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An archaeological investigation of subalpine and alpine use in the southeast Yukon

Jodie MacMillan

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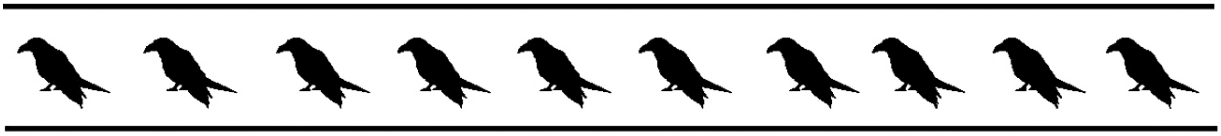

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An Archaeological Investigation of Subalpine and Alpine Use in the Southeast Yukon

by

Jodie MacMillan

B.A., University of Victoria, 2011

Thesis Submitted in Partial Fulfillment of the
Requirements for the Degree of
Master of Arts

in the
Department of Archaeology
Faculty of Environment

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Abstract

An archaeological land use model for subalpine and alpine environments for southeast Yukon was developed using available ethnographic, archaeological and environmental data. The model describes a pattern of dispersed predominantly short-term hunting camps or lookouts located primarily in the subalpine with limited use of alpine zones. These results were compared to the findings of a heritage resource management project conducted in Don Creek Valley and Howard's Pass, Yukon. This data generally conformed well to the model with some unexpected exceptions regarding the density and increased number of sites (n=47) recorded in the subalpine and alpine. Factors for the unexpected site density could possibly be due to the concentration of economically important resources or the use of Howard's Pass as a travel route. Overall the results of this thesis underscore the importance of upland areas to the groups that inhabited this region of the Yukon.

Keywords: southeast Yukon; subalpine archaeology; alpine archaeology; archaeological land use model; Kaska Dena

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List of Acronyms

AAOD	Alaska Archaeological Obsidian Database
asl	Above sea level
ASR	Archaeological Sites Regulation
BP	Before Present
ELC	Ecosystem and Landscape Classification
HRM	Heritage Resource Management
NEF	National Ecological Framework of Canada
NWT	Northwest Territories
PWNHC	Prince of Wales Northern Heritage Centre
pXRF	Portable x-ray fluorescence
Stantec	Stantec Consulting Ltd.
WRA	White River ash
XRF	X-ray fluorescence
YBEC	Yukon Bioclimate Ecosystem Classification

Chapter 1. Introduction

From an archaeological perspective subalpine and alpine areas are generally understudied, leaving gaps in the archaeological record and our understanding of how people used these environments in the past. Archaeological research typically has focussed on lowland areas and these higher altitude locations have been ignored. Reimer, in a Master's thesis at Simon Fraser University, describes this situation as follows:

> Far too often archaeologists in the Northwest dismiss high altitude areas as "areas people would have used only while passing through to get somewhere else." With the more extensive research presented in this thesis, and by other archaeologists in the Pacific Northwest, questions like "what were early people doing in the high mountains?" can begin to be addressed" (Reimer 2000:3)

The perspective is changing, but it has been rare for archaeologists to thoroughly explore subalpine and alpine environments beyond that of a travel corridor to pass between lowland regions. Subalpine and alpine locations are logistically difficult for archaeologists to get to and the often times harsh terrain can be difficult to locate archaeological sites. Yet recent archaeological research, ethnographic records, and local histories show that people were using the subalpine and alpine for multiple purposes beyond travel, including hunting, resource gathering and spiritual purposes (Reimer 2000, 2008; Hare et al. 2004; Hare et al. 2012; Greer and Strand 2012; Andrews et al. 2012a, 2012b, Vanags 2000).

Over the past 20 years alpine archaeology in the Yukon has come into the forefront in large part due to the discoveries made in the field of ice patch archaeology. A fortuitous find at an alpine ice patch in southwest Yukon in 1997 initiated a number of research projects that, ultimately, have defined the field of ice patch archaeology for the Yukon, Northwest Territories, British Columbia and Alaska. Prior to this, few archaeological sites had been recorded at higher elevations in southwest Yukon; only two were identified above 1,250 m elevation (Hare et al. 2012:118). As of 2018 there are 180 ice patches in the southwest Yukon that have been investigated; artifacts have been recovered at 42 ice patches and faunal remains have been found at 85 (Christian Thomas, personal communication 2019). The long frozen context in which these artifacts

occur has led to the spectacular discovery of complete weapons as well as other artifacts, giving us a better understanding of alpine hunting, and hunting technology over time (Hare et al. 2004; Hare et al. 2012; Greer and Strand 2012; Andrews et al. 2012a, b). Preserved dung and other organics similarly provide insight into the animals and vegetal resources available in the subalpine/alpine zones. These data provide substantive and useful context for this thesis and my efforts to build a model of subalpine and alpine use for southeast Yukon. Unfortunately, and aside from ice patch research, there are limited in depth studies of other types of subalpine and alpine archaeological sites in the region.

Building from the ice patch research in southwest Yukon, this thesis explores past human use of subalpine and alpine environments in the southeast Yukon. Unlike southwest Yukon, perennial ice patches have not been recorded in southeast Yukon. Ice patch reconnaissance surveys within southeast Yukon including portions of the Selwyn Mountains, Pelly Mountains and the Hess Mountains in 2004 and 2005 yielded negative results for perennial ice patches with visible deposits of caribou dung which has been an indicator used to identify archaeological ice patches (Hare et al. 2012:121).

The goal of this thesis is to develop a pre-European contact model of First Nations subalpine and alpine land use for the southeast Yukon based on available ethnographic and archaeological research. The region under study corresponds to the Kaska Dena traditional territory within southeast Yukon to make use of documented traditional land use and ethnographic reports for Ross River Dena and Liard First Nation people (Figure 1). Kaska Dena traditional territory also comprises portions of northern British Columbia and western Northwest Territories.

Figure 1. Study Area Map
Note: Study area indicated by red outline within southeast Yukon.

The subalpine/alpine land use model is intended to assist in predicting activities, seasonal patterns, resources, and archaeological site types that characterize these environmental zones. Construction of the model incorporates information from previous

research conducted in the Yukon and Northwest Territories (NWT), especially ice patch studies as noted. Other data are available from heritage resource management projects, surveys of available wildlife resources, and ethnographies and land use studies for regional First Nations groups. Models of alpine and subalpine use from British Columbia (Reimer 2000, Vanags 2000) are referred to as well, to assist in the development of the model for southeast Yukon.

The need for the development of a southeast Yukon subalpine/alpine land use model is motivated by a heritage resource management (HRM) project conducted by Stantec Consulting Ltd. in 2014 and 2015 (Heffner and MacMillan 2015; MacMillan and Young 2017). This project involved a heritage resource impact assessment for a proposed mine operation located in Don Creek Valley and Howard's Pass, a development area within the subalpine/alpine zones of the Selwyn Mountains straddling the border of the Yukon and Northwest Territories. There had been limited archaeological fieldwork or research undertaken in the general area, and little was known about the archaeology of the region more broadly. Initially it was expected that few archaeological sites would be encountered given underlying assumptions about limited past human activity in high elevation zones. That was not at all the case: after two seasons of fieldwork, 47 archaeological sites were recorded in the Yukon sections of the proposed development and six others within Howard's Pass in the Northwest Territories. These results highlight our limited understanding of subalpine and alpine land use. The results of Stantec's investigations will be used to test the reliability of the model developed as part of this thesis. The available information on site location, context, size, type, and material culture of the Stantec sites will assist in identifying where refinements are needed for the model.

In the formulation of a high elevation land-use model, I seek to address the following questions:

1. What activities were conducted in subalpine and alpine environments?
2. What resources were sought after in subalpine and alpine environments?
3. What time of the year were people in subalpine and alpine environments?
4. What are the expected archaeological site types in the subalpine and alpine environments?
5. What types of archaeological sites were present in the Don Creek Valley and Howard's Pass and are these site types anticipated within the model?

6. What do the artifact types, including lithic materials, tell us about First Nations activities in the Don Creek Valley and Howard's Pass?

The results of this research will provide a better understanding of how alpine and subalpine environments in the southeast Yukon were used in the past, with particular focus on the Don Creek Valley and Howard's Pass areas, and how alpine use in southeast Yukon differs from then what has been documented for the ice patch regions of southwest Yukon. It is also hoped that the results of this research enhance our understanding of these areas but also provide a resource for future archaeological projects with the overarching goal of building best practices for archaeological research and heritage assessments in the Yukon.

Chapter 2. Environmental Context

This chapter provides contextual definitions for subalpine and alpine environments, a description of the study area environment being examined and a brief review of paleo-environmental history. I also provide ecological and environmental settings for the heritage resource management project in the Don Creek Valley and Howard's Pass.

2.1. Subalpine and Alpine Environment Definitions

Definitions of subalpine and alpine regions and associated archaeological records vary on a global perspective. These landscapes and their cultural context can differ substantially, depending on where you are in the world. Archaeological studies in these areas generally fall under several names including "High Elevation Archaeology" (Reimer 2000), "Glacial Archaeology" (Grimaldi et al. 2016), "Outfield archaeology" (Indrelid et al., 2015), "Ice Patch Archaeology" (Hare et al. 2004, Hare et al. 2012, Greer and Strand 2012, Andrews et al. 2012a, b), "High Altitude Archaeology" (Curdy 2007) and "Upland Archaeology" (Costello 2016; Means 1999). Regions and their archaeological study typically are framed through a local perspective with distinct ecological and environmental terms of reference. That said, on a general level they illustrate a robust use, exploitation and settlement of high elevation environments in the past.

For the Yukon *per se*, Smith et al. (2004:301-311) provide operational definitions of subalpine and alpine regions and features largely based on vegetation communities. These include:

> **alpine**: (1) Refers to those portions of mountain landscapes above tree growth, or to those organisms living there. (2) That vegetation occurring between the upper limit of trees (treeline) and the lower limit of snow (snowline) on mountains high enough to possess both of these features. (3) Implies high elevation, particularly above treeline and a cold climate.
>
> **alpine meadow**: (1) A dense, low, meadow-like type of herbaceous plant cover found above treeline. (2) Low herbaceous vegetation dominated by grasses, sedges and other herbs in the alpine zone.

alpine tundra: That portion of the landscape above the upper limit of tree growth that supports a plant cover of dwarf shrubs and herbs.

subalpine: The distinctive type of vegetation, usually open forest of reduced height and vigour, below the alpine tundra in mountainous areas.

The definitions of Smith et. al provide general vegetation characterizations. On a more specific level, common vegetation types potentially present in alpine tundra include mountain avens, alpine bearberry, tufted alpine saxifrage, prickly saxifrage, other varieties of saxifragaceae and crustose lichens (Scudder 1997:39). Subalpine vegetation is dominated by willow species, shrub birch/dwarf birch and black and white spruce possibly as krummholtz or stunted (Scudder 1997:44-45). In some cases, trembling aspen can be found near the tree line (Holtmeier 2009:40). In recording high elevation archaeological sites, at least as reported on archaeological record forms in the Yukon, archaeologists do not always report vegetation type. This is unfortunate since vegetation may have been an influential variable in site location.

The *Yukon Ecological and Landscape Classification and Mapping Guidelines* (Flynn and Francis 2016) are produced by the Yukon Government's Ecosystem and Landscape Classification (ELC) program. The goal of this program is to create a consistent and standardized ecosystem classification that can be used as a planning and management tool in various sectors within the environmental assessment process. The ELC program integrates the National Ecological Framework (NEF) of Canada and the Yukon Bioclimate Ecosystem Classification (YBEC) into Yukon ecological frameworks. This provides a more detailed way to view subalpine and alpine environments than in the broad-based terms above. The "YBEC generally characterizes an ecosystem as a particular plant community and its associated topography, soil and climate" (Flynn and Francis 2016:5). There are three classification systems that make up the YBEC framework and include "bioclimate zones and subzones (subdivisions of bioclimate zones); vegetation association; and ecosites" (Flynn and Francis 2016:5). The bioclimate zones and subzones fall under bioclimate regions.

Here I examine the larger bioclimate regions and bioclimate zones. It should be noted that this work is currently in progress and these classifications may be updated or changed (Mitch Heynen, personal communication 2019; Flynn and Francis 2016). There are five Bioclimate Regions in the Yukon: Boreal Bioclimate Region, Subarctic Bioclimate Region, Arctic Bioclimate Region, Pacific Maritime Bioclimate Region and

Alpine Tundra Bioclimate Region. Bioclimate zones are defined within these bioregions and “are areas with a similar climate”; there are currently nine bioclimate zones recognized in the Yukon (Flynn and Francis 2016:7). These include Boreal Low Zone, Boreal High Zone, Boreal Subalpine Zone, Subarctic Woodland Zone, Subarctic Subalpine Zone, Arctic Tundra Low Shrub Zone, Arctic Tundra Dwarf Shrub Zone, Pacific Maritime Glacierized Zone and Alpine Tundra Zone (Figure 2). Each has a reference site constituting the ecological community and environment on which the zone is defined (Flynn and Francis 2016).

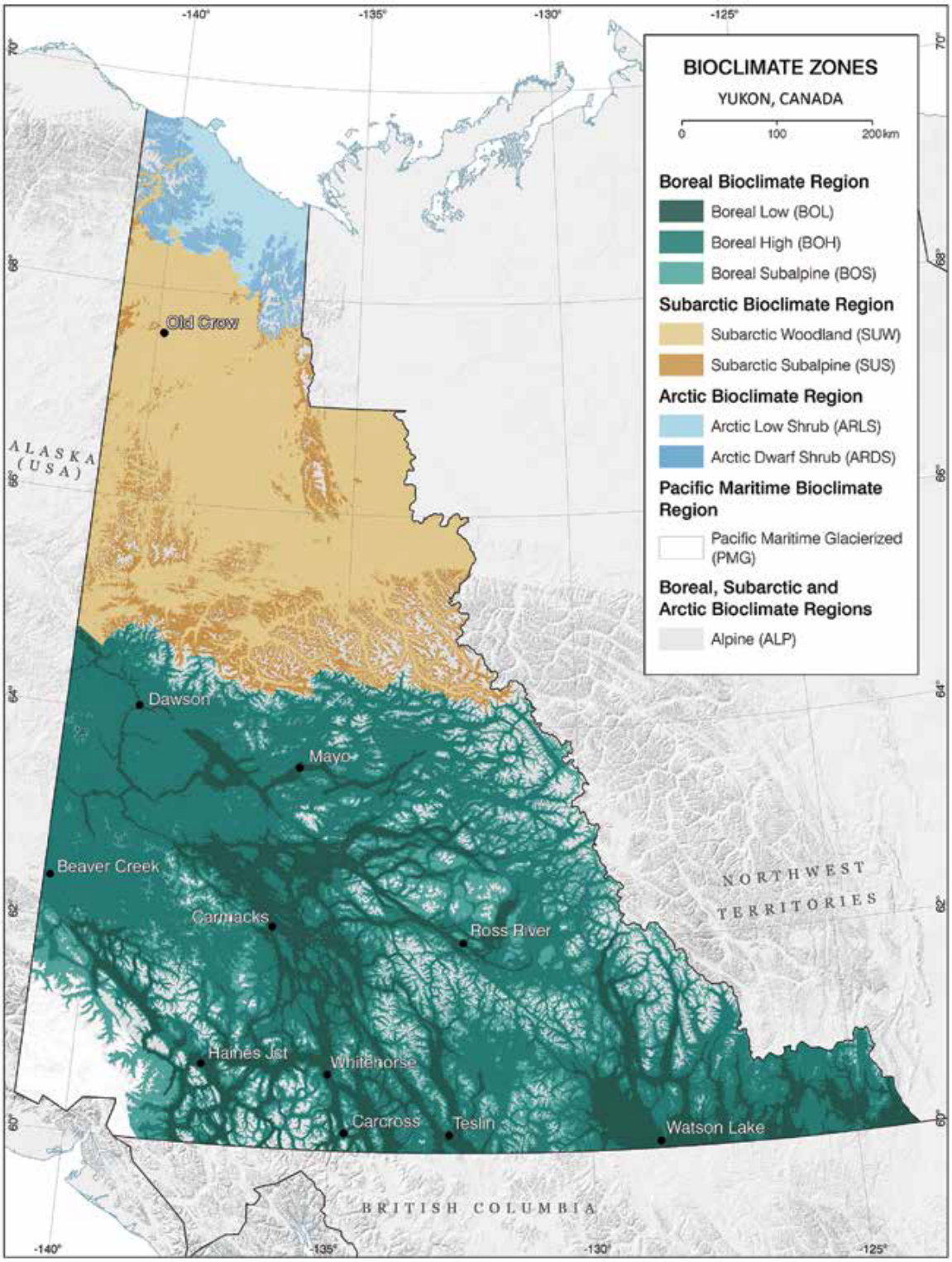

Figure 2. Yukon Bioclimate Zones
Source: Flynn and Francis, *Yukon Ecological and Landscape Classification and Mapping Guidelines Version 1.0*, 2016. Reproduced with permission.

The study area I am concerned with falls within the Boreal Bioclimate Region which includes the Boreal Low Zone, the Boreal High Zone, Boreal Subalpine Zone and the Boreal Alpine Zone (see Table 1). The Boreal High, Boreal Subalpine and Boreal Alpine are at higher elevations and the Boreal Low exists at lower elevations (Flynn and Francis 2016:7). Bioclimate Zones are later referenced in my analysis as environmental locations for archaeological sites.

Table 1. Bioclimate Zones in the Boreal Bioclimate Region

Bioclimate Zone	Code	Relative Elevation	Environmental Description
Boreal Low Zone	BOL	Low to middle elevations	Forested areas - typically mixed wood including aspen, white spruce, lodgepole pine. Wetlands.
Boreal High Zone	BOH	Middle to upper elevations	Open forested areas - typically subalpine fir, lodgepole pine, white spruce. Steep slopes, rolling plateaus.
Boreal Subalpine Zone	BOS	Moderate to higher elevations	Shrub communities, sparse tree cover - white spruce or subalpine fir.
Alpine Tundra Zone	AT	High elevations	Very High elevations: ice, snow, colluvium and bare rock; High elevations: cryptogams (i.e. lichens, mosses), dwarf and low shrubs, herbs. Above altitudinal treeline.

Note: Adapted from Flynn and Francis 2016:8-9

2.2. Study Area Modern Environmental Setting

For the purposes of modelling pre-European contact land use in southeast Yukon, the study area has been defined as the Kaska Dena ethnographic area, which encompasses an area of 111,700 km^2 located east of Whitehorse and Teslin, with the northern limits extending to the Hess River, the eastern limits to the Northwest Territories border and the southern limits being the southern Yukon border (Figure 1). Major population centres within the area are Ross River, Faro and Watson Lake. Two principal watersheds are represented, the Liard (Mackenzie) and Yukon drainages. The continental divide crosses through the eastern portion of the study area. Major water bodies are Hess River, Glenlyon River, Pelly River, Frances River, Ross River, Macmillan River, Frances Lake, Finlayson Lake and Little Salmon Lake. Frances Lake is the largest lake in the Liard River watershed (Smith et al. 2004).

This area falls within three ecozones and multiple ecoregions (Table 2). The western part associates with the Boreal Cordillera Ecozone, the eastern portion within the Taiga Cordillera Ecozone and, in the southeastern corner, is the Muskwa Plateau Ecoregion of the Taiga Plains Ecozone**.** The Don Creek Valley and Howard's Pass is within the Taiga Cordillera Ecozone.

Table 2. Ecozones and Ecoregions Within the Study Area

Ecozone	Boreal Cordillera Ecozone	Taiga Cordillera Ecozone	Taiga Plains Ecozone
Ecoregion(s):	Yukon Plateau-North Yukon Plateau-Central Pelly Mountains Liard Basin Hyland Highland Yukon Southern Lakes Boreal Mountains and Plateaus	Selwyn Mountains	Muskwa Plateau

Source: Adapted from Smith et al. 2004

Study area terrain is generally mountainous with elevations ranging between 229 – 2,940 m asl. Typical landforms include plateaus with areas of lowlands and wide valleys (Boreal Cordillera), deep valleys with ridges (Taiga Cordillera) and lowlands and rolling plateaus (Taiga Plains) (after Smith et al. 2004). Bedrock outcrops, colluvium and glacial tills are common surface materials. Wetlands also are common although the distribution varies. Major wetland complexes include Frances Lake and River, Sheldon Lake, and the Ross River, Tuchitua Beaver and Crow River Complex (Smith et al. 2004).

Climate and seasonality consist of short summers and long winters with a mean annual temperature of -4°C. Temperatures in the Boreal Cordillera Ecozone range from mean summer temperatures of 9.5 to 11.5°C to mean winter temperature of -13 to -23°C. Temperatures vary depending on aspect and elevation with lapse rate prevailing. The lapse rate is where temperature decreases as elevation increases. For the southern Yukon, there is a decrease of 6°C per 1,000 m of gain in elevation during April to October (Smith et al. 2004:23). At other times of the year inversion can take place. This is "a reversal of the normal lapse rate … [where the] … temperature, instead of being cooler with increased elevation, will remain isothermal through a vertical portion of the atmosphere or, in some cases, the temperature will actually rise with increased elevation" (Smith et al. 2004:23). Precipitation ranges from 200 – 700 mm annually.

Apart from the coastal mountain ranges in the Yukon, the Selwyn Mountains Ecoregion has the highest precipitation at 600 - 700 mm (Smith et al. 2004:151).

Brunisols are the dominant soil type but with luvisols, cryosols and regosols also present. Some areas lack soil altogether (Smith et al. 2004). Permafrost and its thickness differ across the study area. In the southwestern portion it is sporadic discontinuous (10-50%), in the central portion extending to the southeast it is extensive continuous (50-90%) and a small portion in the northeast is continuous (90-100%). In general, the thickness and distribution of permafrost increases as you go north (Smith et al. 2004:32). Greater degrees of permafrost occur in higher elevations within the Boreal Cordillera Ecozone (Smith et al. 2004). Permafrost first developed in the Yukon during the early Pleistocene glacial period (Burn 1993).

Vegetation ranges from boreal forest, including montane and open boreal forest, to open coniferous and mixed woodlands as well as subalpine areas with subalpine shrub lands to alpine areas with alpine tundra (Smith et al. 2004). Tree species include white and black spruce, paper birch, subalpine fir, balsam poplar and lodgepole pine. Other vegetation includes dwarf birch, willow, shrubs, dwarf shrubs, lichens, mosses, mountain avens, saxifrages, cottongrass and sedge-dominated meadows (Smith at al. 2004). The Muskwa Plateau located in the southeastern area is a bit unique in its “lush vegetation and high species diversity” (Smith et al. 2004:92). Vegetation absent in other parts of the Yukon can be found here such as devils club and fern meadows.

Common furbearers in the southern Yukon are coyote, wolf, fox, lynx, wolverine, river otter, marten, fisher, ermine, least weasel, mink, black bear, grizzly bear, snowshoe hare and collared pika. Cougars have been spotted occasionally in the Liard Basin. A variety of rodents inhabit the area including multiple vole species, muskrat, northern bog lemming, beaver, bushy-tailed woodrat, deer mouse, northern flying squirrel, hoary marmot, woodchuck, Arctic ground squirrel, red squirrel and meadow jumping mouse. Ungulate species include wood bison, mountain goat, Dall sheep, stone sheep, moose, elk, deer and Woodland Caribou (Smith et al. 2004). Fish species within the Yukon and Mackenzie/Liard river drainage basins are provided in Table 3.

Table 3. Possible Fish species in the Study Area

Fish Species (Species: N = native, I = introduced)	Drainage Basin	
	Yukon River	Mackenzie River Liard River
Chinook salmon (Onchorynchus tshawytcha)	N	
Chum salmon (Onchorynchus keta)	N	N
Coho salmon (Onchorynchus kisutch)	N	
Steelhead salmon/Rainbow trout (Onchorynchus mykiss)	I	
Lake trout (Salvelinus namaycush)	N	N
Arctic char (Salvelinus alpinus)	I	
Dolly Varden char (Salvelinus malma)	N	N
Bull trout (Salvenlinus confluentus)		N
Round whitefish (Prosopium cylindraceum)	N	N
Mountain whitefish (Prosopium williamsoni)		N
Pygmy whitefish (Prosopium coulteri)	N	
Lake (humpback) whitefish (Coregonus clupeaformis)	N	N
Broad whitefish (Coregonus nasus)	N	
Arctic cisco (Coregonus autumnalis)	N	N
Bering cisco (Coregonus laurettae)	N	
Least cisco (Coregonus sardinella)	N	N
Inconnu (Stenodus leucichthys)	N	N
Arctic grayling (Thymallus arcticus)	N	N
Burbot (Lota lota)	N	N
Northern pike (Esox lucius)	N	N
Longnose sucker (Catostomus catostomus)	N	N
White sucker (Catostomus commersoni)		N
Slimy sculpin (Cottus cognatus)	N	N
Spoonhead sculpin (Cottus ricei)		N
Walleye (Stizostedion vitreum)		N
Goldeye (Hiodon alasoides)		N
Lake chub (Couesius plumbeus)	N	N
Flathead chub (Platygobio gracilis)		N
Spottail shiner (Notropis hudsonius)		N
Emerald shiner (Notropis atherinoides)		N
Trout-perch (Percopis omiscomaycus)		N
Threespine stickleback (Gasterosteus aculeatus)	I	
Ninespine stickleback (Pungitius pungitius)		N
Longnosed dace (Rhinicthys cataractae)		N
Arctic lamprey (Lampetra japonica)	N	N

Note: Adapted from Smith et al. 2004

2.3. Study Area Palaeoenvironmental History

The southeast Yukon was glaciated under the Cordilleran Ice Sheet during the McConnell glaciation until approximately 10,000-15,000 years ago (Smith et al. 2004) Reconstruction of environment and past vegetation since deglaciation is taken from

biomes mapping of North America which was mapped based on preserved pollen, faunal and macrofossil remains (Dyke 2005). These were created starting from the last glacial maximum (18,000 ka BP) to current times. Biomes “are distinctive plant and animal communities that are named for their dominant plant types” and are “controlled by climate” (Dyke 2005:212).

The southern Yukon was entirely covered in ice until 14,000 BP. After that, “the pace of atmospheric warming and deglaciation quickened” (Dyke 2005:215). Around 13,000 BP small portions of the northwest portion of the study area, north of Faro and Ross River, as well as southeast segments were starting to transition to herb tundra vegetation. Herb tundra is defined as a “treeless area lacking shrubs other than small, prostrate willows and dominated by bare ground and herbs, typically sedge, grass, and sage with a variety of forbs; includes fellfield” (Dyke 2005:214). It also is notable that a large glacial lake formed in the southeast by the Yukon/NWT territorial border. This lake persisted from 13,000 BP to 12,000 BP and shifted further east.

Around 11,000 BP the central portion of the study area continued to be covered in ice while western and eastern regions had transitioned to deglaciated herb tundra and the southeast corner was a shrub tundra. Dyke (2005: 214) defines this as a “treeless area with a nearly continuous cover of sedge, grass, sage, and forbs along with prostrate and semi-erect willows as well as one or more additional shrubs, chiefly dwarf birch, alder, and juniper, in increasing order of required warmth” (Dyke 2005:214).

At around 10,000 BP the area is entirely ice-free and shrub tundra is the dominant vegetation type throughout. Western portions were transformed into boreal forest by 9,000 BP ago with nearly “continuous cover of trees dominated by northern conifers (mainly spruce, jackpine, larch, and fir) and northern hardwoods (mainly birch, aspen, poplar), broken by wetlands” (Dyke 2005:214). This trend continued until around 6,000 BP when the shrub tundra areas changed to forest tundra, a zone transitional between shrub tundra and boreal forest. This is the point where the biomes mostly reflect current conditions. It is notable that “biome boundaries have shifted slightly and their species compositions have changed in response to general late Holocene cooling, particularly during the last 3000 years” (Dyke 2005:215).

A large volcanic eruption centered at Mount Churchill near the Yukon-Alaska border in the Wrangell Mountains spread an ash layer across many parts of southern Yukon; new research has placed this eruption at around 1,117-1,100 BP (Jensen et al. 2014). This tephra deposit, known as White River ash, is a visible stratigraphic layer, ranging from 1-20 cm thick, found throughout the southern Yukon (Kristensen et al. 2019a). White River ash is used as an important stratigraphic marker for geological and archaeological reference (Jensen et al. 2014). It had substantial impact on regional ecology and indigenous peoples as later discussed. An earlier eruption occurred prior to this eruption around 1,689 and 1,560 cal BP (1,625 cal BP mean age), and deposited ash northwards (Reuther et al. 2019).

2.4. Don Creek Valley and Howard's Pass Study Area Environment

The Don Creek Valley and Howard's Pass area in which zinc and lead mining is proposed is within the Selwyn Mountains Ecoregion of the Taiga Cordillera Ecozone. The Selwyn Mountains Ecoregion encompasses portions of eastern Yukon as well as portions of western NWT and includes the Hess and Logan mountains. The elevation ranges from 745 – 2,970 m asl; the mean elevation is 1,380 m asl (Smith et al. 2004:149). The primary drainage in the development zone is Don Creek. Its headwaters are situated at Howard's Pass where the river flows north/northwest before joining the Pelly River. There are several unnamed tributaries flowing into Don Creek and a small lake locally named "Bob Lake" located in the alpine. The predominant terrain within Don Creek Valley and Howard's Pass includes long esker and knoll features as well as high, rugged alpine areas.

The climate within the Selwyn Mountains is complex due to its location along the continental divide. There is high annual precipitation ranging from approximately 600 – 700 mm and temperatures within this area can be extreme varying from 30°C to -55°C; the mean annual temperature range is –5 to –8°C. Approximately 20% of the land cover is alpine tundra, 65% boreal/subalpine coniferous forest and 15% rocklands. The vegetation in alpine areas can vary significantly within a small area due to "microtopography, microclimate and changes in bedrock lithology" (Smith et al. 2004:154). Common vegetation recorded at archaeological sites in the Don Creek Valley and Howard's Pass study area was balsam spruce, black spruce, subalpine fir, scrub

birch, willow, Labrador tea, cranberry, blueberry, kinnikinnick, crowberry, electrified cat's tail moss, feather moss, reindeer lichen, grass, and mosses.

This ecoregion and the “Selwyn Mountains possess the highest diversity of mammals in the Taiga Cordillera of the Yukon” (Smith et al. 2004:155). Ungulates critical to First Nations subsistence economy are the Tay River, Finlayson and Nahanni herds of Woodland caribou, moose, mule deer, mountain goats, Dall sheep and Stone sheep. Other mammals and rodents include grizzly bear, wolf, wolverine, beaver, hoary marmot, Arctic ground squirrel, red squirrel, meadow jumping mouse, northern flying squirrel, bushy-tailed wood rat and little brown myotis. There are a variety of birds and fish as well.

The bedrock geology on the Yukon side is “characterized by dark-weathering Paleozoic clastic sedimentary rocks of the Selwyn Basin tectonic assemblage, rather than the colourful Proterozoic and Paleozoic carbonate strata of the Mackenzie Platform in the Northwest Territories” (Smith et al. 2004:150). This ecoregion “was a centre of ice accumulation and intense glacial erosion during the McConnell glaciation of the Yukon” (Bostock 1966 in Smith et al. 2004). Peak glacial expansion occurred sometime after 26,000 years ago; deglaciation began in the uplands and lastly the valleys after 14,000 years ago. The processes after deglaciation created “flights of stream terraces and built alluvial fans…and mantles of colluvium on mountain slopes” (Smith et al. 2004:151). During the past few centuries during the Little Ice Age “cirque glaciers and rock glaciers advanced…[and] rock glaciers remain active in many areas” as well as alpine glaciers (Smith et al. 2004:151).

The upland areas within Howard’s Pass were starting to deglaciate by around 13,000 years BP and Howard’s Pass was likely deglaciated between 9,000 to 12,000 years ago (Jackson et al. 1991; Turner et al. 2008). It is thought the ice melted in the higher elevations first and the lowland areas within Don Creek were likely deglaciated soon after. Human occupation in the Don Creek Valley, as a consequence, could have occurred as early as 9,000 years BP.

Chapter 3. Ethnography and Archaeology

This chapter presents the cultural and archaeological background contexts for my thesis. I first review ethnographic and historical data for the Kaska Dena peoples focused principally on land and resource use. Second, I provide the culture historical sequence for the southern Yukon extending over the period since deglaciation. Finally, I synthesize archaeological research conducted in subalpine and alpine environments within the Yukon, the Northwest Territories, and Northeastern British Columbia. The latter review is by no means comprehensive of all high elevation research undertaken in western northwestern North America. It nevertheless provides a framework from which patterns of resource use and occupation in these environments can be identified to assist in the development of the southeast Yukon model of subalpine/alpine land use in Chapter 4.

3.1. Ethnography

The Kaska or Kaska Dena are Athapaskan speaking peoples whose traditional territory extends across the southeast Yukon, southwest Northwest Territories, and northern British Columbia. Communities within their territory include Ross River, Faro, Watson Lake, Lower Post and Good Hope Lake. Yukon Kaska First Nations include the Liard First Nation and Ross River Dena Council.

The following ethnographic review is largely compiled from Dawson (1889), Honigmann (1949, 1954, 1981), Gotthardt (1993) and Johnson (2008, 2010). George Dawson (1889), a geologist and surveyor with the Geological Survey of Canada in the 19th century had strong interests in natural history and indigenous cultures. While in the Yukon in the late 1880s (Dawson 1889), he provided the first ethnographic accounts of the Kaska. John Honigmann (1949, 1954, 1981) carried out ethnographic fieldwork among the Kaska in the late 1940s and his is the first and most detailed description of Kaska traditional culture. Johnson (2008, 2010) provides a more recent documentation of Kaskan ethnoecology focused upon Kaska environmental adaptations and how Kaska understand the land around them. Gotthardt's (1993) studies provided preliminary documentation of archaeological and traditional land use at Frances Lake, an important traditional fishing and hunting locale for the Kaska.

The Kaska were a highly mobile group, moving seasonally throughout their territory to exploit a variety of subsistence resources as these became available in different areas (Honigmann 1949, 1981; Johnson 2010:94-95). Importantly, the seasonal round saw movement from lowland locations to the uplands throughout the year, with both regions important to their subsistence economy (Johnson 2010:96). The traditional annual seasonal round saw the Kaska congregate at fish lakes during the summer. Here family and extended family groups would come to fish, aggregate and socialize (Honigmann 1949:39; Johnson 2010:95). Fish lakes provided a base camp and a steady food supply from which people could set out to hunt and conduct other activities (Honigmann 1949:39). Whitefish, sucker, trout, grayling, and jackfish were harvested as part of the lake fisheries (Gotthardt 1993; Honigmann 1964; Johnson 2010:95; Ives and Sinopoli 1980:29).

The Kaska used many techniques to obtain fish including angling, spearing, clubbing, shooting with bows and arrows, netting and the construction of fish traps and weirs (Honigmann 1981:443). Particularly important winter fisheries were located on the narrows of good fish lakes like Frances Lake (*Ti' Cho Mene*), which tended to remain open during the winter months. Nets were set here during November and December to catch schooling whitefish at these locations (Gotthardt 1993:3). There was also a caribou crossing located at the narrows on Frances Lake and the Kaska hunted caribou here in the fall and spring (Gotthardt 1993:5). Frances Lake provided a variety of other resources including moose, waterfowl and beaver as well as a range of plants for gathering.

In the late summer and fall people broke into smaller groups and travelled from the lowlands into the subalpine and alpine to hunt, trap and to gather various plants and berries. Caribou, moose, mountain goat, sheep, bear, marmot and ground squirrels (locally called gophers) were some of the animals hunted in these areas (Johnson 2010; Ives and Sinopoli 1980; Honigmann 1964). A more detailed list of mammals hunted or trapped is included below (Table 4).

Table 4. Mammal Resources Sought

Mammals	Scientific Name
Arctic Ground Squirrels	*Spermophilus parryii*
American Beaver	*Castor canadensis*
American Black Bear	*Ursus americanus*
Woodland Caribou	*Rangifer tarandus caribou*
Dall Sheep	*Ovis dalli dalli*
Grizzly Bear	*Ursus arctos*
Hoary Marmots	*Marmota caligata*
Canada Lynx	*Lynx canadensis*
American Marten	*Martes americana*
Moose	*Alces americanus*
Mountain Goat	*Oreamnos americanus*
Common Muskrat	*Ondatra zibethicus*
North American Porcupine	*Erethizon dorsatum*
Snowshoe Hare	*Lepus americanus*
Stone Sheep	Thin Horned Sheep

Beaver hunting and river fishing were activities that were conducted year-round (Honigmann 1964). Kaska people traveled to beaver creeks and lakes that were owned by different families, and this was an important part of their subsistence economy (Honigmann 1964:32). Hunting was also a year-round activity for the Kaska. Methods of hunting and trapping included spears, bow and arrows, clubs, slings, gaff hooks, snares, nets, and deadfalls. It also was noted that some Kaska groups may have used the atlatl (Honigmann 1981:443). Fences and surrounds were used to intercept caribou and sheep moving between their winter and summer ranges (Honigmann 1964:41-42).

Food storage was critical to winter survival for the Kaska. During the summer and fall, meat, fish, plants and berries were preserved and dried and stored in food caches located in the mountains for use during the winter. Caches consisted of basic structures such as piled rocks over a hole lined with spruce branches creating a cairn type cache. At other times meat would be attached to a tree and acted as a pole type cache (Honigmann 1949, 1964, 1981). When temperatures cooled, groups returned to a fish lake and spent the winter there (Honigmann 1949:39-40). Trips were taken to the alpine caches to retrieve food typically starting around January (Honigmann 1964). These

caches could be located up to “30 or more miles away” from the lake-side base camps (Honigmann 1964:32).

Plant resources were a necessary part of Kaska life, but they did not play as large a role as fish and animals in subsistence and seasonal round. Wood products were used in various forms of their technology including hunting implements, modes of travel (snowshoes, moose skin boats, dugout canoes and toboggans for example), caches, and shelters. Certain wood products were used for medicine and consumption; spruce gum was chewed, jackpine and spruce fibers and birch sap were consumed, and certain barks were used for medicine (Johnson 2010:103; Honigmann 1964:33). Berries such as crowberry, bog blueberries, high and low bush cranberry were abundant in their territory and were collected typically by woman during the summer and fall (Johnson 2008:154; Honigmann 1964:38). Later I provide (Section 4.2.4) a more in-depth review of flora and faunal resources sought by the Kaska.

The Kaska used a wide range of materials in their technology and material cultures including stone, bone, horn, beaver teeth, wood, bark, copper, antler, hides, and sinew (Honigmann 1964; MacNeish and Teit 1956; Gotthardt 1993; Ives and Sinopoli 1980). Honigmann notes that they may have lined spruce bark basketry with clay as well (Honigmann 1964:27). Obsidian, chert, jasper and siliceous rock are lithic materials used by the Kaska; chert was noted as being the most commonly used material (Honigmann 1964:16-24). A variety of tools were made from lithic materials including axes, adzes, scrapers, knives, crude pestles, large blades and net sinkers (Honigmann 1964:16-27; Ives and Sinopoli 1980:30). Honigmann reports that there were a “large numbers of chips and flakes" produced from stone tool manufacture as well (Honigmann 1964:16).

Kaska houses were structured by settlement mobility and the nature of temporary camps (Honigmann 1949:82). Typical structures include hide-covered conical lodges, inverted V-shape and A-type houses, lean-tos and snow dwellings. The Kaska may occasionally have occupied caves dug into sides of hills during the summer months (Honigmann 1964:61-63). Caches and sweat lodges were other types of principal structures (Honigmann 1964:60).

Alpine areas were considered an important place to the Kaska and traveling from lowland areas to the alpine was an integral part of the seasonal round as noted

(Johnson 2008, 2010; Honigmann 1954, 1964). The Kaska word for the alpine is *héskage* ‘on mountain’ (Johnson 2008:155). Alpine areas were “ecologically significant” and offered many resources, including a variety of plants, some being used for medicines, as well as alpine faunas (Johnson 2008:154; Johnson 2010:102). There are recorded foot trails linking important travel routes to areas in the alpine (Johnson 2010:102) showing the importance of movement between the lowlands and highlands.

3.2. Culture History

There has yet to be a comprehensive culture historical sequence developed for the southeast Yukon specifically. Workman (1978) proposed a culture history for southwest Yukon that is used as a general framework for interpreting the archaeological record for southern Yukon as a whole. For the early period (pre-dating the White River ash fall which occurred at about 1,100 BP) he “recognized two major and distinct lithic technologies, the Little Arm Phase of an unnamed tradition and the Northern Archaic tradition, with the boundary between the two occurring at approximately 5,000 BP” (Hare 1995:11-12). This chronology is still in development due to a lack of “well stratified archaeological sites containing datable organic deposits” in the southern Yukon (Hare 1995:1). Workman’s chronology has been supplemented by recent research, which has extended the archaeological record in southern Yukon back in time to the late Pleistocene (Easton et al. 2007, 2008, 2009, 2011; Thomas et al. 2018).

Eastern Beringian Tradition/Denali (14,000+ BP – 5,000 BP)

Eastern Beringian tradition occupations have been identified at two Yukon sites to date, one near Beaver Creek in western Yukon along the Yukon/Alaska border (Easton et al. 2007, 2008, 2009, 2011), where the sub-paleosol is dated to older than 14,000 cal year BP (Potter et al. 2017); a second site, dated between 12,700 and 13,500 cal BP is Britannia Creek, located on the middle Yukon River drainage (Thomas et al. 2018). Potter (2011; Potter et al. 2013, 2017) characterizes the Beringian tradition as marked by considerable technological variability including both microblade technology (Yubetsu technique) and bifacially flaked point technology reflecting adaptation to diverse resources and procurement strategies. Later in the Beringian tradition ca. 12,000 BP, Denali Complex technology, characterized by Campus technique microblade

production, becomes predominant, persisting to about 5,000 BP. Denali Complex is essentially equivalent to the Little Arm Phase (8,000–5,000 BP) as defined by Workman (1978). Characteristic artifacts include “microblades, tabular and wedge-shaped microcores, burins, geometric round-based points” (Heffner 2002:28). Sites tended to be small short-term camps (Heffner 2002).

The Taye Lake Phase/Northern Archaic Tradition (5,000–1,100 BP)

Workman’s (1978) Taye Lake Phase is subsumed with the Northern Archaic tradition; it constituting a southern variant (Clark 1991). Esdale (2008) suggests that the Northern Archaic ranges from 3,000 to 6,000 years BP based on archaeological sites from Yukon and Alaska. Although in the Yukon chronology, Northern Archaic is generally seen to persist up to the time of the White River ash fall. Notched projectile points are a hallmark of the tradition, although Esdale notes that microblade technology has been found at sites with notched projectile points. Around 4,500 BP people associated with this phase were thought to have inhabited the southern Yukon. According to Workman (1978) the Taye Lake Phase in general includes “all material pre-dating the fall of the volcanic ash and post-dating the displacement of the distinctive Little Arm Phase microblade, core and burin technology” (Workman 1978:379). Clark (1991) states that microblades and burins are absent but Workman (1978) notes that they may be present in earlier collections, and burins are sporadically found. Artifacts during the Taye Lake Phase seem to be “utilitarian” (Workman 1978:380). Common traits include projectile points that are usually “either notched or lanceolate with straight or slightly concave bases” (Workman 1978:379). Endscrapers, large bifaces and unifaces are abundant whereas gravers, heavy tools and cobble implements are more limited (Workman 1978:379-380). This is the only phase that endscrapers prepared for hafting are present (Workman 1978). Ground stone and abraders are rare, but bone tools are present in associated assemblages (Workman 1978).

The Late Prehistoric Period (1,100–50 BP)

The start of the Late Prehistoric Period, which Workman (1978) designates the Aishihik Phase (Hare 1995), coincides with the White River ash event around 1,100 BP. Previous chronology’s have used 1,250 BP for the White River ash fall but I have used 1,100 BP based on the most recent date of the White River ash (Jensen et al. 2014).

The eruption of Mount Churchill no doubt had an impact on the people and climate of the southern Yukon (Workman 1978). Archaeological assemblages in the Late Prehistoric Period incorporate an increase of bone and antler tools, multi-barbed bone points, stone wedges (pièces esquillées), boulder spalls, thin endscrapers, tabular bifaces, blunted discoids, flake blade cores and small stemmed points known as Klo-kut or Kavik points (Workman 1978; Hare 1995; Heffner 2002). Large bifaces and unifaces are rare and burins are rare to absent (Workman 1978:367). Bow and arrow technology is used during this period which replaces the previously used throwing dart technology. All of the bow and arrow technology, except for one outlier, found at ice patches in southwest Yukon date to later than 1,100 years BP (Hare et al. 2012:124).

Workman's (1978) Bennett Lake Phase sees the introduction of items of European manufacture in the proto-historic period after about 150 years ago. This signals the increasing involvement of the indigenous peoples of the southern Yukon in Russian and European trade through Tlingit middlemen in the Gulf of Alaska beginning in the late 18th century. For the Kaska, direct contact with Euro-Canadians occurred with the Hudson's Bay establishment of short-lived trading posts at Frances Lake (1842), Pelly Banks (1842) and subsequently with the influx of gold seekers after about 1880, culminating the Klondike Gold Rush of 1897-98.

3.3. Yukon Subalpine/Alpine Archaeology Review

3.3.1. Yukon Ice Patch Archaeology

Until 1997 there was limited archaeological study focused on subalpine and alpine environments in the Yukon. In 1997 a wooden dart shaft fragment and large amounts of caribou dung were found melting out of an ice patch on Thandlät Ddhäl, southern Yukon (Kuzyk et al. 1999:214). Interest and fieldwork in ice patch archaeology subsequently began. This type of research is now subsumed within the Yukon Ice Patch Research and Site Inventory Project, a collaboration between the Government of Yukon, Yukon First Nations (Champagne and Aishihik, Kluane, Carcross/Tagish, Kwanlin Dün, Ta'an Kwäch'än and Teslin Tlingit) as well as a variety of other researchers (Government of Yukon 2011; Hare et al. 2004). A total of 42 archaeological ice patch sites are now documented and monitored. Collaboration with the First Nations importantly has allowed for traditional knowledge to be applied to ongoing research.

Research elsewhere has shown that ice patches are global in distribution and similarly integrated into hunting strategies for a variety of resources (Dixon et al. 2014); caribou or reindeer hunting, however, appears to be the most common activity (Dixon et al. 2014:2).

An ice patch is an area of a perennial, non-glacial ice field that, through the summer months, provides a natural refuge for caribou to cool down and to avoid parasitic and other types of flies (Kuzyk et al. 1999, 2012; Greer and Strand 2012). For indigenous peoples in the past, ice patches were highly productive hunting sites as hunters could reliably predict the presence of these animals at these locations. Over time, as items were lost, discarded or otherwise deposited on these ice patches, they ultimately became frozen into its fabric. Global warming is now reversing that process with substantial melt out and recession of ice patches over the past three decades. The long-frozen deposits of an ice patch thus provide preserved organic remains rarely found in other archaeological sites. There have been hundreds of artifacts and faunal specimens recovered, indicating ice patch use in the southern Yukon extending back in time over the past 9,000 years (Hare et al. 2004:262; Greer and Strand: 2012:146). These were locales where people not only hunted big game, principally caribou and sheep, but additionally processed the carcass, leaving behind a number of artifacts.

Combining information from archaeology, ethnography and traditional knowledge, it has been possible to provide a framework for the interpretation of prehistoric hunting at southern Yukon ice patches (Hare et al. 2004:262). The ethnographic record indicates that, besides hunting, people were also trapping other animals and gathering particular plants (Hare et al. 2004:261). Archaeological sites in nearby lower elevations suggest still other types of activities (Hare et al. 2004). Greer and Strand (2012) propose that lower elevation sites were small, short-term base camps. In 2004 it was suggested that all of the ice patch hunting sites were within 10-15 kilometres or less of known archaeological sites in lower elevations, with most being sites located on lakes. To date there is no archaeological evidence at ice patches that suggests people were spending long periods of time there or setting up camps on the ice (Hare et al. 2004:262). Faunal remains and the large amounts of dung (caribou, sheep and bison) present at these locales today anticipate large numbers of animals in the past. The majority of the faunal remains are caribou and sheep, but a few specimens of other mammals, rodents and birds have also been collected (Hare et al. 2012). The

presence of caribou and caribou hunting in the alpine is reported in traditional narrative, but caribou are not as common in these areas at present (Greer and Strand 2012:139).

Hunting implements, including blinds, are material evidence facilitating insight into past hunting activities (Greer and Strand 2012:141). This includes both bow and arrow and atlatl (throwing dart) technologies as noted (Hare et al. 2012:121). Relative to the latter, Hare et al. (2012: 134) identifies three different dart construction techniques, “one-piece, darts with foreshafts, and segmented darts”. Other artifacts found include a wooden bow, wooden arrow and dart shafts, stone projectile points, antler and bone points, microblade core, lithic debitage, antler tines, feathers, sinew, a moccasin and a musket ball (Hare et al. 2012:121). Artifact assemblages and associated dates suggest “that hunting technology using throwing darts (atlatl) was abruptly replaced by bow and arrow technology between about 1200 and 1100 14C yr BP” (Hare et al. 2012:133). This technological change roughly coincides with the White River ash fall around 1,100 BP.

Unlike southwest Yukon, perennial ice patches have not been recorded in southeast Yukon. Ice patch reconnaissance surveys in 2004 and 2005 within the southeast Yukon, including portions of the Selwyn Mountains, Pelly Mountains and the Hess Mountains, yielded negative results for perennial ice patches with visible deposits of caribou dung which has been an indicator used to identify archaeological ice patches (Hare et al. 2012:121). Alpine snow was noted in these regions as well as caribou, but it appeared that these areas of alpine ice were too steep and high for people or animals to be present at these locations (Hare 2007:15). Ice Patches on Mount Mye were investigated but no faunal materials or artifacts were found.

The lack of ice patches in southeast Yukon may be due to different terrain and climate of this region which did not favour the formation and/or preservation of these features compared to the rest of southern Yukon. It was noted during reconnaissance flights of ice patches in the Selwyn Mountains that “alpine snow at the ideal elevations (1500-2000 m) completely melts in the summer months” (Hare 2007:15). This difference may have led to different alpine land use patterns in these regions; this will be discussed and considered later in the thesis.

Beyond the ice patch sites, there is ample ethnographic and historic documentation for caribou hunting in alpine and subalpine settings in the southern

Yukon. However archaeological evidence of this activity is meagre, either due to lack of investigation or due to the lack of preservation compared to that found in ice patch contexts. Archaeological visibility factors into this as well as occasional lost arrow and spear points would leave only isolated traces in a range of widely scattered locations. Hunting blinds, which consist of boulders placed in semi-formed rings, have been found in apparent association with a few ice patches in southwest Yukon, in particular including Granger (JdUt-17), Friday Creek (JcUu-1) and Alligator (JcUn-2) (Hare et al. 2004:262). Hunting blinds have also been recorded in a non-ice patch setting at an elevation of ~1,900 m east of Thandlät in the mountains between Kusawa and Rose Lake (Kuzyk et al. 1997:218), on Lime Peaks, east of Lake Laberge (Greg Hare, personal communication 2018) and the Richardson Mountains (Hare 2007:52). The presence of hunting blinds at several ice patch locations may indicate different strategies of procurement were in use and/or the hunting of different game species (i.e. sheep).

3.3.2. Heritage Inventories in the Subalpine/Alpine

In the northeast portion of the study area an archaeological survey of the Macmillan Pass and North Canol Road area, was conducted in 1981 by Greer (1982) and Gotthardt (1981). One of the goals of the projects was to “assess regional patterns in site locations, sizes, stratigraphy, and complexity” (Greer 1982:4). These studies provide a good overview of regional archaeology, contain applicable background information of relevance and will help contribute to the model for alpine/subalpine use.

Fifty-five archaeological sites (54 precontact, 1 historic) in total were identified during this study. Due to the large study area there was a large variety of site types recorded. It is important to note that higher elevation areas within the study area such as mountain tops and high mountain plateaus were noted as underrepresented in the sample set of areas examined. The majority of sites are lithic scatters. Other site types include small hunting/fishing base camps, lithic processing sites, hunting lookouts, processing stations, campsites, hunting camps, family base camps and transitory hunting camps. Archaeological deposits were located above and below the White River ash although the majority were found below. In general, smaller sites were located on bedrock knobs, knolls, river terraces and so on, whereas the larger sites were almost always located beside a lake.

Overall, sites were small in size and “two out of every three sites found here appear to cover an area of less than 10 to 15 square metres” (Greer 1982:59). Mid-sized sites were defined as being between 6 and 100 m^2 in area. Larger sites adjacent to lakes were a “few hundred square meters” in size (Greer 1982:59). Greer suggests the larger sites likely represent “family hunting/fishing base camps” on lakes whereas the smaller sites located on a variety of landforms are likely “single or limited activity sites” (Greer 1982:60). Greer relates site size to the availability of resources in the area such as fish, game and lithic materials. She suggests that, although sheep, caribou and moose were present, the numbers of these animals “could not support a very large aggregation of people for a prolonged period of time” (Greer 1982:84). There were also no known caribou migration routes through this area. Low resource availability could be the reason why it appears that human activity was limited in Macmillan Pass compared to other mountain passes in the region such as Anaktuvuk and Atigun Passes in the Brooks Range (Greer 1982).

Other research conducted by Greer that contributes to this thesis includes a heritage study for a mine development in southeast Yukon (Greer 1996). That study provides traditional land use data which offers some insights into land use in the alpine and subalpine. This data noted that the Ross River Dena travelled within the Pelly Mountains including Grass Lakes, North Lakes, “Sheep Mountain” and Fire Lake areas. Hunting camps were the primary site types within these regions and were noted as being “situated close to key resource features or areas” such as mineral licks (Greer 1996:23). Other key resource features include caribou habitat that exist within known “winter grazing routes” (Greer 1996:24). Shorter term hunting camps were typically found at higher elevations and the favoured locations at these higher elevation sites were at the “edge of tree line” (Greer 1996:25). Fences, snares and hunting blinds were discussed as methods of hunting caribou and sheep.

3.4. NWT Subalpine/Alpine Archaeology Review

In the Northwest Territories the University of Alberta, Prince of Wales Northern Heritage Centre (PWNHC), and the Tulita Dene Band have conducted archaeological surveys at several ice patch sites in the Selwyn and Mackenzie Mountains near the Yukon/Northwest Territories border and O’Grady Lake (Andrews et al. 2012a, 2012b). Twenty-eight sites are currently recorded, and ice patch monitoring is an ongoing

program of the Prince of Wales Northern Heritage Centre. The key topographic feature at archaeological ice patches in the Selwyn Mountains is their location “just beneath the crests of domed mesa-like summits that rise gently from high alpine valleys” (Andrews et al. 2012a:17). This provided “favourable topography” as well as a “topographic advantage” for the hunters, particularly for stalking animals at close range by using the crests of the hills as cover (Andrews et al. 2012a:17).

The recovery of well-preserved artifacts from Northwest Territories ice patch studies is similar to that in the Yukon. This includes bows and arrows, throwing darts, stone projectile points and faunal remains (Andrews et al. 2012a:9). There was also a snare found at an ice patch in the Northwest Territories (Andrews et al. 2012a:9); snares have not been found at Yukon ice patches yet. The dominant fauna represented is caribou but sheep, moose, wolverine, marmot and ground squirrel also are present. From one of the sites, a proximal end of a birch dart was radiocarbon dated to 6,040 years BP; this is the oldest date yet recovered from ice patch work in the Northwest Territories. In 2012 a series of radiocarbon dates were acquired from wood specimens associated with atlatl and bow/arrow assemblages recovered from an ice patch in the Selwyn Mountains. These provide a range for dart technology of 2,157 – 2,699 cal. BP while arrow technology postdates 904 cal. BP (Andrews et al. 2012a:15).

Research conducted in 2012 and 2014 by staff of the Prince of Wales Northern Heritage Centre at O’Grady Lake, near Fort Smith in the Mackenzie Mountains examined the relationship between alpine caribou hunting and lowland camps. Four of the ice patch sites were noted as being less than 16 km from O’Grady Lake and easily accessible from the valley bottoms (Andrews et al. 2012a:17). This pattern is the same as that in the Yukon where “the ice patches used by precontact hunters tend to be located near other important resource extraction areas and travel corridors, particularly fish lakes with evidence of precontact use” (Andrews et al. 2012a:17). Three seasons of test excavations at the lowland sites recovered a variety of stone tools including a spear head, microblades, scrapers, and stone knives (PWNHC 2017). Raw materials, including cherts, obsidian and fused clinker, indicate “long distance trade or seasonal movements” (PWNHC 2017). Test excavations completed at several of the sites between 2012 and 2015 suggest that small groups were utilizing the area over a period of several thousand years to hunt caribou and birds and to fish (PWNHC 2017).

Northwest Territories research has focused as well on alpine ice patches and Shúhtagot'ine or Mountain Dene land use (Andrews et al. 2012b). The traditional territory of the Shúhtagot'ine included 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" (Andrews et al. 2012b:24). Prior to the historic fur trade era, Shúhtagot'ine people spent most of their time, typically seven to eight months of the year, in the mountains. Shúhtagot'ine continue to hunt sheep, moose caribou and other animals in these areas today (Andrews et al. 2012b:24). This study "underscores the potentially important role that detailed traditional land-use data can play in generating hypotheses about the archaeological record" (Andrew et al. 2012b:39).

Chapter 4. Constructing a Subalpine/Alpine Archaeology Model for Southeast Yukon

4.1. Modelling Subalpine/Alpine Archaeology

Available environmental data, ethnographic records and archaeological research for high elevation environments are used to develop a model of subalpine and alpine land use for the southeast Yukon. Two Master's theses serve as precedents for this task. These are *Extreme Archaeology: The Results of Investigations at High Elevation Regions in the Northwest* by Rudolph Reimer (2000) at Simon Fraser University and *An Archaeological Perspective on Alpine/Sub-Alpine Land Use in the Clear Range and Pavilion Mountains, South-Central British Columbia* by Anthony Vanags (2000) at the University of British Columbia.

The Reimer thesis explores the use of high subalpine and alpine environments through an archaeological and ethnographic lens. It provides a good overview of archaeological case studies conducted at high elevations in Northwest Canada including areas of British Columbia, Yukon and Northwest Territories. In this, he presents multiple case studies of archaeological research at high elevation locales illustrating the importance of these areas for a variety of activities including resource gathering and extraction, hunting and spiritual purposes. He is concerned not only with the diversity of pursuits being undertaken, but their location, subalpine versus alpine, and the landforms they were located on. Reimer's goal was "designed to formulate a survey methodology and series of theoretically proposed archaeological site types for high elevation areas in the Northwest" (Reimer 2000:221). Through this he encourages archaeologists to give more attention to high altitude sites and their importance in the archaeological past of First Nations peoples.

Reimer's review of archaeological sites in the Northwest suggest high elevation resources have had a substantive impact on the nature of regional cultures. They influence regional settlement patterns, enhance availability of lithic, faunal and floral resources and result in strong ideological ties to mountainous areas (Reimer 2000, 2018). In a general sense, he found that high altitude sites typically occur in close proximity to specific resources or area with multiple resources. Site locations also were

consistently found in cirque basins/tarns and along ridge tops within subalpine environments (Reimer 2000:221).

Reimer (2000) goes on to propose a model of site location and use from archaeological and ethnographic information. As integrated into Table 5, it takes into consideration nine variables ranging from fauna/flora distributions to slope and aspect, to traditional place names (see Table 5). This, then, allows him to hypothesize ten types of archaeological sites that, potentially, are present in subalpine/alpine locales (Reimer 2000:90-97). These are 1) multitask residential base camps, 2) limited task field camps, 3) low use hunting locales, 4) butchery sites, 5) lithic procurement and reduction locations, 6) cairns and talus feature locales, 7) culturally modified trees, 8) plant processing locales, 9) trails and 10) isolated finds.

Table 5. Variables Affecting Site Distribution in High Elevation Areas for Consideration in Predictive Model for Site Locations

Note: Adapted from Reimer 2000

Flora and faunal distributions - people will exploit different environments including subalpine and alpine environments in search of particular plant and animal resources.
Elevation - determines different environmental zones affecting the distribution of plants and animals and past human activities.
Slope and aspect - also related to the distribution of plants and animals. Reimer (2000:86) notes that "Steep slopes and northerly aspects will have a significantly lower potential for archaeological sites, than relatively flat, dry, southerly facing slopes".
Accessibility – the density of sites in subalpine and alpine areas is conditioned by available access from lowland areas.
Geological exposure - areas with available lithic source materials including tool stone and materials for construction of shelters, cairns or for ritual purposes will have a higher probability for site occurrence. Alpine areas with less ground cover and surface exposures will likely have less archaeological sites than subalpine areas due to greater "paleoenvironmental fluctuation".
Degree and sensitivity of paleoenvironmental fluctuation - plant and animal communities are subject to change in response to geological processes and environmental transitions, especially as they relate to glacial events. Documenting this type of change is imperative to predictions of landscape use and site locations.
Soil types - soil types influence plant communities which in turn influence animals. Where better soil conditions exist, there will likely be "more productive plant and animal communities and people".
Distance to important resources - distance to important and limited resources including fuel, water, the tree line and other archaeological sites are all factors that can determine archaeological site locations.
Ethnographic place names - archaeological sites at higher elevations have been found in areas associated with ethnographic place names. This, then, can be used to locate new archaeological sites.

In a similar type of MA thesis at University of British Columbia, Vanags (2000) examines and models land use of alpine and subalpine locales in the Clear Range and Pavilion Mountains of south-central British Columbia. He examines ethnographic records, archaeological site records, recovered artifacts, fauna and other features to infer aspects of subsistence economy and settlement pattern in these two mountain zones. His ultimate goal was to compare locations and "determine the classes of sites found in the Alpine/Subalpine zones and to determine if there is any variation in how these zones were used in different regions" (Vanags 2000:48). Like Reimer, he identifies a series of archaeological site types for comparison. These incorporate 1) rock cairns and burials, 2) lookouts, 3) generic hunting sites (two types), 4) hunting blinds, 5) base camps, 6) processing sites, 7) rock shelters and 8) locus sites. Each is coded for artifact types, archaeological features and environmental considerations (Vanags 2000: 29). As he reports, use of subalpine/alpine resources in his study area begins in the middle prehistoric period (7,000 BP) but where most sites are associated with the late period (3,500-200 BP). His (2000:48) analysis indicates hunting was an essential activity in both the Clear Range and Pavilion Mountain. There nevertheless was variation in the degree to which plant food were gathered, with this being more prevalent in sites recorded in the Clear Range. For Vanags (2000:49), subalpine and alpine environments were "an important part of the seasonal round, and that the resources from all of the environmental zones were used as part of the subsistence strategies". He also emphasizes that resource exploitation and sites will vary between higher (subalpine and alpine) and lower elevations areas (intermediate grasslands) as well as in different regions within these areas.

Modelling approaches utilized by Reimer and Vanags have been adapted and integrated into the southeast Yukon model developed in this thesis.

4.2. Ethnographic Records Review Results for Southeast Yukon

A review of available ethnographic records for the Kaska of the southeast Yukon was conducted as a first step to constructing the southeast Yukon land use model. Principal sources included Honigmann (1949; 1964; 1981), Ives and Sinopoli (1980) and Gotthardt (1993) as well as complimentary work in ethnoecology by Johnson (2008; 2010). Activities or land use noted during the review were compiled into an Excel

spreadsheet, with comments and references (Appendix A). The time of year that the activity was undertaken, and the environmental setting of activities are recorded where possible. These data are organized by different types of activities and land use to derive site types. Artifacts associated with site type are identified directly from the literature or inferred based on activities.

4.2.1. Ethnographic Site Types

Table 6 provides the ethnographic derived site types in reference to a variety of variables from season of use, to associated artifacts and features, to environmental context. From the different site types, it can be seen that the Kaska conducted activities in several environmental locations throughout the year, moving between upland and lowland areas. The alpine and subalpine were used for different activities and to exploit a range of resources dependent on the seasonality or peak availability of that resource. During the summer and fall, trips were made to the alpine and subalpine to gather plants and berries. In late summer the Kaska also would make trips from the lowlands to hunt in higher elevations. There are many different types of hunting sites that were noted, these sometimes associated with specific vegetation and landscape features including alpine meadows, “rock mountain”, “grass topped mountain” (Johnson 2010:102), mineral licks, sloughs (*ts’ele, tɪli*) and open wet meadows or swamps (*tūtsel*). Other hunting sites were discussed in relation to the particular resource that was being sought including, bears, beaver, moose, caribou and sheep. The only site type that would not be located in alpine or subalpine environments is the base camp, this is typically located in the lowlands near fish lakes.

Table 6. Ethnographic Site Types and Attributes

Site Type		Season of Use				Features								Artifacts								Associated Environmental Context: Bioclimate Zone			Associated Environmental Context: Enivronmental Feature												
		Spring	Summer	Fall	Winter	Stone caim	Pole type cache	Hunting Fence/Surround	Deadfalls	Pitfalls	Hearths	Habitation Structure	Cooking pits	Hunting implements	Fishing Implements	Tool maintenance/debitage	Nets	Snares	Cooking tools	Faunal Remains	Fire cracked rocks	**Boreal Alpine Tundra**	**Boreal Subalpine**	Boreal High Zone/Boreal Low Zone (Lowlands)	Alpine Meadow	Ravine	Near game trail	Near berry patch	Near a lake	Near a creek	Near a river	Swamps	Sloughs	Meadows	Mineral Lick	Wetland	Vantage Point
Food Cache		**x**	**x**	**x**	**x**	**x**	**x**							x		x				**x**		**x**														
Berry Sites			**x**	**x**																		**x**	**x**	**x**				**x**								
Plant Gathering Sites		**x**	**x**	**x**	**x**																	**x**								**x**		**x**				
Hunting Sites	Hunting Fences/surrounds			**x**	**x**	x		**x**			x			**x**		**x**		**x**		**x**		**x**	x	**x**		**x**	**x**							**x**		
	Hunting Site - Alpine/Subalpine		**x**	**x**					**x**	**x**	x			**x**		**x**	**x**	**x**		**x**		**x**	**x**													
	Hunting Site - Alpine Meadows		x	x										**x**		**x**				**x**		**x**			**x**									**x**			
	Hunting Site - Bear		x	x										**x**		**x**		**x**		**x**			x	x				**x**									
	Hunting Site - Beaver	**x**	**x**	**x**	**x**						**x**		**x**	**x**		**x**		**x**	**x**	**x**	**x**		x	**x**					**x**	**x**							
	Hunting Site Lookout - "Rock Mountain"		**x**	**x**	**x**						x			**x**		**x**				**x**	x	**x**														**x**
	Hunting Site Lookout - "Grass Topped Mountain"		**x**	**x**							x			**x**		**x**				**x**	x	**x**														**x**
	Hunting Site Lookout - Mineral Lick			x				**x**			x			**x**		**x**		**x**		**x**	x		x				**x**							**x**		**x**
	Hunting Site Lookout - Sloughs			x							x			**x**		**x**				**x**	x		x	**x**			**x**			**x**		**x**				**x**
	Hunting Site Lookout - Open Wet Meadow/ swamps			x							x			**x**		**x**				**x**	x		x	**x**			**x**				**x**		**x**		**x**	**x**
Base Camp - Fish Lake		**x**	**x**		**x**						**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**			**x**					**x**								

*Compiled from Honigmann 1949, 1964, 1981; Ives and Sinopoli 1980; Johnson 2010

Note: Bolded '**x**' denotes data taken from ethnographies; un-bolded 'x' is an inferred trait

4.2.2. Expected Archaeological Site Types from Ethnographic Record

Ethnographic data subsequently were grouped in Table 7 into generalized site types to identify the characteristics of potential archaeological site classes in alpine/subalpine areas. This resulted in six types consisting of food caches, plant/berry collection sites, base camps and three different types of hunting sites, including fences/surrounds, lookouts and generic. The last is a combination of the different types of hunting sites that do not fall under lookouts or fences/surrounds.

Table 7. Expected Archaeological Site Types

																					Associated Environmental Context																				
Site Type	**Season of Use**				**Features**								**Artifacts**								**Bioclimate Zone**			**Environmental Feature**																
	Spring	Summer	Fall	Winter	Stone cairn	Pole type cache	Hunting Fence/Surround	Deadfalls	Pitfalls	Hearths	Habitation Structure	Cooking pits	Hunting implements	Fishing Implements	Tool maintenance/debitage	Nets	Snares	Cooking tools	Faunal Remains	Fire cracked rocks	**Boreal Alpine Tundra**	**Boreal Subalpine**	Boreal High Zone/Boreal Low Zone (Lowlands)	Alpine Meadow	Ravine	Near game trails	Near berry patch	Near a lake	Near a creek	Near a river	Swamps	Sloughs	Meadows	Mineral Lick	Wetland	Vantage Point
Food Cache	**x**	**x**	**x**	**x**	**x**	**x**							x		x				**x**			**x**																
Plant/Berry Collection Sites	**x**	**x**	**x**	**x**											x						**x**	**x**	**x**				**x**			**x**		**x**						
Hunting Site - Fences/Surrounds			**x**	**x**	x		**x**			x			**x**		**x**		**x**		**x**		**x**	x	**x**		**x**	**x**								**x**				
Hunting Site - Lookout		**x**	**x**	**x**			**x**			x			**x**		**x**		**x**		**x**		**x**	x	**x**			**x**				**x**	**x**	**x**		**x**	**x**	**x**		
Hunting Site - Generic	**x**	**x**	**x**	**x**				**x**	**x**	x		**x**	**x**		**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**			**x**	**x**	**x**				**x**					
Base Camp	**x**	**x**		**x**						**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**	**x**			**x**					**x**											

*Compiled from Honigmann 1949, 1964, 1981; Ives and Sinopoli 1980; Johnson 2010

Note: Bolded 'x' denotes data taken from ethnographies; un-bolded 'x' is an inferred trait

Food Cache Sites

Meat and plants were preserved and stored in caches placed in upland areas in the late summer and fall. Trips would be taken to caches in the winter and spring to retrieve food from them. As described previously, caches were typically excavated into a dry slope, lined with spruce boughs and then covered with large boulders (Honigmann 1949, 1964, 1981). Caches were typically found at treeline as wood was needed to create some of these features. There was no mention of other activities conducted at the cache locations, but hunting did take place in the alpine during the winter when people were traveling to these caches to retrieve food. It is possible that hunting implements and debitage from tool maintenance could also be present at food cache sites because of this.

Plant/Berry Collection Sites

Plants and berries were collected throughout the year in a variety of different environmental locations including the alpine and subalpine. Johnson (2010:102) notes that the Kaska traveled into the mountains to seek out particular berries and medicines. Other ethnographic research focussing on ice patches in southwest Yukon also reports gathering activities in the mountainous areas adjacent to these features (Hare et al. 2004). Gathering activities leave few physical traces on the landscape making it difficult to discern this type of activity in the archaeological record. It is probable that people maintained or manufactured stone tools for gathering activities, and these may be present in nearby sites. In some cases, plant processing may have taken place as part of the gathering process and hearth or other features may be present.

Hunting Site - Fences/Surrounds

The Kaska used hunting fences and surrounds to hunt caribou and mountain sheep (Honigmann 1964:42). Caribou, moose and mountain sheep were driven into these constructions where they would be snared or shot (Johnson 2010:99; Honigmann 1964:33,42). Hunting fences and surrounds were used in subalpine and alpine areas and were often located near game trails or ravines (Johnson 2010; Honigmann 1964). Hunting fences were used at mineral licks as well and were sometimes used in combination with moose or caribou snares (Honigmann 1964:33). There may be physical traces of these features left on the landscape if stone lines were part of fence construction, but wood fences will degrade over time. Hunting implements and debitage

from tool maintenance will be present at this type of site and caches might also be found.

Hunting Site – Lookout

A variety of different lookout sites used for hunting were noted in the ethnographic record. Lookout sites provided a good vantage over the surrounding area for hunting purposes. Hunting lookout sites were located in higher elevations as well as at a variety of other environmental locations in the lowlands. Johnson (2010) noted that the Kaska identified different lookout locations using different terms. This included “rock mountain” which was “good escape habitat for sheep” (Johnson 2010:102) and “grass-topped mountains” which were good habitats for animals including sheep and caribou. These locations could have been visited to seek out different types of animals including moose, caribou and sheep. Mineral licks, sloughs, open wet meadows, swamps and locations near game trails were all noted as good locations for hunting and, would include vantage points for hunters to keep watch. Johnson (2010:99) specifically reports that "[l]icks are an important class of Kaska place” for their abilities to attract animals. Hunting fences and snares were sometimes used. Hunting tools and debitage from tool maintenance should be present and demarcate these types of sites. It is also possible that people camped at these locations and that occupation features including hearths and fire cracked rock will be present.

Hunting Site – Generic

A generic hunting site is a combination of the different types of hunting sites that do not fall under lookouts or fences/surrounds. Generic sites include specific locations where animals including bears, beavers, Arctic ground squirrels, caribou and moose could be encountered or easily trapped or killed. This encompasses a variety of environmental locations including those in higher elevations as well as in the lowlands. Berry patches were noted as being a good place to snare bears (Honigmann 1964:33). Alpine meadow slopes were sought out for gophers as they “were formerly a valued food and fur resource” and were also considered “spiritually powerful because of their closeness with the earth” (Johnson 2008:154). Specific types of streams and lakes were critical to the beaver hunt. Beavers were an important resource to the Kaska and were obtained year-round. Hunting tools and debitage from tool maintenance may be present

at these types of sites while on-site butchering activities might also result in a variety of stone tool types or faunal remains.

Base Camp

Base camps are the only site type not likely to be located in the subalpine and alpine environment as noted. These typically are found on lowland lakes where fish could be caught. Multiple groups would also aggregate for social and other types of interactions (Honigmann 1949:39; Johnson 2010:95). A good base camp provided a secure food supply from which hunters could be dispersed and other types of gathering activities pursued (Honigmann 1949:39). The Kaska used many techniques to obtain fish including angling, spearing, clubbing, shooting with bows and arrows, netting and trapping (Honigmann 1981:443). A full range of stone tools, debitage, residential features, fire-cracked rock and possibly faunal remains will be present at these types of sites. Base camps are most often long-term occupations where substantial archaeological deposits may have accumulated.

4.2.3. Expected Artifact Types

A summary of Kaska tool technologies and the materials from which these were manufactured is provided in Section 3.1. Stone, bone, horn, beaver teeth, wood, bark, copper, antler, hides, and sinew provided the foundation from which Kaska material culture was manufactured (Honigmann 1964; MacNeish and Teit 1956; Gotthardt 1993; Ives and Sinopoli 1980). Obsidian, chert, jasper and siliceous rock are lithic materials employed by the Kaska; chert was noted as being the most commonly used material (Honigmann 1964:16,24). Stone tools and tools made of copper are more likely to be found in the archaeological record due to the poor preservation of organic materials in regional soils. Table 8 lists artifact types that, potentially, can be found in the archaeological record as recorded in ethnographies or inferred from activities being undertaken.

Table 8. Expected Tool Types

Tools Made from Lithics	Tool Made from Organic Materials
Adzes	Antler and bone arrow points
Axes	Various tools and tool handles/hafts made of antler, bone, horn and wood
Scrapers	Beaver tooth (used as a drill)
Burins	Wooden spear or arrow shafts
Gravers	Bone scrapers
Projectile points	Bone/antler awls
Knives	Bone/antler wedges
Crude pestles and anvil stones	Bone thimble
Expedient flake tools	
Net sinkers	

4.2.4. Resources Sought by the Kaska

Arctic ground squirrels, beaver, black bear, caribou, Dall sheep, grizzly bear, hoary marmot, lynx, marten, moose, mountain goat, muskrat, porcupine, snowshoe hare and stone sheep are some of the primary faunal resources sought by the Kaska (Table 9) (Johnson 2010, 2008; Ives and Sinopoli 1980; Banfield 1974; Honigmann 1981, 1964, 1949). A number of these animals travel between the lowland zones and the subalpine and alpine throughout the seasons; mostly spending summers and fall in the subalpine or alpine zones and moving to the lowland areas during the winter. The Kaska would travel to the mountains in late summer and fall to harvest a number of these animals including marmots, goats, sheep, caribou, and Arctic ground squirrels (Honigmann 1981). The alpine and mountains are “strongly associated with caribou and caribou hunting for Kaska” (Johnson 2008:154). Owl, goose, duck, ptarmigan, eagle, crane, swan, loon, spruce hen and willow grouse were also noted as resources that were sought (Honigmann 1964). Fish were also harvested including whitefish, sucker, trout, grayling, and jackfish (Gotthardt 1993; Honigmann 1964).

The Kaska collected a number of plants and berries for eating, technology or for medicinal purposes (Table 10). A number of these resources were obtained from either subalpine or alpine environments including lowbush cranberry, blueberry, crowberry, soapberry, salmonberry, raspberry, strawberry, fern roots, Lily bulbs, "Muskeg apples", wild rhubarb, Labrador tea, and spruce. Some plants found in the alpine like moss

campion were a culturally significant plant that was used as an indicator for ground squirrel habitat (Johnson 2010, 2008; Honigmann 1964).

Table 9. Faunal Resources Sought

Resource	Other Names	Habitat
Arctic Ground Squirrels	"Gophers"	-arctic tundra -southern grassy slopes
American Beaver	Beaver	-water sources (lakes, ponds, wetlands, rivers)
American Black Bear	Black Bear	-boreal forest -alpine and subalpine
Woodland Caribou	Caribou	-alpine tundra in the summer -boreal forest in the winter
Dall Sheep	n/a	-alpine and subalpine
Grizzly Bear	Brown Bear	-boreal forest -alpine and subalpine -arctic tundra
Hoary Marmots	"Groundhog", Marmot	-alpine and subalpine
Canada Lynx	Lynx	-boreal forest
American Marten	Marten	-boreal forest
Moose	n/a	-boreal forest -water sources (lakes, ponds, wetlands, rivers) -subalpine shrubzone -recent burn areas
Mountain Goats	n/a	-alpine and subalpine
Common Muskrat	Muskrat, Water Rat	-water sources (lakes, ponds, wetlands, rivers)
Porcupine	North American Porcupine	-boreal forest
Snowshoe Hare	Rabbit, Hare	-boreal forest
Stone Sheep	Thin Horned Sheep	-alpine meadows in the summer -graze at tree line -mineral licks in the spring and early summer -winter habitat is a bit lower down the mountain

Note: Compiled from Johnson 2010, 2008; Ives and Sinopoli 1980; Banfield 1974; Honigmann 1981, 1964, 1949

Table 10. Flora Resources Sought

Resource	Notes	Habitat	Found in Subalpine/ Alpine
Lowbush cranberry	-significant berry -widely distributed -collected and eaten	muskegs, bogs, turf, moist to dry forests, low to high alpine elevations	**yes**
High bush cranberry	-collected and eaten	forests, open slopes, adjacent to streams and lakes	unlikely
Blueberry	-significant berry -widely distributed -collected and eaten	woodlands, open fields, bogs, low to high elevations	**yes**
Crowberry (locally called ‘‘blackberries’’)	-significant berry -widely distributed -collected and eaten	swamps, bogs, heathlands, tundra	**yes**
Soapberry	-collected and eaten	riverbanks, alpine and subalpine slopes, openings in spruce forests	**yes**
Salmonberry	-collected and eaten	moist areas, adjacent to streams, low elevations to subalpine	**yes**
Raspberry	-collected and eaten	alpine, subalpine meadows	**yes**
Strawberry	-collected and eaten	open slopes, clearings, low to subalpine elevations	**yes**
Currant	-collected and eaten	moist forest areas, low to middle elevations	possibly
Fern roots	-collected in spring, eaten	low to subalpine	**yes**
Lily bulbs	-collected and eaten	open forests, well drained areas or damp areas, low to timberline	**yes**
Mushrooms	-collected and eaten -unknown which types	unknown	possibly
"Muskeg apples"	-collected in the mountains -taste like turnips	unknown	**yes**

Resource	Notes	Habitat	Found in Subalpine/ Alpine
Wild onion	-collected and eaten	moist areas, adjacent to streams, low elevations	no
Rose	-collected petals and eaten or made into tea	burn areas, riverbanks, forest clearings, low to middle elevations	possibly
Wild rhubarb	-collected and eaten -young stems and leaves are edible	disturbed areas, subalpine to alpine meadows, montane slopes	**yes**
Labrador tea	-used to make tea -gathered in fall	meadows, bogs, muskegs, peat, montane forests	**yes**
Moss campion	-culturally significant plant in the alpine -known as 'gopher food' -indicator for ground squirrel habitat	slightly moist areas, mountainous areas, subalpine	**yes**
Spruce	-collected and chewed sap (spruce "gum") -spruce fibers eaten -used in cache construction -used to make tools and equipment -bark used for medicinal purposes -green black spruce cones collected in fall	black spruce found in alpine valleys/slopes and muskegs in lowland locations; white spruce found in well drained exposed spots and bog locations, found in lowlands to the alpine	**yes**
Pine	-fibers eaten	low to middle elevations	possibly, but unlikely
Birch	-tapped trees in spring for birch sap -"minor delicacy" -preferred wood for manufacture of snowshoes, bows and arrows	open woodlands, lower elevations	no

Note: Compiled from Johnson 2010, 2008; Honigmann 1964, Cody 2000

4.3. Developing an Archaeological Model for Use in the Alpine/Subalpine

Having provided the ethnographic review and summarized expected site types for higher elevation zones, I now turn to a review of documented archaeological sites in southeast Yukon within the Kaska Dena Traditional Territory (Study Area). For this, a site data base request was submitted to the Government of Yukon with a site inventory provided as of August 8, 2018. There are 231 archaeological sites recorded within the Study Area. These sites were identified through thirty-eight different heritage studies and two chance finds turned in by members of the public; seventeen of these studies and one chance find identified sites in subalpine and alpine environments (Table 11). The majority of sites are recorded from heritage resource impact assessments for proposed developments, specifically mineral exploration activities and proposed mine developments but other types of developments included proposed campgrounds, forestry projects, highway developments and pipelines. A number of the studies were heritage resource impact assessments but ten were heritage inventory projects.

Table 11. Past Heritage Projects in the Study Area

Permit Number	Principal Investigator	Report Title	Identified Sites in Subalpine/Alpine Environments
17-12ASR	Tim Bennett	Heritage Resource Impact Assessment: BMC Minerals Kudz Ze Kayah 2017 – Proposed Tote Road Borrow Areas and Finlayson Lake Airstrip Improvements (17-12ASR)	yes
17-00ASR	n/a	Chance Find/Public Find	yes
16-10ASR	Ty Heffner	Heritage Resources Impact Assessment of the Faro Mine Complex Study Area	yes
16-04ASR	Tim Bennett	Heritage Resources Impact Assessment – BMC Minerals Kudz Ze Kayah Proposed Mine and Ancillary Facilities 2016	yes
15-10ASR	James Mooney	Heritage Resource Impact Assessment: Proposed BMC Minerals Kude Ze Kayah Mine	yes
15-07ASR	Ty Heffner	Heritage Resources Impact Assessment of the Proposed Selwyn Mine Footprint	yes
15-04ASR	Christian Thomas	Yukon Archaeological Inventory and Inspection Permit	no
15-03ASR	James Mooney	Heritage Resource Impact Assessment of the Rose Creek and Faro Mine Reclamation Interim Work Areas 2015	yes

Permit Number	Principal Investigator	Report Title	Identified Sites in Subalpine/Alpine Environments
14-25ASR	Ty Heffner	Heritage Resources Assessment for the Selwyn Project 2014	yes
13-26ASR	James Mooney	Historic Resource Impact Assessment of the Proposed Faro Mine Interim Works Borrow Areas	yes
13-20ASR	James Mooney	Heritage Resources Impact Assessment of Selected Areas within the King Creek Timber Harvest Plan	no
11-23ASR	Todd Kristensen	Heritage Resources Overview Assessment and Preliminary Field Reconnaissance of the Overland Resources Limited Selous Property Conducted Under Permit 11-23ASR	yes
11-18ASR	Ty Heffner	Heritage Resources Impact Assessments Conducted Under Permit 11-18ASR for the Forest Management Branch in the Southern Yukon	no
11-16ASR	Steve Kasstan	Alaska Pipeline Project – Historic Resource Impact Assessment	no
11-12ASR	James Mooney	Historic Resource Impact Assessment of Northern Tiger Resources Inc. Proposed 3 Ace Project	yes
11-02ASR	James Mooney	Historic Resource Impact Assessment of the Proposed Silvertip Mine Access Road Improvements and Ancillary Components	no
10-00ASR	n/a	Chance Find/Public Find	no
09-10ASR	Ty Heffner	Heritage Resources Impact Assessment Conducted Under Permit 09-10ASR for the Proposed Ross River Staging Areas, on Behalf of the North American Tungsten Corporation Ltd.	no
08-02ASR	Brian Apland	Mactung Project - 2008 Archaeological Investigations	yes
07-03ASR	Christian Thomas	Yukon Archaeological Inventory and Inspection Permit	no
05-09ASR	Kate Peach	Historical Resources Impact Assessment - Yukon Zinc Corporation, Wolverine Project	yes
04-03ASR	Greg Hare	Ice Patch Research Project - Field Reconnaissance and Annual Monitoring	yes
03-13ASR	Christian Thomas	Archaeological Inventory and Assessment of Fort Pelly Banks, Yukon	no
01-08ASR	David Blower	Archaeological impact assessment for the Alaska Gas Producers Pipeline team feasibility study - Alaska Highway	no
97-02ASR	Greg Hare	Archaeological Investigations of Southern Portions of the Robert Campbell Highway	no

Permit Number	Principal Investigator	Report Title	Identified Sites in Subalpine/Alpine Environments
96-11ASR	Sheila Greer	Wolverine Lake Mine Development 1996 Archaeological and Historic Sites Impact Assessment	yes
96-04ASR	Ruth M. Gotthardt	Archaeological Overview Assessment of Five Yukon Campgrounds	no
95-11ASR	Thomas J. Hammer	An Archaeological Impact Assessment of Paul and Beth Rogers' Proposed Lot Enlargement on the East Arm of Frances Lake, Southeast Yukon	no
92-04ASR	Ruth M. Gotthardt	Frances Lake Traditional and Archaeological Sites	no
91-10ASR	Ruth M. Gotthardt	Archaeological Assessment of Proposed Campground and Recreation Site Developments in Yukon	no
91-03ASR	Ruth M. Gotthardt	Archaeological Investigations at First Wye Lake, Southeastern Yukon	no
90-08ASR	Ruth M. Gotthardt	Archaeological Assessment of the Five Proposed Campground Developments in Yukon	no
89-02ASR	Ruth M. Gotthardt	Archaeological Investigations in the Area of Fort Frances on Frances Lake, Southeast Yukon	no
86-06ASR	Ruth M. Gotthardt	Archaeological Resource Inventory: Liard and Frances Rivers, Southeast Yukon	no
84-01ASR	Sheila Greer	Archaeology of the Proposed Coal River Springs Territorial Park, Southeast Yukon	no
82-28ASR	Ian Wilson	Archaeological investigations within the proposed Cypress Anvill Ross Coal Development area	no
81-13ASR	John Damp	NCPC Yukon Hydroelectric Investigations Historical Resources	no
81-11ASR	Sheila Greer	An Introduction to the Archaeology of The Macmillan Pass -North Canol Road Area, Yukon Territory	yes
81-10ASR	Ruth M. Gotthardt	North Canol Road Archaeological Inventory Project	yes
65-01ASR	William N. Irving	Archaeological survey: Aishihik Lake, Old Crow, Mackenzie Delta	no

To determine which sites were located within the subalpine and alpine zones, site locations were positioned within the Bioclimate Zones and Subzones Tif (Version 1.0, Geomatics Yukon 2018) in an ArcGIS environment. Any of the sites that intersected with Boreal High, Boreal Subalpine and Boreal Alpine Tundra were considered appropriate for further consideration. These Bioclimate Zones encompass the upper elevations of the Boreal Bioclimate Region. The reason these upper elevations were

chosen is because the Bioclimate Zones and Subzones Tif data is a broad model for the entire Yukon and the data is limited. The associated location and bioclimate zone for some, sites, thus could be questioned. It was determined that the upper elevation zones would be used to pull out the upper elevation sites and through site analysis other factors such as the site vegetation recorded would be used to confirm if the sites were in fact located within subalpine or alpine environments (Appendix B).

Of the 231 records in the original inventory, 158 sites plotted within the zones of interest. Examination of the site records also identified some sites as being post European contact in age, not having cultural materials for verification of occupation, or with other issues raising concerns. The accuracy of all the archeological site locations was verified through this process to determine if sites were plotting in the correct locations. Appendix C provides a list of the archaeological site corrections that were made. Sites that could not be verified were removed (Appendix D). This led to 46 sites being removed from the sample, leaving 112 confirmed archaeological sites in the subalpine/alpine for further consideration (indicated as red on Figure 3).

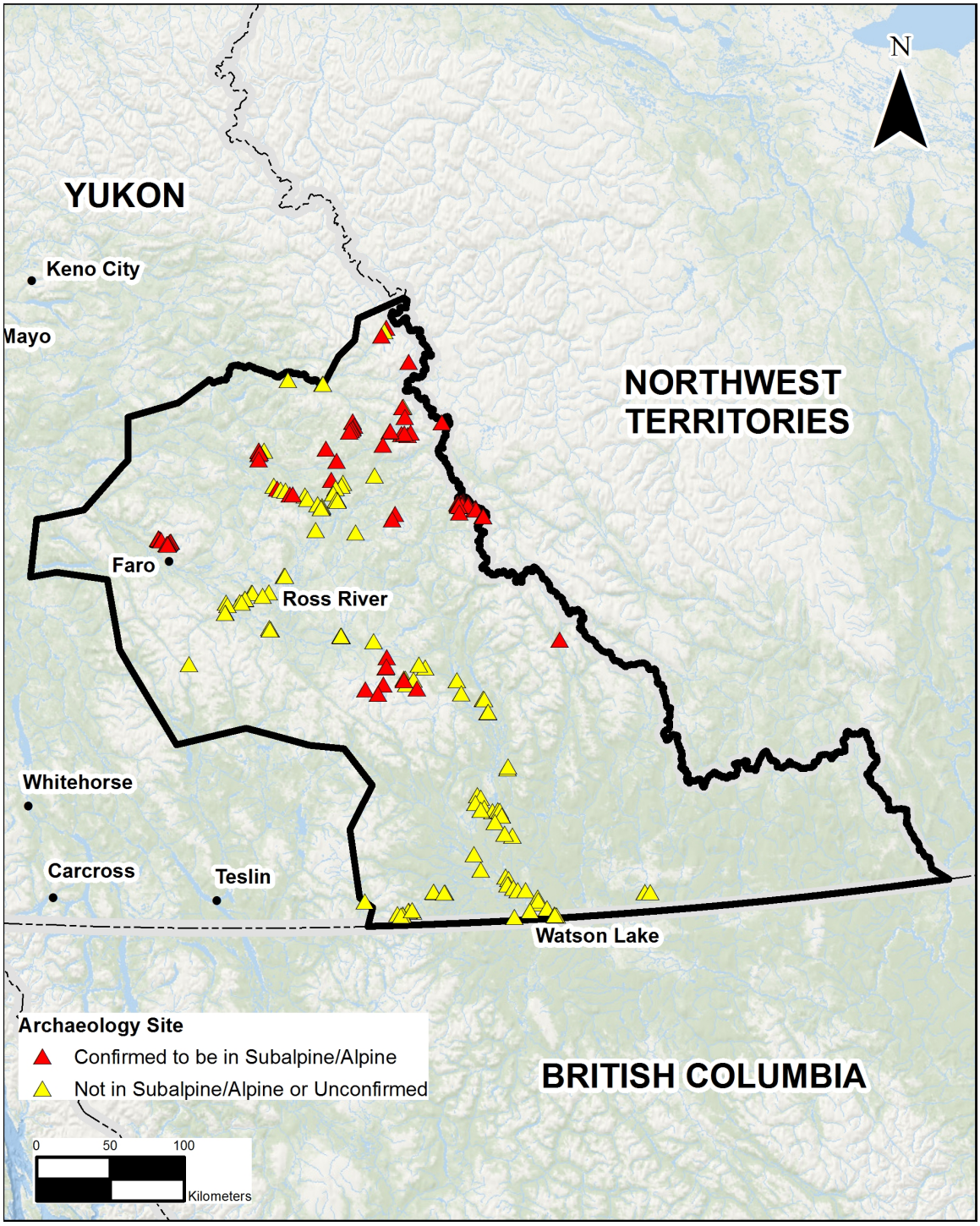

Figure 3. Archaeological Sites in the Study Area
Note: Red triangles indicate sites confirmed to be in the subalpine and alpine. Site locations marked in yellow were removed either because they were not in the subalpine or alpine or for lack of verification or appropriate site data.

Compilation of data and environmental attributes for each of the sites within the final sample was done in ArcGIS, including the 47 sites from the Don Creek Valley and

Howard's Pass study area. The use of ArcGIS was to facilitate construction of an archaeological land use model for alpine and subalpine environments. Compiled data included information on bioclimate zones, ecoregions, ecozones, elevation, vegetation, site type, site location, landform type, distance to hydrological features, soils notes, site size where provided, presence of White River ash, the relation of artifacts to the White River ash layer, lithic material types, debitage count, tool count, presence of bone and presence of trails (Appendix E and F). Also recorded were data related to site management, including permit number, site correction information and assessment status. When possible, data were acquired not only from site record forms but artifact catalogues, permit reports and photos, various Government of Yukon, Geomatics Yukon datasets, and available imagery.

4.3.1. Archaeological Site Types in the Broader Study Area

Because the archaeological model will be applied/tested against the data from Don Creek Valley and Howard's Pass, I exclude the latter sites from model construction. These two study areas will be referred to as the 1) broader study area which consists of the areas and subalpine and alpine sites in the Kaska Dena traditional territory outside the Don Creek Valley and Howard's Pass study area and 2) Don Creek Valley and Howard's Pass Study Area which consists of the sites identified during heritage assessments in 2014 and 2015 (Figure 4).

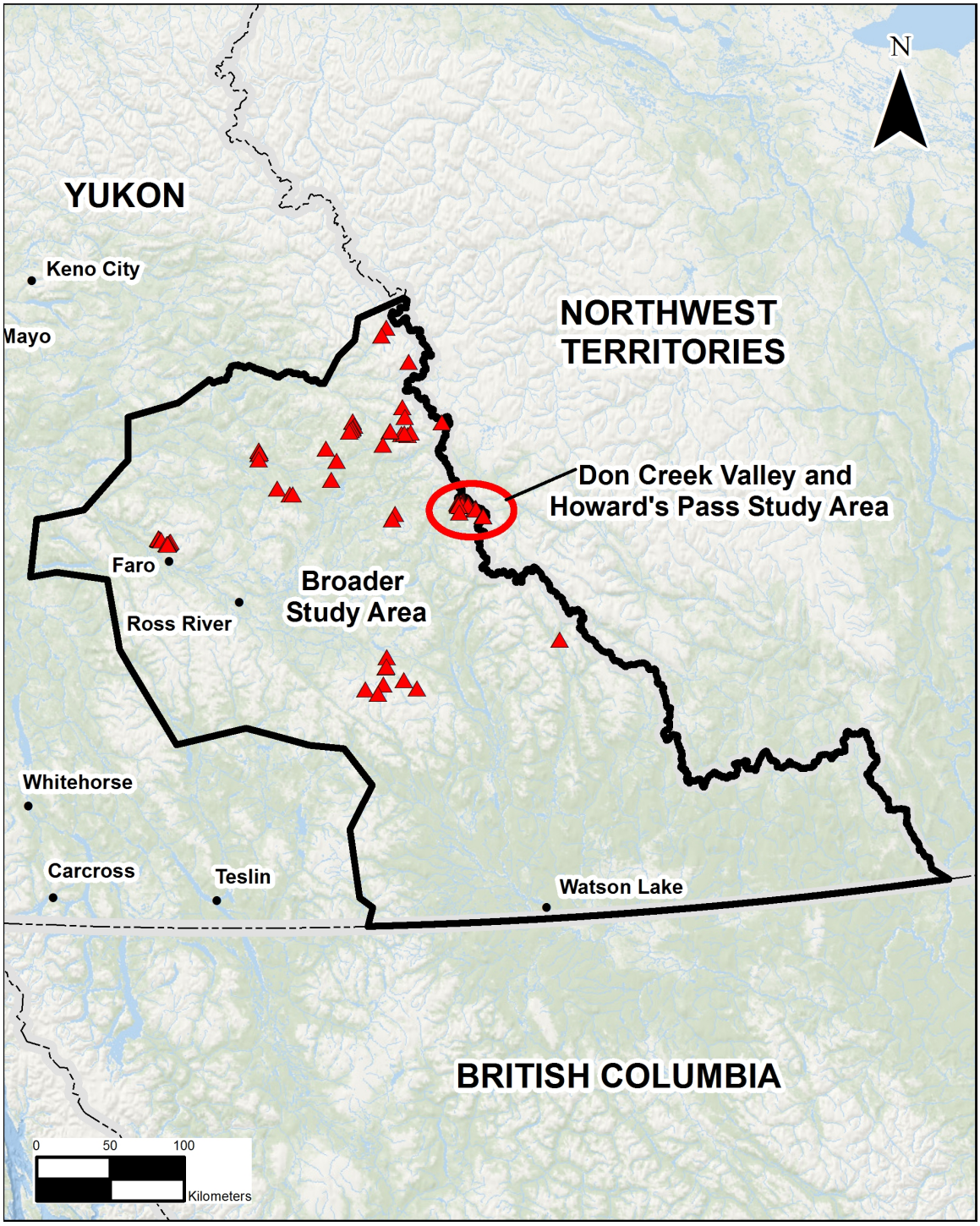

Figure 4. Broader Study Area and Don Creek Valley and Howard's Pass Study Area

Note: Red triangles indicate archaeological sites in the subalpine and alpine.

The 65 sites remaining in the general study area include 62 from the Boreal Subalpine zone, two in the Boreal Alpine Tundra zone and one where location could be either the Boreal Subalpine or the Boreal Alpine Tundra. The data compiled for each was reviewed and sites are categorized in Table 12 within the ethnographic site type classification as described. A detailed summary of this information is provided in (Appendix E). The vast majority of these were considered hunting sites, 56 being of the lookout type and six being generic; three sites are classified as subalpine hunting base camps. Notably, archaeological evidence for food caches, berry/plant collection locales or hunting fences/surrounds were not identified.

Table 12. Site Types in the Broader Study Area

Site Type	Number	Percent
Hunting Site - Lookout	56	86.2
Hunting Site - Generic	6	9.2
Subalpine Hunting Base Camps	3	4.6
Totals	65	100

Subalpine Hunting Base Camp

From ethnographic accounts I have described base camps as being unlikely sites in the subalpine region. Three sites in the recorded inventory, however, appear to meet some of the base camp criteria and are categorized as subalpine hunting base camps. The three are located at elevations of 1,037 m, 1,041 m and 1,073 m. They are positioned on bench features along the shore of a lake. One is situated adjacent to “Oly” Lake (unofficial name), one on the shore of Otter Lake and the third is adjacent to the outlet of an unnamed lake. These sites were not fully assessed so the site sizes are unknown, but one was noted as “moderate” in size and one was noted as being larger than 400 m^2 (Greer 1982). Each of the sites has an abundance of debitage with diagnostic artifacts including blades, scrapers (end and side), bifaces, burin spall, microblades, a stemmed projectile point base and the tip of a projectile point. The artifact types suggest hunting, tool maintenance and processing activities were taking place at these sites. A variety of lithic materials was found at these sites including chert, obsidian and siliceous sedimentary material. A hearth feature and bone fragments were excavated at one with White River ash present at all. Materials were recovered from below the ash at two sites (Greer 1982) providing a minimum antiquity of 1,100 BP. Artifacts from the third were excavated from above and below the ash (Greer 1982).

Hunting Sites – Generic

Based on the archaeological record, generic hunting sites are defined as short-term camps with a smaller number of tools and debris related to lithic processing and hunting, and less diverse artifact assemblages than subalpine hunting base camps. These sites tend to be smaller in size than subalpine hunting base camps and do not provide ideal vantage points for observing game movement as is the case for lookout hunting sites. All of the six sites in this group are small, located in the subalpine, and range in elevation from 1,002 m – 1,202 m. Sites occurred on bench features, esker features and ridges adjacent to a lake, river or wetland. One had a game trail in the vicinity. None of these sites were fully assessed so site sizes are unknown. Minimum site extent was given for two sites as 225 m^2 and 100 m^2 (Mooney 2012, Greer 1982) one site was noted as being less than 100 m^2 and one was described as “small” (Greer 1982).

A small number of diagnostic artifacts were recovered from the sites including retouched flakes, a projectile point, a stemmed projectile point and the tip of a projectile point. The artifacts suggest that hunting activities and lithic processing took place at these sites. Five of the six sites had chert artifacts only; the other had artifacts of siliceous sedimentary material in addition to chert. White River ash was reported for two, one where materials occurred exclusively below and the other where they were present both above and below.

Hunting Sites - Lookout

The majority of high elevation sites are categorized as lookout type hunting sites. Fifty-four of these occur in the subalpine with two occurring in the alpine. Sites varied in elevation from 856 m to 1,566 m. All sites were situated on prominent features, including bedrock knolls, benches, knolls, knoll complexes, esker features, bluffs, ridges, ridge points, terraces and terrace points. One site was noted as being on a ridge/outwash terrace. The landform features provided good vantages overlooking various hydrological features including rivers, streams, lakes, lake outlets, lake narrows, ponds, wetlands and grassy meadows. Twenty-four of these sites have had detailed assessments; site sizes range from 2 m^2 to 4,900 m^2. Three of the site records reported the presence of game trails in the vicinity. Possible hearth features were identified at four locales with fire cracked rock at two others.

Typically, these sites have smaller amounts of debitage and less diverse stone tool assemblages than was the case at subalpine hunting base camps. Artifact types other than waste flakes included cores, microblades, a blade, a point preform, a flake with possible notch, retouched flakes, a scraper, utilized shatter and a possible biface. The artifact types suggest that tool maintenance, hunting and possibly processing was taking place at these types of sites. Tool stone materials varied with basalt, chalcedony, chert, dacite, siliceous sedimentary material, siltstone, Tertiary Hills Clinker, obsidian, quartz, and welded tuff present. White River ash was observed at 39 of the 56 sites; artifacts were recovered from above, within and below the White River ash.

One site (JiTo-1), an indigenous historic and precontact period occupation, was unique. Besides being a hunting lookout, it also had tent poles and a ground depression for either a house pit or in ground storage pit. These features, obviously, are related to a historic use of the site but are informative for interpretations of earlier site usage.

Chert outcrops occur in the vicinity of one site, albeit the chert seems to be of low quality. This site is located in the higher alpine at an elevation of 1,520 m on a bench feature with excellent vantages of the surrounding area, including lower alpine meadows, wetlands, various tributaries and Sheldon Lake. No tools were found but a small amount of debitage (n=7) and a worked chert pebble identify human presence. Lithic debitage included chert, chert/chalcedony and siliceous sedimentary material. All artifacts were recovered in situ from below the White River ash horizon. This site did not have a detailed site assessment conducted but the site size was noted as ~4 m^2.

4.3.2. Archaeological Site Characteristics in the Broader Study Area

Site Locations

Site locations are plotted on Figure 4 above. As illustrated, there are three general areas where sites seem to be clustered. This, most probably, is a consequence of sampling based on where mining exploration and heritage resource management response has occurred rather than cultural factors. Categorized data for individual sites, as previously described, provide additional insights into the nature of the archaeological record integrated within the higher elevation sample.

Site Elevations

Table 13 provides an elevation range and mean for archaeological site categories. There exists only slight variation and overlapping distributions between categories. That being said, it may be notable that the three subalpine hunting base camps are relatively consistent in elevation and tend toward the lower elevations in the range. The wide range in elevations for lookout hunting sites speaks to a dominant activity in subalpine use, at least as can be recognized through the archaeological record.

Table 13. Archaeological Sites Elevation in the Broader Study Area

Site Type	Number of Sites	Elevation Range (m)	Average Elevation (m)
Subalpine Hunting Base Camp	3	1,037-1,073	1,050
Hunting Site - Generic	6	1,002-1,202	1,097
Hunting Site - Lookout	56	856-1,566	1,081

Distance to Water

To determine distances from individual sites to the closest hydrographic features such as lakes, watercourses or wetlands, the “Near” tool was used in ArcGIS. The accuracy of recovered data is potentially limited as some hydrographic features may not be digitized and incorporated in the shapefiles, or the hydrographic features may not be accurately mapped. Based on the ArcGIS data, the relative position of the closest hydrographic features to archaeological sites in the subalpine or alpine ranges from 10 m to 790 m with a mean distance of 145 m (rounded to the nearest 5) (Table 14). A more detailed inspection of site records and maps found five sites located near outlets of lakes, two occur at the narrows of lakes and 16 are either adjacent to wetlands, overlooking a wetland or a wetland was in close proximity. Subalpine hunting base camps are located within 100 m of lakes and outlets of lakes including “Oly”, Otter and an unnamed lake. Four of the six generic hunting sites are located adjacent to lakes including Wolverine Lake, Grass Lakes, Otter Lake and an unnamed lake; the other two are located closest to creeks. Lookout hunting sites are located adjacent to a number of different water features including wetlands, creeks, lakes outlets, rivers, ponds and lakes.

Table 14. Archaeological Sites by Site Type - Distance to Water Features

Site Type	Borden	Distance to Waterbody (m)	Distance to Wetland (m)	Distance to Watercourse (m)	Closest Hydrographic Feature	Hydrographic Feature Name
Subalpine Hunting Base Camp	KcTh-1	**75**	1200	345	Waterbody/ Lake	Otter Lake
	KfTj-1	35	1635	**30**	Watercourse/ Creek	unnamed tributary of unnamed Lake
	KgTi-1	95	1285	**85**	Watercourse/ Creek	unnamed tributary of "Oly" Lake
Hunting Site - Generic	JiTn-1	**20**	3950	680	Waterbody/ Lake	Wolverine Lake
	JiTq-1	**25**	4720	60	Waterbody/ Lake	Grass Lakes
	KfTg-4	**55**	2615	210	Waterbody/ Lake	unnamed lake
	KdTh-1	**175**	415	190	Waterbody/ Lake	Otter Lake
	JjTp-3	340	3575	**235**	Watercourse/ Creek	unnamed tributary of Finlayson Lake
	JkTb-1	565	845	**535**	Watercourse/ Creek	unnamed tributary of Little Hyland River
Hunting Site - Lookout	KdTl-1	**30**	1410	110	Waterbody /Lake	unnamed lake
	KeTl-2	**45**	835	875	Waterbody/ Lake	unnamed lake
	KgTi-5	**55**	1865	175	Waterbody/ Lake	unnamed lake
	KfTg-3	**165**	1895	**165**	Waterbody/Lake/ Watercourse	Fuller Lake/unnamed tributary of Fuller Lake
	KgTi-4	**175**	575	520	Waterbody/Lake	unnamed lake
	KfTg-2	**470**	3785	500	Waterbody/Lake	Fuller Lake
	KgTi-6	**115**	1740	120	Waterbody/Lake Outlet	“Oly” Lake
	KfTm-2	**80**	965	120	Waterbody/Pond	n/a
	KgTf-1	**125**	1185	135	Waterbody/Pond	n/a
	KgTg-2	**55**	2240	140	Waterbody/River	South MacMillan River
	KjTh-1	**115**	3050	385	Waterbody/River	Hess River
	KgTh-1	**225**	585	335	Waterbody/River	South MacMillan River

Site Type	Borden	Distance to Waterbody (m)	Distance to Wetland (m)	Distance to Watercourse (m)	Closest Hydrographic Feature	Hydrographic Feature Name
	KgTh-2	**485**	815	530	Waterbody/River	South MacMillan River
	KbTq-1	1595	7745	**10**	Watercourse/Creek	Rose Creek
	KcTq-9	1570	10605	**10**	Watercourse/Creek	Rose Creek
	KbTq-2	1675	7870	**45**	Watercourse/Creek	Rose Creek
	KcTq-18	2200	8090	**50**	Watercourse/Creek	unnamed tributary of Rose Creek
	KcTq-4	1550	10520	**60**	Watercourse/Creek	unnamed tributary of Rose Creek
	KcTq-13	1840	10390	**60**	Watercourse/Creek	Rose Creek
	KfTm-5	1755	**60**	**60**	Watercourse/Creek/ Wetland	unnamed tributary of South MacMillan River
	KcTq-15	2705	10315	**65**	Watercourse/Creek	Rose Creek
	KfTm-4	2055	280	**65**	Watercourse/Creek	unnamed tributary of South MacMillan River
	JjTp-2	900	6675	**65**	Watercourse/Creek	unnamed tributary of Finlayson River
	KcTq-16	590	9950	**70**	Watercourse/Creek	Rose Creek
	KcTq-17	400	9830	**75**	Watercourse/Creek	Rose Creek
	JiTo-1	325	8600	**75**	Watercourse/Creek	unnamed tributary of Wolverine Lake
	KcTq-2	2045	10480	**75**	Watercourse/Creek	Rose Creek
	KcTq-7	2190	10545	**80**	Watercourse/Creek	Rose Creek
	KcTq-10	1495	10580	**80**	Watercourse/Creek	Rose Creek
	KcTq-5	1145	5820	**85**	Watercourse/Creek	unnamed tributary of Rose Creek
	KfTm-6	1480	95	**90**	Watercourse/Creek	unnamed tributary of South MacMillan River
	KcTq-8	2130	10515	**100**	Watercourse/Creek	Rose Creek
	KbTq-3	1485	7790	**105**	Watercourse/Creek	Rose Creek

Site Type	Borden	Distance to Waterbody (m)	Distance to Wetland (m)	Distance to Watercourse (m)	Closest Hydrographic Feature	Hydrographic Feature Name
	KfTh-1	275	2120	**120**	Watercourse/Creek	unnamed tributary of South MacMillan River
	KcTp-2	1415	5055	**135**	Watercourse/Creek	unnamed tributary of Rose Creek
	JjTp-1	670	6770	**135**	Watercourse/Creek	unnamed tributary of Finlayson River
	KcTq-6	2595	10355	**140**	Watercourse/Creek	Rose Creek
	KiTg-1	920	2790	**145**	Watercourse/Creek	creek
	KcTq-3	1245	10450	**145**	Watercourse/Creek	Rose Creek
	KcTq-12	2390	10650	**150**	Watercourse/Creek	unnamed tributary of Rose Creek
	KfTj-2	275	2035	**165**	Watercourse/Creek	unnamed tributary of South MacMillan River
	KcTq-14	1340	10530	**165**	Watercourse/Creek	Rose Creek
	KcTq-19	1220	6425	**175**	Watercourse/Creek	unnamed tributary of Rose Creek
	KcTq-11	2670	10490	**235**	Watercourse/Creek	Rose Creek
	JiTq-2	625	8145	**290**	Watercourse/Creek	unnamed tributary of unnamed lake
	KjTh-2	465	8450	**310**	Watercourse/Creek	unnamed tributary of Hess River
	KcTq-20	1565	7335	**330**	Watercourse/Creek	Rose Creek
	JiTp-1	395	6275	**380**	Watercourse/Creek	unnamed tributary of Finlayson River
	KfTg-5	880	1480	**790**	Watercourse/Creek	unnamed tributary of Fuller Lake
	KgTi-7	35	1885	**10**	Watercourse/Lake outlet	Lake outlet of "Oly" Lake
	KdTl-2	430	2595	**100**	Watercourse/River	Riddell River
	KgTi-3	30	**15**	80	Wetland	n/a
	KgTg-3	190	**60**	120	Wetland	n/a
	KgTi-2	205	**90**	485	Wetland	n/a

Site Type	Borden	Distance to Waterbody (m)	Distance to Wetland (m)	Distance to Watercourse (m)	Closest Hydrographic Feature	Hydrographic Feature Name
	KfTm-3	575	**200**	600	Wetland	n/a
	KeTj-2	930	1590	**440**	Watercourse/Creek	unnamed mountain creek

(Bold denotes closest water feature to site)

Landform Types

The landform type on which archaeological sites occurred was determined through site records descriptions, topographic map data, site photographs and other imagery. The majority of the sites are located on knolls, benches or ridges. Sites are also located on esker features, terraces, terrace points, ridge points, high bedrock knolls/knobs, “knobs”, knoll complexes, bluffs and ridge/outwash terrace. Below is a summary of the landform types and the numbers of sites that are found on those landform types (Table 15). All three subalpine hunting base camps were found on bench features while generic hunting sites were found on benches, ridges, and esker features. Lookout hunting sites are found on a broad range of landform types.

Table 15. Archaeological Site Landform Types in the Broader Study Area

Landform Type	Site Type			Totals	Percentage
	Subalpine Hunting Base Camp	Hunting Site - Generic	Hunting Site - Lookout		
Bench	3	3	12	19	29.2
Bench/Knoll			1	1	1.5
Knoll			13	13	20
Knoll on Ridge			3	3	4.6
Knoll Complex			1	1	1.5
High Bedrock Knoll/Knob			2	2	3.1
Knob			1	1	1.5
Ridge		2	9	11	16.9
Ridge Point			1	1	1.5
Esker Feature		1	4	5	7.7
Terrace			4	4	6.2
Terrace Point			3	3	4.6
Bluff			1	1	1.5
Ridge/Outwash Terrace			1	1	1.5

4.3.3. White River Ash as a Horizon Marker

White River ash occurs throughout the study area and provides a horizon marker dating to 1,100 BP as reported by Jensen et al. (2014). For virtually all of these sites, it is the only dating indicator for relative chronology. Within the sample, White River ash is reported present at 44 sites with cultural materials positioned relative to this stratum. For the remainder, it was either not observed, not commented upon, or the recorder failed to locate artifacts in relation to the tephra. Of the only two sites recorded in the alpine, White River ash was observed at one. Here artifacts were stratigraphically present below this marker. While hardly an indicator of great antiquity for alpine use, it does illustrate

human presence extending through the first millennium AD and likely beyond. Table 16 summarizes White River ash data by site type.

Table 16. White River Ash in the Broader Study Area

Site Type	Above White River Ash	Above and Below White River Ash	Below White River Ash	Unknown or Uncertain
Subalpine Hunting Base Camp		1	2	
Hunting Site - Generic		1	1	4
Hunting Site - Lookout	7	8	24	17
Totals	7	10	27	21

4.3.4. Lithic Analysis in the Broader Study Area

Data for the lithic analysis was taken from the artifact collections already created in the Government of Yukon collections database or from permit reports. In a few cases the physical artifacts were accessed to try to clarify details if possible. A summary of the artifact types, numbers of artifact types, artifact lithic materials and faunal materials were compiled in an Excel spreadsheet.

Lithic Materials

A variety of lithic materials were identified within project catalogues, reports or collections curated with the Government of Yukon. Chert was by far the most widely distributed tool stone with basalt, siliceous sedimentary material, quartz, obsidian, Tertiary Hills Clinker, chalcedony, dacite and siltstone also present (Table 17). More than one type of lithic material was present at just over half of the sites. The dominance of chert is not surprising as it is the most readily available stone in the region, and it was found at fifty-five of the sixty-five sites (88%). Apparently, “good quality chert cobbles can be obtained along Emerald Creek” (Greer 1982:41). Emerald Creek is located just north of the study area in the Rogue Range of the Hess Mountains. Outcrops of chert were noted near a site within the study area, KeTj-2, but it is likely of poor quality (Greer 1982). A smashed chert pebble (2 pieces refit) was found at the site and may have been tested to determine the quality of the material.

Table 17. Lithic Raw Material Types at Archaeological Sites in the Broader Study Area

Site Type	Borden	Lithic Material(s)	Number of Lithic Materials Present at Site
Subalpine Hunting Base Camp	KcTh-1	chert, siliceous sedimentary material	2
	KgTi-1	chert, obsidian, siliceous sedimentary material	3
	KfTj-1	chert, siliceous sedimentary material	2
Hunting Site - Generic	JiTn-1	chert, siliceous sedimentary material	2
	JjTp-3	chert	1
	JiTq-1	chert	1
	JkTb-1	chert	1
	KdTh-1	chert	1
	KfTg-4	chert	1
Hunting Site - Lookout	KcTq-11	basalt, Tertiary Hills Clinker	2
	KcTq-2	basalt, chert	2
	KcTq-4	chert	2
	KcTq-3	basalt, chert	2
	KdTl-1	chalcedony, chert	2
	KdTl-2	chert	1
	KcTq-13	basalt, chalcedony	2
	KcTq-15	chert	1
	KbTq-2	chalcedony, chert	2
	KbTq-3	siliceous sedimentary material	1
	JiTp-1	chert, obsidian, quartz?, Tertiary Hills Clinker?	4
	KcTq-7	chalcedony, chert, dacite	3
	KcTq-8	chert	1
	KcTq-12	chalcedony, chert	2
	KcTq-16	chert, siliceous sedimentary material	2
	KcTp-2	chert	1
	KcTq-10	chert	1
	KcTq-19	basalt, chert	2
	KcTq-18	chert, dacite	2
	JjTp-2	chert	1
	JjTp-1	basalt, chert	2
	KcTq-6	chert, siliceous sedimentary material	2
	JiTq-2	chert?	1
	JiTo-1	chert	1
	KcTq-20	basalt, chert, siliceous sedimentary material	3
	KcTq-17	chert	1
	KcTq-14	chalcedony, chert, dacite, siliceous sedimentary material	5
	KcTq-5	chert, quartz	3
	KbTq-1	basalt, chert, quartz	3
	KcTq-9	chalcedony, chert, dacite	3
	KfTg-5	siliceous sedimentary material	1
	KjTh-2	chert, welded tuff (Tertiary Hills Clinker?)	2
	KgTf-1	siliceous sedimentary material	1
	KgTi-7	chert	1

Site Type	Borden	Lithic Material(s)	Number of Lithic Materials Present at Site
	KjTh-1	chert	1
	KfTm-4	chalcedony	1
	KgTi-5	chert	1
	KgTg-3	chert	1
	KfTg-3	chert, siliceous sedimentary material	2
	KgTh-1	chert, siliceous sedimentary material	2
	KfTm-5	chert, dacite	1
	KfTm-6	chalcedony	1
	KfTm-2	chalcedony	1
	KfTh-1	chert, siliceous sedimentary material	2
	KgTh-2	chert	1
	KgTi-4	chert	1
	KgTg-2	chert	1
	KfTj-2	chert	1
	KiTg-1	chert	1
	KfTg-2	chert	1
	KfTm-3	chalcedony, chert	2
	KgTi-3	chert	1
	KgTi-2	chert, siliceous sedimentary material	2
	KgTi-6	chert, siliceous sedimentary material	2
	KeTl-2	chalcedony, chert, dacite, siltstone	4
	KeTj-2	chert/chalcedony, siliceous sedimentary material	2

Obsidian was found at two of the sites (JiTp-1, KgTi-1). Non-destructive portable x-ray fluorescence (pXRF) analyses was conducted on the artifacts from these sites. This data is incorporated into the Alaska Archaeological Obsidian Database (AAOD) which includes obsidian samples from Alaska and the Yukon and is being developed by the University of Alaska Museum, Smithsonian's Museum Conservation Institute and the National Park Service (Reuther et al. 2011). Jeff Rasic at the National Park Service Fairbanks Administrative Facility conducted the analysis of the artifacts from JiTp-1; this material was sourced to Mount Edziza (Group E) (Bennett 2017), a source located near Telegraph Creek in northwestern British Columbia (Reimer 2015, Reuther et al. 2011; Cook 1995; Fladmark 1985). Artifacts from KgTi-1 were sourced to Mount Edziza (Group E) and an unknown source (Group AH-AH) likely in central Alaska. A summary of this is provided below in Table 18.

Table 18. Obsidian Artifacts and Sourcing Data - Broader Study Area

Borden Number	Artifact Number	Test Unit	Object Name	Quantity	Sample Provenience	Sample Number	Researcher	Source ID
JiTip-1	24	Test Unit 1	Utilized shatter	1	10 - 20 cm below surface	AOD-10833	Jeff Rasic	Edziza (Group E)
JiTip-1	43	Test Unit 1	Interior flake fragment	1	0 - 10 cm below surface, within White River ash	AOD-10834	Jeff Rasic	Edziza (Group E)
KgTi-1	11a	n/a	flake	1	below White River ash	AOD-04265	n/a	Edziza (Group E)
KgTi-1	11b	n/a	flake	1	below White River ash	AOD-04266	n/a	Group AH-AH

There are three other known obsidian sources reported for sites in the southern Yukon. This includes Wiki Peak (Group A) located in Alaska near the Canadian border in the Nutzotin Mountains (Reuther et al. 2011), Airdrop Lake/Hoodoo Mountain (Group M) located in the Yukon to the west of Haines Junction (Reuther et al. 2011:273) and Batza Tena (Groups B and B'), located in northern interior Alaska in the Koyukuk River drainage (Reuther et al. 2011; Clark and McFadyen Clark 1993; Cook 1995; Kunz et al. 2001; Patton and Miller 1970). A fourth source, presently unidentified but thought to be in the vicinity of the Donjek River in the Yukon, also has been identified in Yukon collections (Kristensen et al. 2019a).

Tertiary Hills Clinker, a partially fused vesicular stone created by combustion (Kristensen et al. 2019b) was present at three sites (KjTh-2, KcTq-11 and JiTp-1). Outcrops for this material are located in the Tertiary Hills, a landform in the Flint Stone Range in the Mackenzie Mountains of the Northwest Territories. It is a unique material type presently recovered from only a few archaeological sites in the Yukon; it is also found in NWT and Alberta (Kristensen et al. 2019b). One site (JiTp-1) had both obsidian (Mount Edziza (Group E); Bennett 2017) and Tertiary Hills Clinker, illustrating a wide-ranging network for lithic material acquisition.

Stone Tool Assemblages

Lithic artifacts recovered from sites within the broader study area are identified from catalogues and reports and the tool types were taken from the original sources.

When collections were available at Government of Yukon, Archaeology, some artifacts were accessed to verify information. In total, only 38 formed tools or diagnostic artifacts were recovered from sites in the broader study area with most sites yielding only one or two tools. These include nine retouched flakes, one flake with a possible notch, eight microblades, four blades, four scrapers (one end scraper, two side scrapers and one unknown), two cores (one was an exhausted (?) rotated flake core), two bifaces, one biface fragment, one point preform, four projectile points and one projectile point base. Tool types are provided in Table 19 relative to the site type they were recovered from.

Five specimens were projectile points or point fragments. A stemmed point base was found at a subalpine hunting base camp site (KgTi-1) below White River ash. A narrow, straight edged lanceolate projectile point and the basal portion of a stemmed point which appears to be a broad leaf shape were found on the surface at JiTq-1, a generic hunting site. Stemmed point varieties are thought to have occurred during the Late Prehistoric Period (<1,100 BP) (Hare et al. 2012; Hare et al. 2008) as well as during the preceding Taye Lake Phase (5,000–1,100 BP) (Hare et al. 2008). The stemmed point from KgTi-1 likely dates from Taye Lake Phase as it was recovered below the White River ash.

A projectile tip found above the White River ash at subalpine hunting base camp site KcTh-1 is described as the “tip portion of a small, thin 'arrow' point, with biconvex cross-section” (Greer 1982:69). The context of this artifact fits descriptions of bow and arrow technology as it occurs after the White River ash eruption (1,100 BP) (Hare et al. 2012). Another projectile tip (JkTb-1:2) was found but is non-diagnostic (Figure 5).

Figure 5. Tip of Projectile Point Found at Generic Hunting Site JkTb-1 (JkTb-1:2)
Photo: Author, 2019

Other tools relate to cutting or processing activities, ranging from bifacial implements to microblades. In addition to the stemmed point base found at site KgTi-1, two blades, a biface fragment and two end scrapers were located below the White River ash. A side scraper was also recovered, and its context is not clear but is likely found below the White River ash (Greer 1982). At KcTh-1, tools related to cutting or processing activities also range from bifacial implements to scrapers. Two blades, a biface fragment and two end scrapers were located below the White River ash. A side scraper without clear context was recovered, but likely originates from below the White River ash (Greer 1982). A total of eight microblades were found at three different archaeological sites including two subalpine hunting base camps and one hunting lookout site. Microblades are thought to be of the Little Arm Phase dating to 8,000–5,000 BP (Heffner 2002). However, two of these were recovered from above White River ash, albeit in this case they are described as possible microblades (Greer 1982). The remaining group was excavated from below White River ash at the various sites. Several retouched flakes may have been used for multiple activities including cutting, scraping hides and working bone or wood (Andrefsky 2005; Workman 1978). Three of the four scrapers in the collections were found below White River ash.

Table 19. Tools by Site Type in the Broader Study Area

Site Type	Borden	Total Tools	Utilized Shatter	Retouched Flake	Flake with possible notch	Microblade	Blade	Scraper	Core	Point Preform	Biface	Biface Fragment	Projectile Point	Projectile Point Base
Subalpine Hunting Base Camp	KcTh-1	5				2	1				1		1	
	KgTi-1	7					2	3				1		1
	KfTj-1	1				1								
Hunting Site - Generic	JiTn-1	0												
	KdTh-1	0												
	JiTq-1	3		1									1	1
	KfTg-4	1		1										
	JkTb-1	1											1	
	JjTp-3	0												
Hunting Site - Lookout	KcTq-2	1		1										
	KcTq-3	1		1										
	KgTi-6	0												
	KcTq-19	0												
	KbTq-1	0												
	KcTq-6	0												
	JiTp-1	2	1	1										
	KcTq-13	0												
	KjTh-2	6				5	1							
	KgTg-2	1							1					
	KgTi-2	0												
	KgTi-4	0												
	KgTi-5	0												
	KgTh-2	0												
	KgTh-1	0												
	KfTh-1	1			1									
	KfTj-2	0												
	KdTl-1	0												
	KcTq-4	0												
	KcTq-5	2		1				1						
	KcTq-8	0												
	KcTq-10	0												
	KcTp-2	0												
	KcTq-18	0												

Site Type	Borden	Total Tools	Utilized Shatter	Retouched Flake	Flake with possible notch	Microblade	Blade	Scraper	Core	Point Preform	Biface	Biface Fragment	Projectile Point	Projectile Point Base
	KcTq-20	0												
	KbTq-2	0												
	KbTq-3	0												
	JjTp-1	1		1										
	JiTo-1	0												
	KjTh-1	0												
	KgTi-3	0												
	KfTg-2	1		1										
	KfTm-3	0												
	KeTl-2	0												
	KdTl-2	0												
	JiTq-2	1									1			
	KiTg-1	1								1				
	KgTf-1	0												
	KgTi-7	0												
	KfTg-5	0												
	KfTm-5	0												
	KfTm-2	0												
	KfTm-4	0												
	KfTm-6	0												
	KgTg-3	2		1					1					
	KfTg-3	0												
	JjTp-2	0												
	KcTq-7	0												
	KcTq-17	0												
	KcTq-11	0												
	KcTq-12	0												
	KcTq-9	0												
	KcTq-14	0												
	KcTq-15	0												
	KcTq-16	0												
	KeTj-2	0												
	Totals:	38	1	9	1	8	4	4	2	1	2	1	3	2

Debitage

Debitage categories and definitions vary between reports and catalogues. Table 20 summarizes these as given including broad and specific debitage groups. Beyond a generic category of flake and flake fragment, secondary flakes, retouch flakes and billet flakes are identified, illustrating tool re-sharpening or reworking rather than manufacture or quarrying activity exclusively. Tool maintenance appears to be a principal activity at most sites. A single burin spall was found below the White River ash at subalpine hunting base camp site, KfTj-1. Burins tend to associate with microblade technologies in southwest Yukon (Workman 1978) and a microblade also was found at the site below White River ash.

Table 20. Debitage by Site Type in the Broader Study Area

Site Type	Borden	Total Debitage	Flake	Primary Flake	Secondary Flake	Bipolar Flake	Billet Flake	Retouch Flakes	Burin Spall	Flake Fragment	Debitage/ Shatter	Smashed Pebble
Subalpine Hunting Base Camp	KcTh-1	321	124					4		193		
	KgTi-1	601	117					13		221	250	
	KfTj-1	79	14					2	1	62		
Hunting Site - Generic	JiTn-1	83						82		1		
	KdTh-1	2	1							1		
	JiTq-1	9	2		7							
	KfTg-4	0										
	JkTb-1	1			1							
	JjTp-3	1								1		
Hunting Site - Lookout	KcTq-2	3			3							
	KcTq-3	1			1							
	KgTi-6	81	39					7		35		
	KcTq-19	3			2		1					
	KbTq-1	36	1		14					8	13	
	KcTq-6	11					11					
	JiTp-1	165	2	1	84					34	44	
	KcTq-13	2			1		1					
	KjTh-2	62	30					1		31		
	KgTg-2	28	6							17	5	
	KgTi-2	38	13							25		
	KgTi-4	27	8							19		
	KgTi-5	10	2							8		
	KgTh-2	1				1						
	KgTh-1	2	1							1		
	KfTh-1	83	35					7		41		
	KfTj-2	6	3							3		
	KdTl-1	4					2			2		
	KcTq-4	2			2							
	KcTq-5	9			4					4	1	
	KcTq-8	1			1							
	KcTq-10	1					1					
	KcTp-2	1					1					
	KcTq-18	53		3	5		30			15		
	KcTq-20	10					7			3		
	KbTq-2	6					6					
	KbTq-3	1					1					
	JjTp-1	1									1	
	JiTo-1	2	2									
	KjTh-1	491	151							340		

Site Type	Borden	Total Debitage	Flake	Primary Flake	Secondary Flake	Bipolar Flake	Billet Flake	Retouch Flakes	Burin Spall	Flake Fragment	Debitage/ Shatter	Smashed Pebble
	KgTi-3	1	1									
	KfTg-2	0										
	KfTm-3	53	1		1		37			14		
	KeTl-2	55	2		2		23			28		
	KdTl-2	2					1			1		
	JiTq-2	0										
	KiTg-1	23	7							16		
	KgTf-1	1	1									
	KgTi-7	2								2		
	KfTg-5	1	1									
	KfTm-5	14			4		7			3		
	KfTm-2	3					3					
	KfTm-4	2					2					
	KfTm-6	2			1		1					
	KgTg-3	0										
	KfTg-3	54	17					1		36		
	JjTp-2	5								5		
	KcTq-7	10					10					
	KcTq-17	1									1	
	KcTq-11	3					1			2		
	KcTq-12	4					2			2		
	KcTq-9	6			2		1			2	1	
	KcTq-14	11			3		7			1		
	KcTq-15	15		1			14					
	KcTq-16	25			3		22					
Hunting Site - Lookout	KeTj-2	5	2							1		2
	Totals:	2536	583	5	141	1	192	117	1	1178	316	2

4.3.5. Faunal Remains

Faunal remains were recovered at eight sites in the broader study area providing a total 391 specimens. The majority of the faunal remains are highly fragmentary, unidentifiable medium or large mammal bone fragments. Identifiable bone includes a distal end and lower shaft fragment of a caribou left tibia with spiral fracturing; this was recovered from a subalpine hunting base camp site. Two other tibia fragments from a large mammal (*Artiodactyla*), likely caribou, (Elizabeth Hall, personal communication

2019) were found at a hunting lookout site (KcTq-17). A number of the bones are reported as being calcined or burned; 250 bone fragments or more were recovered from a hearth feature at one of the hunting lookout sites. Faunal remains have been recovered from above and below the White River ash. The low number of sites with faunal materials is a reflection of poor preservation of organic materials in these types of environments due to either a lack of soil or acidity of the soil.

Table 21. Faunal Remains by Site Type in the Broader Study Area

Site Type	Borden	Artifact Number	Type	Quantity	Comments	Stratigraphic Context
Subalpine Hunting Base Camp	KcTh-1	1	bone, distal end and lower shaft fragment of caribou left tibia	1	spirally fractured, identified as caribou	above White River ash
	KcTh-1	2	bone fragments	20	calcined, 19 tiny fragments, includes unidentifiable medium or large sized mammal, unidentifiable mammal, and one bone unidentifiable as to class	above White River ash
	KcTh-1	4	bone fragments	3	small fragments, unidentifiable large mammal long bone; shows weathering and/or root etching	above White River ash
	KcTh-1	5	bone fragments	10	calcined fragments, includes unidentifiable mammal bone, and bone unidentifiable to class	above White River ash

Site Type	Borden	Artifact Number	Type	Quantity	Comments	Stratigraphic Context
	KcTh-1	9	bone fragments	66	small fragments, includes unidentifiable medium or large sized mammal bone, and unidentifiable mammal bone; well calcined	above White River ash
	KcTh-1	20	bone fragments	3	unidentifiable large mammal, weathered	unknown
Hunting Site - Lookout	KbTq-1	17	bone fragments	26	burned bone	below White River ash
	KcTq-5	12	bone fragments	8	burned bone	below White River ash
	KcTq-9	3	bone fragments	250	large mammal fragments. Found within hearth strata and associated with flakes. Over 250 mammal bone fragments, several are burned.	below White River ash
	KcTq-14	7	bone fragment	1	medium to large sized mammal bone fragments, calcined	base of White River ash
	KcTq-17	2	tibia fragments	2	two tibia fragments from a large mammal (Both are *Artiodactyla* and are likely caribou)	within White River ash
	KeTl-2	n/a	bone fragments	unknown	bone fragments	unknown
	KfTg-3	4	bone fragment	1	single fragment, calcined, unidentifiable medium or large sized mammal	unknown/disturbed context

4.3.6. The Archaeological Model for High Elevation Land Use in Southeast Yukon based on the Broader Study Area

Based on the preceding review of archaeological sites in the broader study area in southeast Yukon, the archaeological model of land use predicts a pattern of dispersed small hunting sites almost entirely in subalpine settings with limited use of alpine zones. The lack of evident occupation of the alpine can be explained to some degree by the absence in these zones of wood for fuel, construction and shelter that would facilitate establishment of a short-term camp for processing and drying meat and/or for berry picking. Further, physical traces of the activity of berry picking or hunting in the alpine would be expected to be meagre. Without an ice patch to concentrate hunting efforts and preserve hunting weaponry, and where stone drive lines or hunting blinds have not been constructed, scattered and isolated lost projectile points would be nearly archaeologically invisible. At least three ice patches are known to be present in the southeast Yukon (Bennett and Mooney 2016); none have evidence for use as a hunting location.

In comparing the archaeological model to that generated from ethnographic accounts, there are notable differences. Importantly, there are no recorded pre-contact hunting sites with fences or surrounds in the subalpine or alpine, one of the common capture methods in ethnographic accounts. Fences and surrounds are built using organic materials and without use of rock as part of the infrastructure, however, there are no identifiable features on the landscape. Food cache sites or plant/berry collection sites similarly are absent in the archaeological sample but are well reported in regional ethnographies. The latter types of activities leave little in tangible remains at any one locale unless short term camps were established. It also is possible that some of the sites identified as hunting locales had a more diversified range of activities. Verification requires collection and analysis of palaeobotanical samples or, perhaps, plant residue extraction from stone tools. The absence of rock cairn caches or boulder caches is noteworthy: while survey skew may be a factor here as well, it is also possible this style of cache was not common in the region. It should be noted that there were two cache sites in the broader study area, but they were not included in the sample as they were considered historic in age.

The three archaeological sites identified as subalpine hunting base camps in the subalpine zone, as earlier described, are anomalous to the ethnographic model. These indicate that the subalpine zone was used for more than short-term hunting. The variety of tool types and raw materials, and the abundance of debitage indicate a wide range of activities at these sites. One subalpine hunting base camp had occupations both above and below the ash indicating continuous re-occupation is a feature of subalpine hunting base camp as well. The larger size of these sites indicates these sites were likely re-used over time as well. All three sites are located in the lower elevations with an average elevation of 1,050 m and are all located adjacent to lakes which provide a variety of resources. The location of the subalpine hunting base camps between the lowlands and uplands would have provided strategic access to both environments and their respective resources. The location of these types of sites in subalpine settings may suggest a greater economic focus on uplands resources in the past as compared with the later proto-historic period.

Hunting appears to be the main activity that was conducted in the subalpine and alpine in the archaeological sample. Although faunal remains are absent or unidentifiable for most of the archaeological sites in the broader study area, it seems likely the sites are located to provide access to sought-after resources (Table 9) including marmots, goats, sheep, caribou, and Arctic ground squirrels (Honigmann 1981). Plant resources were collected as well in the alpine and subalpine zones, including lowbush cranberry, blueberry, crowberry, soapberry, salmonberry, raspberry, lily bulbs, “muskeg apples”, Labrador tea, moss campion, spruce and possibly pine (Table 10). Reimer (2000), Greer (2006, 1982) and Vanags (2000) all note that resource availability was an important influence in determining site distribution patterns in these types of environments.

A heritage study for a mine development in southeast Yukon (Greer 1996) notes that hunting camps were the primary site types within these regions and were “situated close to key resource features or areas” such as mineral licks or caribou habitat within known winter grazing routes. Shorter term hunting camps were typically found at higher elevations and the favoured locations at these higher elevation sites were at the “edge of tree line” (Greer 1996:23-25).

Sites in the subalpine and alpine are found on a variety of elevated landform types including knolls, benches, ridges, esker features, terraces, terrace points, ridge points, high bedrock knolls/knobs, “knobs”, knoll complexes, bluffs and ridge/outwash terraces. The majority of the sites are located on benches or ridges. These features tend to be prominent features on the landscape that stand out. They are also located adjacent to or near a variety of hydrographic features including creeks, rivers, ponds, lakes, wetlands, grassy meadows, alpine meadows, lake outlets and narrows. Of note is that all subalpine hunting base camps were adjacent to lakes. A lot of these locations are favourable habitat for important animal resources and would have provided hunting opportunities.

Besides hunting there is also evidence of tool maintenance and processing activities conducted in sites of these environments. This is evident from the debitage and faunal remains that were found at the sites. Finally, and notable, the presence of exotic lithic materials in sites of the subalpine zone indicates participation in a broad-based exchange network extending into northern British Columbia and the Mackenzie Mountain range in the Northwest Territories. The Kaska are reported to have been engaged and traded with the Mountain Dene for Tertiary Hills Clinker from the Northwest Territories (Gotthardt 2015:2). One clinker sample from a site (KaVa-3) near Carmacks in the central Yukon, in fact, extends this trade connection into early antiquity having a radiocarbon date of ~6,700 cal. BP (Gotthardt 2015:2). Trade with the Tahltan is also well documented in the ethnographic record in which Mount Edziza obsidian was obtained by the Kaska. One of the main trade rendezvous sites was said to be located at at the confluence of the Rancheria and Liard Rivers (Dawson 1898:97).

Combining both the ethnographic and archaeological record, the following are the expected site types that may be found in subalpine and alpine environments within southeast Yukon: 1) food cache 2) plant/berry collection sites 3) hunting fences/surrounds 4) hunting site – lookout 5) hunting site – generic and 6) subalpine hunting base camps. No lithic quarries or workshop sites have been identified to date in upland regions although these site types may yet be found. The Tyer’s River (*Bask’a Túé*), which flows from the southeast into the southeast corner of Frances Lake, was said to be a source of flint that people used in the past (Leda Jules in Gotthardt 1993:4).

Other site types are not documented as yet in the broader study area within subalpine and alpine environments. These include rock cairns with potential as burial sites, rock shelters where hunters would seek refuge from inclement weather, hunting blinds, processing sites with cache pits or roasting pits, butchery stations, lithic procurement and reduction locations, cairns and talus feature locations used for spiritual purposes, trail markers, hunting blinds, culturally modified tree sites and trails.

Chapter 5. Applying the Model of Alpine/Subalpine Use in Southeast Yukon to Don Creek Valley and Howard's Pass Study Area

In this chapter, I briefly review the archaeological impacts assessment projects in the Don Creek Valley and Howard's Pass region (Figure 6 and 7) drawing from information presented in two reports, *Heritage Resources Assessment for the Selwyn Project 2014* (Heffner and MacMillan 2015) and the *Heritage Resources Impact Assessment of The Proposed Selwyn Mine Footprint* (MacMillan and Young 2017). The main objective of the chapter is the examination of the Don Creek Valley and Howard's Pass archaeological sites within the model of alpine/subalpine land use as developed for the broader study area and presented in Chapter 4. Sites in the Don Creek Valley and Howard's Pass area provide a means to assess the model while the model facilitates integrated interpretation of the sites within the larger framework of the southeast Yukon.

Figure 6. General terrain showing subalpine and alpine environments within the Don Creek Valley and Howard's Pass Study Area
Source: *Heritage Resources Assessment for the Selwyn Project 2014* (Heffner and MacMillan 2015). Reproduced with permission.

Figure 7. General terrain showing subalpine and alpine environments within the Don Creek Valley and Howard's Pass Study Area
Photo: Don Creek is seen in the center of the photograph. Source: *Heritage Resources Assessment for the Selwyn Project 2014* (Heffner and MacMillan 2015). Reproduced with permission.

5.1. Heritage Resource Management Studies in the Don Creek Valley and Howard's Pass Study Area

Prior to the Don Creek Valley and Howard's Pass project, the only archaeological investigations in the study area were a 2008 archaeological overview of the area for Selwyn Chihong Mining Ltd. (Simonsen 2009), and a follow-up overview assessment for proposed developments of the Selwyn mining claim and associated areas (Simonsen and Somogyi 2010). The 2008 assessment incorporated a desktop review as well as five field days at the proposed Selwyn mining claim. No heritage sites were found, and the area was designated to have "an overall low archaeological potential" (Simonsen 2009:ii). The follow-up study in 2010 had a similar field time with identical results (Simonsen and Somogyi 2010). These reports, nevertheless, recommended additional archaeological impact assessment prior to any developments. This recommendation resulted in further studies in 2014 and 2015 conducted by Stantec Ltd. for which I

participated as a co-field director with Ty Heffner and Adam Perdue during the 2014 field project and co-field director with Ty Heffner in 2015.

Similar to earlier work, the 2014 project undertook an overview study with preliminary field reconnaissance (Heffner and MacMillan 2015). The principal objective was to develop a model of heritage potential for different areas and landforms based on "proximity to streams and water bodies, known heritage sites, known Aboriginal or historic trails, topography, vegetation cover, and presence of fish and wildlife habitat as outlined in the Wildlife Key Area maps produced by the Yukon Government Department of Environment" (Heffner and MacMillan 2015:22). The preliminary reconnaissance included 12 days of field time. This was to further refine and ground truth the model as well as initiate survey in areas of high potential where impacts would occur (i.e. mine roads, camp areas). Surface survey of these areas was supplemented with shovel testing where removed matrices were screened through 6.4 mm mesh. A total of 12 archaeological sites were identified during the 2014 project (Table 22). Four were identified by surface lithics with the remainder found through subsurface tests. Lithic materials were recovered from all sites with one also having bone. The results of the 2014 project justified a recommendation for additional impact assessment of areas identified with high heritage potential, this leading to the 2015 project.

Table 22. Archaeological Sites Identified Under Permit 14-25ASR

Borden Number	Site Type
KcTe-1	Cultural material (surface, subsurface, lithics)
KdTd-1	Cultural material (subsurface, lithics)
KdTd-2	Cultural material (subsurface, lithics, bone)
KdTd-3	Cultural material (subsurface, lithics)
KdTd-4	Cultural material (subsurface, lithics)
KdTe-1	Cultural material (subsurface, surface, lithics)
KdTe-2	Cultural material (subsurface, surface, lithics)
KdTe-3	Cultural material (subsurface, lithics)
KdTe-4	Cultural material (subsurface, lithics)
KdTe-5	Cultural material; Isolated find (surface, lithics)
KdTe-6	Cultural material (subsurface, lithics)
KdTe-7	Cultural material (subsurface, lithics)

The 2015 impact assessment was focused on the Selwyn mine footprint, a "79.1 km^2 area that is centered on the Don Creek valley and extends southwest from Don Creek to Howard's Pass at the NWT border" (MacMillan and Young 2017:iii). Fieldwork,

undertaken between August 7 and October 1, was to concentrate on areas of high potential identified in the 2014 model. This work employed field methods similar to those of the previous year. Thirty-five archaeological sites were identified with one site located outside of the mine footprint (Table 23). Only three sites were found through observation of surface lithics with two being isolated finds. Of the remainder, more detailed site assessment was conducted at 11 sites (Table 24). This included systematic shovel testing at regular intervals to determine site boundaries (MacMillan and Young 2017).

Beyond the projects summarized above, additional work was undertaken in 2015 on the Howard's Pass Access Road located in the western Northwest Territories near the Yukon-NWT border (Young 2015 and Heffner et al. 2016). Six sites were identified here consisting of surface and subsurface lithics, with lithic materials occurring above and below the White River ash. These sites are not included in further analyses due to project scope and my lack of access to GIS layer data from the Northwest Territories. The results are noted in that these sites also occur in alpine and subalpine settings.

Table 23. Archaeological Sites Identified Under Permit 15-07ASR

Borden Number	Site Type
KcTd-2	Cultural material (subsurface, lithics)
KcTd-3	Cultural material (subsurface, lithics)
KcTd-4	Cultural material (surface, lithics)
KdTd-5	Cultural material (subsurface, lithics)
KdTd-6	Cultural material (subsurface, lithics)
KdTe-10	Cultural material (subsurface, lithics)
KdTe-11	Cultural material (subsurface, lithics)
KdTe-12	Cultural material (subsurface, lithics)
KdTe-13	Cultural material (subsurface, lithics)
KdTe-14	Cultural material (subsurface, lithics)
KdTe-15	Cultural material; Isolated Find (subsurface, lithics)
KdTe-16	Cultural material (subsurface, lithics)
KdTe-17	Cultural material; Isolated Find (subsurface, lithics)
KdTe-18	Cultural material (subsurface, lithics)
KdTe-19	Cultural material; Isolated Find (surface, lithics)
KdTe-20	Cultural material (subsurface, lithics)
KdTe-21	Cultural material (subsurface, lithics)
KdTe-22	Cultural material (subsurface, lithics)
KdTe-23	Cultural material; Isolated Find; (subsurface, lithics)
KdTe-24	Cultural material; Isolated Find (subsurface, lithics)
KdTe-25	Cultural material (subsurface, lithics)

Borden Number	Site Type
KdTe-26	Cultural material (subsurface, lithics)
KdTe-27	Cultural material (subsurface, lithics)
KdTe-28	Cultural material (subsurface, lithics)
KdTe-29	Cultural material; Isolated Find (subsurface, lithics)
KdTe-30	Cultural material (subsurface, lithics)
KdTe-31	Cultural material (subsurface, lithics)
KdTe-32	Cultural material (subsurface, lithics)
KdTe-33	Cultural material (subsurface, lithics)
KdTe-34	Cultural material (subsurface, lithics)
KdTe-35	Cultural material (subsurface, lithics)
KdTe-36	Cultural material; Isolated Find (subsurface, lithics)
KdTe-37	Cultural material (subsurface, lithics)
KdTe-8	Cultural material (subsurface, lithics)
KdTe-9	Cultural material (subsurface, lithics)

Table 24. Archaeological Sites Assessed Under Permit 15-07ASR

Borden Number	Site Type
KdTd-1	Cultural material (subsurface, lithics)
KdTd-2	Cultural material (subsurface, lithics, bone)
KdTd-3	Cultural material (subsurface, lithics)
KdTd-4	Cultural material (subsurface, lithics)
KdTe-1	Cultural material (subsurface, surface, lithics)
KdTe-2	Cultural material (subsurface, surface, lithics)
KdTe-3	Cultural material (subsurface, lithics)
KdTe-4	Cultural material (subsurface, lithics)
KdTe-5	Cultural material; Isolated find (surface, lithics)
KdTe-6	Cultural material (subsurface, lithics)
KdTe-7	Cultural material (subsurface, lithics)

5.2. Archaeological Sites Analysis in the Don Creek Valley and Howard's Pass Study Area

Data gathered from the Selwyn project including archaeological site records, field notes, field photographs and artifact collections were compiled and analyzed to help reconstruct how this area was used in the past. These data provide an opportunity to test and compare the model for alpine and subalpine land use developed in Chapter 4. The 47 sites being examined here were also subjected to a site location review and correction as described earlier (Section 4.3).

5.2.1. Archaeological Site Types in the Don Creek Valley and Howard's Pass Study Area

Once the data for the 47 archaeological sites was compiled, each site was classified based on the ethnographic site types previously identified. For these categories, one site was classified as a subalpine hunting base camp, four were hunting sites – generic, and 42 were hunting sites – lookout (Table 25). Site types were determined based on features present at the site, types and diversity of artifacts recovered, and associated environmental features or context. A detailed summary of this information is provided in Appendix F.

Table 25. Site Types in the Don Creek Valley and Howard's Pass Study Area

Site Type	Number	Percent
Hunting Site - Lookout	42	89
Hunting Site - Generic	4	9
Subalpine Hunting Base Camp	1	2
Totals	47	100

Subalpine Hunting Base Camp

One site, KdTd-2, was identified as a subalpine hunting base camp (Figures 8 and 9). This site is 10–89 m ESE-NNE x 30–135 m ESE-WNW and was located on one of a number of terraces overlooking Don Creek in the subalpine at an elevation of 1,220 m. Based on the ethnographic review and as described in the previous chapter, base camps are located adjacent to fish lakes. However, because of the size of the site, potential hearth feature and artifact assemblage I am classifying KdTd-2 as a subalpine hunting base camp. This site also could have been used as a hunting lookout as it was a prominent feature and provided excellent vantages of Don Creek Valley.

Figure 8. KdTd-2, Subalpine Hunting Base Camp Site
Photo: View north of KdTd-2, subalpine hunting base camp site located on a terrace feature elevated above Don Creek. Site location is indicated by the black arrow. Source: *Heritage Resources Assessment for the Selwyn Project 2014* (Heffner and MacMillan 2015). Reproduced with permission.

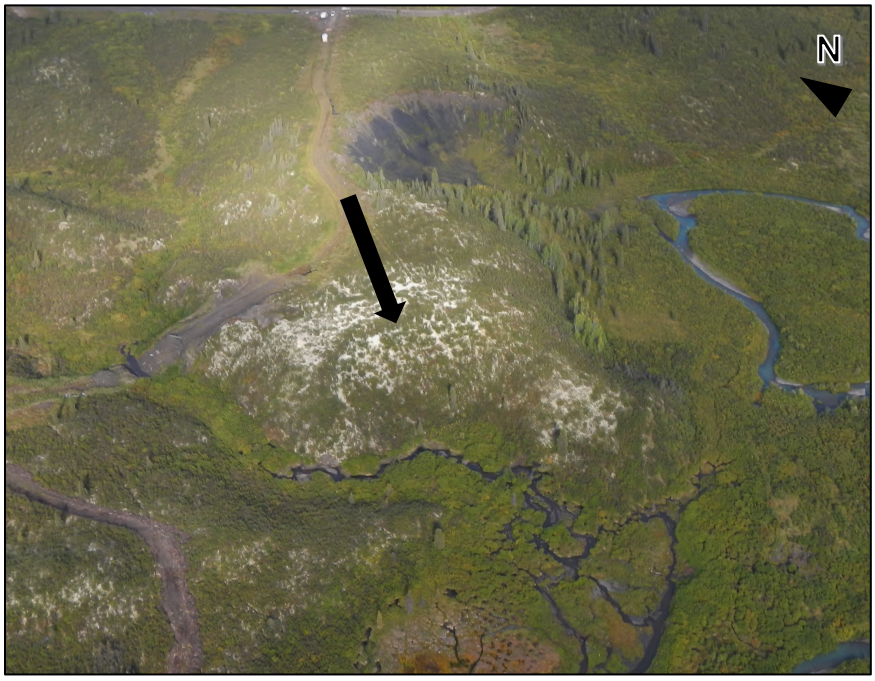

Figure 9. Aerial Image of Subalpine Hunting Base Camp Site KdTd-2
Photo: Site landform is indicated by the black arrow. Don Creek is to the right of the site and a tributary stream is below and adjacent to the site. Source: *Heritage Resources Assessment for the Selwyn Project 2014* (Heffner and MacMillan 2015).

Nineteen shovel tests were excavated in 2014 during the initial testing of the site. During the site assessment in 2015 a total of 91 shovel tests were excavated to determine the site extent. Artifacts were recovered from 15 shovel tests (Figure 10). The excavated site assemblage incorporates abundant debitage and a fragmented scraper. A variety of lithic materials were identified including chalcedony, chert, dacite, obsidian and siliceous sedimentary material. Artifacts were recovered from above, within and below White River ash. A calcined bone fragment was found 5 – 15 cm below surface in a shovel test (ST EC2); two chert flakes were also found in association with the bone. This was found in close proximity to a possible hearth strata; no White River ash was noted in this shovel test. An attempt was made to radiocarbon date the burned bone fragment but was unsuccessful (see section 5.2.5). A charcoal sample was taken from a possible hearth feature found in one of the shovel tests; this has not been dated as yet.

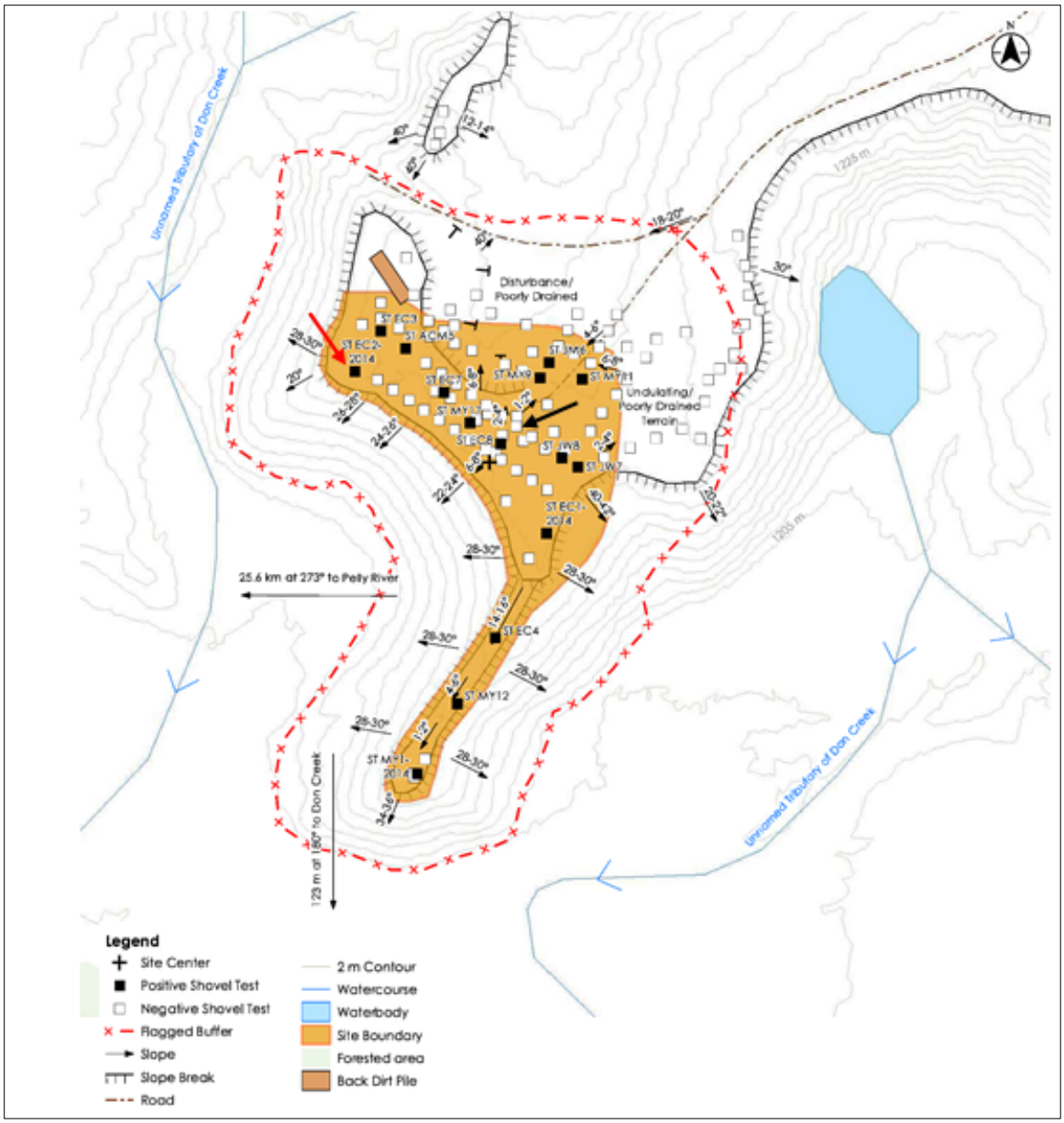

Figure 10. Subalpine Hunting Base Camp KdTd-2 - Site Map
Map: Site map of subalpine hunting base camp site, KdTd-2 showing the site landform with shovel test locations and associated site features. Black squares represent shovel tests with recovered material, white squares are negative shovel tests. Black arrow indicates location of possible hearth feature where charcoal was sampled. Red arrow indicates location of shovel test with recovered bone fragment. Source: *Heritage Resources Impact Assessment of The Proposed Selwyn Mine Footprint* (MacMillan and Young 2017). Reproduced with permission.

Hunting Sites – Generic

Four sites (KdTe- 3, 14, 17, 33) were classified as hunting sites – generic (Figure 11). All of these sites are small to moderate size, located in the subalpine, and range in elevation from 1,108 - 1,158 m. Sites were found on a variety of landform features including a bench, an esker and ridges. These sites are adjacent to Don Creek, tributaries of Don Creek and wetland areas. A smaller amount of debitage was recovered from these sites in comparison to the subalpine hunting base camp site. Identifiable tools or temporally diagnostic artifacts were not recovered. Two of the four had chalcedony lithic material only; one site had chalcedony and siliceous sedimentary material while chert and chalcedony were found at the fourth. White River ash was present at all sites, with materials recovered from within and below the ash stratum.

Figure 11. Generic Hunting Site – KdTe-14
Photo: KdTe-14, generic hunting site located in the subalpine on a bench feature. Source: *Heritage Resources Impact Assessment of The Proposed Selwyn Mine Footprint* (MacMillan and Young 2017). Reproduced with permission.

Hunting Sites – Lookout

The remaining 42 sites in the Don Creek and Howard's Pass study area are categorized as hunting sites – lookout; 37 of these are located in the subalpine and five are within the alpine zone. These sites were found within an elevation range of 1,095 – 1,612 m. The lookout sites were situated on prominent features including knolls, knoll on ridges, benches, bedrock points, ridges, ridge points, esker features, knolls on eskers, terraces and terrace points (Table 28). These features provide good vantages overlooking various bodies of water including Don Creek and its tributaries, Anniversary Creek, Bob Lake (Figure 12), wetlands and ponds (Figure 13). Game trails are present or in the vicinity of 13 sites. A possible hearth feature was noted at one lookout site (KdTe-30).

Figure 12. Site KdTe-29 – Lookout Hunting Site
Photo: Lookout hunting site, KdTe-29 in the foreground of the photo overlooking Bob Lake in the background. Positive shovel test location indicated by arrow. Source: *Heritage Resources Impact Assessment of The Proposed Selwyn Mine Footprint* (MacMillan and Young 2017). Reproduced with permission.

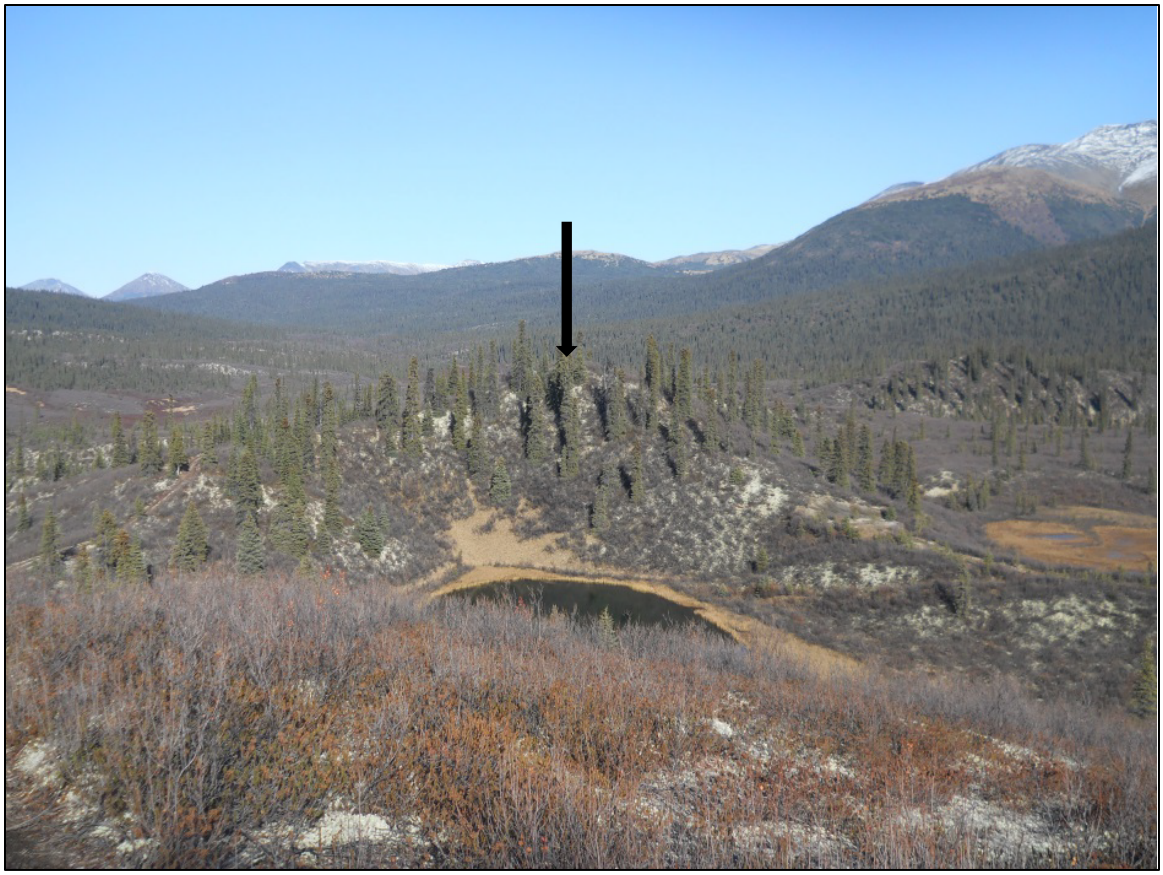

Figure 13. Site KdTe-4 – Lookout Hunting Site
Photo: Lookout hunting site KdTe-4 located on a knoll overlooking ponds and wetlands. Site location indicated by black arrow. Source: *Heritage Resources Assessment for the Selwyn Project 2014* (Heffner and MacMillan 2015). Reproduced with permission.

A smaller amount of debitage generally was recovered at these sites, and assemblages were less diverse than at the subalpine hunting base camp. A small number of diagnostic artifacts included two biface fragments, four microblades, a flake core, a retouched flake, and a side notched triangular shaped projectile point with a concave base. One flake has a possible burin facet. Artifacts are made of a variety of lithic materials including chalcedony, chert, siliceous sedimentary material, dacite, fine grained volcanic material, metamorphosed siltstone, obsidian, Tertiary Hills Clinker, basalt and possibly andesite. White River ash was observed at 34 of the 42 sites with artifacts recovered from above, within and below ash. Only three of the sites, however, had components above the White River ash.

One (KdTe-19) of these lookout hunting sites is worth noting for the associated presence of chert pebbles and nodules; it is also the highest site in terms of elevation.

This site was located in the alpine at an elevation of 1,612 m on a ridge feature (Figure 14). The site provides excellent vantages of the surrounding area and overlooks Don Creek Valley and wetlands below in the lower elevations. One chert flake fragment was found on the surface at the site. The chert appeared to be of poor quality and the flake fragment could be a result of raw material testing. It is possible that this site was accessed to assess the raw material at the site and not for hunting.

Figure 14. KdTe-19 - Alpine Hunting Lookout Site
Photo: Site KdTe-19 located on an alpine ridge feature overlooking the Don Creek Valley.
Source: *Heritage Resources Impact Assessment of The Proposed Selwyn Mine Footprint* (MacMillan and Young 2017). Reproduced with permission.

5.2.2. Archaeological Site Characteristics in the Don Creek Valley and Howard's Pass Study Area

Site Locations

Of the sites in the Don Creek Valley and Howard's Pass study area, 42 are located in the Boreal Subalpine and five are located in the Boreal Alpine Tundra. All sites

are distributed along Don Creek Valley and unnamed tributaries of Don Creek (Figure 15). Three are located near Howard's Pass, there is a grouping of sites at the confluence of the Don Creek Valley and an unnamed tributary of Don Creek, and there is a major concentration of sites along Don Creek and Anniversary Creek (unofficial name). There are also a few sites up higher in the alpine near Bob Lake (unofficial name), and north of Don Creek. One site was found to the south of the major cluster of sites along an unnamed tributary of Don Creek.

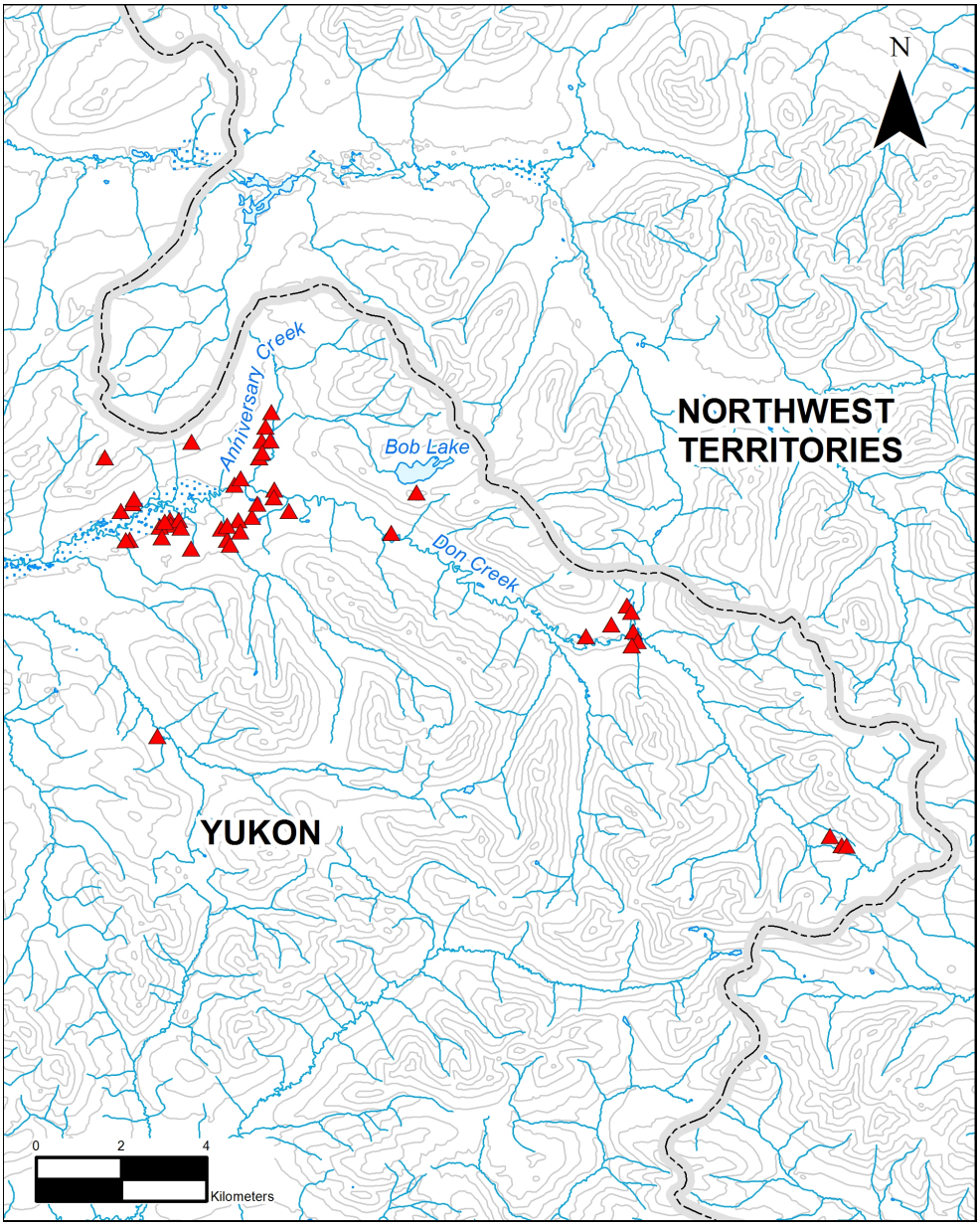

Figure 15. Archaeological Sites Distribution in the Don Creek Valley and Howard's Pass Study Area.

Note: Archaeological sites are indicated by red triangles. All are in the subalpine or alpine.

Site Elevations

Site elevations occur from 1,095 m to 1,612 m (Table 26). The subalpine hunting base camp site was located at an elevation of 1,220 m. This is higher than the average elevation of hunting sites – generic and lookouts. Lookout sites have a higher average elevation than generic hunting sites and they have a higher elevation on their top end of the range. KdTe-19, an alpine lookout hunting site, has the highest elevation.

Table 26. Archaeological Sites Elevation in the Don Creek Valley and Howard's Pass Study Area

Site Type	Number of Sites	Elevation Range (m)	Average Elevation (m)
Subalpine Hunting Base Camp Site	1	1,220	1,220
Hunting Site - Generic	4	1,108-1,158	1,128
Hunting Site - Lookout	42	1,095-1,612	1,201

Distance to Water

To determine the distances from sites to the closest hydrographic feature including water bodies, watercourses or wetlands, the "Near" Tool was used in ArcGIS (Table 27). The same process was followed as outlined previously (Section 4.3.2). The closest hydrographic features include Don Creek, unnamed tributaries of Don Creek, Anniversary Creek, unnamed ponds, wetlands and Bob Lake. Based on the Near analysis, creeks were the closest hydrographic feature for 28 of the sites. Fifteen sites were located closest to wetlands, three sites were found closest to ponds, and only one site was positioned near a small lake (Bob Lake). From descriptions on site records, or by viewing the topographic map data and available imagery, 30 sites are noted as being adjacent either to wetlands or overlooking wetlands.

Four of the five sites in the alpine were located closest to watercourses/creeks and one site was located closest to a small lake (Bob Lake). The distances to the closest water feature for alpine sites ranged from 124 – 532 m, with an average of 232 m. Subalpine sites were located closest to water bodies (ponds), watercourses/creeks (Don and Anniversary Creek, unnamed tributaries) and wetlands. The distances to the closest water feature for subalpine sites ranged from 27 – 417 m, with an average of 130 m. On average subalpine sites tend to be closer to hydrographic features.

Table 27. Archaeological Sites by Site Type - Distance to Water Features

Site Type	Borden	Distance to Waterbody (m)	Distance to Wetland (m)	Distance to Watercourse (m)	Closest Hydrographic Feature	Hydrographic Feature Name
Hunting Site - Generic	KdTe-14	458	**210**	617	Wetland	Wetland/Don Creek
	KdTe-17	792	1057	**53**	Watercourse/ Creek	unnamed tributary of Don Creek
	KdTe-3	558	**152**	271	Wetland	Wetland/Don Creek
	KdTe-33	677	681	**49**	Watercourse/ Creek	unnamed tributary of Don Creek
Hunting Site - Lookout	KcTd-2	3273	9983	**136**	Watercourse/ Creek	unnamed tributary of Don Creek
	KcTd-3	2956	10261	**133**	Watercourse/ Creek	Don Creek
	KcTd-4	2990	10235	**124**	Watercourse/ Creek	Don Creek
	KcTe-1	2560	3979	**126**	Watercourse/ Creek	unnamed tributary of Don Creek
	KdTd-1	92	4942	**56**	Watercourse/ Creek	unnamed tributary of Don Creek
	KdTd-3	495	5291	**340**	Watercourse/ Creek	Don Creek
	KdTd-4	**48**	5045	57	Waterbody/ Pond	pond/unnamed tributary of Don Creek
	KdTd-5	258	5644	**65**	Watercourse/ Creek	Don Creek
	KdTd-6	387	5781	**101**	Watercourse/ Creek	Don Creek
	KdTe-1	**123**	329	208	Waterbody/ Pond	unnamed pond
	KdTe-10	521	241	**106**	Watercourse/ Creek	Don Creek
	KdTe-11	831	721	**107**	Watercourse/ Creek	unnamed tributary of Don Creek
	KdTe-12	458	69	**34**	Watercourse/ Creek	Don Creek
	KdTe-13	458	**68**	177	Wetland	Wetland/Don Creek
	KdTe-15	1153	179	**52**	Wetland	Wetland/Don Creek

Site Type	Borden	Distance to Waterbody (m)	Distance to Wetland (m)	Distance to Watercourse (m)	Closest Hydrographic Feature	Hydrographic Feature Name
	KdTe-16	789	988	**79**	Watercourse/ Creek	unnamed tributary of Don Creek
	KdTe-18	1245	786	**418**	Watercourse/ Creek	unnamed tributary of Don Creek
	KdTe-2	497	**47**	219	Wetland	Wetland/Don Creek
	KdTe-20	1089	647	**112**	Watercourse/ Creek	Anniversary Creek/unnamed tributary of Don Creek
	KdTe-21	1445	360	**177**	Watercourse/ Creek	Anniversary Creek/unnamed tributary of Don Creek
	KdTe-22	1383	**259**	**259**	Watercourse/ Wetland	Anniversary Creek/unnamed tributary of Don Creek
	KdTe-23	1438	**59**	**59**	Watercourse/ Wetland	Anniversary Creek/unnamed tributary of Don Creek
	KdTe-24	188	**76**	304	Wetland	Wetland/Don Creek
	KdTe-25	314	**133**	239	Wetland	Wetland/Don Creek
	KdTe-26	413	**202**	280	Wetland	Wetland/Don Creek
	KdTe-27	411	**58**	310	Wetland	Wetland/Don Creek
	KdTe-28	**126**	5150	182	Waterbody/ Pond	pond/Don Creek
	KdTe-29	**234**	1256	414	Waterbody/ Lake	Bob Lake
	KdTe-30	480	140	**28**	Watercourse/ Creek	Don Creek
	KdTe-31	528	350	**140**	Watercourse/ Creek	Don Creek
	KdTe-32	424	769	**276**	Watercourse/ Creek	unnamed tributary of Don Creek
	KdTe-34	1189	2376	**49**	Watercourse/ Creek	Don Creek

Site Type	Borden	Distance to Waterbody (m)	Distance to Wetland (m)	Distance to Watercourse (m)	Closest Hydrographic Feature	Hydrographic Feature Name
	KdTe-35	991	298	**147**	Watercourse/ Creek	Anniversary Creek/unnamed tributary of Don Creek
	KdTe-36	1114	228	**212**	Watercourse/ Creek	Anniversary Creek/unnamed tributary of Don Creek
	KdTe-37	386	131	**103**	Watercourse/ Creek	Don Creek
	KdTe-4	107	**76**	81	Wetland	Wetland/Don Creek
	KdTe-5	528	**29**	63	Wetland	Wetland/Don Creek
	KdTe-6	413	580	**327**	Watercourse/ Creek	unnamed tributary of Don Creek
	KdTe-7	685	**203**	219	Wetland	unnamed tributary of Don Creek
	KdTe-8	460	251	**143**	Watercourse/ Creek	unnamed tributary of Don Creek
	KdTe-9	319	**50**	360	Wetland	unnamed tributary of Don Creek
	KdTe-19	1472	1347	**532**	Watercourse/ Creek	unnamed tributary of Don Creek
Subalpine Hunting Base Camp	KdTd-2	103	5451	**69**	Watercourse/ Creek	unnamed tributary of Don Creek

(Bold denotes closest water feature to site)

Landform Types

Landform types associated with the archaeological sites are based on observations made at the sites, site records descriptions, site photographs, topographic map data and available imagery. Sites are located on bedrock points, ridges, esker features, knolls, knolls on eskers, benches, ridges, ridge points and terraces (Table 28). The dominant majority (n=31) are positioned on knoll features including knolls and knolls on eskers with a large number also found on esker features.

Table 28. Archaeological Site Landform Types in the Don Creek Valley and Howard's Pass Study Area

Landform Type	Site Type			Totals	Percentage
	Subalpine Hunting Base Camp	Hunting Site - Generic	Hunting Site - Lookout		
Bench		1		1	2.1
Knoll/bench			1	1	2.1
Knoll/esker			1	1	2.1
Knoll			16	16	34.0
Knoll on Ridge			6	6	12.8
Knoll on Esker			7	7	14.9
Bedrock point/ridge			1	1	2.1
Ridge			2	2	4.3
Ridge Point		2	2	4	8.5
Esker Feature		1	4	5	10.6
Terrace	1		1	2	4.3
Terrace/Ridge			1	1	2.1

5.2.3. White River Ash as a Horizon Marker

White River ash was observed at most (n=39) of the sites in the Don Creek and Howard's Pass study area; for eight sites, White River ash was either not observed or it was not certain where artifacts were located in relation to the tephra layer (Figures 16 and 17). Artifact distributions at sites illustrate that subalpine environments were occupied before and after the White River ash eruption. Out of the five alpine sites, White River ash was observed at only one, and artifacts were recovered from within the ash stratum. The majority of site occupations (22 of 47 sites) predate the White River ash fall at 1,100 BP; four sites were occupied after the White River ash fall. At three sites, including the subalpine hunting base camp, occupation materials occur above and below White River ash.

Table 29. White River Ash - Don Creek Valley and Howard's Pass Study Area

Site Type	Above White River Ash	Above and Below White River Ash	Below White River Ash	Within White River Ash	Unknown or Uncertain
Subalpine Hunting Base Camp Site		1			
Hunting Site - Generic			3	1	
Hunting Site - Lookout	1	2	16	15	8
Total:	1	3	19	16	8

Figure 16. Shovel Test Stratigraphy at KdTe-30
Photo: Shovel Test Stratigraphy at KdTe-30 within Don Creek Valley and Howard's Pass. White River ash is seen as the grey layer and there is a possible hearth layer below that. Source: *Heritage Resources Impact Assessment of The Proposed Selwyn Mine Footprint* (MacMillan and Young 2017). Reproduced with permission.

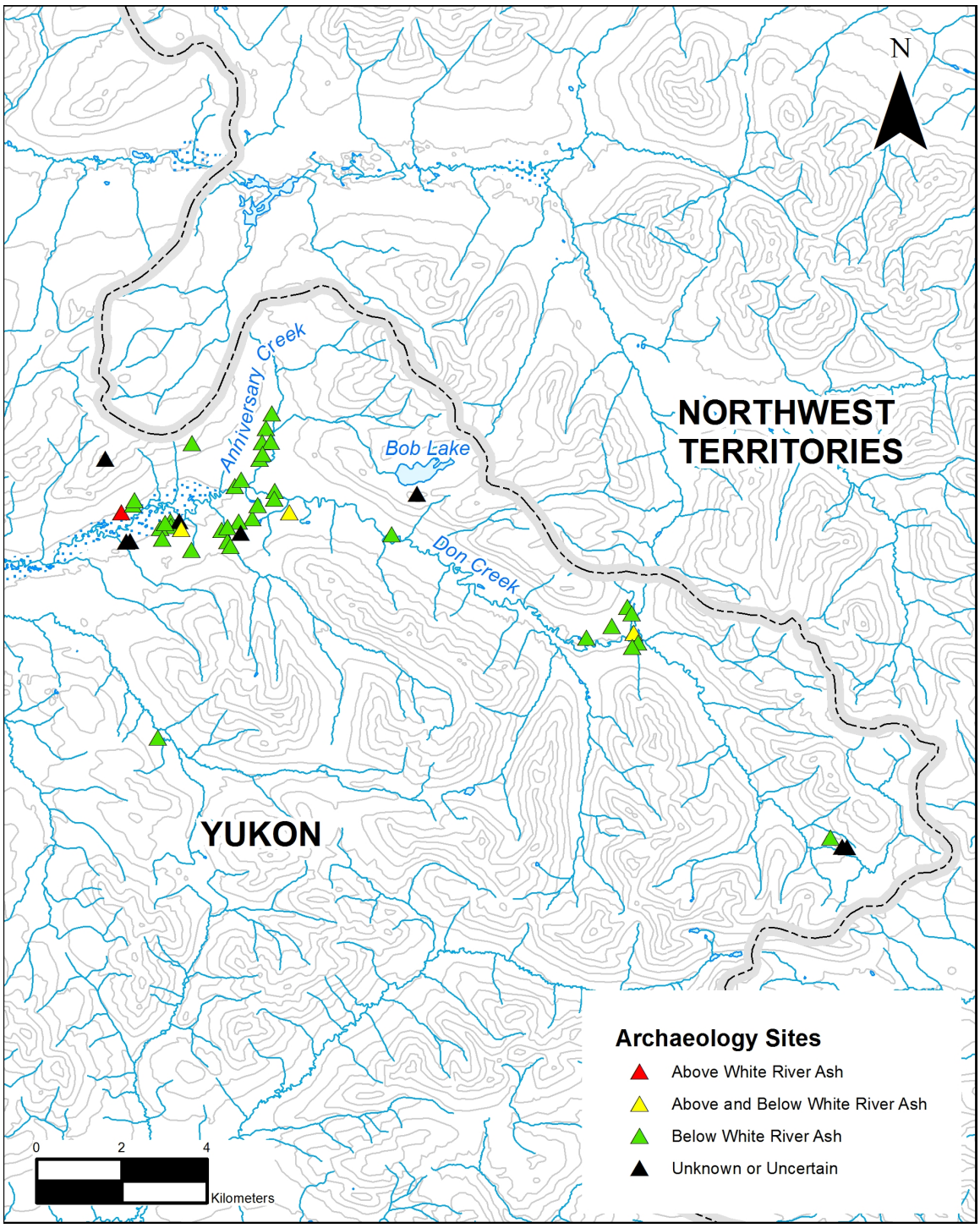

Figure 17. Archaeological Sites in Don Creek Valley and Howard's Pass – White River Ash Context

Note: Archaeological sites are indicated by the triangles; red triangles indicate sites found above White River ash, yellow triangles indicate sites found above and below White River ash, green triangles indicate sites found below White River ash. Black triangles indicate sites where the stratigraphic position relative to White River ash is uncertain or White River ash was not present at the site.

5.2.4. Lithic Analysis in the Don Creek Valley and Howard's Pass Study Area

Data for the lithic analysis was extracted from the Government of Yukon collections database. In a few cases artifacts were accessed to clarify details. A summary of artifact types, numbers of artifact types, lithic materials and faunal materials were compiled in an Excel spreadsheet.

Lithic Materials

A variety of lithic materials are present within the collections including chert, chalcedony, siliceous sedimentary material, dacite, obsidian, fine grained volcanic material, metamorphosed siltstone, basalt, Tertiary Hills Clinker, and materials noted as siliceous sedimentary material or andesite (Table 30). More than one type of lithic material is present at 13 of the sites. Chert was the most common type of material found, occurring at 31 of the 47 sites. This is as expected since chert is the most readily available stone in the region. Chalcedony, occurring at 20 sites, was the second most common type of material found. Obsidian (flakes and one microblade) was recovered from three sites (KdTd-2 and 3, KdTe-26). Jeff Rasic, using non-destructive portable x-ray fluorescence (pXRF), has identified Mount Edziza, British Columbia (Group E and E1) as a source for the artifacts from KdTd-2 and 3 (Table 31); artifacts from KdTe-26 have not been sourced as yet (MacMillan and Young 2017). The artifacts from KdTe-26 may not actually be obsidian but may in fact be chert (Christian Thomas, personal communication 2019). The obsidian assemblage includes a varied colour suite of blue, green, grey and black varieties. Obsidian was found within or below the White River ash. Artifacts made from Tertiary Hills Clinker were found at one site, KdTe-1. This assemblage included billet flakes (n=6) and flake fragments (n=2). The Tertiary Hills Clinker material type identifications were confirmed using XRF analysis by Todd Kristensen in 2016 (MacMillan and Young 2017:83). Outcrops of poor-quality chert consisting of pebble and cobbles with chert nodules was located at an alpine site, KdTe-19.

Table 30. Lithic Raw Material Types at Archaeological Sites in the Don Creek and Howard's Pass Study Area

Site Type	Name	Lithic Material(s)	Number of Lithic Materials Present at Site
Subalpine Hunting Base Camp	KdTd-2	chalcedony, chert, dacite, obsidian, siliceous sedimentary material	5
Hunting Site - Generic	KdTe-3	chalcedony, chert	2
	KdTe-33	chalcedony	1
	KdTe-17	chalcedony	1
	KdTe-14	chalcedony, siliceous sedimentary material	2
Hunting Site - Lookout	KdTe-36	chert	1
	KdTe-2	chert, metamorphosed siltstone	2
	KdTd-1	basalt, chert, dacite	3
	KdTe-5	chalcedony	1
	KdTe-25	chalcedony	1
	KdTe-29	chalcedony	1
	KdTe-9	chalcedony, chert	2
	KdTe-7	chalcedony, chert	2
	KdTe-10	chalcedony, chert	2
	KcTd-2	chalcedony, chert	2
	KdTe-28	chalcedony, chert	2
	KdTd-4	chalcedony, dacite, fine grained volcanic	3
	KdTe-16	chalcedony, siliceous sedimentary material/andesite?	2
	KdTe-15	chert	1
	KdTe-27	chert	1
	KdTe-30	chert	1
	KdTe-31	chert	1
	KdTe-32	chert	1
	KdTd-5	chert	1
	KdTe-8	chert	1
	KdTd-6	chert	1
	KdTe-11	chert	1
	KdTe-4	chert, chalcedony, dacite, siliceous sedimentary material	4
	KdTe-6	chert, dacite	2
	KcTe-1	chert, dacite	2
	KdTe-34	chert, siliceous sedimentary material	2

Site Type	Name	Lithic Material(s)	Number of Lithic Materials Present at Site
	KcTd-4	chert, siliceous sedimentary material	2
	KdTe-37	dacite	1
	KcTd-3	siliceous sedimentary material	1
	KdTe-24	siliceous sedimentary material	1
	KdTe-13	siliceous sedimentary material	1
	KdTe-12	fine grained volcanic	
	KdTd-3	chert, chalcedony, obsidian, siliceous sedimentary material	4
	KdTe-26	obsidian (blue, green)	1
	KdTe-1	chalcedony, chert (?), siliceous sedimentary material, Tertiary Hills Clinker	4
	KdTe-23	chalcedony	1
	KdTe-18	chert	1
	KdTe-35	chert, dacite	2
	KdTe-21	chert, metamorphosed siltstone	2
	KdTe-20	dacite	1
	KdTe-22	siliceous sedimentary material	1
	KdTe-19	chert	1

Table 31. Obsidian Artifacts and Sourcing Information - Don Creek and Howard's Pass Study Area

Borden Number	Artifact Number	Test Unit	Object Name	Quantity	Colour	Sample Provenience	Sample Number	Source ID
KdTd-2	7	ST MY9	billet flake	1	grey/black	5 - 15 cm below surface in mixed White River ash and brown silt	AOD-10835	Edziza Group E
KdTd-2	15	ST MY12	billet flakes	2	grey/black	10 - 15 cm below surface within White River ash	AOD-10836	Edziza Group E1
KdTd-3	3	ST RB5	microblade (proximal segment)	1	green	5 - 15 cm below surface within White River ash	AOD-10837	Edziza Group E1
KdTd-3	4	ST RB5	billet flake	1	green	5 - 15 cm below surface within White River ash	AOD-10838	Edziza Group E1
KdTd-3	6	ST MY10	billet flake	1	black	10 - 20 cm below surface, and below White River ash	AOD-10839	Edziza Group E
KdTd-3	8	ST MY10	billet flake	1	black	10 - 20 cm below surface, and below White River ash	AOD-10840	Edziza Group E
KdTe-26	1	ST JM11	billet flakes, secondary flakes, flake fragments	9	blue	7-18 cm below surface, and found at the base of White River ash and top of grey silt/sand	n/a	n/a

Borden Number	Artifact Number	Test Unit	Object Name	Quantity	Colour	Sample Provenience	Sample Number	Source ID
KdTe-26	2	ST JM11	secondary flake	1	blue	7 cm below surface, found at the base of White River ash and top of grey silt/sand	n/a	n/a
KdTe-26	3	ST JM11	billet flakes, flake fragments	14	green	7-18 cm below surface, and found at the base of White River ash and top of grey silt/sand	n/a	n/a
KdTe-26	4	ST JM11	billet flake	1	green	7-18 cm below surface, and found at the base of White River ash and top of grey silt/sand	n/a	n/a
KdTe-26	5	ST JM11	billet flake	1	green	7-18 cm below surface, and found at the base of White River ash and top of grey silt/sand	n/a	n/a

Stone Tool Assemblages

A detailed artifact analysis was not conducted, but existing data in the catalogues provide insight into the types of artifacts recovered. Artifact types classified in the catalogues can also be grouped into smaller categories. Only ten diagnostic or formed tools were found at sites in the Don Creek/Howard's Pass study area (Table 32). This assemblage includes microblades, biface fragments (Figure 18), a retouched flake, a flake core, possible flake burin, a scraper fragment, and a projectile point. All of these are consistent with hunting and processing activities as interpreted for study area sites.

Table 32. Tool Types in the Don Creek Valley and Howard's Pass Study Area

Site Type	Borden	Total Tools	Retouched Flake	Microblade	Core	Scraper	Biface Fragment	Projectile point
Subalpine Hunting Base Camp	KdTd-2	1				1		
Hunting Site - Lookout	KdTd-3	1		1				
	KdTd-4	1					1	
	KdTe-1	1						1
	KdTe-11	1			1			
	KdTe-21	2	1	1				
	KdTe-31	2		2				
	KdTe-32	1					1	
Totals:		10	1	4	1	1	2	1

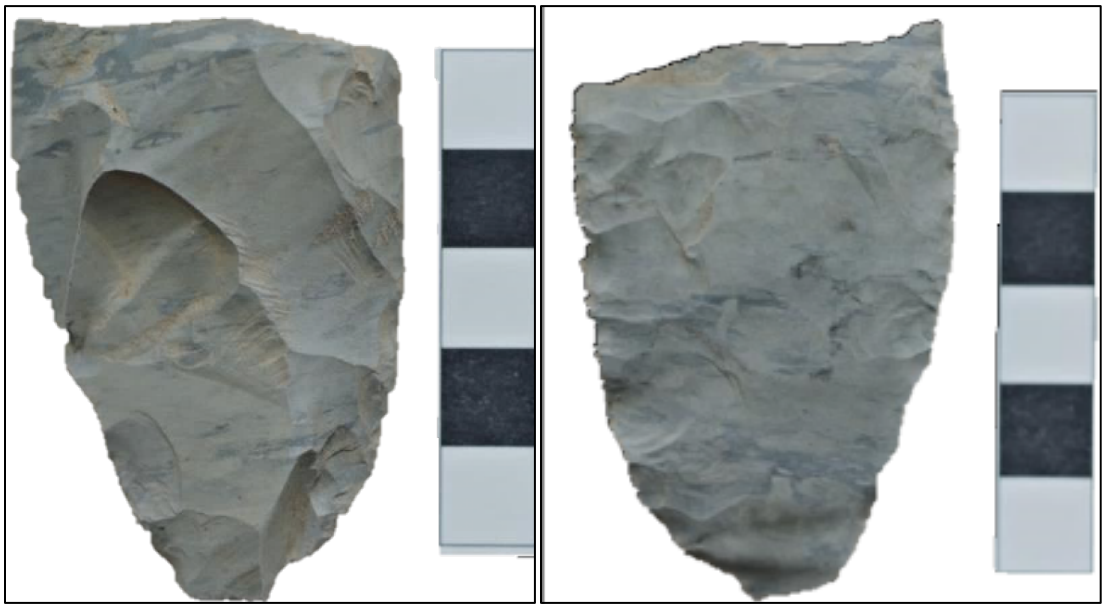

Figure 18. Biface - KdTe-32
Photo: Biface found at site KdTe-32 within the Don Creek Valley and Howard's Pass Study Area. Source: *Heritage Resources Impact Assessment of The Proposed Selwyn Mine Footprint* (MacMillan and Young 2017). Reproduced with permission.

The projectile point is a concave based, side-notched point with a triangular blade (Figure 19). It was found on the surface at a lookout hunting site, KdTe-1. This point likely dates to the Taye Lake Phase/Northern Archaic tradition, 5,000–1,100 BP (Workman 1978).

Figure 19. Projectile Point – KdTe-1
Photo: Concave based, side-notched point with a triangular blade found at KdTe-1 within Don Creek Valley and Howard's Pass Study Area. This point is stylistically related to the Taye Lake Phase/Northern Archaic Tradition, 5,000–1,100 BP. Source: *Heritage Resources Impact Assessment of The Proposed Selwyn Mine Footprint* (MacMillan and Young 2017). Reproduced with permission.

Two microblades were found at each of two lookout hunting sites (Figures 20 and 21). These likely date to the Little Arm Phase between 8,000–5,000 BP (Heffner 2002). Two of the microblades were found below the White River ash while context for the two others is unknown. One of the microblades (KdTd-3:3) was made from Mount Edziza obsidian, indicating travel or exchange networks existed in this area possibly as early as 8,000–5,000 BP.

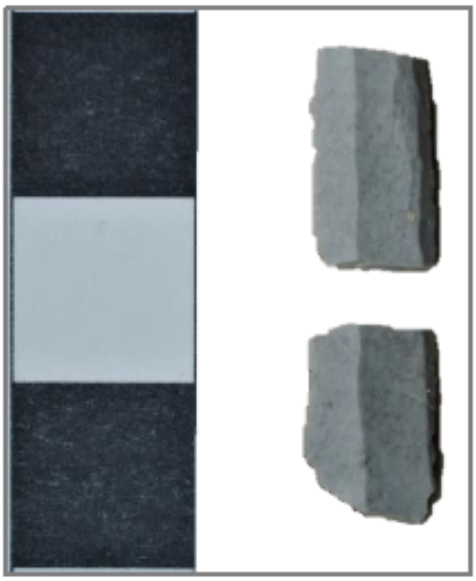

Figure 20. Microblade found at KdTe-21 - Don Creek Valley and Howard's Pass Study Area
Source: *Heritage Resources Impact Assessment of The Proposed Selwyn Mine Footprint* (MacMillan and Young 2017). Reproduced with permission.

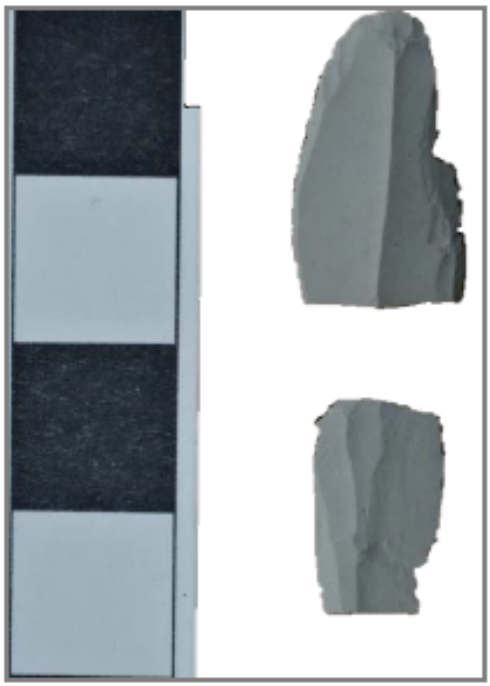

Figure 21. Microblade found at KdTe-31 - Don Creek Valley and Howard's Pass Study Area
Source: *Heritage Resources Impact Assessment of The Proposed Selwyn Mine Footprint* (MacMillan and Young 2017). Reproduced with permission.

Debitage

Debitage categories are summarized in Table 33 as reported. Where flake type could be determined, the largest number within the assemblage is identified as billet flakes. This suggests that tool maintenance or reworking was a dominant activity at most sites in the area.

Table 33. Debitage in the Don Creek Valley and Howard's Pass Study Area by Site Type

Site Type	Borden	Total Debitage	Primary Flake	Secondary Flake	Billet Flake	Flake Fragment	Debitage/ Shatter
Subalpine Hunting Base Camp	KdTd-2	94	1	1	49	43	
Hunting Site - Generic	KdTe-14	10			3	7	
	KdTe-17	1		1			
	KdTe-3	2	1		1		
	KdTe-33	1			1		
Hunting Site - Lookout	KcTd-2	2			1	1	
	KcTd-3	3			1	2	
	KcTd-4	3			2		1
	KcTe-1	2				1	1
	KdTd-1	34			15	16	3
	KdTd-3	34			20	14	
	KdTd-4	3		2	1		
	KdTd-5	22			17	5	
	KdTd-6	2		1	1		
	KdTe-1	22			11	11	
	KdTe-10	6		1	3	2	
	KdTe-11	2	2				
	KdTe-12	3		1		2	
	KdTe-13	1				3 (refit)	1
	KdTe-15	1				1	
	KdTe-16	4		1	1	1	1
	KdTe-18	3			2	1	
	KdTe-19	1				1	
	KdTe-2	6	1		1	4	
	KdTe-20	3			3		
	KdTe-21	15				15	
	KdTe-22	14		3	7	4	

Site Type	Borden	Total Debitage	Primary Flake	Secondary Flake	Billet Flake	Flake Fragment	Debitage/ Shatter
	KdTe-23	1			1		
	KdTe-24	1			1		
	KdTe-25	4			4		
	KdTe-26	27		2	11	14	
	KdTe-27	2			2		
	KdTe-28	7			5	2	
	KdTe-29	1			1		
	KdTe-30	0					
	KdTe-31	9			3	5	1
	KdTe-32	22			8	14	
	KdTe-34	2			2		
	KdTe-35	2			1	1	
	KdTe-36	1				1	
	KdTe-37	0			3 (2 refit)		
	KdTe-4	37	1		23	12	1
	KdTe-5	1			1		
	KdTe-6	2			2		
	KdTe-7	30			22	8	
	KdTe-8	3			1	2	
	KdTe-9	13		2	5	6	
	Totals:	465	6	15	236	199	9

5.2.5. Faunal Remains

A single piece of calcined bone was recovered from the subalpine hunting base camp (KdTd-2) (Figure 22). The bone was found 5 – 15 cm below surface and in association with two chert flakes. The fragment appears to be from a small mammal such as gopher or marmot. The bone was submitted for radiocarbon dating but an absence of bone collagen precluded measurement.

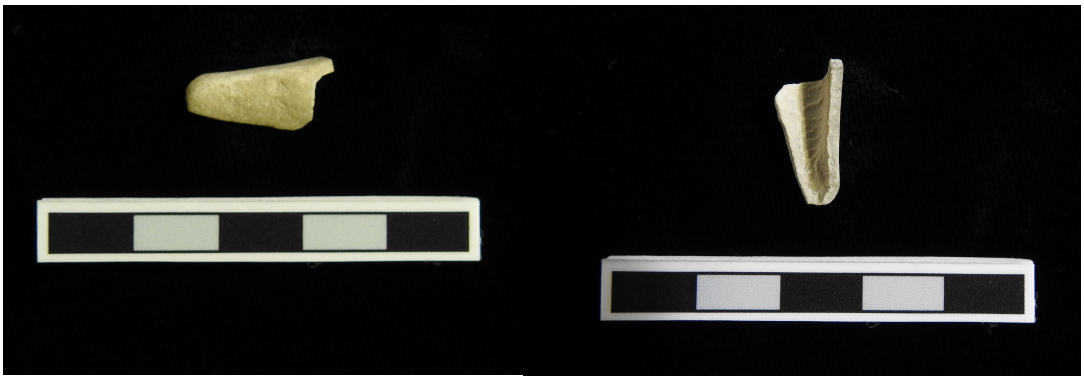

Figure 22. Bone Fragment from Subalpine Hunting Base Camp Site KdTd-2 – Don Creek Valley and Howard's Pass Study Area
Photo: Author, 2019

5.2.6. Don Creek Valley and Howard's Pass Study Area Summary

As was found in the land use model for the broader southeast Yukon subalpine/alpine region, Don Creek Valley and Howard's Pass was used principally as a hunting locale and for short term stays. There are five sites located in the alpine and the remaining 42 sites are located in the subalpine. All of the alpine sites are lookout type hunting sites. Lookout hunting sites and generic hunting sites occur within the subalpine while a single subalpine hunting base camp site also was identified in the subalpine area. The latter is located on a large, broad elevated landform overlooking the confluence of Don Creek and a tributary creek. This was one of the larger landforms noted in the subalpine zone of the Don Creek Valley and Howard's Pass study area. Perhaps because of the feature size, good vantages, and location overlooking a confluence this locale was more intensively used. Three subalpine hunting base camps in the subalpine were noted in the broader study area as well providing further evidence of land use with a greater economic focus on upland areas than is reported in the ethnographic record.

Both in the broader study area and in the Don Creek/Howard's Pass study area, sites are found on elevated land forms such as bedrock points, ridges, esker features, knolls, knolls on eskers, benches, ridges, ridge points and terraces, and in relative proximity to hydrographic features including lakes, ponds, streams and wetlands. Over half of the sites in the Don Creek/Howard's Pass study area (n=30) were noted as being either adjacent to wetlands or overlooking wetlands.

As was the case in the broader study area, a variety of lithic materials were used in the Don Creek and Howard's Pass subalpine and alpine sites including chert, chalcedony, siliceous sedimentary material, dacite, obsidian, fine grained volcanic material, metamorphosed siltstone, basalt, Tertiary Hills Clinker, and materials noted as siliceous sedimentary material or andesite. Chert is the predominant material at most sites, this reflective of its widespread availability in pebble or nodule form. There is, however, at least limited evidence for travel and/or exchange at subalpine sites as exhibited by Mount Edziza obsidian from northern British Columbia and Tertiary Hills Clinker artifacts from the Northwest Territories.

Sites in the Don Creek/Howard's Pass area illustrate clearly that subalpine environments were occupied prior to the White River ash fall with in some cases reoccupation after. Indeed, 35 sites have components below or within the White River ash suggestive of an intensive use of upland environments prior to 1,100 BP. That people returned to the larger subalpine hunting base camp after the ash fall also suggests the area was not abandoned as a consequence.

The Don Creek/Howard's Pass study diverges significantly from the land use model for the broader southeast Yukon study area where upland sites were dispersed and comparatively few in number. In contrast, there appears to be a high number of sites concentrated in the Don Creek Valley and Howard's Pass. Alternatively, this might also be due to the sampling strategy where more intensive survey and shovel testing programs were employed during the impact assessment projects. The fact that surface artifacts were present at only a small number of sites potentially supports this inference. The implications of shovel testing for future projects in this region if not the Yukon more generally are obvious.

Chapter 6. Summary and Research Conclusions

At the beginning of my thesis I presented six questions that I hoped to answer that would assist in the formulation of a high elevation land-use model.

1. What activities were conducted in subalpine and alpine environments?
2. What resources were sought after in subalpine and alpine environments?
3. What time of the year were people in subalpine and alpine environments?
4. What are the expected archaeological site types in the subalpine and alpine environments?
5. What types of archaeological sites were present in the Don Creek Valley and Howard's Pass and are these site types anticipated within the model?
6. What do the artifact types, including lithic materials, tell us about First Nations activities in the Don Creek Valley and Howard's Pass?

I believe these questions were addressed with some degree of success throughout the thesis. The archaeological land use for the broader southeast Yukon study area detailed in Chapter 4 described a pattern of dispersed predominantly short-term hunting camps or lookouts located primarily in the subalpine. All were on elevated landforms in proximity to water. Alpine sites were few, possibly attributable to a preference for establishing camps where wood was available for cooking and drying meat. Where camps are not established, hunting or gathering activity is not expected to result in any significant physical evidence. Although boulder caches, hunting blinds and caribou fences are described in the ethnographic record, none of these features has been identified to date in investigations in southeast Yukon within subalpine or alpine environments, nor have perennial ice patches been located where people might have focused their hunting efforts, and which might have preserved the evidence of hunting. The identification of four subalpine hunting base camp sites in the subalpine was an apparent departure from the land use patterns reported in the ethnographic record, and this suggests a greater economic focus on the uplands in the archaeological record.

Overall, the Don Creek and Howard's Pass study area conformed well to the land use model for the southeast Yukon. The model, thus, gains support through these data but at the same time it informs the Don Creek/Howard's Pass research, illustrating the region to have been part of a larger settlement pattern framework. There are, however,

unanticipated exceptions in the density and greater number of sites found in the Don Creek/Howard's Pass area. Beyond the use of an intensive survey methodology where shovel testing may have influenced site discovery success, two other factors potentially provide an explanation. Both are specific to the Don Creek Valley and Howard's Pass area.

Based on traditional use studies, Howard's Pass is reported as being a traditional travel route that "provided access between areas in the Northwest Territories and Yukon" (Heffner et al. 2016:3-11). The presence of Tertiary Hills Clinker from the NWT and obsidian from Mount Edziza in a number of sites suggests active trade may have occurred here between the Kaska Dena and the Shúhtagot'ine (Mountain Dene). The Shúhtagot'ine historically "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" (Andrews et al. 2012b:24). The presence of microblades in a number of the sites potentially dates this type of exchange to more than 5,000 years BP. The importance of Howard's Pass as a route for travel through the Mackenzie Mountains, thus, might account for a higher number of sites in the area, some of which potentially reflect a trade in valued exotic stone. Although this may have been a factor in the high number of sites, the archaeological record shows that this area was used for more than just simply a travel corridor as noted in Chapter 5. Site density is due to a very long record of travel through the region, as well as the availability of resources. And when travelling, people do have to hunt along the way.

In addition, recent studies have documented key habitat and the presence of a number of economically important species in the Howard's Pass and Don Creek Valley that undoubtedly made the area a focus for past hunting. A survey of traditional ecological knowledge conducted for the Howard's Pass access road indicates that "Howard's Pass and the surrounding areas have been used as Mountain Dene traditional lands for generations" (Mackay Range Development Corporation 2006:4). Regional activities included subsistence hunting, fishing, camping and trapping (Mackay Range Development Corporation 2006).

The study area includes subalpine habitat and vegetation including subalpine shrublands, streams and wetlands, the latter particularly favored by moose. There were

several mineral licks within the study area to attract animals including moose and sheep, and a number of animal trails were noted leading to these locations (MacMillan and Young 2017, Heffner and MacMillan 2015). The study area also provides alpine environments and the subalpine and alpine transition zones. Open alpine ridges and plateaus, grassy slopes, and alpine meadows are good habitat for caribou, marmots and Arctic ground squirrels; marmots and Arctic ground squirrels are plentiful in subalpine areas near Howard's Pass (Kirkham 2012:5-4).

A number of Woodland caribou herds range within the southeast Yukon (Figure 23). Finlayson, Redstone and South Nahanni herd ranges overlap with the Don Creek and Howard's Pass Study area. The Finlayson and South Nahanni Herds move to the alpine areas of Howard's pass in May to July before migrating to their wintering grounds by late August. Unlike the Barren-ground Caribou or migratory caribou, Woodland Caribou do not make "extensive migrations" or form large herds but "spend most of the year in smaller groups that move between the boreal forest and open mountain habitats" (Government of Yukon 2019a:1). Studies conducted for the Selwyn project indicate that "caribou can be found within and around the project area during their life cycle including calving, post-calving, rutting and wintering" (Kirkham 2012:5-3). It is thought that numbers of caribou in the study area during the winter may be limited due to high snow pack (Kirkham 2012:5-3). Moose migrate from the Pelly River watershed and are also present during the late summer and fall.

Thinhorn sheep are a key wildlife species within the eastern portion of the Don Creek Valley and Howard's Pass along the Yukon/NWT territorial border. They range the uplands within these locations during the winter from October to April, breed during early winter from October to January, and reproduce in the spring from April to June (Government of Yukon 2019b).

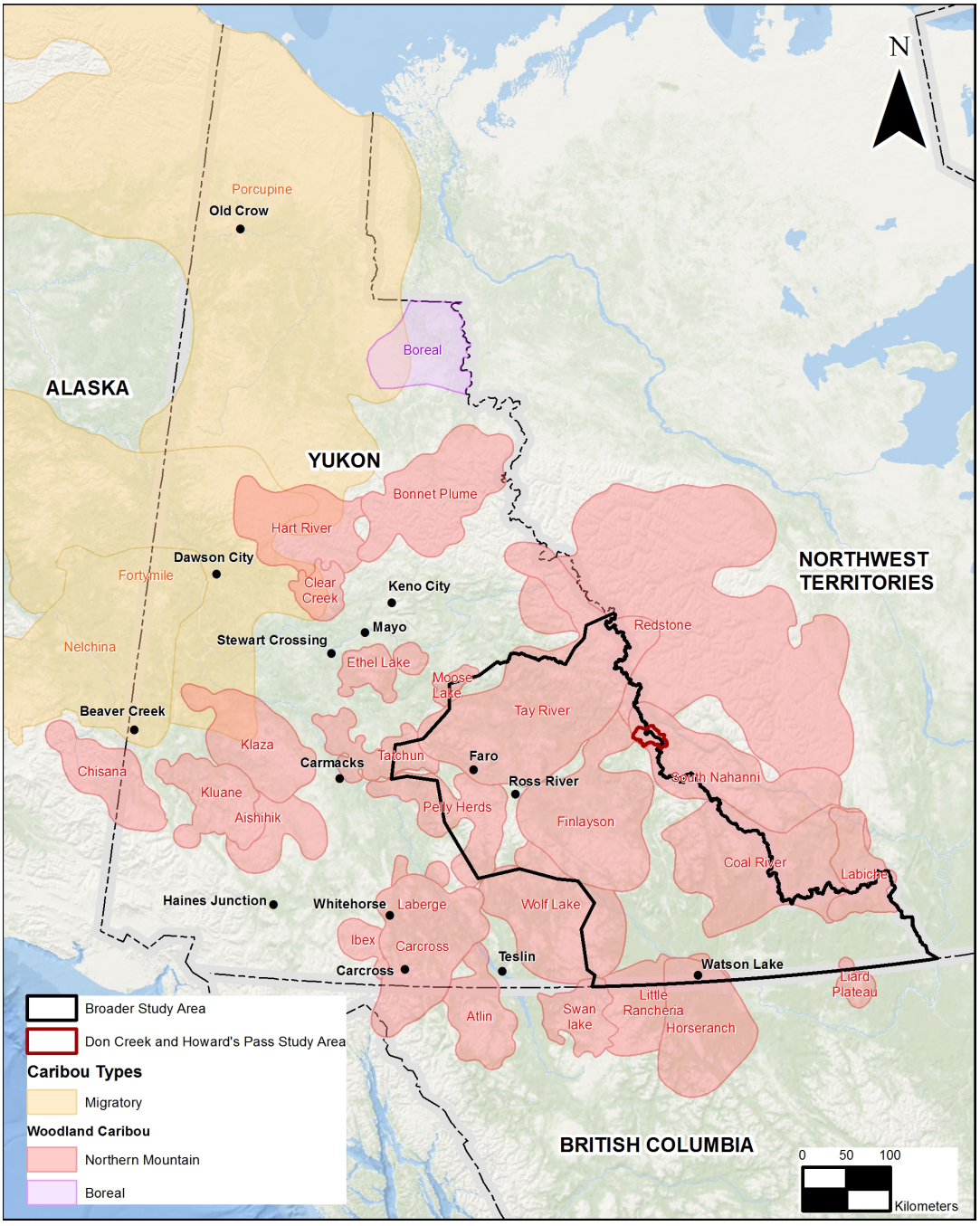

Figure 23. Yukon Caribou Herd Ranges
Note: 2018 Caribou Herd Ranges Data provided by Department of Environment, Government of Yukon.

Finally, studies of the Don Creek fishery report the presence of arctic grayling, round whitefish, chinook salmon, burbot and slimy sculpin. Fish distribution is influenced by a cascade complex, where a barrier at the Don Creek/Anniversary Creek confluence

restricts their presence to areas downstream on Don Creek (Kirkham 2012:5-4). Slimy sculpin are reported in Bob Lake as well (Kirkham 2012).

Archaeological sites are located within or adjacent to prime habitat features for several species of fauna. A number occur on knolls overlooking ponds, creeks or wetlands; these knolls provide good vantages of locales where wildlife frequent, and therefore would be good hunting locales. There are sites located near mineral licks which also were good hunting locations as they are known to have attracted a number of animal species. Esker features were a popular site choice. Eskers are long elevated ridges that provide not only a vantage for hunters, but walkways for both human and game through lower, poorly drained terrain. Game trails were located at many of the sites or in the vicinity illustrating their importance to site location.

The wetland complexes along the Don Creek Valley are seasonally important habitat for waterfowl and moose. Over half of the sites (n=30) were noted as being either adjacent to wetlands or overlooking wetlands. Although the geologic history for these wetland complexes is unknown, they provide a unique ecological environment supporting several resources. Accordingly, they have been used by people in the past and present (Nicholas 1998).

Beyond game and subsistence hunting, there are a number of floral resources within the study area providing supplementary foods, raw materials and medicines. This includes crowberry, cranberry, blueberry, balsam spruce, black spruce and Labrador tea; berry patches in particular were present at many of the recorded sites. Spruce wood was employed for a variety of uses including drying racks, cache construction as well as for medicinal purposes.

The concentration of economically important resources within Don Creek Valley and Howard's Pass area is notable. Resource availability in the Yukon clearly had a significant impact on land use patterns and this, along with the potential of the area as a travel corridor, may explain the density and number of sites recorded in the 2014/2015 projects. This attempt to model archaeological land use in alpine and subalpine settings of the southeast Yukon, however, should be viewed as a preliminary effort only, and subject to considerable improvement as baseline data for different local areas becomes available. This thesis has made use of the available published ethnographies for the

Kaska area. More recent traditional land use studies sponsored by the Kaska will provide additional information on subalpine/alpine areas and resource use to refine and assist in the development of future models.

It is important to note that ethnographic models, and models based on modern species, may not adequately account for changes in resources and climate over time. For example, bison and elk could have been a focus of hunting for early Holocene groups in parts of the study area. Bison, in fact, persisted in the southern Yukon into proto-historic times. According to McClellan (1975:476) Teslin Tlingit informants identify the original name for Ross River as “Buffalo River”, suggesting bison were in Kaska territory until quite recently. Different movements and habitat of these species as compared with caribou and moose potentially affect group size and site location and would alter patterns of land use seen in the archaeological record.

Improved documentation of archaeological sites in the course of surveys and assessments could assist in the development of future land use models. In Chapter 5, I have emphasized the importance of shovel testing in survey methodology for site discovery. Indeed, without shovel tests, a substantially smaller number of sites would have been found. Systematic recording of vegetation, local elevation, distance to water, and landform types is required. Recording of areas without archaeological sites, but where high potential for site presence is predicted, would also be useful for the refinement of the proposed model.

An improved understanding of regional trade and the movement of exotic stone in the past may shed further light on the study area as a travel corridor. Sourcing of Tertiary Hills Clinker, obsidian and native copper are important archaeological discoveries, but the identification of the source for more locally available lithics such as chalcedonies and quartz could also provide important data on logistical strategies. The implementation of guidelines for cataloguing artifacts which include standardization of terms would also contribute to furthering comparative lithic studies in future.

As a conclusion, and certainly the most important outcome of this project, I want to emphasize the importance of upland areas in the economy of groups inhabiting this region of the Yukon. Forty-eight percent of the known sites (112 of 231) in the southeast Yukon study area were confirmed to be in the subalpine or alpine. The southeast Yukon

lacked the abundant salmon runs in the Pacific drainage rivers and streams that were a mainstay of traditional southwest Yukon economies. For past peoples of southeast Yukon, the subalpine and alpine resources were as important as lowland fisheries and beaver ponds for their economic survival.

References

Andrefsky, William
2006 *Lithics: Macroscopic Approaches to Analysis.* Cambridge University Press, Washington State University.

Andrews, Thomas D., Glen MacKay, and Leon Andrews
2012a Archaeological Investigations of Alpine Ice Patches in the Selwyn Mountains, Northwest Territories, Canada. *Arctic 65*(1):1-21.

Andrews, Thomas D., Glen MacKay, Leon Andrews, Wendy Stephenson, Amy Barker, Claire Alix, and the Shúhtagot'ine Elders of Tulita.
2012b Alpine Ice Patches and Shúhtagot'ine Land Use in the Mackenzie and Selwyn Mountains, Northwest Territories, Canada. *Arctic* 65(1):22-42.

Banfield, A.W.F.
1974 The Mammals of Canada. *Journal of Mammology* 57(2):419-420.

Bennett, Tim
2017 *Heritage Resource Impact Assessment: BMC Minerals Proposed Kudz Ze Kayah Mine 2017 (16-04ASR).* Submitted to BMC Minerals (No.1) Ltd., Permit 16-04ASR. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.

Bennett, Tim and James Mooney
2016 *Heritage Resource Impact Assessment: Proposed BMC Minerals Kude Ze Kayah Mine.* Submitted to BMC Minerals (No.1) Ltd., Permit 15-10ASR. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.

Burn, C.R.
1993 Permafrost, tectonics and past and future regional climate change, Yukon and adjacent Northwest Territories. *Canadian Journal of Earth Sciences* 31:182-191.

Holtmeier, Friedrich-Karl
2009 *Mountain Timberlines: Ecology, Patchiness and Dynamics.* Springer.

Clark, Donald W.
1991 *Western Subarctic Prehistory*. Archaeological Survey of Canada, Canadian Museum of Civilization, Hull, Québec

Clark, Donald W., and A. McFadyen Clark
1993 *Batza Tena: Trail to Obsidian: Archaeology at an Alaskan Obsidian Source*. Archaeological Survey of Canada, Canadian Museum of Civilization.

Cook, John P.
1995 Characterization and Distribution of Obsidian in Alaska. *Arctic Anthropology* 32(1):92-100.

Costello, Eugene
2016 Seasonal Settlement and the Interpretation of Upland Archaeology in the Galtee Mountains, Ireland. *Landscape History* 37(1):87-98.

Curdy, Philippe
2007 Prehistoric Settlement in Middle and High Altitudes in the Upper Rhone Valley (Valais-Vaud, Switzerland): A Summary Of Twenty Years Of Research. *Preistoria Alpina* 42(2017):99-108.

Dawson, G. M.
1889 Notes on the Indian Tribes of the Yukon District and Adjacent Northern Portion of British Columbia, 1887. *Geological Survey of Canada Annual Report* 3(2):191B–213B.
1898 *Report on the Exploration in the Yukon District, Northwest Territories and Adjacent Northern Portion of British Columbia 1887*. Submitted to Geological Survey of Canada, Ottawa.

Dixon, James Dixon, M. Callanan, A. Hafner, and P.G. Hare
2014 The Emergence of Glacial Archaeology. *Journal of Glacial Archaeology* 1 (2014):1-9.

Dyke, Arthur S.
2005 Late Quaternary Vegetation History of Northern North America Based on Pollen, Macrofossil, and Faunal Remains. *Géographie physique et Quaternaire* 59 (2-3):211-262.

Easton, Norman Alexander, Glen MacKay, Patricia Bernice Young, Peter Schnurr and David Yesner
2011 Chindadn in Canada? Emergent Evidence of the Pleistocene Transition in Southeast Beringia as Revealed by the Little John Site, Yukon. In *From the Yenisei to the Yukon: Interpreting Lithic Assemblage Variability in Late Pleistocene/ Early Holocene Beringia* edited by Ted Goebel and Ian Buvit, pp. 215-233. Texas A&M University Press, College Station.

Easton, Norman Alexander, David Yesner, V. Hutchinson, Peter Schnurr and Christopher Baker
2009 Wisconsin-Interstadial(?), Terminal-Pleistocene, and Early-Holocene Radiocarbon Dates from the Little John Site, Southwest Yukon Territory, Canada. *Current Research in the Pleistocene* 26:47–50.

Easton, Norman Alexander and Glen MacKay
2008 Early Bifaces from the Little John Site (KdVo-6), Yukon Territory, Canada. In *Projectile Point Sequences in Northwestern North America*, edited by Roy L. Carlson and Martin P.R. Magne, pp. 263-282. Archaeology Press, Simon Fraser University, Burnaby, British Columbia.

Easton, Norman Alexander, Glen MacKay, Peter Schnurr, Patricia Bernice Young, and Chirstopher Baker
2007 The Little John Site (KdVo-6), a Late-Glacial Multi-Component (Nenana–Denali Complex) Site in the Far Southwest of Yukon Territory, Canada. *Current Research in the Pleistocene*, 24:82-84.

Esdale, Julie A.
2008 A Current Synthesis of the Northern Archaic. *Arctic Anthropology*, 45 (2):3-38.

Flynn, N. and S. Francis (editors)
2016 Yukon Ecological and Landscape Classification and Mapping Guidelines. Version 1.0. Electronic document, https://yukon.ca/sites/yukon.ca/files/env/env-yukon-ecological-landscape-classification-mapping-guidelines.pdf, accessed August 13, 2018.

Fladmark, Knut R.
1985 *Glass and Ice: A Report on the Archaeology of Mt. Edziza and Spectrum Ranges, Northwest British Columbia.* Publication 14. Department of Archaeology, Simon Fraser University, Burnaby, British Columbia.

Gotthardt, Ruth M.
2015 *General observations on the occurrence of Tertiary Hills clinker in Yukon.* Submitted to Government of Yukon. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.
1993 Frances Lake Traditional and Archaeological Sites. Submitted to Liard First Nation and Government of Yukon, Permit 92-04ASR. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.
1981 *North Canol Road Archaeological Inventory Project: Preliminary Report to Archaeological Survey of Canada*. Department of Anthropology, University of Toronto, Toronto.

Government of Yukon
2019a Woodland Caribou. Electronic document, http://www.env.gov.yk.ca/animals-habitat/mammals/documents/Woodland_caribou.pdf, accessed September 7, 2019.
2019b Stone's Sheep. Electronic document, https://yukon.ca/en/stones-sheep, accessed September 7, 2019.
2011 The Frozen Past: Yukon Ice Patches. Electronic document, http://emrlibrary.gov.yk.ca/Tourism/frozen-past-yukon-ice-patches-2011.pdf, accessed October 21, 2019.

Greer, Sheila C.
1996 *Wolverine Lake Mine Development 1996 Archaeological and Historic Sites Impact Assessment*. Submitted to Access Mining Consultants and Government of Yukon, Permit 96-11ASR. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.

1982 *An Introduction to the Archaeology of the Macmillan Pass – North Canol Road Area, Yukon Territory.* Final report of the 1981 Macmillan Pass Archaeological Survey. Submitted to Archaeological Survey of Canada, National Museum of Man, Ottawa. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.

Greer, Sheila C. and Diane Strand
2012 Cultural Landscapers, Past and Present, and the South Yukon Ice Patches. *Arctic* 65(1):136-152.

Grimaldi, Stefano, Sveinung Bang-Andersen, Francesco Carrer, Pierre Crotti, Philippe Della Casa, Federica Fontana, Walter Leitner, Estela Mansur, and Sabine Reinhold
2016 Human Occupations of Mountain Environments. *Quaternary International* 402 (2016):2-4.

Hare, Gregory P., Christian D. Thomas, Timothy N. Topper, and Ruth M. Gotthardt
2012 The Archaeology of Yukon Ice Patches: New Artifacts, Observations, and Insights. *Arctic* 65(1):118-135.

Hare, Greg
2007 2004-5 Annual Monitoring and Recovery of Archaeological Materials from Southern Yukon Ice Patches, Final Report. Submitted to Government of Yukon, Permit 04-03ASR, 05-07ASR. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.

Hare, Gregory P., Sheila Greer, Ruth Gotthardt, Richard Farnell, Vandy Bowyer, Charles Schweger, Diane Strand
2004 Ethnographic and Archaeological Investigations of Alpine Ice Patches in Southwest Yukon, Canada. *Arctic* 57(3):260-272.

Hare, Gregory P.
1995 *Holocene Occupations in the Southern Yukon: New Perspectives from the Annie Lake Site*. Hude Hudan Series, Occasional Papers in Archaeology No. 5. Heritage Branch, Government of Yukon, Whitehorse.

Heffner, Ty and Jodie MacMillan
2015 *Heritage Resources Assessment for the Selwyn Project 2014*. Submitted to Selwyn Chihong Mining Ltd. and Government of Yukon, Permit 14-25ASR. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.

Heffner, Ty, Mark Young and Jodie MacMillan
2016 *Howard's Pass Access Road Heritage Resources Impact Assessment*. Submitted to Selwyn Chihong Mining Ltd. Copies available from Prince of Wales Northern Heritage Centre, Yellowknife.

Heffner, Ty Alexander
2002 *KaVn-2: An Eastern Beringian Tradition Archaeological Site in West-Central Yukon Territory, Canada.* Hude Hudan Series, Occasional Papers in Archaeology No. 10. Heritage Branch, Government of Yukon, Whitehorse.

Honigmann, John J.
1981 Kaska. In *Subarctic*, edited by June Helm, pp. 442–450. Handbook of North American Indians, Vol. 6, William C. Sturtevant, general editor, Smithsonian Institution, Washington, D.C.
1954 *The Kaska Indians: An Ethnographic Reconstruction.* Yale University Press, New Haven, Connecticut.
1949 *Culture and Ethos of Kaska Society*. Yale University Press, London: Geoffrey Cumberlege, Oxford University Press.

Indrelid, Svein, Kari Loe Hjelle and Kathrine Stene (editors)
2015 *Exploitation of Outfield Resources – Joint Research at the University Museums of Norway*. University Museum of Bergen, Norway.

Ives, John W. and Carla M. Sinopoli
1980 The Archaeological Correlates of the Athapaskan Kaska. *Michigan Discussions in Anthropology* 5 (1-2):22-39.

Jackson Lionel E., Brent Ward, Alejandra Duk-Rodkin and Owen L. Hughes.
1991 The Last Cordilleran Ice Sheet in Southern Yukon Territory. *Géographie physique et Quaternaire* 45(3):341–354.

Jensen, Britta J.L., Sean Pyne-O'Donnell, Gill Plunkett, Duane G. Froese, Paul D.M. Hughes, Michael Sigl, Joseph R. McConnell, Matthew J. Amesbury, Paul G. Blackwell, Christel van den Bogaard, Caitlin E. Buck, Dan J. Charman, John J. Clague, Valerie A. Hall, Johannes Koch, Helen Mackay, Gunnar Mallon, Lynsey McColl, and Jonathan R. Pilcher
2014 Transatlantic distribution of the Alaskan White River Ash. Geology 42(10):875-878.

Johnson, Leslie Main
2010 *Trail of Story, Traveller's Path – Reflections on Ethnoecology and Landscape*. Athabaska University Press, Edmonton.

Johnson, Leslie Main
2008 Plants and habitats - a consideration of Dene ethnoecology in northwestern Canada. *Botany* 86:145-156.

Kirkham, Garth
2012 *Update for XY West Deposit Mineral Resource Estimate Howard's Pass Property, Eastern Yukon NI 43-101 Technical Report.* Submitted to Selwyn Chihong Mining Ltd. Copies available from the YESAB Online Registry.

Kristensen, Todd J., P. Gregory Hare, Ruth M. Gotthardt, Norman A. Easton, John W. Ives, Robert J. Speakman, and Jeffrey T. Rasic
2019a The Movement of Obsidian in Subarctic Canada: Hunter-Gatherer Social Networks and Responses to a Large Scale Volcanic Eruption. *Journal of Anthropological Archaeology 56:*1-18.

Kristensen, Todd J., Thomas D. Andrews, Glen MacKay, Ruth Gotthardt, Sean C. Lynch, M. John Duke, Andrew J. Locock, John W. Ives
2019b Identifying and sourcing pyrometamorphic artifacts: Clinker in subarctic North America and the hunter-gatherer response to a Late Holocene volcanic eruption. *Journal of Archaeological Science: Reports* 23:773-790.

Kuzyk, Gerald W., Donald E. Russell, Richard S. Farnell, Ruth M. Gotthard, Gregory Hare and Erik Blake
1999 In Pursuit of Prehistoric Caribou on Thandlät, Southern Yukon. *Arctic* 52 (2): 214-219.

Kunz, Michael L., Constance M. Adkins, and Richard E. Reanier
2001 The Batza Tena Obsidian Source: Physical Description and Resource Availability. Paper presented at the 28th Annual Meeting of the Alaska Anthropological Association, Fairbanks, Alaska.

Mackay Range Development Corporation
2006 Preliminary Report Traditional Ecological Study Howard Pass. Electronic document, http://reviewboard.ca/upload/project_document/EA0708-001_Appendix_VI_TK_Study.pdf, accessed August 21, 2019.

MacMillan, Jodie and Mark Young
2017 *Heritage Resources Impact Assessment of the Proposed Selwyn Mine Footprint*. Submitted to Selwyn Chihong Mining Ltd. and Government of Yukon, Permit 15-07ASR. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.

MacNeish, J.H. and J.A. Teit
1956 Field Notes on the Tahltan and Kaska Indians: 1912-1915. *Anthropologica* 3:39-171.

McClellan, Catharine
1975 *My Old People say: An Ethnographic Survey of Southern Yukon Territory.* National Museum of Man, National Museums of Canada, Ottawa.

Means, Bernard K.
1999 Sites on the Margins Are Not Marginal Archaeology: Small, Upland Sites in the Vicinity of Meyersdale, Pennsylvania. North American Archaeologist 20(2):135-161.

Mooney, James
2012 Historic Resource Impact Assessment of Northern Tiger Resources Inc. Proposed 3Ace Project. Submitted to Government of Yukon and Northern Tiger Resources, Permit 11-12ASR. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.

Nicholas, George P.
1998 *Wetlands and Hunter‐Gatherers: A Global Perspective*. Current Anthropology Vol. 39(5). The University of Chicago Press Journals.

Patton, William W., Jr., and Thomas P. Miller
1970 A Possible Bedrock Source for Obsidian Found in Archaeological Sites in Northwestern Alaska. *Science* 169:760‐761.

Potter, Ben A., Joshua D. Reuther, Vance T. Holliday, Charels E. Holmes, D. Shane Miller and Nicholas Schmuck
2017 Early Colonization of Beringia and Northern North America: Chronology, routes, and adaptive strategies. *Quaternary International* 444 (2017):36-55.

Potter, Ben A.
2011 Late Pleistocene and Early Holocene Assemblage Variability in Central Alaska. In *From the Yenisei to the Yukon: Interpreting Lithic Assemblage Variability in Late Pleistocene/ Early Holocene Beringia* edited by Ted Goebel and Ian Buvit, pp. 215-233. Texas A&M University Press, College Station.

Potter, Ben A., Charles E. Holmes, and David R. Yesner
2013 Technology and Economy among the Earliest Prehistoric Foragers in Interior Eastern Beringia. In *Palaeoamerican Odyssey* pp. 81-013.

Prince of Wales Northern Heritage Centre (PWNHC)
2017 Archaeological Fieldwork Reports Database. Electronic document, http://www.pwnhc.ca/cultural-places/archaeology-program/fieldwork-reports/, accessed March 18, 2017.

Reimer, Rudy
2018 The Social Importance of Volcanic Peaks for the Indigenous Peoples of British Columbia. *Journal of Northwest Anthropology* 52(1):1-31.
2015 Reassessing the role of Mount Edziza obsidian in northwestern North America. *Journal of Archaeological Science: Reports* 2:418-426.
2000 Extreme Archaeology: The Results of Investigations at High Elevation Regions in the Northwest. Unpublished MA dissertation, Department of Archaeology, Simon Fraser University, Burnaby, British Columbia.

Reuther, Joshua, Ben Potter, Sam Coffman, Holly Smith and Nancy Bigelow
2019 Revisiting the Timing of the Northern Lobe of the White River Ash Volcanic Event in Eastern Alaska and Western Yukon. *Radiocarbon* 00(00):1-20.

Reuther, Joshua A., Natalia S. Slobodina, Jeff Rasic, John P. Cook, and Robert J. Speakman
2011 Gaining Momentum: Late Pleistocene and Early Holocene Archaeological Obsidian Source Studies in Interior and Northeastern Beringia. In *From the Yenisei to the Yukon: Interpreting Lithic Assemblage Variability in Late Pleistocene/ Early Holocene Beringia* edited by Ted Goebel and Ian Buvit, pp. 270-286. Texas A&M University Press, College Station.

Scudder, G.G.E.
1997 Environment of the Yukon. In *Insects of the Yukon,* edited by H.V. Danks and J.A. Downes, pp 13-57. Biological Survey of Canada (Terrestrial Arthropods), Ottawa.

Simonsen, Bjorn
2009 *Archaeological Overview Assessment of the Proposed Selwyn Project in the Howard's Pass District, Southeastern Yukon Territory.* Submitted to Government of Yukon and Selwyn Resources Ltd., Permit 08-10ASR. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.

Simonsen, Bjorn and John Somogyi
2010 *Archaeology Overview Assessment of the Proposed Pelly Corridor Route Option and Selected Sites at the Proposed 2010 Selwyn Project Mine Site; Southeast Yukon Territory.* Submitted to Government of Yukon and Selwyn Resources Ltd., Permit 10-24ASR. Copies available from Cultural Services Branch, Government of Yukon, Whitehorse.

Smith, C.A.S., J.C. Meikle and C.F. Roots (editors)
2004 *Ecoregions of the Yukon Territory: Biophysical Properties of Yukon Landscapes.* Agriculture and Agri-Food Canada, Research Branch, Summerland, BC.

Thomas, Christian, Greg Hare, Jeff Bond, Nathaly Desjardin-Martin and Margarita De Guzman
2018 Britannia Creek and the late glacial character of the upper Yukon River. Paper presented at the International Union of the Prehistoric and Protohistoric Sciences world congress, Paris.

Turner, D. G., B. Ward., and J.D. Bond
2008 Glacial history of Howard's Pass and applications to drift prospecting. In *Yukon Exploration and Geology 2007*, edited by Emond, D.S., Blackburn, L.R., Hill, R. P., and Weston, L. H. pp. 257–272. Yukon Geological Survey.

Vanags, Anthony
2000 An Archaeological Perspective on Alpine/Sub-Alpine Land Use in the Clear Range and Pavilion Mountains, South-Central British Columbia. Unpublished MA dissertation, Department of Anthropology & Sociology, The University of British Columbia, British Columbia.

Workman, William B.
1978 *Prehistory of the Aishihik-Kluane Area, Southwest Yukon Territory*. National Museum of Man Mercury Series. Archaeological Survey of Canada Paper No. 74. National Museums of Canada, Ottawa.

Young, Mark
2015 *Heritage Resources Overview Assessment for the Howard's Pass Access Road*. Submitted to Selwyn Chihong Mining Ltd. Copies available from Prince of Wales Northern Heritage Centre, Yellowknife.

Appendix A.

Ethnographic Review Results Compilation

Table A.1. Flora/Berry Resources Noted in the Ethnograhic Record

Flora/Berry Resource	Notes	Habitat	Found in Subalpine/ Alpine	Comment	Reference
Lowbush cranberries	-significant berry -widely distributed -collected and eaten	muskegs, bogs, turf, moist to dry forests, low to high alpine elevations	yes	"lowbush cranberries and bog blueberries (Vaccinium uliginosum L.) are the most significant local berry species, along with the widespread crowberry (locally called ‘‘blackberries’’)...Although both the lowbush cranberry and bog blueberry are very widely distributed, some kinds of sites are more productive than others, and one must know what kinds of places to check to see whether the fruit is abundant enough to pick in any given season."	Johnson 2008:154
High bush cranberry	-collected and eaten				Honigmann 1964:32
Blueberry	-significant berry -widely distributed -collected and eaten	woodlands, open fields, bogs, low to high elevations	yes	"lowbush cranberries and bog blueberries (Vaccinium uliginosum L.) are the most significant local berry species, along with the widespread crowberry (locally called ‘‘blackberries’’)...Although both the lowbush cranberry and bog blueberry are very widely distributed, some kinds of sites are more productive than others, and one must know what kinds of places to check to see whether the fruit is abundant enough to pick in any given season."	Johnson 2008:154; Honigmann 1964:32
Crowberry (locally called ‘‘blackberries’’)	-significant berry -widely distributed -collected and eaten	swamps, bogs, heathlands, tundra	yes	"lowbush cranberries and bog blueberries (Vaccinium uliginosum L.) are the most significant local berry species, along with the widespread crowberry (locally called ‘‘blackberries’’)...Although both the lowbush cranberry and bog blueberry are very widely distributed, some kinds of sites are more productive than others, and one must know what kinds of places to check to see whether the fruit is abundant enough to pick in any given season."	Johnson 2008:154

Flora/Berry Resource	Notes	Habitat	Found in Subalpine/ Alpine	Comment	Reference
Soapberry	-collected and eaten	riverbanks, alpine and subalpine slopes, openings in spruce forests	yes		Honigmann 1964:32
Salmonberry	-collected and eaten	moist areas, adjacent to streams, low elevations to subalpine	yes		Honigmann 1964:32
Raspberry	-collected and eaten	alpine, subalpine meadows	yes		Honigmann 1964:32
Strawberry	-collected and eaten	open slopes, clearings, low to subalpine elevations	yes		Honigmann 1964:32
Currant	-collected and eaten	moist forest areas, low to middle elevations	possibly		Honigmann 1964:32
Fern roots	-collected in spring, eaten	low to subalpine	yes	eaten, collected in spring	Honigmann 1964:33
Lily bulbs	-collected and eaten	open forests, well drained areas or damp areas, low to timberline	yes	eaten	Honigmann 1964:33
Mushrooms	-collected and eaten -unknown which types		possibly	eaten	Honigmann 1964:33

Flora/Berry Resource	Notes	Habitat	Found in Subalpine/ Alpine	Comment	Reference
"Muskeg apples"	-collected in the mountains -taste like turnips	unknown	yes	"grew up in the mountains and were described as tasting somewhat like turnips"	Honigmann 1964:33
Wild onion	-collected and eaten	moist areas, adjacent to streams, low elevations	no	eaten	Honigmann 1964:33
Rose	-collected petals and eaten or made into tea	burn areas, riverbanks, forest clearings, low to middle elevations	possibly	eaten, made into a tea	Honigmann 1964:33
Wild rhubarb	-collected and eaten -young stems and leaves are edible	disturbed areas, subalpine to alpine meadows, montane slopes	yes	eaten	Honigmann 1964:33
Labrador tea	-used to make tea -gathered in fall	meadows, bogs, muskegs, peat, montane forests	yes	gathered in the fall	Johnson 2010:103
Moss campion	-culturally significant plant in the alpine -known as 'gopher food' -indicator for ground squirrel habitat	slightly moist areas, mountainous areas, subalpine	yes	"Some named and culturally significant plants grow in the alpine region, such as Silene acaulis L., known in Kaska as ‘gopher food’ [‘‘gophers’’ are Arctic ground squirrels Spermophilus parryii (Richardson, 1825) in the Yukon]"	Johnson 2008:154

Flora/Berry Resource	Notes	Habitat	Found in Subalpine/ Alpine	Comment	Reference
Spruce	-collected and chewed sap (spruce "gum") -spruce fibers eaten -used in cache construction -used to make tools and equipment -bark used for medicinal purposes -green black spruce cones collected in fall	black spruce found in alpine valleys/slopes and muskegs in lowland locations; white spruce found in well drained exposed spots and bog locations, found in lowlands to the alpine	yes	"chewed gum taken from a "half dead" spruce tree" , "jackpine and spruce fibers were also eaten but mud, birch fiber, willow buds, wild rice, and wild peas held no place in the diet.", "Bark medicines are hard to gather in fall" (Johnson 2010:103); "stripped spruce trees for bark" (Honigmann 1964:28) ; Johnson 2010:103	Honigmann 1964:33; Johnson 2010:103; Honigmann 1964:28
Pine	-fibers eaten	low to middle elevations	possibly, but unlikely	"jackpine and spruce fibers were also eaten"	Honigmann 1964:33
Birch	-tapped trees in spring for birch sap -"minor delicacy"	open woodlands, lower elevations	no	"obtained by tapping the birch in spring, ranked as a minor delicacy but people ignored poplar sap."	Honigmann 1964:33

Table A.2. Important Resources Noted in the Ethnograhic Record

Resource	Other Names	Comment	Reference	Found in Subalpine/Alpine	Time of Year
Caribou	Woodland caribou	"The alpine is called he´skage 'on mountain' by Kaska. Mountains are strongly associated with caribou and caribou hunting for Kaska, and with certain plant resources." (Johnson 2008:154);"Caribou (Rangifer tarandus caribou) populations inhabiting mountainous regions undertake veritcal seasonal migrations between alpine tundra zones (summer range) and lower forested zones (winter range)" (Banfield 1974:385); Late Summer and Fall "moved into the mountains to hunt goats, sheep, woodland caribou, and "gophers" and "groundhogs" (marmots)" (Honigmann 1981:444).	Johnson 2008; Ives and Sinopoli 1980:26; Honigmann 1981:444; Banfield 1974:385	yes	summer
Thin horned sheep	(Ovis dalli Nelson; dark Stone Sheep colour phase).	"Kaska have a great deal of knowledge about alpine environments as habitat for caribou and for thin horned sheep (Ovis dalli Nelson; dark Stone Sheep colour phase)" (Johnson 2008:154); Late Summer and Fall "moved into the mountains to hunt goats, sheep, woodland caribou, and "gophers" and "groundhogs" (marmots)" (Honigmann 1981:444).	Johnson 2008:154; Honigmann 1981:444	yes	
Arctic ground squirrels	"gophers"	"Green, moist, meadowy alpine slopes are recognized as gopher habitat. Gophers were formerly a valued food and fur resource, and are considered spiritually powerful because of their closeness with the earth" (Johnson 2008:154); "In the high mountains gopher and groundhog are numerous" (Honigmann 1949:33); "In the fall these larger units broke up, and small bands or individual families travel to the surrounding mountains where large numbers of groundhog and gopher were snared, dried, and cached for winter use. Moose were hunted with snares and bows and arrows and the meat preserved for later consumption" (Honigmann 1949:39); Late Summer and Fall "moved into the mountains to hunt goats, sheep, woodland caribou, and "gophers" and "groundhogs" (marmots)" (Honigmann 1981:444)	Johnson 2008:154; Honigmann 1949:33; Honigmann 1981:444	yes	

Resource	Other Names	Comment	Reference	Found in Subalpine/Alpine	Time of Year
Groundhog		"In the fall these larger units broke up, and small bands or individual families travel to the surrounding mountains where large numbers of groundhog and gopher were snared, dried, and cached for winter use. Moose were hunted with snares and bows and arrows and the meat preserved for later consumption" (Honigmann 1949:39); Late Summer and Fall "moved into the mountains to hunt goats, sheep, woodland caribou, and "gophers" and "groundhogs" (marmots)" (Honigmann 1981:444); "In the high mountains gopher and groundhog are numerous" (Honigmann 1949:33);	Honigmann 1949:39	yes	
Marmots		"Marmots…inhabit alpine tundra and rolling alpine meadows, where colonies frequent cliffs and rocky talus slopes…Marmots constituted an important proportion of the meat dried and cached at this time of the year (Honigmann 1964:139), and marmot hunting itself may have been the impetus for leaving the lowland areas as early as late August" Ives and Sinopoli 1980:26	Ives and Sinopoli 1980:26; Honigmann 1964	yes	
Dall sheep		"Dall sheep (Ovis dalli) would be in excellent condition following summer grazing. Rams move up into high alpine pastures during the summer; while ewes, subadults, and lambs form large herds ranging over the lower slopes. All groups descent to winter range in the foothills sometime in September or October" (Ives and Sinopoli 1980:26)	Ives and Sinopoli 1980:26	yes	
Mountain goats			Ives and Sinopoli 1980:26	yes	
Fish		"In summer a number of bands of one or more adjoining tribes assembled around a fish lake that guaranteed a fairly dependable food supply. From this base the men could go out to hunt and the women could set lines of rabbit snares" (Honigmann 1949:39).	Honigmann 1949:39	possibly	

Resource	Other Names	Comment	Reference	Found in Subalpine/Alpine	Time of Year
Whitefish		“Like other northern Dene people, before the advent of white traders the Kaska came together in the summers at lakes with fish runs, to catch whitefish and to socialize, and dispersed into small family groups for much of the year” (Johnson 2010:95)	Johnson 2010:95	no	
Trout		"it is not unreasonable to speculate that the Kaska took advantage of fall lake whitefish…and lake trout..spawns" (Ives and Sinopoli 1980:29)	Ives and Sinopoli 1980:29	possibly	fall
Rabbits/hare		“In summer a number of bands of one or more adjoining tribes assembled around a fish lake that guaranteed a fairly dependable food supply. From this base the men could go out to hunt and the women could set lines of rabbit snares” (Honigmann 1949:39).	Honigmann 1949:39	no	
Moose		“In the fall these larger units broke up, and small bands or individual families travel to the surrounding mountains where large numbers of groundhog and gopher were snared, dried, and cached for winter use. Moose were hunted with snares and bows and arrows and the meat preserved for later consumption.” (Honigmann 1949:39).	Honigmann 1949:39	yes	
Black Bear			Honigmann 1964:38		
Brown Bear			Honigmann 1964:38		
Beaver		"Now beaver provided an important source of food, the people separating to travel to family-owned beaver creeks." (Honigmann 1964: 32)	Honigmann 1964:38		Spring
Muskrat			Honigmann 1964:38		
Lynx			Honigmann 1964:38		
Marten			Honigmann 1964:38		
Porcupine			Honigmann 1964:38		
Owl			Honigmann 1964:38		
Goose			Honigmann 1964:38		
Duck			Honigmann 1964:38		

Resource	Other Names	Comment	Reference	Found in Subalpine/Alpine	Time of Year
Ptarmigan			Honigmann 1964:38		
Eagle			Honigmann 1964:38		
Crane			Honigmann 1964:38		
Swan			Honigmann 1964:38		
Loon			Honigmann 1964:38		
Spruce Hen			Honigmann 1964:38		
Willow Grouse			Honigmann 1964:38		

Table A.3. Tool Materials Types/Resources Noted in the Ethnograhic Record

Tool Material Types/Resource	Tool Type	Raw Material	Use/Comment	Comment	Reference
Stone Adzes of unhafted caribou	Stone adzes of unhafted caribou	Stone	Stone adzes, blades, various tools	Stone Adzes of unhafted caribou	Honigmann 1964:27
Blades	Blades	Stone	Blades were "hafted in goat horn" (Honigmann 1964:27)	hafted in goat horn	Honigmann 1964:27
Scrapers	Scrapers	Stone (Various)	used to soften and process hide	soften hide, hide processing	Honigmann 1964:27
Clay-lined spruce bark basketry	Clay-lined spruce bark basketry	Clay/spruce bark	used as a vessel		Honigmann 1964:27
Bone arrow points	Bone arrow points	Bone	hunting implement		Honigmann 1964:27
Needles with eyes	Needles with eyes				Honigmann 1964:27
Thimble of bone	Thimble of bone				Honigmann 1964:27
Horn	Various	Animal Horn/Antler (mountain sheep, goats, and caribou)	Various; tools were hafted in horn/antler	"horn from mountain sheep, goats, and caribou found a place in the technology" (Honigmann 1964:27)	Honigmann 1964:27
Beaver tooth	Beaver tooth drill	Beaver teeth	used as a drill	used as a drill	Honigmann 1964:27
Spruce	Snowshoes, handles, canoes, drinking vessels; various	Wood	Spruce was "most frequently used wood" (Honigmann 1964:28)	"most frequently used wood" (Honigmann 1964:28); snowshoes, snow shovels, handles, canoes, drinking/storage vessels, stripped spruce trees for bark	Honigmann 1964:28
White birch bark	?	White birch bark	"not used as much in technology" (Honigmann 1964:28)	not used as much in technology	Honigmann 1964:28

Tool Material Types/Resource	Tool Type	Raw Material	Use/Comment	Comment	Reference
Copper	?	Copper	It seems a little copper was procured from the Kaska (MacNeish and Teit 1956)	It seems a little copper was procured from the Kaska	MacNeish and Teit 1956
Obsidian	“chipped points, scrapers, large blades, a few other implements and large numbers of chips and flakes" (Honigmann 1964:16)	Obsidian	"the material employed was for the most part a fine-grained chert with a fairly well-marked conchoidal fracture; a certain amount of jasper and obsidian was also used” (Honigmann 1964:16)	"the material employed was for the most part a fine-grained chert with a fairly well-marked conchoidal fracture; a certain amount of jasper and obsidian was also used” (Honigmann 1964:16)	Gotthardt 1993; Honigmann 1964:16
Chert	“chipped points, scrapers, large blades, a few other implements and large numbers of chips and flakes" (Honigmann 1964:16)	Chert	"the material employed was for the most part a fine-grained chert with a fairly well-marked conchoidal fracture; a certain amount of jasper and obsidian was also used” (Honigmann 1964:16)	"the material employed was for the most part a fine-grained chert with a fairly well-marked conchoidal fracture; a certain amount of jasper and obsidian was also used” (Honigmann 1964:16)	Honigmann 1964:16
Jasper	“chipped points, scrapers, large blades, a few other implements and large numbers of chips and flakes" (Honigmann 1964:16)	Jasper	"the material employed was for the most part a fine-grained chert with a fairly well-marked conchoidal fracture; a certain amount of jasper and obsidian was also used” (Honigmann 1964:16)	"the material employed was for the most part a fine-grained chert with a fairly well-marked conchoidal fracture; a certain amount of jasper and obsidian was also used”; “chipped points, scrapers, large blades, a few other implements and large numbers of chips and flakes" (Honigmann 1964:16)	Honigmann 1964:16

Tool Material Types/Resource	Tool Type	Raw Material	Use/Comment	Comment	Reference
Close-grained stone or flaked, siliceous rock	"Lithic implements included axes, knives, scrapers, and crude pestles" (Honigmann 1964:27)	Close-grained stone or flaked, siliceous rock		"Lithic implements included axes, knives, scrapers, and crude pestles" (Honigmann 1964:27)	Honigmann 1964:27

Table A.4. Important Places (Named) Noted in the Ethnograhic Record/Literature

Important Places - Named	Comment	Reference
Finlayson Lake	"Before the construction of the Alaska highway in the 1940s, the main access into the Kaska territory was up the Mackenzie-Liard-Dease River systems, along which ran river boats, and up the Pelly River (a tributary of the Yukon) to Finlayson Lake, and from there down the Frances." (Johnson 2010:96)	Johnson 2010:96
Frances Lake	"Before the construction of the Alaska highway in the 1940s, the main access into the Kaska territory was up the Mackenzie-Liard-Dease River systems, along which ran river boats, and up the Pelly River (a tributary of the Yukon) to Finlayson Lake, and from there down the Frances."; "Robert Campbell established short-lived posts on Frances Lake...A trading post was re-established in the late nineteenth century and remained a feature of Frances Lake until the mid twentieth century." (Johnson 2010:96); "Trails connected places on this landscape, converging on centres such as McDames, Lower Post, and Frances Lake, travelling along the rivers, connecting key sites such as fish lakes and overlooks, and providing access to traplines." (Johnson 2010:96-97); "Frances Lake (Tū Chō Mene) has long been a focus of Kaska Dena activity. A large lake consisting of two arms that converge to form a single lower lake, the east arm has a caribou crossing site and a narrows that does not freeze in winter. This site allowed fishing during the winter season, and ancient settlements are focused in these areas of the lake (Gotthardt 1993)." (Johnson 2010:97)	Johnson 2010:96
Dease Lake	"In the early twentieth century a number of trading posts operated at locales such as Dease Lake, McDames, Ross River, Pelly Banks, and so on (Weinstein 1992; McDonnell 1975)." (Johnson 2010:96)	Johnson 2010:96
Mackenzie River	"Before the construction of the Alaska highway in the 1940s, the main access into the Kaska territory was up the Mackenzie-Liard-Dease River systems, along which ran river boats, and up the Pelly River (a tributary of the Yukon) to Finlayson Lake, and from there down the Frances." (Johnson 2010:96)	Johnson 2010:96
Liard River	"Before the construction of the Alaska highway in the 1940s, the main access into the Kaska territory was up the Mackenzie-Liard-Dease River systems, along which ran river boats, and up the Pelly River (a tributary of the Yukon) to Finlayson Lake, and from there down the Frances." (Johnson 2010:96); "The Liard and Frances Rivers provide access to large areas of hunting territory." (Johnson 2010:97)	Johnson 2010:96-97

Important Places - Named	Comment	Reference
Dease River	"Before the construction of the Alaska highway in the 1940s, the main access into the Kaska territory was up the Mackenzie-Liard-Dease River systems, along which ran river boats, and up the Pelly River (a tributary of the Yukon) to Finlayson Lake, and from there down the Frances." (Johnson 2010:96); "Associated with the Cassiar gold rush, a trading post was established at McDames on the Dease River across the border in northern BC, south and west of the present town of Watson Lake, then moved in the late nineteenth century to the mouth of the Dease near the present community of Lower Post (Daliyo)." (Johnson 2010:96)	Johnson 2010:96
Pelly River	"Before the construction of the Alaska highway in the 1940s, the main access into the Kaska territory was up the Mackenzie-Liard-Dease River systems, along which ran river boats, and up the Pelly River (a tributary of the Yukon) to Finlayson Lake, and from there down the Frances." (Johnson 2010:96)	Johnson 2010:96
Fort Halkett	"Early contact centred on Fort Halkett, on the Liard River not far above the Grand Canyon at the confluence of the Smith River (Karamanski 1983)." (Johnson 2010:96)	Johnson 2010:96
Pelly Banks	"Robert Campbell established short-lived posts on Frances Lake and at Pelly Banks in the mid nineteenth century."(Johnson 2010:96); "In the early twentieth century a number of trading posts operated at locales such as Dease Lake, McDames, Ross River, Pelly Banks, and so on (Weinstein 1992; McDonnell 1975)." (Johnson 2010:96)	Johnson 2010:96
Ross River	"In the early twentieth century a number of trading posts operated at locales such as Dease Lake, McDames, Ross River, Pelly Banks, and so on (Weinstein 1992; McDonnell 1975)." (Johnson 2010:96)	Johnson 2010:96
Lower Post	"Trails connected places on this landscape, converging on centres such as McDames, Lower Post, and Frances Lake, travelling along the rivers, connecting key sites such as fish lakes and overlooks, and providing access to traplines." (Johnson 2010:96-97); "The trail net from Big Eddy to McDames and to Lower Post figures in the mental geography of my teacher Elder Mida Donnessey from her childhood." (Johnson 2010:97)	Johnson 2010:96-97
Frances River	"The Liard and Frances Rivers provide access to large areas of hunting territory" (Johnson 2010:97)	Johnson 2010:97
Big Eddy	"The trail net from Big Eddy to McDames and to Lower Post figures in the mental geography of my teacher Elder Mida Donnessey from her childhood."; Big Eddy is a good fishing site near the confluence of the Rancheria and Liard Rivers, and is a former village site. (Johnson 2010:97);	Johnson 2010:97
Rancheria River (Tsí¸h Tué)	"Trails extending up the Rancheria River (Tsí¸h Tué) and from there to Blue River (a tributary of the Dease) also shape her sense of the land."(Johnson 2010:97)	Johnson 2010:97

Important Places - Named	Comment	Reference
Blue River (a tributary of the Dease)	"Trails extending up the Rancheria River (Tsí¸h Tué) and from there to Blue River (a tributary of the Dease) also shape her sense of the land."(Johnson 2010:97)	Johnson 2010:97
Watson Lake	"Watson Lake itself, Luwe Chō, named for its formerly abundant whitefish runs, is known as the site of a past encounter with a supernatural monster." (Johnson 2010:99)	Johnson 2010:99
Money Creek	"Some places are named for the presence of a lick, such as Eles Tué' or 'Lick Creek', now known as Money Creek after the trapper and miner Anton Money who settled there in the early twentieth century (Money 1975)." (Johnson 2010:100)	Johnson 2010:100
Kaska Tse Dek'ese 'Blue Rock Mountain'; Jade Mine Mountain	caribou hunting	Johnson 2010:102
Tootsie (Tudzie) Mountain	"Tootsie (Tudzie) Mountain is another alpine area to which people travel, and Mida explained the habitat differences between "rock mountain" (Figure 6.6) and "grass-topped mountain" (Figure 6.7) pointing out how "rock mountains" are good escape habitat for sheep, while "grass-topped mountains" provide forage for many animals, including sheep and caribou." (Johnson 2010:102)	Johnson 2010:102
McDames River	"Associated with the Cassiar gold rush, a trading post was established at McDames on the Dease River across the border in northern BC, south and west of the present town of Watson Lake, then moved in the late nineteenth century to the mouth of the Dease near the present community of Lower Post (Daliyo)." (Johnson 2010:96); "In the early twentieth century a number of trading posts operated at locales such as Dease Lake, McDames, Ross River, Pelly Banks, and so on (Weinstein 1992; McDonnell 1975)." (Johnson 2010:96); "Trails connected places on this landscape, converging on centres such as McDames, Lower Post, and Frances Lake, travelling along the rivers, connecting key sites such as fish lakes and overlooks, and providing access to traplines." (Johnson 2010:96-97); "The trail net from Big Eddy to McDames and to Lower Post figures in the mental geography of my teacher Elder Mida Donnessey from her childhood." (Johnson 2010:97); "McDames, as well as being the site of the Sylvester's Landing trading post, was the site of a disaster in the past where "half a mountain" fell away and buried ancestors, perhaps for failing to observe moiety exogamy by marrying Crow with Crow, Wolf with Wolf. More recently, McDames is said to have been precipitously abandoned as a result of a flu epidemic. Another possibility raised was that giant worms in the nearby Horseranch Range, said to cause rain and bad weather, might have prompted the move from McDames to Lower Post (L.M. Johnson field notes)." (Johnson 2010:98)	Johnson 2010:96

Table A.5. Trails Noted in the Ethnograhic Record/Literature

Trails	Comment	Reference
Frances Lake	"Before the construction of the Alaska highway in the 1940s, the main access into the Kaska territory was up the Mackenzie-Liard-Dease River systems, along which ran river boats, and up the Pelly River (a tributary of the Yukon) to Finlayson Lake, and from there down the Frances."; "Robert Campbell established short-lived posts on Frances Lake...A trading post was re-established in the late nineteenth century and remained a feature of Frances Lake until the mid twentieth century." (Johnson 2010:96); "Trails connected places on this landscape, converging on centres such as McDames, Lower Post, and Frances Lake, travelling along the rivers, connecting key sites such as fish lakes and overlooks, and providing access to traplines." (Johnson 2010:96-97); "Frances Lake (Tū Chō Mene) has long been a focusof Kaska Dena activity. A large lake consisting of two arms that converge to form a single lower lake, the east arm has a caribou crossing site and a narrows that does not freeze in winter. This site allowed fishing during the winter season, and ancient settlements are focused in these areas of the lake (Gotthardt 1993)." (Johnson 2010:97)	Johnson 2010:96; Gotthardt 1993
McDames River	"Associated with the Cassiar gold rush, a trading post was established at McDames on the Dease River across the border in northern BC, south and west of the present town of Watson Lake, then moved in the late nineteenth century to the mouth of the Dease near the present community of Lower Post (Daliyo)." (Johnson 2010:96); "In the early twentieth century a number of trading posts operated at locales such as Dease Lake, McDames, Ross River, Pelly Banks, and so on (Weinstein 1992; McDonnell 1975)." (Johnson 2010:96); "Trails connected places on this landscape, converging on centres such as McDames, Lower Post, and Frances Lake, travelling along the rivers, connecting key sites such as fish lakes and overlooks, and providing access to traplines." (Johnson 2010:96-97)	Johnson 2010:96
Lower Post	"Trails connected places on this landscape, converging on centres such as McDames, Lower Post, and Frances Lake, travelling along the rivers, connecting key sites such as fish lakes and overlooks, and providing access to traplines." (Johnson 2010:96-97)	Johnson 2010:96-97
McDames to Lower Post	"the late elder Bob Watson talked about travelling by boat from McDames to Lower Post when he was a boy, and Mida recalled the cross-country trail link from McDames to Big Eddy."	Johnson 2010:98
McDames to Big Eddy	"the late elder Bob Watson talked about travelling by boat from McDames to Lower Post when he was a boy, and Mida recalled the cross-country trail link from McDames to Big Eddy."	Johnson 2010:98
Alpine Trails	"Older foot trails to the alpine zone also exist, and are accessed from the Frances River and other travel routes."	Johnson 2010:102

Table A.6. General Important Places Noted in the Ethnograhic Record/Literature

General Places	Comment	Reference
Mountains	The Kaska word for the alpine is héskage ‘on mountain’ (Johnson 2008:155); "People like to go up into mountains looking for game; families travel out together to find “something,” looking for caribou, berries and certain medicines." (Johnson 2010:101); Alpine areas are important places to the Kaska as they are “ecologically significant” and offer many resources including a variety of plants and animals and certain plants used for medicine were harvested in the alpine (Johnson 2008:154) Johnson 2010:102).	Johnson 2010:101; Johnson 2008:154-155
Rivers	"Rivers and lakes too are key places on the land, and also may order travel."; "Critical habitats such as sloughs, which focus game animals at certain seasons and are also the habitat of valued medicinal plants, are also found along rivers, and can be accessed either from the rivers or from trails running along the valleys." (Johnson 2010:97)	Johnson 2010:97
Lakes	"Rivers and lakes too are key places on the land, and also may order travel." (Johnson 2010:97)	Johnson 2010:97
Sloughs	"Critical habitats such as sloughs, which focus game animals at certain seasons and are also the habitat of valued medicinal plants, are also found along rivers, and can be accessed either from the rivers or from trails running along the valleys." (Johnson 2010:97)	Johnson 2010:97
Licks	"Licks are an important class of Kaska place. Moose licks, which are muddy areas that the moose come to for the mineral content, draw other animals as well. Such places are reliable spots to encounter animals." (Johnson 2010:99); "moose and caribou he placed similar snares between trees and runways which those animals had made in the course of visiting drinking places and salt licks. Fences were sometimes extended from either side of a moose or caribou snare." Honigmann 1964:33; "Some places are named for the presence of a lick, such as Eles Tué’ or ‘Lick Creek’, now known as Money Creek after the trapper and miner Anton Money who settled there in the early twentieth century (Money 1975)." (Johnson 2010:100)	Johnson 2010:99-100
Alpine Trails	"Older foot trails to the alpine zone also exist, and are accessed from the Frances River and other travel routes."	Johnson 2010:102

Table A.7. Site Types/Activities Noted in the Ethnograhic Record/Literature

Site Type/Activity	Comment	Reference
Food Cache	"found in them mountainous areas consisted of a spruce-lined hole in the ground covered with stones. Small quatities of meat were also cached on a pole that was then lashed to a tree." (Honigmann 1981: 443-444); "In the mountains a cairn made by piling up rocks covered a supply of meat." (Honigmann 1964:38); "With the onset of winter, the families once more congregated at a fish lake and here spent the coldest part of the year. Occasionally young men were sent to the mountain caches to bring back a supply of meat. Winter was also a time when caribou were hunted and sometimes men traveled up to the mountains to secure goats and sheep. The food supply, however, was not sufficient to eliminate some periods of starvations." (Honigmann 1949:39-40).	Honigmann 1981; Honigmann 1964; Honigmann 1949:39-40
Hunting	Late summer/fall - mountains; "snares, deadfalls, nets, and, perhaps, pitfalls" Honigmann 1964:33); caribou fences	Honigmann 1981; Honigmann 1964:33
Bear hunting site	snare near a berry patch	Honigmann 1964:33
Hunting	"People like to go up into mountains looking for game; families travel out together to find "something," looking for caribou, berries and certain medicines." Johnson 2010:102; The alpine is called he´skage 'on mountain' by Kaska. Mountains are strongly associated with caribou and caribou hunting for Kaska, and with certain plant resources. (Johnson 2008:154)	Johnson 2010:102; (Johnson 2008:154)
Berry Sites	"People like to go up into mountains looking for game; families travel out together to find "something," looking for caribou, berries and certain medicines." Johnson 2010:102	Johnson 2010:102
Plant gathering sites	"People like to go up into mountains looking for game; families travel out together to find "something," looking for caribou, berries and certain medicines." Johnson 2010:102	Johnson 2010:102
Licks	"Licks are an important class of Kaska place. Moose licks, which are muddy areas that the moose come to for the mineral content, draw other animals as well. Such places are reliable spots to encounter animals." (Johnson 2010:99); "moose and caribou he placed similar snares between trees and runways which those animals had made in the course of visiting drinking places and salt licks. Fences were sometimes extended from either side of a moose or caribou snare." Honigmann 1964:33	Johnson 2010:99; Honigmann 1964:33
Gopher habitat	Green, moist, meadowy alpine slopes are recognized as gopher habitat. Gophers were formerly a valued food and fur resource, and are considered spiritually powerful because of their closeness with the earth. (Johnson 2008:154)	(Johnson 2008:154)

Site Type/Activity	Comment	Reference
Base Camps - Fish Lakes	"With the onset of winter, the families once more congregated at a fish lake and here spent the coldest part of the year." (Honigmann 1949:39-40); "Men set weird and nets for fish, hunted, and made the necessary implements and weapons to carry out these and other activities, while women collected supplementary tubers and berries, made camp, and helped pack the household equipment or draw the toboggans." (Honigmann 1949:40).	Honigmann 1949:39-40
Hunting Fences	"Sometimes the Indians drove Caribou and mountain sheep into surrounds where they could be shot or where they might trap themselves in snares. Sheep surrounds were built on relatively low ground and near that animal's trails." (Honigmann 1964:42)	Honigmann 1964:42
Pit Cooking/fire cracked rocks	"In another boiling method, a covered vessel was placed in a pit lined with hot stones." (Honigmann 1981:443).	(Honigmann 1981:443).
Swamps/Sloughs	"Swamps (tūtsel) were mentioned various times, and also sloughs (ts'ele, tıli) as places to which game comes (Johnson 2005, 2009). The pairing of a "lookout" with a slough, or swamp meadow, is an especially effective situation (Figures 6.3, 6.4 and 6.5)." (Johnson 2010:100); "Critical habitats such as sloughs, which focus game animals at certain seasons and are also the habitat of valued medicinal plants, are also found along rivers, and can be accessed either from the rivers or from trails running along the valleys." (Johnson 2010:97)	Johnson 2010:100
Open wet meadow	The open wet meadow (near what is now a tourist campground) represented an opportunity to look for moose on the journey.	Johnson 2010:97
"rock mountain"	the habitat differences between "rock mountain" (Figure 6.6) and "grass-topped mountain" (Figure 6.7) "pointing out how "rock mountains" are good escape habitat for sheep"	Johnson 2010:102
"Grass-topped mountain"	while "grass-topped mountains" provide forage for many animals, including sheep and caribou	Johnson 2010:102

Appendix B.

Archaeological Sites Environment Corrections

Borden Number	Ecoregion	Bioclimate Zone and Subzone Tif	Confirmed Bioclimate Zone	Elevation (m)	Vegetation
KgTf-1	Selwyn Mountains	Boreal Alpine Tundra	Boreal Alpine Tundra	1566	moss
KeTj-2	Selwyn Mountains	Boreal Alpine Tundra	Boreal Alpine Tundra	1520	alpine tundra
KdTe-19	Selwyn Mountains	Boreal Alpine Tundra	Boreal Alpine Tundra	1612	reindeer lichen, grass, cranberry and bearberry (little vegetation present)
KdTe-29	Selwyn Mountains	Boreal Alpine Tundra	Boreal Alpine Tundra	1540	scrub birch, reindeer lichen, cranberry, grasses
KcTd-4	Selwyn Mountains	Boreal Alpine Tundra	Boreal Alpine Tundra	1524	scrub birch, reindeer lichen, kinnikinnick, blueberry, feathermoss, grasses, electrified cat's tail moss
KcTd-2	Selwyn Mountains	Boreal Alpine Tundra	Boreal Alpine Tundra	1522	subalpine fir, scrub birch, reindeer lichen, kinnikinnick, blueberry, feathermoss, grasses, electrified cat's tail moss
KcTd-3	Selwyn Mountains	Boreal Alpine Tundra	Boreal Alpine Tundra	1545	scrub birch, reindeer lichen, kinnikinnick, blueberry, feathermoss, grasses, electrified cat's tail moss
KhTj-1	Selwyn Mountains	Boreal High	Boreal High	844	thick moss cover - severe forest burn in the past
KhTj-2	Selwyn Mountains	Boreal High	Boreal High	843	thick moss cover - severe forest burn in the past
KeTh-2	Yukon Plateau-North	Boreal High	Boreal High	897	unknown
KeTj-3	Yukon Plateau-North	Boreal High	Boreal High	878	unknown
KeTj-4	Yukon Plateau-North	Boreal High	Boreal High	875	unknown
KdTk-7	Yukon Plateau-North	Boreal High	Boreal High	869	young regrowth aspen with birch, rose, willow, fireweed, blueberry, lupine, kinnikinnick, Labrador tea, grass, moss
KcTk-1	Yukon Plateau-North	Boreal High	Boreal High	873	unknown
KcTi-1	Yukon Plateau-North	Boreal High	Boreal High	985	unknown

Borden Number	Ecoregion	Bioclimate Zone and Subzone Tif	Confirmed Bioclimate Zone	Elevation (m)	Vegetation
KaTl-1	Yukon Plateau-North	Boreal High	Boreal High	971	unknown
KaTl-2	Yukon Plateau-North	Boreal High	Boreal High	979	unknown
JlUd-3	Pelly Mountains	Boreal High	Boreal High	865	white spruce, trembling aspen, willow, soapberry, fireweed, kinnikinnick, freckle pelt, mosses, grass
JjUg-1	Pelly Mountains	Boreal High	Boreal High	1097	unknown
JaTr-3	Pelly Mountains	Boreal High	Boreal High	998	unknown
JaTo-4	Pelly Mountains	Boreal High	Boreal High	931	open young lodgepole pine forest, alder, mosses, grasses
JaTn-1	Pelly Mountains	Boreal High	Boreal High	956	open coniferous forest
KhTl-1	Selwyn Mountains	Boreal High	Boreal High/Boreal Subalpine?	819	moss, heavy vegetation cover
KeTj-5	Selwyn Mountains	Boreal High	Boreal High/Boreal Subalpine?	992	unknown
KdTk-3	Yukon Plateau-North	Boreal High	Boreal High/Boreal Subalpine?	884	unknown
KdTj-4	Yukon Plateau-North	Boreal High	Boreal High/Boreal Subalpine?	875	unknown
KdTk-2	Yukon Plateau-North	Boreal High	Boreal High/Boreal Subalpine?	860	unknown
KdTj-1	Yukon Plateau-North	Boreal High	Boreal High/Boreal Subalpine?	848	mature spruce
KdTj-2	Yukon Plateau-North	Boreal High	Boreal High/Boreal Subalpine?	868	unknown
KdTj-3	Yukon Plateau-North	Boreal High	Boreal High/Boreal Subalpine?	881	unknown
KdTk-1	Yukon Plateau-North	Boreal High	Boreal High/Boreal Subalpine?	860	unknown

Borden Number	Ecoregion	Bioclimate Zone and Subzone Tif	Confirmed Bioclimate Zone	Elevation (m)	Vegetation
KdTk-4	Yukon Plateau-North	Boreal High	Boreal High/Boreal Subalpine?	869	unknown
KdTk-5	Yukon Plateau-North	Boreal High	Boreal High/Boreal Subalpine?	875	unknown
KdTk-6	Yukon Plateau-North	Boreal High	Boreal High/Boreal Subalpine?	875	unknown
KjTh-2	Selwyn Mountains	Boreal High	Boreal Subalpine	1142	thick scrub birch, lichen cover
KjTh-1	Selwyn Mountains	Boreal High	Boreal Subalpine	1080	thick scrub birch, lichen cover
KgTg-3	Selwyn Mountains	Boreal High	Boreal Subalpine	1160	lichen, moss ground cover
KgTg-2	Selwyn Mountains	Boreal High	Boreal Subalpine	1107	unknown
KgTi-6	Selwyn Mountains	Boreal High	Boreal Subalpine	1044	scrub birch, lichen cover
KgTi-7	Selwyn Mountains	Boreal High	Boreal Subalpine	1038	scrub birch, lichen cover
KgTi-1	Selwyn Mountains	Boreal High	Boreal Subalpine	1037	scrub birch, lichen cover
KgTi-2	Selwyn Mountains	Boreal High	Boreal Subalpine	1053	scrub birch, lichen cover
KgTi-3	Selwyn Mountains	Boreal High	Boreal Subalpine	1031	scrub birch, lichen cover
KgTi-4	Selwyn Mountains	Boreal High	Boreal Subalpine	1047	scrub birch, lichen cover
KgTi-5	Selwyn Mountains	Boreal High	Boreal Subalpine	1036	scrub birch, lichen cover
KfTg-2	Selwyn Mountains	Boreal High	Boreal Subalpine	1189	unknown
KfTg-3	Selwyn Mountains	Boreal High	Boreal Subalpine	1140	unknown
KfTg-4	Selwyn Mountains	Boreal High	Boreal Subalpine	1129	unknown
KfTg-5	Selwyn Mountains	Boreal Subalpine	Boreal Subalpine	1323	unknown
KgTh-2	Selwyn Mountains	Boreal High	Boreal Subalpine	1046	scrub birch, lichen
KgTh-1	Selwyn Mountains	Boreal High	Boreal Subalpine	1020	scrub birch, lichen
KfTj-1	Selwyn Mountains	Boreal High	Boreal Subalpine	1041	dense shrub cover
KfTh-1	Selwyn Mountains	Boreal High	Boreal Subalpine	1006	scrub birch, lichen

Borden Number	Ecoregion	Bioclimate Zone and Subzone Tif	Confirmed Bioclimate Zone	Elevation (m)	Vegetation
KfTm-4	Selwyn Mountains	Boreal High	Boreal Subalpine	970	white spruce with scrub birch, willow, and young spruce, blueberry, lupine, kinnikinnick, Labrador tea, reindeer lichen, bunchberry, crowberry, and moss
KfTm-5	Selwyn Mountains	Boreal High	Boreal Subalpine	966	white spruce with scrub birch, willow, and young spruce, blueberry, lupine, kinnikinnick, Labrador tea, reindeer lichen, bunchberry, crowberry, and moss
KfTm-3	Selwyn Mountains	Boreal High	Boreal Subalpine	940	black spruce and aspen, with young spruce and scrub birch, blueberry, kinnikinnick, Labrador tea, reindeer lichen, crowberry, and moss
KfTm-6	Selwyn Mountains	Boreal High	Boreal Subalpine	925	white spruce forest, willow, scrub birch, young spruce, Labrador tea, kinnikinnick, blueberry, grass, crowberry, moss, and reindeer lichen
KfTj-2	Selwyn Mountains	Boreal High	Boreal Subalpine	879	scrub birch, lichen
KfTm-2	Selwyn Mountains	Boreal High	Boreal Subalpine	1029	black spruce with young spruce, scrub birch, and willow, blueberry, kinnikinnick, Labrador tea, reindeer lichen, and moss (Surface exposure is less than 5% due to dense ground vegetation)
KeTl-2	Yukon Plateau-North	Boreal High	Boreal Subalpine	856	young spruce, aspen, and birch regrowth, scrub birch, blueberry, kinnikinnick, Labrador tea, reindeer lichen, crowberry and moss
KdTl-1	Yukon Plateau-North	Boreal High	Boreal Subalpine	881	white spruce, aspen, and birch, with young spruce, scrub birch, and willow, blueberry, kinnikinnick, Labrador tea, reindeer lichen, toadflax and moss.

Borden Number	Ecoregion	Bioclimate Zone and Subzone Tif	Confirmed Bioclimate Zone	Elevation (m)	Vegetation
KdTl-2	Yukon Plateau-North	Boreal High	Boreal Subalpine	860	white spruce and aspen, young spruce, aspen and scrub birch in the understory, kinnikinnick, Labrador tea, reindeer lichen and moss (dense ground vegetation)
KdTe-18	Selwyn Mountains	Boreal Subalpine	Boreal Subalpine	1318	scrub birch, reindeer lichen, blueberry, Labrador tea and red stemmed feathermoss
KdTe-20	Selwyn Mountains	Boreal High	Boreal Subalpine	1162	black spruce, subalpine fir, scrub birch, reindeer lichen, Labrador tea, crowberry, kinnikinnick, grass and red stemmed feathermoss
KdTe-21	Selwyn Mountains	Boreal High	Boreal Subalpine	1150	black spruce, subalpine fir, scrub birch, reindeer lichen, Labrador tea, crowberry, kinnikinnick, and red stemmed feathermoss
KdTe-22	Selwyn Mountains	Boreal High	Boreal Subalpine	1144	black spruce, subalpine fir, scrub birch, reindeer lichen, Labrador tea and red stemmed feathermoss.
KdTe-23	Selwyn Mountains	Boreal High	Boreal Subalpine	1121	black spruce, subalpine fir, scrub birch, reindeer lichen, cranberry and red stemmed feathermoss
KdTe-35	Selwyn Mountains	Boreal High	Boreal Subalpine	1136	few spruce, scrub birch, Labrador tea, cranberry and reindeer lichen
KdTe-36	Selwyn Mountains	Boreal High	Boreal Subalpine	1135	few spruce, scrub birch, Labrador tea, cranberry, reindeer lichen, electrified cat's tail moss and red stemmed feather moss
KdTd-1	Selwyn Mountains	Boreal Subalpine	Boreal Subalpine	1243	subalpine spruce, scrub birch, willow, Labrador tea, caribou lichen, red stemmed feather moss, low-bush blueberry, juniper, ground cedar, crowberry
KdTe-1	Selwyn Mountains	Boreal High	Boreal Subalpine	1162	subalpine fir, scrub birch, caribou lichen, electrified cat's tail moss, blueberry, Labrador tea.

Borden Number	Ecoregion	Bioclimate Zone and Subzone Tif	Confirmed Bioclimate Zone	Elevation (m)	Vegetation
KdTe-2	Selwyn Mountains	Boreal High	Boreal Subalpine	1101	spruce, scrub birch, reindeer lichen, blueberry
KdTe-3	Selwyn Mountains	Boreal High	Boreal Subalpine	1108	balsam spruce, scrub birch, caribou lichen, feather moss, crowberry, blueberry, electrified cat's tail moss
KdTd-2	Selwyn Mountains	Boreal Subalpine	Boreal Subalpine	1220	balsam spruce, scrub birch, pixie cup, caribou lichen, electrified cat's tail moss, blueberry
KdTd-3	Selwyn Mountains	Boreal Subalpine	Boreal Subalpine	1247	balsam spruce, scrub birch, Labrador tea, caribou lichen, blueberry, feathermoss
KdTe-4	Selwyn Mountains	Boreal High	Boreal Subalpine	1141	balsam spruce, scrub birch, caribou lichen, Labrador tea, blueberry, cranberry, feathermoss
KdTd-4	Selwyn Mountains	Boreal Subalpine	Boreal Subalpine	1221	balsam spruce, scrub birch, caribou lichen, mossberry, juniper, cranberry, Labrador tea
KdTe-5	Selwyn Mountains	Boreal High	Boreal Subalpine	1099	black spruce, scrub birch, willow, reindeer lichen, lingonberry, bunchberry, crowberry, Labrador tea, blueberry
KdTe-6	Selwyn Mountains	Boreal High	Boreal Subalpine	1136	black spruce, sub-alpine fir, scrub birch, Labrador tea and fireweed
KdTe-7	Selwyn Mountains	Boreal High	Boreal Subalpine	1122	black spruce, sub-alpine fir, scrub birch, Labrador tea, lingonberry, reindeer lichen, freckle pelt, moss
KdTd-5	Selwyn Mountains	Boreal Subalpine	Boreal Subalpine	1222	scrub birch, reindeer lichen, Labrador tea, blueberry, mosses
KdTe-8	Selwyn Mountains	Boreal High	Boreal Subalpine	1142	subalpine fir, scrub birch, reindeer lichen, blueberry, kinnikinnick, Labrador tea
KdTe-9	Selwyn Mountains	Boreal High	Boreal Subalpine	1099	scrub birch, reindeer lichen, blueberry, crowberry, Labrador tea.
KdTe-10	Selwyn Mountains	Boreal High	Boreal Subalpine	1144	subalpine fir, willow, scrub birch, reindeer lichen, blueberry, Labrador tea, mosses

Borden Number	Ecoregion	Bioclimate Zone and Subzone Tif	Confirmed Bioclimate Zone	Elevation (m)	Vegetation
KdTe-11	Selwyn Mountains	Boreal High	Boreal Subalpine	1129	subalpine fir, willow, scrub birch, reindeer lichen, blueberry, Labrador tea.
KdTe-12	Selwyn Mountains	Boreal High	Boreal Subalpine	1109	scrub birch, reindeer lichen, feathermoss, electrified cat's tail moss
KdTe-13	Selwyn Mountains	Boreal High	Boreal Subalpine	1096	black spruce, scrub birch, reindeer lichen, grass
KdTe-14	Selwyn Mountains	Boreal High	Boreal Subalpine	1125	scrub birch, reindeer lichen, blueberry, feathermoss, crowberry
KdTe-15	Selwyn Mountains	Boreal High	Boreal Subalpine	1174	subalpine fir, scrub birch, reindeer lichen, blueberry, crowberry, cranberry, Labrador tea
KdTe-16	Selwyn Mountains	Boreal High	Boreal Subalpine	1155	subalpine fir, scrub birch, reindeer lichen, blueberry, crowberry, cranberry, Labrador tea, red stemmed feathermoss
KdTe-17	Selwyn Mountains	Boreal High	Boreal Subalpine	1158	subalpine fir, scrub birch, reindeer lichen, blueberry, crowberry, cranberry, Labrador tea, red stemmed feathermoss
KdTe-24	Selwyn Mountains	Boreal High	Boreal Subalpine	1106	black spruce, subalpine fir, scrub birch, cranberry, blueberry, crowberry, reindeer lichen
KdTe-25	Selwyn Mountains	Boreal High	Boreal Subalpine	1120	black spruce, subalpine fir, scrub birch, cranberry, blueberry, crowberry, reindeer lichen
KdTe-26	Selwyn Mountains	Boreal High	Boreal Subalpine	1123	black spruce, subalpine fir, scrub birch, cranberry, blueberry, crowberry, reindeer lichen
KdTe-27	Selwyn Mountains	Boreal High	Boreal Subalpine	1100	black spruce, scrub birch, cranberry, blueberry, crowberry, reindeer lichen.
KdTe-28	Selwyn Mountains	Boreal Subalpine	Boreal Subalpine	1220	spruce, scrub birch, reindeer lichen, Labrador tea, blueberry, red stemmed feathermoss
KdTe-30	Selwyn Mountains	Boreal High	Boreal Subalpine	1102	scrub birch, willow, reindeer lichen, Labrador tea, blueberry, cranberry

Borden Number	Ecoregion	Bioclimate Zone and Subzone Tif	Confirmed Bioclimate Zone	Elevation (m)	Vegetation
KdTe-31	Selwyn Mountains	Boreal High	Boreal Subalpine	1120	spruce, scrub birch, willow, reindeer lichen, Labrador tea, blueberry, cranberry
KdTe-32	Selwyn Mountains	Boreal High	Boreal Subalpine	1165	spruce, subalpine fir, scrub birch, reindeer lichen, Labrador tea, blueberry, cranberry, crowberry
KdTe-33	Selwyn Mountains	Boreal High	Boreal Subalpine	1120	spruce, subalpine fir, scrub birch, Labrador tea, blueberry, feathermoss, reindeer lichen
KdTe-34	Selwyn Mountains	Boreal High	Boreal Subalpine	1140	black spruce, subalpine fir, scrub birch, Labrador tea, crowberry, blueberry, red stemmed feathermoss
KdTe-37	Selwyn Mountains	Boreal High	Boreal Subalpine	1095	black spruce, scrub birch, grass, reindeer lichen
KdTh-1	Selwyn Mountains	Boreal High	Boreal Subalpine	1087	reindeer lichen, moss
KcTe-1	Selwyn Mountains	Boreal Subalpine	Boreal Subalpine	1244	spruce, scrub birch, reindeer lichen, feather moss.
KdTd-6	Selwyn Mountains	Boreal Subalpine	Boreal Subalpine	1243	spruce, scrub birch, reindeer lichen, Labrador tea, blueberry, red stemmed feathermoss
KcTh-1	Selwyn Mountains	Boreal High	Boreal Subalpine	1073	unknown
KcTq-2	Yukon Plateau-North	Boreal High	Boreal Subalpine	1013	spruce, scrub birch, grass, reindeer lichen, moss
KcTq-3	Yukon Plateau-North	Boreal High	Boreal Subalpine	1015	spruce, cranberry, reindeer lichen, scrub birch
KcTq-4	Yukon Plateau-North	Boreal High	Boreal Subalpine	1028	spruce, reindeer lichen, moss, cranberry, scrub birch
KcTq-5	Yukon Plateau-North	Boreal Subalpine	Boreal Subalpine	1107	spruce, scrub birch, reindeer lichen, moss
KcTq-6	Yukon Plateau-North	Boreal High	Boreal Subalpine	1011	white spruce, scrub birch, lingonberry, mosses, grass, reindeer lichen.
KcTq-7	Yukon Plateau-North	Boreal High	Boreal Subalpine	1017	white spruce, scrub birch, lingonberry, Labrador tea, reindeer lichen, mosses, grass

Borden Number	Ecoregion	Bioclimate Zone and Subzone Tif	Confirmed Bioclimate Zone	Elevation (m)	Vegetation
KcTq-8	Yukon Plateau-North	Boreal High	Boreal Subalpine	1017	white spruce, scrub birch, kinnikinnick, reindeer lichen, grasses
KcTq-9	Yukon Plateau-North	Boreal High	Boreal Subalpine	1022	white spruce, scrub birch, Labrador tea, kinnikinnick, mosses, reindeer lichen
KcTq-10	Yukon Plateau-North	Boreal High	Boreal Subalpine	1023	white spruce, scrub birch, willow, trembling aspen, Labrador tea, kinnikinnick, mosses, reindeer lichen
KcTq-11	Yukon Plateau-North	Boreal High	Boreal Subalpine	1031	white spruce, scrub birch, Labrador tea, kinnikinnick, mosses, reindeer lichen
KcTq-12	Yukon Plateau-North	Boreal High	Boreal Subalpine	1035	white spruce, scrub birch, Labrador tea, kinnikinnick, mosses, reindeer lichen
KcTq-13	Yukon Plateau-North	Boreal High	Boreal Subalpine	1011	white spruce, scrub birch, Labrador tea, kinnikinnick, mosses, reindeer lichen
KcTq-14	Yukon Plateau-North	Boreal High	Boreal Subalpine	1033	white spruce, scrub birch, aspen, alder, Labrador tea, mosses, reindeer lichen
KcTq-15	Yukon Plateau-North	Boreal High	Boreal Subalpine	1010	white spruce, scrub birch, mosses, reindeer lichen
KcTq-16	Yukon Plateau-North	Boreal High	Boreal Subalpine	1025	black spruce, scrub birch, lupine, reindeer lichen, crowberry, lingonberry, feathermoss, pixie cup, freckle pelt, blueberry
KcTq-17	Yukon Plateau-North	Boreal High	Boreal Subalpine	1024	black spruce, scrub birch, lupine, reindeer lichen, crowberry, lingonberry, feathermoss, grass, mustard
KcTp-2	Yukon Plateau-North	Boreal Subalpine	Boreal Subalpine	1132	black spruce, subalpine fir, scrub birch, lingonberry, feathermoss, Labrador tea, reindeer lichen
KcTq-19	Yukon Plateau-North	Boreal Subalpine	Boreal Subalpine	1127	black spruce, scrub birch, lingonberry, feathermoss, Labrador tea, crowberry, reindeer lichen
KbTq-1	Yukon Plateau-North	Boreal High	Boreal Subalpine	1071	spruce, scrub birch, lichen

Borden Number	Ecoregion	Bioclimate Zone and Subzone Tif	Confirmed Bioclimate Zone	Elevation (m)	Vegetation
KcTq-20	Yukon Plateau-North	Boreal High	Boreal Subalpine	1109	black spruce, white spruce, trembling aspen, scrub birch, lingonberry, feathermoss, Labrador tea, crowberry, freckle pelt, pixie cup, club moss, rose, ground cedar, fireweed, grass, reindeer lichen
KbTq-2	Yukon Plateau-North	Boreal High	Boreal Subalpine	1068	black spruce, scrub birch, reindeer lichen, lingonberry, grass
KbTq-3	Yukon Plateau-North	Boreal High	Boreal Subalpine	1072	black spruce, scrub birch, reindeer lichen, lingonberry, grass
JkTb-1	Selwyn Mountains	Boreal High	Boreal Subalpine	1002	spruce, willow?, lichen, moss, crowberry
JjTp-3	Yukon Plateau-North	Boreal High	Boreal Subalpine	1027	dense spruce forest with a mossy understory, scrub birch
JjTp-1	Yukon Plateau-North	Boreal High	Boreal Subalpine	1127	scattered spruce, scrub birch, grasses, berries, mosses
JjTp-2	Yukon Plateau-North	Boreal High	Boreal Subalpine	1098	open and grassy, scrub birch, with the surrounding area characterized by dense spruce forest
JiTo-1	Yukon Plateau-North	Boreal High	Boreal Subalpine	1146	spruce, scrub birch
JiTp-1	Yukon Plateau-North	Boreal Subalpine	Boreal Subalpine	1447	scrub birch, grass, berries
JiTn-1	Pelly Mountains	Boreal High	Boreal Subalpine	1137	scrub birch, lichen
JiTq-1	Pelly Mountains	Boreal High	Boreal Subalpine	1202	scrub birch (largely unvegetated and at treeline)
JiTq-2	Pelly Mountains	Boreal Subalpine	Boreal Subalpine	1493	spruce, scrub birch, lichen
KcTq-18	Yukon Plateau-North	Boreal High	Boreal Subalpine	1063	black spruce, scrub birch, lupine, reindeer lichen, crowberry, lingonberry, feathermoss, pixie cup, freckle pelt, blueberry
KiTg-1	Selwyn Mountains	Boreal Subalpine	Boreal Subalpine/Boreal Alpine Tundra	1303	little vegetation cover

Appendix C.

Archaeological Sites Corrections

Borden Number	Site Correction Note	Correction Confidence
JaTr-3	Site was plotted in the water, moved ~41 m south based on site description in site form and available imagery.	Moderate
JjUg-1	Site was plotted in the lake, moved ~76 m to the west based on site description in site form and available imagery.	Moderate
KcTi-1	Moved site ~351 m west/northwest based on site description in site form, map in permit report and available imagery.	Moderate
KcTk-1	Site was plotted in the lake, moved ~440 m northwest based on site description in site form and report, permit report maps and available imagery.	Moderate
KdTj-1	Site was plotted in the lake, moved ~35 m to the northwest based on site description in site form and available imagery.	Moderate
KdTj-2	Moved ~219 m north based on site description and available imagery.	Moderate
KdTj-3	Moved ~40 m to the west to move onto ridge based on site description and available imagery.	Moderate
KdTj-4	Site was plotted in the lake, moved ~97 m north based on site description and available imagery.	Low-moderate
KdTk-4	Site was plotted in the lake, moved ~95 m north/northeast based on site description and available imagery.	Moderate
KdTk-5	Moved ~62 m southwest, based on site description and available imagery.	Moderate
KeTh-2	Moved ~905 m based on site description, map in permit report and available imagery.	Low-moderate
KeTj-4	Moved ~473 m to the south/southwest based on site description and available imagery.	Moderate
KfTg-2	Moved ~1.5 km to the northeast based on site description in site form and available imagery.	Moderate
KfTg-3	Site was plotted in lake, moved ~279 m northeast based on site description, map in permit report and available imagery.	Moderate
KfTg-5	Moved ~1 km to the north/northwest based on site description in site form and available imagery.	Moderate
KfTh-1	Moved ~3.9 km to the northeast, moved based on site description, map in permit report and available imagery.	Moderate
KfTj-1	Moved ~343 m southeast, moved based on site description, map in permit report, permit report photographs and available imagery.	Moderate
KfTj-2	Moved ~139 m south/southwest, moved based on site description in site form and available imagery.	Moderate
KgTh-1	Moved ~261 m to the north/northeast, moved based on site description in site form and available imagery.	Low-moderate
KgTh-2	Moved ~191 m to the north/northwest, based on site description in site form and available imagery.	Moderate
KgTi-2	Moved ~249 m north/northwest, based on site description in site form and available imagery.	Moderate
KgTi-3	Moved ~115 m to the south/southwest, based on site description in site form and available imagery.	Moderate
KhTj-1	Moved ~564 m to west/southwest, based on site description in site form and available imagery.	Moderate
KhTj-2	Moved ~300 m to the east, based on site description in site form and available imagery.	Moderate

Borden Number	Site Correction Note	Correction Confidence
KhTl-1	Site was plotted in the lake, moved ~245 m to the northwest, based on site description in site form and available imagery.	Moderate
KjTh-2	Moved 100 m to the northwest, based on site description in site form, photographs in permit report and available imagery.	High

Appendix D.

Archaeological Sites Removed for Modeling Purposes

Borden Number	Site Classification	Site Type	Reason
JaTn-H2	Contemporary	Burial	Not precontact
JaTp-1	Indigenous historic	Habitation - Structural Traces (cabin outlines); Meeting Place	Not precontact
JiTn-2	Indigenous historic	Habitation – Structure (cabin)	Not precontact
JiTn-3	Indigenous historic	Habitation – Structure (brush structure, drying racks)	Not precontact
JjTm-1	Indigenous historic	Habitation – Structure (cabin)	Not precontact
JjTm-2	Indigenous historic	Burial	Not precontact
JjTn-1	Indigenous historic	Habitation - Structural Traces (brush structure)	Not precontact
JjTo-1	Indigenous historic	Habitation - Structure (cabins, other structures); Burial; Cache (ground cache, elevated cache)	Not precontact
JkTq-1	Indigenous historic	Burial	Not precontact
JkTs-3	Postcontact	Burial (Cemetery)	Not precontact
KcTp-1	Indigenous historic	Habitation - Structural Traces (brush structure)	Not precontact
KfTm-1	Postcontact	Habitation - Structural Traces; Cultural Material - Surface	Not precontact
KjTh-3	Indigenous historic	Habitation - Structural Traces (brush structures, log features)	Not precontact
JeTi-4	Undetermined	Rock Cairn/Cache	No evidence to suggest site is precontact
JdTg-1	Undetermined	N/A	No cultural materials found
JdTh-1	Undetermined	N/A	No cultural materials found
JeTh-1	Undetermined	N/A	No cultural materials found
KcTq-1	Precontact	Cultural material; Isolated Find (surface, lithics)	Site was found out of context
KgTg-1	Precontact	Cultural material (subsurface, lithics)	Site location unclear
KhTj-1	Precontact	Cultural material; Isolated Find (surface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
KhTj-2	Precontact	Cultural material (subsurface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra

Borden Number	Site Classification	Site Type	Reason
KeTh-2	Precontact, postcontact?	Cultural material; Isolated Find (surface, lithics); Habitation - Structural Traces	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
KeTj-3	Precontact	Cultural material (subsurface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
KeTj-4	Precontact, postcontact	Cultural material (surface, lithics, bone)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
KdTk-7	Precontact	Cultural material (subsurface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
KcTk-1	Precontact	Cultural material; Isolated Find (subsurface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
KcTi-1	Indigenous historic, precontact	Cultural material (surface, subsurface, lithics); Habitation - Structural Traces	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
KaTl-1	Precontact	Cultural material; Isolated Find (subsurface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal AlpineTundra
KaTl-2	Precontact	Cultural material (subsurface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
JlUd-3	Precontact	Cultural material; Isolated Find (surface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
JjUg-1	Precontact	Cultural material (subsurface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
JaTr-3	Precontact	Cultural material (surface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
JaTo-4	Precontact	Cultural material; Isolated find (subsurface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra
JaTn-1	Precontact	Cultural material (surface, lithics)	Located in Boreal High, not located in Boreal Subalpine or Boreal Alpine Tundra

Borden Number	Site Classification	Site Type	Reason
KhTl-1	Precontact	Cultural material (surface, lithics)	Could not confirm if located in Boreal High or Boreal Subalpine
KeTj-5	Precontact	Cultural material (subsurface, lithics)	Could not confirm if located in Boreal High or Boreal Subalpine
KdTk-3	Precontact	Cultural material; Isolated Find (surface, lithics)	Could not confirm if located in Boreal High or Boreal Subalpine
KdTj-4	Precontact	Cultural material (subsurface, lithics)	Could not confirm if located in Boreal High or Boreal Subalpine
KdTk-2	Precontact	Cultural material (subsurface, lithics, bone)	Could not confirm if located in Boreal High or Boreal Subalpine
KdTj-1	Precontact	Cultural material (surface, subsurface, lithics); Habitation - Structural Traces (bush camp)	Could not confirm if located in Boreal High or Boreal Subalpine
KdTj-2	Precontact	Cultural material (subsurface, lithics)	Could not confirm if located in Boreal High or Boreal Subalpine
KdTj-3	Precontact	Cultural material (subsurface, lithics)	Could not confirm if located in Boreal High or Boreal Subalpine
KdTk-1	Precontact	Cultural material (subsurface, lithics, calcined bone); Habitation - Structural Traces (cabin)	Could not confirm if located in Boreal High or Boreal Subalpine
KdTk-4	Precontact	Cultural material (subsurface, lithics)	Could not confirm if located in Boreal High or Boreal Subalpine
KdTk-5	Precontact, postcontact	Cultural material (subsurface, lithics, historic debris)	Could not confirm if located in Boreal High or Boreal Subalpine
KdTk-6	Precontact	Cultural material (surface, subsurface, lithics)	Could not confirm if located in Boreal High or Boreal Subalpine

Appendix E.

Archaeological Sites in the Broader Study Area Summary

Borden	Permit Number	Classification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KcTh-1	81-11ASR	precontact	Subalpine Hunting Base Camp	Cultural material (subsurface, lithics, calcined bone)	Boreal Subalpine	unknown	1073	Bench	Overlooking Otter Lake	n/a	Not fully assessed	Unknown	chert, siliceous sedimentary material	321	5	Retouch flakes (4), microblade (2), blade (1), biface (1), tip of point (1)	103	above, below
KgTi-1	81-11ASR	precontact	Subalpine Hunting Base Camp	Cultural material (surface/subsurface, lithics)	Boreal Subalpine	scrub birch, lichen cover	1037	Terrace/ bench	Adjacent to Oly lake and stream	hearth, horse trails	Not fully assessed	~400 + square meters	chert, obsidian, siliceous sedimentary material	601	7	retouch flakes, blades (2), end scraper, side scraper, biface, stemmed point base	0	below
KfTj-1	81-11ASR	precontact	Subalpine Hunting Base Camp	Cultural material (surface, lithics)	Boreal Subalpine	dense shrub cover	1041	Bench	Overlooking an outlet of an unnamed lake	n/a	Not fully assessed	Moderate	chert, siliceous sedimentary material	79	1	Retouch flakes (2), burin spall, microblade (1)	0	below
JiTn-1	96-11ASR	precontact	Hunting Site - Generic	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, lichen	1137	Bench	Overlooking Wolverine lake at narrows	n/a	Not fully assessed - flagged	>100 m square	chert, siliceous sedimentary material	83	0	retouch flakes	0	above, below
JjTp-3	17-12ASR	precontact	Hunting Site - Generic	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	dense spruce forest with a mossy understory, scrub birch	1027	Esker?	Overlooking unnamed tributary of Finlayson Lake and River	n/a	Not fully assessed - flagged	Unknown	chert	1	0	n/a	0	n/a
JiTq-1	04-03ASR	precontact	Hunting Site - Generic	Cultural material (surface, lithics)	Boreal Subalpine	scrub birch (largely unvegetated and at treeline)	1202	Ridge	Overlooking Grass Lakes	n/a	Not fully assessed	Unknown	chert	9	3	retouched flake, projectile point, stemmed point	0	n/a
JkTb-1	11-12ASR	precontact	Hunting Site - Generic	Cultural material (subsurface, lithics)	Boreal Subalpine	spruce, willow?, lichen, moss, crowberry	1002	Ridge?	Overlooking Little Hyland River, wetland in vicinity	n/a	Not fully assessed - flagged	Minimum site extent - 15 m x 15 m	chert	1	1	tip of a point	0	n/a
KdTh-1	81-11ASR	precontact	Hunting Site - Generic	Cultural material (subsurface, lithics)	Boreal Subalpine	reindeer lichen, moss	1087	Bench	Overlooking Otter Lake	game trail	Unknown	~10 m x 10 m	chert	2	0	n/a	0	below
KfTg-4	81-11ASR	precontact	Hunting Site - Generic	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	unknown	1129	Bench	Adjacent to outlet of unnamed lake	n/a	Not fully assessed	Small?	chert	0	1	retouched flake (1)	0	n/a
KcTq-11	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	white spruce, scrub birch, Labrador tea, kinnikinnick, mosses, reindeer lichen	1031	Bench	Overlooking Rose Creek	n/a	Assessed	20 m E-W x 16 m N-S	basalt, Tertiary Hills Clinker	3	0	n/a	0	within, below
KcTq-2	13-26ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	spruce, scrub birch, grass, reindeer lichen, moss	1013	Esker Ridge	Overlooking Rose Creek	n/a	Assessed	5 x 15 m	basalt, chert	3	1	Retouched flake (1)	0	above

Borden	Permit Number	Classification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KcTq-4	13-26ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	spruce, reindeer lichen, moss, cranberry, scrub birch	1028	Esker Ridge	Overlooking Rose Creek	n/a	Assessed	5 x 10 m	chert	2	0	n/a	0	below
KcTq-3	13-26ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	spruce, cranberry, reindeer lichen, scrub birch	1015	Esker, Bench	Overlooking Rose Creek	n/a	Assessed	5 x 18 m	basalt, chert	1	1	Retouched flake (1)	0	above
KdTl-1	11-23ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	white spruce, aspen, and birch, with young spruce, scrub birch, and willow, blueberry, kinnikinnick, Labrador tea, reindeer lichen, toadflax and moss.	881	Knoll	Overlooking small unnamed lake and wetland	n/a	Not fully assessed	Unknown	chalcedony, chert	4	0	n/a	0	n/a
KdTl-2	11-23ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	white spruce and aspen, young spruce, aspen and scrub birch in the understory, kinnikinnick, Labrador tea, reindeer lichen and moss (dense ground vegetation)	860	Knoll	Overlooking Riddel River and an abandoned creek channel	n/a	Not fully assessed	Unknown	chert	2	0	n/a	0	n/a
KcTq-13	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	white spruce, scrub birch, Labrador tea, kinnikinnick, mosses, reindeer lichen	1011	Knoll	Overlooking Rose Creek	n/a	Assessed	24 m ENE-WSW x 9 m SSE-NNW	basalt, chalcedony	2	0	n/a	0	within, below
KcTq-15	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	white spruce, scrub birch, mosses, reindeer lichen	1010	Knoll	Overlooking Rose Creek	n/a	Assessed	25 m N-S x 23 m E-W	chert	15	0	n/a	0	within
KbTq-2	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, scrub birch, reindeer lichen, cranberry, grass	1068	Knoll	Overlooking Rose Creek	n/a	Assessed - flagged	20 m ESE-WNW x 11 m SSW-NNE	chalcedony, chert	6	0	n/a	0	below
KbTq-3	16-10ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	black spruce, scrub birch, reindeer lichen, cranberry, grass	1072	Knoll on ridge	Overlooking Rose Creek	n/a	Assessed - flagged	18 m SSE-NNW x 14 m WSW-ENE.	siliceous sedimentary material	1	0	n/a	0	below
JiTp-1	15-10ASR; 16-04ASR	precontact	Hunting Site - Lookout	Cultural material (surface, subsurface, lithics)	Boreal Subalpine	scrub birch, grass, berries	1447	Knoll on ridge	Overlooking creek	n/a	Assessed	35 x 55 m	chert, obsidian, quartz?, Tertiary Hills Clinker?	166	1	utilized shatter	0	above, within, below

Borden	Permit Number	Classification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KcTq-7	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	white spruce, scrub birch, cranberry, Labrador tea, reindeer lichen, mosses, grass	1017	Ridge	Overlooking Rose Creek and wetland	n/a	Assessed	27 m NNE-SSW x 10 m ESE-WNW	chalcedony, chert, dacite	10	0	n/a	0	within
KcTq-8	16-10ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	white spruce, scrub birch, kinnikinnick, reindeer lichen, grasses	1017	Ridge	Overlooking Rose Creek, wetland within ~100 m	n/a	Assessed	17 m SSE-NNW x 13 m WSW-ENE	chert	1	0	n/a	0	below
KcTq-12	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	white spruce, scrub birch, Labrador tea, kinnikinnick, mosses, reindeer lichen	1035	Ridge	Overlooking Rose Creek	n/a	Assessed	1) 42 m ESE-WNW x 18 m NNE-SSW (upper ridge) 2) 20 m NW-SE x 13 m NE-SW (lower projection).	chalcedony, chert	4	0	n/a	0	within, below
KcTq-16	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, scrub birch, lupine, reindeer lichen, crowberry, cranberry, feathermoss, pixie cup, freckle pelt, blueberry	1025	Ridge	Overlooking Rose Creek	n/a	Assessed	100 m ENE-WSW x 20–24 m SSE-NNW	chert, siliceous sedimentary material	25	0	n/a	0	above, within, below
KcTp-2	16-10ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	black spruce, subalpine fir, scrub birch, cranberry, feathermoss, Labrador tea, reindeer lichen	1132	Ridge	Overlooking tributary of Rose Creek	n/a	Assessed	20 m N-S x 20 m E-W	chert	1	0	n/a	0	below
KcTq-10	16-10ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	white spruce, scrub birch, willow, trembling aspen, Labrador tea, kinnikinnick, mosses, reindeer lichen	1023	Ridge point	Overlooking Rose Creek and unnamed tributary	n/a	Assessed	15 m N-S x 15 m E-W	chert	1	0	n/a	0	within
KcTq-19	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, scrub birch, cranberry, feathermoss, Labrador tea, crowberry, reindeer lichen	1127	Terrace point	Overlooking tributary of Rose Creek	n/a	Assessed	19 m SSE-NNW x 13 m WSW-ENE	basalt, chert	3	0	n/a	0	above, below

Borden	Permit Number	Classification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KcTq-18	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (surface, subsurface, lithics)	Boreal Subalpine	black spruce, scrub birch, lupine, reindeer lichen, crowberry, cranberry, feathermoss, pixie cup, freckle pelt, blueberry	1063	Terrace point	Overlooking Rose Creek	n/a	Assessed	67 m SE-NW x 33 m SW-NE	chert, dacite	53	0	n/a	0	below
JjTp-2	17-12ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	open and grassy, scrub birch, with the surrounding area characterized by dense spruce forest	1098	Terrace Point	Overlooking tributary of Finlayson River and Finlayson Lake	n/a	Not fully assessed - flagged	Unknown	chert	5	0	n/a	0	above?
JjTp-1	15-10ASR; 17-25ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	scattered spruce, scrub birch, grasses, berries, mosses	1127	Terrace?	Overlooking stream	n/a	Not fully assessed	Unknown	basalt, chert	1	1	Retouched flake	0	below
KcTq-6	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	white spruce, scrub birch, cranberry, mosses, grass, reindeer lichen.	1011	Ridge	Overlooking Rose Creek	charcoal stained silt	Assessed	20 m N-S x 20 m E-W	chert, siliceous sedimentary material	11	0	n/a	0	above, below
JiTq-2	17-00ASR; chance find	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (surface, lithics)	Boreal Subalpine	spruce, scrub birch, lichen	1493	Ridge	Overlooking creek	game trail	Not fully assessed	Unknown	chert?	0	1	biface?	0	n/a
JiTo-1	96-11ASR; 05-09ASR	indigenous historic, precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics); Habitation - Structural Traces (tent poles, house pit (?))	Boreal Subalpine	spruce, scrub birch	1146	Bench	Overlooking creek and pond area of Wolverine Lake	house pit/in ground storage pit?, structures	Not fully assessed	>200 m square	chert	2	0	n/a	0	below
KcTq-20	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, white spruce, trembling aspen, scrub birch, lingonberry, feathermoss, Labrador tea, crowberry, freckle pelt, pixie cup, club moss, rose, ground cedar, fireweed, grass, reindeer lichen	1109	Knoll	Set back from Rose Creek	possible hearth	Assessed	23 m SSE-NNW x 23 m WSW-ENE	basalt, chert, siliceous sedimentary material	10	0	n/a	0	below

Borden	Permit Number	Classification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KcTq-17	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics, bone)	Boreal Subalpine	black spruce, scrub birch, lupine, reindeer lichen, crowberry, cranberry, feathermoss, grass, mustard	1024	Ridge	Overlooking Rose Creek	n/a	Assessed	12 m N-S x 8 m E-W	chert	1	0	n/a	2	within
KcTq-14	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics, bone)	Boreal Subalpine	white spruce, scrub birch, aspen, alder, Labrador tea, mosses, reindeer lichen	1033	Knoll	Overlooking Rose Creek	n/a	Assessed	68 m E-W x 26 m N-S	chalcedony, chert, dacite, siliceous sedimentary material	11	0	n/a	7	within, below
KcTq-5	15-03ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics, calcined bone)	Boreal Subalpine	spruce, scrub birch, reindeer lichen, moss	1107	Bench	Overlooking tributary of Rose Creek	fire cracked rock, possible hearth	Assessed	5 x 15 m	chert, quartz	9	2	Retouched flake (1), scraper (1)	8	below
KbTq-1	15-03ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics, bone)	Boreal Subalpine	spruce, scrub birch, lichen	1071	Ridge	Overlooking Rose Creek	n/a	Assessed - flagged	30 m x 15 m	basalt, chert, quartz	36	0	n/a	26	above, below
KcTq-9	16-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics, calcined bone)	Boreal Subalpine	white spruce, scrub birch, Labrador tea, kinnikinnick, mosses, reindeer lichen	1022	Terrace	Overlooking Rose Creek	hearth	Assessed	48 m ENE-WSW x 10-15 m NNW-SSE	chalcedony, chert, dacite	6	0	n/a	250	within, below
KfTg-5	81-11ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (surface, lithics)	Boreal Subalpine	unknown	1323	Bedrock knoll	Overlooking Fuller Lake	n/a	Not fully assessed	Unknown	siliceous sedimentary material	1	0	n/a	0	n/a
KjTh-2	81-11ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	thick scrub birch, lichen cover	1142	Bench	Adjacent to river and streams	n/a	Not fully assessed	~25 m x 25 m	chert, welded tuff (Tertiary Hills Clinker?)	62	6	microblade (5), blade (1)	0	below
KgTf-1	81-11ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (surface, lithics)	Boreal Alpine Tundra	moss	1566	Bench	Overlooking unnamed creek, overlooking wetland to the south	n/a	Not fully assessed	Unknown	siliceous sedimentary material	1	0	n/a	0	n/a
KgTi-7	81-11ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	scrub birch, lichen cover	1038	Bench	Adjacent to Oly Lake outlet	n/a	Not fully assessed	4-6 m square	chert	2	0	n/a	0	n/a
KjTh-1	81-11ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	thick scrub birch, lichen cover	1080	Bench/knoll	Adjacent to Hess River and stream	n/a	Unknown	~8 m x 8 m	chert	491	0	n/a	0	below

Borden	Permit Number	Classification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KfTm-4	11-23ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	white spruce with scrub birch, willow, and young spruce, blueberry, lupine, kinnikinnick, Labrador tea, reindeer lichen, bunchberry, crowberry, and moss	970	Esker	Overlooking creek and wetland	n/a	Not fully assessed	Unknown	chalcedony	2	0	billet flakes	0	n/a
KgTi-5	81-11ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, lichen cover	1036	Knob	Adjacent to unnamed lake on lake narrows	n/a	Not fully assessed	~4-5 m square	chert	10	0	n/a	0	within, below
KgTg-3	08-02ASR	precontact	Hunting Site - Lookout	Cultural material (surface, lithics)	Boreal Subalpine	lichen, moss ground cover	1160	Knoll	Adjacent to South Macmillan River and wetland	n/a	Not fully assessed	Unknown	chert	0	2	Retouched flake (1), core (1)	0	n/a
KfTg-3	81-11ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics, calcined bone)	Boreal Subalpine	unknown	1140	Knoll	Overlooking Fuller Lake	n/a	Unknown	~70 m X 70 m	chert, siliceous sedimentary material	54	0	retouch flakes (1)	0	n/a
KgTh-1	81-10ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, lichen	1020	Knoll	Overlooking South MacMillan River and stream, wetland in vicinity	n/a	Not fully assessed	Small - ~ few square metres (1 m x 1 m)	chert, siliceous sedimentary material	2	0	n/a	0	below
KfTm-5	11-23SR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	white spruce with scrub birch, willow, and young spruce, blueberry, lupine, kinnikinnick, Labrador tea, reindeer lichen, bunchberry, crowberry, and moss	966	Knoll	Overlooking creek and wetland	n/a	Not fully assessed	Unknown	chert, dacite	14	0	n/a	0	n/a
KfTm-6	11-23ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	white spruce forest, willow, scrub birch, young spruce, Labrador tea, kinnikinnick, blueberry, grass, crowberry, moss, and reindeer lichen	925	Knoll	Overlooking creek and wetland	n/a	Not fully assessed	Unknown	chalcedony	2	0	n/a	0	n/a

Borden	Permit Number	Classification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KfTm-2	11-23ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce with young spruce, scrub birch, and willow, blueberry, kinnikinnick, Labrador tea, reindeer lichen, and moss (Surface exposure is less than 5% due to dense ground vegetation)	1029	Knoll	Overlooking a small pond and grassy meadow	n/a	Not fully assessed	Unknown	chalcedony	3	0	n/a	0	n/a
KfTh-1	81-10ASR	precontact	Hunting Site - Lookout	Cultural material (surface, lithics)	Boreal Subalpine	scrub birch, lichen	1006	Knoll complex	overlooking South MacMillan River	n/a	Not fully assessed	1) ~10 m x 10 m are 2) 2 m X 3 m	chert, siliceous sedimentary material	83	1	Retouch flakes (7), flake with possible notch (1)	0	above, below
KgTh-2	81-10ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	scrub birch, lichen	1046	Knoll on ridge	Overlooking South MacMillan River	n/a	Not fully assessed	Unknown	chert	1	0	bipolar flake	0	below
KgTi-4	81-11ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, lichen cover	1047	Ridge/Outwash terrace?	Adjacent to small lake and creek, wetland in vicinity	n/a	Not fully assessed	~6 m X 6 m	chert	27	0	n/a	0	below
KgTg-2	81-11ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	unknown	1107	Terrace	Adjacent to South MacMillan River	n/a	Unknown	Unknown	chert	28	1	core, core shatter	0	above, within, below
KfTj-2	81-11ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, lichen	879	Terrace	Overlooking South MacMillan River and tributary	n/a	Not fully assessed	~3 m X 3 m	chert	6	0	n/a	0	below
KiTg-1	81-11ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine/Boreal Alpine Tundra	little vegetation cover	1303	Bedrock knoll	Overlooking creeks	fire cracked rock?	Unknown	Small	chert	23	1	Point preform	0	n/a
KfTg-2	81-11ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (surface, lithics)	Boreal Subalpine	unknown	1189	Bench	Overlooking Fuller Lake	game trail	Unknown	Unknown	chert	n/a	1	Retouched flake	0	n/a
KfTm-3	11-23ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce and aspen, with young spruce and scrub birch, blueberry, kinnikinnick, Labrador tea, reindeer lichen, crowberry, and moss	940	Knoll	Overlooking a wetland	game trail ~25 m to the east of site	Not fully assessed	Unknown	chalcedony, chert	53	0	n/a	0	n/a

Borden	Permit Number	Classification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KgTi-3	81-11ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (surface, lithics)	Boreal Subalpine	scrub birch, lichen cover	1031	Bench	Adjacent to Oly Lake outlet and adjacent to wetland	horse trail	Not fully assessed	Small?	chert	1	0	n/a	0	n/a
KgTi-2	81-11ASR	precontact	Hunting Site - Lookout	Cultural material (surface, subsurface, lithics)	Boreal Subalpine	scrub birch, lichen cover	1053	Bench	Adjacent to Oly Lake and wetland	horse trail	Not fully assessed	Minimum site extent - few square metres	chert, siliceous sedimentary material	38	0	n/a	0	below
KgTi-6	81-11ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, lichen cover	1044	Bench	Adjacent to Oly Lake and lake outlet	possible hearth	Not fully assessed	~10 m x 6 m	chert, siliceous sedimentary material	81	0	Retouch flakes	0	above?, below
KeTl-2	11-23ASR	precontact	Hunting Site - Lookout	Cultural material (surface, subsurface, lithics, bone)	Boreal Subalpine	young spruce, aspen, and birch regrowth, scrub birch, blueberry, kinnikinnick, Labrador tea, reindeer lichen, crowberry and moss	856	Bluff	Overlooking unnamed lake, wetland in vicinity	n/a	Not fully assessed	Unknown	chalcedony, chert, dacite, siltstone	55	0	n/a	Present but unknown number	n/a
KeTj-2	81-11ASR	precontact	Hunting Site - Lookout	Cultural material; (subsurface, lithics)	Boreal Alpine Tundra	alpine tundra	1520	Bench	Alpine meadows and wetlands located below, overlooks various tributaries, can see Sheldon Lake from here	chert outcrops	Not fully assessed	~4 m^2	chert/chalcedony, siliceous sedimentary material	7	0	Smashed chert pebbles	0	below

Appendix F.

Archaeological Sites in the Don Creek Valley and Howard's Pass Study Area Summary

Borden	Permit Number	Class-ification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KdTd-2	14-25ASR, 15-07ASR	precontact	Subalpine Hunting Base Camp	Cultural material (subsurface, lithics, bone)	Boreal Subalpine	balsam spruce, scrub birch, pixie cup, caribou lichen, electrified cat's tail moss, blueberry	1220	Terrace	Overlooking Don Creek	possible hearth	Assessed	10–89 m ESE-NNE x 30–135 m ESE-WNW	chalcedony, chert, dacite, obsidian, siliceous sedimentary material	94	1	broken scraper, calcined bone	1	above, within, below
KdTe-33	15-07ASR	precontact	Hunting Site - Generic	Cultural material (subsurface, lithics)	Boreal Subalpine	spruce, subalpine fir, scrub birch, Labrador tea, blueberry, feathermoss, reindeer lichen	1120	Ridge point	Overlooking tributary of Don Creek	n/a	Not fully assessed	Minimum site extent - 20 m N-S x 16 m E-W	chalcedony	1	0	n/a	0	within
KdTe-14	15-07ASR	precontact	Hunting Site - Generic	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, reindeer lichen, blueberry, feathermoss, crowberry	1125	Bench	Overlooking Don Creek Valley and wetland area	n/a	Not fully assessed	Minimum site extent - 40 NNE-SSW x 34 ESE-WNW	chalcedony, siliceous sedimentary material	10	0	n/a	0	within, below
KdTe-17	15-07ASR	precontact	Hunting Site - Generic	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	subalpine fir, scrub birch, reindeer lichen, blueberry, crowberry, cranberry, Labrador tea, red stemmed feathermoss	1158	Ridge point	Overlooking tributary of Don Creek	n/a	Not fully assessed	Minimum site extent - 28 m WNW-NSE x 11–13 m NNE-SSW	chalcedony	1	0	n/a	0	within, below
KdTe-3	14-25ASR, 15-07ASR	precontact	Hunting Site - Generic	Cultural material (subsurface, lithics)	Boreal Subalpine	balsam spruce, scrub birch, caribou lichen, feather moss, crowberry, blueberry, electrified cat's tail moss	1108	Esker	Set back from Don Creek Valley and wetland area	n/a	Assessed	15 m N-S x 14 m E-W	chalcedony, chert	2	0	n/a	0	within/below
KdTe-24	15-07ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	black spruce, subalpine fir, scrub birch, cranberry, blueberry, crowberry, reindeer lichen	1106	Knoll on esker	Overlooking Don Creek and wetland	game trail	Not fully assessed	Minimum site extent - 20 m N-S x 20 m E-W	siliceous sedimentary material	1	0	n/a	0	above

Borden	Permit Number	Class-ification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KdTe-7	14-25ASR, 15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, sub-alpine fir, scrub birch, Labrador tea, lingonberry, reindeer lichen, freckle pelt, moss	1122	Knoll	Overlooking Don Creek Valley and wetland area	n/a	Assessed	18 m NNW-SSE x 18 m ENE-WSW	chalcedony, chert	30	0	n/a	0	above, below
KdTe-8	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	subalpine fir, scrub birch, reindeer lichen, blueberry, kinnikinnick, Labrador tea	1142	Knoll on ridge	overlooking Don Creek, small pond and wetland	n/a	Not fully assessed	Minimum site extent - 25 m N-S x 12 m E-W	chert	3	0	n/a	0	above, within, below
KdTd-4	14-25ASR, 15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	balsam spruce, scrub birch, caribou lichen, mossberry, juniper, cranberry, Labrador tea	1221	Esker	Overlooking Don Creek tributary and Don Creek Valley	game trail	Assessed	93 m NNE-SSW x 21 m ESE-WNW	chalcedony, dacite, fine grained volcanic	3	1	biface fragment	0	below
KdTe-18	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, reindeer lichen, blueberry, Labrador tea and red stemmed feathermoss	1318	Knoll	Overlooking Don Creek Valley and Wetlands below	n/a	Not fully assessed	Minimum site extent - 39 ENE-WSW x 17 m SSE-NNW	chert	3	0	n/a	n/a	below
KdTe-21	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, subalpine fir, scrub birch, reindeer lichen, Labrador tea, crowberry, kinnikinnick, and red stemmed feathermoss	1150	Knoll	Overlooking Anniversary Creek	old road/contemporary game trail traverses along the base of the southeastern edge of the knoll	Not fully assessed	Minimum site extent - 15 m NNW-SSE x 13 m WSW-ENE	chert, metamorphosed siltstone	15	2	microblade, retouched flake	n/a	below
KdTe-25	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, subalpine fir, scrub birch, cranberry, blueberry, crowberry, reindeer lichen	1120	Knoll on esker	Overlooking Don Creek and wetland	game trail ~330 m to the southwest	Not fully assessed	Minimum site extent - 28 m NNE-SSW x 14 WNW-ESE	chalcedony	4	0	n/a	0	below

Borden	Permit Number	Class-ification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KcTd-3	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Alpine Tundra	scrub birch, reindeer lichen, kinnikinnick, blueberry, feathermoss, grasses, electrified cat's tail moss	1545	Knoll	Overlooking Don Creek	n/a	Not fully assessed	Minimum site extent - 40 m NE-SW x 19 m NW-SE	siliceous sedimentary material	2	0	n/a	0	n/a
KcTd-4	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (surface, lithics)	Boreal Alpine Tundra	scrub birch, reindeer lichen, kinnikinnick, blueberry, feathermoss, grasses, electrified cat's tail moss	1524	Knoll, Bench	Overlooking Don Creek	n/a	Not fully assessed	Minimum site extent - 30 m E-W x 13 m N-S.	chert, siliceous sedimentary material	3	0	n/a	0	n/a
KdTe-29	15-07ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (subsurface, lithics)	Boreal Alpine Tundra	scrub birch, reindeer lichen, cranberry, grasses	1540	Knoll on ridge	Overlooking "Bob" Lake (alpine lake)	n/a	Not fully assessed	Minimum site extent - 12 m N-S x 20 m E-W	chalcedony	1	0	n/a	0	n/a
KdTe-13	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, scrub birch, reindeer lichen, grass	1096	Knoll on ridge	Overlooking Don Creek and wetland	n/a	Not fully assessed	Minimum site extent - 20 m N-S x 7-15 m E-W	siliceous sedimentary material	4	0	n/a	0	n/a
KdTe-32	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	spruce, subalpine fir, scrub birch, reindeer lichen, Labrador tea, blueberry, cranberry, crowberry	1165	Knoll	Adjacent to a pond, vantages of Don Creek Valley and wetlands	game trail	Not fully assessed	Minimum site extent - 56 E-W x 27 m N-S (U-Shape)	chert	22	1	biface fragment	0	n/a
KdTe-37	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, scrub birch, grass, reindeer lichen	1095	Knoll on ridge	Overlooking Don Creek and wetland	n/a	Not fully assessed	Minimum site extent - 37 m N-S x 13 m E-W	dacite	3	0	n/a	0	n/a

Borden	Permit Number	Class-ification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KdTe-5	14-25ASR; 15-07ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated find (surface, lithics)	Boreal Subalpine	black spruce, scrub birch, willow, reindeer lichen, lingonberry, bunchberry, crowberry, Labrador tea, blueberry	1099	Knoll	Overlooking Don Creek Valley and wetland area	n/a	Assessed	36 m N-S x 57 m E-W	chalcedony	1	0	n/a	0	n/a
KcTd-2	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Alpine Tundra	subalpine fir, scrub birch, reindeer lichen, kinnikinnick, blueberry, feathermoss, grasses, electrified cat's tail moss	1522	Knoll	Overlooking Don Creek and Tributary	n/a	Not fully assessed	Minimum site extent - 17 m WNW-ESE x 11 m NNE-SSW	chalcedony, chert	2	0	n/a	0	within
KcTe-1	14-25ASR	precontact	Hunting Site - Lookout	Cultural material (surface, subsurface, lithics)	Boreal Subalpine	spruce, scrub birch, reindeer lichen, feather moss.	1244	Terrace	Overlooking tributary of Don Creek	several game trails	Not fully assessed	Minimum site extent - ~80 m N-S x 50 m E-W	chert, dacite	2	0	n/a	0	within
KdTd-1	14-25ASR, 15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	subalpine spruce, scrub birch, willow, Labrador tea, caribou lichen, red stemmed feather moss, low-bush blueberry, juniper, ground cedar, crowberry	1243	Ridge	Overlooking Don Creek tributary	n/a	Assessed	32 m NNE-SSW x 13 m ESE-WNW	basalt, chert, dacite	34	0	n/a	0	within
KdTd-5	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, reindeer lichen, Labrador tea, blueberry, mosses	1222	Knoll on esker	Overlooking Don Creek	n/a	Not fully assessed	Minimum site extent - 30 m E-W x 13 m N-S	chert	22	0	n/a	0	within

Borden	Permit Number	Class-ification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KdTd-6	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	spruce, scrub birch, reindeer lichen, Labrador tea, blueberry, red stemmed feathermoss	1243	Knoll on ridge	Overlooking Don Creek	n/a	Not fully assessed	Minimum site extent - 127 m N-S x 14–46 m E-W	chert	2	0	possible burin facet on flake	0	within
KdTe-1	14-25ASR, 15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, surface, lithics)	Boreal Subalpine	subalpine fir, scrub birch, caribou lichen, electrified cat's tail moss, blueberry, Labrador tea.	1162	Knoll on esker	Overlooking a kettle hole pond	ATV trail through site	Assessed	91 m N-S x 13–20 m E-W	chalcedony, chert (?), siliceous sedimentary material, Tertiary Hills Clinker	22	1	Concave based, side notched triangular shaped point	0	within
KdTe-10	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	subalpine fir, willow, scrub birch, reindeer lichen, blueberry, Labrador tea, mosses	1144	Knoll	Overlooking Don Creek, wetland area	n/a	Not fully assessed	Minimum site extent - 26 m N-S x 20 m E-W	chalcedony, chert	6	0	n/a	0	within
KdTe-11	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	subalpine fir, willow, scrub birch, reindeer lichen, blueberry, Labrador tea.	1129	Terrace/Ridge	Overlooking Don Creek tributary	n/a	Not fully assessed	Minimum site extent - 20 m N-S x 16 m E-W	chert	2	1	core, flakes refit on core	0	within
KdTe-2	14-25ASR, 15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, surface, lithics)	Boreal Subalpine	spruce, scrub birch, reindeer lichen, blueberry	1101	Esker, Knoll	Overlooking Don Creek Valley and wetland area	game trail	Assessed	1) 24 m NNW-SSE x 12 m ENE-WSW 2) 61 m ESE-WNW x 13–23 m SSW-NNE	chert, metamorphosed siltstone	6	0	n/a	0	within
KdTe-20	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, subalpine fir, scrub birch, reindeer lichen, Labrador tea, crowberry, kinnikinnick, grass and red stemmed feathermoss	1162	Knoll	Overlooking Anniversary Creek	axe cut stumps, game trail	Not fully assessed	Minimum site extent - 20 m N-S x 20 m E-W	dacite	3	0	n/a	n/a	within

Borden	Permit Number	Class-ification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KdTe-23	15-07ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find; (subsurface, lithics)	Boreal Subalpine	black spruce, subalpine fir, scrub birch, reindeer lichen, cranberry and red stemmed feathermoss	1121	Knoll	Overlooking Anniversary Creek	a game trail/old road is ~25 m west/south west of the site	Not fully assessed	Minimum site extent - 18 m NNW-SSE x 10 m ENE-WSW	chalcedony	1	0	n/a	n/a	within
KdTe-27	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, scrub birch, cranberry, blueberry, crowberry, reindeer lichen.	1100	Esker	Overlooking Don Creek Valley and wetland area	game trail	Not fully assessed	Minimum site extent - 28 m NE-SW x 12 m SE-NW	chert	2	0	n/a	0	within
KdTe-34	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, subalpine fir, scrub birch, Labrador tea, crowberry, blueberry, red stemmed feathermoss	1140	Knoll on esker	Overlooking Don Creek	n/a	Not fully assessed	Minimum site extent - 20 m N-S x 16 m E-W	chert, siliceous sedimentary material	2	0	n/a	0	within
KdTe-36	15-07ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	few spruce, scrub birch, Labrador tea, cranberry, reindeer lichen, electrified cat's tail moss and red stemmed feather moss	1135	Ridge point	Overlooking Anniversary Creek	n/a	Not fully assessed	Minimum site extent - 15 m NW-SE x 14 m NE-SW	chert	1	0	n/a	0	within
KdTe-9	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, reindeer lichen, blueberry, crowberry, Labrador tea.	1099	Esker	Overlooking Don Creek Valley and wetland area	n/a	Not fully assessed	Minimum site extent - 1) 26 m E-W x 8–10 m N-S 2) 16 m E-W x 12 m	chalcedony, chert	13	0	n/a	0	within
KdTe-12	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, reindeer lichen, feathermoss, electrified cat's tail moss	1109	Knoll	Overlooking Don Creek	n/a	Not fully assessed	Minimum site extent - 25 m N-S x 25 m E-W	fine grained volcanic	3	0	n/a	0	within, below

Borden	Permit Number	Class-ification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KdTe-15	15-07ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (subsurface, lithics)	Boreal Subalpine	subalpine fir, scrub birch, reindeer lichen, blueberry, crowberry, cranberry, Labrador tea	1174	Esker	Overlooking tributary of Don Creek and Wetland	game trail	Not fully assessed	Minimum site extent - 35 ENE-WSW x 24 m SSE-NNW	chert	1	0	n/a	0	within, below
KdTe-16	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	subalpine fir, scrub birch, reindeer lichen, blueberry, crowberry, cranberry, Labrador tea, red stemmed feathermoss	1155	Ridge point	Overlooking tributary of Don Creek	n/a	Not fully assessed	Minimum site extent - 14 m N-S x 14 m E-W	chalcedony, siliceous sedimentary material/andesite?	4	0	n/a	0	within, below
KdTe-22	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, subalpine fir, scrub birch, reindeer lichen, Labrador tea and red stemmed feathermoss.	1144	Knoll on ridge	Overlooking Anniversary Creek	game trail to west of site	Not fully assessed	Minimum site extent - 28 m WNW-ESE x 13 m NNE-SSW	siliceous sedimentary material	14	0	n/a	n/a	within, below
KdTe-26	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, subalpine fir, scrub birch, cranberry, blueberry, crowberry, reindeer lichen	1123	Knoll	Overlooking Don Creek and wetland	game trail ~434 m to the southwest	Not fully assessed	Minimum site extent - 6–19 m N-S x 28 m E-W	obsidian (blue, green)	27	0	n/a	0	within, below
KdTe-28	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	spruce, scrub birch, reindeer lichen, Labrador tea, blueberry, red stemmed feathermoss	1220	Knoll on esker	Overlooking Don Creek	n/a	Not fully assessed	Minimum site extent - 23 m E-W x 7–10 m N-S	chalcedony, chert	7	0	n/a	0	within, below
KdTe-30	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	scrub birch, willow, reindeer lichen, Labrador tea, blueberry, cranberry	1102	Knoll	Overlooking Don Creek	possible hearth	Not fully assessed	Minimum site extent - 25 m N-S x 16–27 m E-W	chert	42	0	n/a	0	within, below

Borden	Permit Number	Class-ification	Model Site Type	Site Type	Bioclimate Zone	Vegetation	Elevation (m)	Landform Type	Hydrographic Features	Features	Assessment Status	Site Size	Lithic Material(s)	Debitage Quantity	Tool Quantity	Diagnostic Artifacts	Bone Quantity	Artifacts in Relation to White River Ash
KdTe-31	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	spruce, scrub birch, willow, reindeer lichen, Labrador tea, blueberry, cranberry	1120	Knoll	Overlooking Don Creek and Tributary	n/a	Not fully assessed	Minimum site extent - 25 m N-S x 10–20 m E-W	chert	9	2	microblade (2)	0	within, below
KdTe-35	15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	few spruce, scrub birch, Labrador tea, cranberry and reindeer lichen	1136	Bedrock point, ridge	Overlooking Anniversary Creek	cat trail behind site	Not fully assessed	Minimum site extent - 21 m NNW-SSE x 16 m ENE-WSW	chert, dacite	2	0	n/a	n/a	within, below
KdTe-4	14-25ASR, 15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	balsam spruce, scrub birch, caribou lichen, Labrador tea, blueberry, cranberry, feathermoss	1141	Knoll	Overlooking Don Creek and wetland area	ATV trail	Assessed	1) 65 m NE-SW x 18 m SE-NW 2) 28 m N-S x 15 m E-W	chert, chalcedony, dacite, siliceous sedimentary material	37	0	n/a	0	within, below
KdTd-3	14-25ASR, 15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	balsam spruce, scrub birch, Labrador tea, caribou lichen, blueberry, feathermoss	1247	Knoll on esker	Overlooking Don Creek	n/a	Assessed	1) 54 m ENE-WSW x 22 m NNW-SSE 2) 12 m NNE-SSW x 15 m ESE-WNW	chert, chalcedony, obsidian, siliceous sedimentary material	34	1	microblade	0	within, below, uncertain
KdTe-6	14-25ASR, 15-07ASR	precontact	Hunting Site - Lookout	Cultural material (subsurface, lithics)	Boreal Subalpine	black spruce, sub-alpine fir, scrub birch, Labrador tea and fireweed	1136	Knoll	Tributary of Don Creek nearby	n/a	Assessed	31 m N-S x 17–30 m E-W (U-shape)	chert, dacite	2	0	n/a	0	within/below
KdTe-19	15-07ASR	precontact	Hunting Site - Lookout	Cultural material; Isolated Find (surface, lithics)	Boreal Alpine Tundra	reindeer lichen, grass, cranberry and bearberry (little vegetation present)	1612	Ridge	Overlooking Don Creek Valley and Wetlands Below	chert outcrop	Not fully assessed	Minimum site extent - 20 m N-S x 20 m E-W	chert	1	0	n/a	n/a	n/a

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