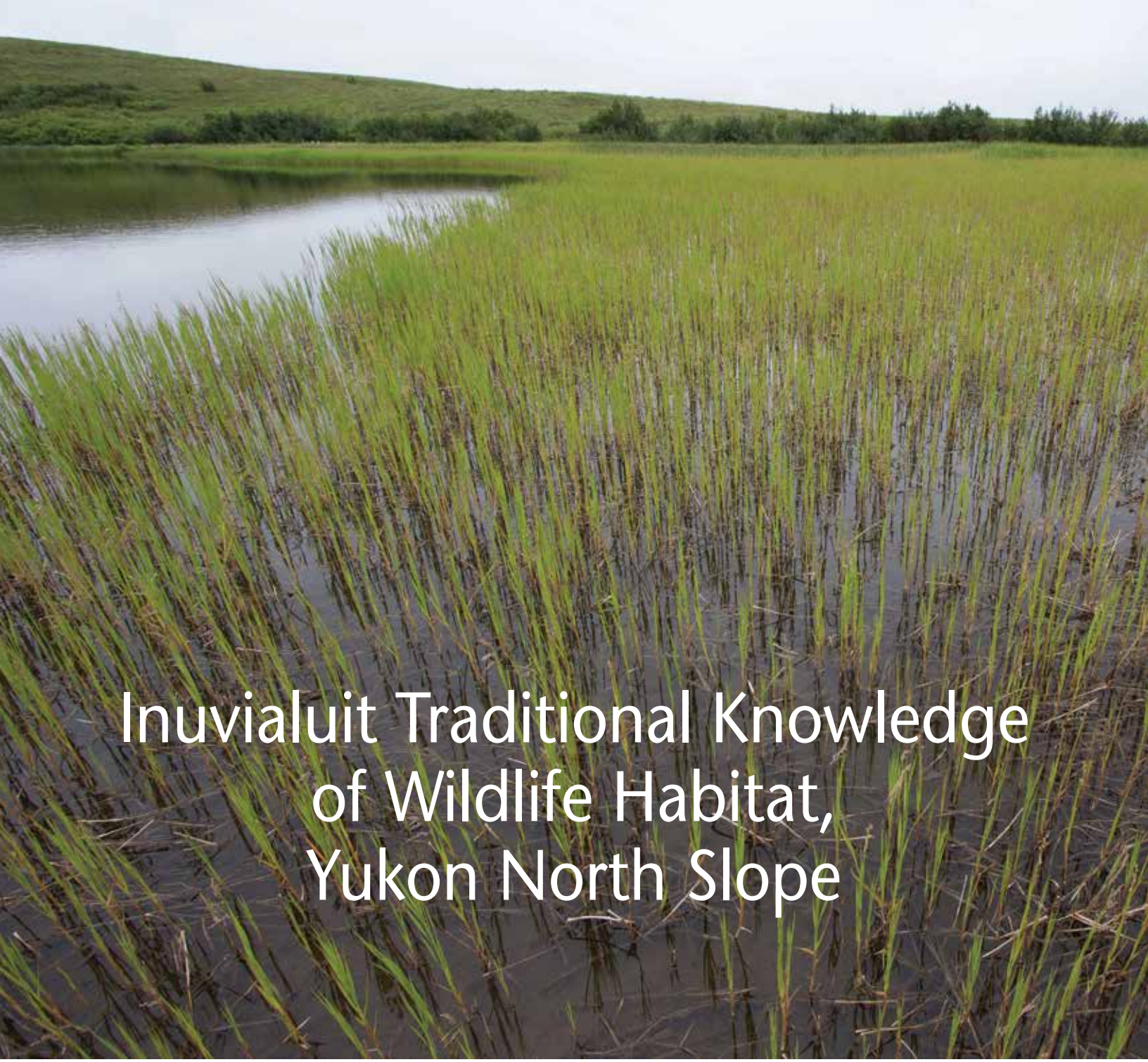

Inuvialuit Traditional Knowledge of Wildlife Habitat, Yukon North Slope

Wildlife Management Advisory Council (North Slope)
and Aklavik Hunters and Trappers Committee

2018

Inuvialuit Traditional Knowledge of Wildlife Habitat, Yukon North Slope

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Front cover: Example of a lower swamp habitat class, selected by interviewees to represent moose habitat. Back cover: British Mountains, Yukon North Slope. Photo: Lindsay Staples

Available from: Wildlife Management Advisory Council (North Slope), P.0. Box 31539, Whitehorse, Yukon Y1A 6K8 Canada

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1

Introduction

The Yukon North Slope (YNS) has been and remains a core hunting territory of the Inuvialuit of the Western Arctic. From their communities in Aklavik, Inuvik and Tuktoyaktuk in the Northwest Territories, the Inuvialuit rely on the YNS for subsistence harvesting. They travel on foot, by boat, all-terrain vehicle, or snow machine to hunt, trap and fish along the coast, foothills and mountains of the YNS.

The Inuvialuit Final Agreement (IFA), legislated in 1984, confirms that the management priority for the YNS is the conservation of the land, waters and wildlife as well as Inuvialuit traditional use. To assist in delivering on this management priority, the IFA established the Wildlife Management Advisory Council (North Slope), or WMAC(NS). This co-management body is comprised of federal, territorial and Inuvialuit representatives and an independent chair. The mandate of WMAC(NS) is to provide advice on all matters related to wildlife management on the YNS and to prepare a Wildlife Conservation and Management Plan.

WMAC(NS) is in the process of updating the existing Wildlife Conservation and Management Plan and has worked closely with the Aklavik Hunters and Trappers Committee (Aklavik HTC) in developing the process, approach and goals for the new plan. The Aklavik HTC also facilitates research and community consultation associated with the revision. Round River Conservation Studies (RRCS) is part of the Wildlife Plan team, and is focused on bringing together ecological and cultural information into a regional assessment for the revised Wildlife Plan.

The revisions to the Wildlife Plan will emphasize greater incorporation of Inuvialuit traditional knowledge (TK) and traditional use (see WMAC and AHTC 2018 and Kilburn 2017), including TK regarding important YNS fish and wildlife habitats. To focus the habitat assessments, the Wildlife Plan team conducted a two-day workshop in Aklavik in June 2015 that identified a suite of focal species (Photo 1). These species represent the ecological and landscape diversity of the YNS for the regional assessment being completed as part of the plan revisions. Members of the Aklavik HTC discussed and selected seven species based on species distribution and habitat needs (Heinemeyer and Smith 2015): barren ground caribou *(Rangifer tarandus)*, polar bear *(Ursus maritimus)*, grizzly bear *(Ursus arctos)*, moose (Alces alces), geese — represented by yellowlegs or greater white-fronted geese *(Anser albifrons)* and snow geese *(Chen caerulescens)* —

Dolly Varden char *(Salvelinus malma)*, and broad whitefish *(Coregonus nasus)*. In addition, the Aklavik HTC identified a diversity of other species or ecosystems of special interest that also need to be considered in the plan, including Dall's sheep, berry-producing ecosystems, furbearers and several other species (Heinemeyer and Smith 2015). The Wildlife Plan will emphasize the habitat requirements of the seven focal species and will also incorporate information available for the suite of species and systems of special interest. Inuvialuit TK provides critical information regarding these focal and special interest species, including their seasonal use of habitat.

The Wildlife Plan team worked on two related projects to ensure that Inuvialuit TK of fish and wildlife habitats was available and documented for the plan revisions. The first project focused on Inuvialuit TK of various types of habitats and ecosystems of the YNS. A workshop of 15 to 20 land users and scientists discussed major ecosystem types across the YNS, grouping them into categories that were recognizable and understood by both parties.

An Ecological Land Classification (ELC) — recently developed by the Government of Yukon to support the Wildlife Plan revisions — was used in the workshop to help bridge TK and science habitat interpretations. The ELC uses satellite imagery and environmental data (on soils, moisture, plant composition, etc.) to identify and map 40 different ecological communities (termed ecosystem units) in the eastern YNS (Flynn 2014; MacKenzie et al. 2016); it dovetails with an ELC for the western portion of the YNS (Fraser et al. 2012).

The goal of the TK-ELC workshop was to translate these "western science" ecological classifications into habitat classes recognized by the Inuvialuit who use the YNS. Therefore, the two main objectives of the workshop were to 1) describe the major habitat classes that are recognized by Inuvialuit land users across the YNS; and 2) group the ELC ecosystem units into these TK-based habitat types. An important outcome of the workshop was the ability to

Photo 1. Inuvialuit YNS land users work with the Wildlife Plan Team in workshop to bridge TK and science classifications of habitats and ecosystems, Aklavik, NWT. Photo: Kim Heinemeyer

bridge the TK and western science interpretations of ecosystem diversity on the YNS. This work facilitates discussions between researchers and land users by providing a shared understanding of YNS ecosystems and habitats. It also allows the spatial mapping products of the ELC to be integrated with TK-based habitat information. The TK-ELC workshop approach and outcomes are described in Section 2.

The second project documented TK about important habitats used seasonally by each of the seven focal species and by some of the species of special interest. This was achieved through a series of interviews where land users were asked to describe focal species distribution, movements and habitat use during each season. Prior to undertaking the interviews, a review was completed of the significant amount of Inuvialuit traditional knowledge of wildlife that is already documented, and the interviews built upon these prior research efforts. The objectives of interviews were to record: 1) TK of the seasonal distribution, movements and habitat use of the focal and special interest fish and wildlife species across the YNS; 2) spatial information (mapped by land users) regarding important habitats for each identified species; and 3) any observed changes to wildlife use of YNS habitats in living memory.

The TK documented through these two efforts and prior TK research will inform and guide the Wildlife Plan revisions, including developing maps and models of key seasonal distributions, movements and important habitats of fish and wildlife. The results of these two projects are summarized in this report.

This report is not intended to provide a full accounting of the TK documented during the two projects. Because this information is complex the report is representative only of the large database from which it derives. It should also be acknowledged that the meaning of some of this information as intended by the interviewees might be partially unclear due to its removal from the interview context and its interpretation. The full range of TK information will continue to be reviewed and relied on as a foundation for the Wildlife Plan revisions.

2

Habitat classification based on traditional knowledge

To support the regional ecological and cultural assessment being undertaken as part of the Wildlife Plan revisions, the Government of Yukon is developing a new, higher quality and higher resolution Ecological Land Classification (ELC) for the Yukon North Slope. The Wildlife Plan team worked with Inuvialuit land users to develop TK-based habitat classifications and link these with the ELC classifications.

Workshop approach and study area

Classification of traditional knowledge-based habitat was undertaken through a two-day workshop in Aklavik in October 2016. Approximately 20 YNS land users participated each day of the workshop, which was facilitated by the Wildlife Plan team; the Government of Yukon Department of Environment staff provided technical support. The workshop included presentations of background information and context for the work, group discussions and small working group sessions over the two days.

The workshop focused on the Yukon North Slope, from the western boundary with Alaska to the Northwest Territories in the east (Map 1). The southern limit of the YNS area was defined as the southern boundary of the Inuvialuit Settlement Region; the northern boundary was the coastline, as the ELC does not include marine areas.

Habitat classes identified by each working group were reported to the full workshop, using a projected map to show patterns of habitat groupings across the working groups (Photo 2). There was extensive overlap in the broad types of habitats identified and described by the four working groups.

After presenting and discussing the background information, workshop goals and an overview of the ELC, workshop participants (Photo 1) were divided randomly into four working groups. These working groups were asked to identify and describe the different types of habitats they encounter on the YNS. A custom 1:250,000 scale map of the YNS study area was used to support these discussions, which showed significantly more terrain, place-name and landmark details than those included in Map 1.

These habitat classes included a diversity of characteristics (Photo 3), including associations with culturally important species (e.g., geese in wet swamps), features that affect travel such as topographic characteristics (e.g., flat, steep or rolling) and moisture (e.g., spongy ground that a person sinks into), and what the habitat looked like (e.g., tall willow, windswept).

Habitat classes that were similar among the different groups were combined through full group discussions, and were synthesized to identify and describe a set of 12 TK-based habitat classes (Table 1). Of these 12 classes, two were eliminated (see notes to Table 1).

Map 1. Yukon North Slope study area

Note: Study area for the October and November 2016 interviews in Aklavik, NWT

Table 1. Broad habitat or landscape classes across the Yukon North Slope

These were identified by land users in the habitat classification workshop in Aklavik in October 2016

Habitat	Description
Foothills/rolling hills	Between mountains and tundra/flats; may start at coast or inland; dry, rocky, low plants
Rocky mountains/high mountains	Rocky, high, steep, small plants, lichen, windy, snow blows off, little vegetation, trees sometimes
Foothills/rolling hills	Between mountains and tundra/flats; may start at coast or inland; dry, rocky, low plants
Rivers and creeks	Willow and shrubs, could be dry or could have water, erosion on the edge; may have wood; may have small trees on edge
Timber	Trees, can have tussocks, willows; can be dry, wet or have medium moisture; can be steep; can have rocks, can be near creeks or small rivers
Hillside slopes and valleys	Large, open valleys, below rocky mountains, water run-off, plants can be grass, lichens, moss, low plants, can have steep creeks, may be found at bottom of hillsides
Tundra/dry land	Dry, flat, no tall willow, tussocks; warmer
Grass willow [1]	Creeks; where fat rabbits are found; willows used to be along ground but now getting tall closer to Aklavik; near creeks; willows up to a person's height; wolverine
Wet spongy ground	Feet sink in as you walk; mossy; wet ground but don't see open water; soft in warm weather and hard when frozen; grassy; may have cranberries; willow areas may have blueberries; akpiks; flat; geese, swans, other waterfowl; grizzly bear; caribou; muskox; moose
Wet swamp	Low, flat and wet; don't drive or skidoo through; small willows (knee high and twisted compared to the Delta); flat with lots of water; berries (but nobody picks there); can see water; fish habitat; geese, swans, ducks, cranes
Erosion/slumping/mudslides/ changing coast	Muddy/silt; uneven ground; steep slope; changing water availability; ice melting/permafrost thawing; may have tussocks; clay soil; mossy; wet; may have flat low areas
Beaches	Flat on the coast; pebbles; more stable (than erosion)
Ice just off shore [2]	Smooth ice for travelling; polar bear; grizzly; caribou; 30 km

Notes to Table 1:

1. The Grass willow habitat class was determined to overlap with the Rivers and creeks class after participants reviewed and classified individual ELC units into each habitat description. It was therefore removed from further discussion at the October 2016 workshop.
2. The Ice just off shore was set aside during the October 2016 workshop so participants could focus exclusively on the land-based classifications that overlap with the ELC.

Photo 2. Four working groups at a workshop in October 2016 in Aklavik, NWT identified broad habitat classes across the Yukon North Slope. The groups worked with paper copies of the study area map, which were synthesized on a projected map (shown here) to facilitate follow-up group discussions.

To place each of the 40 ELC units into a TK habitat class, the land users were randomly placed into three working groups. The working groups reviewed and discussed slides, photographs and descriptions of each ELC unit to decide which TK habitat class it belonged in. Yukon Department of Environment staff provided additional information about ELC units as needed to support discussions and classifications.

Although the working groups again worked independently of each other, there was a high level of consistency among them when they assigned ELC units to TK habitat classes. Of the 40 ELC units, 30 units were placed in the same habitat class by at least two of the three working groups: of these, 18 units were placed in the same habitat class by all three working groups and 12 units were placed in the same class by two of the three working groups. If two or more groups placed an ELC unit in a habitat class, it was assigned to that class. There were 10 ELC units for which each working group selected a different habitat class. These 10 units were brought back to the full workshop group and reviewed and discussed in more detail. The additional discussions resulted in the designation of the 10 ELC units to TK-based habitat classes by the full group.

The Grass willow habitat class did not have any ELC units placed within it, and it is assumed that some of the other closely related habitat classes (such as Rivers and creeks) might have captured the values expressed in this class. Additionally, because the ELC classification is land based, the Ice just offshore habitat class was set aside so participants could focus on the terrestrial ELC classifications that were the primary focus of the workshop. Thus, 10 TK-based habitat classes bridged with the ELC units (see Table 1).

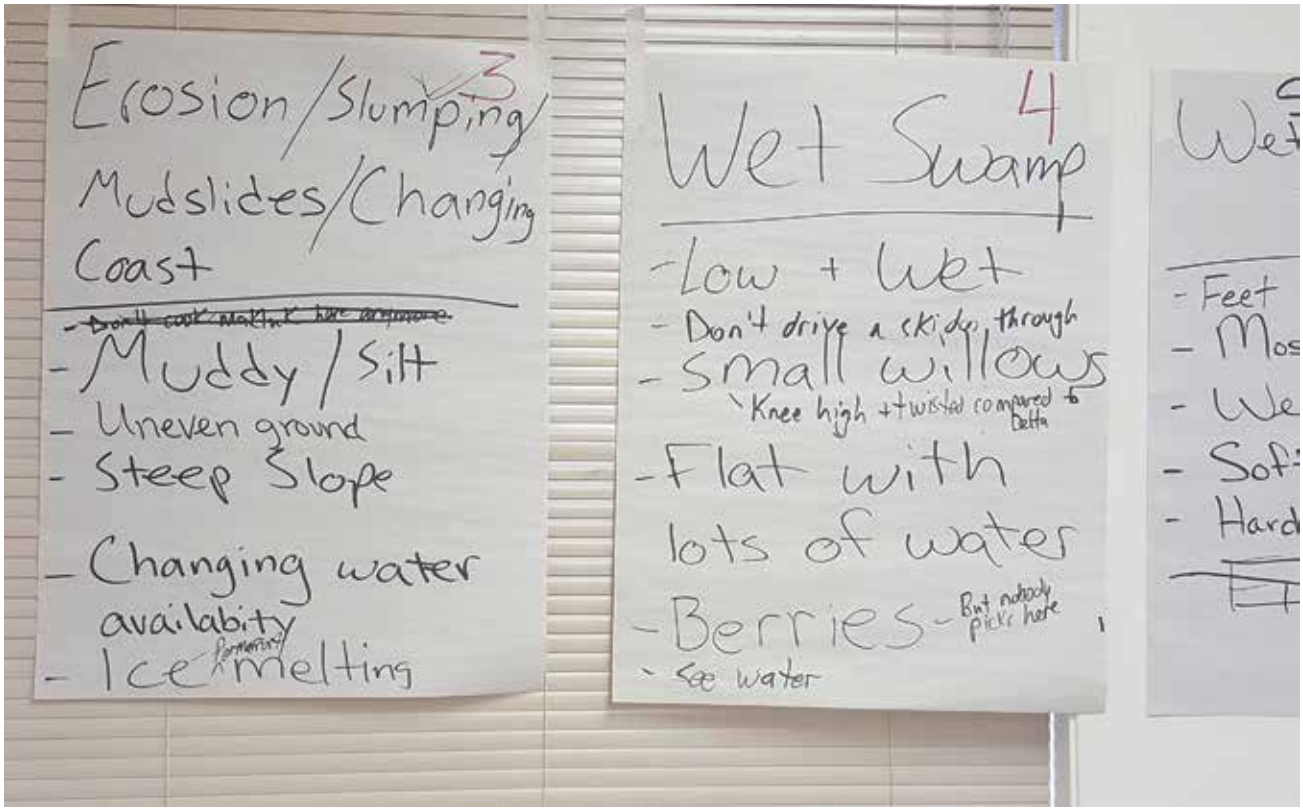


Photo 3. Inuvialuit land users of the YNS identified 12 broad habitat classes, which were characterized by physical and ecological attributes as well as cultural characteristics, during the October 2016 workshop in Aklavik, NWT.

The final task of the workshop participants was to identify any finer-resolution TK habitat types nested within the TK habitat classes. Two working groups were established; each reviewed the characteristics of the TK habitat class and then examined the group of ELC units that fell within that class. Each working group assessed whether the TK habitat class adequately described these ELC units as a single habitat or if habitat subclasses were needed to distinguish important differences between ELC units.

If the ELC units within a habitat class were further divided into subclasses, each of these habitat subclasses was named and remained nested within the habitat class. Both working groups reviewed the TK habitat classes and associated ELC units and arrived at a consensus regarding classes and subclasses. The results of the two working groups were presented and compared for consistency. Across the 10 TK-based habitat classes, eight were consistently treated by the two working groups. The remaining two classes were treated differently by the groups; these were brought back to the full group for further discussion, which resulted in consensus recommendations. The final recommendations resulted in six habitat classes with no subclasses and four habitat classes that were further divided into nine subclasses (Table 2).

Table 2. TK-based habitat class and subclass definitions and number of ELC units in each class

These were identified by Inuvialuit land users during the October 2016 workshop in Aklavik, NWT

TK-based habitat class	TK-based habitat subclass	No. of ELC units
Beaches	River beaches	1
	Coastal beaches	2
Slumps	Active slumps	1
	Inactive slumps	1
Swamps	Lower swamps	1
	Upland ponds and swamps	1
Tundra	—	3
Hillside	High steep slopes	2
	Mid slopes	4
	Low slopes	3
Timber	—	6
Rivers and creeks	—	4
Rocky mountain ridges	—	4
Foothills	—	1
Low flat lands	—	3

Workshop products

Each TK habitat class and subclass has ELC ecosystem units within it, and all ELC units are nested within a TK habitat definition (Appendix 1). This will assist the Wildlife Plan team in linking ELC spatial information to TK of wildlife habitats and other values across the YNS.

The TK-based habitat classifications were used to support the TK wildlife habitat interviews that occurred in November 2016. During these interviews, a poster with photos of the habitat classes (Appendix 2) and descriptions of habitat classifications were used to support the identification of habitats important for wildlife species. Interviewees could refer to specific photos as examples of a particular type of habitat, allowing both researchers and land users to discuss ecosystem types in greater detail. The next section describes these interviews and the information provided by land users about fish and wildlife habitat use.

3

Traditional knowledge of fish and wildlife habitat

The primary management purpose for the Yukon North Slope, as established in the Inuvialuit Final Agreement (IFA) of 1984, is the conservation of land, water, wildlife and Inuvialuit traditional uses. The Yukon North Slope Wildlife Conservation and Management Plan is a requirement of the IFA and is an important instrument in providing guidance to accomplish this purpose. The existing Wildlife Plan is being updated and the traditional knowledge of the YNS traditional land users will provide a foundation for understanding the habitat of focal fish and wildlife species. The Wildlife Plan revision team worked with the Aklavik HTC to identify seven focal species: barren ground caribou (specifically, the Porcupine Caribou Herd), polar bear, grizzly bear, moose, geese — greater white-fronted geese (yellowlegs) and snow geese — Dolly Varden char and broad whitefish to represent the ecological diversity of the YNS. In addition, a diversity of species of special interest were identified, including Dall's sheep, muskox and grayling.

Review of research on traditional knowledge

Existing TK research reports and documents were reviewed to identify TK related to the habitat requirements of the focal species and species of special interest. Although Inuvialuit land users have participated in a wide variety of TK research, this literature review targeted studies that reported on the seven focal species and, to a lesser extent, on the additional species of special interest. We also primarily searched for TK research focused on the YNS. The research was both place-specific and species-specific and did not include a number of TK studies that include Inuvialuit knowledge but were not directly relevant. The reports that were reviewed (Table 3) provide a wide variety of information on the status, historic and current trends, distribution, movements and ecology of fish and wildlife of the YNS and the broader Inuvialuit Settlement Region.

Table 3. Reports reviewed to identify Inuvialuit TK descriptions of habitat, YNS

Reports related to habitat used by the focal species and species of special interest for the Yukon North Slope

Author	Source	Year
Advisory Committee for the Cooperation on Wildlife Management	Taking Care of Caribou: the Cape Bathurst, Bluenose-West, and Bluenose-East barren-ground caribou herds management plan	2014
Bartzen, Blake	Local Ecological Knowledge of Staging Areas for Geese in the Western Canadian Arctic	2014
Bennett, T.D and T. C. Lantz	Participatory photomapping: a method for documenting, contextualizing, and sharing indigenous observations of environmental conditions	2014
Community of Aklavik, Wildlife Management Advisory Council (NWT), and the Joint Secretariat	Aklavik Community Conservation Plan	2008
Day, Billy	Renewable Resources of the Beaufort Sea for Our Children: Perspectives from an Inuvialuit Elder	2002
Devon Canada	Devon Beaufort Sea Exploration Drilling Program - Comprehensive Report. Traditional Knowledge and Land Use	2004
Fisheries and Oceans Canada	DFO Science Stock Status Report D5-60 Big Fish River Dolly Varden	2002
Friendship, Katelyn and the Community of Aklavik	Climate Change Adaptation Action Plan, community of Aklavik, Northwest Territories	2011
Furgal, Christopher and Laurie Chan	Food Security, Ice, Climate and Community Health: Climate change impacts on traditional food security in Canadian Inuit communities (Community Health)	2011
Hart, E. and B. Amos	*Tariurmiutuakun Qanuq Atuutiviksaitlu Ilitchuriyaput Ingilraan Inuvialuit Qulianginnin*/Learning About Marine Resources and Their Use Through Inuvialuit Oral History	2004
Joint Secretariat	Inuvialuit Harvest Study: Data and Methods Report 1988–1997	2003
Joint Secretariat	Inuvialuit Knowledge of Nanuq: A Polar Bear Traditional Knowledge Study	2015
McCleod, Ian	2009 Department of ENR Aklavik TAKT Activity Report	2009
Nagy, Murielle Ida	Yukon North Slope Inuvialuit Oral History	1995
Papik, Richard, Melissa Marschke and G. Burton Ayles	Inuvialuit Traditional Ecological Knowledge of Fisheries in Rivers West of the Mackenzie River in the Canadian Arctic	2003

Russell, Don E., Michael Y. Svoboda, Jadah Arokium and Dorothy Cooley	Arctic Borderlands Ecological Knowledge Cooperative: can local knowledge inform caribou management?	2011
Slavik, Dan	Inuvialuit Knowledge of Nanuq	2010
Stephenson, S.A.	Local and Scientific Observations of Dolly Varden *(Salvelinus malma)* (W.) in the Big Fish River, Northwest Territories, Canada: 1995–2002	2003
Stephenson, S.A.	Harvest Studies in the Inuvialuit Settlement Region, Northwest Territories, Canada: 1999 and 2001–2003	2004
Symbion Consultants	A Review and Discussion of the Arctic Borderlands Ecological Knowledge Coop's Community Monitoring Program Database	2008
Tallman, Ross and James Reist (eds.)	The Proceedings of the Broad Whitefish Workshop: The Biology, Traditional Knowledge and Scientific Management of Broad Whitefish *(Coregonus nasus (pallas))* in the Lower Mackenzie River	1997
Thiesenhausen, Katherine	Eastern Yukon North Slope: Review of the State of Information. Report to WMAC (NS)	2013
Usher, Peter	Inuvialuit Use of the Beaufort Sea and its Resources, 1960–2000	2002
Wildlife Management Advisory Council and the Aklavik Hunters and Trappers Committee	Aklavik Inuvialuit Describe the Status of Certain Birds and Animals on the Yukon North Slope	2003
Wildlife Management Advisory Council and the Aklavik Hunters and Trappers Committee	Aklavik Local and Traditional Knowledge about Grizzly Bears of the Yukon North Slope	2008
Wildlife Management, Department of Resources, Wildlife and Economic Development	Grizzly Bear Traditional and Local Knowledge Summary Report 2002	2013

Many studies refer to the focal species, but do not provide detailed habitat descriptions. For example, yearly harvest totals and human wildlife conflict are the subjects of some TK research (Joint Secretariat 2003; Hegel 2006; WMAC 2008), and do not directly apply to this study. Multiple reports do describe habitat of some of the focal species, specifically caribou, polar bear and grizzly bear (WMAC 2003, 2008, 2009; Hegel 2006; Katz 2010; Joint Secretariat 2015). These studies are often broad in scope, and describe habitat characteristics alongside topics such as harvest totals, changing population dynamics, and human-wildlife conflict.

For example, Joint Secretariat (2015) reports on polar bear habitat, behaviour, Inuvialuit harvest and climate change impacts. This effort focused primarily on the ice-based habitat use of polar bears, so the interviews for this current study focused on terrestrial habitat use to avoid redundancy. Limited TK research exists in regard to other focal species; however, TK of geese staging areas (Bartzen 2014), descriptions of whitefish spawning habitat (Freeman 1997), Dolly

Varden char overwintering sites (Stephenson 2003), and general description of moose habitat (WMAC 2003) were all reviewed prior to beginning the interview process.

To build on the TK information provided by prior research efforts, a series of interviews was undertaken in Aklavik to collect information on the habitats used by the selected focal species. The research was designed to confirm habitat descriptions that were included in prior reports, clarify topics of confusion, address any topics not previously covered, and update habitat descriptions with more recent observations.

Interview methods

The interviews followed a rigorous protocol to ensure the robustness, integrity and confidentiality of the TK information (see Heinemeyer and Tyson 2016 for details). The development of the data collection protocols closely followed the recommendations of Armitage and Kilburn 2015. Interviews followed a questionnaire to guide semi-directed conversations that described the ecosystems and landscape characteristics used by selected fish and wildlife species on a seasonal basis on the Yukon North Slope. Test interviews with four TK holders were undertaken in October 2016 following the TK-ELC workshop, and the questionnaire and interview protocols were refined based on the feedback from these interviews. The remaining interviews occurred in November 2016.

The Aklavik HTC identified land users who actively travel on the YNS and recommended them as participants for the interviews. The majority of interviewees actively hunted and/or fished throughout the YNS, or were active harvesters in the past. Some interviewees also had experience travelling across the YNS for other purposes, including employment with Parks Canada, participation in scientific research, or trips with the Canadian Rangers. This was particularly true of younger interviewees, many of whom drew on these experiences alongside knowledge gained through fish and wildlife harvesting when describing fish and wildlife distribution and habitat. All interviews occurred in Aklavik, NWT.

Interviewees were asked a series of questions (Appendix 4) regarding each focal species that they had extensive knowledge of. Interviewees were asked to describe the habitat characteristics that were important in different seasons and for specific behaviours (e.g., foraging, migrating, nesting, spawning, etc.) and were encouraged to identify TK-based habitat classes by reviewing photographs from the TK-ELC workshop.

Additionally, interviewees marked relevant spatial information on a custom 1:250,000-scale hard copy base map. This was similar in spatial extent to Map 1, but included significantly more terrain, place-name and landmark details. Each interview typically lasted between one and two hours and each interviewee was interviewed between one and three times, depending on the extent of his or her knowledge. In total, 27 individuals were interviewed, completing 37 separate interviews. Interviewees were compensated using locally established rates on a per-interview basis.

Interviews were treated as confidential. Attribution for all quotations and descriptions used in this report is by way of Participant Identification Numbers (PIN) to protect the anonymity of interviewees (see Appendix 3 for a summary of interviewee biographical data).

Interviews were audio-recorded and an independent professional transcribed the recordings.

NVivo software (QSR International Pty Ltd.) was used to help summarize the information. As part of the interview protocol, transcripts were made available to interviewees for review to ensure accuracy. Mapped information was digitized and imported into an ArcGIS geodatabase.

This section summarizes the information documented through the TK interviews, discusses the major habitat requirements of seven focal species throughout the YNS, and provides additional focused information on some of the species of special interest identified by the Aklavik HTC. The TK collected through the interviews is complex and extensive; this report does not represent a full documentation of all the TK collected and is intended to provide a broad summary only. The full extent of TK about fish and wildlife habitats will be used as foundational information for the revisions to the Wildlife Plan.

Caribou

Caribou habitat was the most widely discussed topic across all interviews; 23 interviewees described caribou habitat, and their observations spanned all four seasons. Generally, interviewees stated that the entire YNS was important for caribou; focusing interviews on seasonally specific or behaviour-specific topics generated detailed reports about well-defined resource types that are important during each season. Interviewees referred to various ecosystem types and locations as they referenced different times of year. Interviewees also described a resident population of caribou on Herschel Island and the nearby mainland. These caribou do not move with the main herd and were generally observed to remain near Herschel Island year-round. Caribou habitat observations were typically discussed on a seasonal basis, and the results are summarized accordingly.

Spring migration and calving habitat

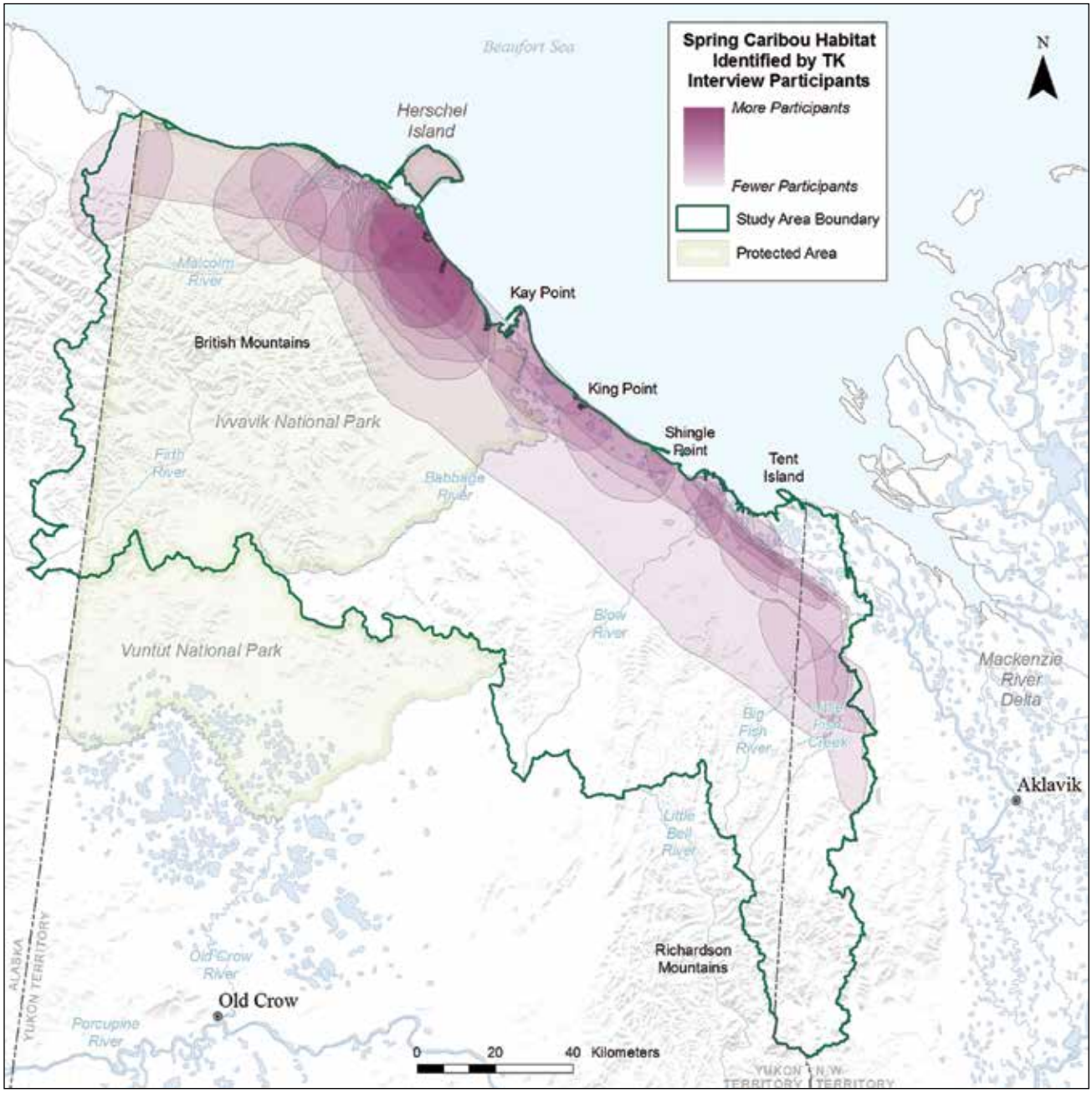
Twenty interviewees described spring caribou habitat. Generally, interviewees observed caribou migrating out of the mountains and moving towards the coast before making their way to calving grounds in the late spring. No specific migration route was described, but interviewees identified a broad area along the coast and foothills where they often see caribou during their migration (Map 2). This migration was the major focus of spring habitat descriptions, and interviewees emphasized that caribou move through a variety of terrain and habitat types on their way to the calving grounds.

Interviewees generally characterized spring habitat as open country near the coast that caribou move through as they migrate to their calving grounds. Ten interviewees described spring caribou habitat as low flat terrain, and ten interviewees described tundra ecosystems. Generally, caribou were described as moving through these areas or foraging for lichen; however, two interviewees described caribou foraging for willows during the spring, and one interviewee observed caribou eating any green grass that they could find, pawing snow off tussocks to reach it. Descriptions of habitat use included both bulls and cows; some interviewees stated that cows are the first to come down to the coast from the mountains, with bulls following later in the spring.

> Well, in the springtime, the cows like to be in the flats… most of the time the bulls always come last… [They] follow the cows.
>
> **PIN 110, November 13, 2016**

Map 2. Areas of the Yukon North Slope used by caribou during spring and spring migration

Note: identified by multiple Inuvialuit land users during TK interviews; darker shades indicate overlap in areas drawn by multiple land users



Hillsides were also commonly discussed in descriptions of spring habitat. Six interviewees described spring habitat either by selecting pictures of hillside habitat classes (Photo 4) or by describing hilly terrain. Some of these interviewees suggested that caribou are usually found near hills or high ground, which they use to look out for or escape from predators. Other habitat classes and subclasses that were used to describe spring caribou habitat included rivers and creeks, swamps and coastal beaches.

They always seem to be on a hillside… always seem to be… [at] the top of the hill… 'cause [they] can see predators coming, I guess.

PIN 112, November 20, 2016

Interviewees typically discussed calving grounds separately from spring migration habitat. Twelve interviewees described calving habitat, noting that calving occurs in late spring or early summer; caribou stay in their calving grounds until early July. This habitat was generally identified as the northwest corner of the study area (see Map 3) and described as flat open country that is close to the coast and where the herd is able to find relief from insects, forage on lichen and grasses, and avoid predators. Ten of the 12 interviewees who discussed calving habitat described it either as flat land or tundra; one interviewee described calving grounds as rolling hills and selected a photograph of the lower slope hillside subclass; and one interviewee mapped the location of calving grounds but did not discuss habitat type.

[Caribou are] mostly kind of close to the hills… the high hills… they can see what's coming they have a chance to get away from whatever they see.

PIN 119, November 21, 2016

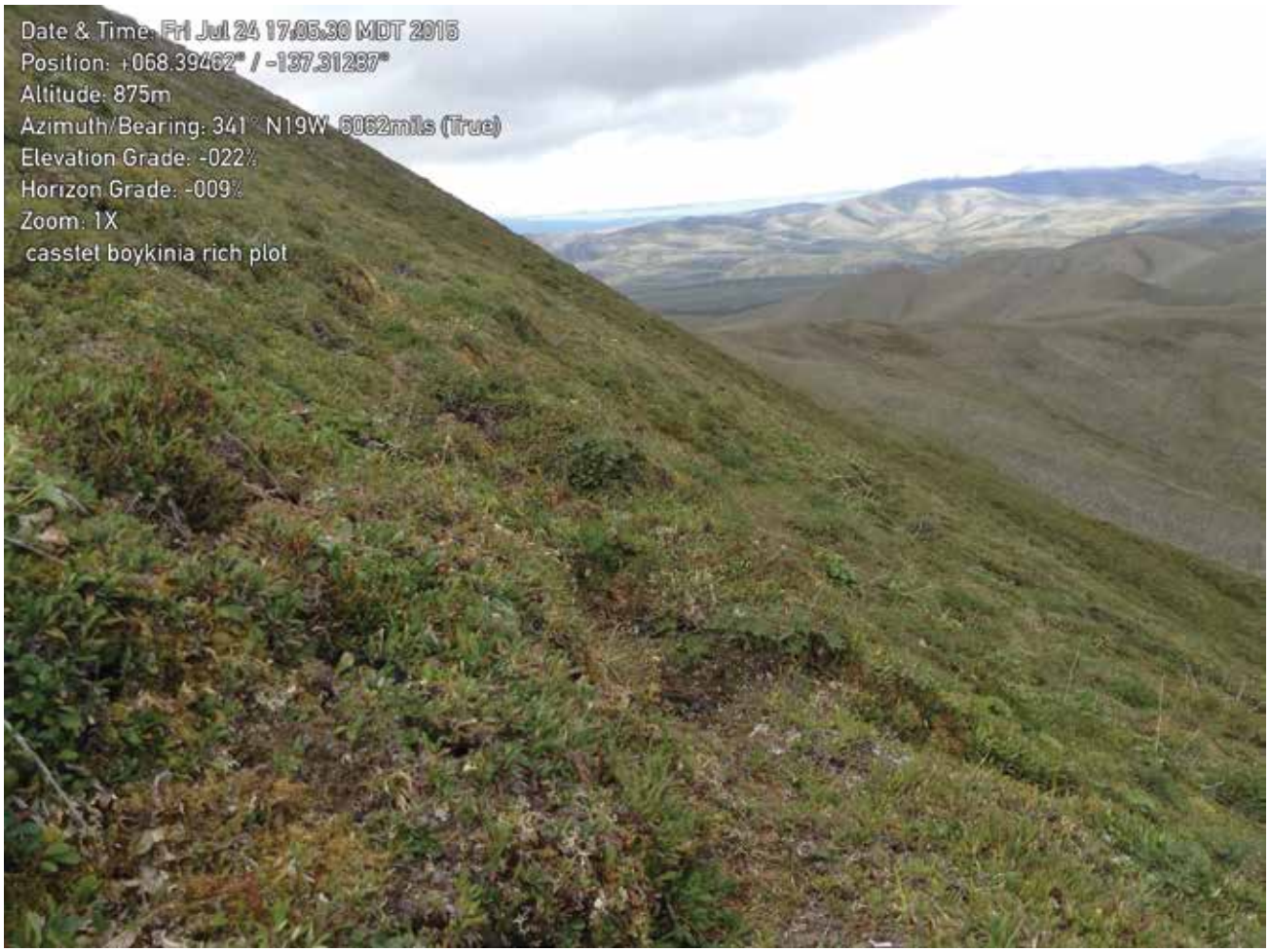


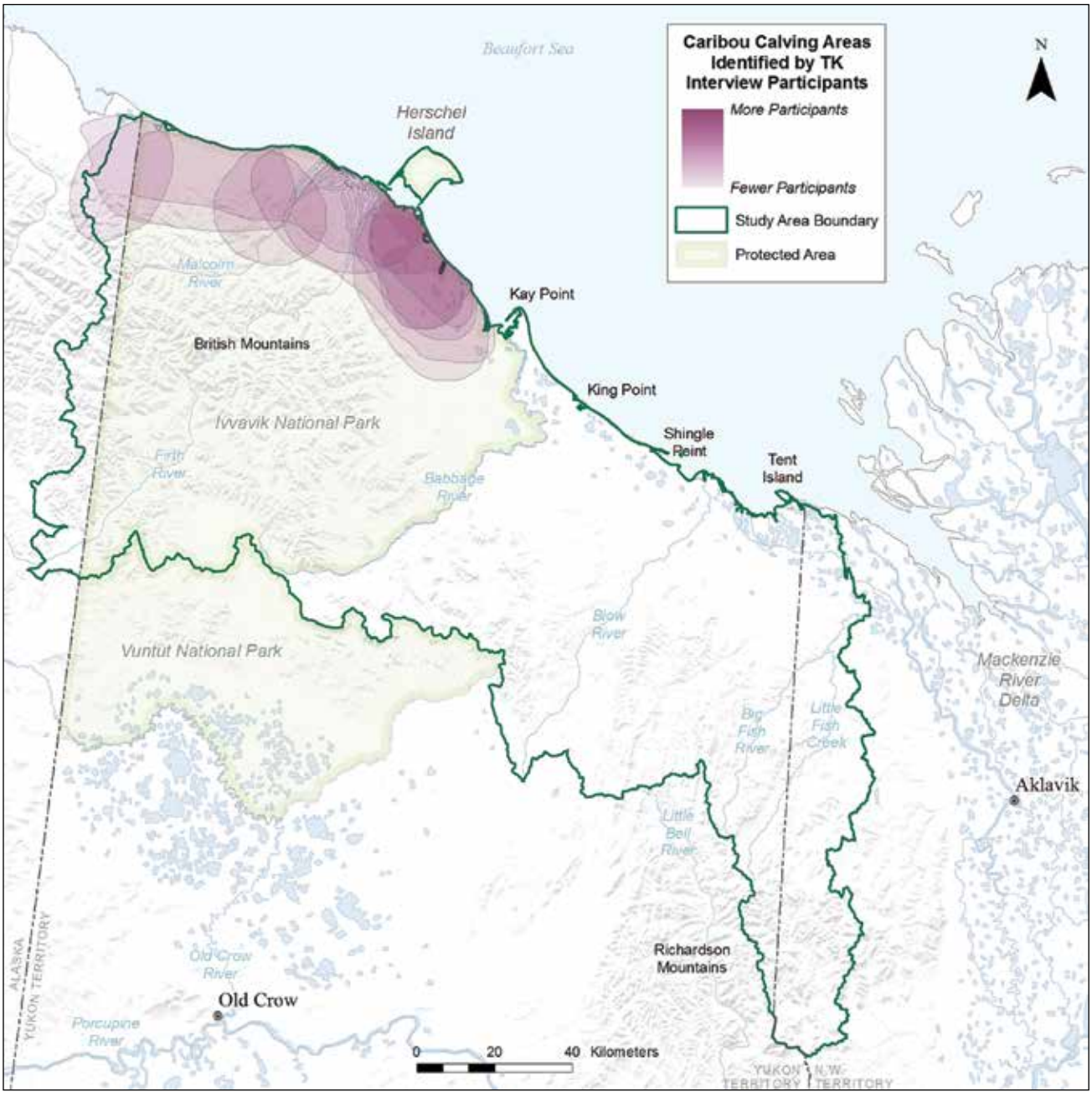
Photo 4. Example of a hillside habitat class photo selected by land users to represent spring caribou habitat.

[The calving grounds are] flat, rolling hills… you could see for miles… You [can] see out to the ocean, you can see all the way to Stokes Point, all the way to King Point.

PIN 120, November 22, 2016

Map 3. Areas used by caribou for calving

Note: identified by multiple Inuvialuit land users during TK interviews; darker shades indicate overlap in areas drawn by multiple land users.



This [the calving grounds] is all flats and rivers and lakes. Up here it's pretty low… [for] up to ten miles inland…"

PIN 2, November 17, 2016

It's all [tundra], you know, there's a lot of good eating there, I guess… they're away from the mosquitoes [when they're] along the coast there.

PIN 107, October 27, 2016

Seven interviewees described changes in calving locations. Five interviewees described calving occurring farther east than was historically considered normal, including areas east of the Firth River along the Yukon coast. One interviewee referred to calving occurring farther inland than was historically normal, and one participant referred to calving occurring in non-traditional areas, but did not specify where. Interviewees considered these changes a notable shift from historic patterns, and cited calving in different areas as increasingly common within the past ten years. One interviewee suggested broad-scale shifts in calving locations, describing major changes over the past 40 to 50 years. Although the location of calving was described as changing, calving habitat was generally described as low flat tundra or rolling hills.

What my granddad… used to tell us when we were growing up, he said, "All the caribous used [to]… come from the mountains to have their young ones in the flats. And later on, in the future, they're going to start having young ones anywhere." That's what [he] used to tell me…and it's happening now.

PIN 110, November 13, 2016

I've never known them to calve too much ... on the east side, towards Herschel, but I notice them [these] past couple of years. They have been [calving there] a lot more.

PIN 301, November 23, 2016

Interviewees suggested possible reasons for the changes in calving location. Five interviewees thought it might be due to earlier springs, with warmer temperatures and earlier green-up resulting in caribou calving sooner, before they reach their traditional calving grounds. Warmer weather results in increased runoff and higher river flows, making river crossings more difficult and therefore limiting access to traditional calving areas. Human disturbance was also suggested as possibly affecting caribou behaviour, causing them to seek out more secluded areas.

Fifty years ago, there [were] no snow machines… so people were travelling less. And no noise. I think noise has a lot to do with [it]… there's a lot more plane traffic around here and that keeps the caribou disturbed all the time.

PIN 2, November 17, 2016

…a lot of the times, these past 10, 15 years, it's been a hell of a lot warmer, earlier, you know? More land, more grasses and that exposed…"

PIN 301, November 23, 2016

…springtime, you know, they [caribou] used to come down here [Alaska and western calving grounds] and calve, but… it's earlier springs and… then they're calving right from Barge Lake area… all the way… down the coast now.

PIN 121, November 22, 2016

You know, it's just a matter of the timing of… things… you know, with everything being early… or later spring… depends on how far they make it before they start [to calve]…"

PIN 302, November 18, 2016

Summer habitat

Fifteen interviewees discussed summer caribou habitat. These observations generally described caribou travelling from calving grounds, southeast along the YNS, and frequenting locations that allow the caribou to avoid insects and find good foraging. Interviewees commonly described summer caribou habitat by referencing the coast. Caribou were widely thought to use areas close to the coast because the ocean breeze provides relief from mosquitoes and there is a large amount of high-quality foraging. These areas were generally described as open tundra, with scattered willows and a large amount of lichen and green vegetation. Six interviewees selected pictures of tundra ecosystems to describe summer habitat, and four interviewees described summer foraging areas as flat lands. Interviewees also frequently selected areas close to the coast when mapping summer caribou habitat (Map 4).

Summer observations of caribou foraging emphasized the importance of green vegetation. Four interviewees referred to summer food sources as green vegetation; interviewees also referred to flowers, grass and willows as summer forage. Two interviewees also described lichen as an important summer food source.

…when they [caribou] come by the coast, I'm pretty sure they're staying away from the bugs… We used to walk up here to look around and… as soon as we get [out of the] wind… that's when the bugs start… That's why I think they're down here [on the coast] because they're staying away from the… bugs.

PIN 109, November 20, 2016

…when we get caribou… we eat parts of the guts and all that kind of stuff… You see it [green vegetation] in their stomachs… The stomach is really green.

PIN 302, November 18, 2016

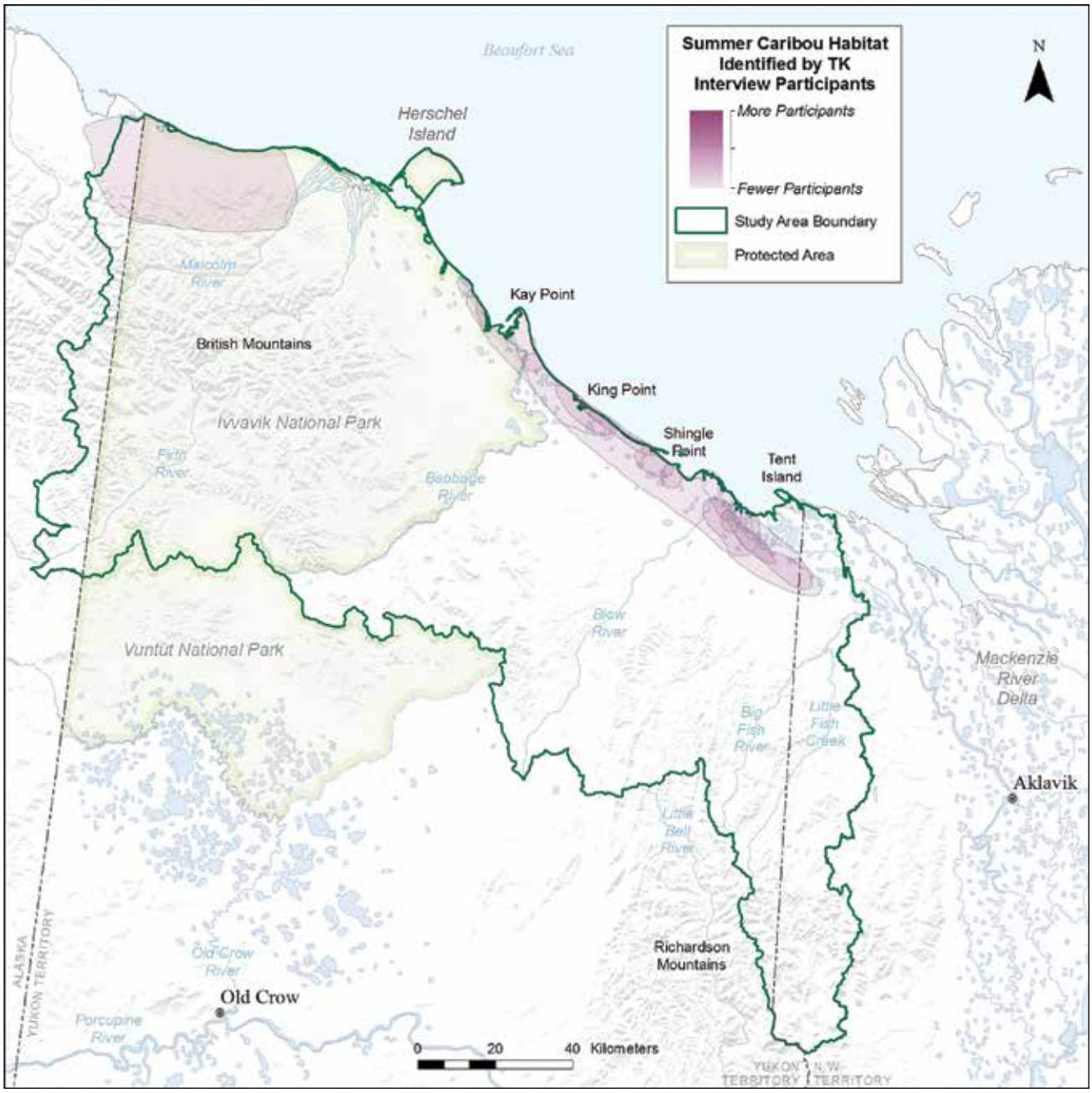
Although open tundra was consistently identified as important summer habitat, caribou were also observed in higher terrain. Six interviewees selected pictures of hillside or mountain habitat classes to indicate summer caribou habitat, or described caribou travelling through hilly or mountainous regions. These areas were described as providing relief from insects and predators. Additionally, two interviewees noted that these areas often have remaining snow patches in summer, which are important for escaping summer heat and insects.

…in the summertime, where we get the temperatures [that] are 20, 25… degrees Celsius, you get… forty, fifty, sixty caribou that are just sitting on these… snow covered valleys… to get away from the… heat and the bugs.

PIN 101, October 26, 2016

Map 4. Area of the Yukon North Slope used by caribou during summer

Note: identified by multiple Inuvialuit land users during TK interviews; darker shades indicate overlap in areas drawn by multiple land users



…they [caribou] hang out there [on snow patches] 'cause it's hot and, you know, it's warming up, June, July, and the mosquitoes are coming out… they go to the snow… 'cause it's cool and the mosquitoes won't bother [them] as much.

PIN 107, October 27, 2016

Fall habitat

Sixteen interviewees described habitat during the fall migration, when caribou leave coastal areas and head into the mountains. Throughout the fall, caribou are scattered across the YNS, and habitat descriptions were typically broad and varied.

Thirteen individuals mapped general locations or migration routes of caribou throughout the fall (Map 5). Specific habitat descriptions varied. Five interviewees described caribou moving through mountainous terrain, while six interviewees either selected photos of hillside habitat classes or specifically mentioned hillsides when referring to fall caribou habitat. These areas were listed as important for general travel, foraging and insect relief as caribou migrate through. Three interviewees indicated that when fall snowstorms arrive, mountain ridges are also important foraging areas, as they are generally blown free of snow. Interviewees predominately described caribou foraging for lichen in the fall (eight interviewees), while one interviewee also described caribou foraging for grass. One interviewee also suggested that caribou get salt from eating the lichen that grows in rocky areas along mountain ridges.

> Well, if they're [caribou] higher on the mountain… you see those little [lichen]… They're all real salty, if they're up that way, they'll be [eating] food on top of the mountain.
>
> **PIN 110, November 13, 2016**

Although mountains and hillsides were often described as providing fall habitat, interviewees emphasized that caribou travel through several habitat types along their migration. At least three interviewees described fall habitat as occurring along the coast, and three interviewees described fall habitat by selecting pictures of tundra ecosystem classes.

> [Caribou are] just all the way down the coast… they're all over. They could be grazing all over…"
>
> **PIN 118, November 14, 2016**

> [Caribou are] right on top of the foothills… where it's flat… they're feeding all the time…'cause this is an area where there's a lot of lichen; even on the rocky beach you can see the lichen.
>
> **PIN 103, November 25, 2016**

> …I go hiking [from the coast] and you notice a lot of them [caribou] are farther back out of hiking distance… and I notice they're travelling… I always see them facing to the left… in the fall… I'm looking south, so they're travelling east.
>
> **PIN 120, November 22, 2016**

Winter habitat

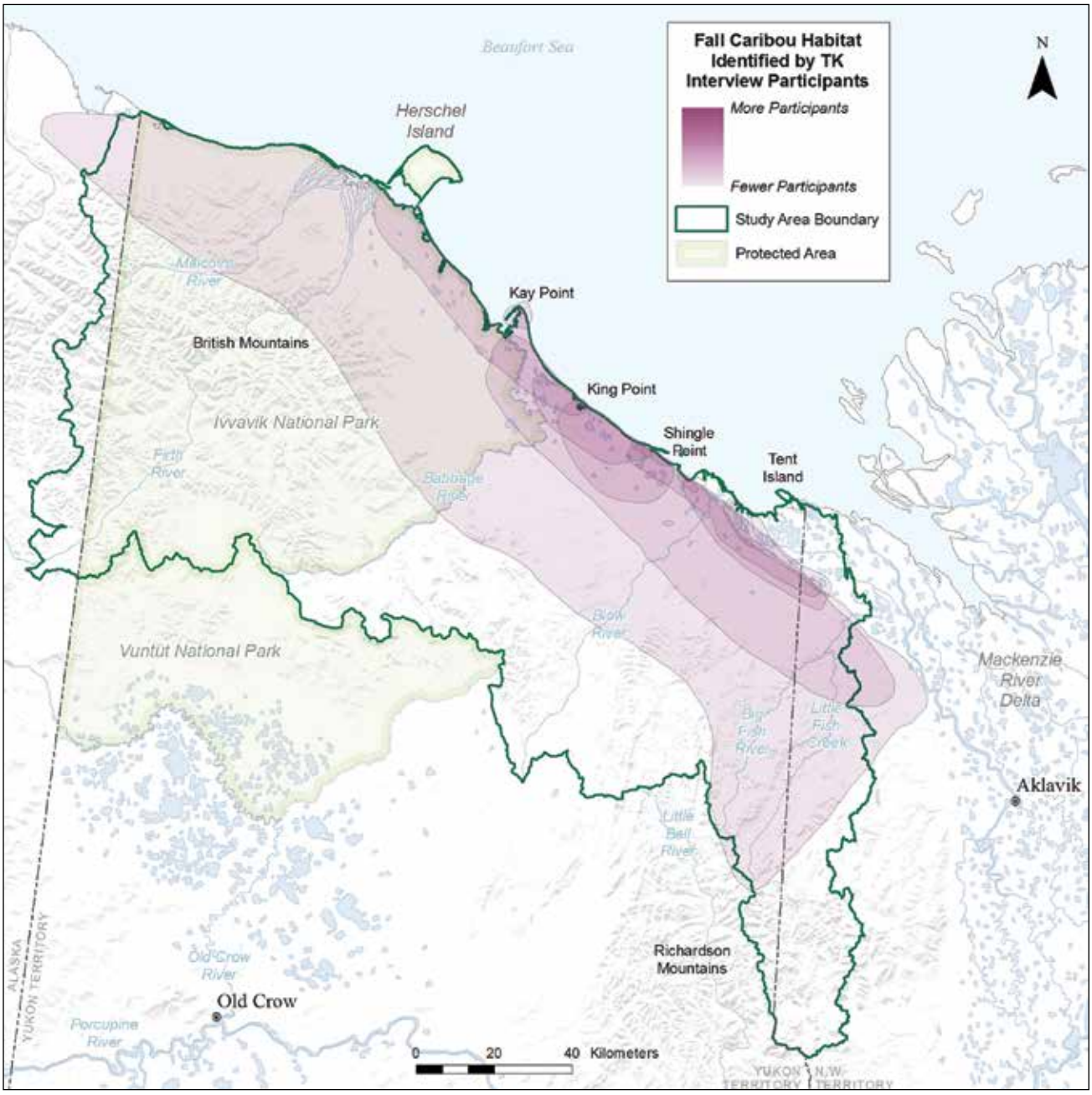
Twelve interviewees described winter caribou habitat. These descriptions focused on the caribou that reside on or near Herschel Island, but also included areas on the mainland coast that are periodically used by smaller groups caribou throughout the winter. Although the main Porcupine Caribou Herd is generally found south of the YNS during the winter, interviewees emphasized that small groups of caribou will occasionally pass through the study region. For example, at the time of these interviews (November 2016), interviewees were reporting a herd of 300–400 caribou near Qutaitchuraq, in the eastern portion of the study area. These caribou

were in addition to the resident population on or near Herschel Island. When describing winter habitat characteristics, interviewees frequently referred to both Herschel Island and to areas along the mainland coast (Map 6).

Interviewees consistently described the characteristics that are important for winter caribou habitat across the study area. They emphasized that caribou select habitat based on areas where the wind will blow snow off vegetation, making foraging easier, and that they choose various aspects, based on wind direction.

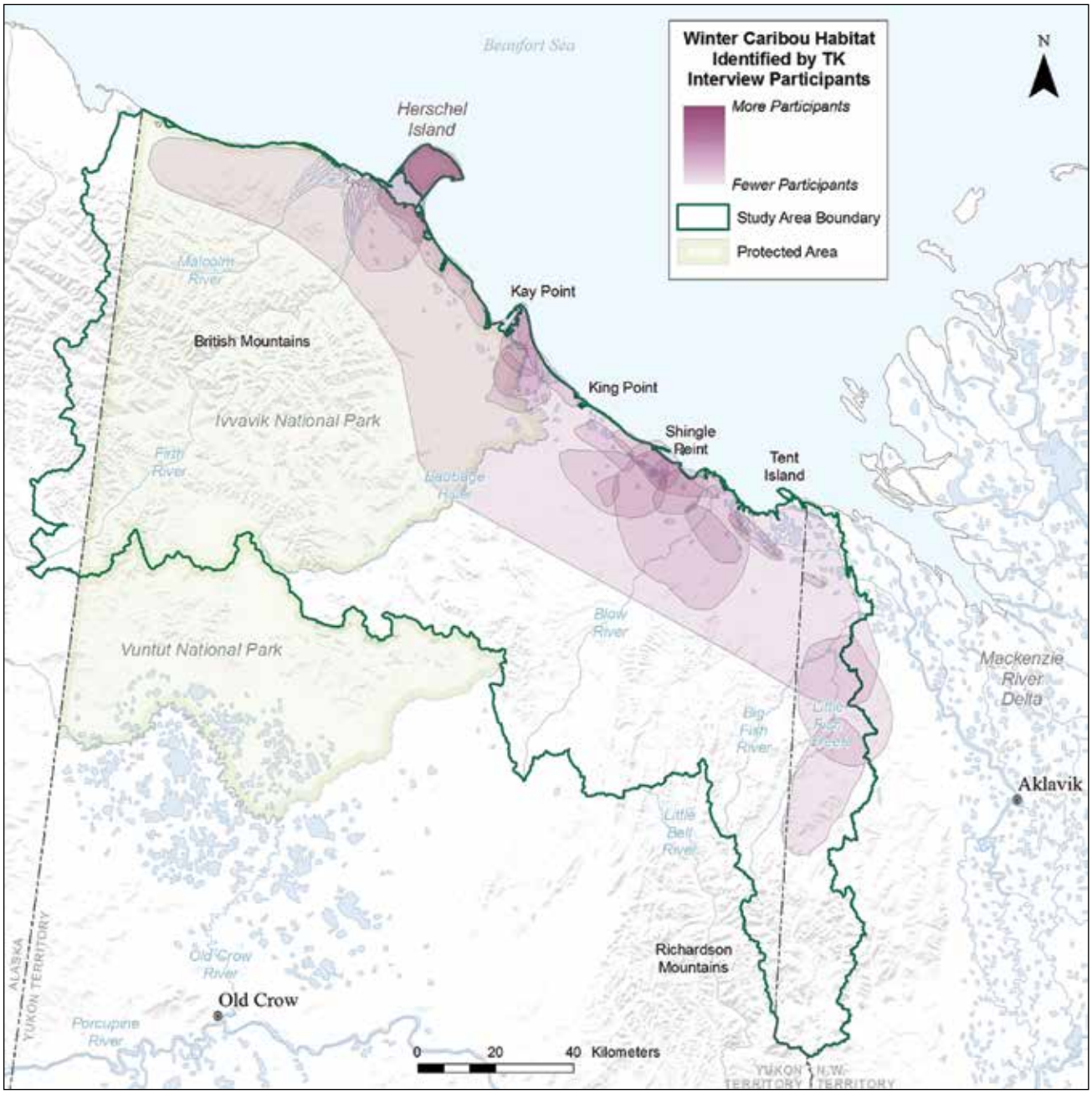
Map 5. Areas of the Yukon North Slope used by caribou during fall and fall migration

Note: identified by multiple Inuvialuit land users during TK interviews; darker shades indicate overlap in areas drawn by multiple land users



Map 6. Areas of the Yukon North Slope used by caribou during winter

Note: identified by multiple Inuvialuit land users during TK interviews; darker shades indicate overlap in areas drawn by multiple land users



Nine interviewees described winter caribou habitat on the YNS as the coast or hills, often describing access to snow-free vegetation as an important factor. Five interviewees described caribou eating lichen in these locations and two described caribou eating grass. At least two interviewees also described caribou eating muskrat push-ups in order to obtain important nutrients during the winter. These interviewees described this behaviour as largely occurring in the Mackenzie Delta, but it has also been observed on the North Slope in areas with high muskrat densities. Additional descriptions of winter caribou habitat either described flatlands or were limited to spatial information, with no associated description. Two interviewees also referenced caribou travelling on the sea ice.

…they're eating along where they can easily access [vegetation], like a little high on the mountain and the sides [of hills].

PIN 111, November 11, 2016

…Sometimes there will be west wind and they'll be on the west side, and sometimes it will be east wind and they'll be on the east side…. The wind always blows the snow off the top of the tundra ... and they'll always be around… feeding around that area.

PIN 6, November 17, 2016

Migration changes, climate change, and other concerns

Interviewees frequently discussed changes to caribou habitat and behaviour. Some responses were unclear regarding the specific nature of change; however, at least 15 interviewees observed changes to caribou migration patterns in both spring and fall. Although observations varied widely, two common themes emerged in the interviews. One was that the migrating animals are changing their routes, generally spending less time along the coast, particularly in the fall. Ten interviewees observed this trend in recent years. These interviewees described caribou leaving the study area sooner and travelling through the mountains toward Old Crow, instead of moving along the coast.

Another common theme across interviewee comments was that both spring and fall migrations are less predictable. This largely referred to the timing of migration and the abundance of animals. Three interviewees observed smaller herd sizes, describing encounters with groups of caribou in the tens or hundreds, rather than the full herd. Five interviewees described a change in the timing of both spring and fall migrations: four interviewees describing caribou arriving earlier in the spring and leaving earlier in the fall; and one interviewee describing caribou remaining in the study area longer during years with warmer weather.

They [caribou] don't hang around very long; they're just beelining straight up towards Old Crow and Alaska.

PIN 121, November 22, 2016

[When I was a kid] you'd see hillsides moving [with caribou]! …Nowadays, it's rare to see that.

PIN 120, November 22, 2016

I don't know what's making them [caribou] do these different routes, or what's going on…"

PIN 301, November 23, 2016

…they're [caribou] just changing their routes… like, you even hear elders talking of… caribou [used to be] just at the other end of town, here [in Aklavik]. You know, that was… a big change"

PIN 302, November 18, 2016

…well, about 15–20 years ago, there used to be tons [of caribou] all over the North Slope… and then lately, now it's just more scattered bunches… like around 40 to 50…. Sometimes you'll get a couple hundred.

PIN 120, November 22, 2016

Explanations for changing migration patterns varied among interviewees. Seven interviewees suggested that changes in caribou migration are a natural occurrence, as the herd occasionally changes its migration route to allow the vegetation in previously used areas to recover. Three interviewees suggested that increased human disturbance or over-hunting might cause the herd to change its migration routes in both spring and fall. General habitat changes that were associated with a warming climate, such as slumping and increasing wildfires, were cited by at least four interviewees as a potential reason for the change in migration patterns.

One thing I was taught, too, is they [caribou] might have another route coming from Alaska and going down through… Old Crow along the… lower mountains.

PIN 301, November 23, 2016

…Personally, I think travelling routes are changing due to… over-hunting in certain times of the year, maybe.

PIN 120, November 22, 2016

Interviewees also discussed climate change generally, noting impacts to caribou habitat beyond altered migration patterns. Thirteen interviewees specifically described climate change impacts to caribou habitat. These observations covered a wide range of changes to habitat across all four seasons. Slumping and coastal erosion were discussed by six interviewees, who expressed concern over the loss of foraging habitat and the challenges that slumping terrain poses to caribou travel. One interviewee described increasing precipitation and faster snowmelt due to climate change as making river crossings more difficult. Increasing willow growth was observed to make access to lichen more difficult in the summer and fall, and freeze/thaw events during the winter were observed to make lichen less accessible. One interviewee commented on increased insect harassment throughout the summer. Increasing fires and the greater likelihood of heavy snowstorms were also mentioned as concerns.

…it gets pretty hot some summers…and we'll have a lot of bugs… we know we're not going to have good shape [healthy] caribou because… they're mostly running all the time.

PIN 6, November 17, 2016

…along the North Slope, it's all eroding, so… it's going to hurt them [caribou] in the long run.

PIN 111, November 11, 2016

I remember a few years back… we had a really warm spell and we had some rain [in January], and you notice a lot of dead caribou… it got cold and the caribou couldn't break through the crust on the snow.

PIN 302, November 18, 2016

Interviewees also cited increasing muskox populations when discussing changes to caribou habitat. Eight interviewees noted concern that increasing muskox populations were affecting caribou habitat. These observations focused on changes to the vegetation in areas with large muskox populations and on caribou's general avoidance of muskox. Interviewees noted that habitat in areas with large muskox populations has decreased in quality, particularly on Herschel Island. Interviewees also stated that caribou avoid muskox, either the animals

themselves or the smell of areas with large muskox populations. Three interviewees suggested that the increased muskox population is contributing to the changing migration routes of caribou.

…they [caribou] stay away from the muskox, they don't go near them too much.

PIN 301, November 23, 2016

We have a lot of muskox on the island [Herschel]… ten years ago, there used to be a lot of tundra and then after the… muskox started going on the island… there's starting to be more and more mud.

PIN 6, November 17, 2016

Well, they avoid muskox. The muskox will chase them… muskox is the only thing I know caribou don't like.

PIN 103, November 25, 2016

Moose

Moose were observed throughout the YNS, and 18 interviewees described moose habitat across a variety of locations in the study area. Most interviewees tended to describe moose habitat generally and did not necessarily link their observations to a specific season. Interviewees did not typically indicate any major seasonal moose migrations or identify specific calving grounds or seasonally specific resources. Instead, interviewees tended to focus on common year-round habitat requirements for moose, providing a detailed summary of moose habitat across the YNS.

Several interviewees emphasized specific habitat characteristics when discussing moose. All interviewees mentioned the presence of willows at some point when discussing moose habitat, and seven interviewees stated that moose are always within close proximity of willows. Fourteen interviewees stated that moose are always in or near water, whether in the form of a river, lake or swamp. Although interviewees emphasized that moose could be found in a variety of terrain types, they typically observed moose at lower elevations and on flatter terrain. Twelve interviewees described moose habitat as flat or low terrain. Even when moose were observed in more mountainous terrain, interviewees typically emphasized that they were seen at the bottom of hillsides or in drainages and river valleys.

These characteristics were reflected in the selection of habitat class photos. Sixteen interviewees selected photos of rivers and creeks (Photo 5) to describe moose habitat, often noting that the willows, low ground, or water in the photos indicated good moose habitat.

Similarly, eight interviewees selected photos of swamps (Photo 6) to indicate moose habitat, specifying that the presence of water and green vegetation are important for moose. Some interviewees also selected tundra habitat classes (six interviewees), low flatlands (three interviewees), or hillsides (two interviewees).

[Moose are] mostly down low. Like, near the river and willows. My guess would be like a protected area from the wind.

PIN 120, November 21, 2016

I've never seen any [moose], or just very few, away from the willows… They seem to stay around the willows in draws… That's where you see them most of the time.

PIN 2, November 15, 2016

[Moose] always seem to be close to the water, because they seem to be feeding in the lakes. I've seen them… feeding in the lakes all the time… I think they're eating grass roots all the time… Sometimes you see them eating tips of the willows.

PIN 112, November 20, 2016

They [moose] wouldn't go into the higher terrains ... they… like to stay in the flat area where it's open…"

PIN 9, October 26, 2016

Photo 5. A photo of rivers and creeks selected by interviewees to represent moose habitat.

Coastal versus inland moose habitat

Although many interviewees described moose habitat in general terms, some interviewees observed a distinct difference between inland moose habitat and habitat closer to the coast. Eight interviewees described coastal habitat as flatter, wetter and more open than inland habitat. Some of these habitat descriptions included willows, but the willows were often described as less prevalent or shorter than willows that are found inland or in the Mackenzie Delta. Three interviewees specifically noted that coastal moose habitat is more likely to consist of swamp habitat classes than inland areas, which are typically composed of river valleys and creeks.

Land users indicated that the difference between these habitats is reflected in moose foraging behaviour. Interviewees who described foraging on the coast often referred to moose eating grasses and sedges, in place of or as well as willows. Interviewees who harvest moose noted a major difference in the quality of meat. Some interviewees noted that moose harvested on the coast taste different than inland moose, with a higher fat content and better flavour in coastal moose.

> [Moose eat] willow in the Delta, and…down the coast [they] eat sedges. It's two different stories; it's two different foods they're eating.
>
> **PIN 9, October 26, 2016**

Photo 6. Example of a lower swamp habitat class, selected to represent moose habitat.

Out on the coast there's different habitat. They're [moose] feeding in lakes, grasses, whatnot… the meat is really different from the ones… up in the Mackenzie.

PIN 101, November 18, 2016

[Moose are eating] sedges [on] the coast. That's why I … get my moose down… past Anderson River… I don't really get my moose up here [inland mountains]… but if I do… they taste like willow. If I get mine down at the Anderson River or Barge Lake…it eats those sedges there, so it tastes like salt.

PIN 9, October 26, 2016

Generally, interviewees who described coastal moose habitat shared observations that were made in the summer, while observations of inland moose were made year-round. In some instances, this was a function of land user travel patterns: most of the interviewees interviewed for this project tend to travel by boat in the summer, making coastal moose sightings more likely. However, at least four interviewees suggested a seasonal movement of moose between inland and coastal habitats. These observations suggest that moose move farther back into the mountains and river valleys in months where snow covers much of the shorter vegetation, and travel to the coast in the summer, when fresh green vegetation is exposed. One interviewee suggested that moose move into the mountains in the winter for protection from predators.

In wintertime, they tend to go… farther inland. You see more draws and more willows growing…. They come inland a bit and are close to the rivers…

PIN 2, November 15, 2016

I think they're [moose] just migrating back towards the Delta after a long winter… because I think they do move up to the mountains before freeze-up… I think they go up to the mountains for winter.

PIN 117, November 15, 2016

Herding

Eight interviewees described instances of large groups of moose herding together. Multiple interviewees described groups of between 10 and 20 moose, and on at least two occasions, interviewees witnessed a herd of moose numbering over 150 individuals. All interviewees who described herding had witnessed it in the winter or spring, typically inland, in river valleys surrounded by more mountainous terrain. Interviewees suggested that this was surprising but increasingly common behaviour, and were unsure of its cause. Areas where land users witnessed large groups of moose were marked on a map.

Springtime, they all bunch up together…like caribou. That's a new one [to me], first time I see that…"

PIN 303, November 12, 2016

…we went travelling up here [in the mountains] and usually this whole area [is] just covered in moose, right where all the willow habitat is… two or three years in a row we saw about 150.

PIN 117, November 15, 2016

…for about…ten years, we see exactly sixty moose in one herd. That's the most moose we [have] ever seen in one herd…

PIN 6, November 12, 2016

…most of the time when they're in the hills, they always bunch up together…we never really saw that much long ago… 2006, I think, I started seeing those bunches.

PIN 118, November 14, 2016

Climate change and population trends

Eight interviewees suggested that climate change is altering moose habitat in the study area. Five interviewees observed climate change positively impacting moose habitat, noting longer growing seasons, earlier snowmelt, and more willow growth throughout the study area. Three interviewees suggested that climate change might negatively affect moose populations, noting concerns about drying lakes, increased insect harassment, and more common wildfires. Nine interviewees observed larger moose populations through the region than were historically considered normal, while one interviewee observed a decrease in moose numbers. Explanations for the growth in moose numbers ranged from a decrease in hunting to better habitat and warmer weather.

Well, when I was a little girl I never used to… see hardly any moose. And today, it's totally different. It's because… we're having earlier [growing] seasons.

PIN 1, November 12, 2016

Grizzly bear

Interviewees emphasized that although grizzly bears travel throughout the entire study area, they have seasonally specific habitat preferences. Eighteen interviewees provided interview data on grizzly bear habitat, focusing on the seasons when they most frequently encounter bears. Spring habitat and denning habitat were the most commonly discussed topics, with 16 and 14 interviewee responses, respectively. This was largely due to interviewees' experience hunting grizzlies in the spring, often when the bears have recently emerged from den sites. In addition, 11 interviewees discussed summer habitat, and eight interviewees provided information about grizzly bear habitat use in the fall.

Up here, the grizzly bear basically roams. You know, it doesn't have its own area… he's always constantly moving…you might see him over here and…you know, couple of weeks later he'll be way off track somewhere else.

PIN 301, November 23, 2016

Spring habitat

Generally, interviewees emphasized that grizzly bears spend the spring moving out of the mountains and travelling down river valleys toward the coast. Depending on when and where interviewees encountered grizzly bears, their responses focused either on mountainous regions and river valleys, or open tundra and the coast.

Ten interviewees identified hillside or mountainous areas as spring grizzly bear habitat, either verbally or through photo selection. These habitats are important for grizzly bears as they emerge from their dens and use the areas for foraging and general travel. Typically, interviewees see grizzly bears digging for roots or hunting ground squirrels along hillsides early in the spring (Table 4). These hillsides are often the first places to become free of snow, and grizzly bears can be found on patches of bare ground where the snow has either melted or been blown away.

Table 4. Major grizzly bear habitat class and number of interviewees selecting each class

Habitat class/subclass	No. selecting	Major uses	Season
Mountains and hillsides	16	Hunting ground squirrels, foraging for bear root and berries, denning habitat	spring, fall
Tundra	12	General travel, hunting caribou and muskox, foraging for berries	spring, summer, fall
Rivers, creeks and streams	11	Travel corridor, fishing, hunting caribou and moose	spring, summer, fall
Coast and beaches	11	Scavenging whale and seal carcasses, hunting caribou and muskox, avoiding insects	spring, summer, fall

[Grizzly bears] are…mostly on the high ground. They stick close to the high rocks where there's no snow…. You can see lots of ground squirrels running around and … you can see those little holes and they're starting to come out [of the ground] and run back and forth. And you can see bear tracks from digging them up…

PIN 119, November 18, 2016

I was taught to use ground squirrels as an alarm clock for [grizzly bears]…. You know if you see a ground squirrel up and about, running around…there's going to be grizzly bears moving.

PIN 301, November 23, 2016

Rivers and creeks are used by grizzly bears for travel routes as they move out of the mountains and toward the coast. Nine interviewees either selected photos of river and creek habitat classes (Photo 5) or specifically described spring grizzly bear habitat by referring to rivers, creeks or streams. In areas where creeks are narrow and surrounded by dense vegetation or steep banks, bears travel on higher ground, above the water. As the rivers widen, and the topography is less steep, interviewees note seeing bears travelling in and along waterways.

Most of the time, in the springtime, you see them [grizzly bears] going down into the bigger creeks, bigger rivers that [are] running out…estuaries.

PIN 301, November 23, 2016

Eleven interviewees noted that grizzly bears move to the coast in the spring. In doing so, they travel onto flatter land, which interviewees typically described as tundra (Photo 7). Interviewees generally observe bears travelling or scavenging carcasses as they move throughout the tundra. Along the coast, grizzly bears have been observed scavenging whale carcasses and hunting for seals. Six interviewees had seen grizzly bears travelling onto the sea ice, hunting for seals along pressure ridges and at breathing holes.

When they come out of the den, they're always running towards the ocean… They can smell the seals. That's where they mostly go [the coast] when they're coming down the mountains… because there's no animals up here [in the mountains] in wintertime… they go for the sea ice where there's seals.

PIN 103, November 25, 2016

[I] see them [grizzly bears] out on the ice… You see them following the cracks, like the polar bears do.

PIN 117, November 15, 2016

Often, interviewees indicated that food availability, rather than specific ecosystem types, is the more important reason that grizzly bears are found in a certain area. This is particularly notable in regard to caribou. Ten interviewees noted that grizzly bear follow the caribou herd, and eight interviewees specifically discussed grizzlies following caribou in the spring, either to directly prey upon them or to scavenge wolf kills.

Photo 7. Example of a tundra ecosystem, selected to represent spring grizzly bear habitat.

[Grizzly bear] follow them [caribou] wherever they go…I've seen, right at Shingle Point, along the shore, we seen these caribou really running and right behind them was a bear!

PIN 1, November 11, 2016

…what I notice in springtime is that when the wolves are hunting between the caribou…as soon as the bears come out, some…follow the wolf trail until they find a wolf kill and then take the caribou away…from the wolf.

PIN 6, November 17, 2016

…what I notice is that… even when I'm travelling, sometimes I'll see a bear and then I'll see a wolf, if not I'll see a wolf, then I'll see a bear…bear and wolf always keep close together.

PIN 6, November 17, 2016

Responses also suggest that grizzly bears increasingly follow muskox herds. Four interviewees gave detailed accounts of grizzly bears travelling to areas with large muskox populations, particularly in the spring when access to and from the Herschel Island muskox population is easier and muskox are having their young. These interviewees suggested that muskox has become an important food source for bears; one person suggested that this might be growing more common as the muskox population increases.

The past… six, seven years…we notice that… with the muskox numbers getting bigger on Herschel, that they're [grizzly bears] eating muskox. No one knew that before, from what I know.

PIN 120, November 21, 2016

What the bears will do is they'll always head down towards where the muskox are …they always have young ones with them in the springtime, and then the bears will always start hunting the young muskox.

PIN 6, November 17, 2016

Grizzly bears [are] always…there on Herschel Island. There's always muskox on the island, so they always head to the island because they know the muskox can have young ones with them.

PIN 6, November 17, 2016

Summer habitat

Interviewee knowledge of summer grizzly bear habitat tended to be based on sightings made while travelling by boat or air and on occasional encounters at summer camps, rather than on a concerted effort to hunt or track bears. Still, 11 interviewees discussed summer grizzly bear habitat. They tended to stress that bears are wide ranging and constantly moving throughout the region, not confining themselves to a specific habitat type.

If they're [grizzly bears] near a creek bottom, riverbed, they will be on willows in the area…if they're up on the hillside, it's more tussocks, tundra-like country…they're moving through all types of vegetation.

PIN 101, November 11, 2016

Interviewees who did discuss specific grizzly bear habitat in the summer tended to describe tundra or coastal ecosystems. Six interviewees noted that grizzly bears are on or around the coast in the summer, often looking for whale carcasses or avoiding insects. Four interviewees described this area by referencing pictures of tundra ecosystems and noted that grizzly bears can be found throughout the rolling hills and flat tundra that is immediately inland from the coast.

Interviewees continued to emphasize that grizzly bears will follow caribou in the summer. As a result, bears will move along the coast and into caribou calving grounds as the herd travels through the area.

They're [grizzly bears] following the caribou…June, July…in August…You wonder where they've gone and then figure it out…they're way over on [the] side with the caribou. You know, along the beach and over into Alaska.

PIN 107, October 27, 2016

Fall habitat

Eight interviewees discussed fall grizzly bear habitat and continued to emphasize that grizzly bears can be found in a variety of landscapes and vegetation classes throughout the region. Interviewees' descriptions of fall grizzly bear habitat ranged widely, and included muskeg, tundra, coastal beaches, river valleys, and mountains. Interviewees stated that food sources determined fall grizzly bear locations, and observations of grizzly bear foraging and hunting in the fall included eating berries, hunting and scavenging caribou, moose and muskox, eating ground squirrels, digging for bear root, and following the Dolly Varden char migration upstream.

…in the early fall time, you still have the cranberries that are just finally ripe, you know. They'll [grizzly bears] be eating those, they'll be eating some of the blueberries that are still starting to grow, and roots…

PIN 301, November 23, 2016

A general theme across interviewees who described fall grizzly bear habitat was the preparation for denning and the movement toward winter and denning habitat. Three interviewees specifically noted that this entailed moving back to the mountains from the coast. Some interview responses suggest that this is associated with the Dolly Varden char migration. Three interviewees said they witnessed a grizzly bear either following a Dolly Varden char migration upstream or fishing at spawning and overwintering sites.

Most times… they are moving into [the mountains]. I've seen myself, in the fall, I'm working [the] lower Firth …counting the Arctic char … in one day there were 14 grizzly bears walk by us, going upstream… I never, ever seen a bear come down river, they were all moving upriver.

PIN 301, November 23, 2016

…where that fish hole is, there will…probably be bear in the fall time.

PIN 6, November 17, 2016

Denning habitat

Fourteen interviewees described grizzly bear denning habitat, mapping or describing more than 20 den sites. The majority of interviewees (12) described dens occurring on a hillside. Eight interviewees observed dens above or close to a river, lake or other source of water. Descriptions of denning areas were highly detailed and the vegetation described ranged from thick willows to open tundra and bare ground.

Interviewees were not always able to recall the aspect of a den site, but when they did, they generally referred to south-facing hillsides. Seven interviewees described denning habitat as south facing, and nine individual den sites were observed on a south aspect.

I could see the bear… It was like straight rocks, way up… like halfway up the mountain and then there was a patch of grass, like a big patch, and that's where he just disappeared right into…It was facing…south.

PIN 117, November 15, 2016

Although south-facing hillsides were the most frequently described denning areas, three den sites were described as west facing, and one was observed on a northwest aspect. A suggested reason for these den locations was avoidance of a cold south wind that prevails in the region throughout the winter.

…in the winter, when they hibernate…the south wind is always the coldest and it's blowing this way.

PIN 103, November 25, 2016

In some instances, dens were observed in flat locations. Five interviewees described den sites in low flat locations, typically near a river or creek. Three interviewees either suggested a change in denning locations over time or cited other land users and elders who have witnessed grizzly bears increasingly denning in lower and flatter habitats.

I notice there are grizzly bears denning lower, in the lowland. Just like on the slope hills.

PIN 301, November 23, 2016

Climate change and concerns

There was no consensus regarding the overall health or status of the grizzly bear population. Some interviewees noticed an increase in the bear population, others suggested a decrease, and some noticed no change in population. However, six individuals observed that it is increasingly difficult to find large bears, especially closer to Aklavik. Some interviewees explained that this was due to local harvesting, and suggested that hunters are taking bears when they are too young or small, not allowing them to reach their full size.

…sometimes they [hunters] come back with small bears and that kind of frustrates me… they should focus way over in the park… they're big over there.

PIN 7, November 13, 2016

Six individuals suggested that climate change is affecting grizzly bear habitat or behaviour.

Generally, interviewees observed grizzly bears entering dens later in the fall and emerging earlier in the spring. Some interviewees were also concerned that an increase in slumping along hillsides is altering grizzly bear habitat, making old dens unusable and the establishment of new dens more difficult.

Polar bear

In-depth research on Inuvialuit traditional knowledge of polar bears (Joint Secretariat 2015) provided significant amounts of information about polar bear movements and ecology, including offshore ice use, and this report did not attempt to replicate the collection of that information. Research for this report focused on terrestrial and near-shore polar bear habitats, with the goal of collecting land-based habitat descriptions. Eleven interviewees described terrestrial or near-shore polar bear habitat. These descriptions largely focused on den sites; however, five interviewees described hunting or foraging areas along the coast or on the near-shore ice. These descriptions add to a body of existing TK literature, and further refine TK descriptions of polar habitat.

Denning

Most interviewees who described terrestrial polar bear habitat referenced observations of polar bear dens. Den sites were typically observed along the coast or on Herschel Island, although on two occasions, interviewees described den sites in inland areas. Interviewees universally described dens on hillsides or banks or in river draws, where snow accumulates through the winter. Snow accumulation was the most emphasized habitat characteristic in den sites, rather than aspect or surrounding vegetation.

> …it [polar bear den] was on a huge snow bank, on the east [side of Herschel Island]… snow accumulates on the east side of… this big valley that it was in… And the den itself was in the snow, which was… two, three feet in diameter and it went down like six feet straight… and you see all these claw marks… on the entrance of the polar bear den.
>
> **PIN 101, November 11, 2016**

> In the… deeper creek… during the storm, the snow will build up over time… and get like up to twenty, thirty feet deep.
>
> **PIN 120, November 21, 2016**

> Usually, they [polar bears] go into snowbanks. This one [den] was in a snowbank… [a] thirty-foot snowdrift.
>
> **PIN 2, November 15, 2016**

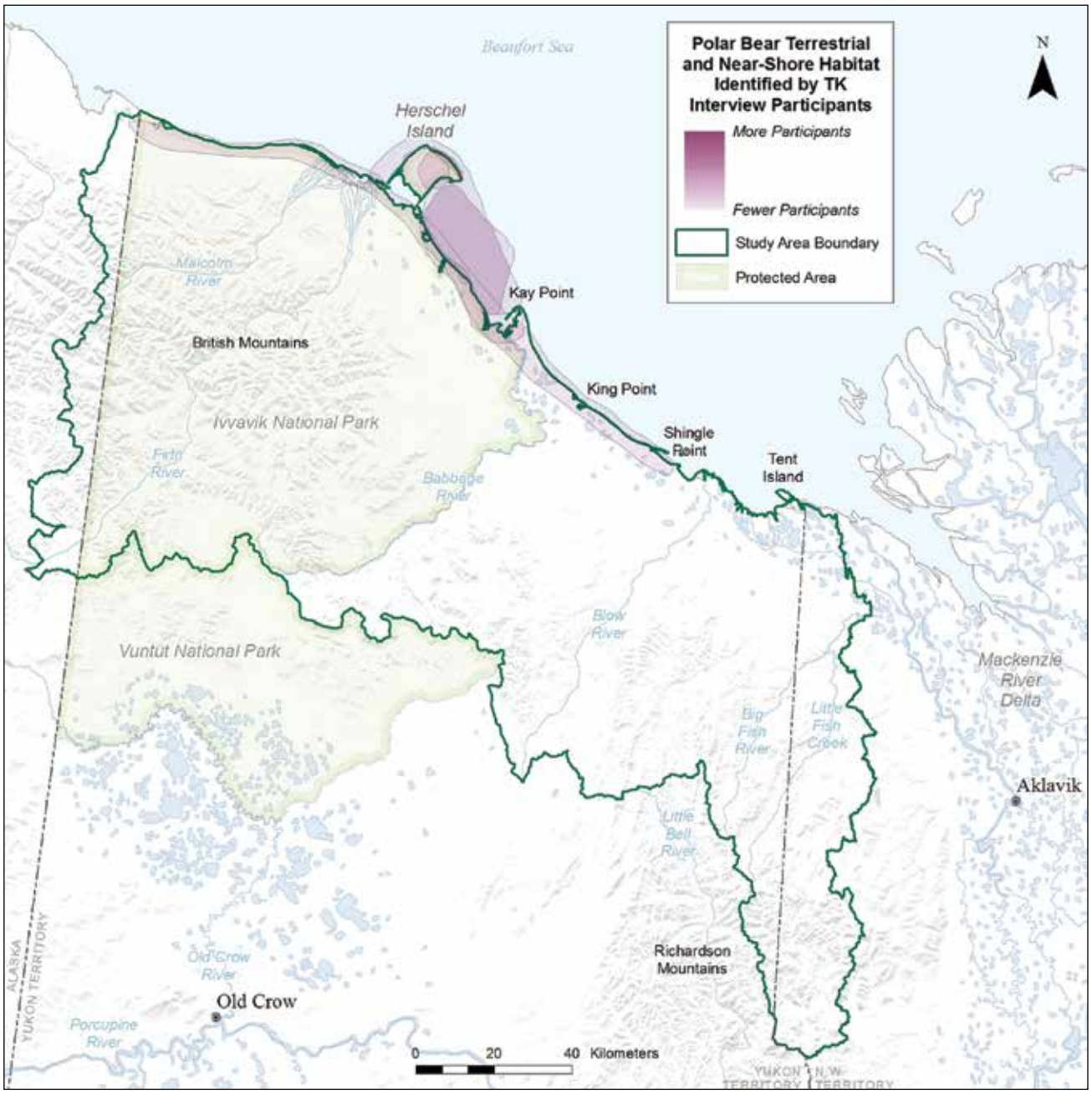
Coastal habitat and near-shore ice

Most descriptions of land-based polar bear activity, aside from denning, referred to Herschel Island or the nearby mainland. Four individuals specifically described the coastline or near-shore ice as important polar bear habitat. Polar bears travel through this area hunting seals or scavenging carcasses along the shoreline. Two interviewees described a break between near-shore or land-fast ice and the open ocean sea ice that forms near the coastline. This area was

frequently described as an important hunting area for polar bears (Map 7) due to the large number of seals that use the break in the ice for breathing holes. Generally, interviewees did not specify a single season when polar bears are more likely to be found on land, but at least one interviewee suggested that on-land activity is more likely to occur in months with no nearby sea ice.

Map 7. Areas of the YNS used by polar bears for overland or near-shore travel and foraging

Note: identified by multiple Inuvialuit land users during TK interviews; darker shades indicate overlap in areas drawn by multiple land users



… they'll [polar bears] hunt seals close to shore because there's cracks that happen in those areas and so the seals will go there for breathing holes…

PIN 120, November 21, 2016

I've seen polar bears in that coastal area…just right off the shore…just travelling along, hunting… places where they've caught seals…

PIN 120, November 21, 2016

… most times, you often run into them [polar bears]… from Kay Point all along… to… the [Alaska] border, here… in this area, there's a lot of seals.

PIN 301, November 23, 2016

[In the] fall time… there's no ice, right? So, he's [polar bear] going to be on the land. I don't know where else he's going to be.

PIN 301, November 23, 2016

Interviewees did not describe any major overland migration or travel route. One interviewee described a seasonal movement pattern, stating that polar bears are seen moving westward each spring. Generally, if polar bears were seen on land, it was suggested that they were crossing to and from sea ice or hunting along the shore. Most interviewees still referred to on-land sightings of polar bears as a rare event, and tended to focus their descriptions of terrestrial polar bear activity on the area from Kay Point to Herschel Island (Map 7).

Dolly Varden char

Dolly Varden char interviews focused specifically on near-shore habitat, rivers, spawning sites and overwintering areas. Twenty-three interviewees discussed Dolly Varden char habitat; interview responses ranged from general descriptions of fishing areas to identification of spawning and overwintering sites. Interviewees described summer ocean habitat, river migrations, and spawning and overwintering areas separately. Some interviewees refer to Dolly Varden char as Arctic char, others use the species names interchangeably, and still others explained that certain fish stocks are considered Dolly Varden char and others are considered Arctic char. For the purposes of the habitat descriptions in these interviews, the names are used interchangeably, based on the preference of the interviewee.

Near-shore ocean habitat

Dolly Varden char were described in near-shore marine habitat throughout the summer; 17 interviewees described summer Dolly Varden char habitat, focusing mostly on fishing areas just off shore, particularly near Shingle Point. Typically, interviewees described fishing for Dolly Varden char in midsummer, when fish stocks are present all along the coast.

Three interviewees described a correlation between sea ice and Dolly Varden char populations. These interviewees suggested that Dolly Varden char move with sea ice, feeding on small invertebrates that are concentrated around floating ice. Interviewees who described this relationship tended to suggest that the presence of sea ice indicated large stocks of Dolly Varden char nearby.

Something about Arctic char… in July, there'll be no fish… And then all of the sudden, the ice comes in… And the fish come in with it. Where there is ice there's always fish.

PIN 2, November 17, 2016

…when the ice first opens up and we can set the fish nets at Herschel Island, we get a good number of fish [Dolly Varden char]… and then once the ice goes out…[it] kind of slows down 'cause they go… in and out with the ice.

PIN 120, November 22, 2016

…long ago, when the ice used to come and it used to be really good for char fishing, 'cause the char… hang around the ice to feed off the little bugs… [that are] there.

PIN 302, November 18, 2016

Migration upstream and river habitat

Dolly Varden char were observed migrating from the ocean into rivers toward the end of summer and beginning of fall. Thirteen individuals described rivers bearing Dolly Varden char, noting that migration typically began at the end of August, with Dolly Varden char reaching their spawning grounds later in the fall. These included the Babbage, Big Fish, Little Fish, Firth, Malcolm, Komakuk and Running rivers as well as major tributaries of these rivers, such as Spruce Creek, Joe Creek and Sheep Creek. River habitat was discussed generally, and interviewees did not indicate that certain areas supported larger runs than others.

Spawning sites and overwintering areas

A major focus of interviews was discussing spawning and overwintering sites; 14 interviewees discussed Dolly Varden char spawning habitat and marked spawning sites on the map (Map 8). These areas were typically described as shallower parts of the river, with some deeper pools and clear water. Four interviewees described these areas as staying ice-free all year. This was usually because of warmer groundwater that entered the river in these locations or a high content of sulfur or salt that prevented water from freezing.

…my granddad used to show us where they [Dolly Varden char]… spawn… It's just like a little… pocket… They're [the eggs] not right in the stream [they're off to the side].

PIN 110, November 13, 2016

That's [a spawning site] where they… do their spawning and all that… It's probably 'cause… the water out of the ground is coming out so much warmer… it stays open.

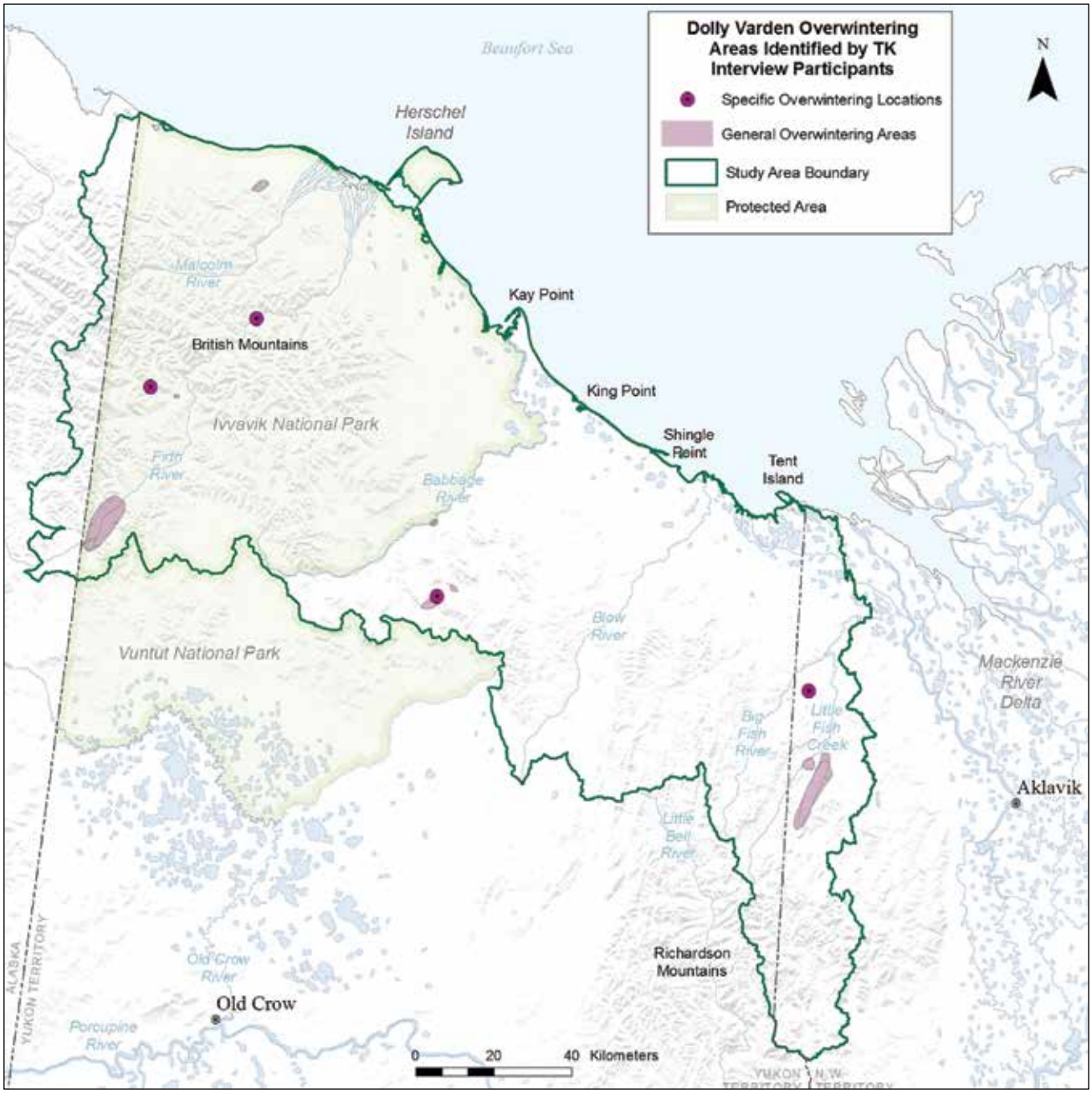
PIN 302, November 18, 2016

…there's big, deep pools, and [it's] also shallow… the river fans out a little bit and gets wider and then… you could walk right across it easily with a pair of rubber boots.

PIN 120, November 22, 2016

Map 8. Areas of the Yukon North Slope used by Dolly Varden char for spawning

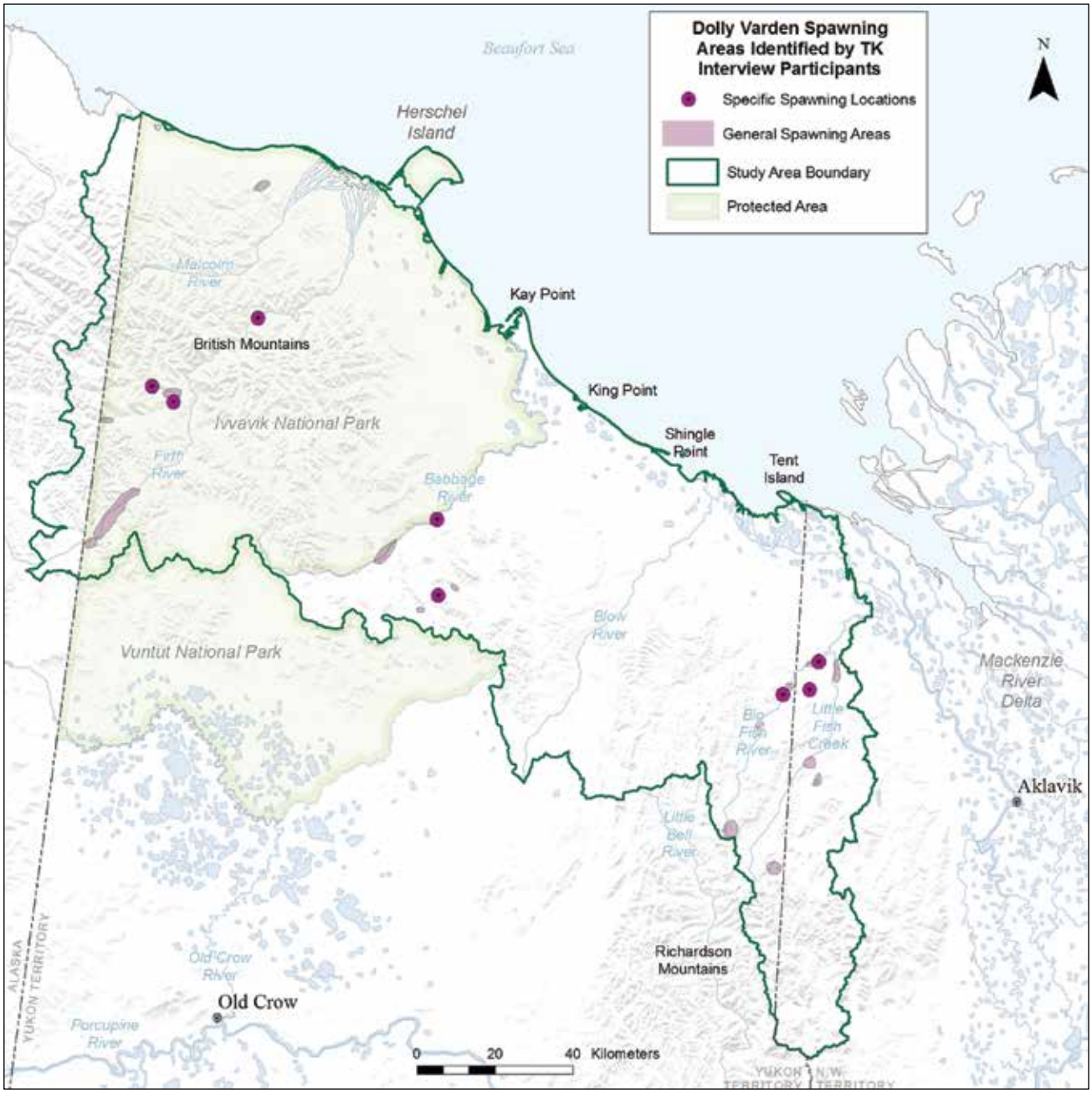
Note: identified by Inuvialuit land users during TK interviews



Overwintering sites were described similarly to spawning areas, and in most instances interviewees described Dolly Varden char using the same area to spawn and overwinter. Five interviewees described overwintering areas remaining ice-free throughout the year, while at least two interviewees observed Dolly Varden char overwintering in areas that freeze. The remaining interviewees described only the location of overwinter sites. Overwintering sites were marked on the map, with a high degree of consistency across interviewees (Map 9).

Map 9. Areas of the Yukon North Slope used by Dolly Varden char for overwintering

Note: identified by Inuvialuit land users during TK interviews



Climate change concerns

Interviewees largely described the Dolly Varden char population as stable, although many stated concerns over climate change impacts on habitat, and three interviewees observed a decrease in Dolly Varden char populations. Ten interviewees described population levels as normal, and ten interviewees did not discuss population changes. Interviewees who observed decreasing populations cited smaller seasonal runs and lower yearly catches as evidence of changing numbers. No specific habitat change was listed as the cause for potential decreases in populations, but interviewees often shared concern over climate change impacts on important Dolly Varden char habitat.

Nine interviewees observed impacts to Dolly Varden char habitat as a result of climate change. Three interviewees described erosion along riverbanks and coastlines, which was observed to deposit sediment in rivers, making them shallower and less clear. Four interviewees described a change in the timing of migration, largely referring to Dolly Varden char moving through summer fishing locations earlier in the year. Three interviewees described incidents of salmon moving into the region, attributing this to warmer temperatures, and two interviewees observed that the decrease in summer ice is impacting marine Dolly Varden char habitat. One interviewee described less snowpack, which is resulting in lower water levels in important creeks and spawning areas.

…erosion is the one that's going to do a lot of damage to our rivers.

PIN 1, November 11, 2016

…you know, we've never had salmon in the area before, and now they're starting to… pop up in places where we're getting the Arctic char.

PIN 101, November 18, 2016

…the erosion on the hills…make the creek shallow… Probably harder [for Dolly Varden char] to get up to where they're supposed to spawn.

PIN 111, November 11, 2016

Probably about ten years [ago] was a really thick ice… And it was really good fishing… you could see the char coming, you could see their little ripples… along the edge of the water… That's what the normal used to be back then.

PIN 302, November 18, 2016

Broad whitefish

Many of the interviewees consider broad whitefish a Delta fish, rather than a species they associate closely with the YNS. Nevertheless, 11 interviewees shared observations of whitefish habitat along the YNS and many of them used the species as an example of habitat change along the YNS, citing the occurrence of whitefish in new locations.

Most reports of whitefish habitat referred to lakes or near-shore coastal waters. Nine interviewees described general whitefish habitat, referring to summer fishing locations. These areas included lakes close to the shore, Roland Bay, and near-shore coastal waters such as those around Shingle Point. Interviewees described catching whitefish alongside Dolly Varden char when fishing in the ocean during the summer months.

Seven interviewees referred to the occurrence of whitefish in marine waters as a recent trend, emphasizing that whitefish were not traditionally thought of as an ocean species. These interviewees noted seeing more whitefish in the ocean than was historically considered normal, describing coastal flooding and storm surges that allow for whitefish to escape from coastal lakes into near-shore marine waters. Many whitefish-bearing lakes are close to the ocean, and the generally low ground between freshwater lakes and the coast allows for mixing of the two when the area floods. Two interviewees also commented that coastal waters have become

less salty than they were historically, suggesting that this may be associated with the increased occurrence of whitefish in marine waters. One interviewee suggested that lower salinity was caused by increased freshwater run-off and changes to river flow as a result of climate change.

> Well, whitefish never used to be at Shingle Point long ago, when I was a little girl… Now the fish from the Delta are starting to come into that area… Because our water is not as salty as before.
>
> **PIN 1, November 11, 2016**

> …there's also a lake that breaks out, lets out the big lake whitefish from that area.
>
> **PIN 302, November 18, 2016**

> We noticed that…[there are] more and more… freshwater fish in the sea.
>
> **PIN 302, November 18, 2016**

> Only time they [broad whitefish] come out [to the ocean] is when there's a big wind and the tide comes up… And this [water] overflows and they come out.
>
> **PIN 2, November 17, 2016**

> They're [broad whitefish] not supposed to be out here [in the ocean]. They're freshwater fish.
>
> **PIN 2, November 17, 2016**

Geese

Many species of geese seasonally travel through the YNS. Interviews focused on two species: greater white-fronted goose (also known as yellowlegs) and snow geese, but interviewees mentioned other species, such as Canada goose, brant and swans, when describing goose habitat. Sixteen interviewees described habitat specifically for yellowlegs and snow geese, with information spanning the length of the YNS and observations occurring in spring, summer and fall.

Most interviewees linked their descriptions of habitat to specific behaviours, such as nesting, foraging, staging and spring or fall migration. Interviewees described important habitat characteristics and emphasized specific locations that are used for each of these seasonal activities. In some cases, the references to geese in the interview conversations did not make clear which species was being described or if multiple species exhibited the described behaviour or habitat use. Where possible, this report differentiates between yellowlegs and snow geese, but in some instances the information collected refers only to general geese habitat.

General migration patterns

Most interviewees shared similar observations of the migration patterns of yellowlegs and snow geese. Generally, interviewees described yellowlegs flying from inland areas and arriving on the YNS between late April and June. Yellowlegs were typically observed in the area through the summer, when they nest or forage. Snow geese were observed flying through the area during the spring, but were less frequently observed nesting or stopping over for long periods of time.

Interviewees suggested that although snow geese will occasionally use nesting sites along the YNS, primarily nest outside of the study area on Banks Island, using the YNS during their fall migration.

Land users find both yellowlegs and snow geese foraging along the YNS in the fall until they migrate south for the winter. Interviewees observed both species of geese foraging in similar areas throughout the study area, and consistently described the southward migration occurring in September or October. Yellowlegs were observed departing approximately two weeks earlier than snow geese, which wait until the first snow to move south.

In the time period between the arrival of geese on the YNS and their migration southwards, interviewees frequently observe nesting, foraging, staging and stopover locations along the coast. These areas are typically returned to each year and were described consistently among interviewees.

Nesting areas

Thirteen interviewees described nesting habitat along the YNS. Generally, nesting geese were observed to be yellowlegs. In three cases, interviewees suggested that nesting areas contain similar numbers of yellowlegs and snow geese; however, the majority of interviewees largely observed yellowlegs throughout the nesting season. Snow geese were generally observed nesting out of the study area on Banks Island.

> The yellowlegs usually nest around Qutaitchuraq… we don't usually get snow geese until we get… snow on the ground…
>
> **PIN 131, November 15, 2016**

> …first week in May, we see a whole bunch [of geese] at Blow River… during the summer they use that [area] for nesting ... [It's] yellowlegs, 95%, maybe mixed 5% with snow geese.
>
> **PIN 2, November 15, 2016**

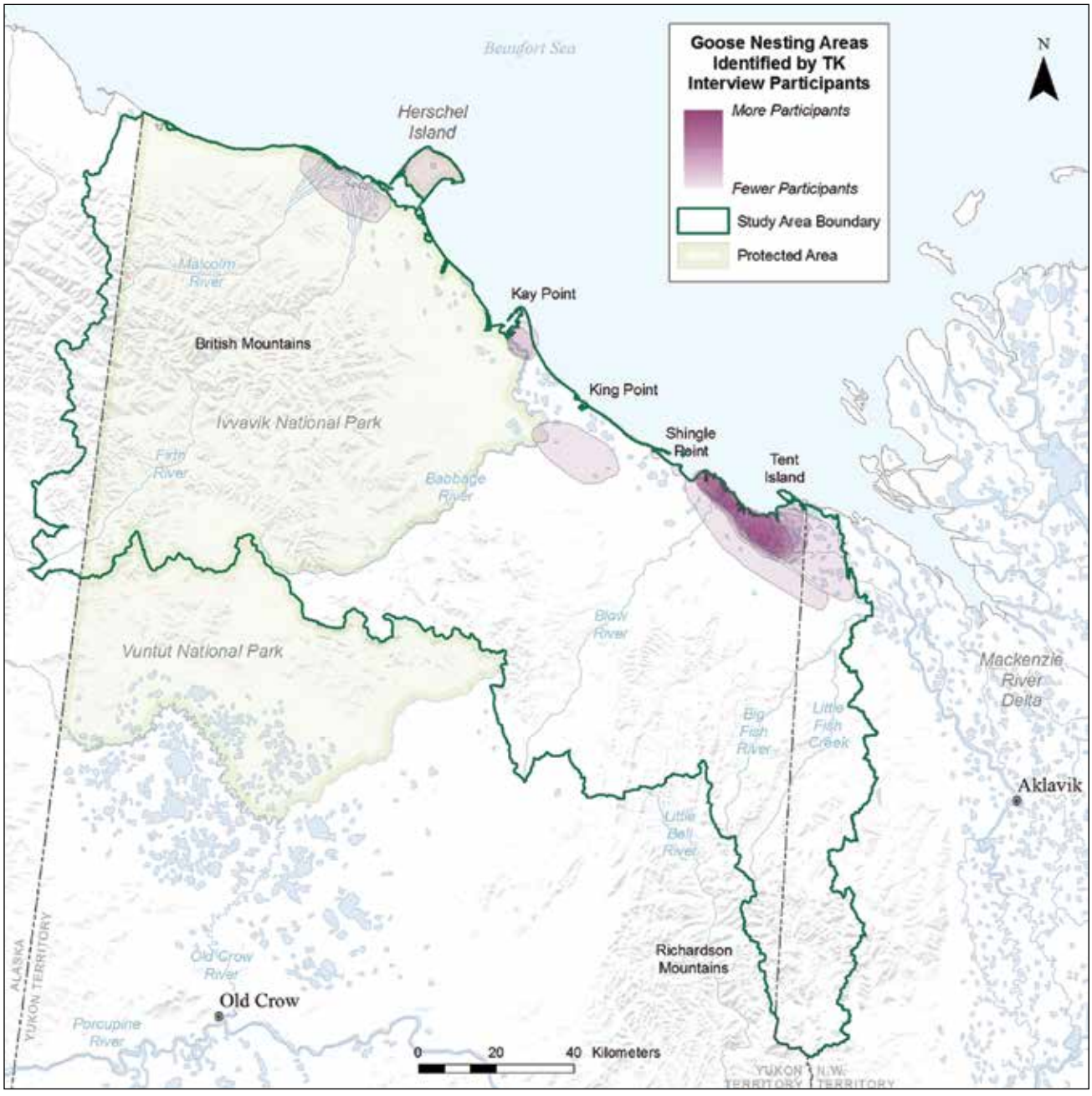
> [It's] mostly yellowlegs in this area… you're seeing a lot of snow geese, too… but they're… crossing over to Banks Island… that's where the snow geese nest.
>
> **PIN 121, November 22, 2016**

Many nesting descriptions were linked to specific areas (Map 10), and habitat observations were largely consistent. Nine interviewees described nesting areas as flat terrain, and eight interviewees observed that nests are always near water. Habitat classes and subclasses used to describe nesting areas included lower swamps (seven interviewees), upland ponds and swamps (eight interviewees), and low flatlands (five interviewees). Within these areas, interviewees often described nesting sites as grassy locations, with available cover or camouflage.

Of the 13 interviewees who described nesting habitat, 12 also mapped specific locations as important nesting grounds for geese. Geese return to these areas every year, and the areas mapped show a large degree of continuity across interviews (Map 10).

Map 10. Areas of the Yukon North Slope used by geese for nesting

Note: identified by multiple Inuvialuit land users during TK interviews; darker shades indicate overlap in areas drawn by multiple land users



[Geese] like an area where they're hard to see, and… they have to live close to the river or the lake where the young ones always…go feeding.

PIN 112, October 27, 2016

…in those [nesting] areas there's water all over… I'd have to say [nests are] 50 to 75 yards… like walking pace from the water.

PIN 120, November 22, 2016

Foraging habitat

Interviewee descriptions of foraging habitat spanned spring, summer and fall. Their descriptions referenced geese habitat generally, and did not usually differentiate between species, but interviewees often observed yellowlegs earlier in the spring and snow geese in the later summer or fall. Spring foraging areas were largely described as similar to nesting areas. Interviewees described low, wet, grassy areas in the same way that they described nesting locations. Many of the same locations mapped as nesting areas were also marked as early season foraging locations (Map 11). Often, interviewees observed yellowlegs staying in these areas through the summer, eating grass and roots. Five interviewees described geese foraging for grasses or sedges, and while these descriptions primarily applied to spring habitat, some interviewees emphasized that geese use this food source through the summer and fall as well.

…they [geese] pull the roots up from [the marsh] and then they have lunch.

PIN 2, November 15, 2016

When you watch geese… you observe the area… [the] edge of a lake or swampy area, they're pulling out the grass… they must be eating the roots.

PIN 101, November 18, 2016

Interviewees also described geese foraging for cloudberries, cranberries and blueberries as they ripen. In the summer, geese were observed flying back and forth between nesting areas and foraging habitat. Five interviewees described summer foraging habitat either by selecting pictures of hillside habitat classes or by specifically describing hillside terrain. These locations were generally described as open terrain, with scattered short willows and low shrubs and grass. Six interviewees described fall foraging habitat in the same manner, as occurring wherever large quantities of ripe berries are found. Four interviewees described fall foraging habitat by selecting pictures of tundra ecosystems.

In addition to the yellowlegs that are abundant in the area in spring and summer, snow geese fly there and forage in the fall before heading south for the winter. Berries were usually discussed in a general sense, but seven interviewees described geese foraging for blueberries, while another seven described them foraging for cloudberries. One interviewee referred to geese also foraging for cranberries, and at least one interviewee suggested that snow geese are more likely to eat blueberries than other berries.

…when we stay at Shingle Point, we see them [geese] come from the ocean, then they're flying up to the high hills, up to the tundra… and eating a lot of aqpik [yellow berries]…"

PIN 6 November 12, 2016

We know they're eating berries in late fall… They always come from the ocean and they're always heading to the foothills.

PIN 6, November 12, 2016

…soon as you see cloudberries…whoosh…that's where they [geese] go.

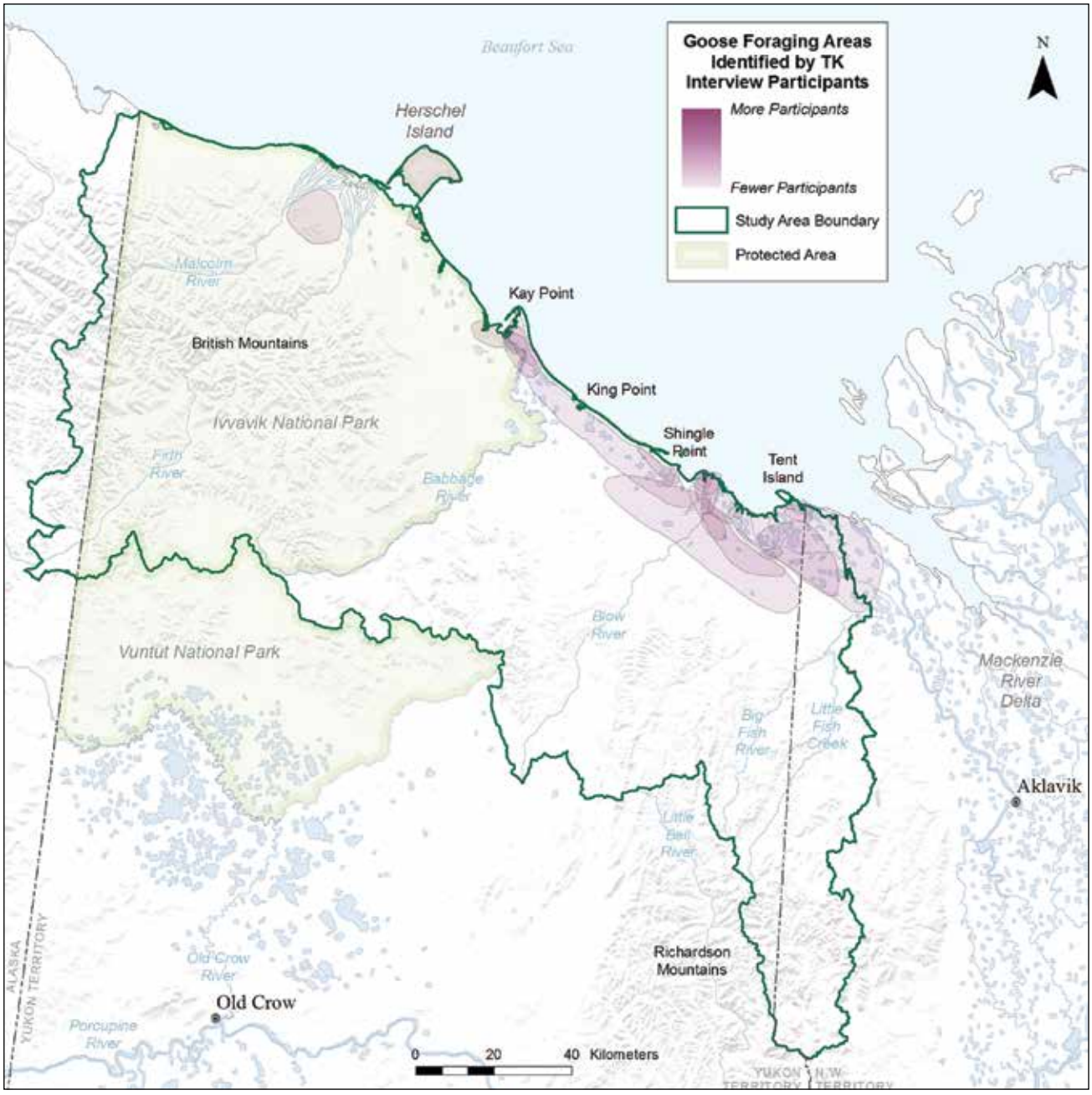
PIN 112, October 27, 2016

I don't know [everything] they [geese] eat, but … when you look in their guts, you can find blueberries.

PIN 1, November 12, 2016

Map 11. Areas of the Yukon North Slope used by geese for foraging

Note: identified by multiple Inuvialuit land users during TK interviews; darker shades indicate overlap in areas drawn by multiple land users



Staging habitat

Interviewees also discussed important stopover or staging areas that geese use during the spring and fall migration. These locations often overlap areas identified for other uses, but were notable because of the high number of geese that were consistently observed; 14 interviewees discussed staging locations and 11 interviewees marked these areas on a map. Interviewees often reported sightings of hundreds or thousands of geese in a single area, typically in the spring or fall, and described both yellowlegs and snow geese using these locations, alongside Canada geese and other waterfowl.

…when they're [geese] flying over here [in the fall], they'll … maybe jump a mile or two and then they stop, 'til somebody scares them up. Then they take off, always going south…

PIN 2, November 15, 2016

… they usually bunch up… thousands and thousands of geese… every spring and fall.

PIN 5, November 14, 2016

Staging areas were generally described as flatter locations, often containing mud bars, near water. Eight interviewees either selected photos of low flatlands or described flat landscapes when discussing staging locations. Two interviewees suggested that geese use these areas in the spring because they are the first to thaw. Other habitat subclasses used to define staging locations included river beaches and coastal beaches. Commonly selected stopover areas included Ptarmigan Bay, the Blow River delta, and the Babbage River (Map 12).

…on this big mud plain… there's always… at least a thousand geese… during the first part of the spring, they come… they stop in there where all the water is… rushing through the Babbage.

PIN 120, November 22, 2016

Changes and concerns

Interviewees observed a number of changes in geese populations and habitat use; nine interviewees suggested that goose populations had increased throughout the YNS. Observations typically referred to all geese in the area; yellowlegs in particular were thought to be increasing.

One interviewee suggested that snow geese, specifically, are increasing in the Shingle Point area, but at least two interviewees noticed a decline in the number of snow geese using the YNS during migration.

One thing about yellowlegs, they're really multiplying, which is really good…. Twenty years ago, you could see very few… [but, now] around this area, I could easily say there were at least… four thousand geese…

PIN 2, November 15, 2016

… over the past ten years… it's a good, healthy [population]… both snow geese and yellowlegs.

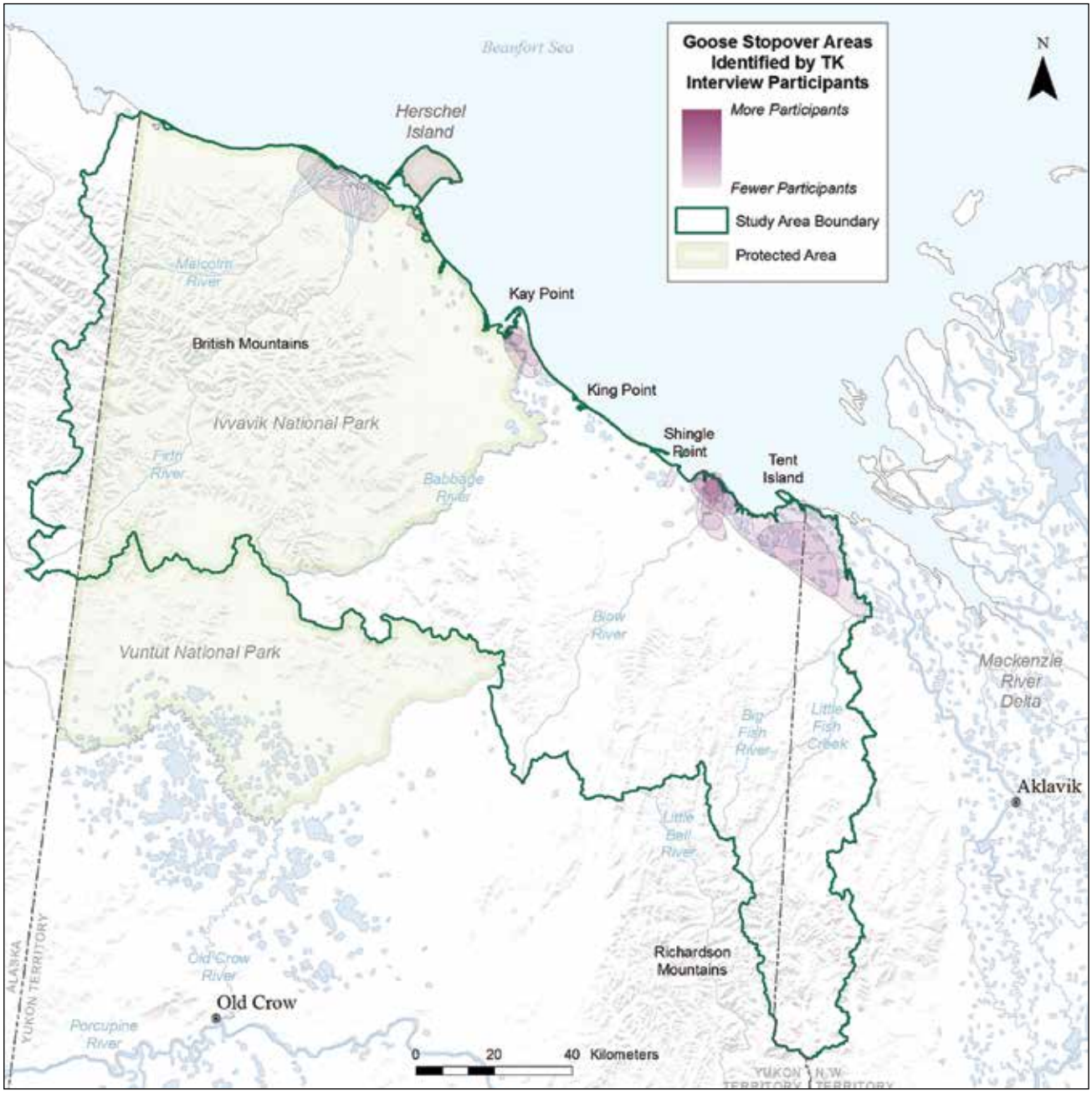
PIN 121, November 22, 2016

…there's a lot of geese now… I see there's more than there used to be.

PIN 5, November 14, 2016

Map 12. Areas of the Yukon North Slope used by geese as stopover or staging areas during spring and fall migrations

Note: identified by multiple Inuvialuit land users during TK interviews; darker shades indicate overlap in areas drawn by multiple land users



It is possible that the observed changes in snow geese abundance are related to the change in migration pattern that four interviewees discussed. These interviewees observed that geese still fly over the region, but either do not stop as frequently or move farther inland during their migration, flying closer to the mountains than was historically considered normal. Three of the interviewees who discussed changes to geese migration suggested that these changes have resulted in fewer snow geese using historically important stopover locations.

…as far as we hear, they're [snow geese] increasing in Sachs Harbour. There's a lot more there… they usually come out from Sachs Harbour and they go through…here. They don't do that anymore. They used to land in here by the thousands…

PIN 2, November 15, 2016

…they should do a study on why [it] is these geese [are] not landing here anymore. What's happening to this?

PIN 2, November 14, 2016

I hardly see snow [geese]. They go inland. I think they go inland ... That's a change.

PIN 8, November 20, 2016

Seven individuals suggested that climate change may also be altering goose habitat, although responses varied regarding specific impacts. Two interviewees noticed geese arriving at the study area earlier, and one interviewee stated concern that increasingly erratic weather may result in geese arriving to the region too soon, exposing themselves to late spring cold spells. Other concerns included drying out of nesting habitat or flooding and salt kill from coastal storms. One interviewee suggested that warmer weather might benefit geese, especially during the nesting period.

Species of special interest

Although the main purpose of the interviews was obtaining detailed information on seven focal species, interviewers also asked for specific information on species of special interest. If an interviewee had knowledge regarding a special interest species and there was time left in the interview, a limited number of questions were asked (Appendix 4). The questions primarily asked for location-specific information, such as dens for wolverines, wolves or arctic foxes, nesting sites for raptors, or seal haul-out zones. These areas were mapped if the interviewee shared relevant spatial data. Special interest questions also related to habitat for Dall's sheep, muskox and berries.

Although these topics were not discussed as frequently as focal species habitat, some interviewees shared detailed habitat descriptions that strengthen knowledge of habitat characteristics throughout the study area.

Muskox

Muskox was the most widely discussed special interest species. Nineteen interviewees referred to muskox, either in direct response to a special interest interview question or in discussing grizzly bear or caribou habitat. Interviewees commonly described muskox in similar habitats as

caribou and emphasized that muskox could be found "all over." Seven interviewees observed muskox in tundra ecosystems and three interviewees observed muskox along the coast. Two interviewees observed muskox in each hillside or mountain habitat classes or in rivers and valleys. Muskox were generally observed eating similar vegetation as caribou, with some interviewees describing either lichen or grass forage.

The largest concern regarding muskox was their observed increase and the resulting impact on caribou populations. Interviewees commonly described an increase in muskox populations, and ten interviewees noted that muskox have a negative impact on caribou habitat, stating that caribou typically avoid muskox. These interviewees noted great concern regarding the impact that a growing muskox population is having on caribou habitat. Four interviewees noted that muskox are becoming a favoured prey source for grizzly bear, particularly on Herschel Island, where there has been a large muskox population in recent years.

Dall's sheep

Sheep were also widely discussed by interview interviewees. Thirteen interviewees discussed sheep, largely focusing on mountainous areas near the eastern and western extents of the study area. Eleven interviewees described sheep habitat as mountainous, either by selecting photos of the rocky mountain ridges habitat class (such as Photo 8) or specifically describing seeing sheep in mountainous terrain. These observations were typically made in the summer and fall, when land users are travelling through sheep habitat; however, no interviewees suggested seasonal specific habitat selection or migration of sheep during the year.

Photo 8. Example of a rocky mountain ridge, selected to represent sheep habitat.

Additional species and Information

When possible, interviewees were asked to describe other special interest species. These questions largely focused on place-specific habitat uses (e.g., identifying den sites) or discussing species that were not a primary focus of the of the regional assessment (e.g., describing ptarmigan habitat). These special interest topics included arctic fox, wolf and wolverine den sites; seal haul-out zones; general berry habitat; raptor nest locations; beaver population changes; and ptarmigan and shorebird habitat. Interviewees gave many detailed descriptions and provided important spatial information regarding these topics, but not enough interviewees provided information on these to allow habitat characteristics to be summarized at this point. Data on special interest topics have been catalogued and digitized and will contribute to the updating of the Wildlife Plan.

4

Conclusion

The TK-ELC workshop and the focal species interviews have documented TK regarding wildlife habitat across the YNS. This information will be an important part of the updating of the Wildlife Plan and the development of the regional ecological and cultural assessment for the Yukon North Slope.

The TK-ELC workshop provided an important foundation for interviews by creating a bridge between TK and western science descriptions of habitat. The importance of this cannot be understated; efforts to share information across knowledge systems have faced technical and social challenges in many regions. This initiative is a collaboration that connects knowledge systems to achieve a shared understanding and terminology to achieve mutual goals.

Important lessons were learned that have improved the ability of researchers and land users to share information effectively. The workshop highlighted the fact that some of the terminology used in western science land classification is unrecognized by many land users. For example, the terms “meadow,” “bog,” “fen,” and “fellfield” were referenced as classes in the ELC documents, but were unfamiliar to many workshop participants, or not commonly used.

The workshop created the opportunity to identify a common language when discussing ecosystems and habitats. Inuvialuit land users did not always use the same names for plant species as western researchers do, and it was challenging to clarify species names despite having an Inuvialuit traditional plant guide and a room of knowledgeable land users. In addition, some words have different meanings when used by traditional land users than when used in western science. For example, traditional land users often used the term “willow” to refer to any woody plant above knee height that is not a tree, including willow, alder and birch, and used the term “shrub” to describe any woody plants below knee height, many of which may be classified as willows by western scientists. Thus, common western science terms such as “tall shrub” were seen as contradictory by Inuvialuit land users and therefore initially caused confusion.

The definitions of habitat classes and photos used in the TK-ELC workshop made a large contribution to TK interviews on fish and wildlife habitats. In some instances, habitat classes and photos translated directly to land user descriptions of wildlife habitat. For example, 16 of

18 interviewees who described moose habitat selected photos of the TK rivers and creeks habitat class, immediately associating the photos with locations where they had observed moose. Similarly, photos of the swamp classes were commonly used to describe goose habitat across many interviews.

Despite the overall success of the use of habitat classes and associated photos, it is recommended that this method be used in addition to — not as a replacement for — obtaining detailed verbal descriptions of habitat characteristics in TK interviews. The most useful descriptor of habitat was the land user's observation, which often revealed more detail or nuance than a photo did.

In some instances, photo selection had the potential to mislead. For example, some interviewees selected photos of ecosystem classes based on landscape features in the foreground or background, not on the intended focal point of the photo. This problem was often encountered if there were mountains or shoreline in a photo, when the intended focal point was a different habitat feature. In these instances, it was important that the interviewee described why he or she selected a photo and what characteristics were important in the photo, and that the interviewer recognized if these characteristics matched the TK habitat class linked to the photograph.

Using a combination of photo-based and narrative-based descriptions of habitat allowed for a high level of detail across interviews, although knowledge of a particular species or seasonal habitat use related largely to an individual's specific travel and land-use patterns. Focal species habitat was often described in the most detail as it related to specific hunting seasons or locations. For example, most interviewees who described grizzly bear habitat focused on locations where bears are found during the spring hunting season. Because most grizzly bear hunting occurs on snowmobiles, the perspective and location of land users who described spring bear habitat was different than those of land users describing summer habitat, which they typically reach via boat.

This variation in land user travel throughout the year made it difficult to discern patterns in seasonality for some species. For example, interviewees described a difference between coastal and inland moose habitat. They suggested that inland moose feed largely on willow, while coastal moose eat sedges and grasses with a higher salt content, which they feel improves the flavour of the meat. Some interviewees suggested that the difference in these habitats was seasonal: moose are more likely to be found near the coast in the summer and move inland during the winter. Other interviewees acknowledged that it was difficult to know if moose are moving between these habitats or if their own patterns of seasonal travel influence the location of sightings. Land users are more likely to travel inland by snowmobile in the winter and by boat in the summer.

Similarly, interviewees' reasons for travelling across the YNS greatly influenced their knowledge regarding certain habitats. For example, many interviewees who described wildlife habitat in the western part of the study area, particularly polar bear habitat, have been employed by Parks Canada or have worked as research assistants in the region at some point. These interviewees used observations made while flying to and from field sites, fieldwork, and other duties related to employment, as well as traditional wildlife harvesting, to gain knowledge of wildlife habitat.

The range in experiences across interviewees is reflected in the TK data. For some species, such as moose, grizzly bear, caribou and geese, combinations of land user observations and photo selections generated consensus descriptions of important vegetation, terrain types and spatial locations for important habitat types. Other species habitats were described in less detail; either because many of the terrestrial habitat descriptors used in the interviews were not relevant (e.g. polar bears, which are largely are observed on sea ice) or because land users do not frequently interact with certain species across the YNS (e.g. broad whitefish, which were often referred to as a "Delta fish").

This interview series adds important habitat information to previously documented traditional knowledge across the YNS. This information has a stand-alone benefit (as summarized in this report) and will also assist in management and conservation efforts for wildlife habitat across the YNS. Through its focus on detailed habitat descriptions, the knowledge collected in this research can inform wildlife habitat mapping and modeling efforts across the YNS. Additionally, the bridging of science-based ecosystem classification (e.g., the ELC) and TK descriptions provides a novel and important approach to coordinating the use of both knowledge systems in conservation and land management efforts. This will enable researchers and land managers to use all available information in planning efforts. Specifically, the information documented through the work presented in this report will directly support the revised Wildlife Plan and other management efforts of WMAC(NS).

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Appendix 1: TK-ELC Bridging

This interim bridging of TK habitat classes and subclasses with the eastern YNS ELC ecosystem units may be updated as the ELC is finalized and some ELC unit classifications or names are revised.

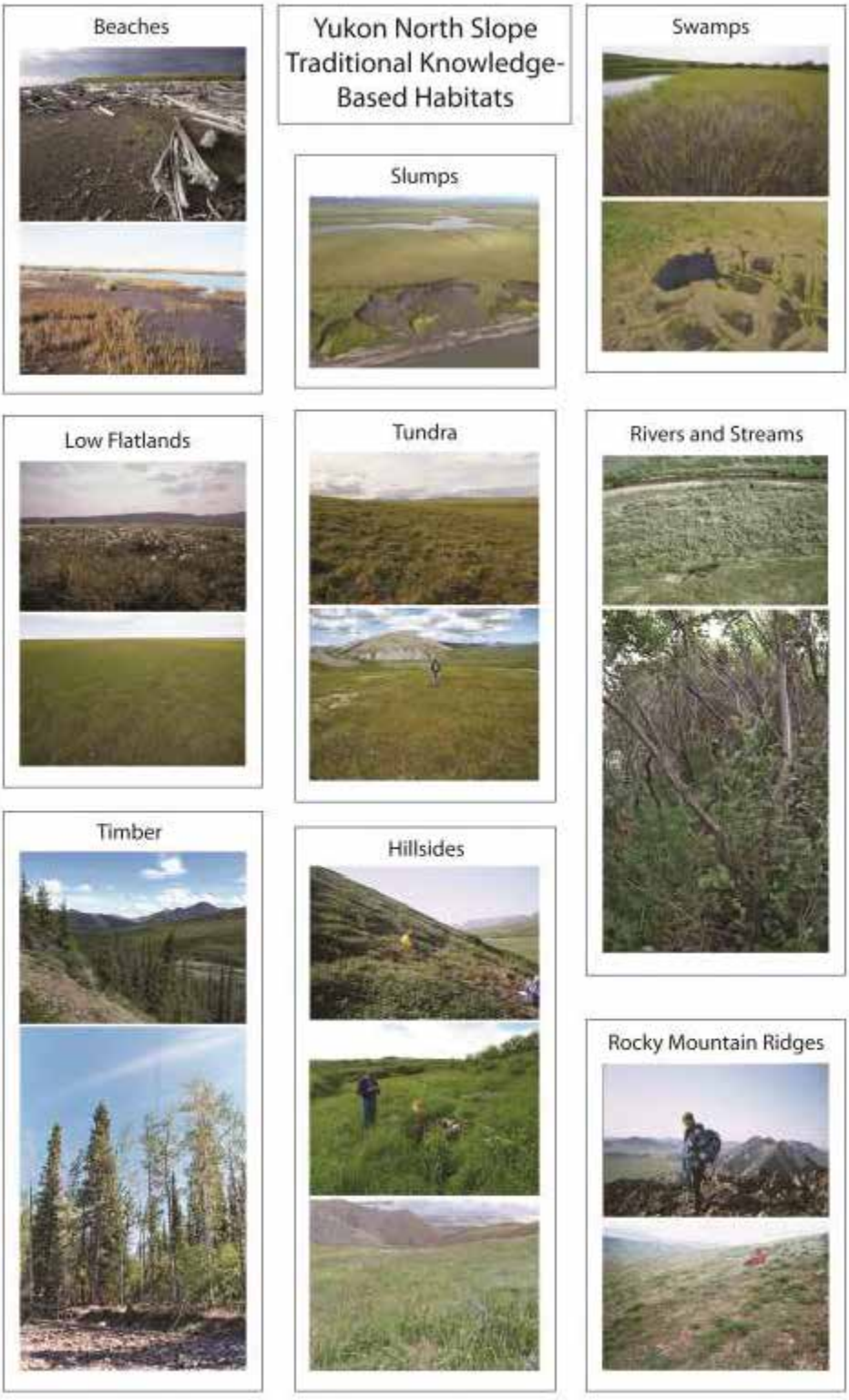
Source for ELC information: Yukon Department of Environment

TK habitat class	TK habitat subclass	ELC class	ELC unit name
Beaches	Coastal beaches	Beachland	6I - Dune-Arctic dunegrass (Dn)
	River beaches	Beachland	6H - Sandbeach sandwort (BchSw)
	Coastal beaches	Estuarine - saltwater marsh	6K - Em-Saline-Beach Sedg (EmSg)
Slumps	Active slumps	Thaw slump	7A - Coastal slump-recent (SIR)
	Inactive slumps	Thaw slump	7B - Coastal slump-stable (SIS)
Swamps	Lower swamps	Marsh	6G - Wm-Graminoid (WmGr)
	Upland ponds and swamps	Fen	6E - Wf-Water sedge (WfS)
Tundra	—	Arctic tundra	3C - Mountain-avens - Alluvial Terrace (MAT)
	—	Arctic tundra	3F - Sedge tussock (ST)
	—	Shrub tundra	5C - Birch-Sedge tussock toeslope (BS)
Hillside	High steep slopes	Arctic meadow	2A - Coltsfoot mountain sorrel drainage area (CMS)
	High steep slopes	Arctic late snowbeds	3B - Late snowbeds (SBL)
	Mid-slopes	Arctic tundra	3D - Mountain-avens – Horsetail-wet (toe slope) (MHV)
	Mid-slopes	Shrub tundra	5B - Birch-crowberry mesic slope (BCr)
	Mid-slopes	Bog	6C - Willow/Birch-moist(cool) slope (WBC)
	Mid-slopes	Fen	6D - Cottongrass tussock - fen (CTf)
	Low slopes	Bog	6B - Alder-cottongrass tussock (ACt)
	Low slopes	Arctic meadow	2B - Graminoid wet slope (GrW)
	Low slopes	Arctic meadow	2C - Chamisso's willow alpine snowbed (SBC)

Timber	—	Woodland	8B - Spruce-birch mesic slope (SBM)
	—	Woodland	8C - Spruce-birch mesic slope tussocked (SBMT)
	—	Woodland	8D - Spruce/Poplar-birch mesic slope (SPM)
	—	Woodland	8E - Spruce-rhododendron inactive alluvial terrace (SR)
	—	Woodland	8F - Spruce-horsetail wet slope (SH)
	—	Woodland	8G - Spruce-kinnikinnick dry slope (SK)
Rivers and creeks	—	Floodplain	4A - Alder-grass drainage channel (AGrD)
	—	Floodplain	4B - Willow-coltsfoot drainage channel (WC)
	—	Floodplain	4C - Willow floodplain (WFl)
	—	Floodplain	4D - Willow Floodplain - Inactive (Wfli)
Rocky Mountain ridges	—	Arctic fellfield	1A - Rock Liohen (RM)
	—	Arctic heather snowbeds	3A - Heather-bearflower nivation slope (HB)
	—	Arctic tundra	3E - Mountain avens tundra herb (MT)
	—	Shrub tundra	5D - Birch-crowberry submesic slope (WBA)
Foothills	—	Shrub tundra	5A - Alder-grass cool slope (AGrC)
Low flatland	—	Fen	6F - Wf-Willow-sedge pediment drainage channel (WfW)
	—	Bog	6A - Cottongrass tussock - bog (CTb)
	—	Estuarine – saltwater marsh	6J - Em-Saline-Graminoid (EmGr)

Appendix 2: Poster of TK-based habitat class photos

This poster shows the ten habitat classes identified in the TK-ELC workshop and used in the TK interviews.



Appendix 3: Interviewee biographical data

PIN	Year of birth	Approximate no. of years using YNS	Primary uses
1	1944	Entire life	Year-round hunting, fishing, and whaling growing up on the land
2	1936	70	Year-round hunting of caribou, geese, furbearers, moose and rabbits; whaling and fishing
3	1948	Entire life	Born at Shingle Point, harvested across all seasons and species over the years
5	1978	Entire life	Year-round hunting of grizzly bears, geese, and caribou
7	1962	Entire life	Childhood fur trapping, currently just summers at Shingle Point
8	1937	Entire life	Spring and summer muskrat and beaver hunting, fishing, polar bear hunting
9	1964	Entire life	Summer hunting and fishing growing up, has also worked with researchers as an adult
101	1956	Entire life	Spring furbearers and caribou hunting, summer fishing and hunting at Shingle Point
103	1989	20	Spring grizzly hunting, winter caribou and furbearers hunting
104	1942	Entire life	Whaling in the summer, hunting caribou, sheep and moose in the fall
106	1954	Entire life	Year-round hunting and trapping
107	1949	Entire life	Grew up hunting, fishing, and whaling at Shingle Point, worked as a researcher on Herschel Island
109	1955	50	Fishing and whaling in the summer at Shingle Point
110	1942	Entire life	Grew up on the North slope, hunting and fishing with grandparents year-round
111	1971	25	Caribou hunting in the spring and summer, Dolly Varden char fishing in the summer
112	1951	56	Whaling and fishing in the summer
114	1981	30	Caribou hunting
115	1965	Entire life	Year-round game and furbearer hunting, berry picking; mainly caribou now
117	1989	Entire life	Spring and summer fishing and hunting of game animals and furbearers, also works at Herschel Island as a ranger
118	1982	25	Summers as a kid, now travels out in the spring and fall
119	1976	Entire life	Year-round harvesting, but mostly spring caribou
120	1988	Entire life	Year-round hunting of furbearers and game animals, also works as a ranger at Herschel Island

PIN	Year of birth	Approximate no. of years using YNS	Primary uses
121	1968	Entire life	Whaling and fishing along coast in the summer
131	1993	Entire life	Caribou and goose hunting
301	1985	Entire life	Hunting furbearers in the spring, fishing in the summer
302	1989	Entire life	Year-round hunting and fishing
303	1975	35	Whaling in the summer and caribou hunting

Appendix 4: Species-specific interview questionnaires

The species-specific questionnaires were used to guide semi-directed interviews of YNS traditional land users in Aklavik, NWT in November 2016.

Part 1: Describing interviewee use of the YNS

These questions are asked at the initiation of each interview.

1) What year were you born in?
2) How long have you been traveling to the Yukon North Slope?
3) In what seasons do you go to the Yukon North Slope? What are the primary reasons you go to the North Slope during each season? How often through the years do you go to the Yukon North Slope during each season?

Clarify species and seasons to be covered in first series of questions by filling in the species name here and indicating which season(s). "First, we are talking about the habitats of (species) during the spring, summer, fall, winter season(s)."

Porcupine Caribou Habitat Interview Questionnaire

Part 2: Describing habitats used by the species in each season

1) What seasons have you seen caribou on the Yukon North Slope? Are these bulls, cows, or both?
2) Do caribou stay in certain places when you see them on the Yukon North Slope or are they moving through the area when you see them in X season?
    a. If they stay: Can you show me where they like to be during the X season? Are these bulls, cows, or both? *Map this*
    b. If they are migrating: Can you show me where they move through the area during the X season? *Map this*
3) Can you describe the habitat where you see caribou in the X season?
    a. What does the vegetation look like?
    b. Can you pick out the photos(s) of habitats that best represents the most important habitat for caribou?
    c. What is the terrain like in these areas? (Flat, sloping, steep?)
    d. Are they often found on certain aspects?
    e. Are they often found down low or up the hillsides or someplace different?
    f. Are caribou often near some kinds of habitats? Describe sheep example, if needed.
        i. How close are they to these nearby places?
        ii. Why do they do this?
4) What are the caribou doing when you see them in this habitat?
    a. If feeding, do you know what are they eating?
    b. Do you know why they like this habitat for doing X activity?

5) Are there other habitats that you also believe are also important for caribou in the X season?
    a. Can you describe these habitats?

6) Are there any other places on the Yukon North Slope that are important for caribou in the X season? For bulls, cows, or both? Why? *Mapped and verbal response*

7) Can you point to areas where you have seen caribou calving? *Mapped response*
    a. Do you know if these areas used every year?
        i. If not used every year, Do you know why the caribou choose these areas in the years they do calve here?
    b. Do caribou choose kinds of lands or habitats to have their calves in?
        i. Can you describe what it looks like where caribou calve?
    c. Are caribou calving in the same kinds of habitats that you have always seen them calve in?
        i. Can you describe how these habitats have changed?
    d. Have you noticed changes to the timing of caribou calving?

The Part 2 question set for wildlife is repeated for each season (spring, summer, fall, winter) the interviewee has experience with the species. Question 7 asked only once

Part 3: Documenting changes in distribution, numbers and habitats

1) Are car ibou more or less common than they used to be, or about the same?
    a Is this change (if there is one) occurring everywhere caribou live in the YNS?
    b. When did you first notice this change? *Ask time frame — try to get as specific as possible*
    c. Do you think that these are natural changes?

2) Are you seeing caribou in new places that you did not used to see them? Are these bulls, cows, or both?
    a. Do you still see caribou in all the places that you used to see it?
    b. Which seasons have you noticed these changes?
    Map, clearly indicating loss or addition of species

3) Do you know of any important movement routes that caribou use; such as between seasonal habitats or for annual migrations? *Skip if this has been covered in the seasonal questions*

4) Are you noticing changes in caribou migration patterns?
    a. Are caribou traveling through different areas or at different times?

5) Do you have ideas about why these changes (in abundance, distribution, movements) are happening?

6) Have you noticed changes to the habitat in places where caribou are no longer found or changes in the habitat in areas where caribou have recently started using?
    a. Do you have any ideas as to why the habitats are changing?

7) Has climate change caused changes in caribou habitat?
    a. Are these changes affecting caribou?
        i. How have these changes affected caribou?

Part 4: Additional Information

1) Is there anything else you would like to share about the important habitats that caribou require on the Yukon North Slope that will help us better identify and conserve these habitats?

Dolly Varden char (Arctic char) and broad whitefish habitat questionnaire

Part 2: Describing distribution and key habitats of Dolly Varden char (Arctic char) and/or broad whitefish in each season

1) Can you show me the rivers, streams or lakes, or areas along the coast have you found Dolly Varden char or broad whitefish in on the Yukon North Slope? *Map these*
    a. Do you know what months they are in this area, or if they are there year-round?

2) Do you know how far upstream each species is found?

3) Do you know some places where Dolly Varden char or broad whitefish spawn in this waterway? *Mapped response*
    a. Can you describe what the waterways look like where they spawn?
    b. When does spawning occur?

4) Do you know some places where Dolly Varden char or broad whitefish overwinter? *Mapped response*
    a. Can you describe what the waterway looks like where they overwinter?

5) Are there other critical areas for either of these species along this waterway? *Mapped and verbal response*

Repeat the above questions 2–4 for each waterway indicated, including any coastal areas as appropriate

After completing the waterway specific questions, confirm the overall seasonal patterns that may have emerged about when each species is found along the coastline, in rivers and/or in lakes:

6) Can you confirm what seasons or months do you see Dolly Varden char or broad whitefish in:
    a. Rivers?
    b. Lakes?
    c. Along the coast?
    d. And, when they spawn?

Part 3: Documenting changes in distribution, numbers and habitats

1) Are either species more or less common than they used to be or about the same?
    a. Is this change (if there is one) occurring everywhere it lives in the YNS?
    b. When did you first notice this change?
    c. Do you think it is a natural cycle?
    d. Are you concerned about it?

2) Are you seeing Dolly Varden char or broad whitefish in new places that you did not used to see them?
    a. Do you still see both species in all the places that you used to see them?
    b. Which seasons have you noticed these changes?

Map, clearly indicating loss or addition of species

3) Are you noticing changes in Dolly Varden char or broad whitefish migration patterns?
    a. Are they traveling through different areas or at different times?
    b. When did you first start seeing these changes?

4) Have you noticed changes to the timing or location of spawning for either species?
    a. When did you first start seeing these changes?

5) Do you have ideas about why these changes (in abundance or distribution) are happening?
    a. Have you noticed changes in the habitats where Dolly Varden char or broad whitefish are no longer found or changes in the habitat where they have recently started occurring?

6) Is climate change affecting Dolly Varden char or broad whitefish habitat?
    a. Are these changes impacting these species?
    b. How are these changes affecting each species?

Part 4: Additional Information

1) Is there anything else you would like to share about the important habitats this species requires on the Yukon North Slope that will help us better identify and conserve these habitats?

Geese habitats questionnaire

Part 2: Describing nesting, foraging and stopover habitats used by geese

This interview is focused on snow geese and white fronted geese (yellowlegs).

1) Do you see both snow geese and yellowlegs commonly on the North Slope?

Based on this answer, decide to focus on just one species, to cover each species separately or to ask questions clarifying between the species.

2) When do you first see geese on the North Slope each year?
    a. Is this the same for both species?
    b. How long do they stay for? Is this the same for both species?

3) Have you seen geese that are nesting on the North Slope?
    a. Which species have you seen nesting on the North Slope?
    b. Can you show me on the map where you have seen geese nesting? *Map for each species*
    c. Can you describe what the habitat looks like where they are nesting? Is this the same for each species?
    d. Can you identify any photos that best describe nesting habitat?
    e. How much time do geese spend in this habitat each year?
    f. Do geese return to the same nesting spots each year? Is this the same for each species?

4) Are there other habitats that are also important to the geese during the nesting season, such as feeding areas? Is this the same for each species?
    a. Can you describe what these habitats look like? Do both species use similar habitat for foraging?
    b. Can you identify the photos that best describe these areas?
    c. How far from the nest will geese go to get to these other habitats? Is this the same for both species?
    d. Can you show me some feeding areas on the map? *Map these for each species*
    e. Do you see them feeding in new places or new habitats as the season passes or do they always stay in the same areas through the season?
    f. Do they return to the same spots each year? Is this the same for each species?

5) We know that some geese nest outside the YNS but may stop to rest and feed on the YNS during their migration. Have you seen geese that you think are just stopping over?
    a. Which species does this stopping over?
    b. What were they doing when you saw them?
    c. What time of year did you see them? Is this the same for both species?
    d. Can you describe what the habitat looks like where you see them? Is this the same for both species?
    e. Can you identify the photos that best describe this habitat?
    f. Can you identify some of these areas on the map for each species? *Map these*
    g. Are they often near other habitat like open water? If so, about how far away would you say they will go from open water? Is this the same for each species?
    h. How much time do geese spend stopping over each year? Is this the same for each species?
    i. Do they return to the same spots each year? Is this the same for each species?

6) Are there any other areas that are important for geese? What do these areas look like? Can you identify any on the map? *Verbal description, photo selection, and/or mapped responses*

Part 3: Documenting changes in distribution, numbers and habitats

1) Are geese more or less common than they used to be, or about the same? Is this change (if there is one) occurring everywhere that geese live in the YNS? Do you think this change a natural cycle? Are you concerned about this change? Is this the same for each species?

Verbal and potentially mapped response

2) Are you seeing geese in new places that you did not used to see them?
    a. Do you still see geese in all the places that you used to see them?
    b. Which seasons have you noticed these changes? Which species?

Map, clearly indicating loss or addition of species

3) Are geese migrating through different areas or at different times? Is this the same for each species?

4) Do you have ideas about why these changes (in abundance, distribution, timing) are happening?

5) Have you noticed changes to the habitat in places where geese are no longer found or changes to the habitat in areas where geese have recently started using?

6) Has climate change resulted in changes in geese habitat?
    a. Have these habitat changes affect geese?
        i. Has this affected geese? Same for each species?

Part 4: Additional Information

1) Is there anything else you would like to share about the important habitats that geese require on the Yukon North Slope that will help us better identify and conserve these habitats?

Grizzly bear habitat questionnaire

Part 2: Describing habitats used by the species in each season

1) What seasons have you seen grizzly bear on the Yukon North Slope?
    a. Can you identify a few spots on the map where you have seen this species in the X season?

2) Can you describe the habitat where you see grizzly bear in the X season?
    a. What does the vegetation look like?
    b. Can you pick out the photos(s) of habitats that best represents the most important habitat for grizzly bear?
    c. What is the terrain like in these areas (flat, sloping, steep, etc.)?
    d. Are they often found on certain aspects?
    e. Are they often found down low or up the hillsides or someplace different?
    f. Are grizzly bear often near some kinds of habitats, animals or other features?

Describe sheep example, if needed. The animal piece is to see if they follow caribou like wolves do

i. How close are they to these nearby places?
ii. Why do they do this?

3) What are the grizzly bears doing when you see them in this habitat?
    a. If feeding, do you know what are they eating?

4) Are there other habitats that you also believe are also important for grizzly bear in the X season?
    a. Can you describe these habitats? *Repeat the questions 2a–2f above, as appropriate*

5) Are there any other places on the Yukon North Slope that are important for grizzly bears in the X season? Why? *Mapped and verbal response*

At least once during the interview, be sure to ask:

6) Can you point to some of the places where you have seen denning areas for grizzly bears? *Mapped response*
    a. Are these sites returned to over multiple years?
    b. Do bears like to den in certain kinds of lands or habitats?
        i. Can you describe what it looks like where grizzly bears den?
    c. Are grizzly bears denning in the same kinds of habitats that you have always seen them den in?
        i. Can you describe how these habitats have changed?

Part 3: Documenting changes in distribution, numbers and habitats

1) Are grizzly bears more or less common than they used to be, or about the same?
    a. Is this change (if there is one) occurring everywhere that grizzly bears live in the YNS?
    b. When did you first notice this change?
    c. Do you think it is a natural cycle? If so, what do you think causes it?
    d. Are you concerned about it?

2) Are you seeing grizzly bears in new places that you did not used to see them? *Map these*
    a. Do you still see grizzly bears in all the places that you used to see them?
    b. Which seasons have you noticed these changes?
    Map any changes in distribution, clearly indicating loss or addition of species
    c. Have you noticed changes to the habitat in places where grizzly bear are no longer found or changes to the habitat in areas where grizzly bear have recently started using?

3) Are grizzly bears eating the same things that they have always eaten?
    a. Are they eating new things or eating more of some foods that didn't used to be very important?

   b. Are they no longer eating things that they used to eat or eating less of some things than they used to?
   c. When did you first notice this change?

4) Are grizzly bears traveling through different areas or at different times?

5) Do you have ideas about why these changes (in abundance or distribution) are happening?

6) Is climate change causing changes in grizzly bear habitat?
   a. Do these changes affect grizzly bears?
      i. How do these habitat changes affect grizzly bears?

Part 4: Additional information

1) Is there anything else you would like to share about the important habitats that grizzly bears require on the Yukon North Slope that will help us better identify and conserve these habitats?

Moose habitat questionnaire

Part 2: Describing habitats used in each season

1) Which seasons have you seen moose on the Yukon North Slope? Based on the answer, decide which seasons to discuss habitat for moose in
2) Can you describe the habitat where you see moose in the X season?
   a. What does the vegetation look like?
   b. Can you pick out the photos(s) of habitats that best represent the most important habitat for moose?
   c. What does the terrain look like in these areas (flat, sloping, steep, etc.)?
   d. Are they often found on certain aspects?
   e. Are they often found down low or up the hillsides or someplace different?
   f. Are moose often near some kinds of habitats?
      i. How close are they to these nearby places?
      ii. Why do they do this?

3) What are the moose doing when you see them in this habitat?
   a. If feeding, do you know what are they eating?

4) Are there other habitats that you also believe are also important for moose in the X season?
   a. Can you describe these habitats? *Repeat the questions 2a–2f above, as appropriate*

5) Are there certain habitats that are used for calving?
   a. Can you describe this habitat?

6) Are there any other places in the Yukon North Slope that are important for moose? Why?
Mapped and verbal response

The Part 2 question set for wildlife is repeated for each season (spring, summer, fall, winter) the interviewee has experience with the species.

Part 3: Documenting changes in distribution, numbers and habitats

1) Are moose more or less common than they used to be, or about the same?
    a. Is this change (if there is one) occurring everywhere that moose live in the YNS?
    b. Do you think that this is a natural cycle?
    c. Are you concerned about this change?
    d. When did you first notice this change? *Verbal and potentially mapped response*

2) Are you seeing moose in new places that you did not used to see them?
    a. Do you still see moose in all the places that you used to see them?
    b. Which seasons have you noticed these changes?
    c. When did you first notice this change? *Map, clearly indicating loss or addition of species*

3) Have you noticed changes to the timing or location of moose calving?
    a. When did you first notice this change?

4) Do you have ideas about why these changes (in abundance or distribution) are happening?

5) Have you noticed changes to the habitat in places where moose are no longer found or changes to the habitat in areas where moose have recently started using? Be clear about which is declining or increasing when describing.

6) Is climate change causing changes in moose habitat?
    a. Is this habitat change affecting moose?
        i. How is this affecting moose?

Part 4: Additional information

1) Is there anything else you would like to share about the important habitats that moose require on the Yukon North Slope that will help us better identify and conserve these habitats?

Polar Bear Habitat Questionnaire

Part 2: Describing and Mapping Denning

Before beginning, acknowledge that a major polar bear TK study has been recently completed. The following questions are following up on this work focused on polar bears use of land.

Denning:

1) We understand that polar bears largely use offshore ice, but for this habitat research, we are focusing on land and near-shore habitat. For example, we know that polar bears den on land.
   Have you seen any polar bear dens on the Yukon North Slope?
    a. Can you show me where you have seen polar bear dens?
    b. Do you know if the bears come back to these dens over multiple years?

c. What does the land look like in places where polar bears den?
d. Has polar bear denning changed (either timing or location)? When did you first notice this change?

Part 3: Describing land movements and other activities

2) Have you seen polar bears on land or the near shore? If yes:
   a. What season or month did you see polar bears on the land or near the shore?
   b. If near-shore, approximately how far from land?
      Can use kilometres, snowmobile ride time, etc.
   c. Would you identify a where you have seen this species in the X season?

3) When you saw polar bears at these sites in X season, what were they doing?
   a. If feeding: Do you know what they were eating?
   b. If traveling: Do you know if bears move through this area a lot?
      i. Where are they coming from and going to?
      ii. Do you know why they go this way?
         Map movement routes that interviewee believes are regularly used
      iii. Do you know if there certain types of land that they like to travel through?
      iv. Are overland movement routes changing? When did you first notice this change?

4) Have you seen polar bear on the land or near the shore in other seasons?
   If yes, then repeat Questions 2–3 for each season

5) Are there any other land features or places that are important for polar bears?

6) Are there any other specific places — on land or near shore — in the Yukon North Slope that are important for polar bears? In what season? Why? If these places are near shore, approximately how far away are they? *Mapped and verbal response*

Part 4: Additional information

1) Is there anything else you would like to share about the important habitats that polar bear require on the Yukon North Slope that will help us better identify and conserve these habitats?

Species of Special Interest Questionnaire

If there is spare time during the 3-hour interview session and the interviewee agrees to do so, explain that we are looking for information on some additional species that the Inuvialuit have identified as important. These are a couple of focused questions to help us understand critical habitats for these species. The questions below are listed in order of priority, so start at the top. Once we have at least 5 responses to a question, consider not asking that question any further in order to be able to get information on species of lower priority.

1) Have you seen polar bear den sites (only asked if the interviewee hasn't been interviewed on polar bear as a focal species)?

   a. What does the land look like in places where polar bears den?
   b. Can you identify any polar bear den sites on the map? *Map these*
   c. Are these sites returned to over multiple years?

2) Can you show me the rivers, streams or lakes, or areas along the coast have you found Dolly Varden char or broad whitefish in on the Yukon North Slope (only asked of those interviewees that were not interviewed about these fish as a focal species)? *Map these*
   a. Do you know of any spawning area along these waterways?
   b. Do you know of any place they spend the winter along these waterways?

3) Have you seen sheep on the Yukon North Slope?
   a. Can you show me where? *Map these*
   b. Can you describe what their habitat looks like? Does this change in different seasons such as in winter or during lambing?
   c. Have you seen where there are mineral licks that they use? *Map these*

4) Have you seen where shorebirds nest on the Yukon North Slope?
   a. Can you describe what the habitat looks like?

5) Have you seen muskox on the Yukon North Slope
   a. Can you describe what their habitat looks like? Diet?
   b. Are their general areas where you see muskox? (what are their typical areas?)
   c. Has this changed over time? (distribution, habitat)

6) Have you seen places where shorebirds gather on their migration in the spring, in the fall?
   a. What does this habitat look like? *Map these if site specific/limited*

7) Have you seen any places where wolves dens? *Map these*
   a. Are there certain kinds of habitats that good for denning for wolves?
   b. Do they use these year after year?

8) Can you describe what good berry habitats look like? Focus on verbal description, can also show photos and identify.
   a. What kinds of berries are found here?
   b. Are there other kinds of berries found in different places? Can you describe what these places look like?

9) Have you seen where seals haul themselves out of the water? *Map a few of these*
   a. Are these used year after year?

10) Have you seen any places where arctic foxes den? Are there other places important for arctic fox (use areas)? *Map these*

11) Are there places where beavers used to not be but they are there now?
Map if specific re: new sites with beaver or sites that no longer have beaver

12) Have you seen places where wolverines den?
    a. Can you describe the habitat where you most often find wolverine denning?
    b. Can you show me some sites on the map? *Map these*

13) Have you seen places where raptors nest?
    a. Do you know which species?
    b. Can you describe the habitat where this species nests?
    c. Can you show some of these places? *Map*
    d. Are these used year after year?

14) Can you describe the types of habitats where you see a lot of ptarmigan?
    a. Do you see ptarmigan in different habitats in different seasons? Can you describe these?

The Wildlife Conservation and Management Plan for the Yukon North Slope is an important instrument for protecting the unique and spectacular landscape that lies at the northern edge of the Yukon and for conserving Inuvialuit traditional use. WMAC(NS) continues to explore new and innovative ways to ensure that the plan reflects the dynamic environment it was created to protect.

This report, along with others, informs the plan. So, although this report stands on its own as the story of Inuvialuit traditional knowledge of wildlife habitat on the Yukon North Slope, it also contributes to the conservation of Inuvialuit traditional use, along with the protection of wildlife and habitat, as central pillars of the conservation regime established for the Yukon North Slope in the 1984 Inuvialuit Final Agreement.

Wildlife Management Advisory Council
North Slope