

Alpine Ice Patches and Shúhtagot'ine Land Use in the Mackenzie and Selwyn Mountains, Northwest Territories, Canada

THOMAS D. ANDREWS,^{1,2} GLEN MacKAY,¹ LEON ANDREW,³ WENDY STEPHENSON,⁴ AMY BARKER,¹ CLAIRE ALIX⁵ and the SHÚHTAGOT'INE ELDERS of TULITA⁶

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ABSTRACT. The NWT Ice Patch Study was developed in partnership with the Shúhtagot'ine residents of Tulita, Northwest Territories, Canada. This paper explores how Shúhtagot'ine traditional knowledge, collected through the direct participation of Elders in our archaeological fieldwork, science camps with Elders and youth, Elder interviews, and traditional land-use mapping, is informing our interpretation of archaeological data collected at alpine ice patches in the Selwyn Mountains. While knowledge of bow-and-arrow and snare technologies persists in Shúhtagot'ine culture, Shúhtagot'ine oral history does not contain detailed knowledge of throwing dart technology. Using data collected in our traditional land-use mapping project, we consider the role of ice patches in the broader context of Shúhtagot'ine land use. We propose that resource harvesting on high alpine plateaus and adjacent ice patches in the summer was more important in late precontact times than it was after contact. Shúhtagot'ine land-use practices involve long-distance travel in all seasons. Safe travel in the alpine landscape requires detailed knowledge of environmental conditions, such as snow and ice conditions, and respectful engagement with the spiritual entities inhabiting the landscape.

Key words: Shúhtagot'ine, Mountain Dene, traditional knowledge, ice patch, interdisciplinarity, collaboration, traditional land use, archaeological ethnography, science camps, Northwest Territories

RÉSUMÉ. L'étude des névés des Territoires du Nord-Ouest a été réalisée en collaboration avec les Shúhtagot'ine de Tulita, dans les Territoires du Nord-Ouest, au Canada. Le présent article explore comment le savoir traditionnel des Shúhtagot'ine, recueilli lors de la participation directe des aînés à nos fouilles archéologiques, à des camps de sciences où aînés et plus jeunes participaient, à des entrevues avec les aînés et au relevé cartographique de l'utilisation traditionnelle des terres influence et éclaire notre interprétation des données archéologiques recueillies dans les névés alpins de la chaîne de Selwyn. Bien que le savoir relatif aux techniques de l'arc et de la flèche et de la chasse au collet est encore bien présent dans la culture des Shúhtagot'ine, leur histoire orale ne fait aucune allusion à la technique du tir au propulseur. En nous appuyant sur les données recueillies dans le cadre de notre projet de cartographie de l'utilisation traditionnelle des terres, nous considérons le rôle des névés dans le plus contexte plus large de l'utilisation du territoire par les Shúhtagot'ine. Nous proposons que la récolte estivale des ressources sur les hauts plateaux alpins et les névés adjacents était plus importante à la période juste avant le contact qu'à celle qui a suivi. Les pratiques d'utilisation des terres par les Shúhtagot'ine impliquent des déplacements sur de longues distances à toutes saisons. La sûreté des déplacements en milieu alpin nécessite une connaissance détaillée des conditions environnementales, telles que l'état de la neige et de la glace, de même qu'une interaction respectueuse avec les entités spirituelles qui habitent le milieu.

Mots clés : Shúhtagot'ine, Déné des montagnes, savoir traditionnel, névés, interdisciplinarité, collaboration, utilisation traditionnelle des terres, ethnographie archéologique, camps de sciences, Territoires du Nord-Ouest

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¹ Prince of Wales Northern Heritage Centre, PO Box 1320, Yellowknife, Northwest Territories X1A 2L9, Canada

² Corresponding author: tom_andrews@gov.nt.ca

³ PO Box 475, Norman Wells, Northwest Territories X0E 0G0, Canada

⁴ Greyrock Consulting Services, Box 1596, Yellowknife, Northwest Territories X1A 2P2, Canada

⁵ UMR 8096 Université de Paris 1 - Panthéon Sorbonne / CNRS, Maison R. Ginouvès – Archéologie, Ethnologie, 21 allée de l'Université, 92023 Nanterre Cedex, France

⁶ Tulita Dene Band, Tulita, Northwest Territories X0E 0K0, Canada

INTRODUCTION

Over the past several decades, archaeologists working in the Canadian North have increasingly engaged with Aboriginal communities in collaborative projects to document and interpret the archaeological record (e.g., Hanks and Winter, 1986; Janes, 1991; Andrews and Zoe, 1997; Kritsch and Andre, 1997; Stewart et al., 2004; Lyons et al., 2010). These efforts, which pay particular attention to the cultural geographies and oral histories of Aboriginal cultural landscapes, have resulted in a productive dialogue that has enriched our interpretations of the archaeological past, while providing a new lens through which our Aboriginal partners can explore their histories. Drawing on this tradition of collaborative archaeological research, and in keeping with the emphasis of Canada's International Polar Year (IPY) program on the involvement of northern communities, the NWT Ice Patch Study, an IPY project sponsored by the federal government, was designed and implemented in partnership with the community of Tulita. Located in the Mackenzie Valley, Tulita (formerly known as Fort Norman) is home to the Shúhtagot'ine, or Mountain Dene, the traditional inhabitants of the study area for our project (Fig. 1).

Through the multidisciplinary research design advanced by the IPY Program, our research team has engaged in archaeological, biological, geophysical, and traditional knowledge studies of ice patches in the Selwyn Mountains over the past several years (see papers in this volume).

Shúhtagot'ine traditional knowledge of the Selwyn and Mackenzie Mountains, held by Elders who until quite recently lived as mobile hunter-gatherers in the alpine environment, has informed many research objectives of the NWT Ice Patch Study. Traditional knowledge was gathered in three different forums within the broader context of the project. First, the direct participation of Shúhtagot'ine Elder Leon Andrew in our archaeological survey efforts gave us access to traditional knowledge of hunting areas, hunting methods, travel routes, and the ecology of mountain woodland caribou (*Rangifer tarandus caribou*), which played an important role in the process of finding ice patch archaeological sites. Second, in the main IPY years of 2007 and 2008, we investigated these themes further by conducting a traditional knowledge study with Shúhtagot'ine Elders in Tulita. Using semi-structured interviews and traditional land-use mapping, we investigated oral traditions about hunting caribou in the mountains, especially on ice patches. The goal was to place caribou hunting into a wider context of traditional land use by mapping place names, trails, hunting areas, resource-gathering areas, spiritual places, and other important locations in the mountains.

The third forum in which we gathered Shúhtagot'ine traditional knowledge was at science camps held in the Selwyn Mountains in 2007 and 2008. These camps were designed to encourage the next generation of northern researchers and resource managers by engaging Aboriginal students from Tulita in both a multidisciplinary and interdisciplinary approach to understanding the alpine environment.

The curriculum was designed to illustrate how traditional knowledge and scientific disciplines complement each other to provide a more complete and culturally sensitive understanding of the environment. To this end, it included instruction in alpine geomorphology and ice formation processes, archaeological methods and regional prehistory, caribou ecology, climate change biology, and traditional knowledge, highlighting the multidisciplinary expertise of the research team. The traditional knowledge instruction, conducted by three Tulita Elders, included traditional place-names and stories, caribou hunting techniques, safe travel in the alpine environment, the manufacture and testing of traditional hunting implements, and other topics (Fig. 2). A visit to an ice patch archaeological site during each science camp provided an opportunity for Shúhtagot'ine Elders and archaeologists to discuss how precontact hunters hunted caribou on ice patches. These visits led to some important insights into the archaeological record of these features, while bringing an interdisciplinary aspect to the project.

Our goal for this paper is to demonstrate the important role that Shúhtagot'ine traditional knowledge is playing in the interpretation of archaeological data collected at alpine ice patches in the Selwyn Mountains. The first section is specific to ice patches, and focuses on traditional knowledge relating to the techniques and technologies used for hunting on these features. We then expand our view to consider ice patch hunting sites in a wider context of Shúhtagot'ine traditional land use, using the land-use data to develop a model of the late-precontact Shúhtagot'ine subsistence-settlement system. Next, recognizing that these land-use practices took place in a sacred landscape, we outline the techniques that the Shúhtagot'ine used to engage with the spiritual beings inhabiting the land and how these techniques may have influenced the practice of hunting on ice patches. Finally, we present Shúhtagot'ine traditional knowledge related to safe travel in the alpine landscape—an important theme for people practicing a settlement pattern that required long-distance travel in all seasons.

ICE PATCH ARCHAEOLOGY

Ice patches are semi-permanent lenses of ice that form on north- and northeast-facing slopes in alpine environments. In the summer, mountain caribou seek relief from insects and warm afternoon temperatures on ice patches (Ion and Kershaw, 1989) and as a result, melting ice patches tend to be ringed by a black band of caribou dung (Fig. 3). Some ice patches in the Selwyn Mountains contain layers of caribou dung dating from the recent past to approximately 5000 years before present, indicating that caribou and ice patches have a long-term relationship. We have found 28 ice patches in the Selwyn Mountains that contain extensive deposits of caribou dung; to date, however, only eight of these sites have archaeological evidence of human hunting. These eight archaeological sites are located adjacent to a high alpine plateau near the continental divide (see Fig. 1). Hunting artifacts found at

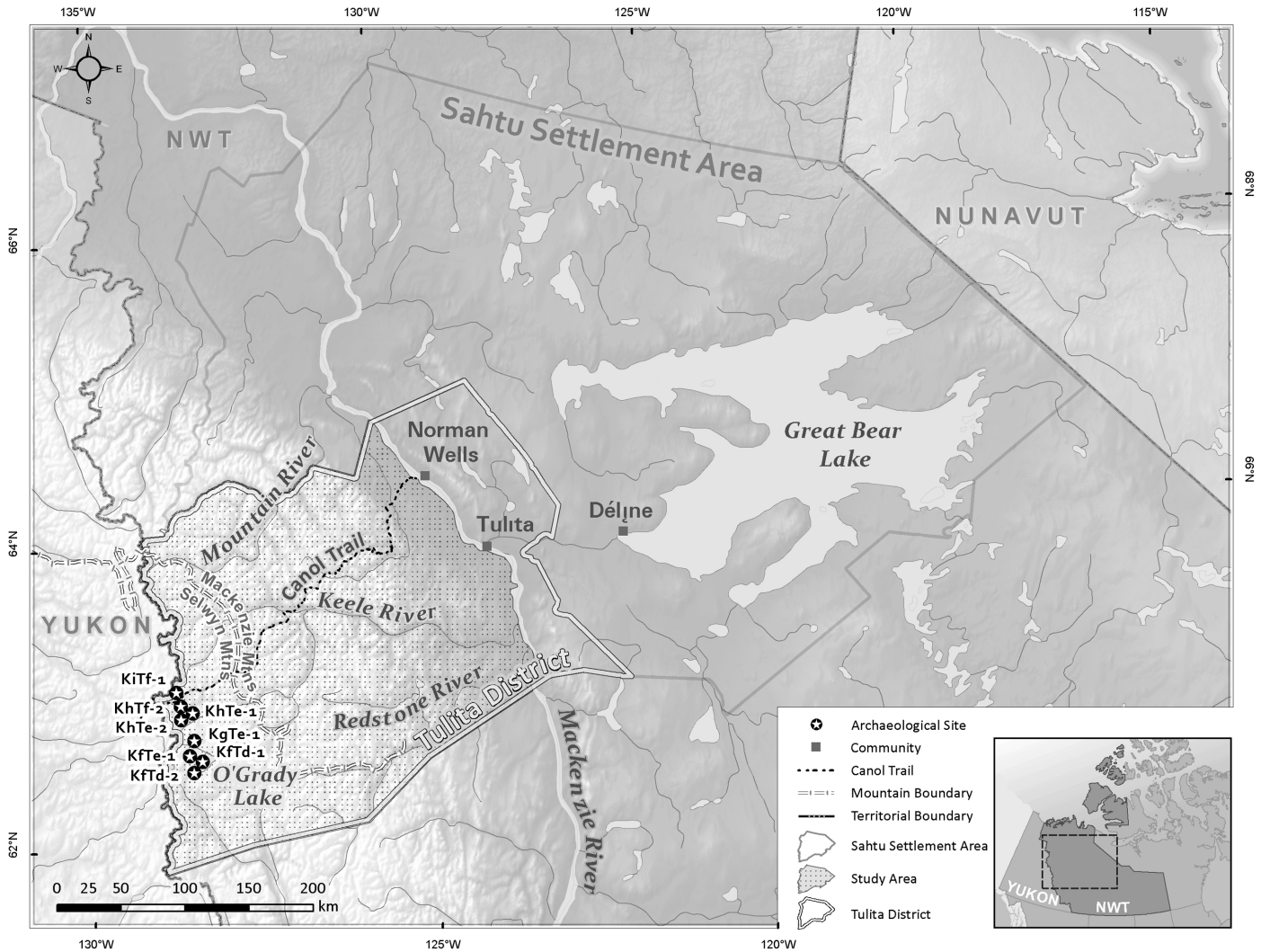


FIG. 1. Study area for the NWT Ice Patch Traditional Knowledge Project.

these sites include well-preserved examples of throwing dart, bow-and-arrow, and small-mammal snaring technologies, and radiocarbon dates on the organic components of these artifacts span a period of approximately 2500 years (see Andrews et al., 2012 for detailed artifact descriptions). While the artifact and faunal assemblages found at ice patches in the Selwyn Mountains indicate that hunting caribou with projectile weapons was the primary activity associated with these features, precontact hunters also harvested small game on or near ice patches (Andrews et al., 2012). Our work has established that ice patches in the Selwyn Mountains are important repositories of cryogenically preserved archaeological artifacts and biological specimens, and that changing climate regimes are rapidly affecting these features.

ETHNOGRAPHIC PERSPECTIVES ON SHÚHTAGOT'INE LAND USE

The study area for the NWT Ice Patch Study falls within the traditional land-use region of the Shúhtagot'ine (“among

the mountains people”), or Mountain Dene. It is part of the broader Sahtu (“bear lake”) region of the Northwest Territories. Associated today primarily with the community of Tulita, historically the Shúhtagot'ine lived, traveled, hunted, and trapped in the Mackenzie, Selwyn, and Ogilvie mountains between 61° and 66° N, and from the Mackenzie River valley in the east to the Stewart, Ross, Pelly, and Hess river valleys in the Yukon Territory to the west.

Elders in Tulita often remark that before the fur trade the Shúhtagot'ine stayed in the mountains almost all of the time (Gillespie, 1981). When the fur trade began in earnest in the Mackenzie Valley in the early- to mid-19th century, the Shúhtagot'ine began to adapt their seasonal movements to visit trading posts in the valley, often spending the summer months fishing and hunting near Tulita. Despite this shift in seasonal land use, up until the 1960s the Shúhtagot'ine spent a large part of the year living as mobile hunter-gatherers in the Mackenzie Mountains, where they hunted mountain caribou, Dall sheep, and moose, and trapped a variety of furbearers. The ethnographer Jean Michea (1963), who lived and traveled with the Shúhtagot'ine in 1957 and 1958,

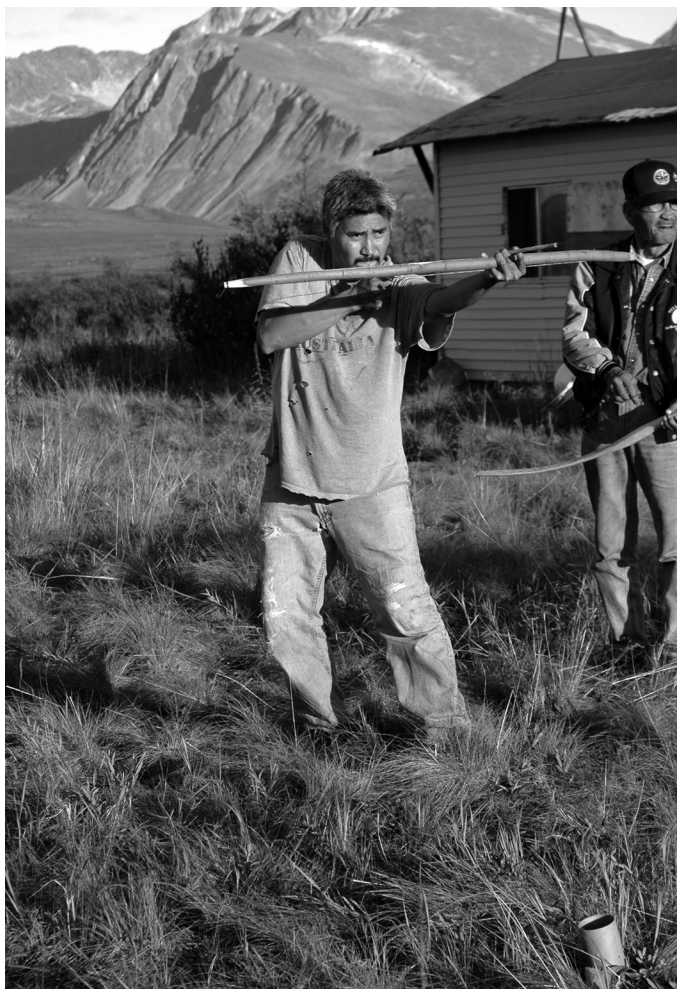


FIG. 2. Shúhtagot'ine Elder Ricky Andrew demonstrating the proper stance for using a bow and arrow at the NWT Ice Patch Science Camp in 2008 (Credit: T. Andrews/GNWT)

noted that this group typically spent seven to eight months of the year in the mountains, and that these visits were marked by periods of high mobility.

Drawing on the ethnographic work of Michea (1963), Beryl Gillespie (1981:332) succinctly summarizes the late contact–traditional (Helm and Damas, 1963) annual cycle of the Shúhtagot'ine:

At that time [late 1950s] those Mountain Indians who still exploited the mountains left the fort in July or August, walking directly westward with their pack dogs into the mountains. By October small groups of families came together at the headwaters of the Keele River where they built large mooseskin boats to descend the river to the Mackenzie River and then downstream to Fort Norman [Tulita] for supplies. After a week or two they moved across the Mackenzie River to several lowland lakes, often accompanied by some Hare Indians, to fish and trap until Christmas, when they returned to the fort. In January they returned to the mountains, making their longest expedition into their heights where they remained until spring. When the

streams were again open for navigation, usually in late May, they returned by mooseskin boats to Fort Norman [Tulita]. There they spent most of the summer, relying on local fish and moose supplies as well as groceries.

Michea hints at an earlier time in the contact-traditional period when the Shúhtagot'ine spent most of the winter in the mountains rather than spending extended periods fishing in the lowland lakes of the Mackenzie Valley.

As noted in Gillespie's summary, a major technological innovation—the moose-skin boat—facilitated Shúhtagot'ine involvement in the fur trade. In the fall and again at break-up in spring, eight to eleven dried moose hides, scraped to remove hair and flesh, would be soaked in water to rehydrate them and then sewn into a covering for a boat frame made from local spruce (Fig. 4). Scaled to the size and shape of a York boat, moose-skin boats permitted transport of tonnes of fine fur and dry meat, brought down from the mountains for trade at Fort Norman. During the late 1800s, the meat trade was particularly important, and Shúhtagot'ine oral tradition records that it was during this time that the moose-skin boat was invented. Stories of travel by moose-skin boat still resonate strongly in Shúhtagot'ine oral tradition.

The era of the moose-skin boat drew to a close as Tulita became more important as a permanent base for the Shúhtagot'ine in the second half of the 20th century. In order to take advantage of Canadian government subsidies—the family allowance (1945), old age pension (1952), and other benefits—the Shúhtagot'ine began to build log homes in Tulita. By the end of the 1960s, with the establishment of a federal program, most children were enrolled in the community's day school (Helm et al., 1981). While today the Shúhtagot'ine are settled in the community of Tulita, most continue to make annual trips into the mountains to harvest bush resources.

RESULTS

Hunting on Ice: Techniques and Technologies

Often during the science camps, especially at times when Elders, students, and scientists were sitting together at one of the ice patches, Elders mentioned that their fathers and grandfathers had told them of the practice of hunting caribou on ice patches. Hunting in the mountains required “climbing high and staying high,” which gave hunters the advantage of being above their prey, where they could not be seen. Though caribou might use a wide variety of ice patches during summer, hunters preferred patches situated on the northerly faces of rounded, mesa-type mountains, which allowed them to approach the patch from the south face. With favourable winds, which typically blow upslope from lower elevations during the height of the day (cf. VanderHoek et al., 2007:79), hunters could watch the caribou and approach closely from above the ice patch, undetected



FIG. 3. Ice patches 7T2 (foreground) and KfTe-1, showing the black dung band and rounded, mesa-type mountains favoured by human hunters, 2007. (Credit: T. Andrews/GNWT)

until they were within bow-and-arrow range (see Andrews et al., 2012 for further discussion). A significant finding of this study is that the practice of hunting from above helps us determine which particular mountain settings are best for locating archaeological sites and may be important in modeling search parameters for other mountainous regions in the circumpolar North where ice patch archaeological sites might exist.

During the science camp and sessions at the ice patches, Elders also related information about other important technologies. For example, snares were a key component of Dene subsistence technology and Elders noted that hunters always carried sinew so that they could make a snare (called *mj*, or “net” in the Shúhtagot’ine dialect of the Slavey language). Snares took many forms and were used for a wide variety of animals, including some as large as caribou or moose. Snares were used extensively in caribou and sheep fences (called *mjk’e*, or “net place”), constructed of wood and rocks and used to capture or drive larger numbers of animals. Commonly, when Shúhtagot’ine families would stop after a day of travel in the mountains, boys and young men would set snares for hare or ground squirrels in the areas near the camp (Ebbutt, 1931). Snares often played a significant role in northern oral tradition as well, and many survival myths recount the actions of individuals left behind with nothing but a strand of sinew. Their central role and importance in Dene subsistence and oral tradition has led some to remark that “the importance of the snare can scarcely be overstressed” (McClellan and Denniston 1981:377).

Arctic ground squirrels (*Spermophilus parryii* Richardson, 1825) were used both as a source of food and for

clothing and were most frequently caught using snares. Snares were used in the mountains during summer months when ground squirrels, sometimes in great numbers, were active. Today, the Shúhtagot’ine use a spring-pole snare (*xoi*), consisting of a willow branch about 50 cm in length, serving as a spring, the base of which is pushed on a steep oblique angle into the ground near the burrow opening. A length of leather or babiche thong, or a stout string made from several strands of sinew twisted together, also about 50 cm long, is tied to the exposed end of the willow spring, and a slip knot forming a noose is tied on the tag end of the string. A small (about 3 cm) trigger stick is tied to the string just above the noose. Two small bi-pointed willow sticks are inserted in the ground just inside the top of the burrow entrance, leaving enough of a space between them to slip the noose and trigger, holding the latter in place with the mechanical force of the willow spring, while allowing the noose to hang unhindered in the burrow opening. A ground squirrel exiting the burrow will be caught by the noose, and its movement will dislodge the trigger, which is then pulled up between the anchor sticks by the willow spring, tightening the noose, causing the squirrel to strangle quickly while being held against the bi-pointed willow sticks (see Fig. 5). Elders expressed no preference for wood for the spring pole, noting only that it had to be green and strong enough to restrain a squirrel, with sufficient spring to dispatch it quickly. Dwarf birch and willow, common shrubs in the vicinity, were used to demonstrate this technology to youth during our science camps in 2007 and 2008. Today, baling wire or commercially manufactured string or cord may be substituted for the string. However, during the course of our science camp in 2008, Elders showed the



FIG. 4. Moose-skin boat tied up on the Mackenzie River below Fort Norman (Tulita), ca. 1920. (Credit: Jackson/NWT Archives, N-1979-004-0022)

students how to use the split quill of an eagle feather for the noose, a traditional practice rarely used today but noted in the ethnographic record for groups in the Yukon (McClellan, 2001:158).

The traditional knowledge gathered during the ice patch science camps strongly suggested that the fragments of two-ply twisted sinew attached to a willow branch collected at KfTe-1 are the remains of a ground squirrel snare. A radiocarbon date of 970 ± 40 ^{14}C yr BP (ca. 870 ± 80 cal. yr BP) indicates that the technology has great antiquity in the Selwyn Mountains. Significantly, the very day that the ancient snare was recovered from the ice patch, Elders were demonstrating the use of ground squirrel snares to students in the nearby science camp, and archaeologists returning from the higher alpine locations were greeted by numerous ground squirrel snares set at the edges of camp. This experience was central to the identification of the artifact, and it demonstrated the continuity of the use of ground squirrel snares in Shúhtagot'ine culture, while underscoring the value of collaborative and community-based archaeological research.

The use of bow and arrow technology in hunting is still strongly remembered in the oral tradition and Elders continue to make bows and arrows for their grandchildren to play with. Evidence from Shúhtagot'ine oral tradition suggests that the use of bows and arrows is very ancient. In one significant narrative, the culture-hero *Yamqzhah* tricks the giant *Bets'erihdele* to chase the last of the giant beavers from the landscape (Andrew, 2003). Though the story is too long to recount in full here, at one point *Bets'erihdele* shoots two arrows at giant beavers swimming at the confluence of the Bear and Mackenzie Rivers (where Tulita is located today), missing his target but leaving the arrows

lodged in the river bottom, the proximal ends still visible above the water. Today, the deadhead ends of large waterlogged logs are sometimes seen at this location, auguring good fortune for those lucky enough to see them. *Yamqzhah* is the most significant culture-hero in Shúhtagot'ine oral tradition. He is known by different names in various Dene cultures, and stories about him are frequently associated with animals reminiscent of those that lived during the late Pleistocene or early Holocene, leading some to suggest that the stories of *Yamqzhah* are examples of Dene oral testimony dating from pre-Holocene times (Hanks, 1997). *Bets'erihdele*'s waterlogged arrows, together with adjacent Bear Rock (*Pietenjza*), where the giant had earlier stretched the hides of three giant beavers, is regarded as one of the most sacred places in Dene culture. The Dene Nation used this place as the graphic basis for their logo, in which the geographic anchoring of a common narrative served as a symbolic representation of their political unity. However, here oral tradition and the ice patch archaeological record diverge, as the latter suggests that archery technology was introduced much later, replacing throwing-dart technology about 1250 years ago (Hare et al., 2004), and not closer to the Pleistocene/Holocene transition as suggested by the story of *Bets'erihdele*. Despite this disagreement in stories, Shúhtagot'ine oral tradition provides information regarding archery technology that is extremely useful for interpreting the remains of bows and arrows recovered from ice patch contexts.

As indicated earlier, men played with bows and arrows as children, though several women indicated that they too used bows and arrows in their youth, and Ebbutt (1931:321) noted that, when walking into the mountains, adult women sometimes carried "long bows and arrows with which they



FIG. 5. Shúhtagot'ine Elder Maurice Mendo demonstrating the success of his ground squirrel snare, 2008. (Credit: W. Stephenson/GNWT)

get occasional spruce grouse or other small game.” Elders recalled that in the old days, hunters would leave their bows, quiver, and snowshoes hanging in a tree just outside the main part of the camp to ensure that these important tools would not be marked with the scent of too many humans.

Bows (*ih̄t̄j̄*) were made by men from a single, straight-grained stave of wood (known as a self bow) and were approximately 160 cm in length. Most Elders noted that “half-dried red willow” was the preferred wood, though a few noted that straight-grained birch was also used, and fewer still indicated that dried spruce was an alternative. All Elders agreed that the wood needed to be “half-dry” as this condition imparted better spring to the bow, though so much that some bows were difficult to draw. Bow strings (*ih̄t̄j̄t̄'ul̄é*) were made from two thin twisted strands of dried raw caribou hide, commonly called “babiche” today. A string spreader attached to the bow prevented the bow strings from slapping the bow and the archer’s wrist when the arrow was released. Constructed from spruce, the

spreader also made the string easy to grasp when nocking an arrow.

Saskatoon berry canes (*k'ij̄j̄ie*, literally “arrow berry”), birch staves (*k'i*), or white spruce staves (*ts'uḡiq̄*) were preferred woods for making arrow shafts. Arrows were fletched with three feather flights (*t'al̄é*), and Elders indicated that eagle primaries were best for fletching, noting that the flights were “waterproof” (see explanation below). However, duck and goose feathers were also used and often gathered during summer moults when the birds were easier to catch. Several areas in the region were known as “moulting areas,” and one of those occurs at *K'atieh*, the expansive, high alpine plateau below the ice patch sites. Owl feathers were also preferred because they made the arrows silent in flight. One Elder reported that grouse feathers were preferred. These identifications compare well with ethnographic data from other Athapaskan contexts (e.g., Honigmann, 1964; Legros, 2007) and from feathers identified from ice patch archaeological contexts in the Yukon (Dove et al., 2005). Sinew (*p'ée*) was used to tie the flights to the shaft, and often arrows were rubbed with red ochre (*tsi*). Interestingly, we have yet to find evidence of the use of red ochre on the arrow fragments recovered from NWT ice patches, while several arrows from the Yukon show extensive use of ochre (Alix et al., 2012).

Elders told us that arrows could be tipped with either barbed bone points made from caribou metapodials or with chipped stone points. Several locations were identified as toolstone sources, including *Begaazhé* (in the Flint Stone Range, located in the front ranges of the Mackenzie Mountains) and the source for Tertiary Hills tuffaceous clinker, a well-documented and widely used material from the Keele River (*Begádeé*) drainage (Cinq-Mars, 1973; Ives and Hardy, 1983; Pokotylo and Hanks, 1989). The material found at these sources does not correspond to the material used to make stone projectiles recovered during the NWT Ice Patch Study, suggesting that more research is required on toolstone quarries.

The archaeological evidence from the NWT Ice Patch Study for throwing-dart technology includes the distal end of a dart made from a birch (*Betula* sp.) stave, dated to 2410 ± 40 ^{14}C yr BP (ca. 2520 ± 180 cal. yr BP). Also found was a complete foreshaft (manufactured from Saskatoon berry, *Amelanchier* sp.), recovered with a broken stone projectile point (with sinew wrapping intact) and a fragment of the main shaft of the dart (made from *Betula* sp.) that fit together to form the distal end of a dart with a detachable foreshaft dating to 2310 ± 40 ^{14}C yr BP (ca. 2300 ± 150 cal. yr BP). (See Andrews et al., 2012: Fig. 5, for a complete description of these objects). Though Shúhtagot'ine Elders could not identify words or narratives related to the use of foreshafts, darts, or dart-throwers (atlatls), words for spear (*fēé*) and spearhead (*tup̄j̄é*) remain.

The use of Saskatoon berry wood for manufacturing projectiles is still remembered, and Shúhtagot'ine Elders were able to identify several locations where Saskatoon berry bushes can be found, including a location on the *Begádeé*

within our study area. The North American ethnographic record shows that the use of *Amelanchier* sp. for manufacturing arrows is widespread; this wood was used by Northern Athapaskans (Williamson, 1955), as well as by groups on the Northwest Coast (Turner and Bell, 1971), on the Plains (Wissler, 1910; Mandelbaum, 1940; Johnston, 1970), and in the Great Basin and California (Elsasser, 1981; Sutton, 1989), among others (cf. Alix et al., 2012). Despite this widespread use, the recovery of the Saskatoon berry fore-shaft marks the first time this wood has been recovered from an archaeological context in the Northwest Territories.

Significantly, the use of Saskatoon berry for making arrow shafts is also recorded in Dene mythology, particularly in one narrative known as the evil family or father-in-law test story. In this story, the particulars of which vary from group to group, the culture-hero *Yamqzhah* comes into contact with an evil family consisting of an older father and mother, their daughter, and her husband. Told that the real husband is the girl's brother, *Yamqzhah* is invited to join the family as her husband. However, as the story plot is revealed, it becomes apparent that it is the family's practice to lure unsuspecting guests to their deaths by asking them to retrieve the resources needed to make an arrow. The resources—stone for projectile points, wood for shafts, feathers for flights—are protected by dangerous creatures—giant frogs or grasshoppers, stone monsters, giant eagles—that *Yamqzhah* must kill in order to retrieve the appropriate material. In the end, *Yamqzhah* kills the four members of the evil family, and disarms or destroys the various creatures guarding the resources, making them available to everyone.

In one motif of the story that is widespread in Athapaskan mythology, *Yamqzhah* is required to retrieve feathers from the nest of a family of giant man-eating eagles. When he reaches the nest he finds two young eagles, a boy and girl, who warn him that he must be careful to watch for their returning parents. The boy eagle tells him that he will be able to recognize that their parents are returning because heavy hail or snow will fall when the mother returns and it will always rain when his father comes back. Eventually, he kills the whole family except the boy, whom he then teaches to fish for food instead of eating humans. That eagle feathers are waterproof, therefore, is a logical assertion based on the story.

A Slavey version of the story was collected by Robert Williamson (1955) from Madeline Mouse (as revealed by Hanks, 1993), an elderly woman living in the bush near Fort Simpson, NWT, more than 50 years ago. From this version, we learn that Saskatoon canes are preferred for arrow shafts. *Yamqzhah* must defeat a monster made from large boulders in order to collect both toolstone and Saskatoon canes, and Mrs. Mouse tells Williamson (1955:135): "In the old times the people always used Saskatoon canes for their arrows as they are hard and straight. A patch of Saskatoon canes was always carefully nurtured as a precious treasure."

Shúhtagot'ine Land Use

The archaeological record emerging from ice patches in the Selwyn Mountains of the Northwest Territories raises many questions about human use of the alpine landscape. While the archaeological data presented in this volume show that ice patches were reliable locations for hunters to intercept and harvest caribou in the summer months, so far these data tell us very little about how those activities fit within a broader subsistence-settlement system (Andrews et al., 2012). The archaeological record of alpine ice patches provides stunning glimpses of precontact hunting events—for example, a hunter breaking and discarding his bow while hunting caribou on an ice patch, or a hunter setting ground squirrel snares downslope of an ice patch while waiting for caribou—but the picture becomes less clear when we expand our view beyond an ice patch kill site to consider the whole story of how precontact hunter-gatherers made a living in the mountains. The traditional knowledge of Shúhtagot'ine Elders offers an avenue for considering ice patch hunting in a wider context of land use.

In an effort to construct a more detailed picture of Shúhtagot'ine land use in the Selwyn and Mackenzie Mountains, we worked with 10 Shúhtagot'ine Elders to map traditional land-use data for the alpine regions of the Tulita District, including information on traditional trails, place names, harvesting areas, resource-gathering areas, and sacred sites. Figure 6 illustrates the various categories of traditional use data collected for a small portion of the study area. This subarea includes a particularly important harvesting area in the Mackenzie Mountains known as *ᑭᑭᑭ ᑭᑭᑭ* or Caribou Flats.

The traditional trails shown on the map mark the travel routes that traverse this area. The trail data used in this map were collected by the Dene Mapping Project in the late 1970s. The Dene Mapping Project recorded the trails traveled by Dene hunters and trappers over their lifetimes to provide traditional land-use and occupancy data for use in land-claim negotiations. These data represent the routes traveled in the living memory of Elders and harvesters interviewed in the mid to late 1970s, and thus provide a picture of land use in the late-19th and 20th centuries. Thus, the dataset includes walking trails, dogsled trails (often used as snowmobile trails in the latter half of the 20th century), and moose-skin boat travel on *Begádeé*. We note, however, that most travel was on foot prior to the introduction of dogsled and moose-skin boat technologies in the latter half of the 19th century. As an approximate measure of the relative intensity of land use throughout the study area, we mapped the trails of Shúhtagot'ine participants in the Dene Mapping Project. Trail data collected during our traditional mapping exercise were largely consistent with the earlier Dene Mapping Project dataset.

The place names associated with specific places along these trails also index information about traditional land use. Aboriginal place names are often highly descriptive of the characteristics of a place and the actions or events that

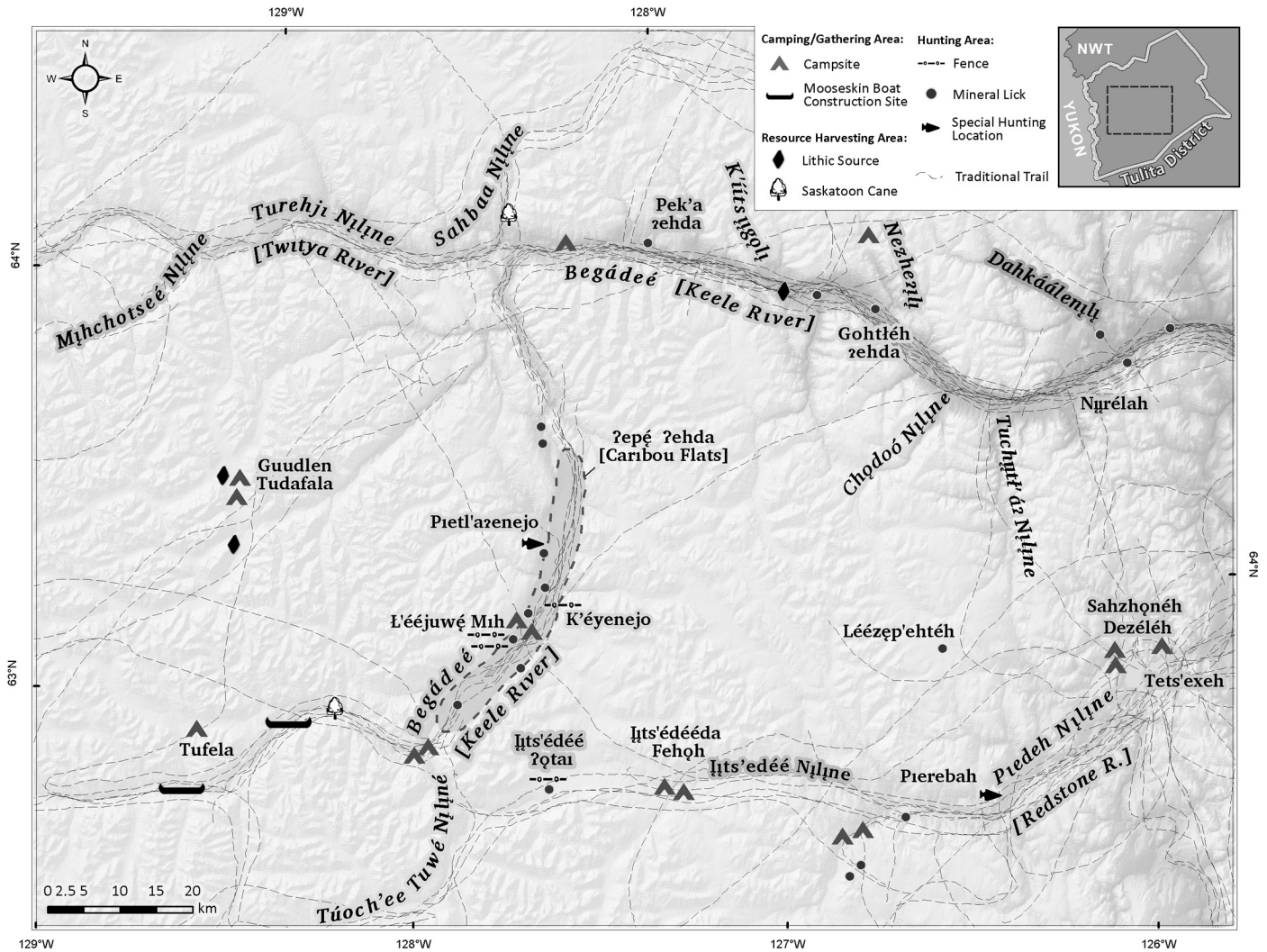


FIG. 6. Shúhtagot'ine traditional land use in the vicinity of ʔepé ʔehda, or Caribou Flats.

took place there. As Basso (1988:110) notes for the Western Apache:

The ancestors, who had to travel constantly in search of food, covered vast amounts of territory and needed to be able to remember and discuss many locations. This was facilitated by the invention of hundreds of descriptive place-names that were intended to depict their referents in close and exact detail.

Two Shúhtagot'ine place names that refer to hunting locations in the ʔepé ʔehda area provide excellent examples: *K'éyenejo* glosses as “chase animal up against cliff,” and the approximate meaning of *Pietl'azenejo* refers to a similar action, but a slightly different landscape feature: “chase animal into cliff pocket.” These places may have been of particular importance before the introduction of firearms, when hunters needed to stalk large game within the range of their arrows. The name *ʔepé ʔehda* also refers to important information about the general area known today as Caribou Flats. The word *ʔehda* means mineral lick

and refers to a large mineral lick located in this area, and the word *ʔepé* means mountain caribou.

Shúhtagot'ine Elders identified numerous harvesting locations, resource-gathering sites, and camping areas. Mineral licks emerged as particularly important harvesting locations for caribou, sheep, and moose. As discrete sources of minerals, these features comprise important habitat for ungulates. Whether they appear as open muddy areas, exposures of dry earth, or open rock faces, mineral licks are often marked by evidence of extensive use by ungulates, such as well-worn trails radiating from the mineral exposures and high densities of shed antlers (Fig. 7). While important to moose, caribou, and sheep, mineral licks are considered critical habitat for ewe groups (ewes and juvenile sheep); indeed, Simmons (1982) argues that the summer ranges of ewe groups are largely determined by access to mineral lick locations. As discrete features on the landscape, mineral licks—like ice patches—were locations where Shúhtagot'ine hunters could predictably intercept and harvest large game. Some of these locations have place names that depict the unique characteristics of the



FIG. 7. Salt lick and mineral spring on the Keele River (*Begádeé*), 2005. (Credit: T. Andrews/GNWT)

mineral lick; for example, a mineral lick on *Begádeé* used by sheep is named *Pek'a zehda*, or “shale slab bank mineral lick.” Other mineral lick locations contain drift fences built by the Shúhtagot'ine to facilitate the harvest of caribou and sheep. One example, designated KjRx-1, and illustrated in Figure 8, consists of a wood fence almost 800 m long designed to guide caribou downhill into a corral structure where they were either snared or shot with arrows or bullets. Examples of resource-gathering sites include a place where Saskatoon canes were collected for making arrows and a toolstone source remembered in Shúhtagot'ine oral tradition. Examples of gathering and camping areas include several places where moose-skin boats were built for the trip down *Begádeé* to trading posts in the Mackenzie Valley. While the Elders identified several sacred sites in the study area, most of these sensitive places are not shown on the maps in this paper. We discuss select examples of sacred sites below.

The example of *ʔepé ʔehda* and the surrounding area illustrates the detailed knowledge of land use contained in the oral history of the Shúhtagot'ine. The data collected contribute specific detail to the general ethnographic

accounts of Shúhtagot'ine land use presented above through the identification of travel routes and a wide variety of important places. Figure 9 presents the traditional land-use data for the whole study area; for clarity, only place names mentioned in the text are included on this map. In many ways, the general pattern of land use indicated by the trail network is consistent with the ethnographic description of Shúhtagot'ine land use outlined by Jean Michea. We see, for example, trails linking Tulita to fish lakes in the lowlands on the west side of the Mackenzie Valley, specifically *Taelé Tué* [Stewart Lake] and *T'ok'átenjza* [Tate Lake], where the Shúhtagot'ine of the late contact–traditional era fished from October until around Christmas time. We see the trails that the Shúhtagot'ine followed from Tulita into the mountains in the late summer and again in January, and the locations on the upper reaches of *Begádeé* where they built moose-skin boats to transport meat and furs down the river to Tulita in the fall and spring. The trail network also indicates the routes across the continental divide that the Shúhtagot'ine took to access prime spring trapping areas in the upper Ross and Pelly River drainages of the Yukon; such access gained importance with the opening of a trade establishment in Ross River in 1900 (Gillespie, 1981).

Looking beyond the more dramatic movements of the Shúhtagot'ine seasonal round, the traditional use data also provide a detailed picture of the alpine subsistence-settlement system. The high density of features along *Begádeé* in the vicinity of *ʔepé ʔehda* relates, in part, to the importance of the fall caribou hunt. The caribou that range in the Selwyn and Mackenzie Mountains—the Redstone population—are woodland caribou of the northern mountain ecotype. In contrast to woodland caribou of the boreal ecotype, which live the entire year in the boreal forest, mountain ecotype caribou spend the winter at lower elevations and migrate to higher elevations in the summer (Creighton, 2006). Caribou of the Redstone population, which may number as many as 5000 to 10000 animals (Olsen et al., 2001), typically spend winters in the river valleys in the front ranges of the Mackenzie Mountains, where less snow accumulation facilitates access to forage. In the spring, the mountain caribou migrate several hundred kilometres to the high alpine area near the continental divide, where they spend the calving and post-calving periods of the summer months (Creighton, 2006). Returning from their calving grounds in the fall, thousands of mountain caribou migrate through *ʔepé ʔehda*, often in large groups. This seasonal abundance of caribou allowed the Shúhtagot'ine to make a substantial harvest. In the post-contact era, this harvest provided excess meat (transported down the *Begádeé* by moose-skin boat) to trade at Fort Norman [Tulita]; in the period before the Shúhtagot'ine gained regular access to clothing and canvas through the fur trade, this harvest was also critically important for obtaining hides in prime condition for making clothing and other items (Gillespie, 1981). Sheep were also an important resource for the Shúhtagot'ine as they hunted along *Begádeé* in the late summer to early fall, the time when



FIG. 8. Caribou fence KjRx-1, located on the traditional trail linking Wrigley (Drum) Lake and *ʔepé ʔehda*, or Caribou Flats, 2009. (Credit: T. Andrews/GNWT)

sheep came down from the high mountains to access mineral licks along the *Begádeé* and its tributaries (Keele, 1910; Simmons, 1982). Moose were hunted for both meat and the hides needed to construct moose-skin boats for the fall trip to Fort Norman [Tulita].

When the Shúhtagot'ine made their way back into the mountains in the winter, they often used *Tets'exeh* [Wrigley Lake] as a base for winter harvesting. Shúhtagot'ine Elders sometimes refer to the area encompassing *Tets'exeh* and Hayhook Lakes as “the place of caribou.” For the Shúhtagot'ine, this name refers to the winter range of mountain caribou in the Mackenzie Mountains, though we note that groups of up to 5000 caribou have been observed in the Hayhook Lake area in the late summer in recent years (Veitch et al., 2000). Small family groups often spent the winter months hunting and trapping in this area, particularly along *İts'edéé Nīlīnē* [Moosehorn River]. The Shúhtagot'ine built a log cabin village on Cabin Creek at the north end of *Tets'exeh* [Wrigley Lake] in the 1920s (Hanks, 1993). Fish—either jigged through the ice or caught with nets in periods of open water—provided a stable resource for Elders and others who remained at the village while the rest of the population traveled out from the lake to hunt and trap (Hanks, 1993). The village also served as a gathering place for small winter hunting and trapping groups to come together; in fact, at a time when the Shúhtagot'ine spent

most of the winter living in the mountains, Christmas gatherings were common at Cabin Creek. Life at the village was greatly facilitated by dogsleds, which provided a means to transport meat cached throughout the winter hunting area back to the village, as well as winter access to supplies from Fort Norman [Tulita].

As winter turned to spring, and the mountain caribou began to migrate towards their summer range, the Shúhtagot'ine moved into the higher mountains to hunt (Fig. 10). Shúhtagot'ine Elders identify the area around *İts'edéé ʔotai* (“moose antler pass or summit”) and areas along *Begádeé* as important places for spring caribou hunting. In spring, as in fall, the Shúhtagot'ine needed to procure moose hides for the construction of moose-skin boats. Moose are known to use mineral licks in the spring, and thus these features may have played an important role in the spring moose hunt. The Shúhtagot'ine built moose-skin boats at the various locations (see Fig. 9), and traveled down *Begádeé* in late May to the Mackenzie Valley, where they spent the summer months. As noted above, in some years the Shúhtagot'ine crossed the continental divide and spent the spring trapping in the upper Ross and Pelly River drainages of the Yukon before making the trip down *Begádeé*.

In 1971, Tatsi Wright, a 99-year-old Shúhtagot'ine woman living in Fort Norman, told the anthropologist Beryl Gillespie (1981:332) that “before the fur trade and

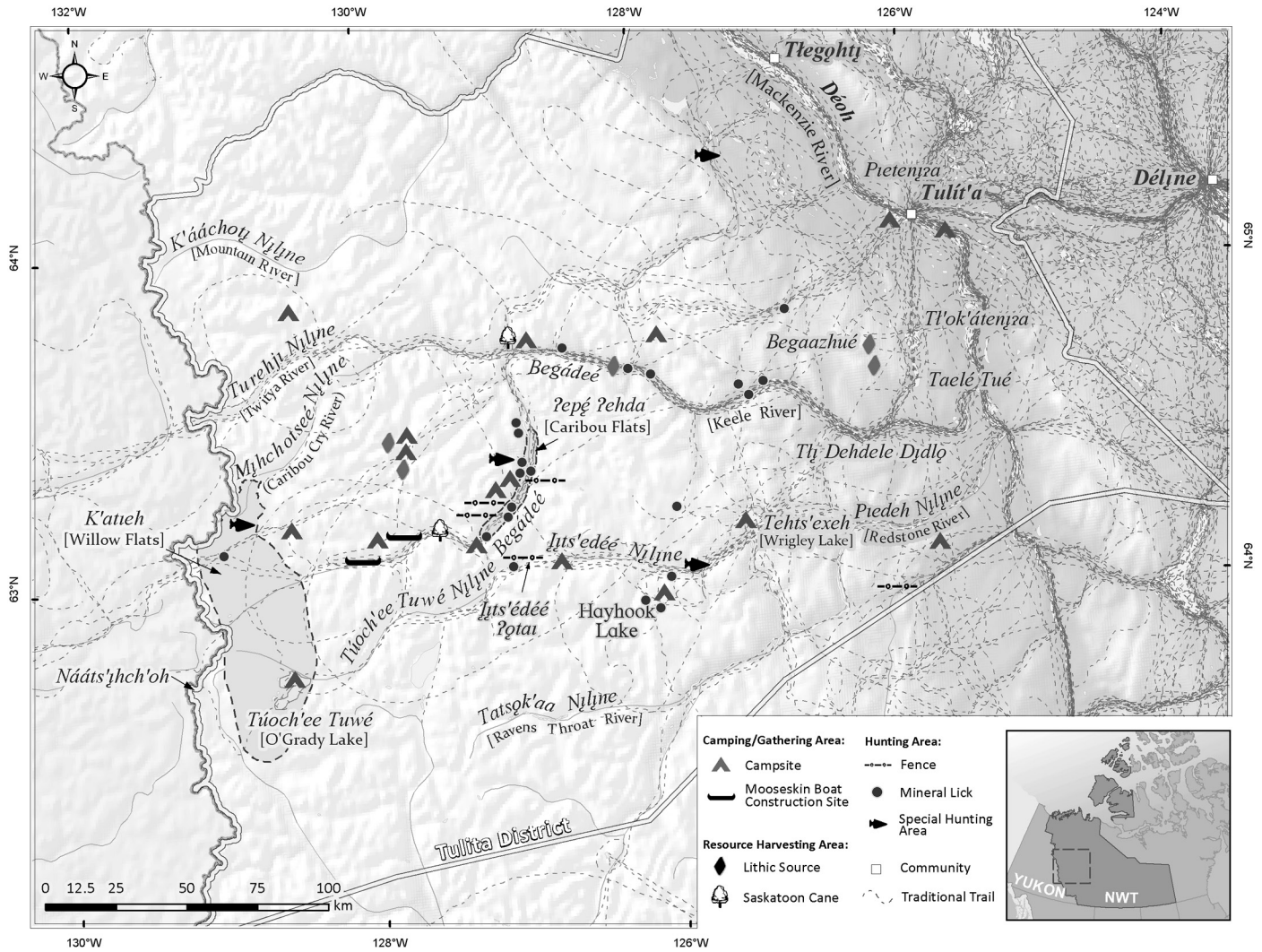


FIG. 9. Shúhtagot'ine traditional land use in NWT Ice Patch Traditional Knowledge Project study area.

even a long time afterward, the Mountain Indians stayed in the mountains almost all the time, seldom traveling to the lowlands and Mackenzie River.” Reflecting the late contact–traditional seasonal round of the Shúhtagot'ine, at which time summers were spent in the Mackenzie Valley, the traditional land-use data presented above provide little information on summer activities in the mountains. However, Shúhtagot'ine oral tradition identifies a locality known as *K'at'ieh*, or “willow flats,” as an area rich in resources during the summer (Fig. 11). Consisting of a series of broad alpine plateaus, *K'at'ieh* is located in the high alpine tundra environment of the continental divide (Fig. 12). While the relative density of land-use features in the *K'at'ieh* area is low when compared to other areas of the mountains, we believe that this reflects the land-use patterns of the late contact–traditional period.

Caribou are abundant in this area during the summer. As described above, the mountain caribou of the Redstone population spend the calving and post-calving periods of their annual cycle near the watershed divide. Archaeological evidence indicates that alpine ice patches provided hunters

with predictable locations to hunt caribou during the summer months (Andrews et al., 2012). Eight ice patches in the *K'at'ieh* area contain evidence of precontact hunting activities. *Tiúoch'ee Tuwé* [O'Grady Lake], located at the south end of this area, is a major fish-bearing lake, and is also the centre of a vast wetland complex that attracts moose and waterfowl during the summer. A second wetland complex is located at the north end of *K'at'ieh*. Recent wildlife observations indicate that this wetland complex is also the focus of moose and waterfowl activity during the summer (EBA Engineering Consultants Ltd., 2009), and our traditional land-use data suggest that the Shúhtagot'ine hunted geese at a moulting area located near this wetland. These data indicate that *K'at'ieh* was a resource-rich area in the summer months, while contributing to the growing literature on the importance of wetland habitats to hunter-gatherer societies (cf. Nicholas, 1998).

We propose a model of late precontact land use in which the Shúhtagot'ine made periodic visits to the *K'at'ieh* area to take advantage of this seasonal abundance of resources. Archaeological evidence of human use of ice patches is



FIG. 10. George Pellissey butchering a caribou near Caribou Flats, 1967. (Credit: N. Simmons/NWT Archives, N-2007-002-004)

consistent with this model. All of the ice patches with material evidence of human hunting activities are located in this area, and the artifact data from these sites demonstrate that people were using bow-and-arrow technology to hunt caribou on ice patches in the final centuries of the precontact era. Collectively, these artifacts span a period from 850 ± 40 ^{14}C yr BP (ca. 790 ± 110 cal. yr BP) to 270 ± 40 ^{14}C yr BP (ca. 230 ± 230 cal. yr BP). While we suggest that hunting caribou on ice patches was one element of a broader-spectrum summer subsistence economy focused on *K'atieh*, detailed archaeological data for this area as a whole are needed to test this hypothesis. Viewed from the perspective of the traditional land-use data presented in this paper, summers spent hunting in the *K'atieh* area became less common as the Shúhtagot'ine shifted their land-use patterns to visit fur trade posts in the Mackenzie lowlands.

Despite this shift in land use, the traditional land-use data presented in this paper offer important clues for understanding the late precontact land-use patterns of the Shúhtagot'ine. While this approach assumes significant continuity in land-use patterns between the precontact and contact periods, we suggest that it is a valid position for several reasons. Most importantly, the ethnographic record

indicates that the Shúhtagot'ine continued to spend most of the year living as mobile hunter-gatherers in the mountains, an adaptation that persisted into the 1950s. Walking into the mountains with only pack dogs as transportation aids, the Shúhtagot'ine could carry only limited material and thus relied on harvesting local resources for subsistence. Food items obtained from the post had generally been consumed before the Dene began to pack into the mountains (Ebbutt, 1931). While the use of firearms in the fur trade era increased the range at which hunters could harvest animals, the Shúhtagot'ine continued to draw on their knowledge of where and when to find animals to hunt. In this way, features like *K'éyenejo* (“chase animal up against cliff”) and *Pietl'azenejo* (“chase animal into cliff pocket”), located in the *ʔepé ʔehda* area, were perhaps less important to hunters with guns, but the *ʔepé ʔehda* area as a whole continued to be an important area for harvesting mountain caribou in the fall and spring. Hanks and Pokotylo (2000) also draw on several lines of evidence to demonstrate that fur trade era land-use patterns in the Mackenzie Mountains had their roots in the late precontact period; particularly compelling evidence is their observation that Shúhtagot'ine Elders remembered and guided them to the locations of toolstone sources located on the traditional trail network.

In the model of late precontact land use that we propose, land-use patterns in the fall, winter, and spring were broadly similar to those indicated by our analysis of Shúhtagot'ine traditional use data. Important elements of the subsistence-settlement system included, for example, the fall caribou hunt in the *ʔepé ʔehda* area, winters spent hunting in the winter range of the Redstone caribou population, and spring hunting in the *İ̄ts'édée ʔətai* (“moose antler pass or summit”) area, but, in contrast to the contact-traditional seasonal round, did not involve extended visits to the Mackenzie lowlands. Instead, as the spring turned to summer, we suggest that the Shúhtagot'ine began to move towards the *K'atieh* area, perhaps traveling up the *Begádeé* and *Túoch'ee Tuwé Nīlīne* [Natla] valleys from their spring hunting areas. In the absence of detailed archaeological site information for the Shúhtagot'ine traditional land-use area as a whole, this model provides a framework for generating hypotheses about the late precontact subsistence-settlement system that can be tested with archaeological data.

Making a Living in a Sacred Landscape

While the traditional land-use data presented in this paper illustrate the Shúhtagot'ine's detailed knowledge of the alpine landscape and the ecology of the animals they hunted, making a living in the mountains also required a deep awareness of the spiritual world. Like hunter-gatherer societies throughout the circumpolar world, the Shúhtagot'ine perceive the world to be “imbued with human qualities of will and purpose” (Ridington, 1982:471), and thus practical engagement with the landscape requires not only intimate knowledge of local ecology and the ability to manufacture and use tools in an effective manner, but also

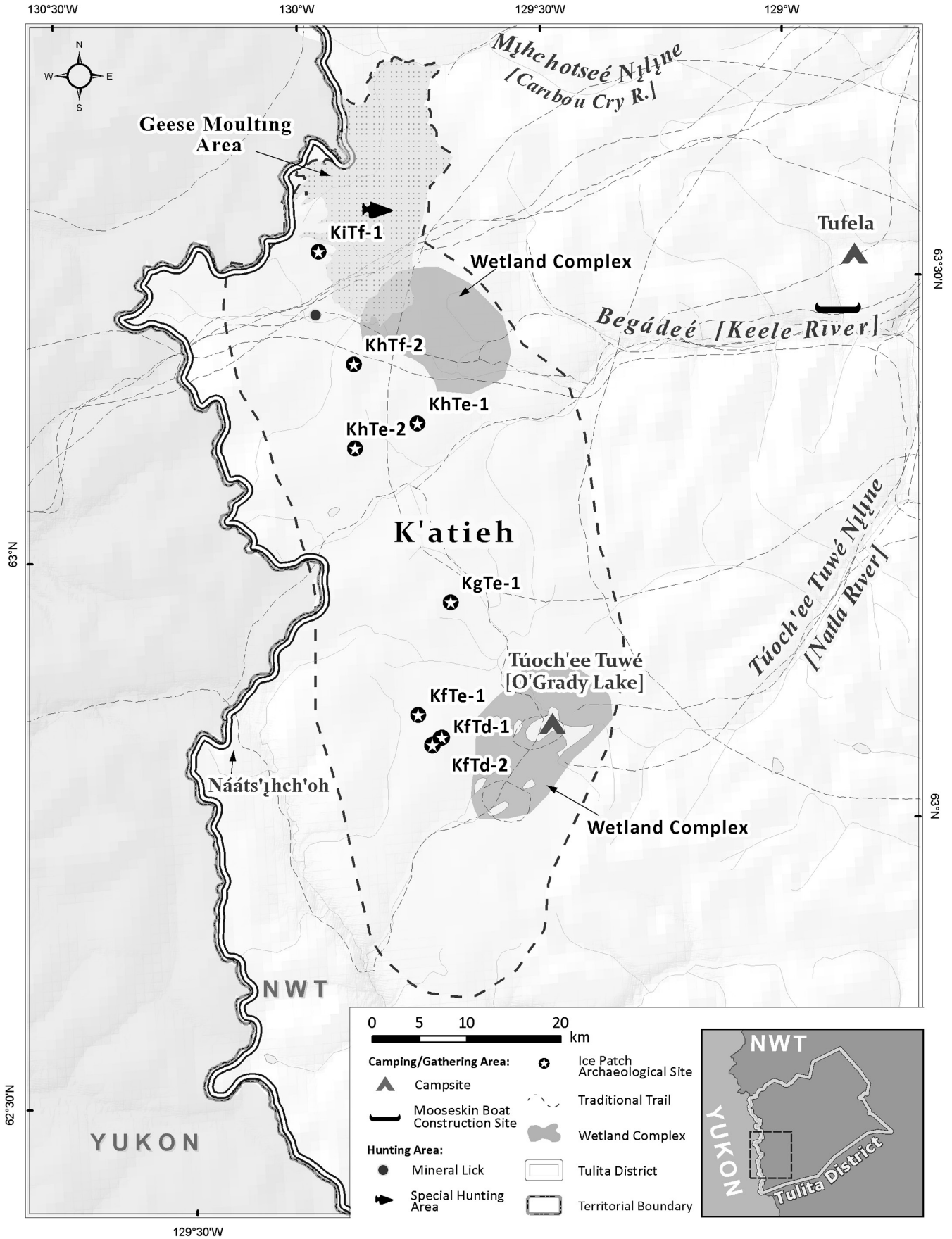


FIG. 11. Shúhtagot'ine traditional land use of the K'atieh area.



FIG. 12. *Katieh*, the vast area of contiguous alpine plateaus characterized by wetlands and birch tundra dominated by *Betula glandulosa* (dwarf birch), 2010. (Credit: T. Andrews/GNWT)

the capacity to manage relationships with the powerful non-human entities and other beings that inhabit the environment (Ingold, 2000). In this section, we discuss some of the techniques the Shúhtagot'ine use to manage their relationships with this animate landscape.

Powerful spiritual entities that are responsive to human intent and action are widespread throughout the Shúhtagot'ine cultural landscape. When gathering resources from the land, the Shúhtagot'ine leave offerings to ensure that spiritual beings associated with resource-gathering places will continue to make those resources available to the people. For example, Shúhtagot'ine oral tradition relates that people made offerings when gathering stone from *Begaazhué*, a large tuffaceous clinker quarry located in the front ranges of the Mackenzie Mountains. Failure to do so would result in bad weather, particularly heavy rain and thunder, creating dangerous travel conditions in mountain environments. Similarly, the widespread Dene practice of “paying the water” expresses respect for spiritual entities by offering gifts while moving through the landscape (Andrews and Zoe, 1997). These offerings are made as a request for the spiritual beings inhabiting the land and water to reciprocate with good weather and safe traveling conditions. The Dene offer a gift each time a new water body is encountered along a travel route; for instance, Shúhtagot'ine Elders made offerings of tobacco to the water soon after arriving at *Túoch'ee Tuwé* [O'Grady Lake] to attend our science camp program. To respect this practice, we left gift offerings whenever an artifact was collected at an ice patch site. Other spiritual entities—often related to mythological events—inhabit specific places on

the landscape that are recognized as sacred places by the Shúhtagot'ine. The narrative of *Tłı Dehdele Dıdłı* [Red Dog Mountain] tells how the Shúhtagot'ine established a protocol for sharing the landscape with a *dı́góóʔı*, or giant spirit animal, located on *Begádeé*:

Long ago, when people went by Red Dog Mountain, they never passed the mountain on the river. They used to get out of the river and portage through the mountains and put in again below Red Dog Mountain. There were no mooseskin boats at that time. People travelled in birch bark canoes. A while after that they started using mooseskin boats. Before the mooseskin boat the women and children would walk along the river and the men hauled their gear in the canoes. When they got to Red Dog Mountain, the men portaged because the Red Dog would take and eat them. That is why they always portaged.

One time they were all gathered getting ready to portage when a man who had medicine and was a really good hunter, said, “Give me all of your possessions.” He took mitts, moccasins, weapons, and food. He gathered all of their possessions together and put them in his canoe. He then turned to the people and said, “I am going to go down the river past Red Dog Mountain.” He wanted to know why the animal took people. As he started down the river a whirlpool opened before him. He started throwing gear into the water to pay. After he threw all the goods into the water, the eddy subsided and let him go down the river.

Up to that time, they did not know what was living at Red Dog Mountain. When he went through the mountain he saw the Red Dog for the first time. He told the people that every time they pass Red Dog Mountain, they must show respect. You must pay the Red Dog with something. So people started leaving matches and shot when they passed by on the river as an offering.

(Hanks, 1993:69–70)

The Shúhtagot'ine continue to recognize *Tłi Dehdele Dıdlq* as a place of spiritual power, and make offerings to ensure safe travel on *Begádeé*. In similar ways, other sacred places in the Shúhtagot'ine cultural landscape require that specific ritual practices be observed in order to avoid malevolent action from the spirit world.

Cultural understandings related to animals also shape the techniques of making a living in the alpine landscape. Like most Subarctic hunting societies, the Shúhtagot'ine think of animals as other-than-human persons who give themselves to hunters in return for respectful treatment. Animal-persons are sharply attuned to the actions of hunters and express their will by giving themselves to those who observe cultural practices that convey respect to animals and their remains (Ridington, 1982; Nadasdy, 2007). Failure to observe these practices, according to the Shúhtagot'ine Elders, could incite the mountain caribou and other animals to leave the area. Shúhtagot'ine practices relating to the proper treatment of animals parallel a constellation of hunting practices that seem to have common expression in hunting societies throughout the circumpolar world (Ingold, 2000; Jordan, 2004; Nadasdy, 2007). These practices—some of which we can expect to have a material expression in the archaeological record—include, for example, distribution of meat to the community after a successful hunt; ritual deposition of bones away from camps, where they will not be trampled or disturbed by dogs; not bragging about the success of a hunt; and not teasing or talking poorly of animals. Shúhtagot'ine Elders emphasized the importance of properly disposing of bones away from the camp and suspending the heads of butchered animals above ground in a tree. These practices ensure that the animal travels intact to the spirit world so that it may be reincarnated. The Elders expressed concern that the display of caribou heads at outfitting lodges in the mountains disrupts this cycle. They also noted that it was important not to butcher animals at special hunting places such as mineral licks, as the presence of blood might discourage animals from returning to those places. This practice may have also been important for ice patch hunting sites; interestingly, caribou bones recovered from ice patches in the study area show no evidence of human processing such as cutmarks, indicating that caribou killed on the ice patches were removed for butchering (see Andrews et al., 2012).

In concert with the physical skills of the hunt, the ability to dream animals played an important role in Shúhtagot'ine hunting practice. Dreaming is a way for hunters to draw on their knowledge and experience of the environment to

visualize where human trails will meet with animal trails (Ridington, 1982, 1983, 1994), and thus the Shúhtagot'ine put considerable effort into developing this capacity in young hunters, a process which involved spending long periods alone in the bush seeking the guidance of an animal helper. Special people known as *mıdzita*, or caribou bosses, were particularly good at dreaming caribou, and they had the ability to send caribou towards hunters or caribou drift fences set with snares. The importance of the *mıdzita* to the caribou hunting technology of the Shúhtagot'ine is expressed in the following story, in which a band living in the mountains learns the importance of the *mıdzita*:

Long ago, a big hunter, returning from an unsuccessful hunting trip, forcibly took some meat from a hunter with the power to dream caribou, a *mıdzita*. As a result of this event, the *mıdzita* refused to participate in caribou hunting. Instead, he went out alone and hunted ptarmigan to feed his family. Other members of the band, unable to kill caribou, began to get hungry. One day, the sister of the *mıdzita*, the wife of the man who had taken the caribou meat from him, physically grabbed her brother, saying, “Look, your nephews are starving!” The *mıdzita* dropped to the ground and slept. He dreamed of ten caribou not too far from camp, and led them towards the hunters. From then on, the *mıdzita* was a highly respected member of the band.

Shúhtagot'ine oral tradition relates that children with the potential to become a *mıdzita* were left alone for several days to develop their power on *Nááts'ıhch'oh*, a mountain with special power located near the continental divide.

These examples illustrate how cultural understandings of the environment play a role in shaping the practice of making a living in a sacred landscape. Looking beyond the technical imperatives of hunting caribou on ice patches, or making an arrow, or navigating a moose-skin boat down *Begádeé*, these examples show that making a living in a sacred landscape also requires techniques for managing relationships with the animal-persons and other spiritual entities that inhabit the landscape (Ingold, 2000).

Safe Travel in the Subarctic Alpine: Shúhtagot'ine Knowledge of Snow and Ice

The alpine environment presents many hazards to travelers: Summer travel required fording swift, dangerous rivers, avoiding rock falls, and being prepared for the possibility of cold, wet and windy weather and hypothermia, while winter travel was threatened by thin ice, overflow, avalanche, deep snow, slippery, steep slopes, and blizzards. However, the Shúhtagot'ine have devised several strategies for ensuring safety while traversing the Mackenzie and Selwyn Mountains. Extensive knowledge of local geography encoded in place names and associated stories provided details about local conditions. For example, the *Chodoó Nıljıne* (“huge rainy river”) warns of its propensity to flood

during heavy rains, or *Tuchjitt'áz Nijine* (“pool of water swirling around the base of a sharp bend river”) provides precise information about a dangerous eddy, a warning important for those traveling in moose-skin boats. Trails, used and reused for millennia, linked the named places and together provided a detailed geography that young people, educated and socialized through the process of traveling on them in the company of knowledgeable Elders, would remember for a lifetime. However, traveling safely in the mountains also meant having well-made equipment, and the skills for manufacturing it were cherished and learned through a lifetime of practice. Adults frequently walked with a staff to help with safe footing (see Fig. 13), or sometimes used a bow as a staff (Ebbutt, 1931:321). Snowshoes, essential for winter travel, were carefully and skillfully crafted; otherwise the hunter's success would be placed at risk. All Shúhtagot'ine snowshoe makers followed an identical pattern, which involved knowing how to select straight-grained birch for the frame, cutting the staves, and skillful weaving of the complex babiche lashing, which was critical to ensure that the shoes did not fail. Stories helped place these skills in context. For example, the lashing on the front panel of snowshoes is said to have been gifted to people by the spruce grouse, a bird renowned for being able to walk on deep snow. The bird devised a “double back twist” in the lashing that allowed it to fit neatly within the confined area. In return, the grouse asked that people never discard his feet before inspecting them. Today, a hunter will look carefully at a grouse's feet, cleaning them if necessary. If he sees a deep red coloration, it foretells a successful hunt (Andrew, 2003).

With snow cover lasting for at least eight months of the year, it's not surprising that there is a complex lexicon in the Shúhtagot'ine dialect for describing ice (*té*) and snow (*zha*) conditions, ice and snow features, and rules related to safe travel over them (see Table 1). Hunters needed specialized knowledge and skills to ensure safe travel during winter conditions and a rich and varied lexicon helped communicate this knowledge to younger hunters. Youth gained knowledge most commonly through direct participation while traveling with older, more skilled practitioners, but Basso (1972) also documented a formal training tool in the form of a question-and-answer game. Fathers quizzed their sons by describing a particular ice situation and asking the boy to decide whether the ice was safe for crossing, or should be approached cautiously or avoided entirely, and how traveling on foot, snowshoe, or dog team might affect the decision. By playing the game himself, Basso (1972:35) was able to elicit 13 terms that described properties or conditions of ice, indicating its thickness, colour, and clarity, whether it is solid, melting, or cracked, whether water lies above or below it, and whether it is smooth, slippery, or rough.

Terms for snow are as rich and varied as those for ice, indicating a detailed understanding of the properties of snow cover, its morphological structure, and metamorphism. For example, Shúhtagot'ine Elders note that



FIG. 13. Shúhtagot'ine Elder Maurice Mendo making a staff, 2008. (Credit: W. Stephenson/GNWT)

freshly fallen light and fluffy snow, which they refer to as *k'ahbahchoré*, or “ptarmigan feathers,” compresses or collapses after three or four days to form two distinct layers: *Shiré*, the top layer composed of dry, compacted flaky snow, and *fileh*, an underlying layer of loose, crystalline snow. For Shúhtagot'ine speakers, several terms immediately connote difficult or dangerous travel conditions. *Luugháh*, for example, refers to ice that is compressed or crushed by the force of moving water and frozen into a jagged jumble of rough ice, or *izé*, slushy snow very difficult for hunters or dogs to break trail through. Different conditions of ice or snow are noted for certain traditional uses. For example, *shiré* was used to help render tallow (*egótle* or “knee grease”) from finely broken caribou long-bone joints by adding a handful to the boiling water just at the end of the process, and *fileh* is preferred for making tea or for washing your face, while *tédeitl'é*, or blue ice, was cut and hauled inside homes to provide water for drinking and cooking. By contrast, *p'enii* or *tegahtú*, defined respectively as overflow onto an ice or a snow surface, was never to be used for drinking water.

The Shúhtagot'ine language has terminology for describing enduring ice and snow features (*lubee* or glaciers), perennial or impermanent features that reoccur at the same place year after year (*zhaayáfelah* or snow patches), or features that tend to occur at the same place though not necessarily every winter such as overflow (*p'enii*, *tegahtú*). These terms evoke knowledge about traditional practices as well. For example, while glaciers are generally regarded as dangerous, *Lubee* [Keele Peak], a mountain in the Yukon Territory named with the term for glacier, is regarded as a sacred site; just seeing it augurs good fortune. Places where overflow (water beneath the ice seeping up through cracks in the ice) occurs are regarded as dangerous because dog teams or snowmobiles might become bogged down or trapped.

TABLE 1. Shúhtagot'ine snow and ice terms as recorded by this study (a) and adapted from Basso 1972 (b). All vowels should be expressed and pronounced as in French (e.g., “*fileh*” is pronounced “fee-lay”). Shúhtagot'ine terms are represented using the standardized orthography developed by the Government of the Northwest Territories (1990), in which *l* is a voiceless fricative, *ʔ* and *ʕ* are glottal stops, vowels stressed with a high tone are marked with an acute accent (e.g., *â*), and nasalized vowels are marked with a subscript hook (e.g., *ɛ̃*).

Conditions of snow (<i>zha</i>)	
<i>zhahdewé</i>	“big snow,” a deep blanket of snow from a storm (a)
<i>k'ahbahchoré</i>	“ptarmigan feathers,” light, fluffy snow (a)
<i>shiré</i>	dry, flaky top layer of snow (a)
<i>fileh</i>	loose, crystalline snow layer below <i>shiré</i> (a)
<i>náegah</i>	powdery snow (a)
<i>tahsilé</i>	hard snow (a)
<i>zhaazuréélj̃h</i>	melting snow (a)
<i>zhahtsele</i>	heavy, wet snow (a)
<i>izé</i>	slushy snow (a)
<i>dazhá</i>	snow on tree branches (a)
<i>zhatú</i>	water from melted snow (a)
Conditions of ice (<i>tɛ̃</i>)	
<i>tɛ̃deibile</i>	thin ice (b)
<i>tɛ̃deizhile</i>	brittle ice (b)
<i>tɛ̃deitl'é</i>	blue ice (b)
<i>tɛ̃deito</i>	thick ice (b)
<i>tɛ̃tagotl'é</i>	muddy ice (b)
<i>tɛ̃piné</i>	slippery ice (b)
<i>tɛ̃vú</i>	hollow ice (b)
<i>tɛ̃gahp̃i</i>	wet ice (b)
<i>tɛ̃tsidenitl'é</i>	black ice (b)
<i>tɛ̃gáh</i>	white ice (b)
<i>tɛ̃tseiyinidlá</i>	seamed ice (b)
<i>tɛ̃chegonecha</i>	cracked ice (b)
<i>tɛ̃netsile</i>	floating ice (b)
Ice or snow features	
<i>zhaayáfelah</i>	ice patch (a)
<i>lubeé</i>	glacier (a)
<i>luugháh</i>	rough, broken ice on a river, making it difficult for travel (a)
<i>p'enií</i>	frozen overflow, where water from below the snow or ice has seeped to surface and frozen (a)
<i>tegahtú</i>	wet overflow (a)

However, *zhaayáfelah* or ice patches, the focus of our study, are known as hunting places.

DISCUSSION

Shúhtagot'ine traditional knowledge is helping us to understand some of the missing pieces in the archaeological record of alpine ice patches, allowing us to visualize, for example, a piece of sinew attached to an unmodified willow branch as a complete spring-pole snare set, or to draw on Shúhtagot'ine perceptions of the alpine landscape and animals to interpret the lack of evidence of human butchering on caribou bones found at ice patch archaeological sites. This knowledge also provides a lens for viewing aspects of a hunting technology on which the archaeological record will perhaps remain silent: for example, the role that a *m̃dzita* might have played in hunting caribou on ice patches.

The emerging archaeological record of alpine ice patches establishes high-elevation environments as important resource harvesting areas for Subarctic hunter-gatherers, and unless these areas are included in our models of hunter-gatherer land use, our understanding of past land-use practices will remain incomplete. The late-precontact land-use

model developed in this paper using traditional land-use data collected from Shúhtagot'ine Elders represents a first attempt to situate ice patches in a broader context of land use. It underscores the important role that detailed traditional land-use data can play in generating hypotheses about the archaeological record.

By contributing to all aspects of the project, from research design to write-up, the participating Elders and community representatives contributed significantly to the documentation of the archaeological past of the Selwyn Mountains. By sharing their worldview and knowledge, Elders helped archaeologists to perceive mountain environments through Shúhtagot'ine experience, providing new tools for interpreting archaeological sites and distributions. In a similar fashion, Elders learned archaeological methods and approaches, which gave them a new perspective on a familiar landscape. By combining their perspectives through an interdisciplinary approach, the partners linked the project to the broader realm of ethnoarchaeology studies and, in particular, to the emerging fields of archaeological ethnography and indigenous archaeology (cf. Nicholas and Andrews, 1997; Smith and Wobst, 2005; Hamilakis, 2011).

While we have drawn on Shúhtagot'ine traditional knowledge to think about the past, the Shúhtagot'ine are drawing on their knowledge of the alpine landscape to plan

for the future. We conclude this paper with a consideration of how the Shúhtagot'ine are using their traditional knowledge to ensure their cultural vitality.

CONCLUSION

Encouraged and guided by three decades of experience in collaborative museum and archaeology projects undertaken by the Prince of Wales Northern Heritage Centre, and in concert with the support of IPY's commitment to meaningful community involvement, the NWT Ice Patch Study included several outreach initiatives in the project's research program. Designed and executed in collaboration with Shúhtagot'ine Elders and the Tulita Dene Band, outreach initiatives included a traditional knowledge study, inviting an Elder to accompany archaeologists during field surveys, conducting two science camps near one of the ice patches, community visits and school presentations to report on project details and findings, development of exhibits for the school in Tulita and the Prince of Wales Northern Heritage Centre, and the production of a book designed to bring the content of the science camps into the high school classroom (Andrews et al., 2009). The project outreach programs thus created a legacy of community-based educational resources, while providing an opportunity for archaeologists and Elders to learn from each other, all the while engaging Shúhtagot'ine youth in a shared hands-on learning experience. Thus, by adopting a praxis-oriented, collaborative research strategy that strove to share knowledge freely through both outreach and research activities, the NWT Ice Patch Study attempted to democratize the process of inquiry by sharing knowledge, authority, voice, research practice, and presentation (Lather, 1986), while providing extensive educational benefits to all project partners.

Though this collaborative approach has become relatively common in northern archaeology and other scientific disciplines in recent years, the Shúhtagot'ine have taken the same approach to knowledge sharing for decades, ensuring that their cultural and land-based interests are recognized and protected in other venues. After years of negotiation, the Shúhtagot'ine helped to enshrine this approach in the Sahtu Dene and Metis land claim (Canada, 1993), and they employ it to protect critical components of their cultural landscape. For example, the claim established the Sahtu Heritage Places and Sites Joint Working Group, with representation from the Sahtu and the federal and territorial governments, and charged it with making recommendations for protecting or managing Sahtu heritage sites. The Working Group's final report identifies two sites within the NWT Ice Patch study area (T'Seleie et al., 2000). One of these is *Tl̄i Dehdele D̄jdl̄o* (Red Dog Mountain), and the other is the traditional trail from the Mackenzie Valley to the Caribou Flats area near Wrigley (Drum) Lake (T'Seleie et al., 2000). In 1993, *Tl̄i Dehdele D̄jdl̄o* and the Mountain Dene Trail were the subject of an unsuccessful attempt to

raise interest in nominating them as National Historic Sites (Hanks, 1993). It is not surprising that the Shúhtagot'ine would choose these two sites to represent the hundreds of cultural sites that exist in the study area, as both symbolize the Shuht'agot'ine tradition of travel in a storied landscape, where places imbued with spiritual power helped people mediate the practice of daily life (T'Seleie et al., 2000:14–22). Using the collaborative ethnographic methodologies outlined in this paper has aided the Shúhtagot'ine in meeting the objectives of heritage site co-management (cf. Hollowell and Nicholas, 2009) defined in their land claim.

Another critical component of the land claim called for the creation of a regional land-use plan, and a draft is currently under review. Again, Shúhtagot'ine traditional knowledge has played a key role in setting the scope and content of the draft plan. For example, the document identifies mineral licks as ecologically significant areas, proposing a 1000 m buffer to protect them from infringement of land-use activities (Sahtu Land Use Planning Board, 2010:305). A key component of Shúhtagot'ine traditional hunting strategies, as indicated above, long-term protection of the mineral licks will aid in the management of the animal species critical to subsistence. As well, the Shúhtagot'ine have been working with federal and territorial governments to establish a variety of protected areas in the Mackenzie and Selwyn Mountains that help secure key aspects of their cultural landscape.

In Shúhtagot'ine practice, the collaboration process requires mutual respect and appreciation of all knowledge-holders, thus conforming to a widely held value of sharing among Athapaskan societies, one that has persisted for millennia (cf. Rushforth and Chisholm, 1991). By sharing their knowledge and experience in collaborative settings, Shúhtagot'ine Elders are taking concrete steps to ensure that their youth have the necessary tools to manage in a world undergoing rapid change caused by forces well beyond their control. In the process, they are helping to provide these same benefits to their many partners.

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