280	99.3%	228	100.0%	4,428	96.7%	432	99.8%
Population of one race:	570,626	91.0%	280	99.3%	227	99.6%	4,063	88.7%	429	99.1%
White	423,788	67.6%	27	9.6%	11	4.8%	972	21.2%	44	10.2%
Black or African-American	21,073	3.4%	4	1.4%	0	0.0%	44	1.0%	1	0.2%
American Indian or Alaska Native	96,505	15.4%	247	87.6%	215	94.3%	2,558	55.8%	382	88.2%
Asian	24,741	3.9%	0	0.0%	1	0.4%	429	9.4%	2	0.5%
Native Hawaiian and Pacific Islander	3,181	0.5%	0	0.0%	0	0.0%	59	1.3%	0	0.0%
Some other race	1,388	0.2%	2	0.7%	0	0.0%	1	0.0%	0	0.0%
Two or more races	30,454	4.9%	2	0.7%	1	0.4%	365	8.0%	3	0.7%

Source: ADOL 2000, Census Table SF-1.

3.4.5 Cultural Resources

3.4.5.1 Introduction

This section discusses cultural resources of the Arctic Coastal Plain, with particular emphasis on the Colville River Delta and the eastern National Petroleum Reserve-Alaska area. Cultural resources include sites and materials of prehistoric Native American, historic European and Euro-American, and historic Inupiat origin (for example, traditional cabin sites, camp sites, and burial grounds). The Cultural Resources section also includes a discussion of cultural resources of the Arctic Coast including traditional subsistence harvest sites and other traditional land uses areas, landscapes, symbols, and place names. This section also discusses continued access to archaeological and historical sites.

This analysis relies on the following sources:

- Alaska Heritage Resource Survey (AHRS) files located at the Office of History and Archaeology
- The NSB's TLUI (NSB 1980)
- An assessment of literature pertaining to cultural resources in the proposed project area

The discussion of prehistoric and historic resources in the Plan Area will be divided into three facility group areas that include (1) the Colville River Delta Facility Group including Nuiqsut; (2) the Fish-Judy Creeks Facility Group, which includes Fish and Judy creeks and the National Petroleum Reserve-Alaska planning area to the south and southeast of these creeks; and (3) the Kalikpik-Kogru Rivers Facility Group, which encompasses the west and northwest area of the northeast portion of the National Petroleum Reserve-Alaska planning area.

The analysis of cultural resources is based on the following:

- Cultural resources are generally assumed to be eligible or potentially eligible for the National Register of Historic Places (NRHP) unless stated otherwise.
- Information for this section relies on available information from existing literature and database resources and inventories.
- From a regulatory perspective, "historic properties" meet the criteria for inclusion in the NRHP by the National Historic Preservation Act (NHPA). Many sites meet the broader definition of "cultural resources," such as AHRS and TLUI sites, which individually would or would not be NRHP-eligible or listed but are nevertheless of cultural importance.

3.4.5.2 Cultural Resources Environment

Knowledge of northern human inhabitants has been recorded for approximately 150 years, and attempts at understanding cultural history of the area began in earnest at the turn of the twentieth century (Lobdell and Lobdell 2000). The Arctic Coastal Plain and the Beaufort Sea coastline have been the subjects of intensive archaeological investigations since 1979. During this time, it has been noted that interior portions of the Arctic Coastal Plain are relatively stable; however, the Beaufort Sea coastline has been subject to fairly rapid change, with an average of 3 m per year succumbing to erosion (Lobdell and Lobdell 2000). In the interior portions of the Arctic Coastal Plain, landforms that could encourage human habitation have yielded evidence of prehistoric and historic occupation. These landforms include pingos, south-facing bluff overlooks above narrow valleys or canyons adjacent to major river systems, and wet or moist meadow tundra (Lobdell and Lobdell 2000). Riverine and stream localities with pronounced banks and terraces and lakeshores of especially large lakes (such as Teshekpuk Lake) or lakes with well-developed basin ridges have proven to be places of past human use (Lobdell and Lobdell 2000).

PREHISTORIC ENVIRONMENT (BEFORE 11,000 YEARS AGO TO AD 1827)

Beginning approximately 12,500 years ago, a warming period brought increased moisture, vegetation, and dune stabilization to the North Slope. During this time, cottonwood trees and shrub tundra vegetation expanded beyond their modern limits. This warm period was interrupted approximately 11,000 years ago by a return to ice-age conditions. This period, termed the Younger Dryas interval, is marked in arctic Alaska by the reactivation of the dune fields, a retraction of cottonwood trees, and a lowering of lake levels. Vegetation was likely cold steppe, and the climate was colder and drier than current conditions. Large mammals that are now extinct in the area (mammoth, horse, bison, lion) dominated the landscape. By 10,000 years ago, the climate began to return to that of before the Younger Dryas interval. The large mammals that had dominated the landscape became extinct, lake levels rose, the ranges of peat and vegetation such as cottonwood expanded, and numerous thaw-lakes developed. By 8,500 years ago, the dune fields were stable and poorly drained, and peaty modern soils were established (Mann et al. 2002, in Reanier 2002).

OVERVIEW OF REGIONAL PREHISTORY

Human prehistory on the north coast of Alaska is represented by isolated localities along the coast of the Beaufort Sea from Point Barrow to the Canadian border near Demarcation Point. The oldest archaeological site that has been documented near the project area was discovered on a pingo frost feature southwest of Deadhorse, Alaska. This archaeological site is associated with the Northern Archaic culture and dates to approximately 6,000 years ago. The earliest sites in the Plan Area are undated and have been assigned to the prehistoric period. These include Puriksuk (HAR-165), Nigliq (HAR-169), and two lithic sites (HAR-022 and HAR-009). The following descriptions outline prehistoric traditions in the region which, based on locations of their documented remains, have potential for occurring in the project area. The cultural history and human development sequences of northern Alaska are incomplete. Table 3.4.5-1 depicts a provisional cultural sequence for Northern Alaska.

PALEOINDIAN/PALEO-ARCTIC (11,000 B.P. TO 7,000 B.P.)

The earliest sites in northern Alaska date to the end of the Pleistocene and beginning of the Holocene, approximately 11,000 years ago, and can be placed in two categories, Paleoindian and Paleo-Arctic. The early prehistory of the North Slope area has been documented at the Putu and Bedwell sites on the North Slope of the Brooks Range. The cultural remains from these sites were initially designated as two separate entities; however, the sites appear to be segments of a single site (Reanier 1996). Putu/Bedwell contain the first Paleoindian-related artifacts to be discovered in Alaska, as well as Paleo-Arctic artifacts (Reanier 1996). The Hilltop site is above the Atigun River and contains Paleoindian artifacts similar to those found at the Mesa site. The site dates to 10,400 years ago (Reanier 1995, in Reanier 2000). Available dates indicate that the early occupation of Putu/Bedwell could be 9,000 to 10,000 years in age. Dates from the Mesa site, 200 miles to the west and south of Putu/Bedwell, corroborate this age range. Close parallels can be seen in the artifact types found at the Putu/Bedwell and Mesa sites. In addition, the range for the Mesa artifacts of 9,700 to 11,700 years ago substantially overlaps with the problematic dates from Putu/Bedwell (Kunz and Reanier 1996). Sites such as Putu/Bedwell and Mesa contain cultural remains that could contribute to research questions associated with the ways in which humans adapted to environments of the high latitudes in North America and the arrival of humans in the region at the Pleistocene-Holocene boundary.

TABLE 3.4.5-1 PROVISIONAL CULTURAL SEQUENCE FOR NORTHERN ALASKA

Tradition	Date	Findings	Representative Sites
Historic Inupiat	A.D. 1826	Stone, metal, trade goods, organic artifacts plus historic, ethnographic and informant accounts	Historic Coastal and Riverine Inupiat
Late Prehistoric (Birnik, Thule)	2,000 B.P.-A.D. 1826	Lithic, wood, leather, bone artifacts, house ruins	Pingok Island, Thetis Island, Niglik, Birnik, Walakpa, Point Hope, Cape Krusenstern, Nunagiak, Utqibgvik, Nuwuk
Arctic Small Tool (Denbigh, Choris, Norton, Ipiutak)	4,500-1,200 B.P.	Diminutive lithic microtools, cores, burins, blades	Putuligayuk River, Central Creek Pingo, Onion Portage, Mosquito Lake, Choris, Walakpa, Iyatayet, Point Hope, Coffin, Jack's Last Pingo
Northern Archaic	6,000-3,000 B.P.	Side-notched points, microblades, bone tools	Putuligayuk River, Kuparuk Pingo, Kurupa Lake, Tuktu
Paleo-Arctic	10,000-7,000 B.P.	Cores and blades, microcores, microtools, bifaces	Putuligayuk River, Jones Pingo, Gallagher Flint Station, Lisburne, Tunalik
Paleoindian	12,000-9,800 B.P.	Extinct fauna, large lanceolate points, bifaces	Mesa, Bedwell, Putu, Hilltop

Source: Lobdell and Lobdell 2000: Table 2; Reanier 2002: Table 1
B.P. = Before Present

NORTHERN ARCHAIC (6,000 B.P. TO 3,000 B.P.)

The Northern Archaic culture appeared approximately 6,000 years ago in many areas of Alaska (Reanier 2002; Lobdell and Lobdell 2000). Most Northern Archaic artifacts found throughout the Arctic Foothills and the Brooks Range are surface finds (Lobdell and Lobdell 2000). Northern Archaic groups are believed to have been primarily hunters of large terrestrial animals.

Northern Archaic sites in the vicinity of the project area include the Putuligayuk River Delta Overlook site at Prudhoe Bay, the Kuparuk Pingo site, Kurupa Lake in the foothills of the Brooks Range, and the Tuktu site north of Anaktuvuk Pass (Lobdell 1995; Lobdell and Lobdell 2000; Reanier 2002). The Putuligayuk River Delta Overlook site contains artifacts associated with the Northern Archaic culture. The Kuparuk Pingo site is within a few miles of the Beaufort Sea shore and approximately 30 miles west of the Putuligayuk River Overlook site. This pingo location is unusual because these ice core hill features on the Arctic Coastal Plain landscape were not believed to persist for more than a "few millennia" from the time of their initial development until they submerged into the plain (Lobdell 1995, p. 62). However, evidence provided by radiometric age determination and artifacts associated with the Northern Archaic culture indicates that the landform has been in existence for at least 6,000 years. The location of the site adjacent to the north Alaska coast indicates that Northern Archaic people possibly used coastal resources in addition to the terrestrial fauna long believed to be the primary focus of Northern Archaic subsistence (Lobdell 1995).

Northern Archaic remains in the Brooks Range include an assemblage from the Tuktu site north of Anaktuvuk Pass that is designated as the Tuktu complex and dates to as early as 6,500 years in age (Lobdell 1995). The occurrence of Northern Archaic remains at Anaktuvuk Pass indicates that Northern Archaic people used the Arctic Coastal Plain, as well as the mountain passes through the Brooks Range. The Kurupa Lake site is in the foothills of the Brooks Range and dates to as early as 6,600 years ago (Schoenberg 1995, in Reanier 2002).

ARCTIC SMALL TOOL TRADITION (4,500 B.P. TO 1,200 B.P.)

The Arctic Small Tool Tradition (ASTt) initially appeared in Alaska approximately 4,800 years ago at Cape Denbigh and Kuzitrin Lake in the central Seward Peninsula (Harritt 1994). ASTt is generally believed to be the earliest archaeological tradition associated with modern Inupiat people (Reanier 2002). Several cultures are associated with ASTt including Denbigh, Choris, Norton, and Ipiutak.

Denbigh is the earliest component of ASTt and dates to 4,800 years ago on the Seward Peninsula (Harritt 1994). The youngest date for Denbigh, approximately 2,000 years ago, comes from the Mosquito Lake site in the northern foothills of the Brooks Range. Denbigh houses are similar to the contact-period Inupiat houses observed by contact-period Russian and American explorers. Denbigh people hunted large game and harvested the salmon that appeared in the streams during the summer runs. Coastal Denbigh sites, and some of the technology associated with them, indicate that Denbigh people hunted seals as well (Anderson 1984, Giddings 1964). Denbigh sites near the project area are documented from northern coastal areas to the Arctic Foothills and pass through the Brooks Range (Lobdell 1995).

Denbigh-related sites occur near Prudhoe Bay at the Putulagayuk River Delta Overlook site (Lobdell 1995). A Denbigh-related site also occurs at Central Creek Pingo, an ancient ice core mountain on the Arctic Coastal Plain, approximately 3 miles from Prudhoe Bay and a mile inland from the Beaufort Sea coast (Lobdell 1995). Radiocarbon dates from this location range from 4,000 to 3,500 years ago (Lobdell 1995).

Denbigh occurrences at locations between the northern coast and the Brooks Range have been termed “tundra Denbigh.” Denbigh is documented at Mosquito Lake, near Galbraith Lake on the northern slopes of the Brooks Range. The age of Mosquito Lake Denbigh is placed at approximately 2,500 years, based on three radiometric determinations (Kunz 1977). This age appears to some researchers to be too young for Denbigh culture in northern Alaska. However, radiocarbon dates of Denbigh components from Tukuto Lake, in the Arctic Foothills, range from roughly 4,400 to 3,300 and 2,200 to 1,600 years in age. The Tukuto Lake Denbigh dates define a temporal range into which the Mosquito Lake occupation fits and indicate that Denbigh culture persisted in the area between the northern coast and the passes through the Brooks Range from 4,400 to 1,600 years ago.

Following Denbigh, the Choris culture appeared in coastal areas of northwest Alaska from 3,700 to 500 years ago. Choris cultural remains have been documented on the North Slope of the Brooks Range dating from 2,700 to 2,500 years in age. Elements of the Choris culture, named after the type site in eastern Kotzebue Sound, have been documented as far inland as Anaktuvuk Pass and Galbraith Lake (Anderson 1984). Assigning Choris origins to the northern interior Alaskan occurrences is less certain than is desirable, and there remains a possibility that the assemblages represent an unnamed cultural tradition (Anderson 1984). Other Choris sites on the North Slope include the Walakpa site, which has been dated to between 3,400 and 2,300 years ago, and the Coffin site (Stanford 1976, in Reanier 2002).

The Norton culture was first defined at the Iyatayet site on Norton Sound and spans a time period from approximately 2,500 to 2,000 years ago. Cultural remains documented at Norton sites suggest that the Norton culture has its origins in the Choris culture (Giddings 1964). At Point Hope, cultural remains identified as Near Ipiutak were found that are identical to those associated with the Norton culture.

The Ipiutak culture is believed by some prehistorians to have contributed to the development of Thule culture. The Ipiutak site at Point Hope was characteristic of the Ipiutak culture. Ipiutak lacked pottery, ground slate tools, and stone lamps, which are associated with the earlier Norton culture and later Inupiat cultures. Ipiutak sites have been documented both coastal and inland. The presence of Ipiutak sites in the Brooks Range and its temporal position immediately preceding Thule indicate that Ipiutak culture played a significant role in the prehistory of the area. Inland Ipiutak persisted substantially longer than the presence of the culture in coastal areas. Coastal age ranges fall within the period from 2,000 to approximately 1,100 years ago, while those of the interior fall within the period from 1,350 to 550 years ago (Gerlach and Hall 1988, Giddings and Anderson 1986). Ipiutak remains in the Brooks Range and in Anaktuvuk Pass are predominantly those of temporary encampments, but sparse occurrences of small

settlements are known, such as those represented by houses at Etivluk and Feniak lakes and the Toyuk site southwest of Anaktuvuk Pass.

LATE HOLOCENE ORIGINS OF THE HISTORIC CULTURES (2,000 B.P. TO A.D. 1827)

Beginning approximately 2,000 years ago, ancestral forms of the historic Native cultures emerged and underwent the final stages of development leading up to the cultural forms that were encountered by European explorers in the nineteenth century.

From the Birnirk period onward, the cultural continuity of arctic peoples into the twenty-first century is well established. The Birnirk phase, a direct ancestor of the historic Thule culture, appears in the Bering Strait by 1,600 years ago. Birnirk peoples lived in semisubterranean winter houses and engaged in the harvest of marine and land mammals, birds, and fish. The Birnirk type-site is located near Barrow at the base of the Barrow spit. Other sites that contain Birnirk cultural remains include Walakpa, Point Hope, and Cape Krusenstern. Birnirk-style artifacts have been found from northeastern Siberia to northwestern Canada, indicating a large trade network reminiscent of the extensive Inupiat trade network in place in the nineteenth century.

Thule is the immediate prehistoric ancestor of the various historic Inupiat groups. Approximately 1,000 years ago, a favorable climate coupled with technological innovations such as the umiak (a large skin boat), the qataq (cold trap door for winter houses), and the umiat (dog sled) resulted in the rapid expansion of Thule populations from the Bering Strait along the shores of the Beaufort Sea to Greenland, and southeast around the shores of the Bering Sea ultimately to Kodiak Island and Prince William Sound. Developed Thule appeared by 1,000 years ago and persisted in the North American Arctic to historic contact, between 1800 and 1850 (Collins 1964, Giddings and Anderson 1986). When the early explorers and whalers arrived on the Beaufort Sea coast in 1826, they encountered the Thule people. Thule people hunted sea mammals, including whales, as well as terrestrial game such as caribou. In many Thule areas, salmon were also an important subsistence resource. Thule sites at Barrow include Nuvuk, Utkiagvik, Thetis Island (destroyed), Pingok Island, and Nigliq.

PREHISTORIC RESOURCES IN THE PLAN AREA

Four prehistoric sites are within the project area. These resources are described in Table 3.4.5-2 and discussed by facility group area below. It should be noted that the lack of documented prehistoric sites in these facility group areas does not preclude the existence of undocumented prehistoric sites in those areas.

COLVILLE RIVER DELTA FACILITIES GROUP

There is one documented prehistoric site in the Colville River Delta Facility Group. The site of Nigliq (HAR-169, TLUI-58, TLUIHAR-084) contains prehistoric artifacts, as well as historic artifacts. Nigliq means “goose,” and this site was a vital link in the aboriginal trade and commerce network from prehistoric times (Hoffman et al. 1988). Trade fairs at this site continued into the early twentieth century.

FISH-JUDY CREEKS FACILITIES GROUP

There is one documented prehistoric site in the Fish-Judy Creeks Facility Group. The site of Puviksuk (Puviqsuq) (HAR-165, TLUI 76) is first mentioned in Nunamiut creation mythology as the knoll where the giant Ayagumaphaq (Aiyagomahala) built his snow house so that he would be remembered through the generations. The snow house turned into a small knoll with a hollow on top where he left his pack (Hoffman et al. 1988). Prehistoric artifacts, including a lithic component, fire-cracked rock, and hearths, as well as historic sod house ruins and a shaman’s grave, are present at the site. Puviqsuq means “it’s swelling up.” The site has also served as a travel landmark over the generations.

**TABLE 3.4.5-2 ALASKA HERITAGE RESOURCES SURVEY AND TRADITIONAL LAND USES INVENTORY
– CULTURAL SITES BY ASDP FACILITY GROUP**

AHRS #	TLUI #	TLUI # (2003)	Other Site #	Site Name	English Translation	Time Period	Site Type/Description	Cultural Remains	TLUI Legend
Colville River Delta Facility Group									
HAR-008							grave	grave	
HAR-052						Historic, Euro-American (post AD 1951-1972)	sod house foundation or tent ring with modern debris that could relate to temporary navigation system set up at VABM Nehi	sod house foundation/ tent ring with modern debris (electrical wire, copper antenna ground rod)	
HAR-054				Nechelik Channel Lifeboat		Historic			
HAR-055							isolated find	caribou bone	3
HAR-056				Ivik Grave		Historic	Ivik grave (1924)	grave	2
HAR-155	63	TLUIHA R-080	Hall #2264	Uyagagvik	"place where one can get many rocks"	Historic and contemporary Inupiat	site, quarry, fish camp	none	4,5,6
HAR-156	60	TLUIHA R-083	Hall #2263	Nanuk	"polar bear"	Historic Inupiat, first half of 20th century	site, reindeer herding station, sod houses, storage pits, sod quarries	sod houses, ice cellars, reindeer corral	3,4,6,8
HAR-157	45		Hall #2273	Niglivik 2		Historic Inupiat	site, sod house, cache pit, sod quarry	sod house, cache pit	3
HAR-158	80			Putu	"hole"	Historic and contemporary Inupiat	site, hunting camp, settlement, sod houses, sod quarry, cellar	sod houses, ice cellar	2,3,6,7
HAR-159	88		Campbell (#33)	Nuiqsutpiat		Historic and contemporary Inupiat	site, fishing/trapping camp, sod houses, ice cellar, sod quarries, tent area	sod houses, ice cellar, sod quarries, tent area	1,2,3,4,5
HAR-160	89		Campbell (#32) (Also in AHRS as HAR-043)	Niglinaat	"place of the white-fronted geese"	Historic (1930s) and contemporary (1970s) Inupiat	fishing, trapping camp	sod houses	2,3,4,6,8

**TABLE 3.4.5-2 ALASKA HERITAGE RESOURCES SURVEY AND TRADITIONAL LAND USES INVENTORY
– CULTURAL SITES BY ASDP FACILITY GROUP (CONT'D)**

AHRS #	TL UI #	TLUI # (2003)	Other Site #	Site Name	English Translation	Time Period	Site Type/Description	Cultural Remains	TLUI Legend
Colville River Delta Facility Group (cont'd)									
HAR-162				Aanayyuk (Anajuk, Anayuk)	Anajuk means "a man who died there"	Historic Inupiat			
HAR-169 ^a	58, 6	TLUIHA R-084		Niglik/Woods Inaat (Camp)	Nigliq means "goose"	Prehistoric, historic, and contemporary Inupiat	site, trading settlement, burials, fish camp	sod houses, smokehouse, cabins, storage pits, grave	2,3,4,5,6,7,10
	57			Tulagvik	"where a boat goes ashore"		fishing, hunting, trapping area		4,5,6
	59			Apkugaruk	"old trail"		fishing area		4
	61			Nuiqsut			fishing, trapping, hunting, camping area, graves (cemetery)	graves/cemetery	2,4,5,6
	62			Tulugaluk	"old raven"		fishing, hunting, camping, trapping area		4,5,6
	79			Sigiaruk			fishing, hunting, and camping area		4,6
	82			Napaun			fishing, hunting, and camping area, sod house ruins	sod house ruins	3,6,8
	85			Milugiak	name of a fish or "fish with mouth under"		fishing, nesting, hunting, root harvesting area		4,8
	86			Illaktugvik			fishing and nesting area, cabins, graves	cabins, graves	1,2,4,8
	87			Nauyaatuuq	"seagulls"		fishing and nesting area		4,8

**TABLE 3.4.5-2 ALASKA HERITAGE RESOURCES SURVEY AND TRADITIONAL LAND USES INVENTORY
– CULTURAL SITES BY ASDP FACILITY GROUP (CONT'D)**

AHRS #	TL UI #	TLUI # (2003)	Other Site #	Site Name	English Translation	Time Period	Site Type/Description	Cultural Remains	TLUI Legend
Colville River Delta Facility Group (cont'd)									
		TLUIHAR-075 ^b							
		TLUIHAR-077 ^b							
		TLUIHAR-078 ^b							
		TLUIHAR-079 ^b							
		TLUIHAR-081 ^b							
		TLUIHAR-082 ^b							
		TLUIHAR-085 ^b							
Fish and Judy Creeks Facility Group									
HAR-004	70	TLUIHAR-067		Kitik (Qitiq)	"pulverized stone"	Historic Inupiat	site, quarry		8
HAR-005							sod house and boat on Fish Creek		3
HAR-010				Kikkaq	"gully"	Historic Inupiat (AD 1970s)	site, camp site, marker	marker (wood and stone)	6
HAR-028	55	TLUIHAR-086	NSB CRSI #2250, Hall #2250	Nukruapaitch (Niaquqturuq)		Historic Inupiat (20th century)	site, hunting and camping area (site could have been destroyed), sleds, beluga butchering locality	sleds, upright poles, beluga bones	3,6
HAR-044						Recent Inupiat	recently attended grave (reburial of surface-scattered human remains) marked and outlined (remains of old coffin a few meters east of the grave), mound of unexplained origin, driftwood marker	grave/reburial marked and outlined, remains of old coffin, mound, driftwood marker	2

**TABLE 3.4.5-2 ALASKA HERITAGE RESOURCES SURVEY AND TRADITIONAL LAND USES INVENTORY
– CULTURAL SITES BY ASDP FACILITY GROUP (CONT'D)**

AHRS #	TL UI #	TLUI # (2003)	Other Site #	Site Name	English Translation	Time Period	Site Type/Description	Cultural Remains	TLUI Legend
Fish and Judy Creeks Facility Group (cont'd)									
HAR-053						Historic Inupiat	site, isolated surface find, human remains	isolated surface find, human remains	2
HAR-163	3			Itkillikpaat, Itqilippaa	"at the mouth of the Indian River"	Historic and contemporary Inupiat	site, fish camp, sod house ruins, sod house, cemetery, sod quarries, tent rings, storage pits	sod houses, storehouses, cemetery	2,3,4,5,6
HAR-164	77	TLUIHA R-072	Hall #2268	Tiragroak, Tirragruaq	"large sandbar"	Historic and contemporary Inupiat	site, fish camp, camp, sod houses, cache pits, historic remains	sod houses, storage pits	3,4,7
HAR-165	76	TLUIHA R-071	Hall#2267	Puviksuk, Puviqsuq	"it's swelling up"	Prehistoric/Historic Inupiat	creation site, hunting, camping, fishing	sod house ruins, lithics, grave	2,3,4,6,10
HAR-166	75	TLUIHA R-070	Hall#2266	Aki, Agki Creek	"the other side" (of a lake or river)	Historic and contemporary Inupiat	site, hunting, camping, fishing	sod house ruins	3,4,6
HAR-167	74	TLUIHA R-069	Hall #2265	Kayukisilik, Kayuqtusilik	Kayuqtusilik means " a place where there are red foxes"	Historic Inupiat/Euro-American, first half of 20th century	site, trading post, storehouse, sod house ruins, graves, tent rings, ice cellars, refuse mounds	wood frame trading post storehouse, sod house ruins, ice cellars, graves, tent rings, refuse mounds	2,3,7
HAR-168				Aqsiataaq Inaat		Historic Inupiat (A.D. 1930s-1940s)	site, camp, moss house, historic remains	moss house, historic remains	3,6
	1	TLUIHA R-088	Hall #2237	Ugiin		Historic	cabins, sod house ruins, winter furbearer hunting	cabins, sod house ruins	1,3,6
	54			Niaquqturuq			fishing, duck hunting and nesting area, sod house ruins	sod house ruins	3,4,6,8
	68			Kastialurak			fishing, berry harvesting and hunting area		4,6,8

**TABLE 3.4.5-2 ALASKA HERITAGE RESOURCES SURVEY AND TRADITIONAL LAND USES INVENTORY
– CULTURAL SITES BY ASDP FACILITY GROUP (CONT'D)**

AHRS #	TL UI #	TLUI # (2003)	Other Site #	Site Name	English Translation	Time Period	Site Type/Description	Cultural Remains	TLUI Legend
Fish and Judy Creeks Facility Group (cont'd)									
	71			Kuugruachiak			fishing, hunting and camping area		4,6
	72			Illanikruak, Ilannik			fishing and trapping area		4,5
	78			Kayaktuagiak			fishing, hunting and camping area		4,6
	81			Ittigiak	Ocean Point		hunting, berry harvesting		6,8
		TLUIHA R-040		Ayuvioa	Place name derived from a person		hunting area		6
		TLUIHA R-041		Silulium Paawa	Entry or mouth of the Siulik River		fishing and hunting area		4,6
		TLUIHA R-044		Ikpitchiaq	"a newly formed hill"		hunting area		6
		TLUIHA R-063 ^b							
		TLUIHA R-064 ^b							
		TLUIHA R-065 ^b							
		TLUIHA R-068 ^b							
		TLUIHA R-073 ^b							
		TLUIHA R-087 ^b							

**TABLE 3.4.5-2 ALASKA HERITAGE RESOURCES SURVEY AND TRADITIONAL LAND USES INVENTORY
- CULTURAL SITES BY ASDP FACILITY GROUP (CONT'D)**

AHRS #	TL UI #	TLUI # (2003)	Other Site #	Site Name	English Translation	Time Period	Site Type/Description	Cultural Remains	TLUI Legend
Kalikpik and Kogru Rivers Facility Group									
HAR-002			Hall #2278			Prehistoric	site, lithic remains (destroyed?)		
HAR-007		TLUIHA R-061					reindeer herding driftwood fence and tent platform	reindeer fence, tent platform	6,11
HAR-009						Prehistoric	site, isolated find (lithic)		
HAR-012	46	TLUIHA R-029	Hall #2244	Aki, Agki		Historic Inupiat (AD - 1920s)	site, sod house ruins (one belonged to Ugruaq)	sod house (3) ruins	3
HAR-013				Uguak		Historic Inupiat	site, sod house, house pits, cabins	sod house, house pits, cabins	1,3
HAR-014			Hall #2279			Historic Inupiat (AD - 1930s)	structure, reindeer corral, house pit	structure, reindeer corral, house pit	3,11
HAR-018				Ahsogeak Site		Historic Inupiat	site, habitation, historic remains		6
HAR-022	49	TLUIHA R-016	NSB CRSI #2245, Hall#2245	Saktui, Saktui, Saktuina Point, Saktui Islands		Historic	former site of Edwardsen's Trading Post, sod houses and graves, site of former fishing area	sod houses and one or more graves (most of site destroyed by erosion)	2,3
HAR-024	50	TLUIHA R-090	Hall #2246	Qiqiktag		Historic Inupiat	Site, tent site	tent site	6
HAR-025	51		Hall #2247	Tikigaqmiut (Tikiragmiut, Eskimo Islands)		Historic Inupiat	site, "old cemetery of Point Hope people..."		2

**TABLE 3.4.5-2 ALASKA HERITAGE RESOURCES SURVEY AND TRADITIONAL LAND USES INVENTORY
– CULTURAL SITES BY ASDP FACILITY GROUP (CONT'D)**

AHRS #	TL UI #	TLUI # (2003)	Other Site #	Site Name	English Translation	Time Period	Site Type/Description	Cultural Remains	TLUI Legend
Kalikpik and Kogru Rivers Facility Group (cont'd)									
HAR-026	52	TLUIHA R-091	Hall #2248	Atigaru Point (Atigruk Point, Amaulik)		Historic Inupiat	site, graves, sod house ruins, tent sites		2,3,6
HAR-027	53		NSB CRSI #2249, Hall #2249	Kanigluq		Historic Inupiat	site, sod houses (1977 TLUI 7 sod house ruins), ice cellar	sod houses, ice cellar	3,7
HAR-029	56		NSB CRSI #2251, Hall #2251	Ikkalipik		Historic Inupiat	site, sod house, ruins (destroyed/ not located – see HAR-030)	none	
HAR-030						Historic Inupiat (20th century)	site, settlement, sod house (may be actual location of Ikkalipik [HAR-029])	sod house (4 x 2.5m), stakes and posts (boat rack), caribou bones, hearth	3
HAR-045						Historic Inupiat (20th century)	site, camp site, racks and old boats (mostly destroyed), possible sod removal area	campsite, boat racks, old boats (mostly destroyed), upright tentstakes, sod removal area	6
HAR-046						Historic Inupiat (20th century)	site, campsite, boat rack and old boats, possible tenting area	campsite, boat rack and old boats (Nantucket-style whaling long boat), tenting area	6

**TABLE 3.4.5-2 ALASKA HERITAGE RESOURCES SURVEY AND TRADITIONAL LAND USES INVENTORY
– CULTURAL SITES BY ASDP FACILITY GROUP (CONT'D)**

AHRS #	TL UI #	TLUI # (2003)	Other Site #	Site Name	English Translation	Time Period	Site Type/Description	Cultural Remains	TLUI Legend
Kalikpik and Kogru Rivers Facility Group (cont'd)									
HAR-051						Historic Inupiat (20th century)	Site, historic remains	historic remains (stove parts, driftwood posts, rusted steel cans, caribou bones, hide pegs) found on stabilized sand dunes west of the creek on which HAR-030 is located (may be associated)	6
HAR-058				USC&GS memorial		Historic	USC&GS bronze memorial for Kay, Grenell, and Roberts (lost at sea)		
	48	TLUIHA R-013		Nuyapisut			trapping and hunting area, place for gathering driftwood		5,8
		TLUIHA R-014		Kiputit			fishing, trapping, nesting, and hunting area		4,5,6,8
		TLUIHA R-021		Kuugruk	Kuugruk River		fishing, hunting, and eider nesting area		4,6,8
		TLUIHA R-036		Kuugruk	Kuugruk River		fishing, hunting, and eider nesting area		4,6,8
		TLUIHA R-038		Savikpaligauram loitublia			fishing and hunting area	sod house ruins	3,4,6
		TLUIHA R-039		Sikulium Kuuwa	Sikulik River		fishing and hunting area		4,6
		TLUIHAR-059 ^b							
		TLUIHAR-060 ^b							
		TLUIHAR-062 ^b							
		TLUIHAR-089 ^b							

Source: Department of Natural Resources, Office of History and Archaeology 2003; NSB 2003
Notes: (see next page)

^a National Register of Historic Places

^b No information available

USC&GS = U.S. Coastal and Geodetic Survey

Traditional Land Use Inventory (TLUI) Legend (Based on NSB template):

1 = Cabins/Shelter Cabins Today

2 = Graves/Cemetery

4 = Fishing

3 = Ruins/Sod Houses/Bones

5 = Trapping Area

6 = Hunting/Camping Area

7 = Cellars

8 = other/Nesting Area, Seals, Roots

9 = Whaling Settlement

10 = Important Event/Old Site

11 = Reindeer Herding Area

KALIKPIK-KOGRU RIVERS FACILITIES GROUP

There are two documented prehistoric site in the Kalikpik-Kogru Rivers Facility Group. One prehistoric site (HAR-002) contained lithic cultural remains, as well as cut antler, bird bone, and an ivory harpoon head, and may have been destroyed by erosion (Ito-Adler and Hall 1986). The second prehistoric site (HAR-009) consisted of an isolated lithic cultural remain.

3.4.5.3 Overview of Regional History

EUROPEAN/EURO-AMERICAN EXPANSION, EXPLORATION, AND ETHNOGRAPHIC RESEARCH

The exploratory period on the North Slope began in 1826 with the first Franklin expedition. Sir John Franklin and his crewmembers sailed westward from the Mackenzie River to the Return Islands just west of Prudhoe Bay and spent 1825 through 1826 at Herschel and Barter islands. That same year, Frederick William Beechey's expedition sailed north from the Bering Strait to Point Barrow. Franklin, as well as other early explorers, noted that the presence of European trade goods (such as tobacco, iron, and copper) preceded their arrival among the Inupiat on the North Slope. In 1837, Thomas Simpson of the Hudson's Bay Company traveled from the east to Point Barrow. In 1849, Lieutenant W.J.S. Pullen, of the *HMS Plover*, surveyed the Arctic coast from Wainwright Inlet to the McKenzie River. Between 1847 and 1854, contact between Europeans and the Inupiat increased because of the influx of whalers to the region, and exploration of the region increased as ships searched for the lost Franklin expedition. From 1852 to 1853, R. Maguire, of the *HMS Plover*, wintered at Point Barrow. Richard Collinson, a captain on one of the search ships looking for Franklin's lost expedition, collected Inupiat place names for areas along the coast from Barrow to the Mackenzie River while wintered off the ice of Camden Bay between 1853 and 1854 (Schneider and Libbey 1979).

During the commercial whaling period, items such as metal and firearms became increasingly important as part of Inupiat material culture. By the 1850s, guns were in use by local Inupiat people; and by the 1880s, Inupiat whalers were using commercial whaling darting guns and bombs. Beginning in 1881, J. Murdoch and Lieutenant P.H. Ray, members of the International Polar Expedition, collected ethnographic information over the course of 2 years at Point Barrow. During the last quarter of the nineteenth century, epidemic diseases caused a severe population decline among the North Slope Inupiat. By the end of the nineteenth century, major population shifts occurred as a result of disease and famine. Declines in caribou populations resulted in famine that caused inland Inupiat to leave their homes and relocate to coastal communities such as Barrow, where coastal Inupiat populations had declined from diseases such as smallpox and influenza (Reanier 2002).

Interest in the geology and history of the early culture of the area began in earnest at the beginning of the twentieth century, but was limited by access to coastal areas. Vilhjalmur Stefansson conducted ethnographic studies along the coast east of Barrow between 1906 and 1907, 1908 to 1912, and 1913 to 1918. Between 1906 and 1914, Ernest de Koven Leffingwell conducted geographical place name research in the Arctic. As an extension of the Fifth Thule Expedition, Knud Rasmussen crossed into Alaska from Canada in 1924. He compiled ethnographic data on the Alaskan Inupiat and their camps and recorded place names on the Utukok River. In 1952, Robert F. Spencer investigated the ecological relationship between inland and coastal Inupiat groups. Various researchers, including Rausch, Ingstad, Gubser, and Binford, studied the Nunamiut (or inland Inupiat).

The initiation of petroleum development led to intensive investigations of cultural resources on the North Slope. These investigations occurred after World War II in the Naval Petroleum Reserve No. 4 (currently designated the National Petroleum Reserve-Alaska), which was created in 1923, and before and during construction of the TAPS. The NSB Commission on History and Culture began the TLUIs for the North Slope in the 1970s in anticipation of and in response to increased resource development on the North Slope (Schneider and Libbey 1979). This program is discussed in greater detail below.

MISSIONARY EFFORTS, TRADING POSTS, AND REINDEER HERDING

Christian missionaries first arrived in Barrow in 1890. Because of the efforts of Christian missionaries and evangelization by the Inupiat, Christianity was nearly universal by 1910 (Reanier 2002). Mission schools were established between 1890 and 1910 at Wales, Point Hope, and Barrow, as well as other places that were not previously occupied year-round. Eventually, the original mission schools split into separate entities—government schools and church-operated missions. Trading posts were set up near the missions and schools. These areas became focal points for the Native population, and settlements grew up around each one (Schneider and Libbey 1979).

At the end of the nineteenth century, Sheldon Jackson, a Presbyterian missionary, introduced reindeer herding to Alaska Natives. Following the collapse of the commercial whaling industry, the people of Wainwright and Barrow developed and maintained large herds of reindeer. Reindeer herds were maintained by Inupiat in the vicinity of Wainwright, Barrow, and Nuiqsut, as well as other settlements on the North Slope (Schneider and Libbey 1979). Reindeer herding ended in 1938 because of the collapse of the market for meat and hides (Reanier 2002).

At the beginning of the twentieth century, whale oil, and whalebone (baleen) decreased in importance. The fur trade filled some of the economic gap left by the collapse of the whalebone market and the subsequent demise of commercial whaling. In 1915, the Barrow whaler and trader Charles Brower ceased commercial whaling operations to begin fur trading operations. It was common practice for white traders to fund Natives in the establishment of outposts. For example, the trading post at Kayiktusilik on the Colville River was financed by Jack Smith and operated by Thomas Ichuagak, a Colville River Delta Inupiat (Schneider and Libbey 1979). For the Inupiat, trading traditionally has had social and economic importance. Trading posts in the area began to cease operation in the 1930s as a result of the Great Depression and reduced fur demand, and many were replaced by village stores. Most of the trading posts had ceased operations by the 1940s (Schneider and Libbey 1979).

3.4.5.4 Community History

NUIQSUT

Nuiqsut is on the Nigliq Channel on the west side of the Colville River Delta. The Nuiqsut area provides a diverse seasonal abundance of terrestrial mammals, fish, birds, and other resources and is a prime area for fish and caribou harvests, but is less advantageous for marine mammal harvests (ADCED 2003). The name Nuiqsut recalls prehistoric and historic camps and settlements occupied by many families on the main channel of the Colville that had been used traditionally as an area for hunting, fishing, trapping, and trading. The people of Nuiqsut call themselves Kukpikmiut, or the People of the lower Colville River (Brown 1979). Most residents in the area moved to Barrow when the Bureau of Indian Affairs mandated school attendance for children in the 1940s. However, former residents continued to use the Colville River area for subsistence purposes. The passage of ANCSA in 1971 led to the reestablishment of the community. In April 1973, the community of Nuiqsut was resettled by 27 families who embarked on a 150-mile trek from Barrow to the Colville River. Many of these people had lived in the Colville River area 25 to 30 years earlier and were “seeking an alternative to the accelerating urbanization of Barrow.” (Libbey et al. 1979)

BARROW

Barrow has been occupied for approximately 4,000 years, with continuous occupation for the last 1,300 years (Dumond 1977). The earliest occupants of the Barrow area were bearers of the Birnirk culture. The Inupiat name for the Barrow area is Utqiagviq, meaning “the place where we hunt snowy owls.” Because Barrow is situated on a point of land where the sea ice is prone to cracking, the main subsistence focus has been marine mammal hunting, particularly whaling. In recent years, Barrow has been the social and economic center for the North Slope Inupiat (with trade, commercial whaling, schools, NSB administration, and wage employment).

