

# Indigenous Knowledge on NPRA Significant Resource Values, Proposed Special Areas, and Proposed Maximum Protection Measures

By Barrett Ristroph

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The knowledge of a people that are part of an ecosystem is essential for managing that ecosystem. These comments rely on the knowledge of Inupiat residents in what is now known as the National Petroleum Reserve-Alaska (NPRA) to suggest special areas, significant resource values (SRVs), and maximum protection measures for these areas and values. This knowledge is typically based on the observations and experiences of resource users over long periods of time, often over generations (Ristroph 2012). As the climate has rapidly changed in Alaska in recent decades and plant and animal populations shift, on-the-ground knowledge has become all the more important (White et al. 2023, 16-4; Huntington et al 2023, 29-34).

The knowledge is sometimes referred to as “Indigenous knowledge,” “traditional knowledge,” “traditional ecological knowledge,” or “local knowledge.” Regardless of what it is called, the knowledge stands on a pillar that is parallel and complementary to so-called “Western science” (see National Academies 2023, comments of Wilson Justin). The knowledge need not be “validated” by Western science, as there are methods within Indigenous knowledge systems to carry forward the most relevant knowledge (see Alessa et al 2016; Drawson et al 2017). The collection of knowledge in these comments draws largely from those who are known in their communities to be knowledge holders and have years of experience using and observing natural resources. As detailed in the bibliography, key sources include observations and recommendations shared by subsistence participants chosen to represent their communities in the NPRA Subsistence Advisory Panel, the NPRA Working Group, the Western Arctic Caribou Herd Working Group, the North Slope Advisory Committee to the Alaska Department of Fish and Game. Other important sources include compilations of interviews carried out by Steven Braund, who is recognized as a trusted knowledge conveyer by those who choose to share their knowledge with him as well as the entities that hire him to do this research. Also important is the

work done by the North Slope Borough in 2007, which brings together traditional knowledge with Western science to identify important resources and protective policies under the then-existing Alaska Coastal Management Program.

The knowledge outlined in these comments draws from years of observations by knowledge holders engaged in traditional hunting, fishing, and trapping practices (also known as subsistence). Many Indigenous knowledge holders are reluctant to place geographic boundaries around the areas that contain resources relied on for subsistence. Resource and subsistence locations fluctuate over time (NSB 2007 Sec. 7.4.3), and climate change has added to the change. Thus, the fact that a particular hunter may not be hunting a particular animal in a particular place today does not mean that this place is not an important habitat for that animal. For this reason, the comments draw on two decades of observations, from about 2000 to 2020.

## **1. Knowledge regarding SRVs in NPRA in existing Special Areas**

This section compiles observations from knowledge holders in NPRA regarding the resources in existing Special Areas.

### **1.1. Teshekpuk Lake Special Area (TLSA) SRVs**

The Teshekpuk Lake Special Area includes the Teshekpuk Lake parts of the Ikpikpuk and Chipp Rivers to the west. It extends westward along the coast all the way to Point Barrow and Utqiagvik, and includes Dease Inlet and Elson Lagoon. It includes some but not all of Fish Creek and a small portion of Judy Creek (both to the west of Nuiqsut and of great importance to that community).

#### **1.1.1. Utqiagvik and Elson Lagoon**

This subsection outlines the resources identified by those who use the area for subsistence, starting in the western-most part of the TLSA—the community of Utqiagvik (formerly Barrow). Areas in the vicinity of Utqiagvik, within and beyond TLSA, are important for caribou (WACH 2019, p. 37; NSBRAC 2022, p. 2; NPRA SAP 12/4/2008, p. 42) and fishing (Cotton 2012, p. 25; Brewster & Geroge 2009, p. 41). Moose and muskox are recent arrivals to the area (NSBRAC 2022, p. 2).

Elson Lagoon is just northeast of Utqiagvik. It is important for fishing (NPRA SAP 3/14/2002, p. 5, 10; SBA 2010-2, p. 58), specifically for arctic cisco (SBA 2010-2, p. 56), flounder, salmon, and whitefish (SBA 2009, p. 141; Brewster & Geroge 2009, p. 90; SBA 2010-2, p. 56, 63), and arctic char/Dolly varden (SBA 2010-2, p. 56). Salmon enter Elson Lagoon when the area north of Point Barrow is ice-free (Cotton 2012, p. 35). Fishers that spoke to Cotton (2012) referred to pink salmon here clogging their fishing nets (p. 10) and getting 30 chum salmon a day at the peak of their run (p. 12). Chinook salmon may also be caught here (Brewster & Geroge 2009, p.

61). Plover Point (Nuvvualuaq), north of Elson Lagoon is a place for arctic cisco (qaaktaq) (SBA 2019, p. 31)

Elson Lagoon is also important for walrus (NPRA SAP 3/14/2002, p. 5), beluga (NPRA SAP 3/14/2002, p. 5), seals (NPRA SAP 3/14/2002, p. 5), and eiders (NPRA SAP 3/14/2002, p. 5; SBA 2010-2, p. 82), and provides critical habitat for nesting and molting birds (NSB 2007, Section 3.5.2, 7.6.2).

Avak Creek, south of Elson Lagoon, is a known spot for caribou (SBA 2010-2, p. 29) and geese (SBA 2010-2 p. 74).

#### 1.1.2. Dease Inlet

Dease Inlet to the east of Elson Lagoon, is important for fishing (NPRA SAP 3/14/2002, p. 5), specifically smelt, arctic cisco (qaaktaq), and Dolly Varden (iqalukpik) (Brewster & Geroge 2009, p. 55); as well as walrus (NPRA SAP 3/14/2002, p. 5, 137), beluga (NPRA SAP 3/14/2002, p. 5), seals (NPRA SAP 3/14/2002, p. 5), and eiders (NPRA SAP 3/14/2002, p. 5).

Kuyanak Bay, which feeds into Dease Inlet, is known for arctic cisco fishing (SBA 2010-2, p. 51).

#### 1.1.3. West of Teshekpuk Lake

Alaktak (Alaqaq) River flows west of Teshekpuk Lake and enters Pittalugruaq Lake (Pittallukruak Lake) (SBA 2019, p. 31). This area is important for caribou hunting (SBA 2010-2, p. 32), broad whitefish (aanaakjiq) (Brewster & Geroge 2009, p. 131, p. 137), arctic cisco (qaaktaq) (Brewster & Geroge 2009, p. 44), and moose hunting (SBA 2010-2, p. 48).

#### 1.1.4. Teshekpuk Lake

Teshekpuk Lake and the area immediately around it holds enormous significance for wildlife and subsistence. The importance of Teshekpuk Lake for fishing cannot be understated (SBA 2009, p. 66). As one fisher said, "Everywhere around Teshekpuk, you put a net out, you'll get aanaakjiq" (broad whitefish) (Brewster & Geroge 2009, p. 36). One person described the importance of the Lake as follows: "you can restore small lakes around Teshekpuk that are destroyed, as long as Teshekpuk Lake is intact with fish, and the ecosystem can be maintained, but if Teshekpuk Lake is destroyed the ecosystem based on fish will be hard to restore" (NPRA SAP 3/14/2002, p. 2-3). More than one person described underground rivers associated with the Lake (SBA 2019, p. 33). One said that "all the rivers that are around Teshekpuk Lake all flow into that lake and, therefore, they do have fish also. That Teshekpuk Lake from the beginning that we could remember that's been passed on by--from generation to generation. Our forefathers had stated that there's fish there that nobody knows that exist in that lake." (SBA 2019, p. 30). One person emphasized the

size of fish in the Lake: “There are big lake trout in Teshekpuk Lake. Sixty-pound trout. Those big trout, they scare the people in the boats because they go up to the boats. Long time ago, there were really, really big fish. Lake trout of 65 pounds, 104 pounds” (Brewster & Geroge 2009, p. 51).

Steve Braund and Associate’s 2019 collection of traditional knowledge quotes one knowledge holder saying “the entire area around Teshekpuk Lake is an extremely important habitat for waterfowl nesting, molting, and feeding” (SBA 2019, p. 46) Another says,

The area to the north and east of Teshekpuk Lake is vitally important for many molting geese. Up to 20 percent of the entire Pacific flyway population of black brant can molt in the Teshekpuk area at any one time. This is a great concern that molting birds are susceptible to disturbance and any activity in these areas has a potential to greatly reduce the population of brants and other geese. Also in the area there are relatively dense populations of king eiders which are very important again for subsistence and king eider populations have declined by about 50 percent in the last 20, 25 years. There are also many other species of waterfowl that are important in this area and we need to learn a great deal about them.

(SBA 2019, p. 46)

The area around Teshekpuk Lake provides for caribou calving area (SBA 2009, p. 69, 132; NPRA SAP 6/8/2000, p. 5) as well as caribou hunting (SBA 2019, p. 50).

Nalaakruk Lake and Okalik Lake, located along the coastline north of Teshekpuk Lake near Point Lonely is known for fishing (Brewster & Geroge 2009, p. 138) The area north of the Lake is also important for waterfowl nesting and molting (NPRA SAP 6/8/2000, p. 5).

#### 1.1.5. East of Teshekpuk Lake

Kogru River, Atigru Point, Harrison Bay, and Cape Halkett are situated directly east of Teshekpuk Lake. This area is important for bearded seal (Galginaitis 1990, p. 1-16), caribou (Galginaitis 1990, p. 1-16; SBA 2010-1, p. 19), and subsistence fishing (NPRA SAP 8/16/2001-1, p. 11). One hunter noted that migratory birds nest in this area: “quite a bit of goslings and nestings (ph) from Iysuk (ph) by Cape Halkett along the Harrison Bay to Fish Creek near the Ocean on those swampy areas” (SBA 2019, p. 45).

Several hunters interviewed by Steve Braund and Associates commented on the importance of the area east of Teshekpuk Lake for caribou. One hunter indicated that this areas is “extremely important for waterfowl, nesting, and molting, and it's also very important as a caribou calving area. This, of course, is getting over into the Teshekpuk region and our Teshekpuk Caribou Herd, which is the most important subsistence caribou herd for most of the villages on North Slope.”

(SBA 2019, p. 48) Another said, "Nearly all of the parturient cows move north through the narrow corridor between Teshekpuk Lake and the Kogru River. It would be very difficult to have any development in this corridor without the risk of seriously affecting the population." (SBA 2019, p. 48). Another said,

The pipeline should not run within forty miles of the south side of the lake because of the caribou calving area. They should not be run through the narrow gap of land between the east side of the lake [and Kogru] Inlet because it's a very restrictive and important caribou migration area for cows and youth calves to travel to get insect relief. Cows with calves are very sensitive to structures and activity and would be detrimentally affected by construction of the existence of the pipeline to that area. (SBA 2019, p. 53).

#### 1.1.6. South of Teshekpuk Lake

The Pik Dunes are prime areas for wolverine and wolf hunting and trapping (SBA 2019, p. 105).

### **1.2. Colville River Special Area (CRSA) SRV**

The Colville River Special Area starts south of Nuiqsut and follows the Colville River south and westward, including Umiat, until it meets the Utukok Special Area at the southernmost point of NPRA.

The area along the Colville River has long been recognized for its important resources. As one hunter indicated, "The Colville is a very rich river. It supplies us.... It's very important to subsistence hunters, like an Arctic Eden, where all the wildlife congregate" (SBA 2011, p. 89). Another stated, "This oasis is a riparian habitat is very productive and supports wildlife populations such as moose, hares, lynx, that are not abundant on the rest of the North Slope. It's an important area where North Slope people can harvest meat and fur trapping, conduct fur trapping" (SBA 2019, p. 66).

The Colville River has traditionally held an abundance of fish that are harvested by Nuiqsut residents, including broad whitefish (SBA 2010-2, p. 257), arctic cisco (qaaktaq) (NPRA SAP 3/16/2004, p. 6; NPRA SAP 6/19/2003, p.10; NSB 2007, Section 7.4.5.7), arctic char (SBA 2010-2, p. 252); arctic grayling (SBA 2011, p. 63; NSB 2007, Section 7.4.5.7), Dolly varden (SBA 2011, p. 63; SBA 2010-2, p. 252), and burbot (SBA 2010-2, p. 263). The Sentinel Hill Area on Colville River is particularly notable for fishing (SBA 2010-2, p. 257; SBA 2019, p. 50) and caribou (SBA 2010-1, p. 21; SBA 2022 p. 20-22; SBA 2010-2, p. 220). Since development began in the 2000s, however, residents have increasingly expressed concerns about the declining quantity and quality of their fish (e.g., moldy fish) due to pollution and reduced flow volumes (NPRA SAP 3/16/2004, p. 6; NPRA SAP 6/19/2003, p.10 SBA 2009, p. 140; NPRA SAP

3/16/2004, p. 6; NPRA SAP 6/19/2003, p. 10; NPRA SAP 3/7/2000, p. 3-4; NPRA SAP 8/15/2002, p. 6; Nuiqsut 2022, p. 90).

Along the Colville River, Nuiqsut residents can harvest moose (Nuiqsut 2022, p. 113; SBA 2011, p. 63; NSB 2007, Section 7.4.5.7), caribou (SBA 2011, p. 63), grizzly bears (SBA 2011, p. 102), geese (SBA 2010-2, p. 269), eider ducks (Nuiqsut 2022, p. 115; SBA 2010-2, p. 276), and furbearers (e.g., lynx and hares) (SBA 2019, p. 66). That said, some have suggested that the number of moose in the Colville River area has been declining (SBA 2011, p. 93).

Umiat is another important area along the Colville River. Nuiqsut residents harvest caribou here (SBA 2011 p. 76; SBA 2019, p. 50; NPRA SAP 8/16/2001-1, p. 6) as well as moose (SBA 2019, p. 65-66; SBA 2011, p. 53; SBA 2011, p. 76), furbearers (e.g. rabbit, wolf, wolverine, and lynx) (SBA 2011, p. 91) Dolly varden, and salmon (Cotton 2012, p. 20). One hunter said that moose “usually tend to gather around Umiat area, in about a 10 mile radius of Umiat, but basically on the river. That’s where you find the bulk of the moose herd. It’s always been like that due to probably the highest concentration of willows in that area" (SBA 2019, p. 65).

### **1.3.Kasegaluk Lagoon Special Area SRVs**

The Kasegaluk Lagoon Special Area starts at the northwestern corner of NPRA at Icy Cape and extends along the coast about halfway to Wainwright.

Residents from Point Lay and elsewhere rely on the Kasegaluk area to collect bird eggs and hunt seal and beluga (NSB 2007, Sections 7.4.5.2 and 7.6.3.4). One Point Lay resident referred to the area as the community’s main source of food (NPRA SAP 6/5/2012, p. 4). Walrus, belugas, ducks, and geese use the lagoon (SBA 2019, p. 67). The islands of Kasegaluk are known to provide critical habitat for nesting and molting birds (NSB 2007,Section 3.5.2, 7.6.2).

One Point Lay resident described Kasegaluk as follows:

And every year we have birds migrating from down south coming up and utilize that lagoon. The walrus use that lagoon to get out of storms that happen in the ocean because I've witnessed it quite a few times during my 40 years. The belugas go in there and, you know, as well as, you know, ducks, geese. We have a wide variety of waterfowl that utilize that lagoon.

(SBA 2019, p. 67).

### **1.4.Peard Bay Special Area SRVs**

The Peard Bay Special Area is northwest of Wainwright and includes Point Franklin.

Peard Bay provides important subsistence resources for Wainwright and Utqiagvik residents, including walrus (and clams found within the digestive systems of walrus) (NPRA SAP

3/14/2002, p. 10), beluga (NPRA SAP 3/14/2002, p. 10), fish (NPRA SAP 3/14/2002, p. 5), eiders (NPRA SAP 3/14/2002, p. 5; SBA 2010-2, p. 82), geese (SBA 2010-2 p. 74), ringed seal (SBA 2010-2, p. 90-92), and black brant (SBA 2010-2, p. 76). Peard Bay is known to be a nesting area for ducks (NPRA SAP 3/14/2002, p. 10). Chinook salmon, which were once scarce on the North Slope, now pass through Peard Bay (Cotton 2012, p. 19).

### **1.5. Utukok River Uplands Special Area SRVs**

The Utukok River Uplands Special Area includes much of the southwest part of NPRA, including the southern part of the Colville River, the Utukok River, and the Ketik River.

The northern part of Utukok River Uplands Special Area is important for caribou calving for the Western Arctic Herd (WACH 2023; SBA 2019, p. 49), which is an “extremely important subsistence resource for some North Slope villages and many villages in the northwest part of the state.” (SBA 2019, p. 49).

## **2. Knowledge regarding SRVs in other areas that should be Special Areas**

This section describes geographic areas that should be protected as Special Areas in order to protect the resource values that are critical to the human ecosystem that includes NPRA.

### **2.1. Nuiqsut Area**

#### **2.1.1. Around Nuiqsut**

Nuiqsut, which sits on the eastern edge of NPRA, was selected for resettlement because of the richness of natural resources (Brown 1979). Residents rely on resources within a short range of the community, some of which includes unprotected portions of NPRA. These resources have traditionally included moose (SBA 2011, p.53; SBA 2010-2, p. 237) and caribou (NPRA SAP 12/16/1999, p. 2, 12), as well as fish (SBA 2011, p. 72), including pink salmon (Cotton 2012, p. 12). Oil development to the east has changed caribou migration (NPRA SAP 12/16/1999; NPRA SAP 8/16/2001-1, p. 7) and altered the quality and quantity of fish (as discussed in connection with the Colville River Special Area).

#### **2.1.2. Fish Creek**

Fish Creek is partially protected by the TLISA, but the end of the river near Nuiqsut, which is particularly important to Nuiqsut residents, is not protected. At Fish Creek, Nuiqsut residents harvest a broad range of fish (SBA 2010-2, p. 257; SBA 2019, p. 50; Galginaitis 1990, p. 1-19), including burbot (SBA 2010-2, p. 263), cisco, whitefish and grayling (NSB 2007, Section 7.4.5.7). A great deal of fishing occurs during freezeup (NPRA SAP 6/19/2003, p. 12).

The area also provides for caribou (SBA 2010-2, p. 220; NSB 2007 Section 7.4.5.7); wolf and wolverine (SBA 2010-2, p. 296), moose (Nuiqsut 2022, p. 113), and waterfowl, (Galginaitis



1990, p. 1-19) including king (qijaalik) and common (amauligruaq) eider duck (SBA 2010-2, p. 276) and geese (SBA 2010-2, p. 269). White-fronted geese are the primary species harvested, followed by Canada geese, brant, and snow geese (kañuq). The area is also important for caribou insect relief (NPRA SAP 3/16/2004, p. 3).

### 2.1.3. Judy Creek

Only two small portion of Judy Creek (where it meets Fish Creek and further upriver) are protected by the TLSA. Judy Creek is important to Nuiqsut residents for geese (SBA 2010-2, p. 269), wolf and wolverine (SBA 2010-2, p. 296), caribou (SBA 2010-2, p. 220)

The area around Nuiqsut, including all parts of Fish Creek and Judy Creek that are not currently covered by the TLSA, should be protected from development because of the habitat provided for caribou, moose, birds, fish and furbearers, and because of the subsistence that takes place here. While human health may not be categorized as a significant resource value under the National Petroleum Reserves Production Act, it is clearly and an important value that could be protected by limiting air and water emissions in this area.

## **2.2.South and West of the Existing Teshekpuk Lake Special Area**

There are a number of important areas that are just south and west of the existing boundaries of TLSA that hold important resources. This section outlines key resources in areas that are unprotected.

### 2.2.1. West of Utqiagvik

Just west of Utqiagvik, there are several places with important resources that are not protected. This includes Skull Cliff, important for bearded seal hunting (SBA 2010-2, p. 98) and caribou (SBA 2010-2, p. 17, 29). Salmon and Dolly varden (locally called char) migrate up the Singaruak River (Cotton 2012, p. 20). Lake Sungovoak (Suffubruaq) is a big lake close to Utqiagvik that is well known as a productive fishery for least cisco (iqalusaaq) and broad whitefish (aanaakjiq) (Brewster & Geroge 2009, p. 141, Figure 100). Pigniq (Birnik National Historic Landmark) on the Chukchi Sea coast near Utqiagvik is important for eider hunting (SBA 2010-2, p. 85-87) and fishing, especially Arctic char (NSB 2007, Section 7.4.5.6; (SBA 2010-2, p. 56).

### 2.2.2. South of Dease Inlet

The Topagaruk (Tupaabruk) River is a good fishing spot, especially for burbot (Brewster & Geroge 2009, p. 133; SBA 2019, p. 33).

### 2.2.3. Mid- NPRA

There are a couple of important rivers west of the southwestern part of TLSA. This includes the Titaluk River, a place for moose (SBA 2010-2, p. 48) and the spot known as Qaababvik on the Topagaruk River. The latter is known for fishing, including broad whitefish (aanaakjiq) (SBA 2019, p. 32; SBA 2010-2, p. 63), least cisco (iqalusaaq) (SBA 2019, p. 32), (Brewster & Geroge 2009, p. 44), Arctic char/Dolly Varden (SBA 2010-2, p. 58); and northern pike (Brewster & Geroge 2009, p. 59).

### 2.2.4. South of Lake Teshekpuk

People harvest Arctic char/Dolly Varden as far as Kugrua River and in various lakes in the region south of Teshekpuk Lake, extending almost as far east as Kealok Creek. (SBA 2010-2, p. 56)

### 2.2.5. Ikpikpuk and Chipp Rivers

The Ikpikpuk and Chipp Rivers drain into the Beaufort Sea, and the portion towards the mouth of these rivers is within TLSA, but important areas further upland were left out of TLSA. Residents of Utqiagvik have cabins and go hunting and fishing along these rivers.

The Chipp River is important for fish (SBA 2010-2, p. 257; SBA 2019, p. 50), especially grayling (Brewster & Geroge 2009, p. 47; SBA 2019, p. 32), arctic char (Brewster & Geroge 2009, p. 57), broad whitefish (aanaakjiq) (Brewster & Geroge 2009, p. 137; Cotton 2012, p. 41; SBA 2019, p. 32), burbot (tittaaliq) (Brewster & Geroge 2009, p. 137; SBA 2019, p. 32; SBA 2010-2, p. 69), least cisco (iqalusaaq) (Brewster & Geroge 2009, p. 137; SBA 2019, p. 32), humped whitefish (pikuktuuq) (Brewster & Geroge 2009, p. 137; SBA 2019, p. 32), and qaaktaq (arctic cisco) (SBA 2019, p. 30; Brewster & Geroge 2009, p. 43, 44). It is also known for caribou (SBA 2010-2, p. 29, 32), wolf and wolverine (SBA 2010-2, p. 113), muskox (NSBRAC 2022, p. 4), and geese (SBA 2010-2 p. 74).

The Ikpikpuk River is likewise important for fish, including grayling (Brewster & Geroge 2009, p. 47), arctic char (Brewster & Geroge 2009, p. 57), and whitefish (Cotton 2012, p. 54), as well as caribou (SBA 2010-2, p. 29), wolf, and wolverine (SBA 2010-2, p. 113). Iqsiñnat, a site on the lower Ikpikpuk River, is an important fishing and camping area (Brewster & Geroge 2009, p. 136).

One resident noted that

The Ikpikpuk River is a migrating river. It migrates. It moves and sometimes it moves 300 feet a season...What is our -- these boundaries that they are putting at a half mile, three quarter of a mile on the rivers, erodes, I mean, you know, there's some real tough questions in there. But we know that the rivers still migrate. You

will see how much the rivers have moved within these years, they've moved miles.

(SBA 2019, p. 20). As such, the specific geographic boundaries warranting protection may shift over time.

#### 2.2.6. Mayuabiq/Miguakiak River

The Mayuabiq (Miguakiak) River, is the sole outlet for Teshekpuk Lake, and flows into the Ikpikuk River (Brewster & Geroge 2009, p. 14). It is important for fishing (SBA 2019, p. 77) and said to have underground rivers where fish come from (SBA 2019, p. 21). There is a story of a man fishing here with “one net. One fish was enough for him. He would drag it home like a seal. Put a rope through the mouth and pull it over his shoulder; you know just like dragging a seal home. It was that big. One fish filled the net.” (SBA 2019 p. 32). A site called Shuqjak on the Mayuabiq River is an important fishing and camping area (Brewster & Geroge 2009, p. 136). Residents harvest grayling (Brewster & Geroge 2009, p. 13, 45), broad whitefish (anaakjiq) (SBA 2019, p. 32), and arctic char/Dolly varden (SBA 2010-2, p. 58) from the Mayuabiq River.

There is concern that travel across Mayuabiq River could cause bank erosion (NPRA SAP 3/14/2002, p. 3).

### **2.3. Atqasuk Area**

Residents in Atqasuk highlight the important resources near their village and along the Meade River, which originates southwest of the village and drains into Admiralty Bay at the base of Dease Inlet. Likewise, there are important resources along the Inaru (Kuugaluk) River, which runs a little to the north of the Meade River and drains into Admiralty Bay. These resources are southwest of the westernmost portion of TLSA and are currently open to leasing.

Both the Inaru River and the Meade River are essential for inland falltime fishing (NSB 2007, Section 7.4.5.6; Brewster & Geroge 2009, p. 44; SBA 2010-2, p. 56) and eider hunting (SBA 2010-2, p. 82). Residents referred to camps and historic locations along the two rivers, including Iviksuk on the Inaru River; and Nauyalik, Pigniq, Pulayaaq, and Pulayatchiaq on the Meade River. Fishing on the Meade River is often combined with caribou hunting and berry picking and, later, with furbearer harvesting (NSB 2007, Section 7.4.5.6; SBA 2010-2, p. 29). Pigniq is known for duck hunting, while Pulayaaq and Pulayatchiaq are used for trapping in late winter and for taking waterfowl in the spring as well as for summer fishing and hunting (NSB 2007, Section 7.4.5.6). Pulayaaq is also known to be a good place for least cisco (iqalusaaq) (Brewster & Geroge 2009, p. 42) .

Geese are found along interior waterbodies and on the tundra after the snow melts and are hunted intensely with productive results at such places as Uatuq on the Meade River (NSB 2007, Section 7.4.5.6; see also SBA 2010-2 p. 74).

The Inaru River is known for arctic cisco (qaaktaq) (Brewster & Geroge 2009, p. 43). Ikroavik (Iksrubabvik) Lake near Inaru River is known to have two types of least cisco (iqalusaaq) (Brewster & Geroge 2009, p. 43). The deep lakes around the Meade River are known to be a spawning place for broad whitefish (aanaakjiq), which transition to the Meade River just before freezeup (Brewster & Geroge 2009, p. 79). The Meade River is also known for grayling (Brewster & Geroge 2009, p. 13, 45). The Usuktuk River just north of Atqasuk is a place to get burbot (tittaliq), arctic cisco (qaaktaq), and humpback whitefish (pikuktuuq) (SBA 2019, p. 33). One knowledge holder noted the importance of Inaru River and Anungavoak Lake for whitefish and grayling, and indicated that when the area was dynamited in the early years of oil and gas exploration, the lake became shallow, fish stopped producing roe (SBA 2009, p. 44).

Residents can find caribou in the 12 to 18 radius around the village itself (SBA 2019, p. 77; (WACH 2019, p. 37). Caribou have also traditionally been found along the Inaru River (SBA 2019, p. 50).

In sum, the unprotected land in the vicinity of Atqasuk, particularly that along the Mead and Inaru rivers within 30 miles of the community, is rich with caribou, fish, and other resources essential to the community and should be protected.

#### **2.4.Wainwright Area**

Wainwright (on the coast) and the area south of the village are situated in the unprotected portion of NPRA between Peard Bay to the east and Kasegaluk Lagoon to the west. Wainwright residents rely on the Kuk (Kuuk) River, which flows northward into the Wainwright Inlet just south of the community, where leasing has been deferred (Wainwright 2008, Map 7). The Avalik, Kertik, and Kaolak Rivers feed into the Kuk River and are also important for Wainwright residents, especially for fishing. (NSB 2007, Section 7.4.5.4; Wainwright 2008, Map 7). Fishing also occurs along the Utukok River (Wainwright 2008, Map 7).

Key waterfowl areas for Wainwright residents extend along the coast from Peard Bay to Point Lay and up the Kuk River (Wainwright 2008, Map 10). Important waterfowl for hunting and egg collecting include Brant, Pintail, Canada Goose, Spectacled Eider, Common Eider, Steller's Eider, King Eider, White-fronted Goose, Lesser Snow Goose, Long-tailed Duck, Loon, and Mallard (Wainwright 2008, Map 10). Key fish species harvested by the people of Wainwright include Arctic Cisco, Salmon, Blackfish, Sculpin, Burbot, Smelt, Broad Whitefish, Tomcod, Char, Whitefish, Dolly Varden, Grayling, and Rainbow Trout (Wainwright 2008, Map 10).

Core caribou harvesting areas for Wainwright are near Wainwright (SBA 2019, p. 77) along the mouth of the Kuk River and upriver, and the mouth of the Kokolik River and upriver (Wainwright 2008, Map 9). Caribou also serve as an “umbrella species,” meaning that their range (particularly along the Kuk River) overlaps with other subsistence species (Wainwright 2008, Map 9) including fur berries, berries, ptarmigan, and fish (Wainwright 2008, Map 9; NSB 2007, Section 7.4.5.4).

Thus, as with Atqasuk, the area around Wainwright, including the Kuk River and the Wainwright Inlet, are rich with resources and should be protected from development.

## **2.5. Migration Corridor for Caribou**

Maintaining space for annual caribou migrations is essential, particularly for the Teshekpuk Herd, which passes near Anaktuvuk Pass en route to calving grounds north of the Teshekpuk Lake. In addition to the Teshekpuk Herd, knowledge holders referred to an eastern herd (presumably Porcupine Caribou Herd) moving west and a western herd (presumably Western Arctic Caribou Herd) moving east through NPRA (NPRA SAP 12/12/2003, p. 6-8).

Residents emphasized that migration routes differ over time (see, e.g., WACH 2019, p. 37; NSBRAC 2022, p. 3; SBA 2009, p. 38; NPRA SAP 8/15/2002, p. 4), such that it is important to maintain a broad space free of obstacles to migration. One knowledge holder described rain and the wolf population as affecting migration, noting “Because of the limited movement in the winter, any little barrier is going to prevent them from moving” (NPRA SAP 8/10/2000, p. 6). Another noted that normally, during the hot summer months, the caribou migrate directly onto the coast to get out of the infestations of mosquitos, but a pipeline has “virtually barred [them] from the coastal protections (NPRA SAP 3/7/2000, p. 4).” One noted that a pipeline will funnel caribou along the pipeline until they can find a place to cross over or under (NPRA SAP 12/12/2003, p. 8). One explained that an east-west road would impede caribou migration, such that it is important for development to avoid the migration corridor during spring migration (NPRA SAP 12/16/2010, p. 7). Seismic activity, vehicle traffic, and other noises also disturb caribou (NPRA SAP 11/3/2003, p. 4; SBA 2009, p. 38-39, 79). Shiny pipelines (SBA 2009, p. 70) and low pipelines also impede caribou (SBA 2009, p. iii to iv, ix, 29, 33; NPRA SAP 8/16/2001-2, p. 20; NPRA SAP 8/15/2002, p. 4; NPRA SAP 6/8/2000, p. 10; NPRA SAP 8/16/2001-1, p. 13).

One knowledge holder suggested that

[T]he area around Teshekpuk Lakes should be avoided, one of the worst places for a pipeline would be just north of the land. A pipeline running east and west would interfere with the ability for the caribou to travel towards the coast ...It would also impact caribou moving south away from the insect relief area grazing areas where weather

conditions are favorable and insect harassment is reduced. This would have a negative nutritional effect especially in the years that conditions cause the trail to the insect relief areas and that back and forth multiple times. ...it would affect the entire herd. (SBA 2019, p. 47).

Some knowledge holders indicated that the Porcupine Caribou Herd had not come westward since the opening of the Dalton Highway and the Trans-Alaska Pipeline (NPRA SAP 11/3/2003, p. 8; NPRA SAP 6/5/2012, p. 5; SBA 2009, p. 70). One resident indicated that the Teshekpuk Herd appears to be shifting southward away from development, rather than going through Fish Creek (SBA 2009, p. 70). Knowledge holders in Wainwright referred to an abundance of caribou in the area south of their village, which sometimes winter in the area (SBA 2019, p. 49).

In sum, traditional knowledge refers to a natural variability in migration that can shift further with development. It is essential to leave space for migration so that caribou can reach calving and insect relief areas (and so that they are accessible to residents who depend on them). Protections should be in place so caribou migrate free of obstructions to important calving and insect-relief areas.

### **3. Significance of Climate Change**

Since the 2000s, knowledge holders have spoken about changes in their environment that affect the resources they depend on.

In 2009, a Nuiqsut knowledge holder reported warmer weather all over: “Right now it should be -40, but it's only zero. Like that time when we first had an El Niño, we had rain in the spring. We have rain in July, not May ...Now the winters are one or two weeks late.” (SBA 2009, p. 142). Nuiqsut knowledge holders interviewed in 2018 largely agreed that winter temperatures were getting warmer, spring was coming earlier, and fall was coming later (Schmidt et al 2018, p. 4). In 2019, an Utqiagvik knowledge holder described climate changes as “So much warmer – remember Halloween with 20 below. Not anymore. Break-up was earlier. Began boating earlier, by June 2019. Colville River broke up a week or two early. Had rain after first snowfall this winter” (WACH 2019, p. 36). In 2019, a Nuiqsut knowledge holder noted that there was more wind in summer now, and more westerly wind compared to other winds (WACH 2019, p. 36).

The warmth has had numerous impacts. Knowledge holders described upland vegetation as growing faster, with willows growing bigger (WACH 2019, p. 36; Schmidt et al 2018, p. 4). One knowledge holder indicated that red tide was starting to show up in mouth of the Colville River in fall, and zooplankton were showing up and feeding from the fish caught in nets (WACH 2019, p. 36).

Erosion and permafrost thaw have been a concern. Nuiqsut knowledge holders reported increasing erosion, especially around rivers, and either less permafrost or more exposed permafrost (Schmidt et al 2018, p. 4). In addition to land loss, Nuiqsut knowledge holders described difficulty travelling and accessing traditional hunting areas (Nuiqsut 2022, p. 93). For example, one indicated that Atigaru Point had eroded a lot. (SBA 2019, p. 19). A Wainwright knowledge holder suggested that climate change had exacerbated impacts from a major August storm, such that the community was left without any beach at all (high water for a long period of time with waves eroding the bank and exposing the permafrost) (NPRA SAP 2015, p. 25). Some houses in Wainwright were originally built on sites that are now in the ocean, such that the houses have been moved inland several times (NPRA SAP 2015, p. 25). An Utqiagvik knowledge holder described erosion and warming at his fish camp located along the Beaufort Sea coast north of Teshekpuk Lake: between the 1980s and 1995, three separate ice cellars each became exposed by erosion and rendered unusable (Cotton 2012, p.39)

Riverine erosion is also a challenge. A Nuiqsut knowledge holder described erosion from the banks of the Colville River:

We noticed changes in the landscape along the river from erosion. We first had a sod house then a cabin. But we had to move the cabin 150 feet from the river because of erosion. We used to have a cellar located 100 feet from the river that eroded away. There was lots of ice [permafrost] where our cellar was and it eroded away very fast. And the water level is coming up higher than in the past when it used to be east winds. The west wind causes the water to rise. The ice movement was so tremendous that it started affecting the landscape and eroding the bluffs.

(SBA 2019, p. 19)

An Atqasuk knowledge holder described erosion along the Meade River: “You see all the ground falling down in the river. Not just there, but other spots. It's getting wider and wider. You can tell. Especially when it rains.” (SBA 2019, p. 20)

Some knowledge holders described rivers as being low or dry. For example, an Atqasuk knowledge holder referred to the Meade River as “getting really low. This is because of global warming. The corner of the river is about closed. It'll be a creek” (SBA 2009, p. 142; see also SBA 2019, p. 23). A Nuiqsut knowledge holder noted that Putu had been the main access channel in the 1970s to get to the Colville; today that river is dry (SBA 2019, p. 24).

Knowledge holders have expressed concern about fewer lakes (Schmidt et al 2018, p. 4), and lakes drying up and dry tundra around their communities (NPRA SAP 12/6/2007, p. 6)

Thin ice is also a concern. An Atqasuk knowledge holder described a winter with thin ice and open water near the cabins on the Meade River (NSBRAC 2023, p. 2). A Nuiqsut knowledge holder suggested that repeated freezing and thawing has made the Colville River dangerous to cross when it should be frozen (NSBRAC 2023, p. 2). Another Nuiqsut knowledge holder described the following phenomenon:

You probably know how water melts the ice. It eats through it. My experience, I have been going out boating every year and seeing how the land changes. It makes that one area shallow and wider, and the water flows where it can flow the easiest. I have seen a lot of change in the river. It moves a lot of gravel. The routes that we used to use going upriver it used to be pretty deep. Now in my lifetime I have seen the mud move in the river. The gravel and mud will move the water into certain places. There is land, or ground that hasn't been touched in so many years and the mud and gravel will get onto it. Water works really quick on that permafrost. The more it melts the more the ground will start falling in the river.

(SBA 2019, p. 18).

Changes in the climate have affected habitat, migration, and subsistence patterns. A Wainwright knowledge holder noted that there used to be a breeding ground right across the inlet near Wainwright, full of arctic terns, snipes, and shore birds, but they were not there at the time of the interview. (SBA 2009, p. 142). An Utqiagvik knowledge holder indicated that he had observed more ducks around the community, which he attributed to the edge of ocean ice being closer to the community than in colder years (NSBRAC 2023, p. 3). One knowledge holder noted in the past, duck hunting usually didn't begin until the second or third weeks of May, but warmer temperatures in the past couple of years have led to hunters going out to duck camp around May 1 (NPRA SAP 3/17/2005, p. 5). One knowledge holder reported snow melting from the rain that disrupted their geese hunting. (SBA 2009, p. 142).

Knowledge holders interviewed by Schmidt et al (2018, p. 4) generally agreed that there were fewer moose around Nuiqsut. In contrast, there are more muskox coming into Nuiqsut and they are becoming a subsistence resource (NSBRAC 2022, p. 3).

One knowledge holder noted that caribou were getting fatter just after rutting season (when they should be leanest) instead of in October, when they usually become their fattest (NPRA SAP 12/12/2000, p. 7). Some knowledge holder residents suggested that rain in winter (freezing over lichen) had led to caribou death (WACH 2019, p. 36; SBA 2009, p. 142; NPRA SAP 12/12/2003, p. 5).

Climate change has changed the patterns of animals that can interfere with caribou wellbeing. For example, a Nuiqsut knowledge holder said that muskox come right to the village and change the caribou migration (Galginaitis 1990, p. 37). An Atqasuk knowledge holder noted that bears,



wolves, wolverines in the area were changing the direction of the caribou (WACH 2018, p. 29). On another occasion, this knowledge holder noted that wolves lingered near the community until long past freeze up (NSBRAC 2023, p. 2). An Utqiagvik knowledge holder described an encounter with brown bears:

We've been seeing quite a few brown bears near our camp where we don't usually see them. One year I met my cousin and we went to the cabin to get our yearly supply of fish. We saw a blonde bear. We killed it maybe 30 feet from the cabin. It had a belly full of lemmings. We killed a moose too. All these animals that we don't usually see are wandering up north. Bears, moose. Three or four years ago there was a lynx near town.

(SBA 2009, p. 141-142)

As with changes to fish described above in the section on the Colville River, some knowledge holder have seen a change within caribou that is not clearly attributable to a particular cause. One hunter said that he usually got 12 caribou yearly, but for last the four years one third had been bad, with black lungs, red spots on stomach, and stomach linings that aren't clean (NPRSA SAP 12/12/2000, p. 6).

The timing of fishing has changed. One fisher remembered setting nets in early June when he was younger, but shifted to setting nets in late June because the ice is not out and the Colville River sediments have not subsided by early June. (Cotton 2012, p. 36) An Utqiagvik fisher expressed concern that the fish may be passing when the ice is too thin to set nets on the ice for whitefish. (Cotton 2012, p. 37) An Atqasuk knowledge holder expressed concern that there was not enough ice to icefish (WACH 2018, p. 28). A Nuiqsut knowledge holder observed that later fall freeze-up timing affects his ability to catch the fish runs under the ice. (Cotton 2012, p. 37). An increase in summer duration means a longer open-water fishing and hunting season, but the important fall whaling and fishing seasons happen later (Cotton 2012, p. 37).

Fishers reported seeing more salmon and pike and less broad whitefish (aanaakjiq) in the Meade River (WACH 2019, p. 29; SBA 2019, p. 23; see also NPRSA SAP 12/12/2002, p. 4). In Elson Lagoon, waters are shallower and hotter and have more salmon, flounder, and horny devil fish and less whitefish (SBA 2009, p. 141).

Given the natural fluctuation in migration patterns and habitat, there is already a need to provide a range of protected space for species to thrive. Climate change has added to the fluctuation and, as described herein, puts a strain on some species (especially caribou) and the people that rely on them. Thus, there is a need for a “margin of error” in establishing protected areas to account for the variation and limitations related to climate change. Expanding the boundaries of existing Special Areas and establishing new ones around villages can help provide this margin.

## 4. Proposed Maximum Protection Measures

In their service on boards such as the NPRA Subsistence Advisory Panel, knowledge holders have suggested measures that would protect their ability to use the resources in NPRA. Institutions including the North Slope Borough (in its 2007 Alaska Coastal Management Program plan) have built on these suggestions in crafting policies for protected areas. The proposed maximum protection measures suggested in this section further build on this collective knowledge. The proposed measures include (1) cross-cutting measures that should apply to SRVs in existing as well as proposed Special Areas, and (2) geographically specific measures.

### 4.1. Cross-cutting Measures for All Development

1. Conflict avoidance agreements: Developers must work with communities that may be significantly affected by development on “conflict avoidance agreements” similar to what Alaska Eskimo Whaling Commission arranges with companies that barge through the Beaufort and Chukchi Seas (NPRSA SAP 3/14/2002, p. 5). Such agreements could provide for voluntary restrictions on timing and location of activities and for mitigation. Potential mitigation actions would include gas to cover added travel distances, training programs to employ young people in skilled jobs, and subsistence leave policies (SBA 2009, p. ii, viii, 42).
2. Village-based representatives: Companies with development that may significantly impact a community’s subsistence should base full-time staff in the community that can address subsistence concerns (NPRSA SAP 8/16/2001-1, p. 11). This suggestion was made in 2000, when the Internet was more limited. A better system for communication (such as a hotline that is answered around the clock) backed by a willingness to promptly send staff to a community or a site to address a concern may also serve the purpose of this recommendation.
3. Cabin/campsite/allotment protection: Companies conducting seismic, on-the-ground, or aircraft activity must notify (via personal contact if possible or newspaper) people with cabins, campsites, and allotments if any activity will be taking place within 2000 feet of cabins to offer a consultation opportunity and avoid disturbance. (NPRSA SAP 12/13/2001, p. 12). All activity must stay 2000 feet from cabins, campsites, and allotments. (NPRSA SAP 3/14/2002, p. 4).
4. Visual harmony: Pipelines that are silver in color reflect the sunlight and hurt the eyes of animals (SBA 2009, p. iii to iv, ix, 29, 33). Facilities and structures must be designed or sited to blend in with the surrounding landscape unless the applicant demonstrates that such measures would propose threats to wildlife. Measures shall include one or more of the following: (1) use of colors similar to the surrounding environment; (2) use of non-

reflective surfaces; (3) facility design that uses similar shapes or lines as the surrounding environment, or (4) placement of facilities so they are screened from coastal waters or navigable aquatic water bodies (NSB 2007, Policy A-5).

5. Remediation:

- a. Applicants for development must have a plan for the dismantlement, restoration and rehabilitation (DRR) of oil and gas facilities. The plan must explain how DRR will take place, identify at what point in the project development the measures will be implemented, and identify resources available to fund the DRR (NSB 2007, Policy E-3).
  - b. To the maximum extent practicable and to the satisfaction of BLM and the closest community, the measures shall be designed to return the project area to pre-project conditions, especially in regard to habitat functions and visual impacts to the landscape (NSB 2007, Policy E-3).
  - c. DRR measures shall be implemented when a facility is no longer being used and there are no specific plans for future use, unless an alternate plan or site treatment is preferable to the one described in the DRR plan (NSB 2007, Policy E-3).
  - d. Upon abandonment, project completion or expiration of permit authorizations, whichever occurs first, permitting agencies may amend required measures identified in the original plan if (1) There is a demonstrated future use for the site, or (2) The original measures would cause greater adverse effects (NSB 2007, Policy E-3).
  - e. Ground-disturbing projects should be bonded for environmental cleanup and site remediation (NPRA SAP 3/14/2002, p. 5). Development projects already face bonding requirements from various agencies, including BLM; however these bonds are typically inadequate to provide for the remediation that would be required to restore the area to pre-development conditions (Ristroph and Robards 2019).
6. Mobile camps: All mobile camps must have a hydrocarbon burner/incinerator on site that allows for the burning of hazardous materials, trash, and solid waste to avoid transporting waste across the tundra and filling up local landfills (NPRA SAP 6/19/2003, p. 4).
7. Airstrips: Temporary airstrips (ice strips) that have extensive fuel storage must be located on lakes that do not connect to the river system, such that damage from any spill would be localized (NPRA SAP 6/19/2003, p. 4).
8. Noise/disturbance: Noise disrupts and displaces caribou, whales and other wildlife, resulting in hunters having to go longer distances at greater expense and risk. Of

particular concern are helicopters, small aircraft, marine vessels, and seismic testing (SBA 2009, p. ii, viii, 42).

- a. Studies: Researchers conducting studies must avoid commuting to the study site each day (either camp at study site or use drones) (NPRA SAP 8/16/2001-2, p. 16-17).
  - b. Flights: Companies should minimize flights by sharing trips among different companies when possible (SBA 2009, p. ii, viii, 42). Except when necessary to protect human health and safety, aircraft must not fly below 1500 feet (1) over known subsistence use areas for bowhead whales, other marine mammals and caribou when subsistence use is occurring, and (2) over concentrations of 50 or more caribou during critical periods including spring migration (generally between April and May), calving (generally between the end of May and the 3rd week of June), insect relief (generally between July and August), and rutting (generally late September through the first week of November) (NSB 2007, Policy A-4).
  - c. Communications: Companies must put in place a real-time monitoring and response communication system so harvesters out on the land and water can communicate directly with company dispatchers, and can be alerted to planned activities. Companies should conduct an annual survey of harvesters to monitor harvest success and reports of impacts to harvest activities and hold an annual workshop to discuss and respond to results (SBA 2009, p. ii, viii, 42).
9. Air pollution: Air pollution from flares and small spills and accidents results in threats of contamination to wildlife and health risks to people. (SBA 2009, p. ii, viii, 42)  
Companies with air emissions in or near NPRA must do the following:
- a. Hold an annual health fair that is responsive to local concerns about air pollution;
  - b. Monitor air quality in each village that may be affected by air emissions;
  - c. Communicate with the public regarding the results of air monitoring activities;
  - d. Alter design of flaring as warranted after consultation with communities; and
  - e. Monitor tundra vegetation downwind from flares; alter design of flaring as warranted. SBA 2009, p. ii, viii, 42).
10. Wildlife Health: Companies with air or water emissions must implement a wildlife pathology and toxicology program so that harvesters can send in samples for analysis (SBA 2009, p. iv, ix).
11. Bird protection: Project activities that would significantly disturb nesting, brooding or molting birds are not allowed, including activities that would force birds away from nests or chicks or cause molting birds to exhibit stress behavior (NSB 2007, Policy C-7).

12. Caribou protection:

- a. No permanent facilities are allowed in caribou calving areas, and no activity is allowed within 1 mile of caribou calving (NSB 2007, Policy C-8).
- b. Activities must avoid disturbing caribou migration, especially the lead caribou who establishes the path that the rest of the herd will follow (NPRA SAP 8/10/2000, p. 4). Companies should reduce or reroute road traffic when caribou are present; ask local hunters to map locations where caribou have been deflected; and monitor locations and redesign as warranted (SBA 2009, p. iii to iv, ix, 29, 33).

13. Pipelines:

- a. Major pipelines along the coast aligned east to west are not allowed (NSB 2007, Policy H-1).
- b. Inland pipelines that would corral caribou, including pipelines aligned east to west, are not allowed (NSB 2007, Policy H-1).
- c. Above-ground pipelines are not allowed in areas known as thaw bulbs where the ground cannot safely support the pipeline (NSB 2007, Policy H-1).
- d. Above ground pipelines located within 500 feet of roads are not allowed. Buried pipelines in roads are allowed (NSB 2007, Policy H-1).
- e. Pipelines within 25 miles of communities should be buried to allow for the caribou to come to the communities, and to allow hunters easier access away from the village (NPRA SAP 6/19/2003, p. 12). Likewise, for heavily used caribou migration routes, the use of underground pipes should be considered for the width of the migration path. (Wainwright 2008, p. vii).
- f. Pipelines that cannot withstand the impact of a 338-caliber rifle are not allowed (NSB 2007, Policy H-1).
- g. Pipelines elevated less than seven feet, especially when snow builds up, as well as heavy road traffic deflect caribou from their normal migration routes. The lead bull caribou cannot go under the pipeline and therefore changes direction. The rest of the caribou follow the lead bull around the pipeline and away from usual migration routes (SBA 2009, p. iii to iv, ix, 29, 33; NPRA SAP 8/16/2001-2, p. 20; NPRA SAP 8/15/2002, p. 4; NPRA SAP 6/8/2000, p. 10; NPRA SAP 8/16/2001-1, p. 13). Pipelines shall maintain an elevation of at least 7 feet (preference for 12 feet), unless the pipeline is buried (NSB 2007, Policy H-1; SBA 2009, p. iii to iv, ix, 29, 33).

14. Transportation corridors (e.g., roads and rail):

- a. Transportation corridors are not allowed when the anticipated use can be accommodated by existing corridors (NSB 2007, Policy H-1).

- b. Major transportation corridors along the coast aligned north to south are not allowed (NSB 2007, Policy H-1).

15. Ice roads:

- a. Cleanup of ice roads must start just after snow melt (NPRA SAP 8/16/2001-3, p. 3).
- b. The use of rolligons should be considered where possible instead of ice roads (NPRA SAP 12/12/2003, p. 11).

16. Waterbody buffers:

- a. Seismic routes must be at least 300' from bluffs and water bodies (NPRA SAP 3/14/2002, p. 9).
- b. Generally, facilities shall not be allowed within (1) 500-feet from anadromous water bodies, (2) 250-feet from headwater streams creeks and tributaries, and (3) 100-feet from all other water bodies. These setbacks may be adjusted if a facility will not significantly affect the function of the habitat, including consideration of existing instream and riparian vegetation, slope, soil type, potential for erosion and other natural hazards, and other potential adverse effects of the project on the physical, biological and chemical characteristics of the habitat and the project activities meet one or more of the following criteria: (1) Existence of a significant public need for the project activity, (2) The facility is a temporary structure located during a time when anadromous fish are not present, (3) The facility is a bridge, or (4) The facility must be located nearer to the waterbody for health and safety concerns. (NSB 2007, Policy C-4)

17. Construction in waterbodies:

- a. Transportation routes and facilities shall avoid crossing waterbodies unless the crossing is necessary to the purpose and function of the route or facility. When it is necessary to cross water, the applicant shall: (1) Consolidate crossings at a single location unless consolidation will cause more adverse effects than separate crossings, (2) Conduct construction activities during times when significant numbers of fish and wildlife are not present, especially during critical life stages, (3) Use elevated, open pile or pier structures when practicable and otherwise use culverts placed to accommodate the high water mark of record, or (4) Site, construct and maintain ice bridges to allow free passage of over-wintering fish by locating crossings in areas where the river freezes to the bottom. Where it is not possible to site an ice bridge in an area that freezes to the bottom, the applicant shall include a monitoring provision in the project description to ensure the ice bridge does not obstruct fish passage. (NSB 2007, Policy H-2)

- b. Project activities, including bridges, culverts, docks, pipelines, causeways and ice road crossings shall not: (1) Block winter fish passage or displace overwintering fish in pools, and (2) Adversely affect habitat functions, including the capability for spawning, feeding, rearing, and overwintering unless the applicant restores the habitat to support these functions after project disturbance. (NSB 2007, Policy C-4).
- c. Culverts shall not be used in areas where they repeatedly wash out during flood events (NSB 2007, Policy C-4).

18. Water withdrawals:

- a. Water withdrawals should be avoided from fishbearing waterbodies. Signs that a waterbody may be fishbearing or an important place for fishing include (1) lakes that are at least 6 feet deep; (2) the presence of qaglu (deep holes in the river where fish overwinter), or (3) the presence of aiyugaq ("places where the ice opens and closes in the winter, like at the lower end of Admiralty Bay ..." or "a break in the ice caused by expansion and contraction.")( Brewster & Geroge 2009, p. 135).
- b. Water withdrawals must be filtered so as to not also take fish. (SBA 2009, p. iv, ix)
- c. Following water withdrawals, monitoring of lake recharge must occur to ensure that the lake will resume its previous level (NPRA SAP 12/6/2007, p. 6).

19. Seismic/Vibroiseis: Since animals may be stunned by vibroseis, companies conducting vibroseis must inspect the bottom of nearby deep lakes in the summer for dead fish (NPRA SAP 8/10/2000, p. 16).

20. Gravel mining: Review and approval of sand and gravel extraction shall use the following criteria.

- a. Upland areas shall be used first to the maximum extent practicable.
- b. Inactive stream channels shall be used before siting operations in active channels and deltas.
- c. Larger rivers and streams shall be used before siting operations in smaller rivers and streams.
- d. Braided river systems shall be used before siting operations in other river systems.
- e. The quantity of gravel removed shall be limited to ensure gravel recruitment and accumulation rates are sufficient to avoid extended impacts on channel morphology and anadromous fish habitat.
- f. Skimming of gravel bars in streambeds shall be allowed when other alternatives are not practicable. Use of gravel bars shall occur during periods of low flow and from areas above the low-flow water level.

- g. Pit excavations from areas adjacent to rivers shall be separated from the active channel by a buffer designed to maintain the separation for two or more decades.
- h. When practicable, operations shall avoid removal of large, woody debris from streambeds. When it is not practicable to leave such material in the streambed, comparable materials shall be replaced by an applicant.
- i. Applicants shall include in the project description measures to monitor the adverse impacts of gravel operations on anadromous fish habitat to determine if actual impacts exceed those predicted. (NSB 2007, Policy F-3)

21. Compensation: BLM should establish a mechanism for NPRA residents to seek reparations for damage to habitat, animal, human health, and subsistence that directly results from violations of these protective measures (NPRA SAP 12/12/2000, p. 9)

## **4.2. Protective Measures for Specific Areas**

### **4.2.1. Fish Creek**

In 2004, when development near Nuiqsut and Fish Creek was still in early stages, one resident emphasized the importance of prohibiting development around Fish Creek:

The buffer zones, as you know, are assurances to our community that we will be able to hunt and fish at Fish Creek without there being pipelines and oil rigs. Shrinking that buffer zone would be shrinking our assurance. We don't want an alternative area, because Fish Creek is the area of the caribou; there is no other alternative area. That is why we specifically made that area a buffer zone in 1998...in order to protect that area from development. No pipelines, no nothing. (NPRA SAP 3/16/2004, p. 3)

Based on this history, it is recommended that all permanent structures be prohibited within 500 feet of Fish Creek.

### **4.2.2. Teshekpuk Lake**

Many knowledge holders have spoken of the importance of Teshekpuk Lake, as noted above. One knowledge holder referred to an agreement made in the 1980s to keep a 3-mile buffer around Teshekpuk Lake, including for winter vehicles, to avoid pollution (NPRA SAP 3/14/2002, p. 2-3). Another said, "You don't use water from lakes to build ice roads, you don't put airstrips on lakes. Especially Teshekpuk Lake" (SBA 2009, p. 66).

Based on this, it is recommended that there be a 3-mile prohibition of development around Teshekpuk Lake, with no water withdrawals or ice roads allowed in this area.



#### 4.2.3. Utukok River Uplands

The Western Arctic Caribou Herd Working Group has described the northern part of the Utukok River Uplands Special Area as important for caribou calving and recommended that there be no leasing or new infrastructure in caribou calving areas (WACH 2023).

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