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BOOK REVIEWS

"SOMEHOW, SOMETHING BROKE INSIDE THE PEOPLE": DEMOGRAPHIC SHIFTS AND COMMUNITY ANOMIE IN CHUKOTKA, RUSSIA

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ABSTRACT

Demographic records on population movements in the Arctic tell compelling stories about community change, especially when combined with health statistics and qualitative data. Chukotka went through several dramatic demographic shifts during the twentieth century: influx of newcomer populations during the Sovietization of the Russian Arctic, large-scale village relocations during the Cold War, and labor outmigration after the collapse of the Soviet Union. The new demographic regimes had wide-ranging effects on social cohesion and community health. Focusing on the spillover effects of demographic change on local communities, this article contextualizes displacement events using demographic data, health statistics, and oral histories.

ALL THAT REMAINED

The only two things that can satisfy the soul are a person and a story; and even the story must be about a person.

—G. K. Chesterton

Chukotka, 1998. The Siberian tundra is spread against the horizon. Rolling hillocks are lost in vast scenery, no longer measurable in human paces. Rocky outcrops occasionally interrupt the low shrubs covering the ground. Constant frost tears the earth and turns it into a pockmarked landscape. A restless wind sweeps over the rippled ground; its continuous presence makes the silence all the more desolate. The sun clings ponderously in a cold blue sky as if struggling against setting. Now, its rays are just touching the distant hills, and the snowfields on the steep slopes reflect for the last time the radiance of the setting sun. A dark and heavy cloud is gathering in front of the descending fire. Night's frost is creeping over the cold, deserted plain. In some rocky places the ground is still warm, and it feels like wandering through different chambers—from cold to warm, from warm to cold. In a discouragingly short time the single cloud has turned the whole sky into all-consuming blackness. The silence gives way to the roaring of the gale, driving snowflakes through the air.

It feels like sleepwalking—strangely detached, stumbling through a storm without feeling the cold. The storm should have pressed down and the dazzling snow barrier should have taken away the sight, but the perception is disembodied. The tundra has been turned into a snow desert by the encroaching fierce blizzard, and the horizon has drowned in a maelstrom of ice crystals. Darkness blurs the dimensions. Out of the indistinct darkness a faint glow appears. A tent, half covered with snow and the canvas pressed down by the wind, glows from inside. The cords can hardly keep the wind-torn tent on the ground. Dimly lit human shadows dance on the tent wall. Suddenly the canvas is thrown back and a figure emerges from the entrance. It sinks deep into the snow cover. The released canvas flutters furiously in the gale. Light streams out of the tent and illuminates the body. A fur mitten is torn from its hand and disappears into the blizzard. The man stumbles forward, frostbitten fingers covering his face to ward off the piercing ice. The figure disappears into the night, finally swallowed by the blizzard. All that remains is the howling of the gale.

They find Anatoliy the next morning, his body stuck in the snow, slanted, frozen stiff; hands rigidly outstretched, as if they had wanted to grasp something unreachable; coat open and filled with snow; face frozen, open eyes staring into space, astonished. The people say Anatoliy lost his mind while out hunting and simply ran out of the tent on that winter night. Rumors speak of suicide—some of heavy drinking that led to this tragic accident. What remains is another violent death.

Chukotka, 1997. Night has come to the coastal town of Lavrentiya. The storm rages outside; inside the concrete building calmness persists. The force of the storm, which pushes on the double-paned windows, can only be faintly surmised. Down on the dimly lit alley the street lights dance in solitude. This evening, I am invited to the apartment of Boris Kimovitch. Another guest has just arrived: Anatoliy Mutarev, the head of the state farm, or *sovkhoz*, of Uelen. It is warm in the kitchen, and even the scant furnishing of the apartment radiates a sense of security tonight. We are sitting on stools around the small kitchen table, focusing our attention on the gift the rare guest brought. Anatoliy has come with fresh whale skin. He gently places the forearm-length piece on the table. The pure colors of the gray whale skin give it an almost artificial appearance. Over the pearl-white color of the blubber lies the fine gray tissue of the outer skin. Anatoliy draws a long knife made of crude steel and concentrates on cutting thin pieces of the portion. I scrutinize his dexterous movements. The sharp blade cuts through the two layers with ease, and I am almost worried the incision might make the colors run. While I observe the smooth movements and faint clicking sounds of the knife, Anatoliy begins to talk animatedly about the political and economic change in Chukotka.

Anatoliy is a small, middle-aged Chukchi man. Twenty-five years ago, he arrived in Lavrentiya as an agronomist. He carried with him the dream of starting a reindeer breeding enterprise. Unfortunately, that vision was quashed, as it was much too individualistic and would have undermined the socialist collective. A shaking of the head is his only comment on that dream of so many years ago. When he took over the management of Uelen's *sovkhoz* during *perestroika*, men like Anatoliy were needed in great numbers. However, these kinds of people are rare in a country that systematically collectivized every form of private initiative.

Anatoliy now dices the fine strips of blubber. He does it with the same precision and patience displayed by a surgeon.

Currently, a third of the reindeer herds along the coast of Chukotka are in private hands. The rest still belong to the state farms, which have been transformed into corporations without stockholders. However, since the state has removed itself as the main buyer, state farms are constantly in the red. As the manager of such a *sovkhoz*, Anatoliy is in a dilemma. On one hand, he is obliged to a market that has ceased to exist; on the other, he is indebted to the dependent workers of the *sovkhoz*. Workers expected to be supplied by the state farm beyond their regular pay. Yet, since the shipments of food and commodities have been severely reduced by the central government, Anatoliy cannot afford to distribute goods to the farm workers any more. The workers feel let down by the farm and abandoned by Moscow, which obviously has chosen to forget its border regions.

Meanwhile, Anatoliy looks satisfied at the heap of diced blubber in front of him and starts salting it.

Almost all of the professionals in Chukotka have left for the European-influenced region of Russia in search of better working and living conditions. The departure of engineers and energy technicians is a problem for communities that heavily depend on working power stations and service technology. In the past, 170 persons worked in the state farm of Uelen; today only 70 remain.

"It is important to chew the blubber well," says Anatoliy. The whale skin has a delicate taste, a little like walnut oil. Its effect is in the stomach: a warm, pleasant feeling gradually spreads inside of me.

Since the breakdown of the Soviet Union, Chukotka has severely lacked the necessary modes of transport to bridge the long distances between individual settlements. Prior to the 1990s, helicopters supplied the most remote bases and camps. However, since gasoline has become a scarce resource, a helicopter commutes only once a week between the two provincial towns of Uelen and Lavrentiya. Apart from that, people depend on the *vezdekhod*, provided there is enough fuel, as the heavy, tracked, all-terrain vehicle has extremely high energy demands. Sluggish like a dinosaur, this relic of Soviet times churns through the muddy tundra, leaving a black track of disturbed soil behind it. Unfortunately, without these vehicles, supply-ing the outposts is almost impossible. Accordingly, the *vezdekhod* is highly valued. The state farm of Uelen has two in their vehicle pool, just like the local military outpost. Two more *vezdekhod*s are now in private possession.

The heat of the whale blubber has expanded through my body and the pleasant warmth draws my attention away from the details of the conversation. I take another piece of blubber, chew slowly, and gaze out of the window. It is still dark outside and the storm pushes with restlessness against the panes. The conversation continues, but I am lost in thought.

Abruptly I am torn from my daydream. My absence has been noticed and in order to draw me back into the conversation, I am questioned about my opinion on a burning local issue. Tomorrow is the first day of September, the cutoff date for a 300 percent increase in the price of bread. I cannot think about any better comment than that from now on, Lavrentiya will be one of the most expensive villages in the world, at least as far as the price of bread is concerned.

Anatoliy laughs, sharpening his knife to start on a second round of whale blubber: "If you can't afford to buy bread, you should at least eat whale. That is still free!"

INTRODUCTION

In the summer of 1997, when I visited Chukotka for the second time, I got stuck for two weeks in the small town of Lavrentiya. The weekly flight out of town was completely overbooked and no other plane was available. During that time, I made the acquaintance of Boris Kimovitch. He was an ambitious Russian, having just started producing a local TV channel. With a couple of different jobs and a self-made enterprise, he had adjusted more or less to the tremendous changes the past ten years had brought to Russia. He had great visions, dreams of flying, to start his own bush plane service for tourist and business travelers. He liked to talk about his plans. I liked to listen and was invited a couple of times to his small apartment on the fourth floor of a run-down concrete apartment complex. One evening, Anatoliy Mutarev, the head of the former state farm of the nearby village of Uelen, came over for some business and a chat among friends at Boris' home. I was impressed by his lively character and at the same time shocked by the desolate picture he drew of the current economic situation in Chukotka. For the first time I began to understand the economic predicament of northern Russia. We talked for hours, and it was late at night when I returned home.

Back in Lavrentiya the following year, I met neither Boris nor Anatoliy. Boris was probably out of town, doing some business in Magadan or Vladivostok. I could not find any trace of Anatoliy until I heard the story of his violent death. Was it an accident, a suicide, or an alcohol overdose? There were only rumors; nobody could tell me what really happened. For two reasons, I find Anatoliy's story worth sharing. First, I do not understand writing merely as a technique of communicating facts, but also as a mode of thought that gives meaning to experience (Rapport 1997:45). Thus, verbalized impressions and recollections of Anatoliy serve as ethnographic material. Second, as an anthropologist, I have the peculiar aspiration to try to understand others' lives and, in this special case, their deaths. The violent death of Anatoliy is not an isolated case. Between 1970 and 1980, every second death among the indigenous population of Russia's North was attributed to violence (Pika and Prokhorov 1999:xxxvi).

I define violent death in this article as all forms of death that incorporate a violent component, including suicides, accidents, and homicides. I choose this broad definition to show that suicide in Chukotka is part of a wider environment of deadly risk that also includes accidents, alcohol overdoses, and homicides. I also decided on this broad definition to address the ambiguity of causality inherent in suicide. As exemplified in the opening vignette, many questions remain after a person's suicide: Was it a suicide or an accident? Why did he do it? Was it an alcohol overdose or an alcohol-related accident or a suicide? As Janne Flora has shown in her work on suicide in Northwest Greenland, Native interpretations of suicide differ from Western ones in the role causality plays. Where in Western explanations causality plays a paramount role (the reason why he/she did it), in Greenland, Flora shows, knowing and unknowing both play parts in the conversation about a person's suicide (Flora 2012).

I use a fictionalized account, a collage of different parts of my field notes, to describe the post-Soviet reality of the region and to place Anatoliy's death in a broader cultural context. Violent death is something vague, but nevertheless deadly. There are different ways of approaching such an issue. One possibility is to examine and evaluate mortality statistics. This approach, though, risks missing the immediacy and reality of death in a forest of numbers. Another approach is to dwell on personalized accounts, which risks losing the overall perspective in idiosyncrasies. In the case described here, the primary data to which I had access consisted of stories, rumors, and gossip. To retain the ambiguous quality of the material, I present it in a narrative style and balance it with supplementary material, which forms a meta-text to the narrative.

This article combines quantitative and qualitative material of different scales. Demographic data on population dynamics are supplemented by data on internal demographic shifts within the region and paired with personal accounts of village resettlements and closures. Similarly, health statistics are coupled with individual stories and field notes to explore the various dimensions of violent death in Chukotka's Native communities. I did research in Chukotka in 1996–1998 and 2008–2009. During the second period, I mainly focused on the effects of state-enforced village resettlements during the Soviet period. The qualitative backbone of this article are life-history interviews that I conducted in the communities of Provideniya, Novoe Chaplino, Yanrakynnot, Lorino, Uelen (Fig. 1), Inchoun (Fig. 2), and in hunting camps along the coast. I also incorporate local Native accounts of village resettlements that have recently been self-published (Sal'yak 2008; Tepilek 2008). My main goal is to correlate a set of historical events, i.e., state-enforced village closures and community relocations, with health indices such as life expectancy and suicide rates. As other researchers have noted, the village resettlements in Chukotka during the 1950s and 1960s coincided with a sharp rise in suicides, alcoholism, and violent death in the affected communities (Pika 1999:127–128; Schweitzer and Gray 2000:23–24).

Suicide, as well as other forms of violent death, is a "multidimensional malaise" (Leenaars 1996; Shneidman 1985) with its own psychological, interpersonal, cultural, and historical dimensions. For the purposes of this article, I focus on the historical dimension. Recent research on suicide in Native communities has stressed the importance of the psychological dimension, by focusing on strong emotions and emotional dysfunctions in everyday life as triggers for suicides (Leineweber and Arensman 2003; Rasmus 2008). For instance, various accounts from Alaska Native communities hint at a significant relationship between suicide and extraordinary emotional states (i.e., love, jealousy, boredom, and loneliness) (Rasmus 2008; Weingarten 2005). Although no comparable data exist from pre-Soviet times, early ethnographies from Chukotka suggest that suicide was a relatively common practice among the historic Chukchi (Bogoras 1904–09; Lester 2006). Comparative studies of suicide among Native people, mainly based on the Human Relations Area Files (HRAF), indicate a very high prevalence of suicide among the Chukchi during the nineteenth century (Ember and Ember 1992; Masumura 1977; Palmer 1965). The reason for the one-dimensional historical ap-

Figure 1. A fall storm on the coast at Uelen. People from several coastal communities were relocated here in the 1950s.

Figure 2. Graveyard at Inchoun.

proach taken here, with all its possible shortcomings, is simple. While I did research in Chukotka on the topic of village relocation and contemporary hunting culture, it was never my intention to explicitly investigate violent death. Therefore, I lack the ethnographic and qualitative data to thoroughly investigate the cultural and psychological dimensions of suicide. Much more research is needed on that topic, but I nevertheless find it imperative and too important to ignore.

DEMOGRAPHY OF CULTURAL CHANGE

For Russia, the twentieth century was a period of deep-seated changes, revolutions, and systemic collapse. Especially in the North, centuries-old traditions and subsistence practices were replaced by new cultural and economic patterns that accompanied and implemented the Soviet Union's master plan of a new society for all of its citizens.

Chukotka went through several demographic shifts in its recent history. Tsarist Russia started to expand into the territory of the present-day Chukotka Autonomous Okrug (Chukotka AO) during the mid-seventeenth century, first establishing a trading post and fort (*ostrog*) along the river Anadyr. Chukotka's remote location at the eastern fringes of the Russian Empire, combined with chronic supply shortages and frequent clashes with local Koryak and Chukchi tribes, made control and settlement of the land a difficult task. Russian settlers and Cossacks probably numbered in the hundreds during the eighteenth century, while the Native Chukchi population was estimated to be between 8,000 and 9,000 (Forsyth 1992:150). The first major demographic regime shift commenced after the Russian Revolution with the systematic Sovietization of the North, which pulled thousands of party workers, teachers, engineers, and laborers from the central regions of Russia to the remote corners of the Soviet Union. The first national census of 1926–1927 recorded a total of 12,364 Chukchi; the second census in 1939 counted 12,111 Chukchi, while the incoming Russian and Ukrainian population had risen to almost 6,000, i.e., 27% of the total population. In 1959 the number of newcomers had increased to more than 30,000, or 68% of the total population. Ten years later, in 1970, the number of immigrants had more than doubled to 87,780 (Leontev 1977:13). By 1979, the Native population of Chukotka was largely outnumbered by Russian newcomers, comprising merely 10% of the total population of the Chukchi National Region (Forsyth 1992:367). Ten years later, in 1989, shortly before the collapse of the Soviet Union, the percentage of Natives had dropped to a mere 7% (Fig. 3).

The ratio between Native and newcomer populations changed dramatically after the dissolution of the Soviet Union. Pushed by a crumbling infrastructure and economic system, and at the same time pulled by prospects

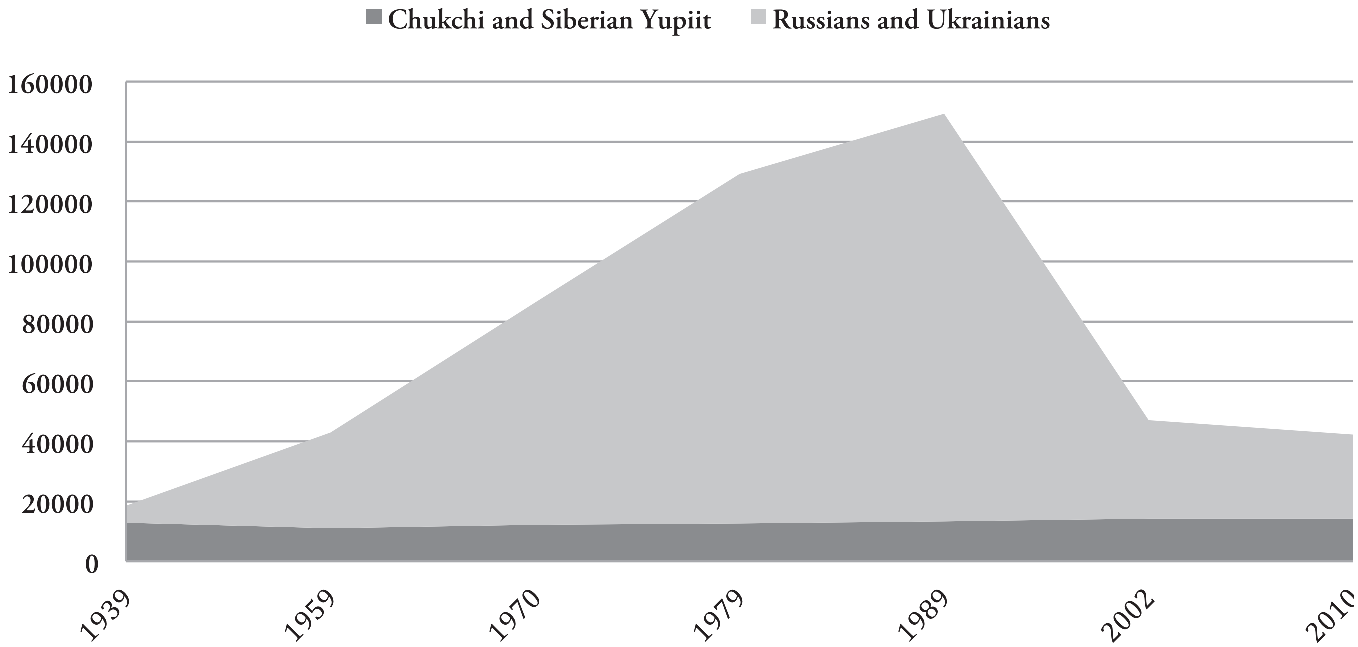

Figure 3. Population dynamics in Chukotka Autonomous Okrug, 1939–2010.

of better employment and new travel opportunities, many Russian and Ukrainian settlers left for the central regions of Russia or the new successor states of the former Soviet Union. As a result of this massive outmigration, Chukotka lost more than two- thirds of its total population between 1989 and 2002 (Thompson 2008:4–5). Yet, as an indirect result of this outmigration, the percentage of Chukchi Natives rose again to 23% of the total population. The latest census of 2010 showed a continuing population decline to 50,526, while the percentage of Chukchi and Siberian Yupiit rose to almost 30% (FSGS 2012a).

The influx of migrant workers during the first half of the twentieth century led to a series of problems. As a consequence of increased migration of workers from the central regions of Russia, a law was enacted in 1932 that differentiated between newcomers and Natives, dividing the population into two categories. The first category, the so-called professionals (administrators, technicians, police inspectors, etc.) received an array of state privileges (higher salaries, tax reductions, and earlier pensions). The remainder of the population could only enjoy these privileges if they came as workers to the North from other areas of the country. That automatically excluded the northern minorities and created a two-class society (Vakhtin 1992:16).

VILLAGE RESETTLEMENTS

The industrialization and Sovietization of Russia's North was an all-encompassing endeavor, which deeply affected and changed Native and non-Native communities in a long-lasting way. In addition to the arrival of Russian settlers, major internal demographic shifts affected Chukotka during the twentieth century. The inhabitants of predominantly Native coastal villages along the Bering Sea were subjected to a relocation policy implemented by the Soviet state that left dozens of settlements and hunting bases deserted. State-enforced resettlement of Native communities, which peaked during the 1950s and 1960s, led to a creeping depopulation of the coastline, whose intricate settlement history extends back for thousands of years. On the Chukchi Peninsula alone, more than eighty settlements were abandoned or closed in the course of the twentieth century (Figs. 4, 5).

These relocations fundamentally changed the settlement pattern along the coast, as Stanislav Nuteventin, an old hunter from Uelen, recalled in 2009: "In former times the coast was densely populated. When you traveled by boat you could always visit the villages along the coast and seek shelter there in case of a storm" (Nuteventin 2009).

Generally speaking, two different relocation waves can be distinguished in Chukotka during the twentieth century. The first wave of relocations was primarily a se-

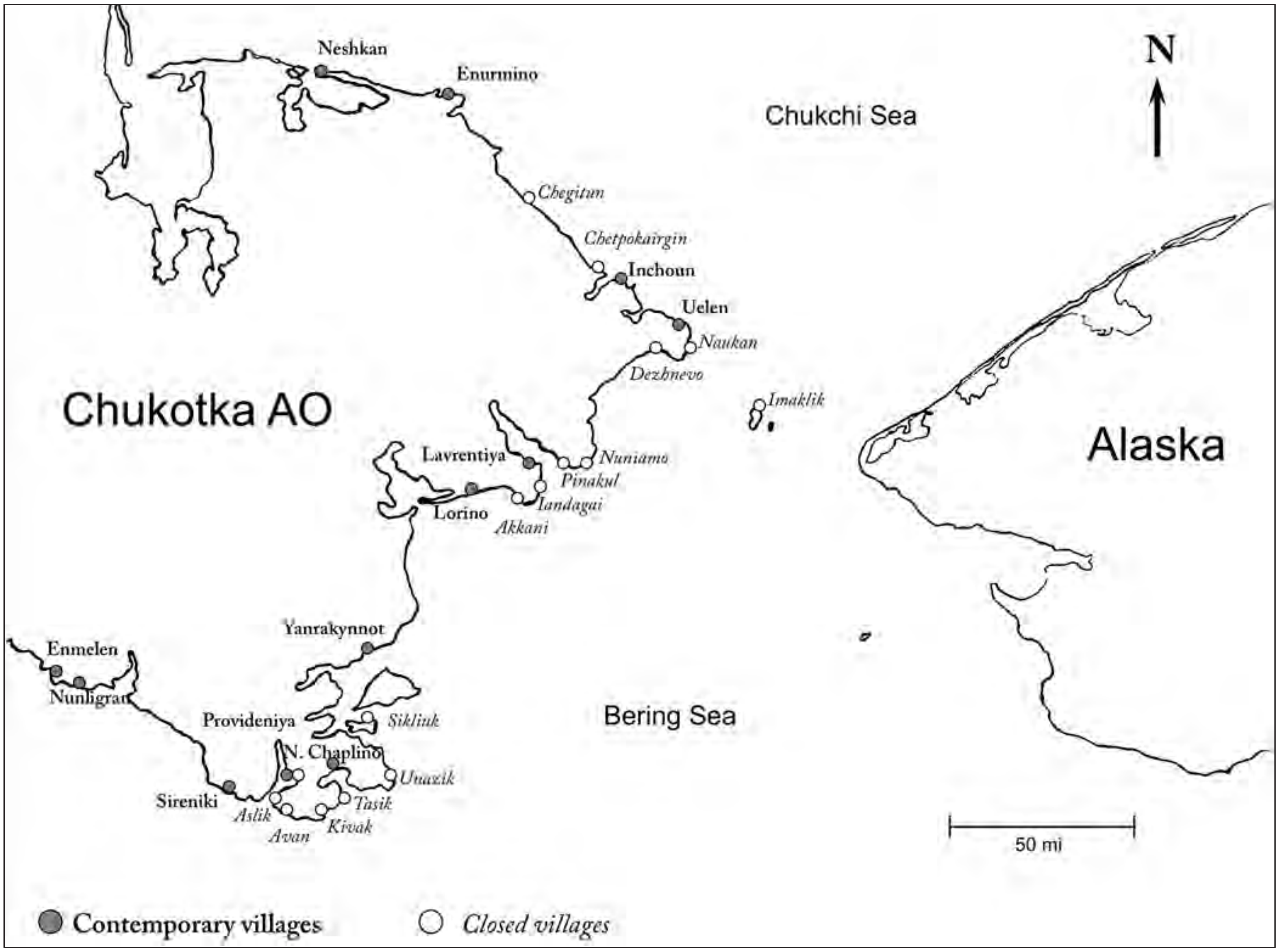

Figure 4. Map of Chukotka showing abandoned coastal villages and relocation sites.

ries of voluntary abandonments of smaller coastal villages and hunting camps. Pulled by new schools, stores, and medical facilities, most families opted to move to larger adjacent villages. For instance, the Siberian Yupik villagers of Kynlirak, Imtuk, and Angytykuk moved during the 1930s to Sireniki, completely abandoning their former settlements on a voluntary basis. The second wave of resettlements commenced during the 1940s and 1950s and was mostly driven by Soviet administrative decisions to close certain villages and relocate their populations to nearby settlement centers. The absolute numbers of forcefully relocated people were relatively low (approximately 2,000 people) in comparison to state-enforced resettlements in other regions, yet in the context of the small population, resettlements affected almost 20% of the Chukchi and Siberian Yupik populations of the entire *okrug* (Table 1).

Administrative rationales for village closures often contradicted local perspectives. For instance, what Soviet planners identified as "unprofitable" or "economically unviable" village locations had supported whole communities for generations. In the case of Unazik, a Siberian Yupik settlement in the south of the Chukchi Peninsula, Soviet administrators had given regular flooding of the village as a reason to close the community in 1958 and relocate its population to the newly founded village of Novoe Chaplino. A contemporary witness of the relocation remembered:

> Back in 1958 the authorities found a lot of arguments for the relocation. Apparently Unazik was about to be washed away by strong storms. Yes, once in a while the storms were severe, but that has always been the case and for many centuries our ancestor-hunters, who picked the place for a settlement, learned to retreat farther back along the spit. But when the bad weather had calmed down the people from Unazik returned to their dwellings again. The people did not fear the sea, they

Figure 5. The settlement of Dezhnevo, on the northeastern coast, abandoned in 1951.

Table 1. Chukotka village populations relocated during the Soviet era.

Village	Closure Date	Village Population (Census Date)	Relocation Site
Aslik (Plover Bay)	1958	150 people (1943)	Provideniya
Ureliki	1946	169 people (1943)	Provideniya
Avan	1942	77 people (1926–27)	Provideniya
Kivak	1952	92 people (1946–50)	Novoe Chaplino
Tasik	1947	32 people (1926–27)	Provideniya/Chaplino
Unazik (Chaplino, Indian Point)	1958–59	206 people (1946–50)	Novoe Chaplino
Sikliuk	1950	45 people (1926 –27)	Provideniya/Chaplino
Akkani	1960	153 people (1926–27)	Lorino/Lavrentiya
Iandagai	1950s	117 people (1926–27)	Lorino/Lavrentiya
Pinakul	1970s	45 people (1926–27)	Lavrentiya
Nuniamo	1970s	131 people (1946–50)	Lorino/Lavrentiya/Uelen
Dezhnevo	1951	64 people (1946–50)	Uelen
Naukan	1958	254 people (1946–50)	Nuniamo/Uelen/Lavrentiya
Imaklik (Ratmanova)	1947	30 people (1940)	Naukan
Chetpokairgin	1950s	81 people (1946–50)	Uelen
Chegitun	1957	124 people (1943)	Uelen/Inchoun

> respected it as a neighbor and lived on its shore. They enjoyed the sea, which fed and dressed them [...] yet here, where our native Unazik was located, only a polar station and a border guard post remained—and nothing bad happened to them (Sal'yak 2008:5).

Relocated populations were often forced to live in new locations that were picked for infrastructural convenience, i.e., sites that could be easily accessed by supply barges or were already hosting state-owned enterprises. Indigenous concerns of losing access to prime subsistence sites were of secondary importance to the planners, as Luba Kutylina from Novoe Chaplino remembered:

> There was a large gathering when they announced that [old] Chaplino would be resettled. The old peo-

ple said that the catch is bad [at Novoe Chaplino] compared to Old Chaplino. Some wanted to go to Kivak, because there is at least open water, but that was also rejected. During the fall you couldn't sleep at night in Chaplino, because you were afraid that the water was coming, that's why they closed the village. But at the new place the catch was bad and you had to bring the meat in from afar. The closest was [the hunting base] Inakhpyk, where you can get a good catch. At least we had a big refrigerator back then. Nowadays it is not working anymore and a lot of meat gets spoiled because of the long distances (Kutylina 2008).

The Soviet focus on large-scale industrial operations left little space for indigenous economies based on traditional social units. These economies were termed "inefficient" and the corresponding localities, Native settlements near traditional key resources, were declared "unprofitable" (Slezkine 1994:340).

Between 1937 and 1953, the total number of villages on the Chukchi Peninsula was reduced from ninety to thirty-one (Krupnik and Chlenov 2007:62). At the beginning of the twenty-first century, twelve villages remained. Traumatic loss of homeland and the vanishing of traditional socioeconomic structures, which had replaced traditional ways of living, sent devastating ripples through the fabric of Native communities, with often disastrous effects on health and community cohesion.

Personal accounts of the relocations in Chukotka offer insight into the dramatic effects on traditional culture and individual lives. Igor Krupnik and Mikhail Chlenov, two Russian anthropologists who conducted interviews with relocated Siberian Yupiit in the region during the 1970s and 1980s, documented the extent of traumatic experiences during and after the relocations (Krupnik and Chlenov 2007). Some of the relocations were executed in such a hasty manner that most of the household items were left behind. In the majority of cases, the host communities were unprepared for the influx of dozens of families. Apartments provided for the relocated were mostly unfinished and people had to move into already occupied houses, which created considerable tension in the respective communities.

Slava, a former inhabitant of Nuniamo (Fig. 6) who was resettled to Lavrentiya in the 1970s, where a special apartment house had been constructed for those being relocated, remembered the time:

Figure 6. The settlement of Nuniamo, abandoned in the 1970s. Inhabitants were relocated to Lorino, Lavrentiya, and Uelen.

> It was not easy; there was not enough space in the apartment. Everybody of my family had to cram in one room. It was a time of hardship and hunger. And, I can remember one thing clearly. It was one morning when suddenly all our dogs that we had brought from Nuniamo were dead. Over night, Russian soldiers had shot them all, for fur hats (Slava 2009).

In the majority of relocations, the new sites were inferior in terms of hunting possibilities, and most of the hunters had to forfeit their profession to work in the state collective farms. Promises that relocated people could still use their old settlements as hunting bases were not honored, and most of the relocated people were prevented from returning to their homelands.

In addition to the spatial dislocations, changes in temporal orientation fundamentally affected the Native communities. In particular, the integration of Native hunters into the so-called combined state farms, where fox farming, reindeer herding, and sea mammal hunting were administratively consolidated, led to major socio-economic shifts.

> Compared to traditional hunting, where you work as a team on your own schedule, in the *kolkhoz* [collective farm] seven to eight people worked each shift and had to bring in an equal amount of walrus. And each person worked individually on one of the animals. These were often very long shifts, lasting up to three o'clock in the morning. It was very strenuous work (Eineucheivun 2008).

The loss of language, cultural practices, and hunting grounds were exacerbated by the unfamiliar living conditions in the new villages, where the predicaments of shift work, insufficient living space, and alcoholism took a heavy toll on the indigenous population. Depression and homesickness still reverberated strongly through the relocated communities more than twenty years after the fact (Krupnik and Chlenov 2007:70).

LIFE AND DEATH

During the mid-twentieth century a violent cycle of suicide, alcoholism, domestic violence, and accidental death ravaged many communities in Chukotka, a fact that is indirectly observable in the declining average life expectancy and in the changing causes of death. Between the 1960s and 1980s the average life expectancy in Native communities in the Russian North dropped by twenty years (Slezkine 1994:375). The causes of death also changed drastically. From the 1950s to the 1970s the causes of fatalities among the indigenous people of the Russian North changed from infectious diseases to various forms of violent death (Bogoyavlinsky 1996:36). Between 1970 and 1980, 50% of all deaths were attributed to violent causes. This means that one in two deaths among the indigenous population was caused by injuries at home, accidents at work, or murders and suicides. The mortality rate attributed to suicides and murders can be regarded as a distinctive indicator of the severe situation for Russia's northern people: more than sixty suicides per 100,000 people and about thirty murders per 100,000 people (1988–1989). The suicide rate was three to four times the national average, and the murder rate three times (Pika 1999:161). Furthermore, violence was and still is the leading cause of death among young and middle-aged men.

Suicide and homicide in the Russian North are often positively correlated, indicating that similar social forces affect these forms of violent death (Lester and Kondrichin 2003:107). A correlation between the rate of violent deaths and alcohol consumption is also apparent, as the high mortality rate due to accidents, suicide, and homicide is closely tied to the increase in alcohol abuse among the peoples of the Russian North, especially in Chukotka, where during the 1970s 31% to 57% of violent deaths were connected to alcohol abuse (Avanaseva 1995). Similar causal relationships between alcohol consumption and suicide rates can be found in other circumpolar regions. For instance, comparing the suicide rates of three Alaska communities (Bethel, Nome, and Galena) from 1979–1990, Marshall argues that access to alcohol appears to be a major factor in accidental deaths and suicides in those villages (1995:4). Despite these correlations, the deadly cluster of suicide, homicide, accidental death, and alcohol abuse presents an "epistemic murk" (Taussig 1987:356) for the researcher. In many cases, as in the opening story, it is hard to differentiate between an accidental death and a suicide, or to determine the role alcohol played in a specific form of violent death.

During the early 1990s among the peoples of the Russian North, 73% of murders, 55% of suicides, and 64% of accidents involved heavy or moderate intoxication (Pika 1999:162). Although high levels of alcohol consumption among coastal Natives were reported as early as the nineteenth century, the situation deteriorated severely during the mid-twentieth century, coinciding with the end of the era of forced resettlements. Politically unaltered fieldwork accounts by Soviet ethnographers, such as the description of alcohol-induced work breakdowns, offer glimpses into the extent of the crumbling social fabric of Native communities along Chukotka's coast (Sergeev 2005:192).

Not much has changed since the early 1990s. Economic and social collapse in the Native communities of Chukotka, combined with poverty, a deteriorating psychological state, and alcohol, have led to a steady increase in suicide rates (Gray 2005:188). In 1997 the suicide rate of the *okrug* was 43.5 per 100,000—double the Russian average (Lester and Kondrichin 2003:105). Data collected on suicide rates during the last all-Russian census in 2010 illustrate the dire situation of many Native communities, especially in Chukotka, where the suicide rate per 100,000 was 82.2 and 94.9 in 2008 and 2009 respectively, while the average Russian rate during these years was around 26 (FSGS 2012b). According to these numbers, Chukotka ranks highest in suicide rates of all the regions of the Russian Federation.

Recent data show similar causal relationships between alcohol and various forms of violent death. The alcohol-related death rate among Natives of Chukotka is significantly higher than the death rate among the non-Native population. Native women appear to be especially vulnerable. In 1994, alcohol caused 19% of deaths of all women of the Chukotka AO (Kozlov et al. 2007:148). In a recent survey on living conditions in the Arctic by the Institute of Social and Economic Research, University of Alaska Anchorage, 100% of the respondents in Chukotka saw unemployment and alcohol abuse as their biggest community problem, while 97% considered suicide to be the biggest problem (SLiCA 2007:3).

During my recent fieldwork in several coastal communities in 2008 and 2009, suicide, various forms of violent death, and heavy alcohol abuse were ever-present topics in conversations. Especially disturbing was a string of recent youth suicides that had gripped several communities. Nadeshda Posnyakova, a local community activist who had lost her husband and children in a house fire many years ago, recounted a story of her childhood friend who committed suicide at the age of twenty-one. This short story is similar to other reports I heard in the way family dysfunction relates to suicidal motivations:

> As a young child she was severely beaten by her father. Her leg was crippled and she had a difficult time walking. She tried to drown herself twice, walking into the surf of Uelen, where she supposedly saw her mother and sister in white, traditional clothing calling her. She eventually finished her life by stabbing a knife into her heart, still having the power to turn it around (Posnyakova 2009).

In many conversations I had on related topics, family problems and alcohol were closely associated with individual suicides. For instance, while I was visiting the hunting camp of Akkani, an hour boat ride from the village of Lorino, all the sea mammal hunters of the local cooperative were suddenly recalled to the village for gun inspection. Initially explained to me as the result of yet another unfortunate event, the management of the cooperative was in fact reacting to the recent violent death of one of its members. An older hunter had died of a self-inflicted gunshot wound and alcohol had played a pivotal role. During the ensuing discussions, where people tried to make sense of yet another violent death in their community, a triad of deadly forces constantly surfaced in their conversations: unemployment, boredom, and alcohol abuse.

SOCIAL REALISM

Early ethnographic accounts of Koryaks, Itel'mens, and Chukchi from the eighteenth and nineteenth century describe various practices that express different forms of ritual violence, from infanticide to "voluntary death" (Batianova 2000:150). Specifically in Chukotka, Waldemar Bogoras documented a seemingly widespread cultural practice of assisted suicide (Bogoras 1904–09:560ff). Prominent in those descriptions are instances of older people who seek voluntary death with assistance, mostly of close relatives. These practices were closely tied to cultural and cosmological attitudes towards death and accentuated what was considered to be a "good" death. A voluntary death was considered to be superior to a death from disease, a common form of fatality during the century of contact with Russian settlers and foreign whalers. Exploring the socio-religious mechanisms behind these practices of voluntary death, Rane Willerslev argues that among a Chukchi group in northern Kamchatka, suicide epitomizes the optimal blood sacrifice in a life and death cycle of soul renewal (Willerslev 2009:694–696).

I am hesitant to explain the prevalence of suicide in contemporary Chukotka along these lines for several reasons. First, one has to clearly distinguish between an assisted suicide involving ritualized violence and sacrifice and a self-inflicted suicide that most of the time is bare of any ritual connotation. Bogoras noticed a generational difference between assisted suicides that were practiced exclusively among older people and self-inflicted suicides that were more widespread among the younger generation (Bogoras 1904–09:565). Bogoras distinguished the latter from the more ritualized form and attributed it to psychological distress, e.g., grief or the unwillingness to live (Batianova 2000:158). Second, for the high suicide rates in contemporary Chukotka to be associated with Chukchi cosmology, one has to assume that the value of a "good" sacrificial death is shared by a significant part of a community. During my stays in Chukotka, mostly in coastal settlements, I did not witness or hear accounts of assisted suicides nor did I hear references to a cosmology involving these ritualized forms. Although Willerslev as well as Batianova documented several cases of assisted suicide among Chukchi elders during the 1980s and 1990s, neither of them related first-hand accounts of these incidents. I don't want to disregard documented cases of ritualized suicide, but they appear to be only a fraction of the more common self-inflicted suicides that occurred in the communities. In addition, cultural explanations do not effectively explain the dramatic rise in suicides among indigenous communities during the 1970s and 1980s in the larger circumpolar world. Such suicides also began increasingly to affect younger generations. Without completely disregarding cultural factors, I agree with Flora (2012:138–139) that a greater cultural acceptance of suicides among circumpolar people paired with socioeconomic changes and relocations that led to the alienation of people from their own culture created a deadly combination that still ravages many communities in the circumpolar world.

In his classic study on suicide, Emile Durkheim argued that a strongly constituted society provides a reservoir of energy that individuals can fall back upon in time of need (Durkheim 1951:210). Thus, the more integrated and cohesive a society is, the more it structures the lives of its members, protecting them from suicide. On the other hand, Durkheim diagnosed a state of anomie as the result of social and economic changes resulting in a decline of social regulation. Anomie entails a sudden change, confronting people with new social conditions and rules. This initiates hopes and wishes that are often shattered by reality, ultimately resulting in frustration, depression, and therefore high suicide rates (anomic suicide). Durkheim conceptualized the suicidal tendency in opposition to cohesive social forces (Pope 1976:18). High suicide rates therefore reflect the inability of a society to integrate its members into its overarching and protective structure. Alexandr Pika's observations in the Russian North point in a similar direction; he argues that the large number of violent deaths among married people and those with children leads to the conclusion that the family, as the basic unit of social defense and psychological and moral support of individuals, cannot fulfill its protective function any more (Pika 1999:162).

The policies of forced collectivization and resettlement destroyed the cohesive system of indigenous life, which integrated land, resources, and people into a functioning whole (Schindler 1992:57). Elena Tepilek, a Native woman from Naukan who was resettled to Nuniamo and only a few years later to Lavrentiya, expressed this social disintegration in her own words:

> In the 1950s, the authorities saw in my native village a place without a perspective. They resettled us. They "closed" us. You can close a people and without thinking scatter its roots in the wind. But you can't create a people. For the Eskimo from Naukan the resettlement was disastrous. It was an ethnocide in its physical outcome (Tepilek 2008:2).

Another example refers to the relocation of Unazik:

> The most frightening thing was that somehow something broke inside the people. They lost their self-sufficiency [*samodostatochnost'*]. They had to move into low-wage employment, which didn't require any qualifications. Many became sick and died, many were knocked down. The people were suffering under the extreme stress, their life force diminished; they were overcome by the longing for the past life […] Up to today nobody asked us about our longing (Sal'yak 2008:5–6).

High suicide and violent death rates among indigenous populations are not confined to Chukotka and the Russian North, but represent a rather common predicament of many circumpolar Native communities. Rapid social change has been identified as one of the major causes of the disproportionally high suicide rates among Native people worldwide (Morell et al. 2007; Rubenstein 1992). Alienation from land and a deteriorating social structure seem to constitute a deadly mix of forces that extort a prohibitive toll from Native communities.

In her study of the Ojibwa community of Grassy Narrows in western Ontario, Anastasia Shkilnyk illustrates how the move to a new reserve in the mid-1960s triggered a change in the most common cause of death: prior to the move, 91% of deaths were from natural causes; by the end of the 1970s, 75% of the deaths were due to violent causes, including suicide (Shkilnyk 1985:11–18). Shkilnyk further argues that the fundamental changes in spatial and temporal orientation that went along with the relocation led to a deterioration of the traditional way of life. Combined with chronic alcohol abuse and mercury poisoning, with its vicious effects on brain chemistry, cultural dislocation exposed the community to hitherto unknown levels of risk, which were clearly visible in health indices.

Changes in health conditions and major demographic shifts affect the social body at its core. Dee Mack Williams, an anthropologist who worked on violent death in a modernizing pastoral society on degraded Chinese grasslands in Mongolia, argues that the individual human body is a palimpsest and battleground for competing local and global forces (Williams 1997:763). Thus, the body as the fundamental mediator among self, society, and world is the site of inscription. The transformations and injuries endured by bodies parallel the wounds inflicted on the land. Land and body share the experiences of violation and change. In Inner Mongolia, deepening poverty, combined with a cold climate and social conventions, have produced a pattern of injury and death. The rapidly changing physical and social environment is shaped by broader processes, as the deadly accidents do not typically involve random misfortune but are rather structured by changes that leave certain members of society prone to bodily damage (Williams 1997:781). A similar situation is observable in Chukotka, where outside forces, acting on land and people, have created an environment of risk to a greater extent than ever before.

CONCLUSION

The historic forces in Chukotka that intruded and shaped local space became corporeal. The hegemonic forces of Soviet colonialism increased rates of mortality and violent death, creating an environment of deadly risk. In Chukotka, where new demographic regimes had wide-ranging effects on social cohesion and community health, social forces thus reveal their corporeal effects by embodying alienation from the land in various forms of violent death.

However, highlighting one aspect of a culture (and in this case an extremely serious and negative one) runs the inherent risk of a one-sided treatment of a society. By focusing on violent death, I chose to present a dark and often hidden side of Native communities in Chukotka. As shown above, violent death and especially suicide pose serious problems to Chukotka's Native communities, yet this does not mean that all individuals necessarily succumb to the social and historical forces that have fundamentally affected their culture and communities.

The transformations of the last twenty years also created room for agency. After the collapse of the Soviet Union, access to resources in coastal villages of Chukotka changed significantly. During the Soviet period, Soviet settlers and administrators were key resource brokers, while the Native population was at the receiving end of a very long supply chain. As brokers between the state and the indigenous population, Russian settlers were at the center of the economy. Yet, the retreat of the state and economic collapse in rural and remote Chukotka, exacerbated by the outmigration of many Russians, led to a socioeconomic inversion of this hierarchy. With the collapse of industrial sea mammal hunting and commercial reindeer herding, and in the absence of basic provisions, Chukotka's coastal communities witnessed a revitalization of subsistence practices. Sea mammal hunting and fishing were crucial for the survival of many communities during the arduous 1990s. Individual Native hunters and cooperatives thus became central players in a post-Soviet informal economy, and Russian settlers were suddenly in a position of dependency on local resources and facilitators.

The collapse of the Soviet Union and its infrastructure in remote periphery regions created new local opportunities as well. Formerly relocated and abandoned coastal villages became new foci for local hunters. After the failed experiment of large-scale social and cultural engineering, the depopulated coastal landscape with its abandoned settlements represents a new point of anchorage for a partial resettlement and for revitalization movements (Holzlehner 2011:1969). The logic of subsistence practices and a longing for lost homelands draw groups of people to the old sites, so that the former settlements are now almost continuously (re-)inhabited by rotating groups of hunters during the summer and winter (Fig. 7). Embedded in the landscape and local ecology, resettlement allows some people to escape the shattered utopia of Soviet modernization. Revitalization of old hunting technologies and camps and traditional forms of cooperation allow for alternative life ways that are diametrically opposed to the dire realities in the villages—hunting camps are dry places with respect to alcohol, and hunting and

Figure 7. A hunting camp in current use at Akkani, originally abandoned in 1960.

butchering expertise are actively passed on to a younger generation. Many hunters see these reoccupied camps and villages as places of healing.

In a reversal of the alienation and environment of deadly risk in Chukotka, the reclaiming of space and (re-)building of a homeland facilitate recovery from the wounds of the past. Whatever the outcome, these efforts show the importance of local space and highlight the crucial interconnections between self-determined land use and societal well-being.

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CHRONOLOGY OF THE OCEAN BAY TRADITION ON KODIAK ISLAND, ALASKA: STRATIGRAPHIC AND RADIOCARBON ANALYSIS OF THE RICE RIDGE SITE (KOD-363)

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ABSTRACT

The Rice Ridge site provides the only known deeply stratified archaeological deposits on the Kodiak Archipelago that retain a substantial and well-preserved faunal assemblage associated with the Ocean Bay tradition. A suite of twenty-two radiocarbon dates was obtained from eleven discrete strata from the site, spanning several thousand years of the Early to Middle Holocene. Calibrated age estimates of the deposits range between about 7,600 and 4,200 years ago, corresponding with much of the Ocean Bay I and II periods. Alternating occupation surfaces and midden deposits accumulated during three discrete episodes, separated by two hiatuses of several hundred years each. Such periods of abandonment are not seen in the radiocarbon sequences of the few other well-dated Ocean Bay sites in the Kodiak Archipelago and highlight the data gaps that must be overcome to obtain a better understanding of Ocean Bay settlement and subsistence at the regional scale.

INTRODUCTION

Kodiak Island has one of the richest documented archaeological records in the North Pacific and one of the more well-established bodies of anthropological research, which provides a detailed picture of past Alutiiq lifeways extending back millennia.[1] Characterization of early Kodiak populations along the North Pacific coast remains elusive despite this record and a growing data set from which a culture historical sequence has been defined and models of settlement, subsistence, technology, and social complexity have been tested. Questions regarding the early period of the culture-historical framework persist, as well as uncertainty about the social, technological, and ecological dimensions of the people who lived here during the Early and Middle Holocene. Until recently, characterization of such dimensions during this early period on Kodiak Island, termed the Ocean Bay tradition, was limited to intensive investigation at only a few sites (Fig. 1).

Research conducted to date provides general chronological limits for the Ocean Bay tradition, defines broad patterns in its material culture and technology, and generates explanations for the evolution of social complexity on Kodiak Island (e.g., Clark 1979; Fitzhugh 2001, 2003). However, chronological data have rarely come from a fine-grained sequence of archaeological deposits at a single Ocean Bay site, and our understanding of basic parameters such as site formation processes is not at a level comparable with our knowledge of later periods spanning roughly the past 4,000 years leading up to Russian colonization. The research described here, analyzing Ocean Bay radiometric data, establishes a more detailed chronological framework well-suited for the exploration of early broad-scale land use patterns on Kodiak Island. The data set contributes to the largest aggregation of radiocarbon dates from a single Ocean Bay site, Rice Ridge (KOD-363), and is used to supplement the existing Ocean Bay chronology.

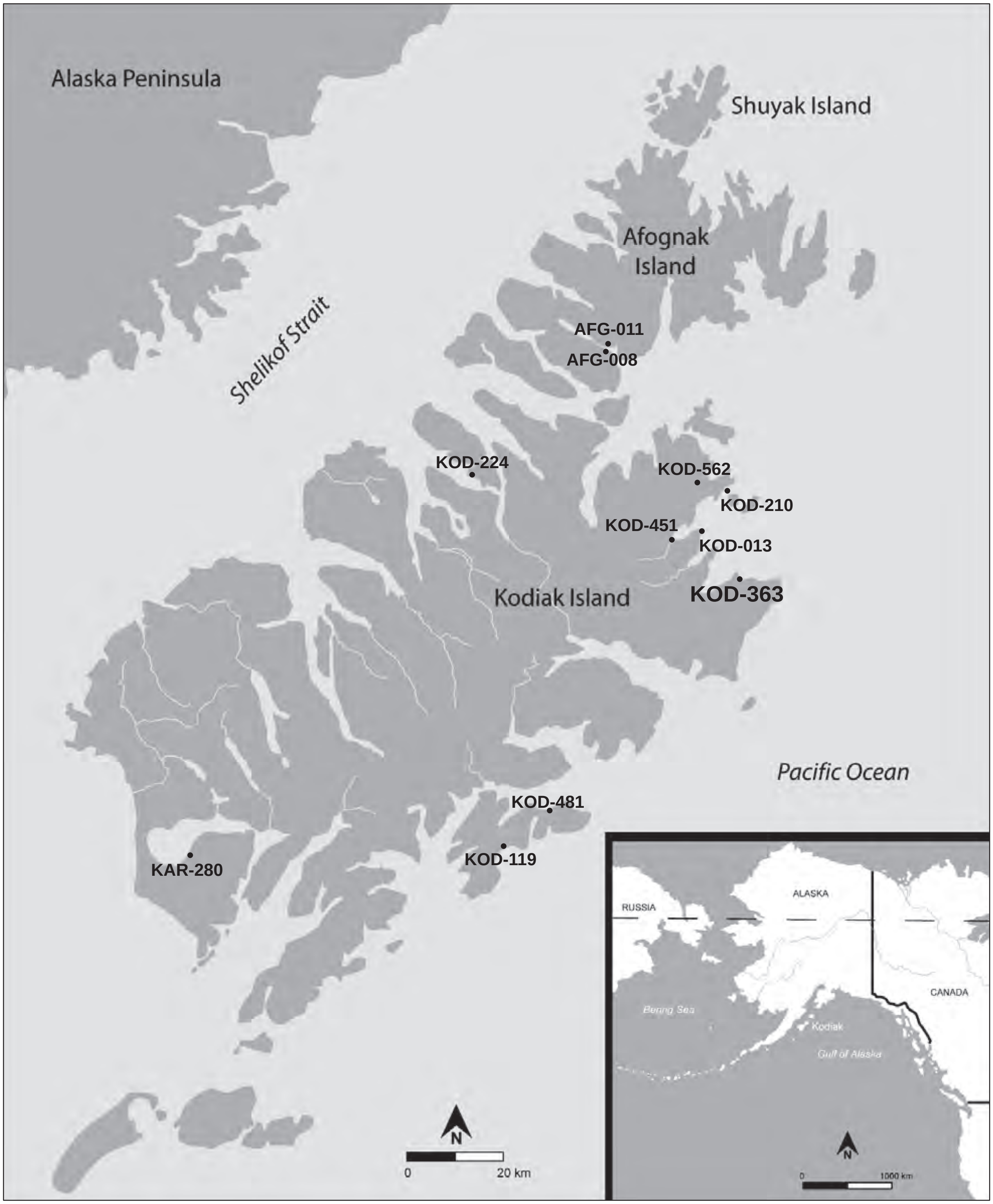

Figure 1. Kodiak Island, the Rice Ridge site, and other sites listed in Table 1. Base map courtesy Alutiiq Museum, Kodiak.

THE OCEAN BAY TRADITION

Early speculative attempts to create a culture history of the Kodiak Archipelago split prehistory into two periods manifested in the archaeological record: the Pre-Koniag and Koniag cultures (Hrdlička 1944:335–336). A more nuanced picture of the precontact history of Kodiak began to emerge in the 1960s as part of the University of Wisconsin's Aleut-Konyag Project (Laughlin and Reeder 1966), a trajectory that continued into the 1970s as participants in that project surveyed and tested more of the Kodiak Archipelago's rugged coastline and additional investigations began on behalf of government agencies (Clark 1984:136).

Donald Clark was the first researcher to identify a technological complex and archaeological deposits predating Hrdlička's two successive culture-historical periods, by that time termed the Kachemak and Koniag traditions (Clark 1979, 2001:106–107). He first encountered the distinctive chipped stone artifact assemblages characteristic of the Ocean Bay tradition in 1961 on Sitkalidak Island off the southeast shore of Kodiak Island, as well as a separate component dominated by incipient ground slate technology, in a road-cut (KOD-119) through an old beach ridge of the bay after which the period is named. A follow-up investigation in 1971 along the Afognak River on Afognak Island yielded similar assemblages of chert and slate artifacts at the Chert (AFG-008) and Slate (AFG-011) sites. Radiocarbon dating and relative dating based on tephra correlations between sites allowed a preliminary chronology of the two periods. The earlier Ocean Bay I (OBI) deposits were characterized almost exclusively by chipped cryptocrystalline silicate (CCS) artifacts and some assemblages with microblades and yielded a range of uncalibrated radiocarbon age estimates between about 6000 and 4000 RCYBP. The later Ocean Bay II (OBII) deposits were characterized by fewer chipped stone artifacts and an abundance of sawn and snapped slate, yielding uncalibrated age estimates between about 4500 and 3900 RCYBP (Table 1; Clark 1979:42–43).[2] It was also during this period of archaeological research that affinities were first recognized between the Ocean Bay tradition of the

Table 1. Ocean Bay components identified in the Kodiak Archipelago

Site #	Site Name	Ocean Bay Components	Primary Reference	Uncalibrated Dates for Ocean Bay Components (RCYBP)
AFG-008	Chert Site	OBI	Clark 1979	5750 ± 240 (base of site) 4150 ± 200 (Late OBI)
AFG-011	Slate Site	OBII	Clark 1979	4480 ± 160 (base of site) 4200 ± 140 (base of site) 4475 ± 125 (lower strata) 3890 ± 110 (upper strata)
KAR-280	Qus'ituq	OBII	Saltonstall and Steffian 2007	4740 ± 40 (lowest layer)
KOD-119	Sitkalidak Roadcut	OBI/II	Clark 1979	5503 ± 78 (base of OBI component) 3929 ± 65 (OBII component)
KOD-224	Uganik Passage	OBI	Nowak 1978	6220 ± 70 (base of site) 5065 ± 135 (upper strata)
KOD-210	Blisky Site	OBII	Steffian et al. 1998	No radiocarbon dates for earliest component, attributed to OBII based on artifact assemblage
KOD-013	Zaimka Mound	OBI/II	Steffian et al. 2002, 2006	Seven dates on OBI components between 6390 ± 70 and 5360 ± 60; Three dates on OBII components between 4540 ± 180 and 4350 ± 70
KOD-481	Tanginak Spring	OBI	Fitzhugh 2003, 2004	Twenty dates between 6600 ± 230 and 5370 ± 60
KOD-363	Rice Ridge	OBI/II	Hausler-Knecht 1993; Kopperl 2003	See Table 3
KOD-562	Array Site	OBII	Steffian et al. 2006	No radiocarbon dates for earliest component, attributed to OBII based on artifact assemblage

Kodiak Archipelago and relatively early archaeological components identified on the Alaska Peninsula mainland across Shelikof Strait to the west, as well as on the southern Kenai Peninsula to the north (e.g., Clark 1977; Workman 1998). Similarities have also been highlighted between Ocean Bay lithic technology and the early archaeological record of the Anangula Phase of the eastern Aleutian Islands dating from about 9,000 to 4,000 years ago, specifically the use of blades and microblades in slotted bone points (e.g., Davis and Knecht 2010:515) and architectural features (Rogers 2011:106–107).

Since the 1970s, excavations at several sites in the vicinity of Chiniak Bay on northeast Kodiak Island (Hausler-Knecht 1990, 1991, 1993; Steffian et al. 2006) and on Sitkalidak Island on the southeastern side of Kodiak (Fitzhugh 2003) have filled important gaps in our knowledge of Ocean Bay subsistence and settlement patterns. The growing body of data available for the Ocean Bay tradition has both reinforced and added detail to Clark's culture-historical scheme for the period, spanning an interval of time from first human colonization before 7,500 years ago to approximately 3,700 years ago. The transition between Ocean Bay I and Ocean Bay II is most clearly marked by the change from reliance on chipped stone technology to ground slate technology that occurred approximately 5,000 years ago. During the Ocean Bay tradition, the Kodiak population expanded across the archipelago, settling in locations ideal for obtaining resources such as sea mammals, marine fish, salmon, and birds.

For much of the OBI phase, populations probably consisted of small but growing residentially mobile groups, inferred from the small size and thin deposits that characterize most excavated OBI components (Clark 1979; Fitzhugh 2002, 2003, 2004; Steffian et al. 2002). Known locations of Ocean Bay sites in the archipelago reflect a focus on places where hunter-gatherers could most easily access sea mammal haul-outs and rookeries and marine fish habitats along the coast from primary residential camps (Fitzhugh 2002). Whale bone found throughout the occupation sequence at the Rice Ridge site may indicate open-water whale hunting but may also reflect opportunistic processing of beached whales (Kopperl 2003:56). Excavated OBII components have yielded more complex deposits that occasionally include thick middens, post-hole features, and housepit depressions suggesting more substantial dwellings and settlement patterns that favored particular places on the landscape (Fitzhugh 2002; Hausler-Knecht 1993; Steffian et al. 2006). It is not until the subsequent Kachemak tradition, however, that the means of harvesting, processing, and storing surplus food resources were established (Steffian et al. 2006).

Even without organic preservation, several Ocean Bay sites provide a diverse picture of site types and settlement patterns during the Ocean Bay period. The Tanginak Spring site (KOD-481) has yielded some of the oldest radiocarbon dates in the archipelago situated within one of the most extensive and fine-grained Ocean Bay date sequences and is associated with a very large assemblage of OBI chipped stone artifacts from deposits almost a meter and a half thick (Fitzhugh 1996, 2003, 2004). Like Tanginak Spring, the Blisky (KOD-210) and Zaimka Mound (KOD-013) deposits on the shore of Chiniak Bay have survived to the present by fortuitous tectonic uplifting. Excavation at the Blisky Site uncovered an OBII component suggesting a small, seasonally restricted camp where people engaged in a limited range of hunting and processing activities (Steffian et al. 1998). Excavation of the deepest Ocean Bay strata at Zaimka Mound encountered thin layers of red ochre and a simple arrangement of post holes and a hearth, along with chipped stone tools, microblades, and a boat-shaped oil lamp also typical of the time period (Steffian et al. 2006). A small volume of deposits was excavated at the Array Site (KOD-562), located several kilometers upstream from Chiniak Bay near the outlet of Buskin Lake, and an assemblage dominated by large OBII slate bayonets was recovered, suggesting at least some use of inland riverine environments later in the Ocean Bay period for hunting or spear-fishing (Saltonstall and Steffian 2007; Steffian et al. 2006).

Research aimed at dating Ocean Bay components offers the potential to explore diachronic change in various aspects of early Alutiiq lifeways. Relative to other known Ocean Bay sites, the Rice Ridge site is exceptionally well-suited for such research, both because its components span the Ocean Bay I and II phases and because its excellent faunal preservation is extraordinarily rare for deposits of this age, including a very large assemblage of both modified and unmodified bone (Hausler-Knecht 1991, 1993).[3] During analysis and interpretation of mammal and fish remains from the site (Kopperl 2003), several critical questions were addressed regarding the chronology and basic site formation history of Rice Ridge. First, could faunal remains from the existing collections be aggregated into meaningful analytic units by stratigraphic differentiation? Second, was faunal deposition at the site a continuous or punctuated process, and is this reflected by the available analytic units? And third, under the assumption that this deep, well-stratified site is a product of periods of greater and lesser occupation intensity, what factors may account for such changes?

THE RICE RIDGE SITE

The Rice Ridge site represents a relatively large occupation based on the thickness and horizontal extent of its deposits, which span the Ocean Bay I and II phases and have yielded one of the largest well-preserved faunal assemblages dating to this early time (Hausler-Knecht 1993; Knecht 1995:32–33). These deposits, over two meters thick in some places, are situated atop a ridge of land that formerly extended into Chiniak Bay, in the lee of a small nearshore island, during the middle Holocene (Fig. 2). Today, however, the site is located over 300 meters inland from the present coastline and about four meters above sea level because of tectonic uplift (Hausler-Knecht 1991:1). During much of the period of time that Rice Ridge was occupied, relative sea level was much higher than at present (Crowell and Mann 1996). Chiniak Bay is a very biologically productive place in the Kodiak Archipelago and probably has been for much of the Holocene, based on the relative density and time depth of many archaeological sites on the bay. Today, nearby subsistence resource microhabitats available within a five-kilometer radius include small streams with runs of pink salmon, seal and sea lion haul-outs, rocky and sandy nearshore environments providing marine fish and sea mammals, and a variety of littoral environments with abundant shellfish beds and marine birds. At greater distances are a large sea lion rookery at Cape Chiniak east of Rice Ridge and larger rivers, such as the Olds River at the head of Kalsin Bay west of the site, which provide significant runs of pink, coho, and chum salmon (NOAA 1997). However, physiographic changes in the local environment caused by various geomorphological processes have undoubtedly changed the microhabitats and harvestable prey located in the proximity of Rice Ridge (e.g., Gilpin 1995).

Between 1988 and 1990, archaeological excavation units were dug, clustered in several blocks and concentrations across an area of at least three acres, as part of the dissertation research of a Harvard University anthropology graduate student (Hausler-Knecht 1990, 1991, 1993:10). In the first two field seasons, a four-by-six meter block of two-meter-square units was excavated, centered on the ridge and extending northward from an initial two-meter-square test unit. These units contained cultural deposits an average of 2.5 meters thick, separable into at least eleven distinct strata containing abundant artifacts, faunal remains, and charcoal. Artifacts and faunal remains were recovered by hand during excavation, both *in situ* by natural stratigraphic layers and from ¼"-mesh screened spoils from each stratum (Hausler-Knecht 1991). The third field season in 1990 resulted in excavation of a four-by-six-meter block in the southwest corner of the site, as well as several noncontiguous test units in the northwest corner, exploring later OBII and Early Kachemak deposits. Almost no site documentation is available from this excavation, although a schematic map was produced (Hausler-Knecht 1990). Fig. 2 was adapted from this map and verified by a site visit by the author in the summer of 2003, guided by landowners Dale and Marie Rice. Excavation Units 2, 3, 5, and 6 from the 1988–1989 block excavation were the focus of this analysis. They provided the largest faunal sample representing the greatest span of time within the site, based on earlier estimates from a limited radiocarbon chronology and artifact typology to be about 2,500 years, including both the OBI and OBII periods.

RICE RIDGE STRATIGRAPHY

The stratigraphy of the excavation units was inferred primarily from narrative descriptions of the deposits written on what were designated "level bags"[4] of faunal remains collected during excavation, as well as from personal communications in 2001, 2002, and 2012 with Donald Clark, one of the excavators of the site. General descriptions of the depositional stratigraphy of the 1988–1989 excavation block were gleaned from Hausler-Knecht (1991); Photographs of the fieldwork corroborate that the excavation block stratigraphy was undisturbed below the 1912 Katmai ash and generally sequential in vertical orientation (Fig. 3). Despite the near-absence of synthetic stratigraphic information for the excavation, precisely recorded provenience information was written on each bag of faunal remains, including depth below datum (cm bd) as well as color, texture, and content characteristics of the deposits from which the faunal remains came. Cases where stratigraphically recent deposits cut into relatively older ones were clearly noted on the bags. Eleven sequential stratigraphic units, designated A through K, were derived from this information and developed as stratigraphic profiles (Kopperl 2003:122–125). The term "floor" is used here to denote strata interpreted as occupation surfaces that often

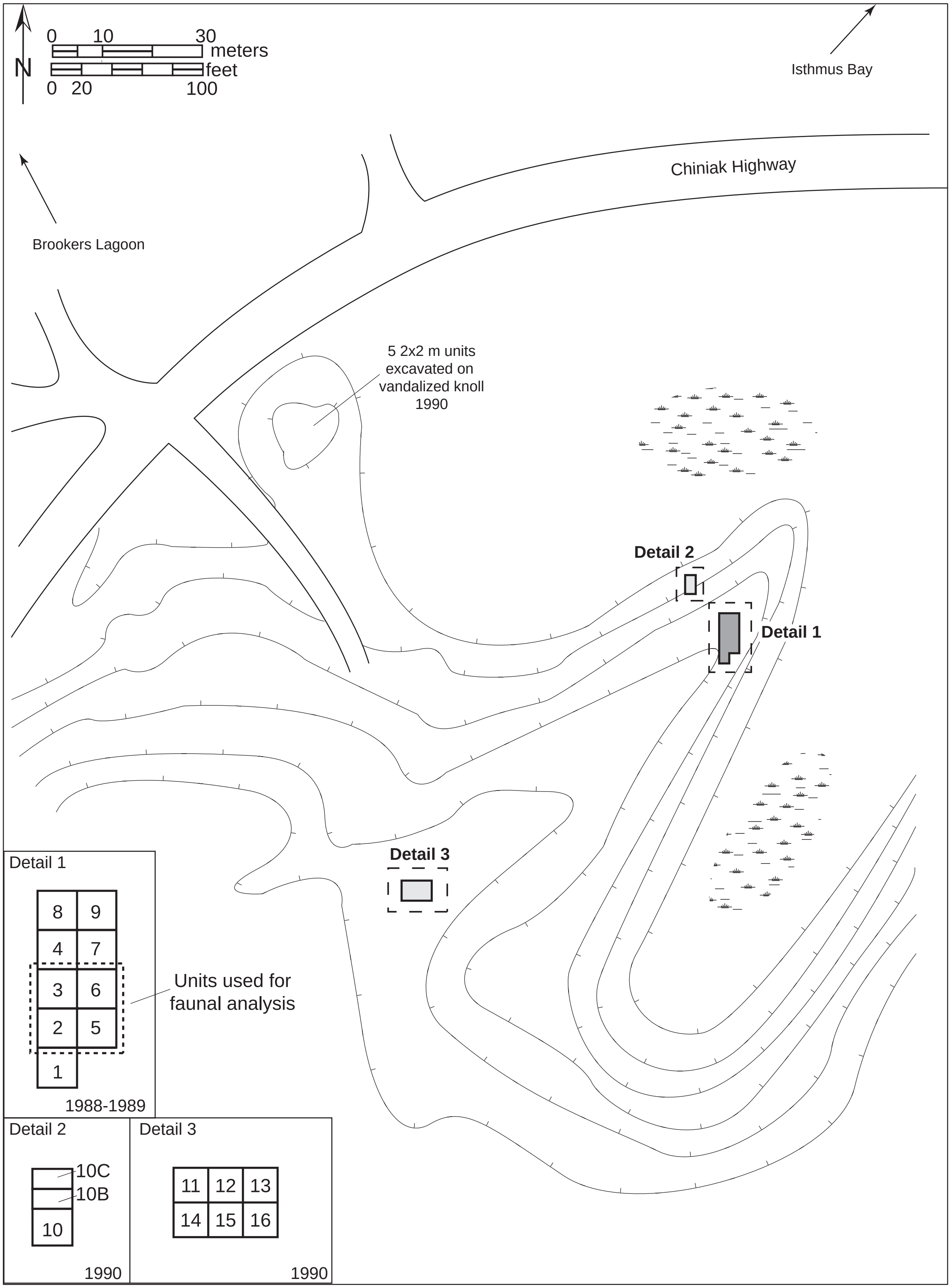

Figure 2. Sketch map of the Rice Ridge site. Insets show configurations of excavation units. Adapted from Hausler-Knecht (1990) and Kopperl (2003:121).

Figure 3. Don Clark excavating in the 1988–1989 block at Rice Ridge. Note 1912 Katmai ash layer visible as the distinct light-colored stratum at the top of the profile. Photo courtesy of Elizabeth Odell.

contained hearths and other features (Fig. 4), as opposed to midden strata, and does not connote an association with a particular kind of structure or house.

Table 2 summarizes the stratigraphy of faunal-bearing deposits from Excavation Units 2, 3, 5, and 6, describing the eleven strata that comprise these units. The June 6, 1912, Novarupta pyroclastic event on the Alaska Peninsula blanketed most of northern Kodiak Island with 30 to 60 cm of "Katmai" ash (Griggs 1922), which formed a protective cap over the archaeological deposits at Rice Ridge. Below the Katmai ash and above the archaeological deposits are 40 to 60 cm-thick bands of culturally sterile deposits, representing postabandonment sedimentation and soil development prior to the 1912 ashfall. The uppermost archaeological stratum is a layer of black, organic-rich sediment that includes loose rubble, occasional thin bands of shell, and faunal material. Designated Stratum A, it is found across all four excavation units under consideration and represents the terminal cultural midden deposit in this area of the Rice Ridge site. Stratum designation proceeds from A to K with increasing depth. Excavation in all four units was terminated at an orange tephra, thought at the time of excavation to be a weathered volcanic ash deposited shortly after glaciation and before human occupation. The stratigraphic sequence characterizing each unit is shown schematically in Fig. 5.

Radiocarbon dating of this sequence, discussed below, indicates that deposition occurred in three discrete episodes. To avoid confusion with either the lettered alphabetical stratigraphic sequence (A–K) or the culture-historical division between the earlier and later Ocean Bay phases using Roman numerals (OBI and OBII), the stratigraphic aggregates are referred to here as Early, Middle, and Late portions of the Rice Ridge sequence,

Figure 4. Molly and Kelly Odell observe Philomena Hausler-Knecht excavating a feature within the 1988–1989 block at Rice Ridge; Don Clark in background. Photo courtesy of Elizabeth Odell.

Table 2. *Stratigraphic summary of Rice Ridge deposits sampled for faunal analysis.*

Stratum	Units	Disposal Context	Description
Katmai Ash	2, 3, 5, 6	postdeposition	Ash fall from Novarupta eruption
overburden	2, 3, 5, 6	postdeposition	Natural deposition and soil development
A	2, 3, 5, 6	midden	Black, organic-rich sediment with loose rubble and shell bands
B	3, 5, 6	floor	Charcoal and red ochre-banded occupation surfaces with hearth and pit features
C	2, 3	midden	Mixed rocky/clay sediment with shell flecks
D	3, 5, 6	floor	Red ochre-stained occupation surface
E	2, 3, 5, 6	midden	Shell midden mixed with brown weathered ash
F	3, 5, 6	floor	Red ochre surface with “cooking pit” features
G	3, 5, 6	midden	Pebbly, brown weathered ash with small pockets of shell midden fill
H	2, 5, 6	midden	Dense shell midden and some grayish-brown ashy and rocky matrix
I	2, 5, 6	floor	Red ochre-stained occupation layer with charcoal and several gravel-filled pit features
J	2, 3, 5, 6	midden	Fairly compact tan weathered ash and fragmented bone, shell, and charcoal
K	5, 6	floor	Red ochre and black charcoal-rich occupation floor; basal cultural layer
sterile	2, 3, 5, 6		Culturally sterile orange tephra

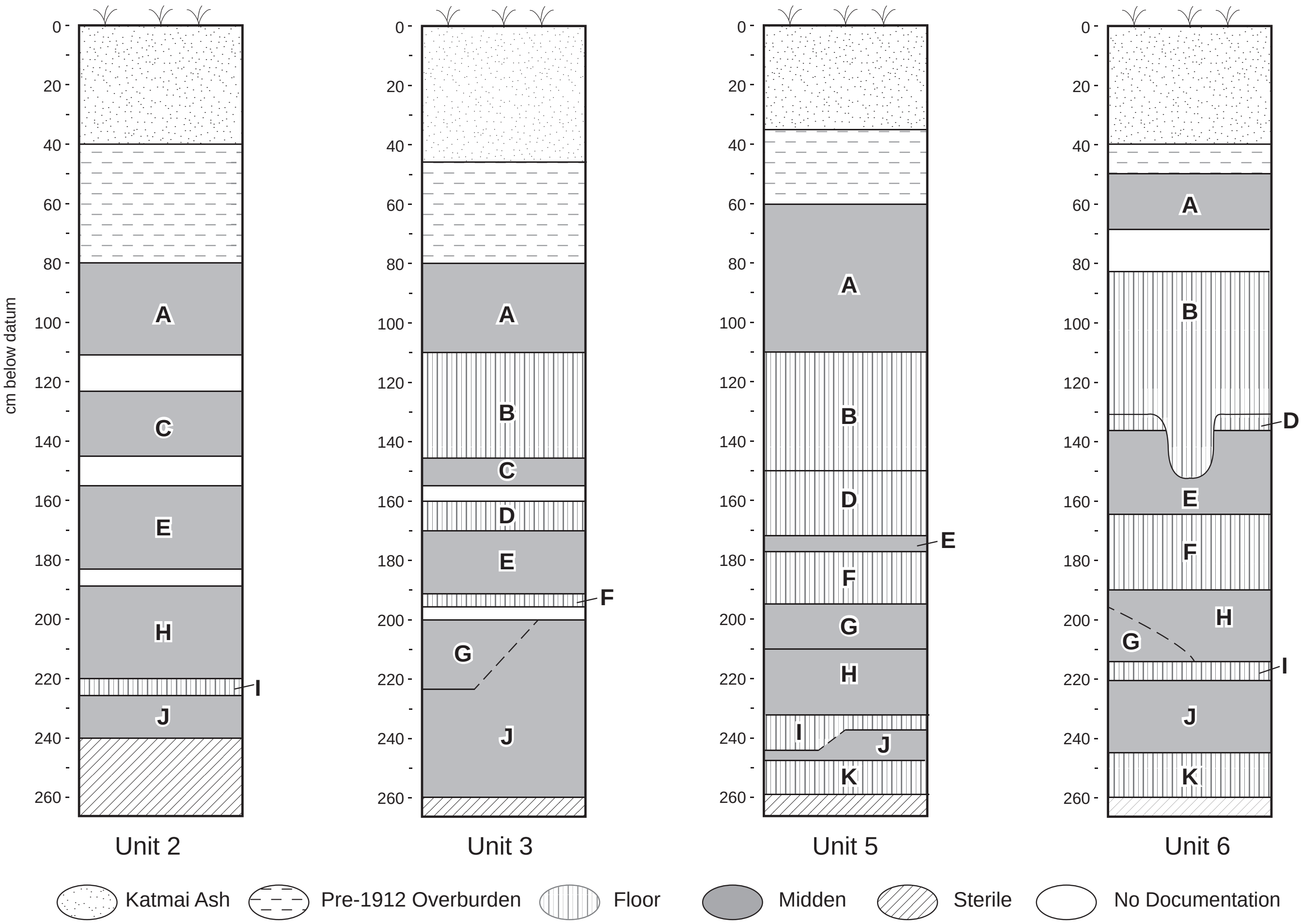

Figure 5. Schematic stratigraphic sequence of floor and midden deposits in excavation units 2, 3, 5, and 6. Adapted from Kopperl (2003:122–125).

corresponding with Strata G–K, Strata C–F, and Strata A and B, respectively.

RICE RIDGE RADIOCARBON CHRONOLOGY

Bulk sample bags from the Rice Ridge excavation curated at the Alutiiq Museum were examined for datable charcoal. From these bags, twenty-two charcoal samples were submitted to Beta Analytic in September 2002 for radiocarbon dating to establish absolute chronological control of the stratigraphic sequence identified in excavation units 2, 3, 5, and 6 and to clarify their depositional history. The plant taxa of the charcoal specimens were not identified prior to radiocarbon analysis, but small-diameter branch and twig wood was isolated for each sample bag to minimize interpretive problems resulting from the dating of old wood (e.g., Shaw 2008; Tennessen 2000; West 2011). Charcoal suitable for radiocarbon analysis was submitted from all strata except E.

The resulting dates are listed in Table 3, along with five dates previously acquired during the active field project (Hausler-Knecht 1991, 1993; Mills 1994). Focusing on small-diameter twig wood resulted in low quantities of carbon extracted from over half of the specimens, necessitating AMS dating or, in a few cases, extended counting. Probabilistic age measurements for all radiocarbon dates are shown in Fig. 6, created using OxCal 4.1 (Bronk Ramsey 2009) and calibrated using the IntCal09 curve (Reimer et al. 2009). 1σ probability intervals are indicated by the accompanying bars. Stratigraphic association for each date is indicated where such information is available, and the Early, Middle, and Late aggregated units are separated by lines. Although age estimates for the previously submitted samples are included, their stratigraphic position is fitted into the sequence based on their age estimates alone, owing to a paucity of fine-grained provenience information.

The measured radiocarbon age estimates of the samples do not proceed unidirectionally through time up the sequence of lithostratigraphic units. This is not surprising, given the reuse of this location within the site for both concentrated disposal (midden) and occupation (floor) at different times. Visual inspection and statistical evaluation of the September 2002 dates, however, indicate that most of the apparent reversals may be mere artifacts of measurement error and therefore that the sequence of strata is chronologically consistent (Brown 2012 and pers. comm.). Importantly, the strongest statistical evidence for stratigraphic integrity obtains when the database of ages is divided into subsets according to the Early–Middle–Late stratigraphic scheme defined above. Only Beta-171560, from Stratum A, is significantly older than the remaining three dates from Strata A and B.

The overall time frame of occupation for this portion of Rice Ridge thus begins possibly as early as 6000 cal BC and ends by about 2100 cal BC when considering the 2σ limits of the dates within the sequence, generally conforming to the established time-frame of the entire Ocean Bay tradition. However, accumulation of cultural deposits in this

Table 3. Rice Ridge (KOD-363) radiocarbon dates

Sample #	Date (RCYBP)	Calibrated Range, 1σ (BC)	Calibrated Range, 2σ (BC)	Site Context/Stratum (Dating Method)
Dates obtained from samples submitted during and shortly after excavation (Hausler-Knecht 1991; Mills 1994)				
Beta-43135	3850 ± 80	2458–2206	2563–2043	Ocean Bay II Layer, 1990 block
Beta-43134	3860 ± 90	2464–2206	2570–2040	Ocean Bay II Layer, 1988–1989 block
Beta-26230	4310 ± 60	3012–2886	3262–2703	Ocean Bay II Layer, 1988–1989 block
GX-14674	5030 ± 250	4225–3528	4438–3117	Hearth outside structure, Ocean Bay I Layer
GX-14673	6180 ± 305	5466–4793	5665–4403	Ocean Bay I Layer
New Dates				
Beta-171559	3900 ± 70	2475–2245	2571–2150	A—Charcoal lens in midden, 80 cm bd (standard)
Beta-171560	4310 ± 80	3090–2873	3327–2668	A—Sample from trench, 87 cm bd (ext. count)
Beta-171564	4100 ± 70	2860–2505	2877–2489	A—145 cm bd in pit (standard)
Beta-171561	3930 ± 80	2563–2296	2831–2146	B—Occupation layer hearth, 112 cm bd (ext. count)
Beta-171562	5070 ± 40	3946–3802	3963–3779	C—Base of midden/above ochre, 160 cm bd (AMS)
Beta-171563	5130 ± 40	3980–3811	4037–3800	D—Between ochre floor layers, 170 cm bd (AMS)
Beta-171565	4960 ± 110	3935–3645	3981–3521	F—Base of ochre floor, 189 cm bd (ext. count)
Beta-171566	6050 ± 40	5003–4854	5055–4837	G—Charcoal-stained ashy midden, 215 cm bd (AMS)
Beta-171567	5990 ± 60	4945–4797	5020–4725	G—Charcoal-stained ashy midden, 203 cm bd (AMS)
Beta-171568	6090 ± 150	5212–4843	5368–4619	H—Charcoal layer in midden, 205 cm bd (ext. count)
Beta-171569	5980 ± 40	4932–4802	4988–4750	H—Loose fill layer in midden, 204 cm bd (AMS)
Beta-171570	5970 ± 40	4907–4795	4953–4729	I—Midden fill on floor, 235 cm bd (AMS)
Beta-171571	6060 ± 50	5035–4855	5206–4803	I—Mottled ash and charcoal lens, 219 cm bd (AMS)
Beta-171572	6040 ± 40	4996–4853	5048–4810	I—Red ochre floor w/ pit features, 237 cm bd (AMS)
Beta-171573	5970 ± 50	4932–4793	4982–4726	J—Brown/tan ashy midden, 225 cm bd (AMS)
Beta-171574	6020 ± 100	5047–4790	5212–4709	J—Tan/clayey midden, 214 cm bd (standard)
Beta-171575	5990 ± 40	4936–4809	4991–4786	J—Tan/clayey midden, 234 cm bd (AMS)
Beta-171576	6580 ± 220	5715–5319	5974–5048	J—Shell band in tan midden, 216 cm bd (ext. count)
Beta-171577	6040 ± 50	5000–4849	5193–4796	J—Tan/clayey midden, 225 cm bd (AMS)
Beta-171578	6080 ± 90	5205–4848	5287–4778	K—250 cm bd (ext. count)
Beta-171579	6140 ± 60	5207–5004	5289–4859	K—Charcoal-stained floor, 252 cm bd (standard)
Beta-171580	5900 ± 60	4841–4709	4936–4615	K—Organic stain in tephra layer, 256 cm bd (AMS)

Calibrated using Calib 6.1.0 and IntCal09 (Reimer et al. 2009; Stuiver and Reimer 1993).

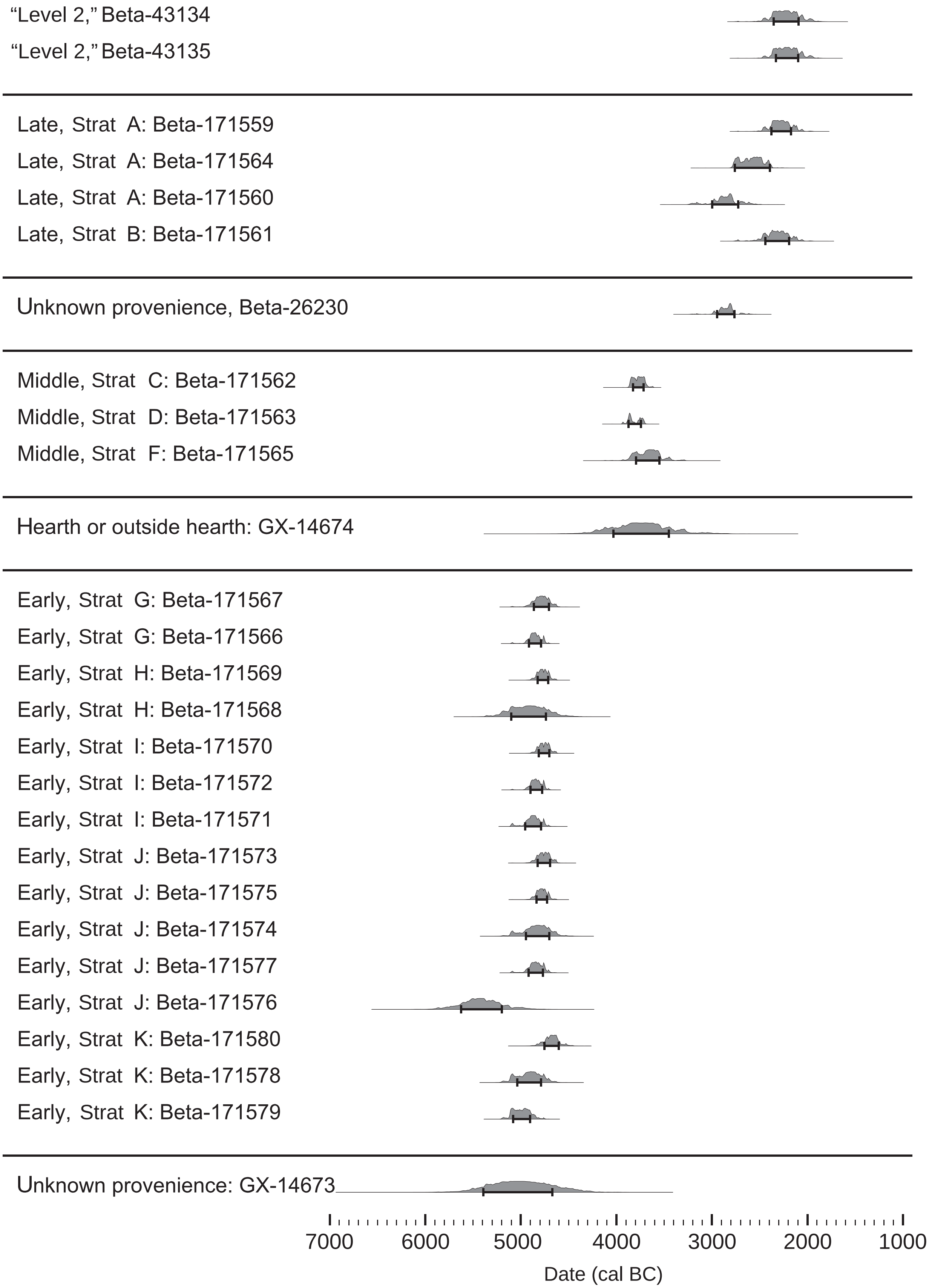

Figure 6. Calibrated age-estimate curves of radiocarbon dates acquired from the Rice Ridge site. Curves adapted from data generated by OxCal 4.1 (Bronk Ramsey 2009).

location appears punctuated, with superimposed midden and floor strata sequentially deposited during three discrete episodes, the first two spanning intervals of no more than a few hundred years each, the latest lasting perhaps somewhat longer. These three episodes are separated by gaps of several hundred years. While calibrated intercepts as point-specific age estimates can be misleading when considered singly (Telford et al. 2004), in the aggregate the pattern still affords a relatively straightforward means of exploring accumulation rates (Stein et al. 2003).

Fig. 7 illustrates weighted means of calibrated dates using OxCal 4.1 (Bronk Ramsey 2009) and the IntCal09 curve (Reimer et al. 2009). Within the Early strata, G through K, 53 cm of deposits accumulated in approximately 314 years between 5091 and 4777 cal BC if the anomalously old date from Stratum J (Beta-171576) is omitted, implying an accumulation rate of about 0.17 cm/year. Weighted means of calibrated age estimates within the Middle strata, C through F, range between 3908 and 3770 cal BC, at depths between 189 and 160 cm below datum, which implies an average accumulation rate of about 0.21 cm/year. The third group of weighted means, between 2960 and 2374 cal BC within deposits approximately 65 cm thick, suggests an accumulation rate of about 0.11 cm/year. In sum, the rate of deposition at Rice Ridge accelerated as represented by the Middle strata relative to the Early strata, and then substantially decreased for the Late strata.

IMPLICATIONS OF THE RICE RIDGE DATA

The initial research questions identified earlier regarding the depositional history and occupation span of the Rice Ridge site are successfully addressed with the chronometric and depth data described in the preceding section. These data suggest that the Rice Ridge deposits represent human occupation between about 7,600 and 4,200 years ago, corresponding with most of the age range conventionally defined for the Ocean Bay tradition. The eleven stratigraphically discrete units defined by this analysis provide a diachronic sequence spanning the major technological shift between Ocean Bay I and II, though in a punctuated

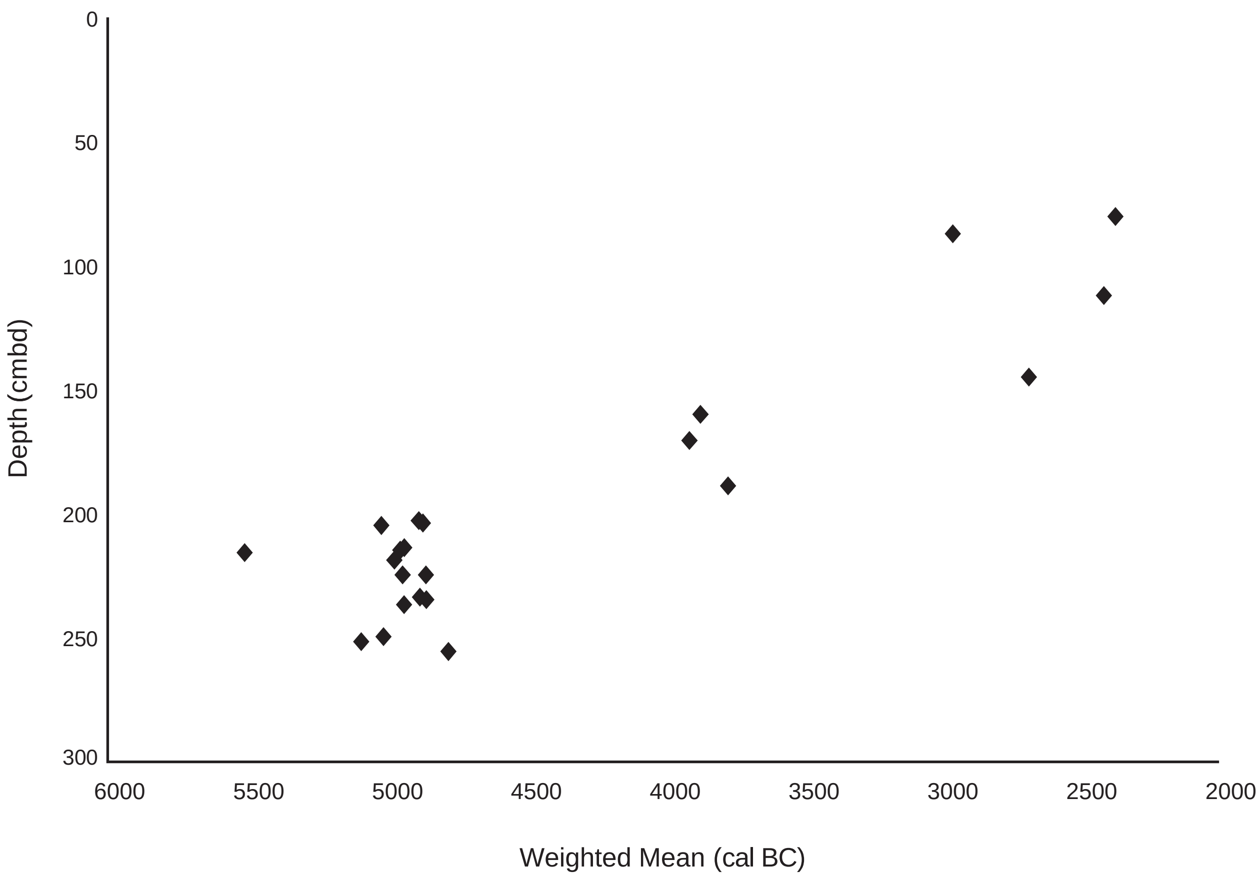

Figure 7. Scatterplot of weighted means of calibrated 2002 radiocarbon dates from Rice Ridge excavation units 2, 3, 5, and 6. Adapted from Kopperl (2003:126); reanalyzed with OxCal 4.1 (Bronk Ramsey 2009).

rather than continuous manner, divided between three discrete periods—Early (ca. 5700–4700 cal BC), Middle (ca. 3950–3650 cal BC), and Late (ca. 3100–2250 cal BC)—with consecutive episodes separated by hiatuses of several hundred years. The radiocarbon dates from the Early and Middle Rice Ridge deposits correspond with the Ocean Bay I period, and they accumulated at a faster pace than the Late deposits that correspond with the Ocean Bay II period. Concomitant changes in artifact assemblage composition are expected that reflect technological differences between these two Ocean Bay periods—for example, the dramatic shift away from chipped stone tools, notably microblades, towards ground stone tools (cf. Steffian et al. 2002; Steffian and Saltonstall 2005).

The depositional hiatuses observed for this location within the site may be explained by several alternative scenarios. Because charcoal samples were collected from level bags at the Alutiiq Museum that correspond most closely with the analyzed faunal samples, the possibility exists that cultural deposits from interstices without faunal remains fill these chronological gaps but were biased against in date sample selection. However, samples were sought from as many strata as possible with the goal of obtaining as complete a span of dates as possible. Coverage of dates by stratum and depth was almost complete, omitting only Stratum E. Sampling bias is therefore not a likely explanation for the pattern seen in the Rice Ridge radiocarbon data.

Alternatively, the hiatuses in occupation may be real but limited to just the part of the site examined for the faunal analysis (Kopperl 2003). In this scenario, occupants of the site deposited cultural debris, and perhaps also resided, away from the location of the 1988–1989 excavation block during the observed depositional hiatuses. A potential housepit and later Ocean Bay and Early Kachemak deposits found elsewhere at the site leave open the possibility that shifts in site function and/or in the spatial organization of activities account for both the gaps and the changes in accumulation rates of deposits. Further examination of data from the other portions of the Rice Ridge site is necessary, however, to evaluate this hypothesis.

A third possible explanation is that the gaps represent periods of erosion, during which several hundred years of cultural deposits were removed from the sequence, each followed by a return to a depositional regime. Erosion by water is a common process that frequently acts against archaeological preservation in this way, especially in coastal settings in this region where the dynamic interactions between tectonic, isostatic, and eustatic processes have created a complex sea level history (Crowell and Mann 1996; Mann and Hamilton 1995). Subsidence and uplift could have led to the gaps seen in the Rice Ridge radiocarbon sequence. However, while microstratigraphic evidence for these two geomorphic processes at locations elsewhere in the region includes the presence of tsunami deposits (e.g., Saltonstall and Carver 2002) and buried peat (e.g., Combellick 1991; Hamilton and Shennan 2005), no such lenses of sterile sand or peat were identified during the 1988–1989 excavation at Rice Ridge. This lack of evidence must, however, be treated with caution because, as noted, the available documentation is insufficient to characterize the nature of the contacts between particular strata. It is therefore not possible to say whether consecutive strata are conformable (e.g., Waters 1992:68–74).

A final explanation is that the entire site may have been abandoned during the two apparent hiatuses. As noted above, archaeologists and geologists have asserted that changes in relative sea level caused by frequent tectonic activity have had profound effects on the physical integrity of archaeological deposits across this region. While these events would have entailed major alterations to the local coastal landscape, the Native residents of Kodiak were well-adapted to such events from the earliest times (Fitzhugh 2003:41; Gilpin 1995:180–182; Mann 1998; Saltonstall and Carver 2002). Because coastal settlements on the Kodiak Archipelago were particularly susceptible to the effects of large subduction earthquakes, both in terms of changes in the position of shorelines and subsidence-generated erosion, their abandonment following such events was probably commonplace. Alternatively, other kinds of environmental perturbations could have played a role in site abandonment, though we know little about those to which Ocean Bay populations may have been either particularly well-adapted or vulnerable, nor about what perturbations actually transpired. As noted above, sterile sand, peat, and tephra deposits indicative of catastrophic events such as great earthquakes or volcanic eruptions are either lacking or unobserved in the excavation block stratigraphy. Furthermore, faunal remains from the block excavation exhibit long-term trends towards increased harvest of marine fish relative to sea mammals, as well as a rather uniform abundance of salmonid remains over time, with no indication of wholesale changes in mammal or fish use or extirpation within the Rice Ridge sequence (Kopperl 2003). Thus, changes in encounter rates with certain key subsistence resources were apparently ongoing and cannot be specifically tied to the gaps in the depositional sequence at Rice Ridge.

A related question that would provide further insight into Ocean Bay settlement patterns at a regional scale during these two gaps is whether other dated Ocean Bay components fall within the time periods in question. A conservative comparison using calibrated 1σ age estimates of Ocean Bay components listed in Table 1 indicates that almost all of the other sites have at least one component that falls within one or both of the Rice Ridge gaps. Table 4 summarizes the Rice Ridge radiocarbon data relative to the established culture-historical sequence for Kodiak and to age estimates of other radiocarbon-dated Ocean Bay sites (rounded to nearest century),[5] as well as the Ocean Bay components of the Lower Midden at the Mink Island site (XMK-030), across Shelikof Strait (Casperson 2012:21).

The Zaimka Mound (KOD-013) radiocarbon chronology corresponds most closely to the Rice Ridge sequence; its earliest OBI deposits are contemporaneous with the Early Rice Ridge components but also extend later in time through the first depositional gap at Rice Ridge. Three of its later house floor deposits date to the gap between the Middle and Late Rice Ridge components, as does the earliest date from the Qus'ituq site from the interior southwest of Kodiak Island (Saltonstall and Steffian 2007). The OBI Chert Site (AFG-008), located northwest of Chiniak Bay on Afognak Island, yielded a date from the basal stratum that overlaps the earlier gap in the Rice Ridge sequence, while the OBII Slate Site (AFG-011) yielded two dates from its early deposits that correspond with the later gap at Rice Ridge (Clark 1979). On Sitkalidak Island south of Rice Ridge, one date from the base of the Sitkalidak Roadcut (KOD-119) deposit and several dates from the upper deposits of Tanginak Spring (KOD-481) correspond with the earlier Rice Ridge gap (Clark 1979; Fitzhugh 2004:16). Only the Uganik Passage site (KOD-224) on the northwest side of Kodiak Island yielded 1σ age estimates within the ranges found at Rice Ridge (Nowak 1978), but as shown in Table 4, they bracket undated deposits that may coincide with the earlier gap in the Rice Ridge sequence. In contrast to these sites on the Kodiak Archipelago, midden deposits at the Mink Island site span the entire range of OBI and OBII in a continuous sequence (Casperson 2012; Schaaf 2009).

In summary, the radiocarbon dates of other Ocean Bay components from the Kodiak Archipelago suggest that the two gaps in the Rice Ridge sequence, 700–800 years between the Early and Middle periods and 500–600 years between the Middle and Late periods, were localized phenomena. The two Ocean Bay sites with comparably high chronological resolution, Tanginak Spring and Zaimka Mound, show continuity of occupation through both Rice Ridge gaps. The most direct and ideal way to evaluate shifts in the nature and intensity of occupation at Rice Ridge would be to analyze stratigraphic and chronometric archaeological data collected elsewhere within the site, coupled with local geomorphological and paleoecological data. Such analysis would further clarify the nature of the gaps as well as changes in accumulation rates documented within this particular sequence of deposits.

CONCLUSION

The stratigraphic information and radiocarbon dates from Rice Ridge document a more complex depositional history than previously surmised for Kodiak's Ocean Bay tradition. Definition of stratigraphic units, tied to a firm radiocarbon sequence, is a necessary first step towards meaningful interpretations of the various constituents of the Rice Ridge archaeological deposits. This framework provides context for past, present, and future analyses of the Rice Ridge archaeofauna (Kopperl 2003; Mike Etnier and Molly Casperson 2012, pers. comm.). Furthermore, the data described here contribute not only chronological and site formation contexts to site-specific investigations, but also highlight the value of detailed pictures of individual sites for our understanding of broader Ocean Bay settlement patterns throughout the Kodiak Archipelago.

ACKNOWLEDGEMENTS

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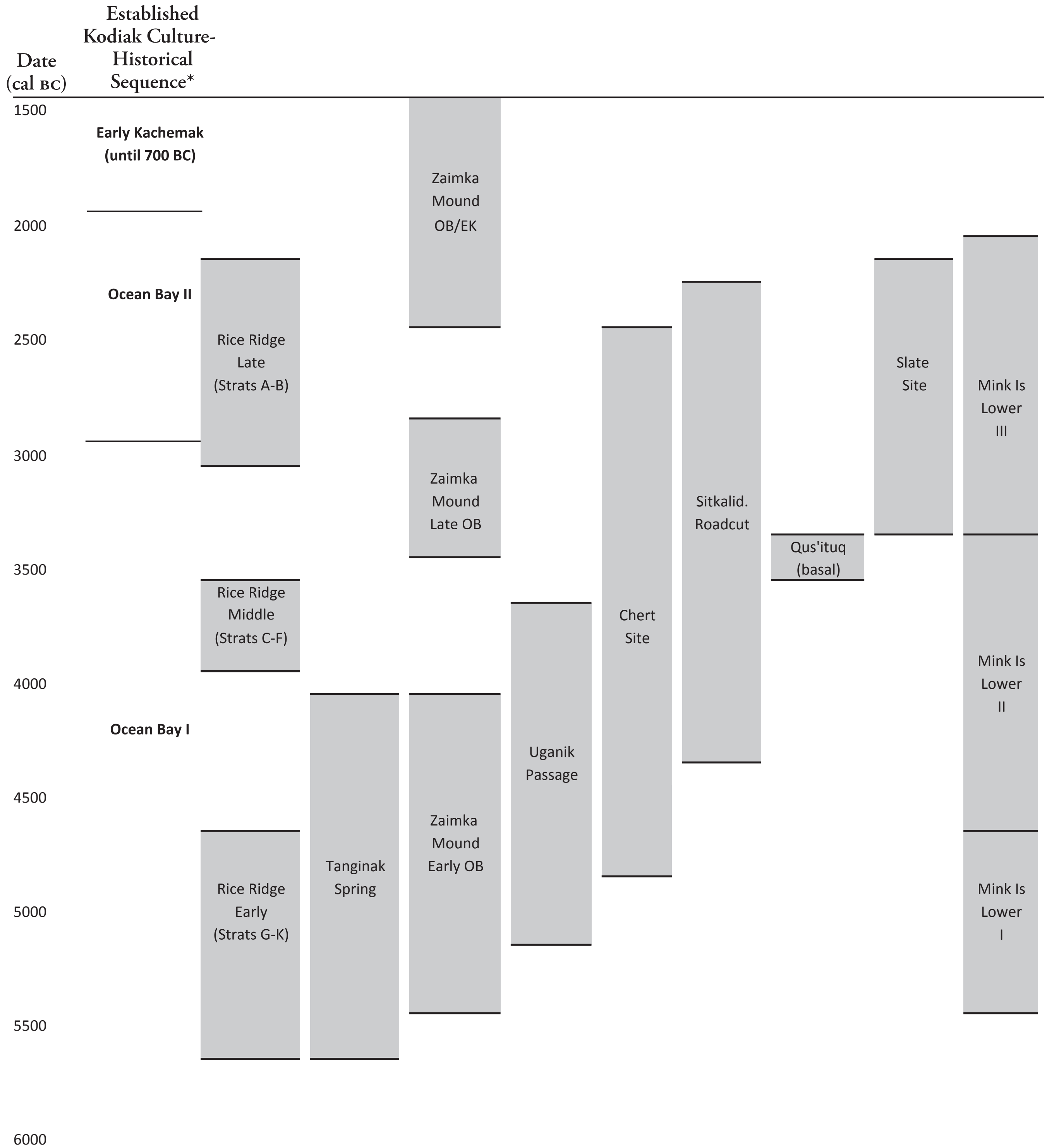
Table 4. *Ocean Bay radiocarbon data relative to the established culture-historical sequence for Kodiak. Ranges bracket the 1σ age estimates, which are rounded to the nearest century (except Mink Island age limits, based on Casperson 2012:21).*



* Kodiak sequence presented as ranges based on calibrated dates (e.g., Saltonstall and Steffian 2006:11, 2007:21)

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NOTES

1. I maintain that Alutiiq lifeways extend back through the entire culture-historical sequence that continues to be developed for the Kodiak archaeological record. Although peripheral to the research described here, there has been a long-standing debate regarding the influx of, and transitions between, certain technological traditions manifested in the archaeological record and whether this represents migration and replacement of the human residents of the Kodiak Archipelago. The debate is centered primarily on the transition between the Kachemak and Koniag traditions (e.g., Clark 1992; Dumond 1988; Knecht 1995) as well as Alutiiq exchange and interaction with bearers of Arctic Small Tool tradition technology on the Alaska mainland. Such technology is occasionally associated with Early Kachemak components in the Kodiak Archipelago (Steffian and Saltonstall 2005). I take the continuity in the archaeological record between the major cultural traditions of Ocean Bay, Kachemak, and Koniag to be "evolutionary, not revolutionary" (Fitzhugh 2003:53) and, following Crowell et al. (2001), I view the roots of Alutiiq identity in the earliest archaeological traditions on the Kodiak Archipelago.
2. Discussion of age estimates based on calibrated radiocarbon data has become much more common amongst archaeologists working in this region over the past several decades (e.g., Clark 1984; Mills 1994; West 2011). Uncalibrated radiocarbon dates were the means of establishing the general culture historical framework during earlier years. The general discussion of Ocean Bay chronology at the beginning of this article gives both uncalibrated age ranges established at those times and rounded approximations of their calibrated intercepts using the IntCal09 curve (Reimer et al. 2009). After the introductory discussion, all ages are based on calibrated radiocarbon dates.
3. Although Rice Ridge has yielded, to date, the only substantial Ocean Bay faunal assemblage from the Kodiak Archipelago, there are other assemblages of similar time depth from nearby areas, including the Mink Island site (XMK-030) in Katmai National Park and Preserve, across Shelikof Strait from Kodiak (e.g., Casperson 2012; McKinney 2013; Schaaf 2009).
4. The term "level" is used here to refer to natural stratigraphic units. This terminology was adopted based on the "level bags" into which all faunal remains were aggregated when originally collected. Descriptions written on the level bags allowed reconstruction of the depositional sequence in this part of the Rice Ridge site. There is no indication that arbitrary excavation levels were used during fieldwork.
5. A related issue is the arbitrariness of the chronological line we draw between OBI, OBII, and Early Kachemak. This is readily apparent as we attempt to reconcile the recognized changes in the archaeological record through time—important shifts in technological, economic, and social strategies that are fundamental to our definitions of the Ocean Bay and Early Kachemak traditions—with calibrated age estimates of the sites from which we make such inferences. Understandably, broad gaps characterized the chronological sequence several decades ago when it was based on a few dated Ocean Bay components and even fewer dated Early Kachemak components (e.g., Clark 1984). Excavations across the archipelago have exponentially increased, most notably under the research program of the Alutiiq Museum. Consequently, chronologies based on both radiometric age estimates and the characteristics of artifact assemblages and features merge, and the dates used to divide the culture-historical sequence constantly shift on a centenary scale as new data are obtained (e.g., Saltonstall and Steffian 2007:21).

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INTRODUCTION TO "TRIBAL DIVISIONS OF THE ESKIMO OF WESTERN ALASKA" BY FRANK H. WASKEY (1950)

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Several decades ago, while conducting research for a study concerning Eskimo social groups in the Yukon-Kuskokwim region of southwest Alaska (Pratt 1984), I came across a reference by Wendell Oswalt (1967) to an unpublished manuscript by Frank H. Waskey (Fig. 1). Unable to locate a copy of the manuscript through normal research channels, I contacted Oswalt (then professor of anthropology at the University of California at Los Angeles) and requested his assistance. He suggested where the manuscript could likely be found and then generously explained how it came to be written and provided background information about its author.

According to Oswalt (1983), who first learned of the manuscript while enrolled as a student at the University of Alaska Fairbanks (UAF) in the early 1950s, Waskey was a friend of Ivar Skarland—head of the UAF Department of Anthropology from 1946 until his death in January 1965. Aware of Waskey's extensive knowledge of and experience with the Eskimo peoples of southwestern Alaska, Skarland encouraged him to write about the region's Eskimo groups and their respective geographic boundaries. Waskey complied with the request and sent the manuscript to Skarland upon completion. Since it was maintained in the Department of Anthropology's files for many years, Oswalt assumed it was probably still there—but also believed he had a copy of the manuscript in his personal library. The manuscript was not found at either the UAF Department of Anthropology or the Alaska and Polar Regions Collections and Archives (APR) at UAF, which had a file on Waskey. Fortunately, however, Oswalt located his own copy of the manuscript and reproduced it for me; in turn, I provided a copy to the APR.

After reading it myself, I was convinced that Waskey's 1950 manuscript represented a significant contribution to the issue of historical Eskimo group boundaries in southwest Alaska; it also contains some unique details about the region's indigenous peoples. Its relative inaccessibility and potential value to future researchers is the basis for presenting the manuscript in its near-original form. Changes include the addition of maps to show the locations of selected places and groups mentioned. Bracketed information has also been inserted to (1) better identify places, groups, and landscape features mentioned; (2) clarify published sources alluded to by Waskey in the manuscript; and (3) provide spellings of certain Native words and names that correspond with accepted modern orthographies (e.g., Jacobson 2012). Corrected spellings of such words and names appear in brackets following their first mention in the text. Endnotes are intended to place the work in context and clarify, explain, or elaborate on some of the key information it contains. Waskey's original capitalization is generally retained, except where indicated.

BIOGRAPHICAL SKETCH OF FRANK H. WASKEY

Frank Hinman Waskey was born on 20 April 1875 in Lake City, Minnesota. Following a six-year stint (1892–1898) as a salesman in the Minneapolis area, Waskey journeyed to Alaska in 1898 and prospected in the vicinity of Hope, on

Figure 1. Frank H. Waskey, ca. 1907 (Alaska State Library, Portrait File, ASL-Waskey-2).

Turnagain Arm of Cook Inlet, until 1900. For the next thirty years he prospected and mined in numerous parts of Alaska including Nome, Iditarod, Marshall (Fortuna Ledge), Quinhagak, and the Kuskokwim River region. He was a successful, early participant in the Nome gold rush of 1899–1900 and became a prominent businessman in that community. Waskey's reputation as a man of "industry and native intelligence" (McCollom 1973:55) contributed to his selection as Alaska's first delegate to the U.S. Congress. He served as Alaska's delegate in Washington, D.C., from December 1906 through March 1907, after which he returned to Alaska and resumed his mining and prospecting activities.

In 1930, Waskey became the proprietor of a trading post in the Bristol Bay community of Dillingham, a business he continued to operate until 1956 (Atwood and DeArmond 1977:103–104). During that period he traveled extensively in southwest Alaska and became a student of Alaska Native life, languages, and traditions. He was a fairly competent speaker of the Central Yup'ik Eskimo language, according to fluent speaker Wassilie Evan (Fienup-Riordan 1996:297; Oswalt 1983). Waskey

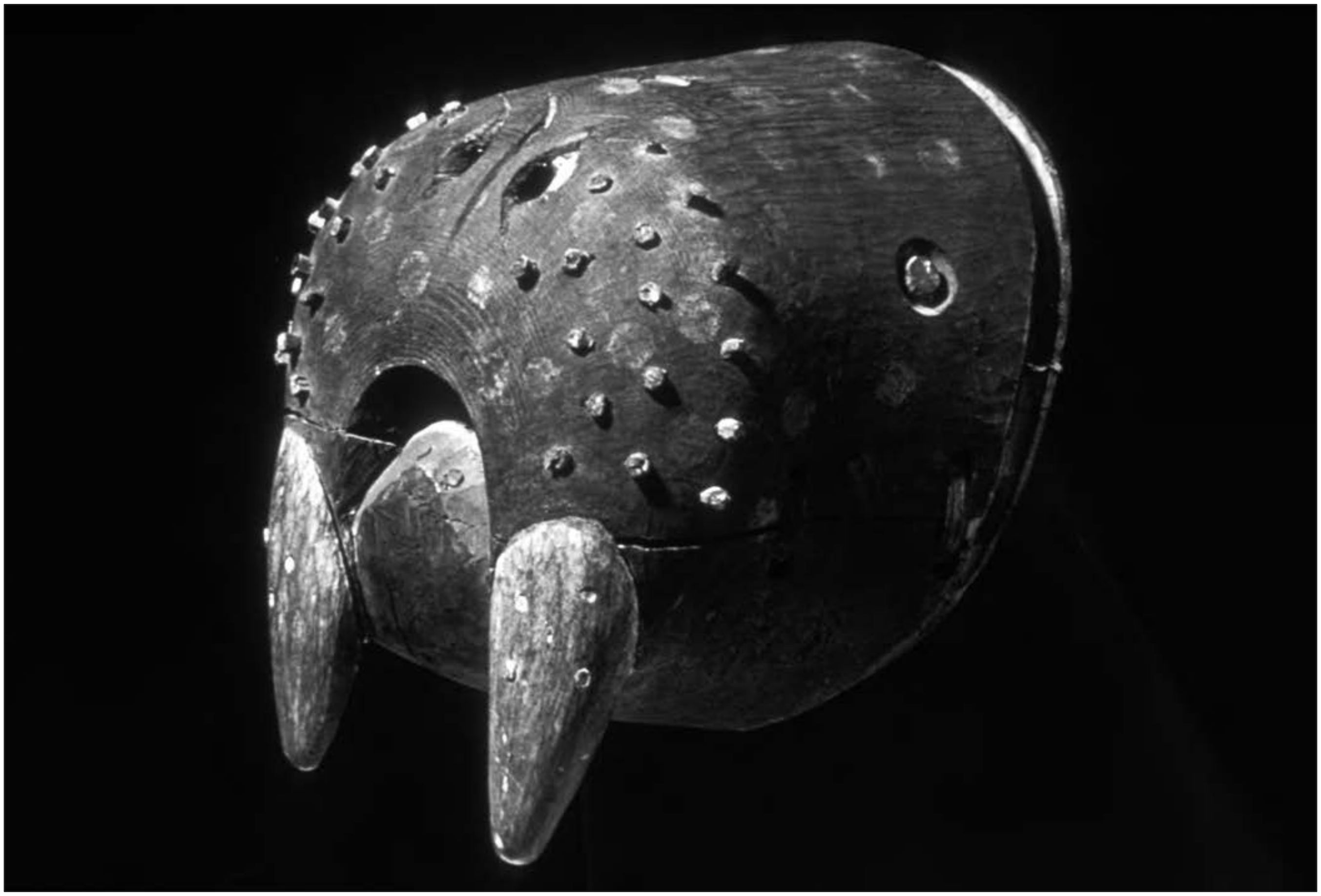

Figure 2. Walrus mask collected by Waskey at the Yup'ik Eskimo village of Qissunaq in 1946. 19 cm high x 11.4 cm wide x 5.2 cm deep. Wood, root, natural paints (University of Alaska Museum of the North, Catalog No. UAM-0314-4351; photograph by Barry McWayne).

gathered a broad range of information from Native villagers of the region. In 1946 he collected ten dance masks (Fig. 2) and five "humorous masks"—one of which was a caricature of himself (Fig. 3)—at the village of *Qissunaq* (Kashunuk); he later sold them to the University of Alaska Museum (Fienup-Riordan 1996:297–303). That Waskey was well-known to Native residents of the region is evidenced by the fact that he is discussed in Yup'ik oral history accounts recorded up to thirty years after his death. Examples include comments about Waskey's artifact purchasing activities (Fienup-Riordan 1996:297–298; Post 1984), his interest in mining and minerals (Smith 1988), and his work as a trader (Sundown 1984; cf. Andrews 1989:84–85). People of the region also identified him by at least two different Yup'ik names: Neqyacagaq ("little fishy one") and Uaskiq (Fienup-Riordan 1996:297–298), the latter of which is a Yup'ik rendering of "Waskey."

Local prospectors and airplane pilots were another source of information about the region who Waskey regularly consulted. He was also an important source of local geographical names for surveyors of the U.S. Coast and Geodetic Survey (USC&GS) and the U.S. Geological Survey (USGS): this may account for a major mountain in the Bristol Bay region being named in his honor (see Orth 1967:1030).

In addition to his manuscript on Eskimo group boundaries, Waskey's wide-ranging interests resulted in an article written for the scientific community regarding Alaska's geology and its economic potential (Waskey 1946). The "Frank H. Waskey Papers" are housed at APR in Fairbanks (Waskey 1919–1954); however, nearly all of the materials contained therein are photocopies. The items with the most potential research value are two handwritten "travel" diaries (91 and 115 pages in length, respectively) which, for example, describe aspects of the trading Waskey conducted with Native villagers. Unfortunately, the poor copy quality of the diaries makes much of Waskey's writing difficult to decipher. It is

Figure 3. Caricature mask of Frank Waskey. Collected by Waskey at the Yup'ik Eskimo village of Qissunaq in 1946. 19 cm high x 12 cm wide x 6 cm deep. Wood, natural paints (University of Alaska Museum, Catalog No. UAM-0314-4356; photograph by Barry McWayne).

unknown if his original diaries still exist and, if so, where they are located. The small APR collection also includes several versions of a manuscript on Eskimo place names, a number of Eskimo tales, an account of fossil sequoia finds in southwestern Alaska, descriptions of various rocks and minerals, and assorted correspondence.

After retiring from his Dillingham business in 1956, Waskey moved to Oakville, Washington, where he continued to trade in Alaska Native artifacts. He died on 26 January 1964 at the age of eighty-eight and was buried in Shelton, Washington.

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TRIBAL DIVISIONS OF THE ESKIMO OF WESTERN ALASKA

Frank H. Waskey (1950)

Edited and Annotated by Kenneth L. Pratt

The Eskimo are not a tribal people in the sense that they have or had political organizations distinguishing their many entities.[1]

However, as Anderson and Eells in *Alaska Natives* have well said, tribal distinctions based upon linguistic differences were sufficiently marked to denote distinct tribes [Anderson and Eells 1935:29, 193].

To this may be added: these differences extended to the building of their dwellings, open boats, kayaks, sleds, fishing and hunting tools to meet [the] regional environment. Parkas, inner clothing, footwear, and personal adornment differed noticeably among the many divisions of the Yut, Yuit [Yup'ik] and Innuit [Inupiat].

Among the Yut from St. Michael to the Kuskokwim, vocabularies differed less than speech intonations and voice inflections. The trenchant articulateness of the Akulamut [Akulmiut] was in marked contrast to the questioning sing-song habit of the coast dwellers from the Askinuk Mountains to Cape Avinof.

In certain villages on the lower Yukon, old and young alike seemed unable to form the Y sound before a broad vowel. Their neighbors who did not have this trait referred to these folk as "Pizzilaraet" [*pisalriit*][2]—"Those who do the Z's."

Physical characteristics frequently changed decidedly as one entered a new area. Some of these differences are so marked that, once being familiar with, say, the Kashunuks [people of *Qissunaq*] or the people of Tununak, even in these days of air transportation of cannery employees far from their homes, one recognizes the section from which they come, even if unable to distinguish them as individuals.

Speaking generally, the dwellers along the coast from Hooper Bay to Kuskokwim Bay are of less stature and rounder of feature than their neighbors farther inland.

Many observers have noted the fairness of skin of a considerable percentage of the dwellers north of the Askinuk Mountains and in the southerly part of the Yukon Delta. This lighter color extends to the pigmentation of the iris. The same trend towards fairness is not uncommon among the Togiak people.

In both of the localities cited there is little likelihood that the fairness is due to White blood. It is one of the phases of the Eskimo race and has been noted among the Innuit.[3]

Mixed bloods of Nordic, Celtic, or "Old American" are often no fairer than these light Eskimo. But there is something about the offspring of mixed marriages that usually at once differentiates them from the folk who have inherited their fairness from Eskimo forebears. Persons of the White race sometimes show more or less pique upon learning of the Eskimo's modest appraisal of themselves as "Yukpiat" [*Yupiaq*]—"The real men." So in those sections where there are many of these fair full bloods, the Yut have their own name for them, Yukapeeg—*agana—goelet*; roughly, those bright-eyed real ones. Mixed bloods are "avuk" [*avek*] (half).

In Chapter IV of *Alaska Natives* [Anderson and Eells 1935:28–31] is an outline of the several divisions of the Alaska Eskimo. The authors of this admirable treatise have shown great care in the investigations made and conclusions reached concerning the sociological, educational, and economic conditions and problems of the Alaska Eskimo.

Obviously, in matters pertaining to the several "tribes" and their loci, they question only slightly the findings of prior observers. The pattern they followed was set by Dall [1877], elaborated by Petroff [1884], and then in turn slightly amended by Nelson [1899].

It is the purpose of this writing to call to attention some of the apparent errors which have been generally accepted concerning the Yut of Western Alaska. The writer speaks only as a lay observer, and asserts the ability to speak credibly only with reference to the Eskimo from Prince William Sound to Unalakleet (Figs. 1, 2, and 3). Definitely so as to the sections from Bristol Bay to the Yukon-Kuskokwim portage.[4]

One must, however, do as others have done and include some word concerning the Ugalakamut, those daring and adventuresome Eskimo who penetrated far into Indian territory along the storm swept and glacier rimmed coast east of Controller Bay.[5]

That this folk occupied and held for a time the shoreline of Controller Bay (including Kayak Island) and the forbidden terrain eastward to Icy Bay seems well established [Birket-Smith and De Laguna 1938:343–345]. That they visited and traded still farther along the Pacific shore is evidenced by la Pérouse, who in 1786 found the remains of an Eskimo umiak [*umiaq*] in Lituya Bay.[6] And the Indians there reported that seven other of these skin-covered boats had visited them.

It is probable that the Ugalakamut waged a continued struggle with the Eyak and other Indians for the rich fishing and hunting grounds of the Copper River Delta. No Ugalakamut, as such, exist today. Some were no doubt assimilated by their Indian neighbors to the east and west. And it is likely that some found sanctuary among their Eskimo kinsmen, the Chugachamut [Chugachmiut] of Prince William Sound (see Fig. 4 and Table 1).

Today the remnant Chugachamut refer to themselves as Aleut.[7] And their White neighbors usually so think of them. But Petroff was and is right in naming them and the similar tongued folk of Kodiak Island, Eskimo. So were the dwellers on the east side of Kenai Peninsula and part way along the westerly shore of that peninsula.

Anderson and Eells [1935:29] give Ugashik as the southerly boundary of the Eskimo on the west side of the Alaska Peninsula. It is known that they occupied the

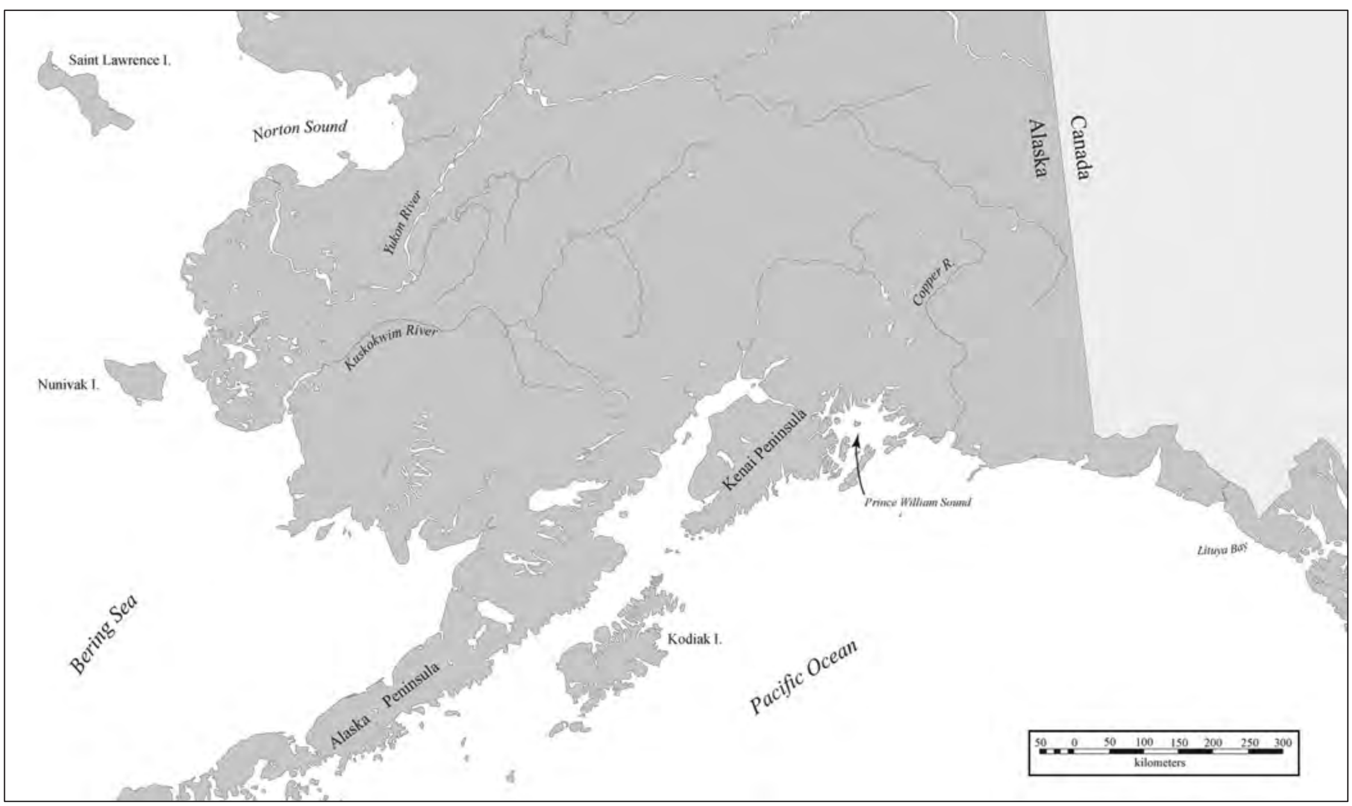

Figure 1: Study area showing selected places mentioned in text.

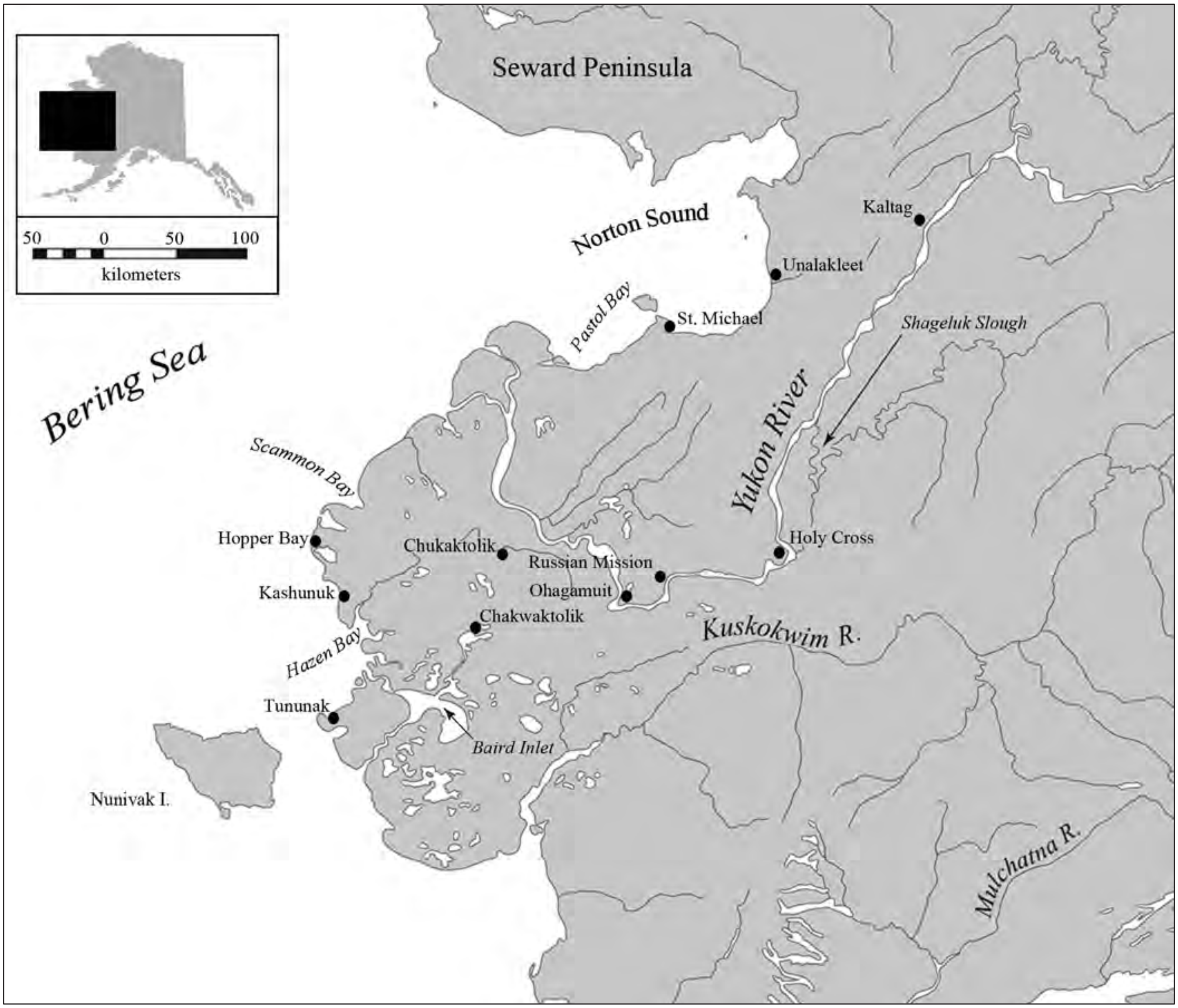

Figure 2: Norton Sound to Kuskokwim Bay showing selected places mentioned in text.

west side as far as Port Moller, and on the Pacific side to below Chignik.

These Oglemut [Aglurmiut],[8] or as they are known today, Oogwasheet, held the coast line to Point Etolin, all of the south shore of Lake Iliamna, had at least one village on Naknek Lake, and with the folk of Kanatak on the Pacific, fished the salmon spawning grounds at the head of Lake Becharof. The Yut of Lake Iliamna often hunted on Kamishak Bay their desired quarry, sea otter. Sometimes they were accompanied on these hunts by adventurous souls from as far west as Togiak.

Whether or not the Kaniatak [Koniag] or Krikiktukpugamut of Kodiak Island had regular settlements on the west side of Shelikof Strait is a matter of conjecture.

It is among the descendants of the Oglemut of both full and mixed blood that there is the most decided insistence that they are Aleuts. This feeling has been accentuated by the presence at Ugashik and below of a number of families of Northern Eskimo who migrated from Seward Peninsula before and subsequent to 1900.[9] White traders and teachers as well as the Natives insist that while these migrants are Eskimo that the local Natives are of Aleut descent.

Among many of the mixed bloods a decided stigma attaches to, and makes a fighting word of "Eskimo." A few questions and answers as to the equivalents in their native tongue of such words as sun, moon, land, air, water, man, woman, and the numerals will demonstrate

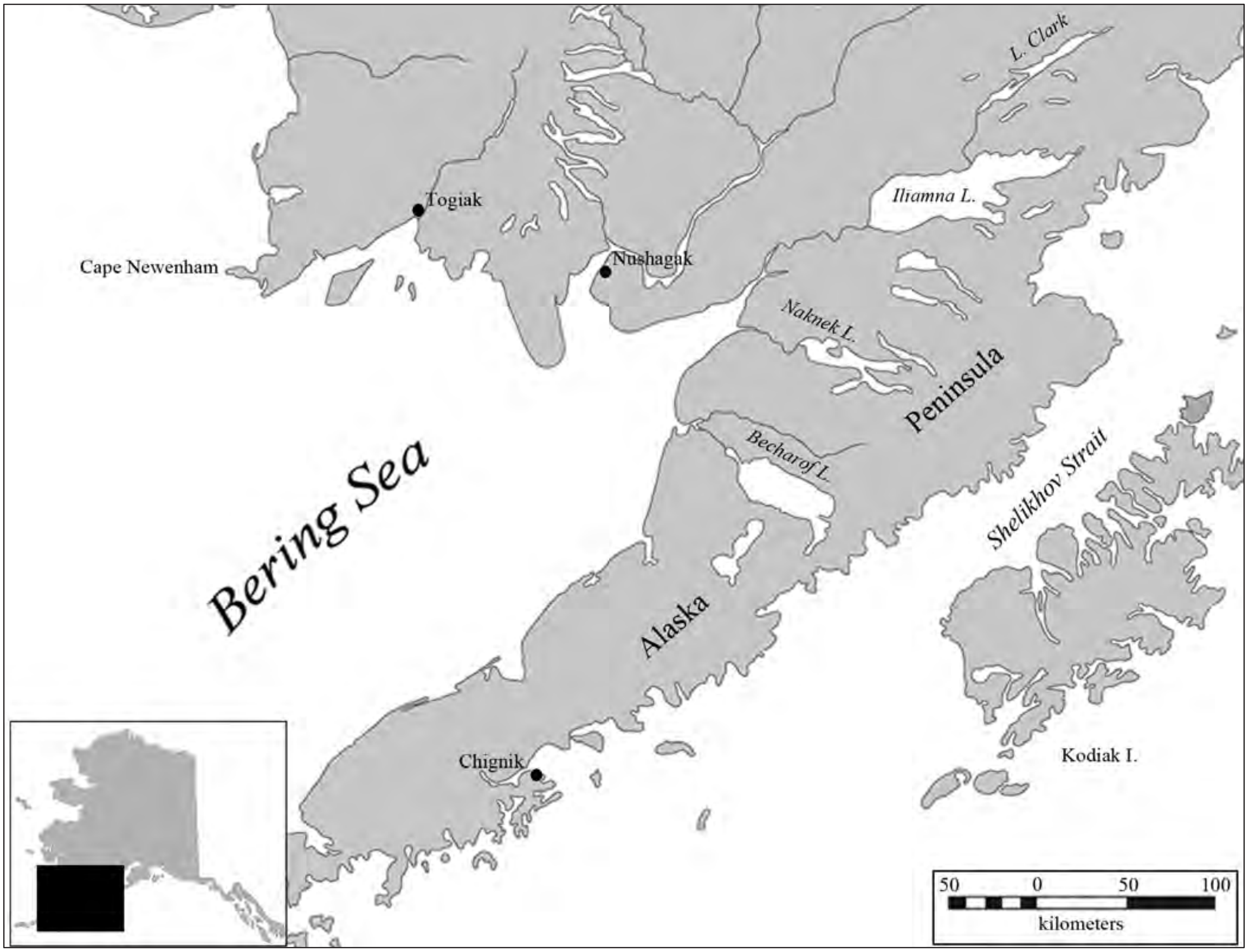

Figure 3: Bristol Bay and Alaska Peninsula showing selected places mentioned in text.

(but not convince the answerers) that they are of Eskimo descent.

An instance of how general this error is may be found under "G" in Plate II of *Alaska Natives* [Anderson and Eells 1935:13]. Among the boys and girls shown are children of both Northern and local Eskimo, but none of Aleut parents.

The use of the word Nushagak as applied to the village at the point where the Russians established Alexandrofski [Aleksandrovskii Redoubt], and also as the name of the largest river entering Bristol Bay is well established (by time and usage). The source of the word Nushagak is unknown. It is not an Eskimo name. The Eskimo name for the site of the former post of Alexandofski is Tathlekok [*talliquq*] (Elbow).[10] Nushagak River is the Ilagyok [*Iilgayaq*](Il-a-gy-ok): there is no Eskimo knowledge of Nushagak either as a place name or otherwise in their vocabulary. And there is nothing in the word's etymology on which a reason for its being applied as a place name might be suggested. Petroff [1884:135–136] records a second name for the "Nushagamut" [Nushagagmiut], "Kiatagamut." Analysis of this word and its use elsewhere indicates clearly that it means simply "the upper people," and as Petroff says these "were to be found on the Nushagak River and along the coast to Cape Newenham."[11]

Rounding Cape Newenham one comes soon to the eastward extension of the Kuskokwagamut [Kusquqvagmiut]. They were a widespread folk, remarkably one linguistically. They had year-round villages to the mouth of the Holitna and well up that stream. Their hunting grounds included the lower reaches of the easterly tributaries of the Kuskokwim to the Tatlaiksuk.[12] Occasionally in early spring by dog team they would go to the head of Big River [var. West Fork Kuskokwim River], construct boats covered with moose or caribou skin, and return to their homes downstream all the way.[13] Big River is a partial translation

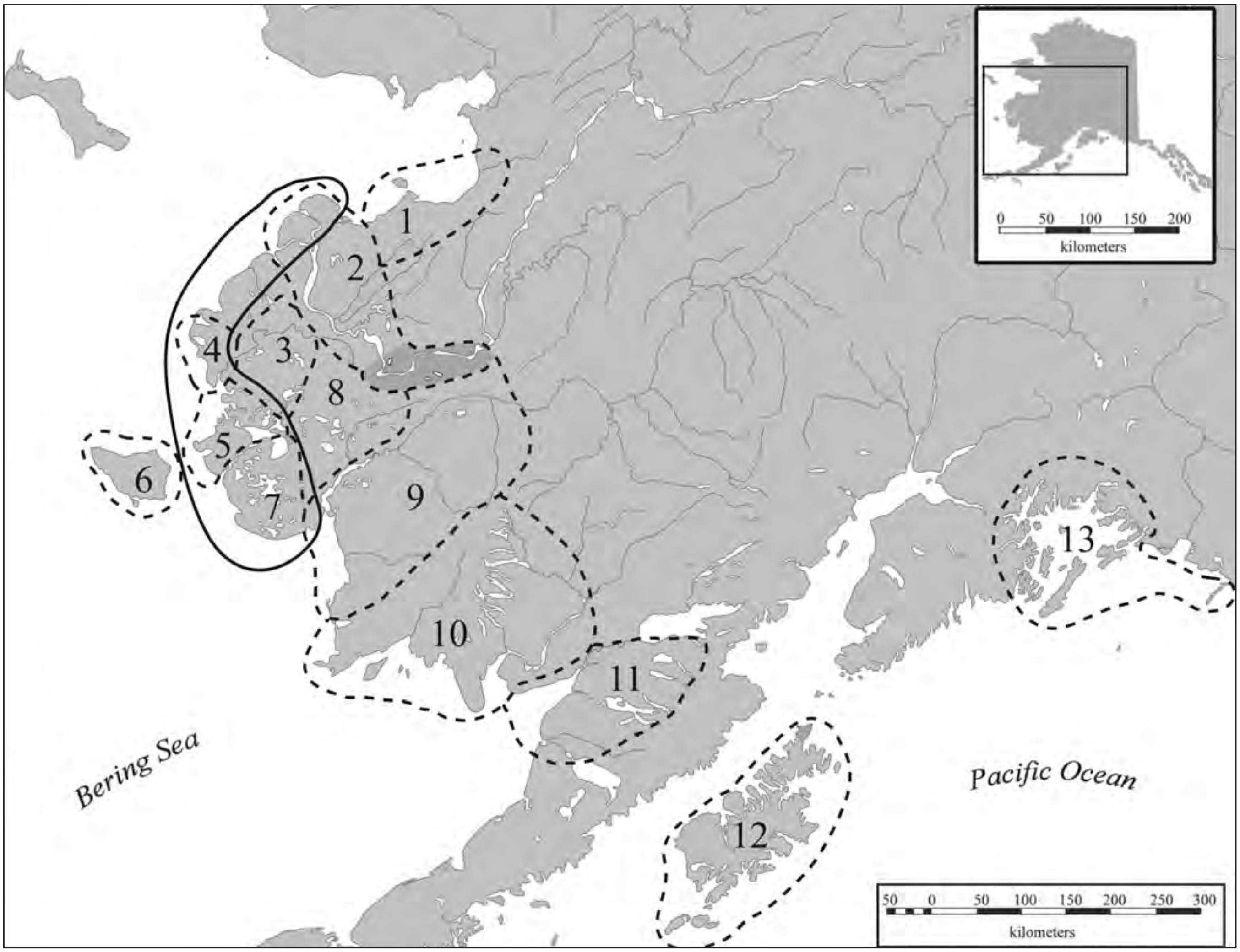

Figure 4: Approximate "tribal" group boundaries described by Waskey (keyed to Table 1).

of the Eskimo name Kweechpathluk [*Kuigpalleq*]. Stony and Swift Rivers are more complete translations of their Eskimo names.[14]

On the north side of the Kuskokwim from the "Portage" to Crooked Creek, the Yut had contact with the Indians of Shageluk Slough, whom they called (as did the Yukon Yut) "Yugwileingut"—different men.[15]

The Tenai (tinne [dene, *denaa*]) of the Upper Kuskokwim evidently established their village of Talaquana [*Dilah Vena*] on the Stony at an early date. From there they entered and built on both the Mulchatna River and Lake Clark.

The Kuskokwagamut called these Athapaskans "Inkillet," and the Yukon Yut also applied this term to the Indians of Kaltag and above, whom they recognized as differing from the Yugwileingut.[16]

The Ilagyogamut of Nushagak River and the Oglemut of Iliamna both called their Indian neighbors "Kenaiyut." This compound hybrid name involves an initial sound substitution, otherwise [it] is simply the Tenai (men) as the Indians called themselves qualifying the Yut (also men) that the Eskimo called themselves.[17]

Anderson and Eells [1935:29] somewhat question the name "Akulamut" as a "tribe." That they were and are an important division of the Yut is unquestionable. In a broad sense the term Akulamut included all the Yut between the Kuskokwim watershed, one village whose lakes outlet to Baird Inlet, and the village of Chukaktolik [*Cugartalek*] on the head of the Kashunok River.[18] As late as the early 1900s many of these villagers did not come to either the Yukon or Kuskokwim to fish during the summer. Their home lakes and rivers contained an abundance of several

Table 1: Names of "tribal" groups reported by Waskey (keyed to Figure 4).

Map Number (See Fig. 4)	Waskey's "Tribal" Group Name	Name as Spelled in Current Orthography	Comments
1	Unaleet	Unaliq	
2	Kwichpukamut	Kuigpagmiut	Includes the Ekogmut [Iqugmiut] subgroup[1]
3	Magemut	Maarmiut	
4	Askinukamut	Askinakmiut	
5	Kaluyuagamut	Qaluyaarmiut	
6	Nunivagamut	Nunivaarmiut	
7	Cheneyanukamut	Caninermiut	
8	Akulamut	Akulmiut	
9	Kuskowagamut	Kusquqvagmiut	
10	Nushagamut	Nushagagmiut	Includes Kiatagmut [Kiatagmiut][2]
11	Oglemut	Aglurmiut	
12	Kaniatak	Koniag	
13	Chugachamut	Chugachmiut	
Not numbered; indicated by solid line	Snahgamiut	Cenarmiut	Generic name for coastal residents

1 As described by Waskey, the area occupied by the Iquqmiut corresponds with the shaded portion of Kuigpagmiut territory shown on Fig. 4.

2 In Waskey's account, "Nushagagmiut" and "Kiatagmiut" are treated as variant names for the same group of people.

varieties of whitefish, pike, and freshwater cod (burbot). And the swamps and small connecting streams swarmed with blackfish (*Dallia pectoralis*). The Akulamut still live in the villages cited from late August or September until spring breakup. That they are an outstanding distinct division of the Yut is evidenced not only by their physical characteristics but by their present-day well-built and well-kept dwellings and orderly communal life.

In practice the term Akulamut did not extend to the coast dwellers between the two great rivers. Collectively these were the Snahgamut [Cenarmiut]. Of their several divisions, one of the largest and the last to be influenced by white traders, missionaries, and schools was the Cheneyanukamut [Caninermiut] (people of the low-lying coast). Their territory was and is from Kuskokwim Bay [to] the Kolevinerak [*Qalvinraaq*], the southerly outlet of Baird Inlet. At least two of their larger villages have not yet had a secular school.

On both sides of the Nelson Island Mountains are the numerous Kaluyuagamut [Qaluyaarmiut] (people of the dip net). So well established is the name of these folk, and so well known their homogeneity and occupied territory, that far and wide the Nelson Island Mountains are known as "kaluyeet" [*qaluyiit* (dip nets)].

In both lay and scientific circles there is general knowledge of the importance of blackfish as a major source of food among the Eskimo. Little has been said about the local importance of the sticklebacks, taken by dip nets rather than by a weir trap of splints, or nowadays, wire netting. These tiny members of the family Gasterosteidae are normally taken during the winter months, literally by the hundredweight. They seldom average more than two inches in length, and often that two inches includes a segmented parasite nearly as large as its host.

Notwithstanding this far from appetizing fact, these "needlefish" are a good food for both man and dog. And so important a food that even in these days of handy trading posts, a failure of the run to come, or to come late, may mean a near famine among those who regularly prepare for and depend on such run[s]. In short, these tiny fish are, during the winter, the staff of life among the Kaluyagamut and to some extent their neighbors, the Askinukamut [Askinakmiut]. Kipniak [*Qip'ngayaq*] or Black River seems to be the northerly limit of their plentiful occurrence. There is some reason to believe there may be two or more genera among these nest builders of the Bering Sea littoral.[19] Occasionally in dipping for sticklebacks a somewhat larger fish, possibly a dace, are taken. These shapely bodied shiners (chimukaleet [*cemerliq* (smelt)]), three to five inches in length, are a treat indeed and even tastier than larger pan fish.

The Kialivigamut [Kaialivigmiut], often mentioned as a "tribe" are a part of the Kaluyuagamut. The name means the people of the upper place. Their spring and summer camps are near the mouth of the Azun River on Hazen Bay. Between Kialivik [*Kayalivik*] and the several former villages of the Kashunoks was the longest stretch of coastline within Yut territory along which there were no regular winter villages. In the days of dog team travel, this was the one day's trip that under ordinary trail and weather conditions was difficult.

Within the past few years, the Kashunoks, instead of occupying two or more winter villages nearer the coast, have moved to Chevak up the Kashunuk River. The Kashunok [*Qissunaq*] folk are a part of the Askinukamut, who included the large village of Napukayahak [*Naparyaraq*] on Hooper Bay and several villages along the south foot of the Askinuk Mountains. In the early 1900s the people of Kutmuit [*Keggatmiut* (var. *Marayarmiut*)] on the north side of the Askinuks were considered by their neighbors the Magemut [Maarmiut], as belonging to the Askinukamut. But the Kutmuit folk resented this, often speaking disparagingly of the people of Napukayahak and Kashunok.[20]

The statement in *Alaska Natives* [Anderson and Eells 1935:29] that the Nunivagamut [Nunivaarmiut] had settlements on the Kashunok probably had its source in the fact that Nunivakers did come to the mainland to join the Kashunoks in their goose drives during the molting season.[21] Tradition says that the Nunivak folk were allied with the Hooper Bay warriors in their strife with the Malemut, the general name of the Yut for the Innuit.

The correct pronunciation of Nunivak is Nu-nee-vahk [*Nunivaaq*].[22] Among the Yut, the one people whose vocabulary includes distinctively St. Lawrence Island words are the Nunivaks.

The Magemut are the folk who occupy the lake country (above brackish water) from east of Chevak and the Askinuks, north past Kusilvak Mountain, the name derived not from the word for mink, *emukamutuk* [*imarmiutaq*], but from the word for water, *muk* [*meq*].

Ekogmut is not correctly applied to the Yut of all the Yukon. They are all properly Kwichpukamut (Kweeshpugamut) [Kuigpagmiut] people of the Big River. Ekogmut [*Iqugmiut*] applies particularly to the formerly large village of that name now generally called Russian Mission. It is also correct to term as Ekogmut the inhabitants of the several villages from Ingarahathluk [*Ingrirralleq*] (Holy Cross) to the original inhabitants of the section just below Ohogamut [*Iquarmiut*] (Bennetts).[23]

Ekok [*Iquk*] means "end." Ohogamut is a corruption of Ikwagamut [*Iquarmiut*]. Ikowak [*iquaq*] also means "end," and in this instance indicates the exact end of the Ungulak Mountains, rounding which the Lower Yukon makes its farthest southing.[24] The comparatively short distance occupied by the Ekogmut is one of the most important in Alaska from the viewpoint of anthropology, and a distance or section which so far has received scant attention scientifically.[25]

The Ekogmut's direct contact with the Yugwileinguk emphasizes this section's importance.

The Unaleet [Unaliq] or Ungalikthlugamut are the farthest north of the Yut. Their country was and is along the southerly shores of Norton Sound and a part of Pastol Bay. "Unaleet" signifies "those down there."

Ungalik [*ungalaq*] is the word designating the warm easterly and southerly winds that may occur at any time, often bringing rain even in winter. These warm winds have great importance in the economic and other phases of the life of the Yut. The words Ungalik and Ungalikthluk [possibly *ungalaggluk*] occur over and over as place names in Yut territory. Invariably they designate river valleys or passes through the country that are natural "draws" for these winds.

It is not unreasonable to hazard the guess that the term which the Chugachamut applied to their easterly and southeasterly neighbors the Eyak Indians [Birket-Smith and De Laguna 1938:343–345] derived from the fact that these Indians lived towards the quarter from which these warm winds first descend from the higher altitude over the Pacific Ocean.

NOTES

1. Extensive confusion exists in the literature with respect to the names, scales, and geographical boundaries of Yup'ik Eskimo groups in Southwest Alaska (see Pratt 1984a, 1984b, 2009:258–279; cf. Fienup-Riordan 1984; Shinkwin and Pete 1984), which is the main focus of Waskey's account. Many of the group names and boundaries he described have been critically evaluated previously (Pratt 1984a, 1984b) and are illustrated here in Fig. 4 and Table 1. Three additional maps (Figs. 1, 2, and 3) show the locations of numerous places mentioned in Waskey's essay.
2. This term refers to speakers of the Norton Sound–Kotlik dialect of the Central Yup'ik language (Jacobson 2005:xix; cf. Pratt 1984a:66–67, 118–119*n*4).
3. These remarks concerning "fairness of skin" and "color phases of the Eskimo race" should be taken with a large dose of skepticism. "Fairness" is a relative term,

and Waskey's conjectures are not supported by scientific evidence.

4. The main route of this portage extends from the vicinity of Lower Kalskag on the Kuskokwim to Russian Mission on the Yukon (cf. Zagoskin 1967:273–274).
5. Birket-Smith and De Laguna (1938:341–345) identified the "Ugalakamut" as "a branch of the . . . Shallow Water People, one of the eight tribes of the Prince William Sound Eskimo." Their position on this point seems solid; however, other authors have instead correlated the Ugalakmiut with the Eyak Indians (e.g., Oswalt 1967:5).
6. Since Birket-Smith and De Laguna (1938:345) cite La Pérouse (1797:206f) as the source of this information, he was apparently the person who described the craft as an "umiak."
7. Today most of these people refer to themselves as Alutiiqs, Chugach, and/or Sugpiat (cf. Ganley and Wheeler 2012). In the literature they have also been identified as the "Prince William Sound Eskimo" (e.g., Birket-Smith and De Laguna 1938:343) and the "Pacific Eskimo" (e.g., Clark 1984).
8. The Aglurmiut were characterized by Oswalt (1967:4) as "the most perplexing of all Alaskan Eskimo tribes"—a reference to confusion about their actual identity and geographical range at historic contact. The earliest Russian accounts about these people state that warfare with other Yup'ik groups forced them to migrate from the Kuskokwim River area to Bristol Bay and the northern Alaska Peninsula sometime prior to 1819 (cf. Pratt 2012). Waskey's remarks about this group are unique in two ways: they contain no reference whatsoever to the reported "Aglurmiut migration" and also assert that these people insisted they were "Aleut."
9. Speakers of the Inupiaq language and frequently identified as the "Malimiut" (see Ganley 1995; Ray 1975:130–139), the movement of these "Northern Eskimo" southward from the Seward Peninsula evidently began sometime after ca. 1850.
10. Jacobson (2012:608) translates *talliquq* as "flipper of seal, foreleg of animal." Waskey's translation of the term as "elbow" appears to be an error. Yup'ik terms for "elbow" are *cingun*, *ikusek*, and *ikuyek* (Jacobson 2012:211, 285–286). For further information about this placename problem see VanStone (1988:103–104*n*23).
11. The source of this statement has not been located. Waskey may have been quoting from memory and probably erred in attributing the statement to Petroff. It most closely matches Dall's (1877:19) description of the Nushagagmiut territory.
12. The "Tatlaiksuk" is identified on modern maps as the Tatlawiksuk River; it lies just above Swift River about 21 km northeast of the village of Sleetmute (Orth 1967:951). Zagoskin (1967:268) reported the Eskimo name for this river as "Talgiksyuak" (possibly *Taillerviksaq*) and its Indian name as "Talgotno."
13. Moose or caribou skin boats were common in much of the north (primarily among Athabascan peoples); they were usually built for one-time river journeys associated with spring subsistence activities or for carrying heavy loads. Data concerning their use by Eskimos are more limited, but Yup'ik oral history documents the construction and use of boats covered with the skins of moose, caribou, brown/grizzly and black bears (e.g., Andrew and Andrew 1988; Coffing 1993; Fienup-Riordan 2007:158–164; Spein 1988). The Yup'ik name for this type of skin boat is *angyaqatak*. Boat coverings used by Nunamiut in the Brooks Range included caribou and sheep skins (Campbell 1998:plate 57; 2004:91–97, fig. 39). Osgood (1940:378–380) provides an excellent description of the construction and use of moose skin boats by the Ingalik [Deg Hit'an]. Other Athabascan groups that used such boats include the Dena'ina (e.g., Kari 2003), Upper Tanana (Hosley 1981:537–539, fig. 14; McKennan 1959:93–94), and Gwich'in in (e.g., Osgood 1936:57–58, 62; Slobodin 1981:518). Sheep and/or goat skins were also used as boat coverings by Ahtna (De Laguna and McClellan 1981:650), Eyak (Birket-Smith and De Laguna 1938:54) and Tlingit (De Laguna 1972:330–331).
14. The Yup'ik name for Stony River is *Teggalqum Kuiga* ("stone river") or *Teggalquq* ("stone") (Kari 1985:169; cf. Zagoskin 1967:267–268). Zagoskin (1967:268) reported the Yup'ik name for Swift River as "Chagvanakhtuli" ("fast"). A more accurate spelling and translation of this name is *Carvanertuli* ("one with very strong current").
15. "Yugwileingut" corresponds with the "Inkalik–Yug-elnut" of Zagoskin (1967:243, 265), and both terms refer to the Ingalik [Deg Hit'an].
16. The term "Inkillet" is a reference to the Koyukon people (e.g., Arndt 1996:197; Zagoskin 1967:243).
17. For another explanation of this term see Zagoskin (1967:300–301*n*95).

18. “Chukaktolik” was actually affiliated with the Kuigpagmiut, not the Akulmiut. This is emphasized by the fact that when the village was abandoned ca. 1950 the majority of its former residents relocated to Pilot Station on the lower Yukon River. The Akulmiut village Waskey probably meant to name here was “Chakwaktolik” [*Cuukvagtuliq*], located near the north shore of Aropuk Lake [*Arurpak*] some 60 km south of Chukaktolik.
19. The male stickleback constructs a small, barrel-shaped nest from vegetation (e.g., Jordan and Evermann 1896:745–749).
20. The reported resentment probably stemmed from the fact that the people of “Kutmiut” (sometimes called “Old Scammon Bay”) spoke a different dialect of Yup’ik from that spoken by the people of Hooper Bay and Chevak. Language was historically a crucial marker of group identity and also a commonly used means for differentiating between Native populations in the Yup’ik region.
21. The extent of connections that existed between the people of Nunivak and those of the Hooper Bay–Chevak area were overstated by several early authors (cf. Pratt 1984a:96–98), as Waskey recognized. But his suggestion that such overstatements may have been based on Nunivakers formerly traveling to *Qissunaq* to join its residents in “goose drives during the molting season” is problematic, for at least two reasons. First, geese (e.g., Canada, black brant, white-fronted) were plentiful on Nunivak Island—so its people had no need to make long journeys away from home to procure this resource. Second, an extensive collection of oral history data exists concerning the Nunivak Eskimos, and it appears to lack any mention of cooperative goose drives with *Qissunaq*-area people.
22. This spelling is based on the common pronunciation of Nunivak by General Central Yup’ik (GCY) speakers (cf. Jacobson 2012:463); however, in the Nunivak dialect (Cup’ig) the name is pronounced differently and spelled *Nuniwar* (Amos and Amos 2003:230). This difference also extends to the spelling of the islanders’ group name: i.e., Nunivaarmiut (GCY) versus Nuniwarmiut (Cup’ig).
23. “Ohogamut” was apparently also known as *Urra’armiut* (George 1988:7; Jacobson 2012:688). Robert Drozda (personal communication, 20 March 2013) suggests this name may have been applied to the site by people of the Kuskokwim River. He speculates that it may have been so named due to its location at or near one end of a well-known trail/portage that (on the Kuskokwim side) began near the village of Akiachak.
24. The name Waskey gives for these mountains (i.e., “Ungulak Mountains”) is based on the Yup’ik place name *Ungluq*, which refers to a mountain (“Ungalak Mountain”) near Devil’s Elbow of the lower Yukon River that was reportedly the nest site of a giant eagle, or *tengmiarpak* (Hansen 1985:119–121; cf. Jacobsen 1977:110; Pratt 1993).
25. Waskey’s “Ekogmut” discussion underscores a central problem that occurs over and over in historical and anthropological accounts reporting the names and geographical locations of traditional Yup’ik groups in southwest Alaska. That is, the names of specific local groups are often extended to encompass members of other local groups who identified themselves by their own, entirely different, names (i.e., autonyms). The resulting “regional group” names distort and over-simplify traditional Yup’ik socioterritorial organization in numerous ways (cf. Pratt 2009:76–98, 214–279). When combined with uncritical research, such designations may be used in ways that not only perpetuate old errors, but also introduce new inaccuracies to an already complex problem (e.g., Funk 2010:528, fig. 3).

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SPECIAL SECTION:
ANTHROPOLOGY AND ARCHAEOLOGY IN YUKON TERRITORY

KLONDIKE GOLD RUSH CAPITAL PUNISHMENT: REDISCOVERING THE CONVICTED AT FORMER FORT HERCHMER

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ABSTRACT

In November 2010, construction workers finishing late-season excavations for a new waste-water treatment facility in Dawson City, Yukon, inadvertently exposed two wooden coffins with associated human skeletal remains. During the ensuing recovery and excavations, a total of four gold rush–era burials, consisting of wooden coffins, clothing fragments, lime, and disarticulated skeletal remains, were collected. The interred individuals' remains showed evidence they had been executed by hanging, a finding that is linked to the administration of justice by the North West Mounted Police during the height of the Klondike Gold Rush. This paper describes the recovery of the deeply buried, frozen graves and the osteological and archival analyses used to identify each individual.

INTRODUCTION

Dawson City, Yukon, recognized for its historic role in the Klondike Gold Rush, remains today a thriving northern town with a strong reliance on gold mining. Situated at the confluence of the Klondike and Yukon Rivers, the town serves as a year-round home to nearly two thousand people, and is a popular tourist destination and the supply and service center for prospectors and miners who work in outlying areas (Fig. 1).

In early 2008, Dawson City faced the problem of updating its sewage treatment infrastructure and decided to build a new mechanical waste-water treatment facility at the south end of Fifth Avenue. Historically, this was the location of Fort Herchmer, the North West Mounted Police (NWMP) headquarters for the Yukon and the territorial center for the administration of justice, established in 1897 at the beginning of the Klondike Gold Rush. Between 1899 and 1932, ten individuals were executed by court order within the confines of the Fort Herchmer NWMP barracks. Many of these individuals were buried on site, along with the bodies of several other individuals who died while in custody (Jones and Jones 2005). Burial records are incomplete, but it appears some individuals who died at Fort Herchmer may be buried elsewhere.

Much has been written regarding the role of the NWMP in the early days of the Yukon Territory (e.g., Coates and Morrison 2004; Dobrowolsky 1995; Morrison 1985; Wallace 2000) and the relations between First Nations and non–First Nations people before and at the time of the gold rush (e.g., Castillo 2012; Coates 1986, 1993; Coates and Morrison 1988; Dobrowolsky 2003; Neufeld and Norris 1996). Rather than expand upon these discussions, this article focuses on the unique discovery and recovery of four gold rush–era burials using archaeological techniques, osteological observations, and archival research to identify each individual. For questions regarding capital punishment, the process of law in Canada, and First Nations concepts of justice and capital punishment, readers are referred to Coates and Morrison (2004), Cruikshank (1989, 2000), Grove (1995), and Leyton-Brown (2010).

DISCOVERY

On November 4, 2010, a backhoe operator excavating a large pit for the water treatment facility encountered human skeletal remains and associated coffin wood approximately 2.7 m below the ground surface. Work on the facility stopped immediately and the Royal Canadian Mounted Police (RCMP), the Yukon Government Cultural Services Branch, and the Heritage Department of Tr'ondëk Hwëch'in First Nation were notified, as required under the *Guidelines Respecting the Discovery of Human Remains and First Nation Burial Sites in the Yukon* ("Guidelines") (Yukon Government Tourism Heritage Branch 1999) and Section 13.9.0 of Chapter 13 of the Umbrella Final Agreement (UFA) (1993).

Under the provisions of the Guidelines, management authority of historic (and nonforensic) human remains in the Yukon is vested to the Yukon Government Cultural Services Branch, unless the remains are of First Nations ancestry, in which case management authority of the remains is vested to the First Nation within whose traditional territory the remains were found (Yukon Government Tourism Heritage Branch 1999). Dawson City is located within the traditional territory of the Tr'ondëk Hwëch'in First Nation.

RECOVERY

Following the initial discovery, the senior projects archaeologist from the Yukon Government Cultural Services Branch traveled to Dawson City to assess the situation. Wooden coffin fragments, clothing fragments, and disarticulated human remains were evident along the face and at the base of the steep excavation. In situ remains and coffin materials were also visible in the side cut, approximately 2.7 m below the surface. At least one truckload of sediment containing disturbed remains had already been removed from the excavation and had been deposited at a location off-site. Freshly exposed sediments were unfrozen, but with daily temperatures dropping to –20° C it was only a matter of time before the soils would be frozen for winter. The decision was made to conduct an emergency salvage excavation.

A volunteer field crew was assembled and organized by the Heritage Department of Tr'ondëk Hwëch'in First Nation, consisting of members of their own staff, the City of Dawson Public Works crew, Dawson City Fire Department, staff of Corix Water Services, and the Dawson Nursing Station (Fig. 2). Subsequent recovery and disinterment of the remains were directed by the senior projects archaeologist under Yukon Archaeological Sites Regulations Permit #10-29ASR.

Disturbed skeletal material, fabric, and coffin remains were collected from the side and base of the excavation pit. Following this, sifting screens were set up in the bottom of the pit and alongside the sediment piles that had been previously removed. Trowels and shovels were used to fill buckets with sediment that was then screened for burial goods. Simultaneously, excavations were carried out into the sidewall of the pit to recover the in situ skeletal and related materials.

After the remains of two coffins and associated skeletal materials had been recovered from the sidewall, a third undisturbed coffin was discovered. A tracked backhoe was used to remove approximately 2.5 m of overburden above the coffin, and trowels and shovels were used to finish the excavation. When fully exposed, the undisturbed

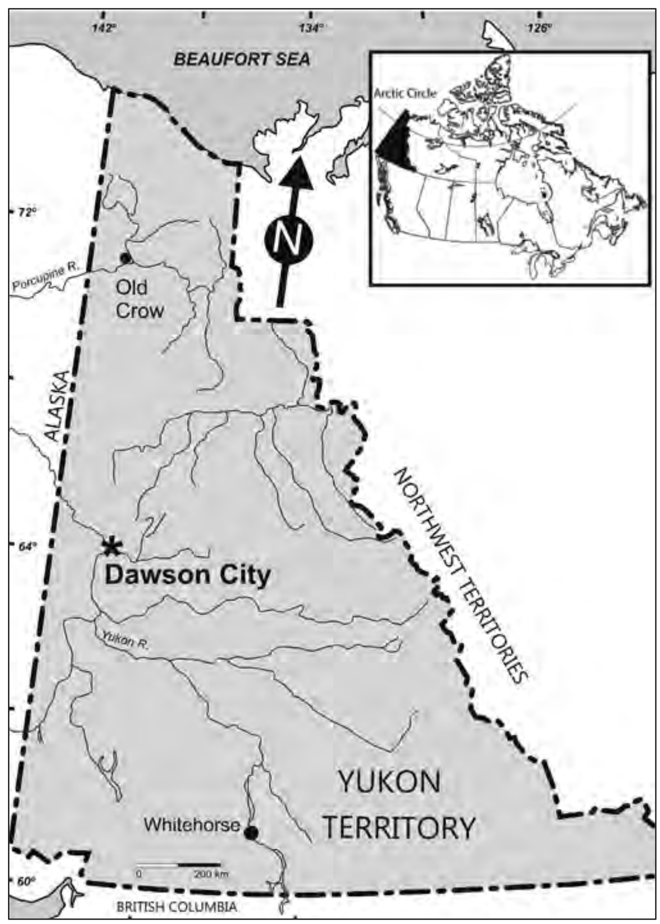

Figure 1. Yukon Territory. Courtesy Yukon Government Cultural Services Branch.

Figure 2. Salvage activities in excavation pit, November 2010. Courtesy Pat Habiluk, Yukon Government Highways and Public Works.

coffin consisted of a heavily deformed wooden box, approximately 1.8 m long and one meter wide. The top and bottom were constructed of three broad planks (likely spruce) with two lateral braces. The sides of the coffin had collapsed through time and skeletal material, fabric, and thick deposits of crumbling lime were visible through gaps in the side wall. The undisturbed coffin was excavated and removed in its entirety without being opened. The coffin was removed from the excavation using a rescue-carry technique employed by construction crews to remove an injured worker from a deep mine excavation (Fig. 3).

Following removal of the in situ burial, recovery efforts continued on the disturbed remains both within the excavation pit and off-site. During the next week, temperatures dropped to –30° C. Diesel-powered portable light towers were employed to facilitate work in the brief subarctic days, insulated tarpaulins were used to prevent freezing of the ground, and portable heaters were used to thaw dirt piles for screening.

The following week, a fourth interment was discovered at the edge of the excavation pit. This interment lay approximately 15 m to the north of the other interments, at the same depth below the surface. Unlike the previous burials, the skeletal material at the new location was incomplete, with associated skeletal elements present only from the waist down. Excavation of the burial revealed both the sides and bottom of the coffin were deflected downward, indicating a significant earlier disturbance of the grave. The burial was situated near a historic slough or watercourse, and it is possible a flood or erosion episode removed the upper half of the body. No evidence of the upper body or coffin was found during the salvage efforts. The fourth burial also differed from the previous burials in the amount of lime associated with it. Lime associated

Figure 3. Excavators prepare to lift the intact coffin from the pit. Courtesy Tr'ondëk Hwëch'in Heritage Department.

with the first three interments was thin, chalky, and crumbly. Lime associated with the fourth interment, however, resembled large thick blocks, often with skeletal remains completely entombed within them.

Eventually the ground became too frozen to continue the salvage excavation. Several piles of dirt were protected with tarpaulins and screened in spring 2011, with all recovered human skeletal fragments and associated clothing added to the recovery inventory. At the conclusion of screening, an estimated twenty tons of material from the excavation pit had been shoveled, carried, and screened.

HISTORICAL CONTEXT

FORT HERCHMER

In 1870, Rupert's Land and the North-Western Territory were transferred to the government of Canada. Prior to and during this time, western law and order in much of the region was controlled by the Hudson's Bay Company. Attracting the attention of Canadian authorities in Ottawa because of heavy prospecting activity in the area, the government of Canada created the NWMP Yukon administrative division in 1895.

Following the announcement of the discovery of gold, the NWMP began constructing Fort Herchmer in Dawson City in 1897, naming it for the NWMP commissioner Lawrence William Herchmer. Approximately 16 hectares (40 acres) in size, Fort Herchmer was located between modern-day Front Street and Sixth Avenue, and Turner and Church Streets (Fig. 4). The fort was to become the NWMP headquarters for the Klondike Gold Rush. A number of buildings were moved to the new fort from Fort Constantine, and others were quickly constructed, including officers' quarters, a hospital, barracks, and a jail (Bush 1972) (Fig. 5). By September 5, 1898, Fort Herchmer boasted fifty-one police personnel and five special constables (MacBride Museum 2006). The workload

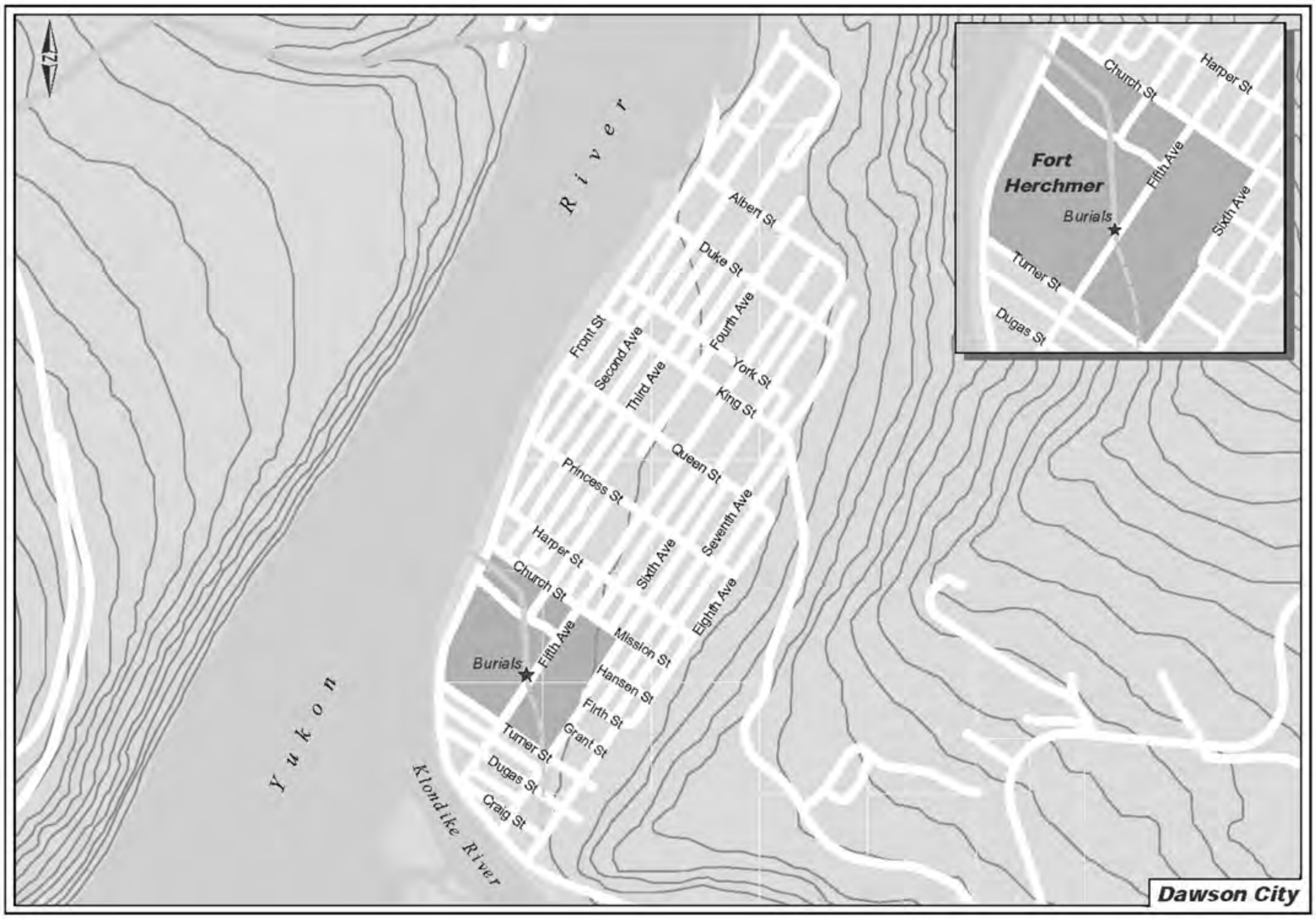

Figure 4. Fort Herchmer and Dawson City. Courtesy Ecofor Consulting, Inc.

Figure 5. Fort Herchmer, looking southeast, 1900. L-shaped building in the middle foreground is the guard house with jail. The Yukon River is to the right (Bush 1972).

became so great with the number of stampeders present in the area the NWMP established both a detachment to serve the Klondike and a town station in 1900 (MacBride Museum 2006).

YUKON HANGINGS

In addition to regular police work, patrolling the goldfields, overseeing the health and safety of the people in the region, and representing the NWMP on the Territorial Council, commanders at Fort Herchmer were also expected to carry out capital punishment sentences (MacBride Museum 2006). While the Yukon was not plagued with frequent murders like some U.S. gold rush towns in California and Colorado, killings did take place (Coates and Morrison 2004:5). Between 1892 and 1961, the penalty for murders in Canada was death by hanging (Leyton-Brown 2010).

The first execution in the Yukon Territory under Canadian law took place in 1899 at Fort Herchmer (Canada Death Penalty Index 2008). In total, thirteen hangings were carried out in the Yukon between 1899 and 1932 (Canada Death Penalty Index 2008; Gadoury and Lechasseur 1994). One hanging took place in Whitehorse in 1916, two on Herschel Island in 1924, and ten in Dawson City between 1899 and 1932 (Table 1).

The practice of execution across Canada during this time was constrained by law and tradition. Death by hanging was intended to cause massive trauma to the cervical spine and result in a broken neck. However, many things could go wrong, including slow strangulation or decapitation. As a result, standardization surrounded the format of a trial as well as the construction of the gallows, the length and size of the rope, the size of the trap door, the procession to the gallows, the list of people allowed on the gallows with the condemned, any speeches given, the straps and hood used on the condemned, the positioning of people under gallows to help if the process was botched, the type of coffin, and the interment of the body (Leyton-Brown 2010:81–103; *Klondike Nugget* 1900b). Of course, there were exceptions and changes were made to the standards over time, but across the country police detachments carrying out capital punishment followed the same procedures.

One of the practices of the day was to construct a new gallows for each hanging, often erected above the freshly dug grave (Leyton-Brown 2010). After the person was hanged, the body was lowered into the waiting coffin. The position of the coffin and the presence of a bag of quicklime, used to speed up the decomposition process and reduce odor, were often mentioned or depicted in newspaper accounts (*Dawson Daily News* 1908a; Leyton-Brown 2010:143). In many cases graves were not marked and were placed in the prison yards, according to Canada's criminal law Section 117, which states the only reason to bury outside a prison would be lack of space (Leyton-Brown 2010:139). Although in later years this practice changed (Leyton-Brown 2010:140), the Fort Herchmer burials appear to follow the earlier tradition. Archival records indicate there were two reported burial areas at Fort Herchmer, known as the "Barracks Cemetery" and the "Lime Pit" (Jones and Jones 2005). It is unclear if these are separate locations or simply descriptive names for general burial areas. Unfortunately, the historic record sheds little light on the actual locations of any of the burials.

Table 1. Individuals hanged for murder in Dawson City, 1899–1932

Name	Date	Ancestry	Age
Henderson, Edward	August 4, 1899	Caucasian	?
Nantuck, Dawson	August 4, 1899	First Nation	teens
Nantuck, Jim	August 4, 1899	First Nation	early 20s
King, Alexander	October 2, 1900	Caucasian	54
O'Brien, George	August 23, 1901	Caucasian	?
Fournier, Victor	January 20, 1903	Caucasian	?
Labelle, Edward	January 20, 1903	Caucasian	?
Elfors, Ned	October 6, 1908	Caucasian	55
Yoshioka, Rokuichi	November 23, 1917	Japanese	?
West, Barney	September 27, 1932	Caucasian	47

Sources: Barr 2004; Canada Death Penalty Index 2008; *Dawson Daily News* 1908b; Dickey 1898; Gadoury and Lechasseur 1994; *Klondike Nugget* 1900a.

SKELETAL ANALYSES

All human skeletal remains, along with associated coffin wood and fabric fragments, were taken to a secure nearby facility for analyses. The in situ burial's coffin was opened but left generally undisturbed in its burial matrix. Over ninety-five percent of the available skeletal elements from the four interments were recovered from the excavation pit collection and screening activities in November 2010, with the remaining five percent recovered after protected back dirt piles thawed in spring 2011. The bulk of analyses of the skeletal remains were constrained to two days during the November 2010 salvage activities, with spring 2011 additions inventoried and analyzed prior to summer 2011 reburial activities.

The goal of the analyses was to be as noninvasive and respectful as possible while gathering enough information to match remains to known individuals based on archival information and oral histories. Skeletal analyses were conducted only to the level appropriate to this task. Time constraints for the analyses as well as limitations between objective observations and subjective interpretations were recognized at the onset. As a result, care was taken to compare collected data to standardized osteological sets in an effort to improve efficiency and lessen subjectivity. Any deviations from the standards were noted.

Because of the commingled and incomplete nature of some of the remains, the first task was to ascertain the minimum number of individuals (MNI) present in the four interments. There were several epidemics of typhoid, scurvy, flu, and diphtheria during the Klondike Gold Rush (Mellor 1997), and it was difficult to dig new grave shafts during the winter months; thus it was possible for a winter shaft to contain multiple burials. A count of the skeletal elements present (i.e., number of right femora, left ulnae, etc.) revealed an MNI of four individuals present in the four interments. Temporary letter designations were assigned to each individual (A, B, C, and D).

Examination of pelvic elements revealed all four individuals were male. Individuals recovered from the first three interments (A, B, and C) exhibited well-preserved wool clothing, bone, teeth, and hair. This preservation was likely the result of the loosely packed lime used during burial preparations. The fourth individual (D), present only from the waist down, differed from the others in this regard, as this individual was completely encased in large solid blocks of lime and exhibited no preserved clothing other than a few pieces of leather and metal eyelets from a pair of boots.

Evidence consistent with hanging was also present. The individual left in situ and block lifted from the work site (C) had a cloth hood over his head, as well as evidence of leather bindings above and below the knees. The two individuals commingled by the backhoe (A and B) possessed similar hood material. Remains of leather bindings above and below the knees adhered to the well-preserved wool clothing around leg elements. Similar bindings were not observed for the fourth individual (D), likely due to poor preservation of his clothing. One hyoid bone, a small bone at the front of the throat, was identified among the commingled remains. It was broken but, due to the commingled nature of the remains, the timing of the fracture—whether perimortem (at the time of death) or postmortem (after death)—was indeterminate. No fractures of any of the cervical vertebrae were noted.

Evidence associated with the four individuals recovered from the former grounds of Fort Herchmer was consistent with persons who had been hanged. Hanging records from Fort Herchmer (Table 1) indicated ten men were hanged between the years of 1899 and 1932 and were of Caucasian, First Nation, or Asian ancestry. Although this provided a good starting point, more detailed analyses of the skeletons were necessary to identify each individual. The next steps in the osteological analyses were to determine stature, separate the commingled remains (A and B), determine age at death, try to determine ancestry, and look for pathological and cultural markers that might aid in the identification of each person when compared to the historical and oral records.

STATURE

Studies of the relationship between bone length and stature show the measurement of leg bones correlates better with stature than does the measurement of the arm bones (U.S. Army 1976). When leg bones are missing or badly fractured, arm bone measurements may be used, but are less accurate. Most of the leg bones recovered at Fort Herchmer were complete. As a consequence, the "femur plus fibula" formula was chosen for estimating stature, as it holds the least standard error (U.S. Army 1976). No measurements were taken on in situ Burial C, so as not to further disturb this individual.

The ten men hanged at Fort Herchmer were known to be of Caucasian or First Nation/Asian ancestry. Stature formulae vary by ancestry, so two stature estimates were calculated for each set of remains: one formula for Caucasian males and one formula for First Nation/Asian males (U.S. Army 1976). Table 2 presents the results of these calculations.

SEPARATION OF COMMINGLED REMAINS

To separate the commingled remains (A and B), numerous methods were employed to distinguish one individual from the other. All long bones exhibited fully fused epiphyses (growth ends) and all third molars were erupted and in occlusion, indicating both individuals were adults at the time of death. Measurements taken of the long bone elements (humeri, tibiae, fibulae, femora) indicated both individuals were approximately the same size, thus separating the remains on the basis of stature was not possible. The comparison of cranial sutures (spaces between skull bones) was a bit more revealing, however; one individual exhibited a fully intact cranium (skull) with sagittal and occipital sutures that were beginning to fuse (A). The other individual exhibited a fully open and nonarticulated cranium (B). While the use of cranial suture fusing is not the most ideal or reliable method for determining age in skeletal analyses, it provided a hint as to the ages of both individuals. There was also an observed difference in the sternal rib ends, with some rib elements exhibiting concavity and others having a more blunt appearance. These differences indicated both commingled individuals were fully adult, with one individual likely older than the other.

Beyond the crania and the ribs, the separation of the remainder of the skeletal elements was only guesswork without further clues. The lime associated with each of the interments served as an excellent preservation agent and enabled separation of the commingled remains. Both individuals were wearing wool underwear and wool socks at the time of death, as indicated by pieces of wool material adhering to a number of the skeletal elements. Some of these elements also exhibited a blue chalky stain, likely caused by the corrosive action of the lime as it degraded a pair of blue cotton trousers worn over the wool underwear. All the skeletal elements exhibiting this staining were easily matched to one another as antimeres (opposite bones of a pair), revealing the blue pants were worn by individual A. The preservation was so complete that light brown leg hair was observed inside the blue-stained wool material still adhering to many of the skeletal elements. In comparison, black leg hair was observed on the skeletal elements without blue-stained material.

The commingled remains were separated using this difference in body hair when possible, followed by the fitting of adjacent skeletal elements to the known matched elements and antimeres. Some foot bones adhered to the wool underwear associated with the lower leg elements of one individual. These were compared with loose commingled foot bones; antimeres were then matched to one another. Ribs were differentiated based on the appearance of their sternal ends (ends forming joints with the sternum/breastbone). The ribs exhibiting concave sternal ends were

Table 2. Fort Herchmer burial stature estimates

Burial	Skeletal Element	Length (cm)	Stature Estimate	Confidence Interval for Stature (1 σ)
A	left femur	48.5	177.9 cm (~5'10.0") if Caucasian	174.3–181.6 cm (5'8.5"–5'11.4") if Caucasian
	left fibula	39.2	177.2 cm (~5'9.8") if First Nation/Asian	174.1–180.4 cm (5'8.5"–5'10.9") if First Nation/Asian
B	left femur	47.5	176.9 cm (~5'9.6") if Caucasian	173.3–180.5 cm (5'8.2"–5'11.0") if Caucasian
	left fibula	39.4	176.3 cm (~5'9.4") if First Nation/Asian	173.1–179.4 cm (5'8.2"–5'10.6") if First Nation/Asian
D	right femur	44.1	169.3 cm (~5'6.6") if Caucasian	165.7–172.9 cm (5'5.2"–5'8.0") if Caucasian
	right fibula	37.0	169.2 cm (~5'6.6") if First Nation/Asian	166.0–172.4 cm (5'5.3"–5'7.8") if First Nation/Asian

Caucasian stature estimate: [1.31 (femur length + fibula length) + 63.05] ± 3.62 = living height in cm

First Nation/Asian stature estimate: [1.22 (femur length + fibula length) + 70.24] ± 3.18 = living height in cm sided and placed with the older commingled adult (A), while the ribs exhibiting blunt sternal ends were sided and placed with the younger adult (B). The occipital condyles (underside of skull forming a joint to the vertebral column) were present for both of the commingled individuals. Thus, vertebrae were matched using articulating facets when possible. Some of the blue staining from the leg elements appeared to have been transferred to the material adhering to a radius and ulna (lower arm bones). These elements were placed in association with that individual (A) and matched with the articulating humerus, then to the antimeres and associated hand bones. The remaining skeletal elements were placed with the other individual (B).

DETERMINATION OF AGE AT DEATH

Determining age at death for skeletal remains involves the observation and comparison of a number of points on the cranial and postcranial skeleton. Age-at-death ranges for each of these observation points have been developed using large skeletal samples from a number of populations (Buikstra and Ubelaker 1994). The appearance of each site can vary widely from population to population, as well as from individual to individual within a particular population. Individuals known to have been hanged at Fort Herchmer had European, Japanese, and First Nation ancestries.

Burial A exhibited completely fused long bones and sacrum (tailbone), indicating an age over thirty-two years (Buikstra and Ubelaker 1994), and third molars that were completely erupted and in occlusion (in contact with one another) for some time (crowns rounded), indicating an age at least in the mid-thirties (Scott 1979; Ubelaker 1989). A clavicle (collarbone) exhibited a smooth medial epiphysis (end of bone), indicating an age of over thirty years (Buikstra and Ubelaker 1994). This individual also exhibited cranial sutures showing significant closure on the back of the skull, while sutures at the top of the skull showed minimal closure. This is consistent with an individual between the ages of thirty-five and forty-nine years (Buikstra and Ubelaker 1994). Taking all of the observed sites into consideration, along with the amount of wear on the teeth, this individual was likely in his late thirties or early forties at the time of death.

Burial B exhibited completely fused long bones with very slight epiphyseal growth lines on the distal left radius, indicating an age around twenty to twenty-two years (Buikstra and Ubelaker 1994). This individual also exhibited open cranial sutures, indicating he was a young adult or possibly an older adolescent (Buikstra and Ubelaker 1994). In contrast, this individual's third molars were completely erupted and in occlusion with large occlusal facets, indicating an age likely in the mid-twenties (Scott 1979; Ubelaker 1989). These observations seem to contradict each other when compared to osteological standards (Buikstra and Ubelaker 1994), with the teeth indicating an older age at death than the fusion of long bone and cranial elements. Discussions with colleagues in Alaska revealed similar observations in subarctic Athabascan remains (Rachel Joan Dale, pers. comm., April 18, 2011). Forensic experts there noted a predisposition for teeth to erupt earlier and long bones to fuse later in some First Nation remains recovered in southern Alaska than published osteological standards (Rachel Joan Dale, pers. comm., April 18, 2011). The morphology of Burial B's dentition and jaw indicated First Nation ancestry (see discussion below). Taking this into account, this individual was determined to be in his early twenties at death.

Burial C was in situ, surrounded by burial matrix, yet many long bone epiphyses could be observed. This individual exhibited erupted third molars with at least one small occlusal facet, indicating a possible age around twenty to twenty-one years (Buikstra and Ubelaker 1994; Scott 1979). All of this individual's cranial sutures were open and all of the long bones observed (distal radii, distal femora, proximal tibiae, and proximal fibulae) were unfused, indicating an age of death in the mid-teens (Buikstra and Ubelaker 1994; McKern and Stewart 1957). As with Burial B, these observations seem to be in conflict, unless regional ancestry is considered (Rachel Joan Dale, pers. comm., April 18, 2011). Athabascan ancestry might explain these differences. Taking this into account, this individual was determined to be in his late teens (seventeen to nineteen years).

Burial D contained skeletal elements only from the waist down. All of the long bones present were completely fused, indicating this individual was an adult. Although incomplete, the remains included a complete right pubic symphysis exhibiting an eroded ventral margin and disfigurement, indicating an individual over fifty years of age (Buikstra and Ubelaker 1994). Additionally, this individual had a completely fused right sacroiliac joint (where tailbone articulates with pelvis) and osteoarthritic lipping on the left sacroiliac joint and first sacral element, further indicating the individual was a mature adult when he was hanged.

CULTURAL MODIFICATION AND NONMETRIC OBSERVATIONS

Assessing the ancestry of skeletal remains is not a precise science. Techniques using observed differences in the skull, particularly the morphology of facial bones and dentition, provide clues to which broad ancestral category (Caucasoid, First Nation/Asian, Black, or Hispanic) a person belongs. Coupling this information with observations of cultural modifications can provide further insight and assist in identifying unknown skeletal remains.

Burial A's complete cranium revealed many clues regarding his ancestry and background. The most obvious was a gold dental bridge extending from the left lateral incisor to the first left premolar with a porcelain canine veneer mounted in between. Also, there was prominent staining on the mandibular and maxillary molars, likely from heavy use of chewing tobacco. These observations indicate the individual had access to dental specialists and a steady supply of tobacco (Fig. 6).

The next set of observations regarding Burial A's cranium were of the nonmetric type. His orbits (eye sockets) had a slight downward angle on the sides, there was a slight anterior nasal spine at the base of his nasal cavity, and a prominent chin. His incisors exhibited no shoveling, and he had anterior crowding of his incisors, indicating his jaw was a bit too small to accommodate the size and number of his teeth. Additionally, the mandibular arcade was C-shaped, the angle of his jaw (gonial angle) was more oblique than square, and his ascending ramus exhibited a pinched appearance.

Burial B had a nonarticulated calvarium and face, making nonmetric observations difficult. Cranial fragments revealed a blurred nasal sill and what appeared to be symmetrical double mastoid processes (bony protuberance behind ear). Further inspection revealed these to be the mastoid processes and very robust digastric muscle insertions, possibly indicating robust chewing musculature in this individual (Fig. 7). (The digastric muscle extends from behind the ear to the hyoid bone in the throat under the jaw to the back of the chin. Its key function is to open the jaw and move the hyoid bone during chewing.) Other observations included a prominent chin, slightly shovel-shaped incisors, and a U-shaped mandibular arcade with no incisor crowding. The gonial angle of Burial B's jaw was more oblique than square, and his ascending ramus was parallel and nonpinched.

Burial C exhibited a partially articulated calvarium but, like Burial B, nonmetric observations were difficult due to the nonarticulated nature of the face. Cranial elements were somewhat fragmented or obscured due to coffin wear and the presence of burial matrix but appeared to show the robust digastric muscle insertion, like Burial B. Burial C's mandible exhibited a prominent chin, his incisors were shovel-shaped, and his mandibular arcade was U-shaped with no crowding of the incisors. The gonial angle of Burial C's jaw was more square than oblique, unlike those of Burials A and B, but his ascending ramus was parallel and nonpinched, like that of Burial B.

Burial D's skeletal remains consisted only of elements from the waist down, leaving few elements helpful for nonmetric determination of ancestry. This individual exhibited marked muscle attachments on his legs, indicating he may have been quite muscular and/or heavyset or overweight.

The shape of Burial A's orbits, his slight anterior nasal spine, crowded anterior teeth, C-shaped arcade, and prominent chin are consistent with those of a Caucasian individual. His custom dental work and tobacco-stained

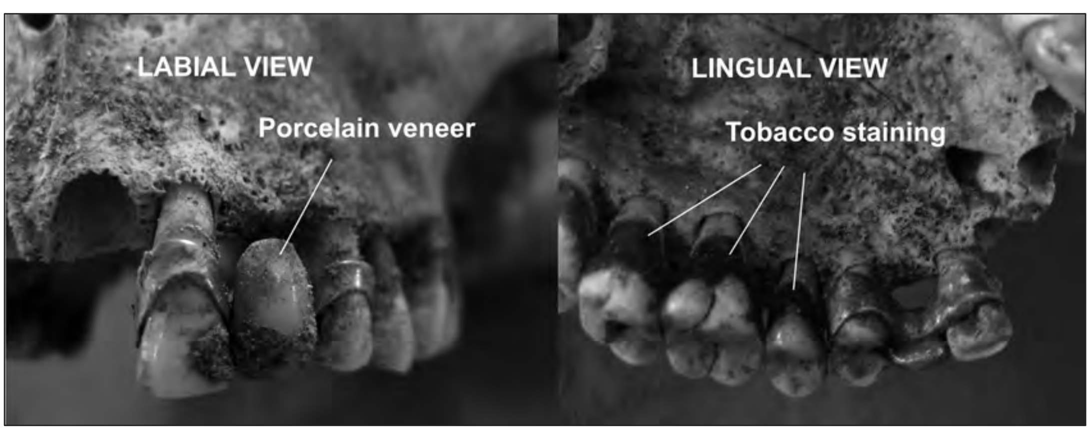

Figure 6. Burial A dentition. Left: labial view showing gold bridge and porcelain canine veneer. Right: lingual view showing gold bridge and tobacco-stained molars.

Figure 7. Mastoid process and robust digastric muscle insertion of Burial B.

teeth indicate he likely came to the Klondike from a population center with specialized services and amenities.

Burial B and Burial C's characteristics are consistent with First Nations individuals. A noted difference between the two was Burial B's gonial angle or non-squared jaw and Burial C's squared one. This could indicate variation within a particular population, the presence of two different population groups, or population admixture. Without a larger sample, it is difficult to explain the difference. Also of note was the robust digastric muscle insertions near the mastoid processes. Correspondence with colleagues in Alaska indicates subarctic Athabascan remains recovered in that region exhibit robust attachment points for chewing musculature. This trait is believed to be of a genetic rather than cultural origin (Rachel Joan Dale, pers. comm., April 18, 2011), as it is associated with the same individuals exhibiting early dental eruption and late long bone fusion from that region. Burial D's ancestral origin remains a mystery, given the incomplete nature of the skeletal remains.

PALEOPATHOLOGY

Observations of abnormal bone can provide insight into an individual's health before his death, but not all illnesses leave skeletal signatures. Observations made of the remains recovered from Fort Herchmer, however, revealed each of the individuals likely suffered from significant physical pain due to pathological conditions.

Burial A exhibited robust muscle attachments and good joints free of osteoarthritis. The spinous tubercle of the first sacral element was skewed to the left so that bone on the right side of the sacrum exhibited a slightly remodeled appearance. This indicates Burial A suffered from a soft tissue condition within the right sacroiliac region that was present long enough to push the spinous tubercle away from its centered anatomical position. Whether the origin of this soft tissue condition was infection, cancer, or some other cause is indiscernible.

Burial B exhibited osteomyelitis (infection of the bone) in the tenth, eleventh, and twelfth thoracic and first lumbar vertebrae with significant cloacae (holes). Although the origin of this infection is unknown, its location at the base of the lungs is consistent with tuberculosis (Fig. 8).

Burial C exhibited porotic hyperostosis (spongy bone) on the parietal, frontal, and occipital bones of the skull, along with marked pitting of both the maxillary and mandibular alveolar bones. This condition indicates this individual suffered from poor nutrition and severe gum disease resulting in low levels of iron in his blood prior to his death (Stuart-Macadam 1992). Whether or not this individual's low iron level was a consequence of the individual fighting a pathogen or was a direct result of malnutrition is unknown.

Burial D exhibited a completely ankylosed (fused) sacroiliac joint and a probable compressed third sacral segment, likely the result of a traumatic injury. In addition, the top and right auricular surface of this individual's first sacral element exhibited marked osteoarthritic lipping. Whether this lipping is a result of ambulatory compensation for the fused joint on the right or due to this individual's mature age is unknown, given the incomplete nature of the skeletal elements.

SELECTED PROFILES

The data on stature, age at death, ancestry, pathology, and cultural markers provide the necessary information to build identities for each individual excavated from the former grounds of Fort Herchmer.

A summary of the osteological analyses for each individual is presented in Table 3.

Klondike Gold Rush sources sometimes conflict with one another. Exact dates, locations, and proper spelling of names are almost always problematic, with rival newspapers of the day displaying contrasting attitudes toward the trials leading to the scaffold—one viewing them as a swift form of justice and the other as an endless series of procrastination and appeals (Bush 1971:17). Nonetheless, newspaper articles often describe the physical appearance of the individuals on trial. Typically, however, the convicts' ages were not noted in the press unless he was rather young (teens), or appeared to be in his fifties or older. Comparison of the data collected from the osteological analyses to these articles, as well as other historical records and oral histories, help determine identities for each of the individuals excavated at Fort Herchmer.

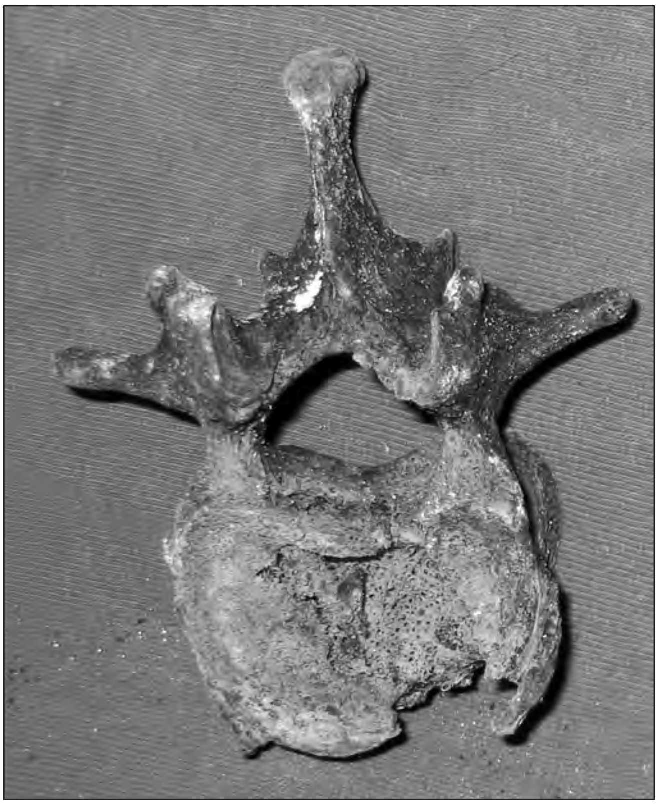

Figure 8. Superior view of L1 vertebra showing evidence of osteomyelitis on Burial B.

Selected profiles are presented for five of the ten men hanged at Fort Herchmer, detailing the circumstances that led each to the gallows. A discussion of how the osteological analyses coincide with each follows.

Edward Henderson

Edward Henderson left Seattle for the Klondike gold fields and went over the Chilkoot Pass with his former co-worker, George Gale, and another companion, Tomburg Peterson (Grove 1995:95; *Klondike Nugget* 1898). Described as "peevish" and "irritable," likely because of pain, Henderson needed to urinate in a small tin can every ten to fifteen minutes on the trek (Coates and Morrison 2004:25). His condition, described at the time as "catarrh of the stomach," involved the discharge of blood in his urine and allowed him very little sleep. Henderson also endured constant ridicule from his traveling companions (Grove 1995:95).

By autumn, the three made it as far as Marsh Lake and decided to camp (Grove 1995:95), Henderson and Peterson in one tent and Gale in the other. Gale was awakened by an altercation and pistol shot in the early hours of the following morning (*Klondike Nugget* 1898) and found Peterson had been wounded. Henderson claimed a tin cup

Table 3. Summary of osteological analyses

Burial	Initial Observations	Probable Ancestry	Estimated Stature/ Range	Estimated Age at Death	Pathological Condition
Burial A	commingled with Burial B	Caucasian	177.9 cm (~5'10.0")	mid-to-late 30s	soft tissue malady near right sacroiliac region
Burial B	commingled with Burial A	First Nation	176.3 cm (~5'9.4")	early 20s	bone infection of T10, T11, T12, and L1 vertebrae consistent with tuberculosis
Burial C	in situ	First Nation	unknown	17–19 yrs	nutritional imbalance and gum disease
Burial D	complete from waist down	unknown	169.3 cm (~5'6.6")	+50 yrs	fused right sacroiliac joint, compressed sacral segment, and osteoarthritic lipping

containing his urine had spilled on Peterson's bedroll and he awoke to Peterson kneeling on his groin and choking him (*Klondike Nugget* 1898). Henderson claimed he shot Peterson in self-defense. Peterson died the next morning. At trial a year after the incident, Dr. H.A. Bonner testified Peterson's wounds were inconsistent with Henderson's story. During trial it was shown Henderson had become irritated with the violent-tempered Peterson for teasing him to "the point of frenzy" and had threatened Peterson's life. Henderson claimed to have been "sick in bed for a year" prior to his trip to the gold fields, and was still in so much pain he "could barely stagger to the prisoner's box." Henderson was given morphine, which reduced his irritability, but he continued to suffer as a result of his condition and never changed his story. The jury refused to believe his unsupported testimony and "did not recognize his irresponsibility on account of his illness" (*Klondike Nugget* 1898). Edward Henderson was hanged on August 4, 1899.

Jim and Dawson Nantuck

Jim, Dawson, Joe, and Frank Nantuck, "brothers" in the Crow clan of the Tagish Kwan, befriended two miners, Christian Fox and William Meehan, along the banks of McClintock Creek near Marsh Lake in early May 1898. The miners had attempted to make a spring foot trip to Dawson City prior to breakup using pathways along frozen creeks in hopes of avoiding a boat trip through the dreaded Whitehorse rapids (Grove 1995:88). The miners broke through the ice, got soaked, doubled back, made camp on the muddy banks of the creek, and grudgingly decided to build a boat and float to Dawson City with the rest of the stampeders (Grove 1995:88). Frank and Joe Nantuck were hunting in the same area; they came into the prospectors' camp and asked for food. Over the next few days, Frank, Joe, and their brother Dawson camped nearby and made friendly visits as the miners built their boat and the brothers borrowed tools to build a raft. The brothers finished their project, returned the tools, and floated a short distance down the creek to their own camp where they were joined by their brother, Jim, and some others. Fox and Meehan were "disturbed" by the way the group across the creek was acting and decided to pack and leave the next morning. The two miners struck out at 11 AM and twenty minutes later were shot by the Nantucks. Fox was shot first in the arm and badly wounded; Meehan was shot second and killed instantly. Fox slumped low in the boat so as not to be seen and used his good arm to paddle to the opposite shore from where the shots had been fired. Upon reaching the shore he ran into the woods to escape. He carefully walked on logs and grass to hide his trail and headed toward the mountains. Eventually, he lost the use of his wounded arm and tied it to his side.

Fox walked six miles south to Bill McIntosh's camp near Marsh Lake. McIntosh entrusted Fox to the care of a local physician then dispatched an employee to the NWMP post in Tagish and sent his partner and some others to Fox and Meehan's camp site, where they found a bloodied and bullet-ridden boat with no body. Within two weeks the NWMP found Jim Nantuck and discovered that he and his brothers had submerged Meehan's body in eighteen feet of water by weighing it down with a pick-ax. The police recovered Meehan's body and arrested the four Nantucks, taking them to Tagish Post to await a trip to Dawson City for arraignment (Fig. 9). The Nantucks were chained together in a public area and were photographed and/or sketched by numerous stampeders en route to the gold fields (Cruikshank 1989:28; Healy 1898:10) (Fig. 10). Described as being between fourteen and twenty years old, the four were questioned by a Presbyterian missionary about the incident (Dickey 1898:72). They admitted to killing Meehan and seemed ashamed of their poor marksmanship in not killing both men (Dickey 1898:72).

Oral accounts from Tagish elders provide a possible explanation for the boys' actions, recounting two deaths in the Crow clan the previous summer when an elderly woman found or was given a small can of white powder (Cruikshank 1989:30). Thinking the powder was baking soda, the woman used it to bake bread and fed it to her husband and grandson, who then died. Later it was discovered the white powder was arsenic, used in the gold refining process (Cruikshank 1989:30). Conventional Tagish/Southern Tutchone conflict resolution dictated if a victim was of one clan and the attacker a member of another clan, formal negotiations were necessary to arrange fair compensation for the deaths, which could include repayment in goods or the deaths of "social equivalents" (Cruikshank 1989:30). The social group to which the attacker belonged had the responsibility of opening negotiations (Cruikshank 1989:30). From the Nantucks' perspective, the Crow clan had been wronged by the "White" clan. Since the members of the "White" clan did not open negotiations during the brothers' many visits to their camp, the Nantucks decided the miners were social equivalents for the deceased (Cruikshank 1989:30).

A trial was held July 28, 1898, in Dawson City, at which Jim, Dawson, and Joe pled guilty and were sentenced to

Figure 9. Nantuck brothers chained together at Tagish Post. Frank Nantuck, the youngest, is in the middle. Jim Nantuck is second from the right between Frank and an unidentified NWMP officer. Joe and Dawson Nantuck are on the left, but are not identified individually. National Archives of Canada, RG13, Series C1, vol. 1434.

Figure 10. Sketch of the four Nantuck brothers imprisoned at Tagish Post, by Leon Boillot, 1898 (Boillot [1899] 2010).

hang for murder (Dickey 1898:72; Canadian Department of Justice 1898). Frank, the youngest, who spoke some English and provided testimony, was also sentenced to hang, but with a strong recommendation for clemency from the court. These sentences were delayed, however, because the trial had taken place after Dawson City came under the jurisdiction of the Yukon Territorial Court (June 13, 1898), but it had been heard by the Supreme Court of the Northwest Territories. Writs of habeas corpus were filed and the sentencing delayed while letters traveled overland between Dawson City and Ottawa. In February 1899, Frank and Joe Nantuck died in custody from complications of consumption (tuberculosis) and scurvy (Canadian Department of Justice 1899; Grove 1995:102). Jim and Dawson Nantuck were hanged alongside Edward Henderson on August 4, 1898.

Alexander King

Alexander King arrived on the Kenai Peninsula of Alaska in 1888 from Sacramento, California (Carlson and Bill 2006:136; *Klondike Nugget* 1900a). He convinced Captain Charles Swanson to grubstake him for two summers and a winter, then rowed an "old, sorry-looking dory up Turnagain Arm" looking for gold (Carlson and Bill 2006:136; McKinney 2007). Given the deadly bore tides of Turnagain Arm, this was a worthy feat in and of itself, and King was not expected to return, but return he did late the second summer with four pokes of gold (Carlson and Bill 2006:137). King paid off his grubstake debt then went to look for the mother lode, staking his claim on Resurrection Creek in 1893 and forever putting the Kenai Peninsula on the map (Carlson and Bill 2006:137).

By July 1900, King had moved to the Yukon Territory and taken a position on a scow crew out of Whitehorse (*Klondike Nugget* 1900c). The scow was captained by Herbert Davenport, who had made several river trips already that season. The crew included "Chas" Everett, Lester Knouffe, and King for the trip to Dawson City (*Klondike Nugget* 1900c). As was the norm for freight travel when the river was muddy, the scow kept running into sandbars, which reportedly enraged the fifty-four-year-old King (*Klondike Nugget* 1900a, 1900c). On the evening of July 18, the scow stopped at yet another sandbar near the White River confluence. Davenport and Everett got into a small boat to seek out the river channel. As they returned to the scow, King leveled his .44-caliber rifle at Davenport and said, "You have bum-fuzzled us fellows long enough." King shot the scow captain, killing him instantly (*Klondike Nugget* 1900c). King then trained the rifle on Everett and Knouffe until they promised to swear Davenport had been shot by accident. Everett and Knouffe then persuaded King to leave Davenport's body on the scow and continue to Dawson City with them in the boat. Within hours of their arrival, King's companions "ratted" him out to authorities (*Klondike Nugget* 1900c). On October 2, the short, thick-set, grey-bearded King was hanged (*Klondike Nugget* 1900a, 1900b). NWMP files contain correspondence regarding the placement of King's remains that suggest he be placed outside, but near, the NWMP barracks square, "alongside the bodies of the Nantucks and Henderson" (Neufeld 2010).

Anthony Nestor Elfors

Anthony Nestor "Ned" Elfors, born in Finland in 1853, traveled to the Yukon from Seattle in the summer of 1908 with two companions, David Bergman and Emil Anderson, another Finn (*Dawson Daily News* 1908a). The three left Whitehorse on Saturday, May 16, 1908, by boat. By the first week of June, they were ten miles south of Fort Selkirk (*Dawson Daily News* 1908a). Elfors awoke Anderson one morning and asked him to help bring out a bear he had killed earlier. After walking a mile or so, Elfors told Anderson to go ahead of him, then pulled a .32-caliber revolver and shot Anderson in the jaw from behind (*Dawson Daily News* 1908a). Anderson, twenty-three years old, lean and 5'7," wrestled with Elfors, who was fifty-five, thin and 5'4," while Elfors continued to try and shoot him in the head and face (*Dawson Daily News* 1908c). Anderson overpowered and pinned Elfors down, then plunged into the woods and ran to Fort Selkirk wearing no shoes (*Dawson Daily News* 1908a). Anderson reported to police at Fort Selkirk he did not know what had happened to Bergman, as he had not seen him since retiring the night before (*Dawson Daily News* 1908a).

Within a few days, police found Elfors' camp and quietly approached the tent, removing his rifles before awakening the sleeping man (*Dawson Daily News* 1908a). Elfors and Anderson were transported to Dawson City, where Anderson had the bullet removed from his jaw and authorities matched it with the caliber of Elfors' pistol (*Dawson Daily News* 1908c). Bergman's body was eventually found, and Elfors' trial was set for July 6, 1908. Elfors was reportedly hard of hearing and said he could not understand half of what was said at his arraignment (*Dawson Daily News* 1908b). At trial he did not speak, so his jailer, Sergeant Edward Smith, retold the story Elfors had told him. Elfors claimed he went hunting the morning of the incident, got two rabbits, hung them in a tree and then went back to camp for coffee, not knowing where Bergman had gone. He claimed he and Anderson had merely had a fight, and that he shot Anderson while the younger man was on top of him (*Dawson Daily News* 1908a). The prosecution argued Elfors, who was right-handed, could not have shot Anderson in the back of the right jaw from below (*Dawson Daily News* 1908b). The jury convicted Elfors and he was hanged on October 6 after confessing to the murder of David Bergman (*Dawson Daily News* 1908a).

DISCUSSION

The ten hangings carried out at Fort Herchmer occurred on seven different occasions. On one occasion, August 4, 1899, three men were hanged on the same day—Edward Henderson, Jim Nantuck, and Dawson Nantuck. Burials A, B, and C were found to be directly adjacent to one another and at the same depth below the surface, 2.7 m, implying the three were interred at the same time. Additionally, lime associated with these burials was very similar, yet differed significantly from lime associated with the fourth burial.

Edward Henderson was a Caucasian male, thirty-five to forty years of age. He came to the Yukon from Seattle, and his need to urinate in a tin cup every ten to fifteen minutes was well documented. Osteological analyses indicated Burial A was that of a Caucasian male, approximately 177.9 cm tall, in his mid-to-late thirties at the time of death, sported a golden smile and tobacco-stained teeth, and exhibited a soft tissue malady in his right sacroiliac region consistent with the condition described for Mr. Henderson.

Jim Nantuck was a First Nation male from the Tagish Kwan territory, in his early twenties, and the tallest and oldest of the four Nantuck brothers (Canadian Department of Justice 1898; Dickey 1898:72). He was incarcerated with his brothers, two of whom were known to have died in NWMP custody from tuberculosis and scurvy. Osteological analyses indicated Burial B was that of a First Nation male, approximately 176.2 cm tall, in his early twenties at the time of death, who exhibited bone infection of four vertebrae consistent with tuberculosis.

Dawson Nantuck was a First Nation male from the Tagish Kwan territory, in his teens, and one of the middle two Nantuck brothers (Dickey 1898:72). Osteological analyses indicated Burial C was that of a First Nation male, in his teens at the time of death, who exhibited pitting on his skull and alveolar bone consistent with someone who suffered from nutritional imbalance and gum disease.

The fourth burial (D) was found 15 m to the north of the first three burials, at a similar depth, and by itself. Lime associated with the fourth burial resembled large, thick blocks. Osteological analyses indicated this individual was a male, approximately 169.2 cm tall, over fifty at the time of death, whose leg muscle attachments suggested an extremely muscular and/or heavy-set individual. This individual also exhibited a completely fused sacroiliac joint, a compressed sacral element, and osteoarthritis.

Only two individuals hanged at Fort Herchmer are known to have been over fifty years old: Alexander King (fifty-four) and Nestor Elfors (fifty-five) (*Dawson Daily News* 1908c; *Klondike Nugget* 1900a). Alexander King is described in newspaper accounts of the day as short and thick-set (*Klondike Nugget* 1900a), while Nestor Elfors is described as 5'4," thin, and "perhaps one of the smallest men in stature ever in Dawson" (*Dawson Daily News* 1908a). Burial D's stature and overall build are more consistent with newspaper descriptions of King than of Elfors. Further, King was reported to have stood on a scow and shot his victim before rowing to Dawson City, while Elfors is reported to have walked over a mile to shoot one of his victims and admitted prior to hanging that he had fought with the same individual. King's upper body actions are more consistent with an individual exhibiting a completely fused sacroiliac joint and osteoarthritic lipping than are Elfors' actions, which would have required greater mobility.

Since newspaper accounts from the time are known for exaggeration, further evidence is needed to assign Burial D's identification. An unsigned letter to the commanding officer of the Yukon Territory NWMP from the commissioner, dated October 2, 1900, gives permission for the body of Alexander King to be buried outside, but close to, the barracks square and suggests it be placed "alongside the bodies of the Nantucks and Henderson" (Neufeld 2010). Whether or not 15 m is close enough to be considered "alongside" is unknown. Newspaper accounts from October 6, 1908 (*Dawson Daily News* 1908d), report Elfors' body was placed in a crude box and interred beside the slough which runs through the barracks yard, consistent with the location of all four of the burials salvaged from the grounds of former Fort Herchmer.

CONCLUSION

The goal of the skeletal analyses was to be as noninvasive and respectful as possible, yet still determine individual identifications when compared with archaeological context and archival information. In so doing, Burial A's identification was assigned as Edward Henderson. Burial B's identification was assigned as Jim Nantuck. Burial C's identification was assigned as Dawson Nantuck. Burial D's identification was left unassigned, but noted as being consistent with Alexander King.

REBURIAL

Following the analyses of the individuals from Fort Herchmer, the Tr'ondëk Hwëch'in First Nation managed the process of deciding how to proceed with the reburial of Jim and Dawson Nantuck, while the Yukon Government managed the process of how to proceed with the reburial of Edward Henderson and King or Elfors. The Tagish Kwan of 1898 is now represented in the Yukon by their descendants in the Carcross/Tagish First Nation, the Kwanlin Dün First Nation, and the Ta'an Kwäch'än Council. Elders from these three self-governing First Nations decided against any further testing (e.g., DNA analyses), as they felt it more respectful and in line with their traditional beliefs and values to rebury the two men as soon as possible near their initial burial site. Likewise, the Yukon Government decided to rebury Henderson and King or Elfors in the cemetery closest to their original interment location.

On Saturday, June 11, 2011, all four individuals were reburied. A private and media-free ceremony was held in the city cemetery beside gravesites donated by Dawson City. Over twenty individuals representing Dawson City, the Yukon Government, the Tr'ondëk Hwëch'in First Nation, the Carcross/Tagish First Nation, the Kwanlin Dün First Nation, and Corix Water Services were in attendance.

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MAKING YOUR CASH GO A LONG WAY: FIVE CHINESE COINS IN THE SOUTHERN YUKON AND NORTHWESTERN BRITISH COLUMBIA

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ABSTRACT

Recent discoveries of Chinese coins minted in the early fifteenth, late seventeenth, and early eighteenth centuries have rekindled interest in their protohistoric and early historic modes of transport from China to the interior of the Yukon and northwestern British Columbia. Russian and British trading may have provided the link between China and coastal Tlingit peoples who carried or traded the coins into the interior. Historic Chinese placer miners in the late 1800s and early 1900s may have also carried these coins with them as lucky charms, amulets, or gaming pieces. While small components of site assemblages, the coins represent significant and expansive patterns of culture contact and movement in the North.

INTRODUCTION

Two archaeological fieldwork efforts in the Yukon during the summer of 2011 each identified a Chinese coin (sites KdVf-7 and JeUn-1). These were the second and third Chinese coins found in the Yukon in archaeological contexts. The first Chinese coin was found in 1993 by Keary Walde at site KbVo-1 near Beaver Creek. None of these three sites yielded additional historic materials, but they did produce lithic debris from stone tool manufacture. In the fall of 2011, a private collector notified the Yukon Heritage Branch of two additional Chinese coins found just across the border in an abandoned mine site in northern British Columbia on the Fantail River by Tagish Lake. The minting dates of these five coins range from approximately AD 1408 to 1727 (based on Hartill 2005:247, 295). Overviews of coin manufacture and historic trade are presented below. These are followed by a short summary of Chinese coin use in the protohistoric and early historic periods of the Northwest Coast and the interior of the Yukon and British Columbia. Locations where the coins were found are discussed, along with dates and locations of mints. Historical records and archaeological finds indicate the Yukon experienced widespread and complex culture contact that ranges from precontact trade between coastal and interior First Nations to the influx of diverse ethnic groups during historic-period gold rushes.

CHINESE CAST COIN MANUFACTURE

The coins identified in this paper were minted during the Ming (AD 1368–1644) and Qing (Ch'ing) (AD 1644–1912) dynasties and were mass produced by the cost-effective method of casting. During this period, "mother" coins were first created by carving in a softer material such as tin. Casting frames of tightly packed, fine-grained sand were sprinkled with coal or charcoal dust, which acted as a molding agent to improve casting. The mother coins were placed near each other along a central line, which gave the appearance of a long thin "tree" of fifty to one hundred coins (Bowman et al. 2005:5; Hartill 2005:xviii). This first frame would imprint one side of the coin. A second frame was placed on top of the mother coins to imprint the other side. Then the mother coins were removed, the top and bottom of the first two frames were placed together and the mother coins were placed on top of the second frame. The process was repeated and multiple frames with molds in the packed sand were tightly bound together. Molten alloy was poured down the central lines of the casting trees and allowed to cool. The frames were opened and each coin was broken off, cleaned, and placed on a long square rod through the central hole. This allowed large numbers of coins to be turned at the same time while the casting spurs were filed off. The coins were then cleaned and strung together in groups of approximately one thousand, called "strings." The number of coins per string varied depending on the value of the coins as well as the local customs or markets. Various finishes and coatings were applied (Hartill 2005:xviii).

The value of the individual coins was assigned by weight, but shortages of copper and forgery attempts caused Chinese emperors to make changes to control production. A few relevant changes are noted here. The coins minted during these two dynasties had four characters on the obverse of the coin. These characters were read from top to bottom and right to left. At the beginning of the Qing Dynasty (AD 1644) the coins were minted at the Board of Revenue and the Board of Works (and at some provincial mints), and these did not have any inscriptions on the reverse. In 1645 the provincial mints started producing coins with one inscription on the reverse to show mint location. In 1653 the style changed to include two characters on the reverse, one of which stated the coin value was 1/1000 of a liang (approximately 36 grams) of silver (Keddie 1990:18). By 1660 the character on the left side of the reverse had changed to the Manchu equivalent of the name of the mint while the Chinese name of the mint was shown on the right (Hartill 2005:281).

During the Ming and Qing dynasties, coins were basically six or seven parts copper and three or four parts zinc, but the ratios of these and other metals changed over time. Coins with a higher copper content were more valuable as copper was in higher demand. By 1683, the shortage of copper induced an official decision to allow a higher ratio of zinc, at 40% (Cowell et al. 2005:66). Since some coins were thought to possess more monetary or luck value as charms or amulets, these were often conserved to be passed on or traded at a later date. In contrast, the value of some of the coins decreased over time, and many became almost worthless and were simply thrown away. Therefore, it was possible for individual coins minted hundreds of years apart to be restrung together. As the Chinese became more involved in international trade in the 1700s and 1800s, the value of cast coins was reduced, and by 1845 a liang of silver could purchase approximately 2,200 cast copper coins (Keddie 1990:18).

CHINA–YUKON TRADE INTERACTIONS

We define as protohistoric any Asian or European materials that reached the Northwest Coast and were subsequently traded into the interior prior to written first-hand accounts (for discussions of the trade in metal at this time, see Keddie 1990:2; McCartney 1988:57). Other indicators of the protohistoric period are the arrival of the first non-native diseases and information concerning non-natives. Therefore, dates for the protohistoric period vary from place to place. It is difficult and perhaps impossible to determine when the first Russian, Asian, or European influences began to impact First Nation people in the Yukon interior. News of early non-native shipwrecks and explorers and traders may have travelled inland along First Nation trade routes with foreign items such as metals, cloth, glass beads, and, later, tobacco and other goods.

"Drift-iron" refers to metals and other materials that wash ashore following shipwrecks. Historical accounts of shipwrecks in the region date to the mid-1700s, but much earlier wrecks are possible (Brooks 1875). Metals and other foreign trade items may have been obtained on the coasts of Alaska or British Columbia from Asian or European shipwrecks (Quimby 1985), likely due in part to the Kuroshio (Black Stream) or Japanese current, which flows east from Japan past the Aleutian Islands, the Gulf of Alaska, and along the Northwest Coast (Fig. 1) towards California (Callaghan 2003). This current carried both willing and accidental seafarers to the east. Travel times for materials caught in the current vary, but in one 1916 example a damaged Japanese fishing boat drifted across the Pacific Ocean to the Dixon Entrance of Haida Gwaii in twenty-four days (Emmons 1991:10).

Some of the first far-reaching effects in the protohistoric period of the Yukon interior may stem from Russian exploration in the early and mid-1700s and other Asian

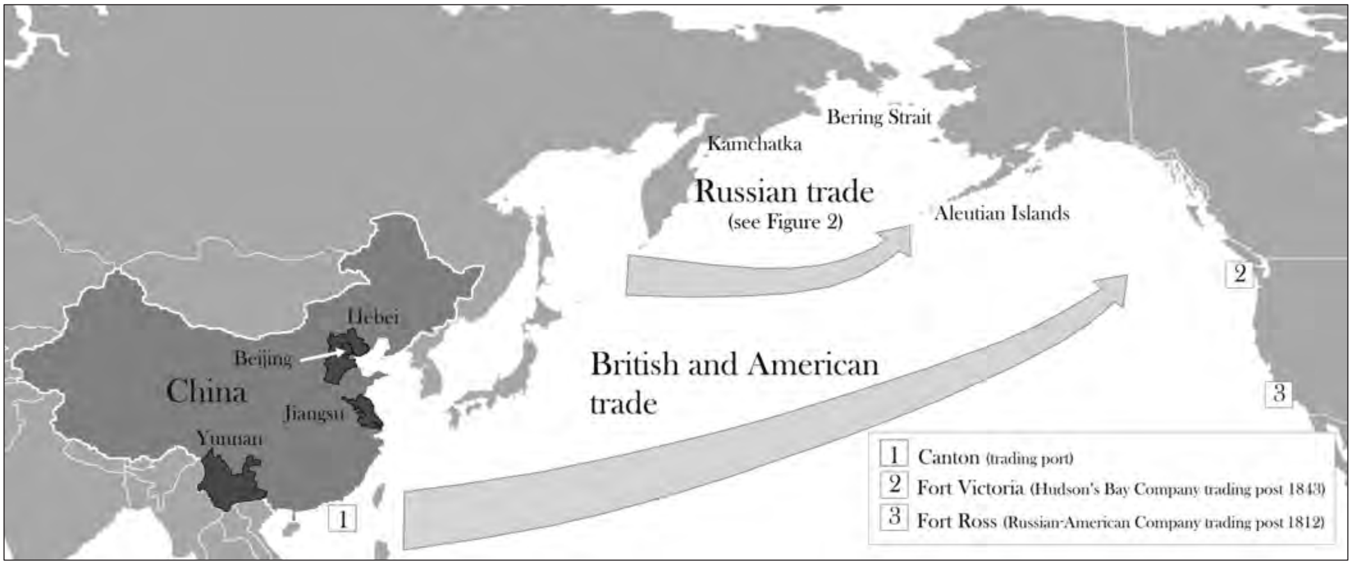

Figure 1. General trade from north China and Japan to Alaska via the Russians and from South China to the Northwest Coast via the British and Americans.

and European exploration and contact with coastal communities (Andreev 1952; Quimby 1985; Veniaminov 1984). This includes the actions of early European privateers known to have travelled along the Pacific Coast of North America between 1575 and 1742 (e.g., Cook 1973; Schurz 1959). However, it was well known that the Chilkat Tlingit travelled and traded with many interior First Nation peoples (e.g., Abel 1993; Castillo 2012; Davidson 1901; Legros 1985; McClellan 1975; Olson 1936). These interior peoples included the Northern Tutchone from the Dawson, Mayo and Selkirk areas and occasionally the Mountain Dene people from as far away as Fort Norman on the Mackenzie River in Northwest Territories. The Tlingit protected and controlled the trading routes into the interior and fiercely defended those routes when they were threatened. The main trade routes into the interior of northern British Columbia and the Yukon were up the Stikine and Taku rivers, over the Chilkoot and Chilkat passes, and along the Alsek River from Dry Bay in the Yakutat area (e.g., Davidson 1901; Emmons 1991:55; Mahoney 1870:20).

Based on written accounts by the early 1700s, Russian Tsar Peter I (Peter the Great) ordered an expedition that would travel from Kamchatka to America (Dmytryshyn et al. 1988). In 1728, Vitus Bering sailed from the mouth of the Kamchatka River northeast along the Russian coast, then through the strait that now bears his name. He did not sight the American coast on this expedition and returned to Russia, where plans were laid for a second voyage in 1741. Early exploration efforts were also made by the Dutch (Veniaminov 1984:63), the Japanese (Quimby 1985), and the Spanish (e.g., Andreev 1952; Olson 2002), all of which may have influenced Native populations.

Bering's second voyage in 1741 opened the Russian era of exploration and settlement in Alaska. News of Bering's explorations spread quickly, nationally and internationally. The Russian reports of rich marine resources and, in particular, the news of the luxurious sea otter pelts increased international trade in the region. This early exploration in the Russian era involved hundreds of *promyshlenniki* (private traders) who reached the Commander Islands two years after Bering's first voyage and reached Kodiak Island by 1762 (Black 1984:81).

By 1784, Grigorii Shelikhov had built a trading company and established a settlement at Three Saints Bay on Kodiak Island (Fig. 2). From this base his traders expanded outward to other islands and the mainland (Clark 1984). As exploration continued, the Russian government continued to assert its control in the area within a field of growing international interests. The Russians were not alone: Cook's voyage of 1776–1780 and Vancouver's voyage of 1791–1795 played critical roles in mapping and exploring the area for the British (Fig. 1).

In 1792, Alexander Baranov was put in charge of Shelikhov's company, renamed the Russian-American Company, which built temporary trading and defensive posts on some of the islands and coastal harbors (Black 1984, 2004; Grinev 1993; Hosley 1981; VanStone 1984). These posts helped to open Alaska to the fur trade. The

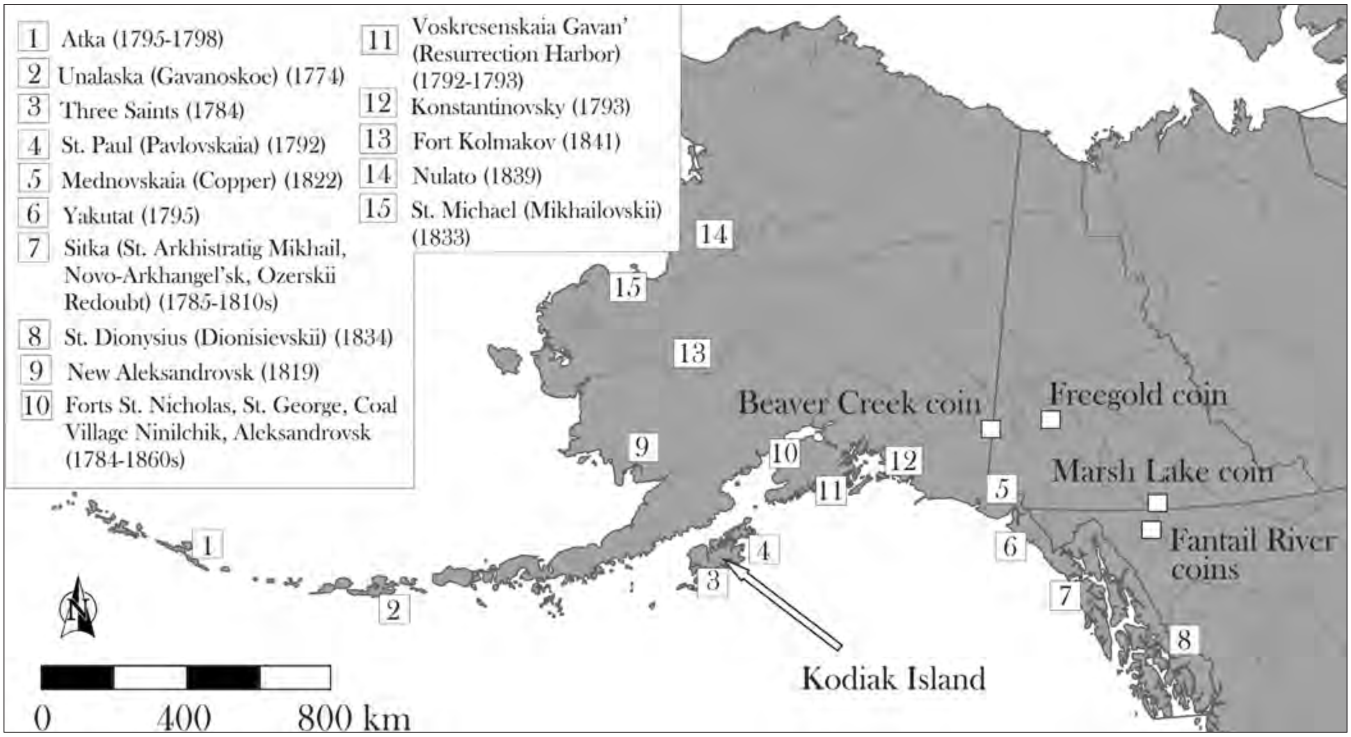

Figure 2. Early Russian settlements in Alaska in relation to Yukon coin finds (Black 1984, 2004; Grinev 1993; VanStone 1979).

first half of the nineteenth century was a period of sustained maritime exploration, and the Russian-American Company extended its empire to Fort Ross in California. Of particular interest to interior trade were the Russian establishments at Yakutat, Sitka, Mednovskaia, and St. Dionysius in the late 1700s and early 1800s (Fig. 2) (Black 1984, 2004; Grinev 1993; VanStone 1979).

The British realized the potential to trade sea otter pelts from coastal indigenous people to a ready market in South China (Grinev 2005). An estimated thirty-five British fur trade ships reached the Northwest Coast between 1785 and 1794 (Grinev 2005:97). Cold waters, abundant food, and sheltered harbors resulted in otter pelts of exceptional quality, which were sold and traded in China for tea, silk, and porcelain that were brought back to Europe (Gough 1989:251–252). Principal trade contacts for the British were coastal Tlingit and Haida. These First Nations were particularly accomplished traders whose interaction spheres extended from Vancouver Island to the eastern Yukon (Emmons 1991:56–57; Fitzhugh and Crowell 1988:238; McClellan 1987:234–235).

The coastal Tlingit traded with Eyak, Chugach, and interior Athabaskans of Alaska and Yukon (Grinev 2005:215). Major rivers and trails brought candlefish (eulachon) oil, dried shellfish, seaweed, shells, obsidian, walrus ivory, spruce root baskets, tobacco, traditional medicines, metals, and handicrafts to the interior, while Athabaskans supplied Tlingit traders with furs; elk, moose, and caribou hides; cloaks of marten, mountain goat, and marmot; clothing decorated with porcupine quills; sinew; and meat (Krause [1885]1956:108; Legros 1984:17–18; 2007:48–49; McClellan 1975:502; Olson 1936:211). European and Russian contact likely extended Tlingit trade networks, based on nineteenth-century records of visits between Tlingit and Ahtna, Northern Tutchone, Hän, Kaska, and Sekani First Nations (Grinev 2005:216–217).

The trading cycle that developed can be summarized as a Russian, British, and American reliance on indigenous hunters to collect pelts that were traded for metals, including weapons; blankets; cloth; and miscellaneous mass-produced low-cost items such as glass beads and Chinese coins. The coastal peoples, such as the Chilkat Tlingit, traded foreign items along with traditional coastal materials. The Russians retained connections to trading centers in North China and Japan while British and American traders used southern Chinese ports (Fig. 1). Indigenous peoples of the Yukon and Alaska therefore fueled an international exchange system that connected fur markets at Chinese and European ports to Russian, British, and American traders. Pre-existing networks between coastal

Tlingit and interior Athabaskans were drawn into an international system that delivered sea otter and beaver pelts from the Northwest Coast and Yukon First Nations to upper-class Chinese and Europeans (Epstein et al. 1980:11).

Control of the trade routes played a major role in Tlingit society, and threats to their interior relationships were not taken lightly. This was very evident in 1852, shortly after the Hudson's Bay Company opened Fort Selkirk on the Yukon River. A Chilkat Tlingit raiding party travelled inland and forced Robert Campbell and his crew to leave the trading post, which was consequently burned by the Northern Tutchone (Castillo 2012:212). Fork Selkirk was reached by travelling over the passes from the head of Lynn Canal down into the headwaters of the Yukon River. However, while travelling south back to the coast, people could also travel along a "Chilkat Return Trail" east of Aishihik Lake, on to Dezadeash Lake and south to the Chilkat Pass (Fig. 3).

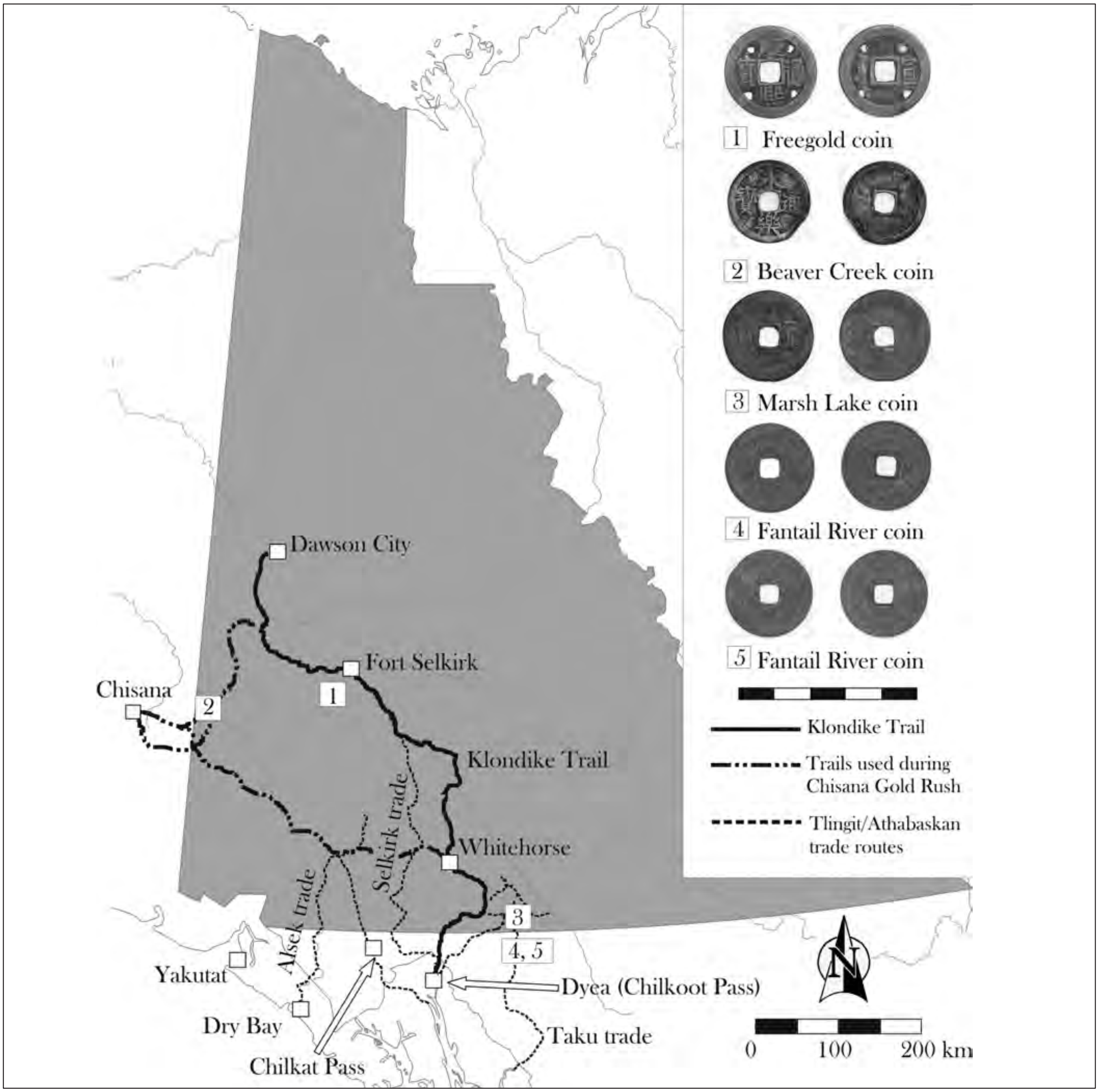

Figure 3. Yukon coin locations in relation to trade routes and gold rush trails.

PROTOHISTORIC AND EARLY HISTORIC USE OF CHINESE COINS

Billions of Chinese coins were cast in the seventeenth century alone, and many thousands of them were brought to North America and used for a variety of purposes. In the eighteenth century casting increased to almost four million strings (with about one thousand coins per string) per year (Hartill 2005:275). Some of the earliest uses of the coins by coastal and interior indigenous people may have been for decoration and adornment, by stitching the coins through the center hole into headdresses, baskets, and clothing (Akin 1992; Beals 1980:61). Another early use included a defensive and/or decorative role in Tlingit body armor, which was modified to include coins and metal in attempts to deflect Russian musket balls (Henrikson 2008:394; von Aderkas and Hook 2005:45). Many historic accounts note how Chinese coins were stitched into leather armor jackets or cuirasses (e.g., Emmons 1991:344; Fitzhugh and Crowell 1988:231). After fighting with the Russians decreased, the use of coins in ceremonial dance vests and as decorations may have increased, as with other rare goods that were used as displays of wealth (Beals 1980:62; Kan 1993:224) (Figs. 4, 5). Chinese coins were also used well into the early 1900s as decorations in hair and adornments for the deceased (Beals 1980:62; Keddie 1990:8). One of the better known examples of use of Chinese coins was in the Chilkat Tlingit mask that was portrayed in a 1980 fifteen-cent U.S. postage stamp (Keddie 1981, 1990:15).

In the mid-1800s, Chinese immigration increased and in the northwest interior of British Columbia Chinese immigrants used coins as good luck charms, gaming tokens, "coin swords" (sword-shaped decorations made from many coins), and medicinally (extracting zinc from the coins) (Akin 1992:63). It is uncertain when the first Chinese immigrants entered the Yukon, but the total number of immigrants seems to have been relatively small. Census numbers were not recorded until 1901, when six Chinese were noted for the entire Yukon (Library and Archives Canada 1901). The first Chinese immigrants were likely placer miners and prospectors who moved north from previous central and northern British Columbia gold rushes; a few Chinese moved into the southwest Yukon after mining in the Cassiar district of northwestern British Columbia. The Chinese were very active in that area, as detailed by Lai (1978:24) and summarized by Keddie (1981:8). Records of the British Columbia Ministry of Mines (1877:400–401) show Chinese made up approximately one-third of the thousands of men involved in placer mining in that area between 1874 and 1877. A Chinese "talisman" or temple token coin was identified from the Cassiar placer mining district in 1882 as part of a group of about thirty brass coins strung on a wire. The temple token or talisman was first thought to be up to three thousand years old. However, further investigation revealed it was likely minted between approximately AD 900 and 1900 (Keddie 1981:8, 1990:10). Keddie concluded this coin was likely brought over by Chinese miners or deposited in a First Nations burial that was disturbed by miners (Keddie 1990:10).

It is unlikely that Chinese placer miners entered the Yukon during or shortly after the Klondike Gold Rush, due to public and political pressures of the time. North West Mounted Police Inspector Constantine recounted an event in the spring of 1894 when a party of Japanese and Chinese tried to pass through "Dia-yah" (Dyea) in Alaska Territory to the interior in search of gold. However, after a meeting by a group of approximately two hundred whites, the Japanese and Chinese were not allowed to enter the Yukon. A group of whites confronted the would-be miners and threatened them, saying that if they valued their lives they would not proceed (*British Colonist* 1895:7). The Japanese and Chinese miners did not continue, but it is not clear where they went following the confrontation.

Chinese immigration into Canada starting in the late 1800s was restricted by pressure from the Canadian federal government in response to fears that Chinese laborers were taking jobs away from other Canadians. Policy included passing two laws to restrict Chinese immigration. The first was the "head tax" law passed in 1885 that required every Chinese immigrant to pay a $50 entry fee, which was a significant burden. However, immigration continued, because a Chinese laborer could earn $30 a month in Canada compared with $2 a month in China. In response, the Canadian government increased the tax to $100 in 1900 and increased it again to $500 in 1903. This was followed in 1923 by the passage of the Chinese Immigration Act, which prevented all Chinese except consuls, merchants, and students from entering Canada. This act remained in effect until 1947. In summary, it is possible that Chinese coins were tokens retained by Chinese immigrants, but the coins appearing in Alaska and Yukon may have also been exchanged between Russian, British, and American traders and coastal and later interior First Nations people.

Figure 4. Tlingit war vest with attached Chinese coins. Courtesy Department of Anthropology, Smithsonian Institution (cat. no. E9284-0).

Figure 5. Tlingit dancing vest with attached Chinese coins. Courtesy Department of Anthropology, Smithsonian Institution (cat no. E60241-0).

CHINESE COINS IN THE YUKON

BEAVER CREEK COIN

The Beaver Creek coin (Figs. 3, 6) was discovered in the summer of 1993 by Keary Walde of Heritage North Consulting Ltd. while working on a salvage program at KbVo-1 (Walde 1994) near the Alaska Highway in southwestern Yukon. The site was previously identified during an archaeological assessment for planned improvements to the highway near Beaver Creek as part of the Skakwak Project (Walde 1991). This site is located on a well-drained gravel ridge overlooking Enger Creek to the southwest (approximately 15 km southeast of Beaver Creek) and includes concentrations of fire-cracked rock; burned bone;a variety of basalt, obsidian, and chert lithic materials, including microblades; and copper nuggets. This multicomponent site may have had three occupations: a possible early Taye Lake Phase (ca. 3000/2500 BC–AD 400); a possible Aishihik Phase (ca. AD 400–1800); and occupation again during the Bennett Lake Phase (late prehistoric/early historic period, ca. 1800–1900). The coin may have been associated with the Klondike Gold Rush–era use of a trading trail and/or the Chisana Gold Rush, which began in 1913 (Coutts 1980:104). This site is within the traditional territory of the White River First Nation.

Date and minting location: This coin has four inscriptions on the obverse and no inscriptions on the reverse. The inscriptions read *Yong Le tong bao* (永樂通寶), which means it was cast during the reign of Emperor Cheng Zu of the Ming Dynasty (AD 1403–1424). However, a shortage of copper forced the mints to stop the production of cast coins by 1393 in favor of printed paper currency. Minting cast coins resumed between 1408 and 1410 (Hartill 2005:247). Therefore, this coin was minted between 1408 and 1424. Since there were no mint marks on the coin, it is impossible to confirm where it was minted. It could have been minted in either what would become the capital of Beijing or in Nanking in what is now Jiangsu Province on the east coast (Fig. 1), or at one of the early provincial mints (Hartill 2005:237).

Figure 6. Front (left) and back (right) of Chinese coin discovered in the Beaver Creek area. Scale in cms. Courtesy Government of Yukon.

Interpretation: Based on previous research and the discussions of how long coins were curated, it is unlikely (but not impossible) that this coin arrived in the Yukon earlier than the establishment of the first Russian posts in the late 1700s. Since this coin was found along the western edge of the Yukon, it is also likely that it was carried and/or traded into the Yukon by Tlingit traders. The coin may have travelled inland along the Alsek River drainage from the Dry Bay or Yakutat Bay area. Other trade routes along which the coin might have travelled include the Chilkat or Chilkoot passes north to the Selkirk area, then west to the copper-rich areas of the White River.

A second way this coin could have been brought to this site is through early prospecting and placer mining activities. One possible means may have been a Chinese prospector or placer miner who carried the coin with him during the Klondike or Chisana gold rush. Another remote possibility includes non-Chinese placer miners carrying the coin as part of a common gambling game known as *fan t'an* (or another known as sick) in which the coins were used not as currency but as markers or gaming pieces (Akin 1992:61). Perhaps non-Chinese placer miners who had worked with Chinese laborers in British Columbia or the United States could have played the game with such coins and acquired a few as markers. Chinese laborers may have also worked on the Copper River Railroad from Cordova to Kennicott, Alaska (approximately 150 km southwest of Beaver Creek), which was built between 1907 and 1911.

Function: This coin was likely used for a variety of functions, beginning as currency followed by use as a trade item. It may have also been used as a decoration, perhaps as part of Tlingit armor, as a gaming token, or as a good luck charm. However, the coin also has what appears to be an impact impression on its edge. The impact impression was not caused during excavation and the material, although very old by Yukon standards, is in good condition and relatively strong.

FREEGOLD ROAD COIN

The Freegold Road Chinese coin (Figs. 3, 7) was discovered by Ecofor employee Kirby Booker in July of 2011 in the southwestern Yukon during a cultural heritage impact assessment conducted by Ecofor Consulting Ltd, conducted at the request of the Western Copper and Gold Corporation in advance of the proposed extension of the Freegold Road to provide access to their Casino Mine project. The site (KdVf-7) that contained the coin is approximately 240 km northwest of Whitehorse within the traditional territory of the Selkirk First Nation.

KdVf-7 is located on the southeastern corner of a terrace overlooking the confluence of a tributary to Hayes Creek. This area has a lower section and a slightly higher section, but only the lower section, where the Chinese coin was found, contained prehistoric materials (Fig. 8). Preliminary shovel testing at the site consisted of twelve negative tests and five positive tests. Shovel test #8 contained only the coin, which was found within the top 5 cm of organics and soil, while the remaining four positive tests (within approximately 1 to 7 m of the coin) contained two microblade fragments and ninety-one nondiagnostic lithic flakes, flake fragments, and lithic debris, all from basalt materials. The lithic scatter likely represents a moderate density but small temporary camp site or lithic reduction workshop overlooking the wide valley at the head of the Hayes Creek valley. No other historic material was recovered.

Date and minting location: This coin was minted in China during a long period of peace and prosperity under the rule of Qing (Ch'ing) dynasty emperor Sheng Zu (AD 1662–1722). Emperor Sheng Zu is better known by his reign title of Kang Xi (Kangxi 康熙). The coin obverse has the four-character inscription *Kang Xi tong bao* (康熙通宝), meaning "currency of Kang Xi." The reverse side has a two-character inscription. The character to the left of the square hole is not Chinese but is written in the Manchu script. This character is the equivalent of the Chinese *xuan*. The Chinese character to the right of the square hole is *xuan* (宣), which is the abbreviation for *xuanhua* (宣化) garrison, which was located in what was then called Zhili (直隶) Province (now Hebei Province), roughly 300 kilometers southwest of what is now Beijing. This garrison only minted coins between 1667 and 1671 (Hartill 2005:291).

Interpretation: Emperor Kang Xi was the longest serving Chinese emperor and also a well-known poet. He wrote poetic verses to accompany the popular publication "Illustrations of Plowing and Weaving." Emperor Kang Xi also took the names of twenty of the twenty-three operating mints of the time and put them in a specific order to produce a poem that followed a traditional rhyming pattern. These "poem coins" (shi qian 诗钱)

Figure 7. Front (left) and back (right) of Chinese coin discovered in the Freegold Road area. Scale in cms. Courtesy Government of Yukon.

Figure 8. The lower section of the landform at KdVf-7 looking northwest. Photo: James Mooney.

were considered to have charm and amulet properties. When strung together in the proper order they are known as "set coins" (*taozi qian* 套子钱). The poem was apparently well-liked and people collected coins from the twenty selected mints and strung them in sets for good luck. If authentic coins were used, they were said to expel evil spirits and prevent fires (Hartill 2005:291). Thus, if this was a "poem coin," it may have been valued as a good luck charm and may have been part of a twenty-coin set, perhaps first collected and strung together then passed down to younger generations for good luck. However, the date at which this coin was deposited into archaeological context could be a great deal later than the minting dates (Keddie 1978, 1980a, 1980b, 1981, 1982, 1989, 1990). The coin may have been traded to the Russians and then the coastal Tlingit and carried or traded into the Yukon interior through the Chilkat trail, which ran from Dyea to Selkirk (Gotthardt 1988). However, this coin may have been curated and traded for many years as a token or amulet and deposited at the site by Chinese placer miners who may have been in the area in the early to mid-1900s (Gow 2011). Additional

Figure 9. Examples of casting errors in similar Chinese cast coins. Courtesy Ron Cheek, 2011.

investigations into the historic placer-mining records of the Freegold and Carmacks area may provide additional insight into Chinese placer-mining activity in the early to mid-1900s.

Function: The four small holes located between the square hole and edge of this coin may provide more questions than answers. These holes may have been the result of intentional modification required to tack or nail the coin to a door or gate for good luck or perhaps stitched into a garment, basket, headdress, or other item. However, some or all of the holes may have first been the result of casting errors, as evident in many other coins of the same casting technique. Errors during casting (Fig. 9) caused small voids in the molds that produced thin spots and/or holes. These holes often had irregular, rough, jagged edges.

This coin may also reflect the very serious nature of trading and the extreme measures Tlingit traders took to protect trade routes. One use of Chinese coins may have been as a supplement to Tlingit warriors' armor. If this coin was used in armor, then the four holes in the coin would allow it to be stitched in a tight overlapping pattern with other coins to the base material. However, the coins on Tlingit armor collected in the late historic period only show coins stitched into place by the central hole. This attachment would have been weaker and the coins more likely to be torn off.

This four-hole coin may also have been used as a button. A few other coins with what appear to be multiple casting errors were identified in American and New Zealand collections, including two other four-hole examples (see Ritchie and Park 1987:44; Yu and Yu 2004:23).

MARSH LAKE COIN

The Marsh Lake Chinese coin (Figs. 3, 10) was discovered by Todd Kristensen in 2011 in southern Yukon during a cultural heritage inventory conducted by Matrix Research Ltd. at the request of Kwanlin Dün First Nation. The location is approximately 20 km southeast of Whitehorse within the traditional territory of the Kwanlin Dün First Nation and the Ta'an Kwäch'än Council.

The site (JeUn-01) is located on a high ridge that projects northeast from the southern shore of a small lake (Fig. 11). JeUn-01 was initially identified in 2010 (Tourigny and Heffner 2010) as a subsurface lithic scatter; subsequent excavations in 2011 revealed a fairly extensive lithic workshop including a large microblade component, suggesting the site was first occupied over 6000 years ago. The site revealed multiple phases of occupation, including a more recent surface scatter of lithics that extended along the ridge feature. Surface inspection to delimit the boundaries of JeUn-01 revealed the Chinese coin in an eroded sand exposure on the southeast-facing upper slope of the ridge in the immediate

Figure 10. Front (left) and back (right) of Chinese coin discovered in the Marsh Lake area. Scale in cms. Courtesy Government of Yukon.

Figure 11. Aerial view of landform and excavations at JeUn-01 looking northwest. Photo: Ty Heffner, Matrix Research Ltd.

vicinity of small chert and obsidian flakes. No other historic material was recovered.

Date and minting location: Based on inscriptions, this coin was cast in the Qing Dynasty during the reign of Emperor Shi Zong (AD 1723–1735). The inscription on the front is *Yong Zheng tong bao* (雍正通寶) and the back of the coin is inscribed with Manchu characters that represent the word "treasure" and an abbreviation of the Yunnan Province (Hartill 2005:295), which lies along China's southern border (Fig. 1). Identifying the exact mint date is more difficult, but this particular coin has long feet on the *bao* and was cast at the Zhanyi mint between 1724 and 1727 (Hartill 2005:295).

Interpretation: The southern minting location of the coin has implications for potential trade routes related to its arrival in the Marsh Lake area. Immigrants from southern Chinese provinces may have brought coins and lost them while prospecting in the early 1900s around Marsh Lake. Gold prospecting occurred in the area throughout the early 1900s, and prospectors frequented the Livingston Trail, which runs through the Marsh Lake area. Chinese laborers carried old coins as heirlooms or charms (Akin 1992; Olsen 1983; Phebus 1974), which is evidenced by the relatively large collection of pre-1800 coins uncovered in Chinese structures in the 1858 gold-rush town of Barkerville, British Columbia (Chen 2001).

A second and perhaps more likely explanation is that the coin was acquired by a trader from a southern Chinese port before it was exchanged to Northwest Coast First Nations and on to interior Yukon. One would expect that if the coin had been delivered by Russian traders it would be derived from a northern port or northern interior province (Beals 1980:71). For example, Davis (1996:375) recovered several Chinese coins from the Yakutat area of Alaska and hypothesized on the basis of their northern mint that they derived from Russian traders or passed through indigenous hands across Siberia and down to Southeast Alaska.

While admittedly speculative, the mint location in Yunnan suggests the coin arrived via British or American traders, who were known to purchase supplies in the southern port town of Canton before proceeding to the Northwest Coast (Fig. 1). The Chinese coin may therefore have arrived at the coast via fur traders and then moved through First Nations trade routes along drainages such as the Taku and Alsek to interior Yukon. This interpretation is supported by the recovery of the coin from the immediate vicinity of several chert and obsidian flakes associated with stone tool maintenance and manufacture.

Function: The coin may have been traded as an item of curiosity and/or decorative piece (Epstein et al. 1980:11) intended for attachment to Athabaskan clothing. The back of the Marsh Lake coin is notably more worn than the front, which may be due to friction if the coin was fastened to a material. Conversely, the wear may be due to differential chemical erosion during taphonomic processes.

CHINESE COINS IN BRITISH COLUMBIA

FANTAIL RIVER COINS

In the fall of 2011, two additional Chinese coins (Figs. 3, 12) were brought to Ruth Gotthardt of the Heritage Branch of the Yukon Government by a local resident. This individual found the two coins in a historic mineral exploration town site near the Fantail River on Taku Arm of Tagish Lake just across the border in northern British Columbia.

Date and Minting Location: These two coins have the same inscriptions on the obverse and reverse and were minted during the reign of Kang Xi (Kangxi 康熙). The coins were cast by the Board of Revenue mint, which is located northeast of Tiananmen Square in what is now Beijing between 1702 and 1713 (Hartill 2005:286).

Interpretation: Since these two coins were minted in northern China, they may have been traded to Russian merchants then to Coastal Tlingit traders who moved them into the Tagish Lake area. However, it is more likely these coins were brought into this historic mining site by Chinese placer miners or other placer miners who had contact with Chinese.

Function: These two coins do not show any evidence of alteration that could be used to infer previous use. Since they were found near a known historic mining area, they were most likely brought to the area by Chinese miners and functioned as good luck charms, amulets, or perhaps gaming pieces used during the common gambling game of *fan tan*.

Figure 12. Front (left) and back (right) of Chinese coins discovered in the Fantail River area near Tagish Lake. Scale in cms. Courtesy Government of Yukon.

CONCLUSIONS

Chinese coins discovered in Yukon in 1993 and 2011 contribute to a growing body of Chinese trade items recovered from protohistoric and early historic sites in the North. Little is known of the archaeological context of the recent finds but the discovery of coins at sites with precontact stone artifacts (often in association with neighboring First Nations heritage trails) suggests that they arrived in the Yukon via complex trade networks involving indigenous and foreign partners. From the protohistoric period to the major northern gold rushes, the Yukon experienced a rapid growth in culture contact that expanded Tlingit and Athabaskan trade and brought immigrant workers from around the world to its profitable gold fields. Future research on the coins and their respective sites may shed new light on both the significance of trade goods to First Nations and the role of coins carried by Chinese miners.

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CULTURALLY MODIFIED TREES AND TRADITIONAL MANAGEMENT SYSTEMS: AN EXAMPLE FROM SOUTH-CENTRAL YUKON

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ABSTRACT

Approximately 1,400 bark-stripped culturally modified trees (CMTs) recorded near Teslin in 2011 currently represent the largest recorded CMT site in the Yukon. This site contains evidence of regular, sustainable cambium collection for over one hundred years. To date, little CMT research has been done in the Yukon. This paper is intended to spur discussion on the presence, importance, and research potential of these living heritage resources. Temporal and spatial data from the site are discussed within the context of Teslin history. The roles of traditional knowledge and forest structure in the creation of the CMT site are explored, as well as the ways in which quantitative CMT data may relate to traditional management systems.

INTRODUCTION

Archaeological evidence of past plant management and use has been elusive in part due to the "subtle ecological consequences" of these practices (Lepofsky and Lertzman 2008:130). The relatively low impact of forest activities from small nomadic groups is difficult to recognize or measure (Lepofsky 2009), and this is particularly true in subarctic regions (Bergman et al. 2004; Östlund and Bergman 2004; Östlund et al. 2005; Östlund et al. 2009). Culturally modified trees (CMTs) are unique in that they provide physical evidence of resource use and represent a biological archive of past forest practices that may not otherwise be available (Andersson 2005; Östlund et al. 2002; Östlund et al. 2009; Turner et al. 2009). CMTs are also living legacies of traditional resource management systems (Lepofsky 2009:164; Turner et al. 2009) that can represent the breadth of technological, spiritual, medicinal, and nutritional knowledge attached to trees (Andersson 2005; Bergman et al. 2004; Marshall 2002; Mobley and Eldridge 1992; Östlund and Bergman 2004; Östlund et al. 2002; Östlund et al. 2005; Östlund et al. 2009; Turner et al. 2000; Zackrisson et al. 2000).

Traditional resource management is defined as "the application of traditional ecological knowledge (TEK) to maintain or enhance the productivity, diversity, availability, or other desired qualities of natural resources or ecosystems" (Lepofsky 2009:61). The word "traditional" does not refer to a static system, but to one that has been passed down generationally (Lepofsky 2009:61). Research into traditional resource management systems highlights the diversity of ways that humans interact with and modify their environments. Understanding the biophysical and cultural interactions involved in these practices has also become fertile ground to investigate notions of sustainability (Berkes et al. 2000; Berkes and Davidson-Hunt 2006; Davidson-Hunt 2006; Gadgil 1998; Houde 2007; Lepofsky 2009; Turner and Berkes 2006; Turner et al. 2000; Turner et al. 2009).

Turner et al. (2009:239) note that "[s]patial and paleoecological studies of CMTs can extend our understanding of ethnoecological relationships between humans and trees, and of the complex dynamics among traditional ecological knowledge systems, historical landscapes, and resource stewardship, particularly in forested ecosystems." However, with the exception of Marshall (2002), there have been few efforts to combine CMT data with other data sources, such as traditional ecological knowledge in western Canada. There have been fewer efforts to explore how spatial, chronological, and paleoecological data can contribute to a better understanding of the cultural management systems for trees. Instead, much of the information on CMTs in western Canada is limited to descriptive, quantitative data sets contained in unpublished archaeological reports. Through this research, we hope to encourage discussion on the potential of the quantitative data archaeologists typically collect from CMT sites to contribute to the broader interpretative values noted above.

It is also the goal of this paper to stimulate discussion of CMTs in the Yukon Territory and provide some necessary background for future CMT research in the study area. While examples of bark-stripped CMTs are well documented in many parts of western North America and Fennoscandia (see Östlund et al. 2009; Turner et al. 2009), limited research has been conducted in the Yukon. This paper discusses the current state of CMT knowledge in the Yukon, with a particular focus on the Teslin Tlingit region. Background information on CMTs, previous CMT research, and the natural, cultural, historical, and ethnographic data specific to the study area are discussed. Temporal and spatial data from a large CMT site near Teslin, herein referred to as the Hermit Lake CMT site, is discussed within the context of documented Teslin history and Tlingit ethnography. The role of traditional knowledge and forest structure in the creation of the CMT site is also explored. Future research questions are posed and the potential for further research at the site is discussed.

CULTURALLY MODIFIED TREES

A CMT, by definition, is a "tree that has been altered by native people as part of their traditional use of the forest" (Stryd 2001:1). Trees with scars indicative of aboriginal modification are assumed to be associated with First Nations' harvesting activities. Different types of CMTs are associated with particular tree species and harvesting practices. Turner et al. (2009:240) group cultural modifications of trees into three categories:

1. harvesting, which includes the removal of the sap, pitch, gum, and bark for food and medicinal purposes; the removal of bark or planks for technology (e.g., weaving, cordage, roofing, baskets, canoes, paper, housing, or dyeing); and the removal of pitch and resin for technology (e.g., fuel or glue);
2. pruning, pollarding, and coppicing, which includes training or encouraging growth; and
3. tree marking for spiritual or practical purposes (e.g., tree art, witness trees, and trail markers).

This paper will focus on the first category: bark-stripped CMTs. The cultural scars discussed here are the result of removing the outer bark from lodgepole pine (*Pinus contorta*) to expose and harvest the inner bark (phloem) and cambium for food or medicinal purposes. The term "cambium" will be used throughout the paper; however, as Gottesfeld (1992:149) points out, it is neither the entire inner bark nor vascular cambium that is consumed, but likely the active phloem. Bark-stripped pine (*Pinus*) CMTs have been documented throughout western Canada, the United States, and Sweden (Andersson 2005; Bergman et al. 2004; Marshall 2002; Östlund and Bergman 2004; Östlund et al. 2002; Östlund et al. 2005; Prince 2001; Zackrisson et al. 2000). Cambium is only in its optimal state for a few weeks, depending on elevation and climate (Marshall 2002:34).

PREVIOUS RESEARCH

Although there are likely many more, to the authors' knowledge only forty-three bark-stripped CMT sites have been formally recorded in the Yukon and these are only documented in unpublished reports. Recorded sites consist mainly of lodgepole pine (*Pinus contorta*); common modifications include bark stripping, kindling chopping, and sap extraction. Sites in the Teslin area appear to be considerably larger than those in other areas. Of particular note is a large CMT site situated adjacent to the Hermit Lake CMT site. This neighboring site consists of approximately 990 lodgepole pine CMTs modified between 1891 and 1974 (Brian Charles pers. comm. 2012). Our research focuses on the Hermit Lake CMT site but the presence of another large CMT site in close proximity provides opportunities for future research, discussed in subsequent sections.

Early CMT studies focused on the time depth, location, variety, morphology, and research potential of CMTs (Eldridge 1982; Mobley and Eldridge 1992). Subsequent research has explored the ethnographic and ethnological data and traditional knowledge associated with harvesting (Gottesfeld 1992; Johnson 1997; People of 'Ksan 1980), the spiritual associations between trees and harvesting practices (Andersson et al. 2005; Bergman et al. 2004; Östlund et al. 2005; Östlund et al. 2009), and the use and importance of cambium in the diet by examining combinations of historical, ethnological, and dendroecological data (Bergman et al. 2004; Marshall 2002; Niklasson et al. 1994; Prince 2001; Swetnam 1984; Zackrisson et al. 2000). These latter studies, with the exception of Marshall, who also interviewed community elders, have primarily focused on CMT age distributions to interpret the role of cambium in subsistence strategies.

Past research on CMT age ranges and spatial distributions has suggested that a consistent age distribution indicates regular resource use, while age clustering reflects more intensive use of cambium and might also indicate times when other resources were scarce. Conversely, gaps in CMT age distributions have been interpreted as times when people were either harvesting the same resource in other areas or pursuing different resources. In general it appears that, although some groups relied on cambium during times of food stress, cambium more often functioned as a staple food, delicacy, and medicine (Marshall 2002; Östlund et al. 2009:104–105; Turner et al. 2009:240). The location of CMT sites has also been noted as a factor in the expected age distribution and type of site (Mobley and Lewis 2009; Östlund and Bergman 2004; Östlund et al. 2009). Large and evenly distributed CMT sites have been found near village settlements and large water bodies, leading researchers to believe that these areas most likely represent long-term harvesting areas (Marshall 2002; Östlund et al. 2009; Östlund and Bergman 2004; Prince 2001). In contrast, CMT sites that are associated with travel corridors tend to be clustered around trails and have varied age ranges (Marshall 2002); they are thought to represent short-term subsistence harvesting while travelling (Carlson 1998 [cited in Prince 2001:256]). The slow rate of absorption of the sugars contained in cambium has led some to suggest that cambium may have been an ideal food for travelling. Its high vitamin C content may have been an important supplement to a high protein diet and particularly important in northern climates or areas that experience sharp seasonality (Bergman et al. 2004; Östlund and Bergman 2004; Östlund et al. 2009). Östlund et al. (2005:321) refer to cambium as a "stable low risk and high food yield food resource."

More recently, the focus of CMT research has been on the cultural and traditional practices associated with CMTs (e.g., Andersson 2005; Östlund et al. 2009; Turner et al. 2009). This work describes the significant potential for CMT research as a means to explore the complex interactions between people and forests. As noted earlier, CMT research in western Canada has not kept pace with these theoretical developments; corresponding problem-oriented research has not occurred at individual CMT sites. Below we describe the natural, cultural, historical, and ethnographic data for the study area prior to discussing the Hermit Lake CMT site. Traditional knowledge data was not consulted but would be a productive avenue for future research at the site.

THE STUDY AREA

NATURAL SETTING

The study area is located 1.5 km north of the village of Teslin on Teslin Lake (Fig. 1). Teslin is situated in southern Yukon in the Boreal Cordillera Ecozone and Yukon Southern Lakes Ecoregion (Smith et al. 2004). The area is characterized by mixed spruce (*Picea* sp.) and pine boreal forest that tends to be dominated by pine because of its ability to quickly regenerate after a fire (Smith et al. 2004). Teslin Lake is a long and wide water body that is over 150 km in length, north to south (TTC and Greer 2004:4) and its tributary streams host the lengthiest portion of the Yukon River salmon run (TCC and Greer 2004:8).

CULTURAL SETTING

The study area is within the traditional territory of the Teslin Tlingit. Much of the written description of the Teslin Tlingit is by Catharine McClellan, an anthropologist who worked and lived in the area in the middle of the twentieth century (McClellan 1981, [1975] 2001; McClellan et al. 1987). McClellan (1981:469) describes the Tlingit expansion from the Alaska coast to the Yukon interior in the nineteenth and twentieth centuries as one that was initiated because of the abundance of fur-bearing animals in the area. The Teslin Tlingit were living permanently in the Yukon interior by the late nineteenth century (McClellan 1981, [1975] 2001; TTC and Greer 2004).

Salmon was a principal food resource for the Teslin Tlingit, and July and August were important months to

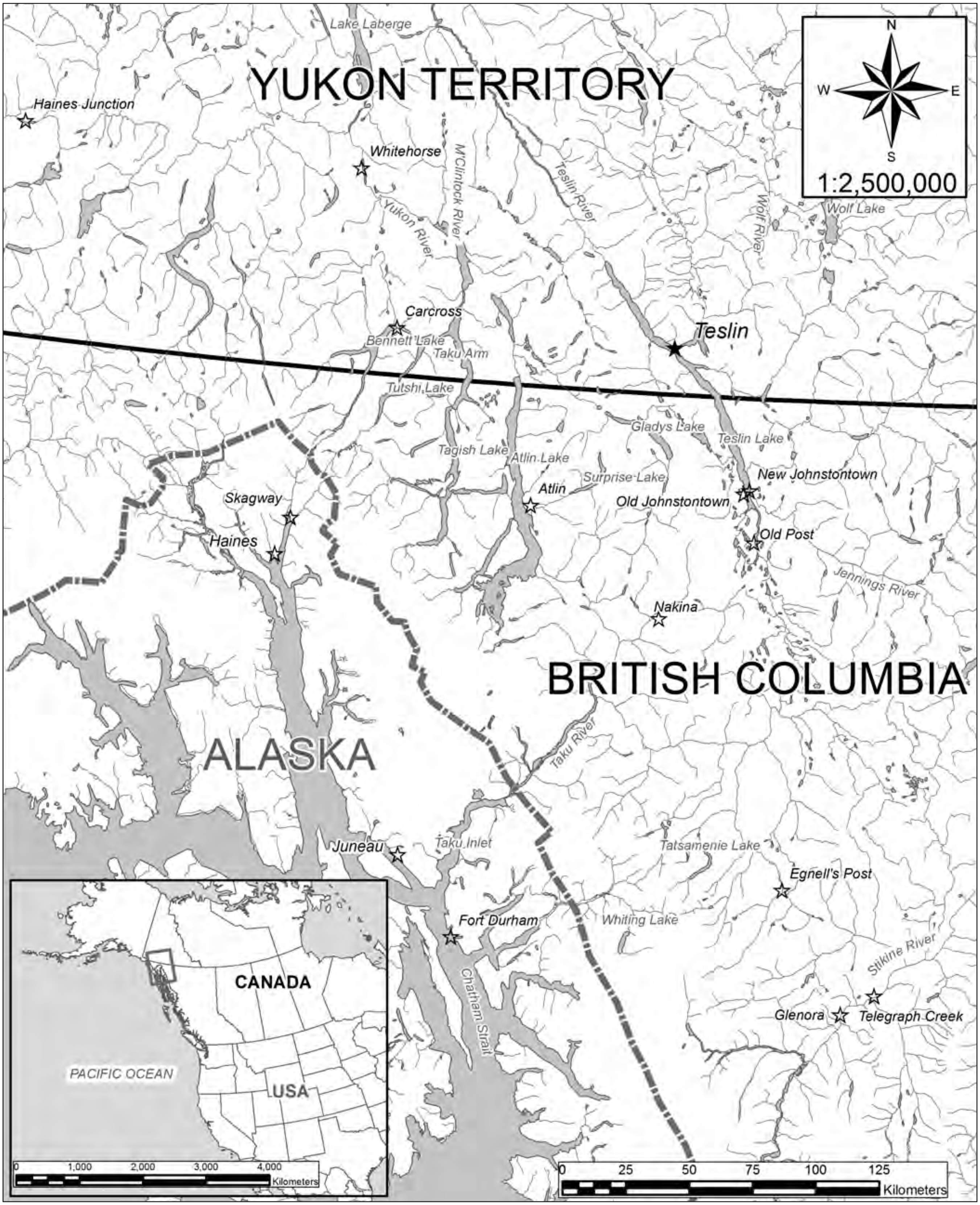

Figure 1. Study area.

catch and dry salmon for the winter (McClellan 1981, [1975] 2001). Berry gathering and preservation were also carried out during these months (McClellan [1975] 2001). By late summer, groups dispersed into upland areas to hunt and stock caches before they returned to valley bottoms and lakes for the winter (McClellan 1981). However, the Teslin Tlingit, like many Yukon groups, did not remain sedentary through the winter, as they needed to venture out to replenish food stores. Movement throughout the year was common (McClellan 1981, [1975] 2001; TTC and Greer 2004).

During spring, the inner bark of spruce and pine was at its best and was scraped off to acquire the "sap," which was described as sweet and juicy (McClellan et al. 1987:140). Fish and mammals were also harvested in the spring, and people sometimes returned to berry caches under pine trees, where berries were preserved through the winter (McClellan [1975] 2001:200, 220). "Berries, either fresh or preserved, *Hedysarum* roots [bear root], and inner spruce bark were the chief vegetal foods" (McClellan 1981:472).

Fluctuations in climate, temperature, and animal migratory patterns created the necessity for adjustments in land use patterns and the seasonal round. As McClellan ([1975] 2001:96), points out, "people[s] did not live in the totally unchanging natural environment which has sometimes been imagined." This is an important consideration when interpreting historic land use activities. Like the environment, culture is not static. Many historic events altered traditional subsistence, land use, social structure, and technology.

HISTORICAL SETTING

Outside influence on the lives of the Teslin Tlingit began in 1741 with the appearance of Russian fur traders on the North Pacific coast (Emmons and de Laguna 1991:324). As sea otter numbers declined, the inland fur trade intensified, with interior peoples trading furs to coastal peoples, who acted as middlemen in the trade with the Russians and British. The Teslin Tlingit were active participants in the trade. By 1840 they were making annual trips to Nakina to rendezvous and trade with the Lower Taku River Tlingit (McClellan [1975] 2001) and by the 1850s (TTC and Greer 2004), they were trading directly on the coast. In the 1870s Teslin Tlingit were also trading at Glenora on the Stikine River near Telegraph Creek (Mitcham 1993:150).

In 1891 American explorer Frederick Schwatka, with the assistance of Native guides and packers, ascended the Taku River and walked the trail to the south end of Teslin Lake (Schwatka 1996:58–59); he reported meeting many Inland Tlingit on their way to the coast to trade (Schwatka 1996:58, 61, 63, 64). Shortly after Schwatka's trip, the Teslin area became the focus of commercial ventures. Survey work and trail improvement projects began on both the Stikine and Taku routes to Teslin Lake (Mitcham 1993). An independent trader named Galbraith opened a store at Old Post near the Teslin Tlingit settlement of Old Johnstontown at the south end of Teslin Lake in 1896; the following year there was also a Hudson's Bay Company post, a sawmill, and a shipyard, while the Stikine Trail was developed into a wagon road (Teslin Women's Institute 1972). The year 1898 marked the start of the Klondike gold rush, and the Stikine/Teslin route was touted as one of the "all Canadian" routes to the Klondike. This intense activity at the south end of the lake was short-lived, and while commercial activities did not cease altogether, the geographic focus shifted.

Two traders named Smith and Geddes opened a store at the present location of Teslin in 1903, and Taylor and Drury followed in 1905. In the years after 1910, Teslin Tlingit began to settle at this site (McClellan [1975] 2001) and no longer made summer trading trips to the coast, although some families still traveled to Nakina and the upper Taku River to fish for salmon (TTC and Greer 2004). By the 1940s, Teslin people were no longer travelling to Nakina and the upper Taku River, and the families at Old Johnstontown relocated to the new village site.

The Alaska Highway was built by the American military in 1942–43 and the route passed through Teslin. Unfortunately for the Teslin people, a series of epidemics occurred shortly thereafter, with devastating impacts to community health (Coates and Morrison 2005:250). Illness reportedly caused many people to stay in the village and limit their traditional hunting and trapping activities that winter (Teslin Women's Institute 1972). Highway construction reoriented the transportation and communication of the Teslin people away from waterways and toward the new highway (TTC and Greer 2004:23). In the decades following construction of the highway, schools, stores, motels, and government services were established and the village approached its current population of about 450 people (Village of Teslin 2012).

ETHNOGRAPHIC DATA RELATED TO CAMBIUM AND BARK STRIPPING

Terms found throughout the regional ethnographic literature that refer to edible inner bark include "sap," "inner bark," and "cambium" (Legros 2007; McClellan 1981, [1975] 2001; McClellan et al. 1987). The term "cambium" will be used throughout this paper.

In general, the use of tree species varies throughout the Yukon according to cultural preference and local abundance of different species (Legros 2007; McClellan 1981, [1975] 2001; McClellan et al. 1987). For example, spruce cambium is more commonly mentioned than pine, which likely relates to the widespread distribution of spruce compared to the more limited extent of pine. Tree products were made from resin, bark, roots, gum, pitch, and leaves. Legros (2007:254) provides these comments about tree use among the neighboring Tutchone:

> Firstly, forest products were harvested to a far greater extent than might have ever been imagined. The resources provided by trees were put to about 90 different uses. Some varieties were sought not only for their wood, but also for their roots, boughs, bark, cambium, resin and even sap. Secondly . . . trees proved to be the primary resource not only for a number of products intended for individual consumption, but most were also to be used for products related to productive consumption.

Legros (2007:256) mentions that lodgepole pine and cottonwood cambium were harvested in May and early June and eaten in season without being stored. Spruce bark, important for Teslin Tlingit canoes and containers, was also harvested in the spring because the bark was more pliable when the sap was running (Legros 2007:256; McClellan [1975] 2001).

Albright (1984:67) wrote of the neighboring Tahltan that cambium was an "important spring time food" and notes that people were still consuming it at the time of her study (1978–1983). She noted that the bark was pried back with caribou antler tines and the sap was scraped into cups and consumed fresh (Albright 1984:67). She also mentions how the resulting scars (i.e., CMTs) could be found in the wooded areas around the village.

Similarly, McClellan ([1975] 2001:203, 220) wrote that the inner bark and associated sap was an important spring-time food for the Teslin Tlingit and Southern Tutchone. According to McClellan ([1975] 2001:203), Southern Tutchone women used spruce, cottonwood, and poplar as sources of sap; Tagish women preferred spruce; and Inland Tlingit "stressed jack pine, and say they make little use of cottonwood." Teslin Tlingit are said to have either boiled the white inner bark (cambium), or consumed it fresh as it "provided a welcome sweet" (McClellan [1975] 2001:203). Interestingly, there is mention of a special song for "sap gathering" that Southern Tutchone women sang, and McClellan ([1975] 2001:203) suggests "there may have been sap-collecting parties of the same kind as berrying parties." Recent studies on traditional food consumption in Teslin households indicate that pine cambium was being consumed in 1994 (Wein and Freeman 1995), and as recently as 2008 (Schuster et al. 2011).

METHODOLOGY

Pedestrian survey was conducted by crews of two to three people spaced 5 to 50 m apart, with survey intensity increasing in areas with dense CMTs and decreasing in areas with sporadic or no CMTs. Each crew member used a Garmin Rino 530Hcx handheld GPS unit to record tracks and CMT locations and ensure adequate survey coverage. Survey and sampling were conducted over the course of twelve days during the fall and early winter of 2011. Approximately 148 ha (or 86%) of the 172 ha study area was surveyed.

All scarred trees encountered along transects were closely inspected to confirm their cultural origin using established criteria (Stryd 2001). Tree scars of natural origin were primarily fire scars that were easily identifiable due to their typically flared bases, tapered tops, and sometimes charred or disfigured surfaces. Tree scars of cultural origin were primarily rectangular or lenticular in shape, began at about shoulder height, did not extend to the ground, and had smooth scar surfaces. Definitive cultural indicators, such as cut marks or cut branches, were observed on over half of the CMTs.

All of the CMTs encountered were recorded to Level I specifications (Stryd 2001). Useable core samples were successfully retrieved from 96 CMTs using a 16-inch increment borer as near as possible to breast height (BH). Two cores were taken from each CMT: one from the scar side and one from the healthy side of the tree. The pith was present in many cores and the remainder came near enough to the pith (i.e., within one to three annual rings) that the ring count could be confidently adjusted. Trees selected for sampling had well-defined single scars and lacked complex healing lobes that would complicate tree-ring analysis.

Core samples were returned to the lab and analyzed under 10x magnification to count annual rings and determine the age of the tree (tree age) as well as its age at the time of modification (scar age). Modification date was calculated by subtracting the scar age from the tree age and subtracting the resulting number from 2011. Germination date was calculated by adding five years to the tree age (to compensate for the number of annual rings below BH) and subtracting the resulting number from 2011. The age to BH factor of five years was determined through application of published lodgepole pine site index curves for the local ecoregion (Thompson et al. 1984) and classification of the site area as a "good" grow site (Kirk Price pers. comm. 2013).

LIMITATIONS AND BIASES

A major problem with CMT data generally is that the remaining scars only represent a portion of the original population of trees due to natural decay and death, pest infestation, fire, and/or human use (i.e., firewood) (Andersson 2005; Marshall 2002; Östlund et al. 2005; Östlund et al. 2009; Prince 2001; Zackrisson et al. 2000).

As the site was recorded during a heritage resource impact assessment, the study area is confined to the boundary of a proposed forestry block. There are additional CMTs located outside of the study area that were not considered in the analysis. Time constraints did not allow for complete survey coverage, and it is estimated that an additional 100 CMTs that have not yet been recorded are located in the unsurveyed portion of the study area. Our sampling strategy was not designed to be statistically rigorous. Instead, we aimed to retrieve the most core samples possible in a short period of time from across the site. Interpretation was hindered by a lack of detailed forest stand data, particularly ages or species.

RESULTS

SITE SUMMARY

The Hermit Lake CMT site (Fig. 2) is situated on the top and sides of a broad, gently sloping hill west of Hermit Lake and north of the present-day village of Teslin. During the inventory, a total of 1,275 CMTs were identified and recorded. It is estimated that an additional 100 or more CMTs are located in the unsurveyed area (24 ha), which would bring the size of the site within the study area to approximately 1,400 CMTs. The vast majority of the CMTs were lodgepole pine (*n* = 1,265), with much lower frequencies of white spruce (*Picea glauca*; *n* = 9) and birch (*Betula neoalaskana*; *n* = 1). Most of the CMTs were live trees (*n* = 1,077; 84.5%).

Only thirty-four (2.5%) of the CMTs exhibited multiple cultural scars: thirty-two CMTs exhibited two scars and two CMTs had three scars. All CMTs displayed bark-stripping scars (Figs. 3, 4) and eighteen of these scars had subsequently been chopped into for the purpose of kindling collection (Fig. 5). The most common scar shape was lenticular and tapered at the top and bottom. Girdled CMTs, where the bark had been removed from the entire circumference of the trunk, were relatively rare (*n* = 30); nearly all of these trees were dead and increased mortality may explain their relative scarcity. Half (*n* = 655) of the CMTs exhibited cutmarks (Fig. 6) that were still visible on the scar face, and 393 showed multiple cutmarks.

About midway through the survey it was noted that a relatively high number of the scars displayed two distinctive cutmarks (usually at the top of the scar) in the shape of an "X" (Fig. 7). This style of cutmark has also been noted on interior British Columbia bark-stripped CMTs (Stryd 2001:65). We began noting the frequency of this attribute, and it was observed on sixty of the 679 scars for which this attribute was recorded. This feature is undoubtedly present on more scars that have become obscured by subsequent growth. This may be a distinctive stylistic attribute related to an individual or group (e.g., family or clan).

A total of ninety-six CMTs were successfully sampled using an increment borer to determine their age. The increment cores returned modification dates between 1872 and 1973, with a notable increase in frequency in the 1920s. The CMTs were stripped when the trees were between eleven and sixty years old, with an average modification age of 26.45 years.

DISCUSSION

CMT data were analyzed to determine modification date frequencies (Fig. 8), or how many of the sampled CMTs were modified per year; germination date frequencies (Fig. 9), or how many of the sampled CMTs germinated per

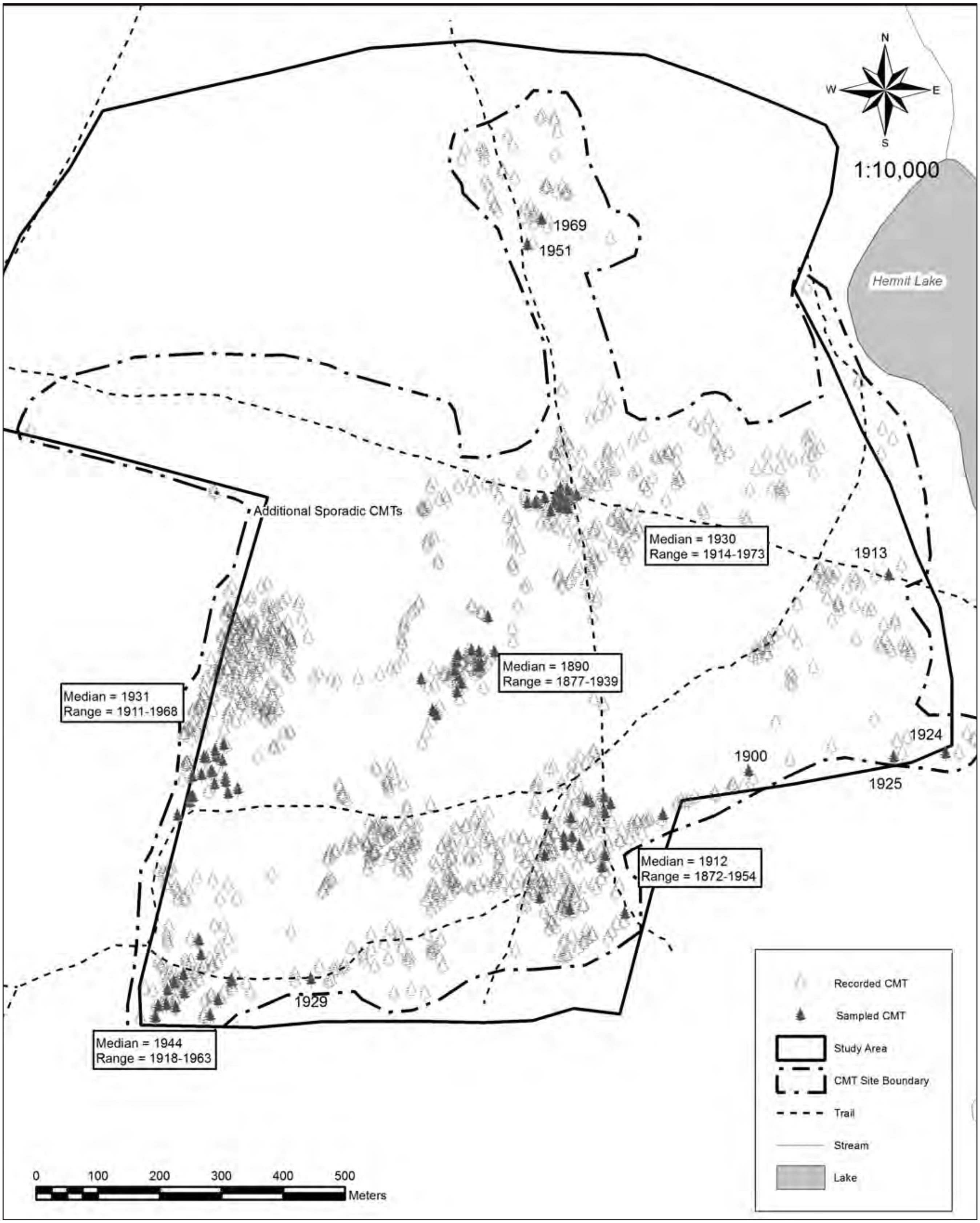

Figure 2. Hermit Lake CMT site. Locations of all recorded CMTs are shown and sampled trees are indicated as solid symbols.

Figure 3. A typical bark-stripped lodgepole pine CMT. This tree germinated in 1857 and was bark-stripped in 1900.

Figure 4. A bark-stripped white spruce CMT. This tree germinated in 1894 and was bark-stripped in 1954.

Figure 5. A bark-stripped lodgepole pine CMT that was subsequently chopped into for kindling collection. This tree germinated in 1906 and was modified in 1926; kindling collection occurred sometime later.

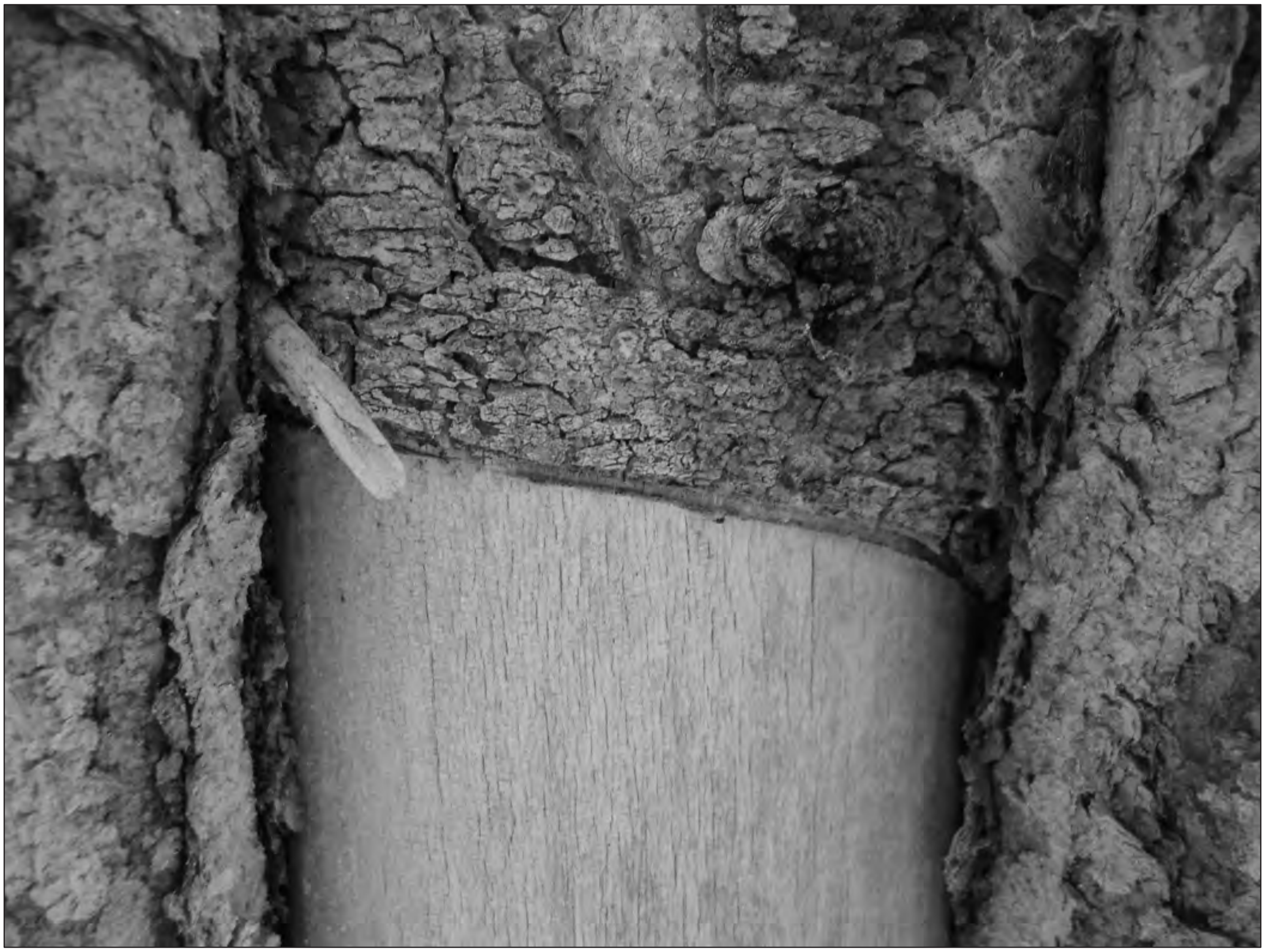

Figure 6. Cut mark at the top of a bark-strip scar.

year; and the spatial distribution of the modification and germination dates across the site.

The following observations were made from the modification date histogram: (1) there is a consistent age distribution; (2) there are cyclical peaks in modification frequency approximately every fifteen to twenty years; and (3) cambium harvesting activity peaked markedly in the 1920s. Observations made from the germination date histogram include cyclical peaks in germination approximately every fifteen to twenty years, and a pronounced germination peak in 1901. These regular peaks in germination frequency appear to be offset by twenty-five to thirty years from corresponding peaks in modification frequency.

Analysis of the spatial distribution of the CMTs indicates that (1) CMTs are distributed relatively evenly across the site without pronounced spatial clustering; (2) there is no clear clustering of modification dates—trees that were stripped the same year (or within a few years of each other) are widely distributed throughout the site; and (3) there is no clear clustering of germination dates within the site—tree ages exhibit no clear patterning.

Our interpretation is that the site represents long-term, sustained cambium harvesting over a large area. Frequency of use appears to have been cyclical and could reflect fluctuating resource availability or periodic increases in harvesting intensity for other reasons. Small gaps occur in the 101-year record; however, the modification histogram is generally a bell curve with "lower level use" occurring through the late 1800s, a peak in use in the 1920s, and "lower level use" continuing through to the 1970s. As discussed earlier, consistent distribution of modification dates would suggest regular use of a site while a tightly clustered distribution would suggest more intensive use of the site during discrete time periods. Here it appears that cambium was a regular part of the subsistence economy.

Figure 7. Distinctive X-shaped cut mark at the top of a bark strip scar.

The increase in cambium harvesting during the first quarter of the twentieth century is notable. This increase appears to correspond with historical records that indicate an increase in population as "[g]radually, in the first decades of the 20th century, a community grew at the Teslin Yukon site" (TTC and Greer 2004:21). The introduction of two stores to the area also meant that people did not need to travel to the coast to trade (which had been a springtime activity). McClellan ([1975] 2001) noted that people would often split into smaller family groups for the winter to trap, and TTC and Greer (2004) noted that they would come back to the village to trade in the spring. This means that more people would have been in the village during the time when cambium was harvested and more people would have been in the area in general. Interestingly, this time period is noted as a time in Teslin history when families were actively trading for goods, prices of furs were high, and people were still very much out on the land, hunting, trapping, and gathering—"It was a good life" (TTC and Greer 2004:22). This point is important because some CMT researchers have hypothesized that people intensified cambium harvesting out of necessity when other resources were unavailable (c.f. Prince 2001). This does not appear to be the case at this site. Instead, cambium appears in the record in greater numbers when times were "good" and other forms of carbohydrates and sugars would have been readily available.

The peak in modification frequency in the 1920s may not necessarily be explained by historical data. Correlating the temporal data with the historical data, we expected the peak in harvesting to occur earlier than the 1920s. Perhaps the peak in the 1920s is more reflective of a change in land use patterns around this time. Or maybe there were more trees of the right age/size or "ripeness" available for stripping in the site area at that time. Taste was an important factor in determining which trees were ready to be

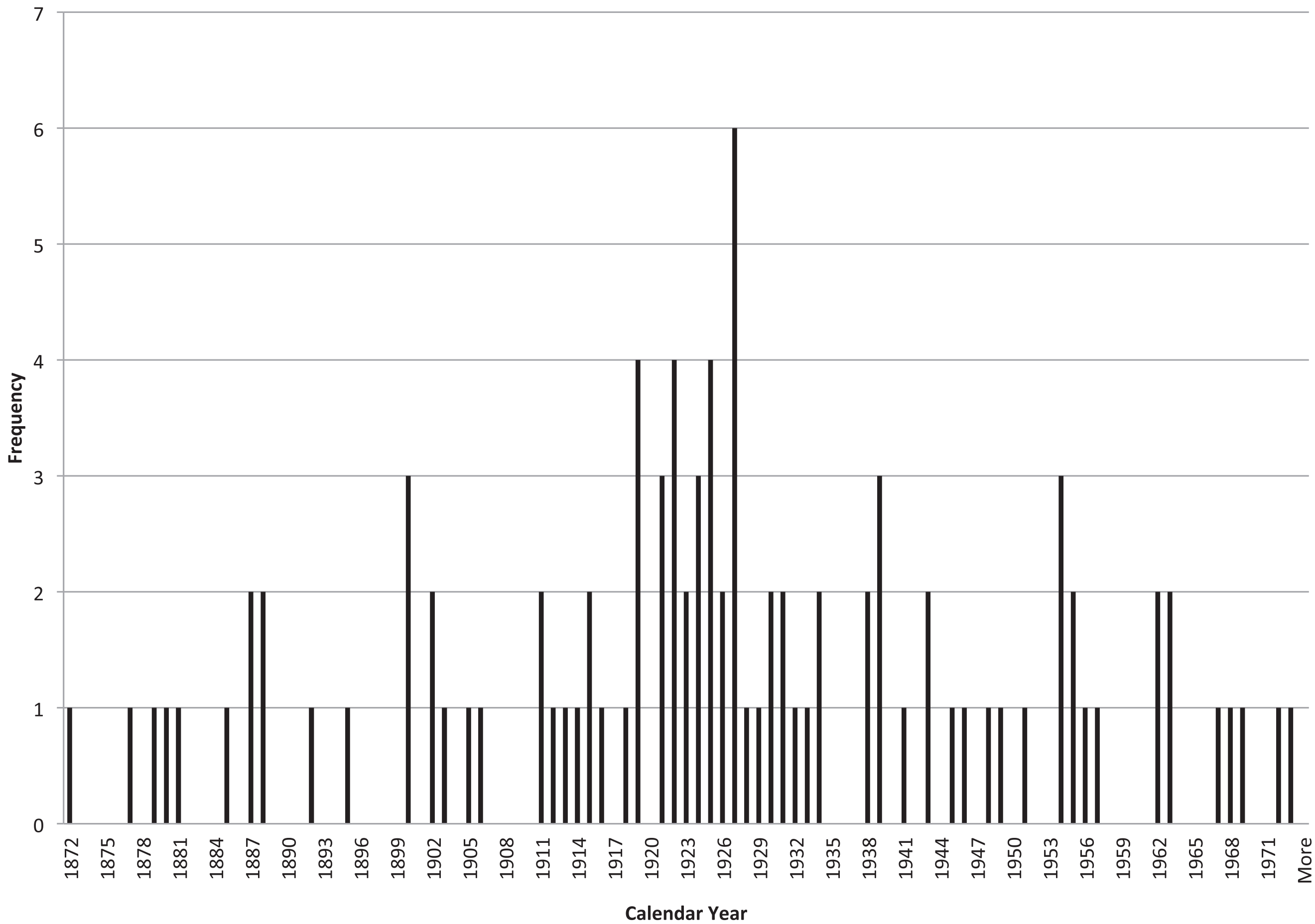

Figure 8. Histogram showing the frequency of CMT modification by calendar year.

harvested. "Scots pine trees were selectively chosen, with respect to taste, bark structure, and stem diameter when peeling inner bark for food" (Bergman et al. 2004:6). Gottesfeld (1992:150) relates that "suitability . . . was determined by making a test scraping of the bark and tasting it for tenderness and sweetness." Zackrisson et al. (2000:107) state that "[w]hen used as food, bark was harvested with a great deal of selectivity for taste and nutritional values." Small scars on CMTs have been interpreted as tasting scars (Östlund et al. 2005; Östlund et al. 2009). Younger, actively growing trees were likely sweeter than older trees; however, tree diameter and bark structure would not always be the best indicators of this because tree growth (and subsequent size) and tree age will vary considerably in a multistoried stand (Zackrisson et al. 2000:107). The CMT ages at the Hermit Lake CMT site likewise vary throughout the site.

While the peak in modification frequency in the 1920s does not necessarily correlate directly with historical data, neither does the drop in frequency prior to the construction of the Alaska Highway in 1942–1943. The highway brought about significant change in Teslin Tlingit land use patterns (TTC and Greer 2004:23) and it was expected that CMT frequency would drop around or shortly after the construction of the highway. Contrary to expectations, CMT frequency fell around 1934–1935, almost a full decade before the highway. Tree mortality should tend to inflate the apparent frequency of CMTs during the 1930s compared to the 1920s, all other things being equal. Explanations for the apparent decrease may include a shift to alternative harvesting areas or a decline in resource (i.e., young pine) availability.

The germination and modification histograms appear to show fairly regular peaks in activity every fifteen to twenty years, with a pronounced peak in germination in 1901 and in modification in 1927. At first we assumed these cycles were correlated—the peaks in modification appeared to mirror the peaks in germination with an offset of about twenty-five to thirty years. We therefore hypothesized that an increase in germination (and therefore greater

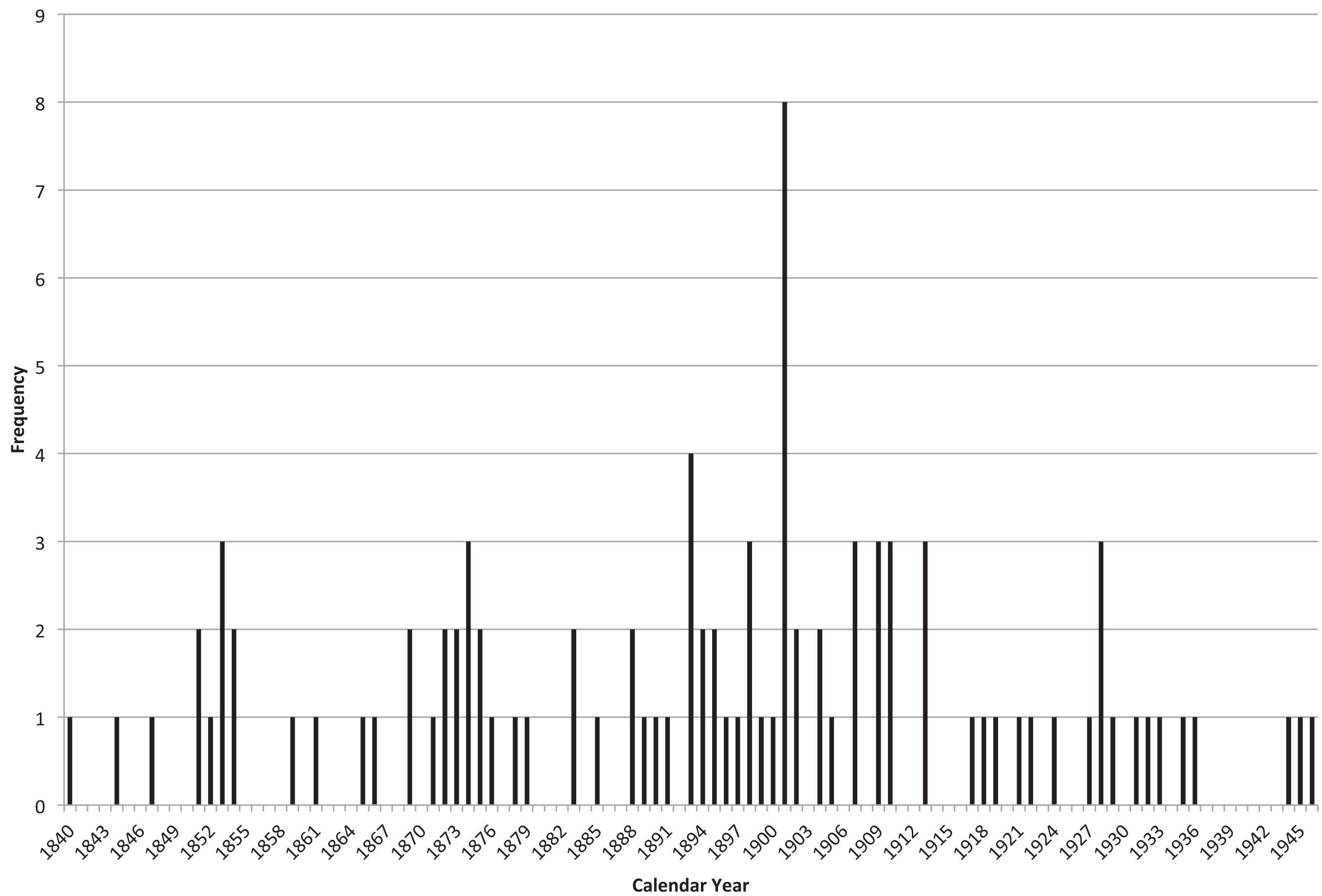

Figure 9. Histogram showing the frequency of CMT germination by calendar year.

resource availability) directly influenced a harvesting peak twenty-five to thirty years later. This was interesting and suggestive since our past experience with bark-stripped CMTs indicated that lodgepole pine trees were generally stripped when they were around twenty to thirty years old. Upon closer inspection, however, not all trees that germinated in a certain year were stripped twenty-five to thirty years later. For example, not all of the trees that germinated during the 1901 peak (or within five years of this date) were modified in or around the 1927 modification peak; instead, there is a wide variety of germination ages for trees modified in and around 1927. This is true for all the peaks in each histogram. The observed fifteen-to-twenty-year germination and modification fluctuations do appear to be real; however, current evidence does not suggest that there is a direct correlation between these two cycles.

The combined spatial and temporal analysis of the CMTs revealed a wide distribution of both germination and modification dates across the site. There is no obvious spatial clustering of modification dates at the Hermit Lake CMT site that would lead us to believe that different areas of the site were preferentially used at different times. Instead, the entire site appears to have been used, and there is a wide diversity of CMT ages. Marshall (2002:133) suspected that fire history had a significant effect on the spatial and temporal clustering she observed at the site she analyzed. While we cannot rule out the idea that fire and/or other disturbances have had an effect on harvesting history, stripping and germination events appear to be widely distributed throughout the Hermit Lake CMT site. This distribution complicated our ability to explain the peaks in germination and modification frequencies. Josefsson et al. (2010) suggested that peaks in forest regeneration may indicate discrete disturbance events, such as periods of increased human activity, or may result from good seed production due to climatic fluctuations. Climate alone could not explain periods of increased germination in their study area and, although natural fires could not be ruled out, past human activity and climatic fluctuations were likely responsible (Josefsson et al. 2010:880). Any disturbance that occurred at the Hermit Lake CMT site must have been large enough to encourage germination, yet small enough to not affect older trees to any great extent. Possible disturbance types include individual trees falling down (e.g., deadfall or blowdown), climatic changes, localized pest infestation, or small brush fires (Josefsson et al. 2010).

To summarize, the Hermit Lake site is a large subsistence "harvesting" CMT site (Marshall 2002; Prince 2001; Turner et al. 2009) that was in use for at least one hundred years. A large majority (99%) of the trees are lodgepole pine and exhibit bark stripping scars typical of cambium collection for food. Temporal data indicate an increase in use during the 1920s. Historical data indicate that the main Teslin population increase occurred before 1920, so population numbers alone cannot explain this increase. Spatial and temporal data suggest that trees were selected for harvesting across the whole site, rather than clustering as discrete stripping events. CMTs with similar germination dates are also widely distributed, suggesting that ripe trees were similarly dispersed. There appear to be regular fifteen-to-twenty-year cycles in the frequencies of germination and modification. The disturbances influencing germination may result from natural disturbance, increased general human activity in the area, and/or intentional modification (e.g., anthropogenic fire) of forest structure to stimulate new growth of trees or other resources, such as berries. These types of disturbance may have affected the availability of trees considered ready for harvesting. However, there is no obvious correlation between germination and stripping frequencies at the site, so resource availability alone cannot explain observed patterns. Alternatively, the CMT distribution may result from intentional cultural selection (i.e., for taste) or choices to ensure sustainable use of the site through time; a combination of these factors is likely.

Research on CMTs as evidence of sustainable forest use has focused on the practice of bark-stripping. Harvesting cambium without endangering the tree, even if stripped multiple times, shows extensive knowledge of trees and is linked to a particular worldview and value system (Bergman et al. 2004; Östlund and Bergman 2004; Östlund et al. 2009; Turner et al. 2000; Turner et al. 2009; Zackrisson et al. 2000). Mobley and Lewis (2009) proposed that repeated stripping on single trees at the site they investigated reflected sustainable use of the resource. At the Hermit Lake CMT site only 2.5% of the CMTs were stripped more than once; we suggest that this pattern also reflects sustainable use. Temporal and spatial data from the site suggest cyclical selective harvesting of individual trees on a local scale, but people were probably also targeting other harvest sites on a regional scale. Prince (2001) has suggested that temporal gaps in CMT data may result from people harvesting different areas at different times. The data described here hint at a similar resource-use pattern. This alternating pattern of forest use may reflect the cultural practices that sustained this long-term cambium collection area. Forest structure fluctuations suggested by the cycles evident in germination frequency likely contributed to the need to shift resource areas.

Recognition of the need to better understand both the ecological and cultural factors influencing CMT sites is not new (Andersson 2005; Turner et al. 2009; Zackrisson et al. 2000). More information on forest ecosystem dynamics, including the occurrence of forest fires, pest infestations, and climate changes at the Hermit Lake CMT site, may help explain the temporal and spatial distributions we have observed. More information on the traditional and cultural practices associated with cambium collection and the values and beliefs attached to trees is certainly necessary. A combination of this information is needed to fully realize the interpretive value of this site.

There are numerous avenues available for future research. A larger sample size could prove to even out the spatial and temporal patterns we have noted here. We suggest expanding the study area to include not only the adjacent site but also other locations of historic Teslin Tlingit land use, such as the older village at Johnstontown and the trail from Teslin Lake to Taku River. Analysis of CMTs in these areas, if present, might provide insight into whether village areas have similar CMT site characteristics and travel areas have different site characteristics.

Community-based research on the traditional ecological knowledge behind the cambium harvesting patterns observed at the site is necessary to realize the full interpretive value of this site. CMT studies like the one described here can contribute to future community-based traditional ecological knowledge research concerning the management of trees. For example, several research questions resulting from the current study include: how did people know when the tree was ready to be stripped? Was this related to the size of the tree or "ripeness"? How would people know when the cambium was best? Does this relate to the size of the tree? What did people understand about tree cycles and growing conditions at different sites? How does this relate to where and when cambium was harvested? How much of the harvest pattern noted here reflects cultural choices to sustain the resource? What were the relationships with, and beliefs about, the forest?

Much of the discussion about ecological factors in CMT research has emphasized effects on the survival rate of trees and therefore the available sample size of CMTs (i.e., forest fire or logging history) (Andersson 2005; Andersson et al. 2005; Bergman et al. 2004; Marshall 2002; Niklasson et al. 1994; Östlund et al. 2002; Swetnam 1984; Zackrisson et al. 2000); less discussion about how these factors influence or are related to CMT age distributions has taken place. Archaeologists conducting CMT research could benefit from working closely with foresters with knowledge of local forest structure to better understand forest ecosystem dynamics and design appropriate sampling programs.

Not all CMT sites are conducive to in-depth studies due to the history of fire, logging, settlement, and other cultural or natural disturbances—this makes the Hermit Lake CMT site a relatively rare resource. The long history of cambium harvesting at the site along with relatively few past disturbances provides an ideal setting for further CMT studies. There is adequate historical data for the area, and the fact that the Teslin Tlingit were still consuming cambium in 2008 suggests there is likely existing traditional knowledge for this area and the resource.

CONCLUSIONS

Traditional management systems include "the strategies for ensuring the sustainable use of local natural resources such as pest management, resource conservation, multiple cropping patterns and methods for estimating the state of resources" (Houde 2007:6). The results of this preliminary analysis suggest that intentional strategies to manage cambium availability are affecting the temporal and spatial distributions of CMTs at the Hermit Lake site. This should not be surprising, as Turner et al. (2009:238–239) point out, since CMTs reflect aspects of intentional resource management and traditional ecological knowledge. However, exploration of the linkages between the data that archaeologists collect and the traditional ecological knowledge in First Nations communities has remained weak in western Canada. One of our initial questions was whether the types of data that archaeologists typically record at CMT sites in western Canada are conducive to realizing the broader interpretive values of CMTs and informing us about the traditional management systems that have created them. Archaeologists are typically the principal recorders of CMTs and should ensure that the data collected from these features is appropriate to the research value they offer.

While more information is necessary for a complete analysis, the quantitative data collected from the Hermit Lake CMT site do reveal some things about the management system that created it. Temporal data from the site demonstrate the transmission of knowledge about cambium and bark stripping in a long-term human-environment interaction over a period of at least one hundred years. The data are suggestive of a harvest pattern or strategy to ensure cambium remained a sustainable resource—cambium resources were harvested extensively but not intensively. Frequency of use appears to have followed fifteen-to-twenty-year cycles, and this is not explained solely by resource availability. Moreover, an influx of population and changing land-use patterns appear to have had limited effects on the frequency of use at the site, further suggesting intentional rotational and/or cyclical harvesting patterns.

The Hermit Lake CMT site is only a small part of the overall Teslin Tlingit cultural landscape, but trees and cambium have obviously been, and likely continue to be, an important feature of that landscape. It is hoped that the data compiled here are useful to the Teslin Tlingit community and that they initiate further research into the role of cambium and the meanings and practices associated with its harvesting. CMTs and the traditional knowledge associated with them are both living entities that deserve documentation and further research. We also hope this paper spurs discussion in the Yukon archaeological community about the role of plants in Yukon precontact history and about the value of CMTs as heritage resources.

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BECOMING NATIVE AGAIN: PRACTICING CONTEMPORARY CULTURE IN THE YUKON–ALASKA BORDERLANDS

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ABSTRACT

For the Upper Tanana and Northern Tutchone members of the White River First Nation (WRFN), conceptions of contemporary Northern Athabascan tradition are understood within the context of several historical events in the Yukon–Alaska borderlands. The history and presence of the international border, twelve kilometers from the community, has amplified themes more broadly associated with indigenous revitalization movements in the North American Subarctic. The construction of the Alaska (Alcan) Highway, deeply enmeshed memories of residential schools, and federal governmental intervention (Umbrella Final Agreement and Alaska Native Claims Settlement Act) are now regularly regarded as influences that have led to broader regional revivals of Central Alaska–Yukon linguistic and cultural practices. These influences, amplified by the presence of the border, have prompted members of the White River First Nation to reimagine their past in a contemporary, intergenerational way. The retelling of oral histories and the implementation of a Northern Athabascan language program have enabled the White River First Nation community to revitalize precontact cultural and linguistic practices. This article examines one community's experience of a larger trend aimed at restoring and continuing Northern Athabascan culture and language.

Ongoing attempts to define what the term "tradition" means within the Northern Athabascan community of Beaver Creek, Yukon (Fig. 1), shape the way lives are lived in the Yukon–Alaska subarctic borderlands today. The community of Beaver Creek, home to the White River First Nation (WRFN), is no exception. Theirs is a situation markedly affected by a series of historic influences that have been internalized and reconfigured within a Northern Athabascan cultural repertoire. The contemporary revitalization of cultural and linguistic practices in Beaver Creek is representative of larger regional movements to reclaim precontact traditions, with several unique differences.

The area surrounding Beaver Creek is known as the Yukon–Alaska borderlands for fairly obvious reasons—the Canada–United States international border splits the local landscape into two parts. Tribal elders tell stories of the day that U.S. officials showed up and insisted that individuals choose whether to be American or Canadian. The imposition of this border, the construction of the Alcan Highway, and the Umbrella Final Agreement (UFA) and Alaska Native Claims Settlement Act (ANCSA) have forced the WRFN to reconcile these events with contemporary cultural beliefs and practices. Nostalgia for what is described as a more "pure" and non-Western past plays a dominant role in present conceptions of Northern Athabascan intergenerational identities in the borderlands.

For the WRFN community, the aforementioned events illustrate a distinct series of "Western" influences within the Yukon–Alaska borderlands region. Over the last century, the impacts of these events have led those in Beaver Creek and other Northern Athabascan communities in the region to actively reconfigure themselves and their contemporary understandings of culture in opposition to "the West." Objectified versions of precontact cultural practices now serve as the "pure" standard by

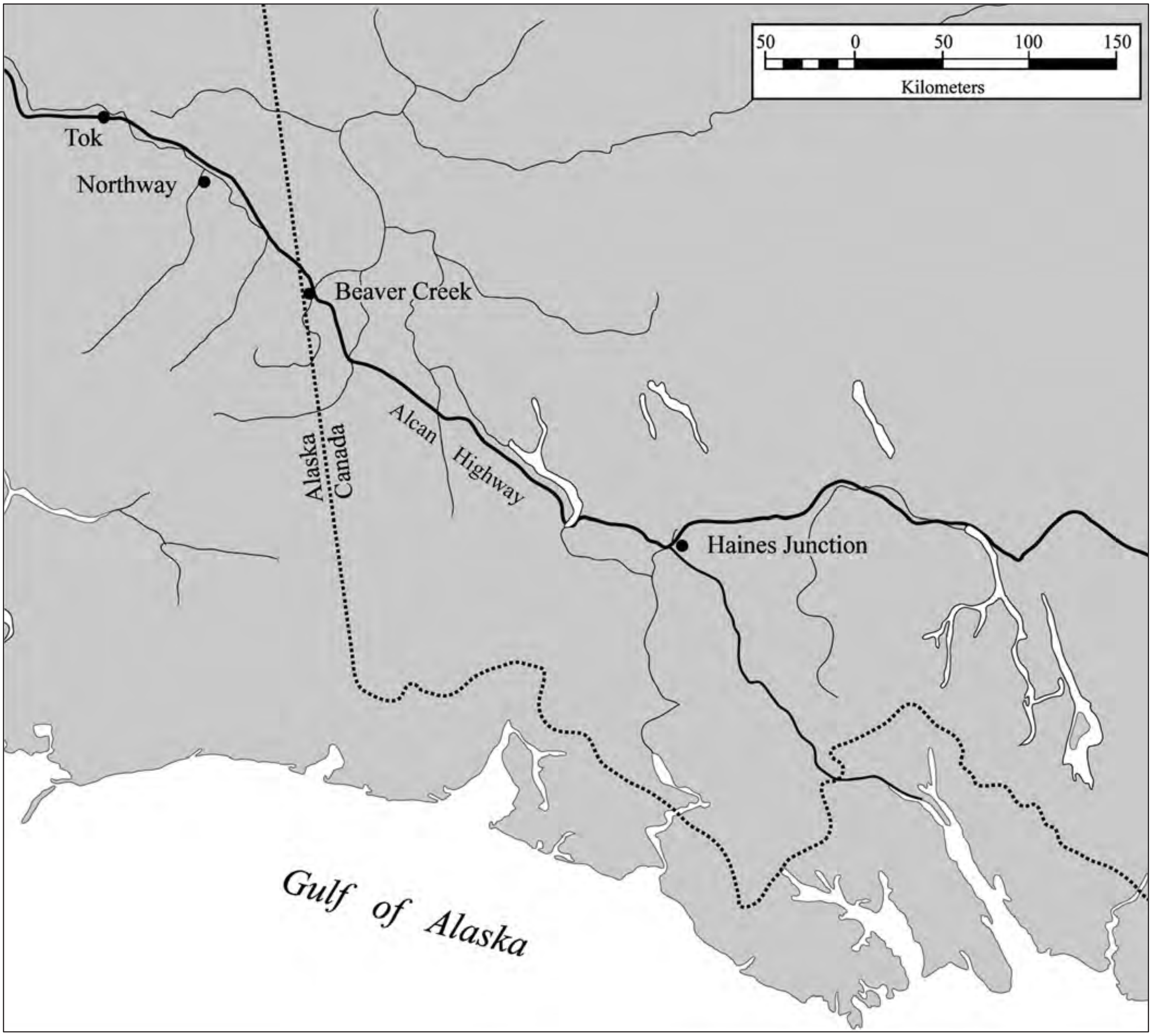

Figure 1. Study area. Map by Dale Slaughter.

which the community may enact "authentic" Northern Athabascan practices.

This paper highlights two distinct themes that adult and elder members of the WRFN use to tell the story of their contemporary culture, themes that have become apparent across much of the Subarctic. The retelling of oral histories and the implementation of a successful Northern Athabascan language program allow for forms of "traditional" cultural expression in the village of Beaver Creek. These activities allow the community to imagine and assert their identities in response to what they view as the ongoing threat of Western influence. This modern world is interpreted within specific intergenerational groups, with each group playing a role in the retelling of the community's story. This essay explores the efforts of tribal elders and adults, aged forty to sixty, to express the importance of local geography, history, and language to younger members of the community through oral histories and the reintroduction of Upper Tanana and Northern Tutchone dialects.

The failure of younger community members to adopt practices as they are taught often leads to overlapping and occasionally contradictory interpretations and enactments of contemporary Northern Athabascan culture. Ongoing efforts to reconcile the presumed "death" of traditional Northern Athabascan practices with fears of an already present and encroaching Western culture[1] feed into the intergenerational processes that shape the cultural realities of Beaver Creek.

BEAVER CREEK

The town of Beaver Creek is located in the southwest of Canada's Yukon Territory along the Alcan Highway and is Canada's westernmost town, 12 kilometers southeast of the Alaska border and the Canadian Customs Post. The WRFN includes the majority of the population of Beaver Creek in the winter months, averaging seventy individuals. The population increases in the summer months to around 120 people, including seasonal workers and members of the community who spend their time in larger towns or cities during the winter.

The community's main employers are the Canadian Customs Post, the WRFN, and two tourist lodges that are open in the summer. Beaver Creek's economy is heavily based on the seasonal tourism that peaks in the summer. Though there are small stores and gas stations along the Alcan that provide services and supplies during the summer, the closest large towns to Beaver Creek are Tok, Alaska, two hours to the northwest, and Haines Junction, Yukon, about three hours to the southeast. There is a small grocery store open year-round in town, but the high prices usually send individuals to either of the larger towns hours away for supplies. Beaver Creek is served by a very small airport, operated by the Yukon government.

The Nelnah Bessie John School, located in the center of the village, serves students in kindergarten through grade nine. The school was renamed in 2001 after WRFN elder and teacher Nelnah Bessie John, whose "legacy of traditional ways of knowing and being continue to define [the community's] determination to include culturally significant learning opportunities for students in combination with mainstream curriculum" (Cochrane 2012). Following the completion of ninth grade, students have the choice of continuing their education in larger towns and cities in the Yukon Territory or Alaska, pursuing online education, or ending their schooling.

The remote location of Beaver Creek has amplified the effects of outside influences in the region. Construction of the Alcan Highway in 1943 and implementation of the international border and customs offices have altered conceptions of individual and cultural identity. By altering the flow of traffic and travel and by imposing two sets of national laws upon a previously unified indigenous community, the border and highway have become points of contention in the borderlands region. Adults and elders in the community describe the Alcan as having "sliced" through traditional lands and trail systems, while the border imposed a set of unfamiliar and unnecessary regulations upon a previously unified community. The provisional border separating the Yukon Territory and Alaska, established in 1825 and subsequently altered during the Klondike Gold Rush in 1898 (Gibson 1945:27),[2] was not monitored by Canada or the United States until the construction of the highway and implementation of the customs posts in the mid-1950s. Because the border only began to be monitored at the completion of the Alcan's construction, the two events remain linked in the minds of those in Beaver Creek, who felt their immediate effects. As David Krupa (1999:52) states, "it often seems as if Native people and culture are relegated to the margins of some more urgent history coursing the narrow artery of the Alcan."

The Alcan, understood as a "channel" of Western influence, supports the northern tourist trade. The border, on the other hand, acts to monitor and limit flow between Canada and the United States, forcing a switch from one set of national laws to another. The highway and the border are viewed in the WRFN community as the most tangible representations of Western influence in the area, and as such remain at the root of discourse surrounding cultural revitalization. Both the highway and the border have been internalized as impositions of a distinctly Western separation of space upon what was previously land structured by the Northern Athabascan tribes in the region.

REVITALIZATION

For the WRFN, contemporary cultural revitalization remains rooted in a collective effort to reclaim "authentic" cultural practices with a basis in traditions preceding Western contact. Anthony Wallace describes this trend as a "deliberate, organized, conscious effort by members of a society to construct a more satisfying culture" in a time when those involved in the process of revitalization perceive their cultural system as "unsatisfactory" (Wallace 1956:256). The presumed death of "traditional" culture is often alluded to as the factor that drives the community to actively remember and re-create cultural ideologies and practices from the past. However, the adoption of certain Western practices and technology to accomplish this revitalization has prompted the community to reconfigure what constitutes "tradition."

Revitalization movements are powered by emic understandings of cultural objectivity that exist within a framework constructed by demarcation between self and cultural other (Wallace 1956). The movement in Beaver Creek is characterized by such understandings. The demarcation between "Native," or more specifically Northern Athabascan, and "Western" drives the revitalization efforts. Many objectified forms of culture exist within the repertoire of Beaver Creek. Two activities frequently referred to as among the most significant indicators of successful cultural revival include linguistic revitalization efforts and the retelling of oral histories. These activities act as contemporary gauges of culture and "authenticity" that have been reconfigured and reinvented as, paradoxically, both inversions and replications of Western customs. During the process of inversion and replication, the activities are reconfigured to include both Western and Northern Athabascan aspects.

The use of trucks or ATVs to hunt large game, refrigerators to preserve food, and firearms for hunting are both assets and hindrances at once. At any time, community members in Beaver Creek may choose to venture into the bush and live in the "traditional" way—hunting, fishing, and foraging sans vehicles, walkie-talkies and, occasionally, Western weapons. Community members may also, in the same day, buy groceries at the local convenience store or drive two hours to see a "Western" movie in a "Western" movie theater. More commonly, and most significantly, a combination of these two sets of activities occurs. Western technologies increase the ease and productivity of authentic practices, but also have innately altered the practices themselves to such an extent that many adoptions of technologies and practices within the Northern Athabascan repertoire are deemed "authentic."

How can driving down the highway with binoculars be considered a culturally authentic form of hunting for large game? How can using a speedboat to collect fish nets for a fish camp be considered a traditional cultural activity? Why is it acceptable to study Native language from note cards instead of learning it fluently as a child? To account for these changes and to internalize them in ways that make sense in the setting of Beaver Creek, WRFN members actively reflect upon the ideologies and practices that constitute authenticity (e.g., speaking in Upper Tanana and Northern Tutchone dialects, hunting large game, participating in fish camps). What has resulted from this discussion is two-fold—on one hand the community seeks to cherish and maintain Upper Tanana and Northern Tutchone practices as remembered and described before the waves of Western encroachment. On the other hand, community members actively engage with the Western world and are very aware of their positions as modern indigenes. They are aware of the complex, often contradictory nature of these beliefs. As stated by Radin:

> Did not similar things happen before? . . . It is quite unwarranted to argue that, because we can demonstrate the presence of European artifacts or influences, we are necessarily dealing with cultures that are in process of deterioration or that can no longer be regarded as aboriginal in any sense of the term. These cultures have no more lost their aboriginal character because of European influence than, for instance, the Mississauga Indians of southeastern Ontario lost their aboriginal character because they were so markedly influenced by the Iroquois (Radin 1933:121–122).

In the WRFN, the underlying ideological features of the revitalization movement are rooted in efforts to reconcile understandings of precontact cultural heritage and the colonizing efforts that altered it. Individuals from the two major groups within the community—Upper Tanana and Northern Tutchone—have, to a large degree, worked together to assert claims of Northern Athabascan heritage in the face of broad interpretations of "Western" culture. While differences between tribal groups, most notably Upper Tanana and Northern Tutchone, are acknowledged, semblances of past conflicts between groups have been deemphasized.

In the 1970s, Guédon (1974:20) argued that, "on the whole, the different native groups in and around the Upper Tanana basin present themselves as a cultural continuum, the boundaries of which must be defined only with the most extreme caution." This description also serves to define the contemporary relationship between the Upper Tanana and Northern Tutchone groups within the WRFN today. The relatively fluid contemporary nature of Northern Athabascan tribal identity in the borderlands makes speaking about one particular group difficult. The feeling of cultural continuity that exists in the region is supplemented by increasing reliance on kinship ties as a measurement of similarity. Now kinship ties often overshadow what were once considered significant cultural differences, though Northern Tutchone and Upper Tanana elders have pointed out that this was not always the case (Sanford 2010; Winzer 2010).

POLITICS

In the early 1950s, the Upper Tanana and Northern Tutchone–speaking bands were combined into the White River Indian Band by the Yukon government. In 1961, the White River Indian Band was merged with the Southern Tutchone-speaking Burwash Band. This new band, the Kluane Band, was centered at Burwash on Kluane Lake until 1990, when the Kluane Tribal Council split into two groups—the Kluane First Nation in Burwash and the WRFN in Beaver Creek. Following the founding of the WRFN in 1990, an elder spoke to difficulties surrounding cultural and organizational issues related to the differences of the two bands. She mentioned that at first "we [the two groups] did not always get along, but today it's much better and more peaceful" (Winzer 2010).

The unification of the two groups within the WRFN is attributed to the revival of traditional Northern Athabascan culture. To a large degree, separate tribal groups were forced to make drastic changes following the implementation of Canada's UFA and the United States' ANCSA to fight for land rights and self-governance. Described as being faced with a common "adversary," familial and tribal groups banded together in a fight to preserve aspects of their livelihoods that were threatened (Winzer 2010).

A political agreement between the governments of Canada, the Yukon, and the Yukon First Nations, Canada's UFA was reached in 1988 and finalized in 1990. The document provided a framework within which established Yukon First Nations would conclude a final settlement agreement regarding land, compensation, self-government, and the establishment of boards and committees to guarantee joint management of future ventures.[3] The WRFN refused to agree to the terms of the final agreement, splitting from the Kluane First Nation in 1990. Though they did participate in land negotiations following their break from the Kluane First Nation, the WRFN was unable to reach a consensus for ratification. The mandate to negotiate land claims expired on March 31, 2005, and on April 1 of the same year the Canadian government ceased discussion with the WRFN. From this point forward, the government stated that negotiations with the WRFN would no longer allow for the possibility of land claims and self-government agreements, and that further discussion would fall under the provisions of the Indian Act. The UFA provided a total of 13 percent of the Yukon's area to be returned to First Nations under the Final Agreement, but because the WRFN was unable to reach a consensus, they hold no official claim over the traditional lands that were in dispute during land claims negotiations.

While kinship and cultural ties still play important roles in connecting the lives of regional tribal groups, tribes falling under the jurisdiction of either Canada or the United States have faced separation from cultural and kin-based networks that were in place prior to the implementation of the international border. Family members on the U.S. side of the border, most of whom live in the village of Northway, Alaska, have had their own negotiations with the federal government, most notably in the form of ANCSA.[4] Although strong cultural and kin-based connections have been maintained between the community of Beaver Creek and villages like Northway, the fact remains that their lives are significantly shaped by their respective relationships with the countries within which their territories lie. Given its geographical placement, the WRFN has been especially impacted by the UFA and internal culture and politics.

At the time of its founding in the early 1950s as the "White River Indian Band," many individuals believed that the tribal groups to which they belonged were fundamentally different from others within the band (Winzer 2010). Years after the establishment of the WRFN, individuals of Northern Tutchone and Upper Tanana identity perpetuated a divide between themselves despite familial ties and many cultural similarities. Only recently within the WRFN has there been a move to identify Northern Athabascan intercultural ties and strengthen bonds between groups. This period of disagreement between tribal groups is now entirely attributed to Western influence (Johnny and Johnny 2010; Sanford 2010), with residential schools identified as the most emotionally disruptive and psychologically traumatic example. The fact that the majority of adults and elders attended the schools now serves as a rallying point against a broadly defined sphere of "non-Native" influence.

RESIDENTIAL SCHOOLS

In addition to the hardships that occurred with the increasing populations of hunters, trappers, and prospectors, missionaries introduced Christian religion and Western education simultaneously through the implementation of residential schools throughout Alaska and the Yukon in the nineteenth century. By 1850, children between the ages of six and fifteen were required by Canadian law to attend the schools, though many Northern Athabascan groups in the Yukon–Alaska borderlands region were geographically far enough removed from government and missionary officials that this law did not affect them immediately. Several elders in the WRFN recall living in the bush as young children in the mid-1900s with their families, who actively avoided the missionaries (Johnny and Johnny 2010).

The Canadian government and the missionaries who were responsible for running the schools maintained the belief that it was necessary to separate Native children from their parents to civilize them and break them of their "savage" tendencies (Hoxie 1996:275; Sanford 2010). Children arrived at the schools speaking their Native dialects, only to be punished for failing to adopt English and Western customs. Forced to remain in the boarding schools all year, with their only breaks during the summer, children became estranged from their families, languages, and culture. Many stories from WRFN elders who attended residential schools in the mid-1900s allude to physical and sexual abuse. Authority figures would literally try to "beat the Indian out of [them]" (Demit 2010; Sanford 2010; Winzer 2010). The generation of children who experienced residential schools is often referred to as the "lost generation," and within the community many of these individuals have just in the last decade begun to be comfortable speaking their Native language(s).

The last Canadian residential school was closed in 1996, despite the fact that compulsory attendance ended in 1948. Elders actively avoid the topic of their experiences at the schools to this day, and many harbor deep-seated resentment toward government officials, whether or not officials have had any involvement with the schools themselves (J. Johnny 2010). Within Beaver Creek, distrust and suspicion continue to flavor dialogue between First Nation members and the local Royal Canadian Mounted Police (RCMP) (J. Johnny 2010; Sanford 2010). Both parties continue to address these issues through seasonal community events and an emphasis on creating a more positive atmosphere within the community for the sake of future generations (Johnny and Johnny 2010).

Talk of residential schools regularly enters discussions of the efforts to revive past cultural and linguistic practices, especially among adults and elders, who deal with the effects of their experiences on a daily basis. Younger generations, on the other hand, present a unique challenge to the revitalization efforts. Their disconnect from the immediate psychological effects of the schools paired with the vastly different atmosphere in which they spent their formative years (e.g., English as a first language and access to Western technology) has prompted an "intergenerational meld" of practices considered to be "traditional" and "authentic."

GENERATIONS

The impetus for the conscious attempts to revive and maintain culture within the WRFN is largely attributed to Western contact, specifically residential schools, the expropriation and alienation of lands, and forced resettlements. It is the current older generation who experienced the direct effects of these events during the formative years of their childhood and youth and who subsequently suffered with the effects through their adult lives.[5] This generation now faces the task of passing their knowledge to a younger generation of individuals who understand their culture within a vastly different framework and environment.

An issue at the center of many of the community members' attention is this intergenerational conflict of cultural rejuvenation and continuity, which is often explained through the opposition between the "hard life" of the authentic past and the "easy life" of the modern present. Lack of interest in continuing historically based "authentic" traditions in the WRFN continues to be a source of conflict. Many elders attribute this lack of interest in learning Upper Tanana and Northern Tutchone dialects and practices to the draw of an easy Western life, centered upon reliance on cars, computers, telephones, and other technology. In an interview, Agnes Winzer (2010), a Northern Tutchone elder, expressed her disappointment that some young community members did not display an interest in storytelling. Her interpretation of this trend was that young people increasingly express a lack of interest in traditional Northern Athabascan culture. This lack of interest is often viewed as a factor negatively affecting the work that adults and elders do to revive and maintain traditions.

For instance, when Easton was in the early stages of his fieldwork in the village of Beaver Creek in the 1990s, elders pressed him to devote considerable attention to recording of place names in the local Native languages and documenting the trails connecting these places (Easton 2008). The current generation of elders, who had spent some portion of their lives living in the bush, holds a comprehensive knowledge of these names and trails. In his description of the trails around the Scottie Creek area, close to Beaver Creek, Chief David Johnny, Sr., described just how significant the trails were to the structural integrity of the Native communities in the area. He pointed out that:

> Walter Northway said, even marriage [relied on the trails]. Northway, they marry this way, Copper Center and even Burwash before. Copper Center, all the way down that way and then back up Mentasta, Tanacross, South Lake, Suzie Lake. At that time they said one more person married from Tetlin to Northway it would've covered, made a round circle. A big circle (D. Johnny 2010).

This description of the importance of trails for tribal relationships mirrored that of Agnes Winzer (2010), who described the trails around Beaver Creek as "all connected together, just like how all people are connected together." The emphasis on the familial and marital connections that were so reliant on the trails highlights the distinction between a "pure," traditional Native way of life and the current way of life, tainted by Western influence.

The younger members of the WRFN, ages twenty to thirty, simply do not have the same relationship to these trail systems as their parents and grandparents did. The use of the trails for communication and travel has been almost entirely replaced with the Alcan (D. Johnny 2010). Young community members still travel along the trail systems if they so desire, but they are by no means used as frequently as they were prior to the construction of the highway. The presence of the international border atop the trail systems further complicates their use. Border officials require individuals to report any plans to use trails close to the border before heading into the bush, limiting spontaneity and freedom of movement on lands still considered to be under the informal stewardship of the WRFN.

The younger generation (Fig. 2) faces the task of reviving traditional practices in a world lacking aspects of what constitutes "Indianness" for older generations (Easton 2001). These differences may be understood to reflect a distinct intergenerational division of cultural labor and knowledge, implying that with time these youth will grow into new identities as they mature (Easton 2001). This intergenerational division of cultural labor informs the ways in which indigenous heritage and cultural traditions are remembered, interpreted, and taught within the community. The following sections address specific examples of the ongoing attempts to revive and maintain Northern Athabascan culture in light of the factors discussed above. The recitation of oral histories and linguistic revitalization play significant roles in what appears to be a trend to reconnect with authentic practices of the past.

ORAL HISTORIES

There are several themes that color the dialogue of Native and Western relations in the Yukon–Alaska borderlands, many of which are viewed in a negative light in Northern Athabascan discourse on culture and identity. The exploitation of Native people, the land, and its resources by fur trappers, missionaries, and, later, the governments of the United States and Canada shapes associations with Western influences in Northern Athabascan dialogue. At the heart of the cultural revitalization of the WRFN are intersections of cultural, historical, and political rhetoric and practice. Oral and written histories, current archaeological evidence, and representations of "Western" culture inform modern notions of what being Native means in the borderlands community of Beaver Creek.

While there are no indigenous written accounts of Athabascan groups before Western contact in the late nineteenth century, oral histories, myths, and legends provide a historical context more attuned to an Athabascan way of interpreting the past. Myths and stories provide a type of history that individuals in the community use to understand their own identities. Many of these stories span great distances across the interior of the borderlands and hold significance for the interior Northern Athabascan region as a whole. Elder Joseph Tommy Johnny offered an example of this practice in his account of how raven created the moon:

> It was all dark and raven was flying up there [points to the sky], and he saw a little hole in the big blackness above. Raven fly around and pick up a white cloth and fly it up to that hole. Raven fly all around the sky. When get to that hole he plug it with the cloth. Raven get sucked into that hole out the other side, but that cloth stick in, and that's how we get moon up there (J. Johnny 2010).

Stories like this one reflect centuries of oral history practice that are becoming increasingly significant to those working to preserve a uniquely Northern Athabascan present. This particular story retold in January of 2010 was likely modified on the spot to fit within the window of time of the interview and altered so that a *Noglé* (non-Native person) would be able to understand the intended message more clearly. For many in the borderlands, the

Figure 2. Chealsea and Jolenda Johnny at fish camp on Pickhandle Lake, summer 2009.

practice of storytelling relies less upon the recounting of facts and truths and more upon the context of the time and place in which the story is told.

As Annie Ned, an elder interviewed by Julie Cruikshank, said, "You've got to believe it, what Grandma said. . . . Old-style words are just like school!" (Cruikshank 1990:267). These "old-style words," like those in Joseph Tommy Johnny's raven story, represent a part of the repertoire of Northern Athabascan tradition. According to Annie Ned and other elders interviewed by Cruikshank, collective cultural knowledge passed on from generation to generation was the equivalent in precontact Athabascan life to Western schooling today. Whether the practice of oral histories is in fact equivalent to the Western schooling system is not the point. The significance for those who tell and retell these stories stems from the *belief* that these oral histories exist as forms of authentic indigenous culture and history.

The widespread staying power of the stories in relation to specific locations in the landscape of the Southwest Yukon and Alaska Interior shows the importance of the local landscape in shaping understandings of modern Athabascan cultural identity. In an interview with Chief David Johnny, Sr., ties to the landscape were extended to galactic heights and presented apocalyptic themes:

> I'll tell you a story about the time they landed on the moon. My grandpa, Billy John, and grandma, Laura John, and my dad, we go down in Northway and went to visit them, and they [the astronauts] landed on the moon! So we had black and white TV, Andy had black and white TV, so we went over and watched it and then went back over to the house, Andy's house. And we took them [his grandparents] over and they said, "so what they [the astronauts] do?" They landed on the moon up there, and they [grandparents] were really mad. My grandma was mad, my dad was mad (D. Johnny 2010).

When asked why they were mad, Johnny responded:

> Because, he said, those white people have no business up there, it's weird, they got no business up there, we have to leave that alone, that's not up there for you to go up there and do what you want. It was put there for a reason and that reason was that the creator made the earth as it was so you can live on it. And, you know, you can't go up there and live there, so you got no business bothering that stuff. The planets, my grandma said, if you bother that stuff, that moon, you bother the things up there, the world is going to change, she said (D. Johnny 2010).

Here, apocalyptic warnings drove the distinction between a uniquely Native perspective, understood to be natural, and its opposition to the Western way, described as intrusive and unnatural. By casting blame upon the scientists and astronauts who destroyed the natural order of things by traveling to the moon, this story highlights the oppositional categories that inform notions of revitalized identity. This identity is at the crux of cultural representation within the Beaver Creek community. By using scientific terminology in his story, Johnny demonstrated the simultaneous adoption and rejection of Western influences upon contemporary Upper Tanana and Northern Tutchone notions of cultural identity and authenticity.

While a rejection of Western ways and technology is glorified among various members of the community,[6] Western rhetoric is still widely used in representations of Native and Western social and cultural categories. This was evident in Johnny's commentary on *Noglé* reliance on Western culture and technology:

> What's gonna happen to you if the banks and technology goes down? How would you get home [from here]? Where would you get money? Banks don't mean anything if the system goes down. There would be no way for you to get money or way to get back home. But us? We could go back and live off the land like we used to (D. Johnny 2010).

David Johnny, Sr., also contrasted Athabascan and Western spiritual beliefs to illustrate the environmental and geographical orientations upon which individuals frequently base their identities. Johnny described a paradigm wherein Northern Athabascan identity became associated with the natural, pure landscape and Western identity was associated with science and a distinct lack of connection with the environment.

> You know the thing, the bushman, eh? We say *gonh*. It comes and lives in the fall time, it will come around and bother you and all that stuff, eh. You know me, I went to school, to Western school and all that stuff, and even though I went to listen to the Western idea of what things are, when I come back to my culture I believe in the spiritual part of it, you know? I know there are bushmen out there, I know there's something out there not human like me, but it's spiritual, it's a spirit. I know that white people are not gonna believe me, but you know, I walk in the bush and I heard stuff. But you tell somebody from Western, the white people, and they'll say "Oh, that's a whippoorwill, that's a bird, yeah." But you know, do birds do that? I heard all that stuff. But… their minds are just blocked, you know, they're just so blocked… there's a spirit out there (D. Johnny 2010).

The bush-dog, a large wasp about four inches long, bright orange and black with a large stinger and an appendage for drilling wood, is very active and can be seen flying frequently during the summer. The bush-dog is a "spy" for the bushman. It serves as an example of the ways in which multiple meanings may be projected onto a single entity. For the Northern Athabascan elder, the bush-dog means *gonh*, the bushman, is investigating the area. For a Western entomologist, the presence of the bush-dog may convey information about the surrounding ecosystem and season. For a young Northern Athabascan child, the bush-dog may incite fear or anxiety about being captured by *gonh.* For a young, Western-educated member of a First Nation group raised by his grandmother, like David Johnny, all three interpretations may apply. During a camp visit by a bush-dog, several individuals declared "we should pull out its stinger," or "kill it," and yet none dared to.

Reconciling the Western and Athabascan worlds is the challenge of the cultural revival movement occurring in Beaver Creek. I suggest that what occurs in the examples above is a modern melding of Northern Athabascan and Western categories of theory and practice. This modern meld is complicated by intergenerational interpretations of what it means to be Athabascan in an increasingly Western world.

Facets of the Western world that have worked their way into the Yukon–Alaska borderlands are there to stay. Accommodating these factors into an existing, intergenerational cultural repertoire is the project at hand. The goal of cultural revitalization in Beaver Creek is one that simultaneously embraces certain aspects of Western technology and culture and protects other Northern Athabascan practices that are deemed "authentic" and "traditional" in nature. It is increasingly important for individuals to embrace Western practices only within the scope of a Northern Athabascan cultural narrative.

LANGUAGE REVIVAL

Over the past twenty years the people of the WRFN have actively identified themselves as members of a distinct cultural group who struggle to revive and maintain what they understand to be "traditional" culture. The descriptors "tradition" and "traditional" have come to encompass a conscious move toward practices that predate the waves of white settlers in the mid-eighteenth century. These settlers represent the exploitation of Native people, the land on which they live, and its resources. The active revival of traditional culture within this community is "founded on the marked opposition between 'ourselves' and 'others'... [and] is a *relation* inscribed [within their] culture" (Comaroff and Comaroff 1992:51).

Frequently, tribal elders insist upon an overt objectification of their own culture to highlight creative ways in which Western technology may be adopted within a Northern Athabascan framework. Throughout this process, Western technology is used in ways that more quickly and effectively allow individuals to identify and return to their indigenous roots. The Upper Tanana and Northern Tutchone language courses offered at the WRFN Band Office and in the Nelnah Bessie John School exemplify the ways that technologies have been adopted to bolster cultural and linguistic revitalization efforts.

Spearheaded by the late Bessie John and now run by Ruth Lynn Johnny (Fig. 3), the WRFN conducts Upper Tanana and Northern Tutchone language classes that attract individuals from all generations in the community. The classes are taught in English by Ruth Johnny, who uses visual aids, her own extensive knowledge of pronunciation and vocabulary, and a discussion-based teaching style to conduct lessons. These lessons provide opportunities for community members to both learn and practice several Northern Athabascan dialects and to congregate and reflect upon cultural and community activities.

At one such language lesson, the word for "refrigerator" was discussed and translated into the Upper Tanana and Northern Tutchone words for "ice" and "box." In a similar instance the word for "fox" was decided to mean "shadow of a dog" in Upper Tanana and Northern Tutchone. When questioned as to why no word for fox existed already, Ruth Johnny explained that until the past twenty years, foxes were not seen in that particular area of the borderlands (R. Johnny 2010). She thought that global warming, a common theme she and others regularly attributed to Western society, had changed patterns of temperature and snowfall in the area, creating an environment more suitable for foxes. Changes in the ecosystem and the availability of refrigerators provoked discussions of meaning and interpretation of their places in contemporary vocabulary.

In an interview, Chief David Johnny, Sr., and his wife, Ruth Johnny (Fig. 3), highlighted the increasingly significant role of Native language within the community by pointing out the history of use and fluency of Upper Tanana and Northern Tutchone dialects. David Johnny described how a chart could track the use of Upper Tanana and Northern Tutchone languages in the community. He argued that "if you set up a chart with fluent speakers—line up fluent speakers from the 1950s up until now... you see that the chart starts to rise back up because people are starting to take an interest in their culture again" (Johnny and Johnny 2010). Moving his hands to mimic the fall and subsequent rise that would represent Native language use on this hypothetical chart, Johnny explained that, "after 1985 the language just kind of died... but then Bessie [John] started to bring it back" (D. Johnny 2010). Both fluent speakers, David and Ruth Johnny vehemently ar-

Figure 3. Ruth and David Johnny at home, January 2010.

gued that the revival of Native language was paramount to the revival of Northern Athabascan culture as a whole.

As prominent individuals in the community and leaders of the language and cultural revival, the Johnnys have taught and continue to teach the Upper Tanana and Northern Tutchone dialects to their youngest children and grandchildren, all of whom are now fluent. Their fluency is unanimously regarded and celebrated throughout the community as a huge success in the fight to revive and maintain indigenous culture. The fact that their vocabularies include the words for refrigerator, fox, truck, highway, and other words associated with Western influences is generally regarded as an acceptable form of cultural change.

As the Johnny example shows, language is a means for assessing the degree to which an individual is linked to his or her Upper Tanana and/or Northern Tutchone past. There is a prevalent sentiment among the community that the use of these dialects alongside cultural practices provides tangible evidence of one's involvement in the revival and continuation of Northern Athabascan culture. Language competency is continually emphasized across the intergenerational division of cultural labor and agreed upon as one of the most important aspects of cultural revival (Easton 2001). Elders who are fluent in Upper Tanana and Northern Tutchone are viewed with high esteem and are looked upon as "keepers of tradition" and representatives of the "true" languages and practices of the past. While some, usually older, members of the community lament the loss of culture, others, often younger members, embrace changes and objectively choose to incorporate them into an existing cultural repertoire.

While members of the WRFN live in houses with central heating, drive Hondas, Fords, and Chevys, and take vacations to Hawai'i, many of them also hunt moose, catch fish, and speak local dialect(s). These practices remain resolutely grounded in the Athabascan way (Easton 2001). While these practices remain contested, they have also become deeply enmeshed over time and are emblematic of the conflict between Northern Athabascan tradition, history, and culture and Western practices. Discussions of cultural authenticity play an important role in this conflict. When faced with so many choices of livelihood, how individuals choose to live their lives becomes increasingly dependent upon their personal identification as members of both the Yukon–Alaska borderlands and the far-reaching Western world. The agency that distinct groups such the WRFN exhibit in the shaping and reshaping of their beliefs and practices relative to external influences demonstrates the complex nature of cultural revival movements taking place not only in the borderlands, but throughout the North American Subarctic.

CONCLUSION

Members of the WRFN have maintained a distinctive position in the Yukon–Alaska borderlands through their dynamic interaction with their surroundings and distinct cultural "others." Changes in geographic space, contact with different cultural groups, and assimilation processes have altered the realities of those who claim Northern Athabascan heritage and culture. Individuals have reacted to these forces through active reconfigurations of their collective cultural identities and ownership of geographic spaces within the borderlands. In many cases, these reconfigurations have been initiated through forceful means, attributed to Western culture, the capitalist state, and the Canadian and U.S. governments. Despite these events, the people of the WRFN remain optimistic about their future as an autonomous cultural group and as representatives of Northern Athabascan culture in an increasingly modern world.

The people of the WRFN who are most involved with cultural revival movements objectify aspects of their culture they believe to be authentic (e.g., Northern Athabascan dialects, traditional hunting and fishing practices, subsistence living). These practices are at the forefront of an explicitly reflexive set of ideas of what it means to be a member of the community. Distinct forms of culture are perpetuated, though in ways unfamiliar to some tribal elders. Discourse surrounding the presumed death of Northern Athabascan borderlands culture has effectively been reconfigured to fuel an ongoing, intergenerational dialogue of cultural rebirth and revitalization.

There are many understandings of what traditional and authentic culture mean today for members of the WRFN. For tribal elders, authentic Athabascan culture refers to practices such as speaking one's dialect fluently, mastering traditional hunting practices, and living in the bush. For younger members of the community, modern technology, oral history, and local notions of space and geography inform understandings of contemporary Northern Athabascan culture. These interpretations continue to shift as the WRFN works toward a peaceful future, a goal envisioned by the vast majority of those living in the small communities of the borderlands. Individuals envision this future as involving aspects of both the Western and traditional worlds. The community understands the necessity of interplay between these two worlds, an interaction that involves a balanced configuration of modern categories of cultural identification that remain distinct and intertwined at once.

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NOTES

1. The terms "Western," "traditional," and "Native" are emic categorizations.
2. In 1903, U.S. Secretary of State John Hay and British Ambassador Michael Henry Herbert resolved the international boundary dispute by creating a joint commission composed of one British, two Canadian, and three U.S. nationals. The final ruling of the commission was in favor of the U.S. boundary proposal (Gibson 1945:31).
3. Only eleven of the fourteen established First Nation groups currently have final agreements. The WRFN refused to concede to the terms of the agreement and still unofficially manages the land that they claim as their own.
4. The Alaska Native Claims Settlement Act was signed into law in 1971. Congress required Native Alaskans to organize twelve regional "profit-making corporations and approximately two hundred village corporations to manage this property." Forty-four million acres of land were handed over to these corporations, along with $962.5 million to compensate for "the extinguishment of aboriginal title to the remaining acreage of Alaska" (Doyon, Limited, 2013a, 2013b; Hoxie 1996:276; Landye Bennett Blumstein LLP 2006). Doyon, Limited, owning 12.5 million acres in Alaska's Interior, is the corporation most closely associated with the Yukon–Alaska borderlands.
5. This has included feelings of deep shame of their *Dineh* heritage, endemic racism despite attempts to Westernize, drug-abuse and imprisonment, loss of language facilities and traditional geographic knowledge, erosion of bush skills, the tragic deaths of many of their peers, and difficulties in raising their own children due to a lack of parenting models (Dänojà Zho Cultural Centre 2009).
6. These members tend to be part of the older generations.

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DIVING THROUGH TIME AND ACROSS DISCIPLINES: THE NORTHERN NATURE OF RESEARCH AND INTERPRETATION OF THE *A. J. GODDARD* SHIPWRECK

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ABSTRACT

The *A. J. Goddard*, a steamboat built for the Klondike Gold Rush of 1897–1898, was wrecked in 1901 on Lake Laberge, Yukon Territory, where it lay undisturbed until its rediscovery in 2008. It is the only known shipwreck from this period to show such remarkable preservation. The complete and undisturbed nature of the wreck site provides an unparalleled opportunity for studying the construction features and associated material culture of a gold rush-era steamboat. Researching and exhibiting this ship provided an opportunity to form cross-disciplinary partnerships among a local, national, and international team of archaeologists, historians, divers, conservators, and curators. In addition, three seasonally and topically distinct museum exhibits were developed from a combination of the findings, field research, and historical data. This article provides an introduction to the history and interpretation of the *A. J. Goddard* shipwreck based upon the work of this cross-disciplinary team. The nature of northern research, museology, and small museum outreach programs will be explored to draw lessons for future collaborations and opportunities between enthusiasts, researchers, and museums.

INTRODUCTION

In 2008, a small iron steamboat from the 1896–1898 Klondike Gold Rush was discovered at the bottom of Lake Laberge in the Yukon Territory. The complete and undisturbed nature of the wreck site, which is the only known site from this period to show such remarkable preservation, provides an unparalleled opportunity for studying the construction and material culture of Klondike steamboats and to form strong cross-disciplinary partnerships with a local, national, and international team of archaeologists, historians, divers, conservators, and curators. The three topically distinct museum exhibits that developed from the research were strongly influenced by the particular circumstances faced by most northern museums: seasonality, small staff, and limited resources. Throughout the project, the continuities, friendships, and growing network of researchers have been the key components that have influenced the evolution of the exhibitions.

The *A. J. Goddard* and its research story have developed side by side with the Yukon Transportation Museum's interpretive decisions. The first section of this article presents a very brief account of the history of the *A. J. Goddard* and the subsequent interpretation of the shipwreck in order to provide background for the second section, which discusses the museology. For those who are interested in learning more about the history of the *A. J. Goddard* or the archaeological field seasons, several articles and a monograph have been published that will hopefully answer any lingering questions that are not addressed in this article due to its focus on museology (e.g., Davidge et al. 2010; Thomas 2009, 2010a, 2010b, 2011, 2012; Thomas et al. 2012). The second section is a narrative account of the museological experience that reveals lessons and experiences from the project and highlights the dedication of all involved.

HISTORY OF THE *A. J. GODDARD*

When the steamboat *Excelsior* puffed into San Francisco on 15 July 1897 loaded with gold from the Klondike, the world swiftly received news of gold in Yukon Territory, Canada (Berton [1972] 2001:92–93). Before a year had passed, nearly 100,000 men and women attempted to reach the Klondike gold fields, located near Dawson City (Fig. 1). Though it was possible to travel by land, a journey upon the Yukon River was often inevitable, and everything from hastily constructed rafts to fleets of steamers set out for the Klondike from Seattle, San Francisco, Vancouver, Victoria, and elsewhere (Berton [1972] 2001:113–115, 2003). Seattle's proximity to the Yukon, combined with three transcontinental railroads, made it the most attractive city to shipping companies (Knutson 1997:6).

Figure 1. Yukon Territory and river route to the gold fields of Dawson City. Map by L. Thomas.

The *A. J. Goddard* was one of the vessels constructed in order to capitalize on the wealth coming out of the gold fields of the Yukon—a steel-hulled steamboat designed and ordered prefabricated by Albert James Goddard and his newly formed Upper Yukon Company. Hauled over White Pass in pieces during the winter of 1897–1898, the *A. J. Goddard* was assembled on the shores of Lake Bennett, British Columbia, along with thousands of other small craft (Bennett 1978:35; Goddard n.d.:2) (Fig. 2).

After successfully passing through the rapids on the Yukon River between Bennett Lake and Dawson City, the *A. J. Goddard* reached Dawson City in June of 1898. After the gold rush, the vessel went on to a successful career delivering passengers and mail along the Yukon River and Lake Laberge (*Dawson Daily News* 1923; *Klondike Nugget* 1898; *Los Angeles Times* 1898:4). On 11 October 1901, the *A. J. Goddard* fell victim to a storm on Lake Laberge and sank in 15 m of water approximately 180 m from shore (*Daily Klondike Nugget* 1901). It lay undisturbed for more than a century until it was discovered untouched in 2008. The ship looks like it is in near-perfect condition, sitting upright on the lake bed, though the steel hull is suffering from corrosion. A scatter of artifacts surrounds the site and extends for several dozen meters in all directions.

The *A. J. Goddard* is one of more than a hundred steamboats built for the Klondike Gold Rush. It is one of only a few prefabricated metal vessels ever built for the Yukon River, and the only surviving member of the fleet of small steamboats that served on the river at the end of the nineteenth century. The majority of Yukon River steamboats were built of wood and larger in size. They could be up to four times longer than the *A. J. Goddard*, which was a mere 50 feet (15 m) long. The wrecks of twenty-two of these boats are known to exist in the Yukon Territory; many have been studied by the Yukon River Survey Project and Norman A. Easton at Yukon College (Easton 1987; Pollack et al. 2009; Pollack et al. 2010; John Pollack 2011, pers. comm.). There are a number of Yukon River sternwheelers being surveyed in Alaska as well, including the *Charles H. Hamilton* (1897) and *J. P. Light* (1898) (Katherine Worthington 2011, pers. comm.). Steamboats from the rivers of the United States are also useful for comparison; eighteen have been archaeologically surveyed (Corbin and Lass 2006; Corbin and Rodgers 2008; Kane 2004:34).

Like most steamboats built for the western rivers of America, the wooden boats of the Klondike were built

Figure 2. Clara Goddard on board the* A. J. Goddard *at Lake Bennett. Courtesy Candy Waugaman.

without plans, according to an oral tradition, with construction and modification based on a vessel's intended use (Custer 1991:13, 1997:17, 26). The *A. J. Goddard* represents a period of vast change in shipbuilding techniques and is juxtaposed between the highly traditional wooden boats and new, prefabricated industrial solutions to boatbuilding.

The following brief interpretation of the vessel is the result of the cooperative efforts of a multitude of team members; more information can be found in the sources referenced in the introduction. The interpretation is the basis of the exhibit and outreach efforts conducted by the Yukon Transportation Museum, discussed in the second section of this paper.

THE HULL: INTERPRETATION

Data for the interpretation of the hull was gathered in several ways: with traditional tape measure and slate survey underwater, with a BlueView BV-5000 3D Mechanical Scanning Sonar generously provided by BlueView Technologies and OceanGate Inc., and with archival research. Each method revealed different aspects of the hull's construction details and design. Small details were obtained by divers with tape measures and slates and remote details (such as spacing of deck beams that were inaccessible to divers) were gathered with the 3D sonar. Comparative studies and historical accounts revealed additional information about the construction process. Any of these processes alone would not have sufficed, but when combined, a more complete picture is revealed. In order to operate and understand any of these methods, it was necessary to have team members with various skills cooperating in the effort. They were a pivotal part of the research and exhibit process and are described later.

Though it was clear from the beginning that the *A. J. Goddard* was an unusual vessel for its time, research has revealed that an enormous amount of thought went into the selection and construction of the steamboat as one of the Upper Yukon Company's gold rush boats. When the company headed north in 1898, Goddard knew that speed was essential to reaching the gold fields in order to realize a profit. Climbing over the Coast Mountain Range was by far the shortest route to the Klondike. Though it required considerably greater effort, the Upper Yukon Company hauled their boats over the mountains because it was the fastest and most reliable route to the gold fields. With the fastest route determined, portability of the boat played the largest role in determining the features of the vessel that Albert Goddard designed and had constructed at Risdon Iron Works in San Francisco (Goddard n.d.:2).

These limitations can be seen in the vessel itself and from old photographs. Not only is it a small boat that is well suited for navigating the shallow upper Yukon, it is made up of small parts that were shipped north in sections to allow for relatively easy construction. Ideally, any vessel used for transportation would be as large as possible in order to maximize profit. Though larger boats, some close to 100 feet (30 m), have been navigated through the upper Yukon, the *A.J. Goddard*'s primary construction requirement was that it be easily transportable over land. Were this not a prefabricated vessel in need of transport over a high mountain on trams, sleds, and the backs of men and pack animals to allow assembly in a remote location, the boat could have been much larger. While the small size of the *A.J. Goddard* may have offered lower profits than a larger transport vessel, its proportions would have made carrying it over the mountain passes far easier.

In addition to requiring an easily transportable boat, research and fieldwork have revealed that the hull features a simple construction design, facilitating its remote assembly and any future repair. Prefabricated in San Francisco by Risdon Iron Works, the *A.J. Goddard* was a kit vessel intended for transport in sections. "Build It Yourself" steamboat kits were common at the end of the nineteenth century, allowing capable men and women in remote locations to purchase a boat via catalog or from a supplier and assemble the vessel themselves. However, instead of purchasing a predesigned kit vessel, Albert Goddard designed one himself. He records in his autobiography that he specified vessel parameters and gave them to the Risdon Iron Works, which likely handled the details of creating a full construction plan for the steel steamboat (Goddard n.d.:2). If specific plans still exist, they have not yet been found.

The relatively simple construction can be seen in the components that would streamline the assembly process. The *A.J. Goddard*'s uniform construction using angle iron framing is similar to many other metal hulls built during this period. While the simplicity of this design is suited to the Klondike for ease of construction and repair, it is not necessarily a design that was developed specifically for use on the Yukon River. Instead, it was part of the larger tradition of the newly developing field of metal hull construction and can be seen not only on riverboats but on sea-going ships as well. Similar design and construction features can be found in numerous ship-building guides from the nineteenth century (e.g., Fairbairn 1865; Grantham 1858; Reed 1869). These types of vessels were far more common outside of the Klondike wilderness, where the traditional wooden boatbuilding methods were predominant.

While the *A.J. Goddard*'s small size was ideal for transportation over the Coast Mountain Range, the Upper Yukon Company found that the vessel was too small to easily operate on the larger sections of the river. After the first trip to Dawson City, the *A.J. Goddard* began running the ferry service on Lake Laberge (*Dawson Daily News* 1923). Photographic and archaeological evidence indicate that modifications were made to the vessel to improve its seaworthiness; these include the addition of the bow rail and a new pilothouse with windows, likely to protect the pilot and the open boiler door from spray while on Lake Laberge in storms. However, these modifications weren't enough to save the *A.J. Goddard* from the October storm of 1901. Though the small draft and low freeboard were suited for shallower sections of the Yukon River or calm days on Lake Laberge, the waves of the October 12 storm rushed over the low freeboard and swamped the bow-facing boiler. The vessel lost power and sank shortly after with the loss of three of the five-person crew (Northwest Mounted Police 1902:18; *Daily Klondike Nugget* 1901). Though the *A.J. Goddard* was well designed for its most important purpose—being transported over the mountains and quickly making the passage to Dawson City during the gold rush—it was unsuited to large storms on open water and undersized for larger sections of the Yukon River.

THE ARTIFACTS: INTERPRETATION

Hundreds of artifacts are scattered around the wreck site, providing a fascinating glimpse into life on board a steamboat at the beginning of the twentieth century. The crew members who fled the *A.J. Goddard* could not save much, if anything, before leaving the vessel. Small bits of clothing and shoes, along with tools, kitchenware, and full bottles of ink and vanilla were found at the site. One of the more surprising finds was a Berliner Gramophone and three records. Music was undeniably important during the gold rush, and the *A. J. Goddard*'s crew was willing to care for a bulky and unwieldy gramophone to play the music popular at the time (Murray 1999). Every aspect of life on board is represented through the artifacts; research, conservation, and display efforts by the team have revealed more about the outfitting of the vessel and life on board.

Makers' marks indicate that the artifacts and steam machinery are from a variety of manufacturers. Many of the steam fixtures came from all over the United States: Seattle; Boston; Rochester, NY; and Cincinnati. While it is possible that components were ordered new from their original manufacturers, it is likely that the Upper Yukon Company's rush to reach the Klondike would have prohibited this. Instead, many of these items may have been purchased used and cobbled together to quickly outfit the *A. J. Goddard* or found new from various dealers in the Upper Yukon Company's hometown of Seattle (*Canadian Music Trades Journal* 1901; Carter's Inks 2011; Carvalho 2007; *Cassier's Magazine* 1893; Crosby Steam Gage & Valve Co. 1897; Lunkenheimer Company 1906; Mitchell, Lewis & Staver Co. 1900).

Some of the other artifacts (e.g., a forge and other tools) can be found in the 1897 issue of the Sears and Roebuck catalogue. Presumably they were available from other catalogues as well. Alternatively, many of the items could have been purchased in Seattle, though it is likely that the *Goddard*'s crew would have limited what they wanted to carry over the mountains. The hodge-podge collection of dishware found at the site suggests that pieces were collected over the years and added to the galley or that each crew member owned his or her own set.

Many of the *A. J. Goddard*'s artifacts are what one would expect to find on a small working vessel. With few towns along the river and thousands of miles between the boat's crew and the next big city, the crew's self sufficiency is reflected by the tools and forge found aboard the vessel. Luxury items were initially a surprise. While many of the larger western river steamboats were known for their luxurious accommodations, most of the steamboats of the Klondike were far more utilitarian. The vanilla suggests that the crew's diet was not as basic as one might expect. Music may have sounded along the river on quiet nights, hand-cranked from the cherished gramophone. If thousands of miles of ocean, river, and mountains did not stop fresh grapes, cigars, and lemonade from reaching Dawson City for the gold rush, it is not a huge surprise to find such things on board the smallest and most utilitarian member of the Yukon River steamboat fleet (Berton 2004:304).

THE *A. J. GODDARD* AND THE YUKON TRANSPORTATION MUSEUM

The *A. J. Goddard* project rapidly evolved for the Yukon Transportation Museum, a territorial museum in Whitehorse, Yukon, in the summer of 2010. With little warning, archaeologists and divers were coming and going through the museum, and their frequent visits became the new norm. The people and the excitement of the 2010 summer distinctly and positively flavored the many interactions between the museum and everyone involved with the fieldwork, conservation, and research. It was an adventure, one that rapidly grew from a local interest story to an internationally significant historical and archaeological find. The ongoing *A. J. Goddard* project exemplifies a successful collaboration of several distinct disciplines with different mandates, interests, locations, and resources. Such a balance is hard to manufacture but was spontaneously created by the compelling discovery of the *A. J. Goddard*.

A HISTORY OF MULTIDISCIPLINARY COLLABORATION: THE MUSEUM'S PERSPECTIVE

Although the excitement peaked in 2010, the Yukon Transportation Museum had been involved in the *A. J. Goddard* project since its discovery in 2008. Doug Davidge has been on the board of the museum since 2008; he knew the facility and the mandate and felt the museum to be particularly well suited to house and interpret materials related to the *A. J. Goddard*'s story. Shortly after the vessel's discovery, Davidge reassumed his role as museum director and later became president of the museum's volunteer board of directors. As someone both deeply involved in the project and as president, he would be able to see the *A. J. Goddard* project through the process of exhibit development and interpretation. Davidge's familiarity with Yukon history, the museum, and all aspects of the *A. J. Goddard* project (dives, historical and archaeological research, and presentation) provided continuity throughout the process.

Finding the *A. J. Goddard* took thirty years and involved the cooperation of many different people and organizations. In 1986, Norman Easton of Yukon College in Whitehorse and the local recreational diver club completed a Heritage Resources Inventory report, specifically mentioning that "The discovery of either or both of these vessels [*A. J. Goddard* or *Thistle*] would not only be of local but national, and in the case of the *Goddard* at least, international significance" (Easton 1987:228). More than a decade later, Davidge found a side scan sonar target in 1997 off of Goddard Point in Lake Laberge. Though he catalogued the target as requiring future exploration, he did not have the opportunity to return to the *A. J. Goddard* search for ten years. His opportunity arose in 2008 in collaboration with the Institute of Nautical Archaeology's (INA) Yukon River Survey Project, undertaken and directed by John Pollack and Robyn Woodward since 2005. The project, focused on cataloguing various construction techniques used over time on the Yukon River, joined the INA in 2007. It was this collaboration, the availability of more modern depth-sounding equipment, GPS technology, Davidge's long-time interest, and his knowledge of the sonar target of a decade before that led to the positive identification of the *A. J. Goddard* wreck in 2008 (Figs. 3, 4).

International cooperation increased when American archaeologists became involved in the project, inspired by both the fascinating nature of the *A. J. Goddard* and the transnational nature of the American-built boat lost in Canada. James Delgado, an experienced nautical archaeologist and the executive director of the INA at the time, immediately became involved in fundraising, research, and the fieldwork effort in 2009. Lindsey Thomas, a student from Texas A&M University, joined the project in 2009 and wrote her master's thesis about the site after agreeing to lead the project in 2010 (Thomas 2011). The U.S. National Oceanic and Atmospheric Administration (NOAA) sent Michigan State maritime archaeologist Wayne Lusardi to act as the senior archaeologist for 2010. He worked with Yukon territorial museums conservator Valery Monahan and Thomas to decide which artifacts would be brought back to Whitehorse for conservation and exhibition. In addition to the archaeologists, the team consisted of members from various disciplines from Canada and the United States, including conservators, historians, photographers, sonar specialists, and environmental scientists. Many of the team members were volunteers from other disciplines whose opinions and experiences allowed the vessel to be viewed in different contexts. The varied experiences brought by the members of the team made it possible to efficiently gather data during the relatively short field seasons (a combined fifteen days between 2009 and 2010). As with any archaeological project, the majority of work occurred after the field season. It was during this time, and through the cooperation of historians, conservators, museologists, archivists, sonar specialists, and archaeologists, that the story of the *A. J. Goddard* was revealed. Because the research efforts were spread over so wide an area, with experts in so many fields, an enormous amount of information was discovered about the vessel in an unusually short period of time (Davidge et al. 2010; Thomas 2009, 2010a, 2010b, 2011, 2012; Thomas et al. 2012).

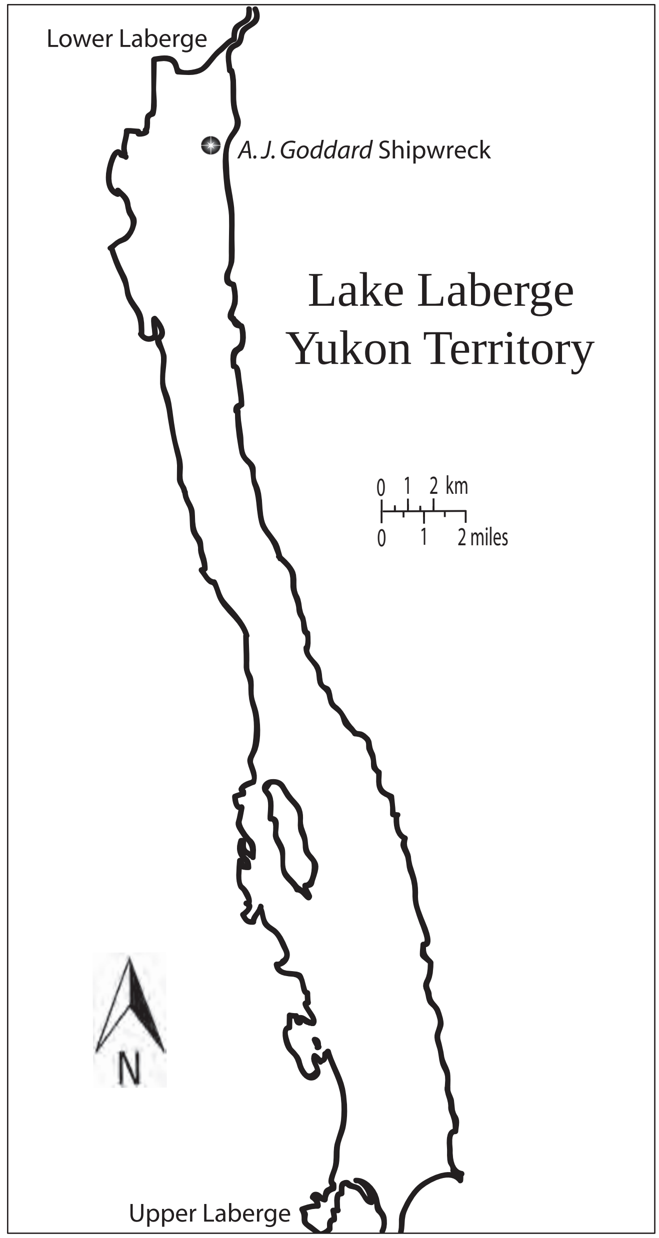

Figure 3. Lake Laberge with location of **A. J. Goddard.**

In 2009, the site was proposed to the Government of Yukon for designation as a Yukon Historic Site to ensure visitor control and site preservation. (Divers are allowed

Figure 4. The **A. J. Goddard** *at the bottom of Lake Laberge. Photo by Larry Bonnett.*

to visit the site once they've obtained a permit from the territorial government). In 2010, artifact recovery was performed in collaboration with the Yukon River Survey Project and the Government of Yukon. These actions ensured optimal treatment of the physical wreck and artifacts and the integrity of site data both during the field season and the ensuing investigations.

Friends of the project were important in the early days, particularly in making a case for the importance of the *A. J. Goddard*. There are many wrecks in this territory, both of watercraft and aircraft, another focus of the Yukon Transportation Museum. Boats of all kinds sank by the score during and following the gold rush, and the mid-twentieth century saw many more dragged on shore and abandoned. During WWII and in the following years, approximately five hundred aircraft made their final landing in the Yukon. With such a vast and valuable cultural heritage, the *A. J. Goddard* was initially one of many. The discovery of the vessel, along with images of the wreck, allowed the researchers and friends of the project to make the case for the importance of the *A. J. Goddard* so that it could be designated a Yukon Historic Site and to find a venue for the exhibit and collection. Most importantly, the historical significance of the wreck allowed the project to secure funding and administrative support to continue the research.

DESIGNATION

In 2009, researchers started to gather information to support designation of the *A. J. Goddard* as a Yukon Historic Site. To date, no intact examples of the prefabricated, steel-hulled sternwheeler design used in North America have been discovered except for the *A. J. Goddard*. The intact nature of the wreck site and its artifacts makes the site truly spectacular and capable of revealing a great amount about life on the river during the time of the Klondike Gold Rush. The *Goddard* was the first upper Yukon River sternwheeler to make its way to Dawson City in 1898. The paddlewheel-propelled design of the vessel very quickly became obsolete, although many were used for a short time all over the globe. Very few have ever been found, and none as intact as the *A. J. Goddard*. It was widely recognized by this time—by all parties—that the *A. J. Goddard* wreck had to be designated a historic site. The Yukon Heritage Resources Board determined the *A. J. Goddard* to be an underwater archaeological site and categorized it as a historic site in June 2010.

Doug Davidge remembers the seventy-two-hour period when the story broke on 24 November 2009 through a high-profile *National Geographic* announcement. Davidge received numerous calls on that day. The news showed up on national television and newspapers such as the *Globe & Mail*, internationally in the *Los Angeles Times*, and online in news media web sites, history, and shipwreck blogs. A radio-control boat enthusiast built a model of the *Goddard* and sent the Yukon Transportation Museum a donation. The granddaughter of a crew member also sent money. Nearly a dozen U.S. and Canadian government agencies, private foundations, research institutions, corporations, and Native entities contributed thousands of dollars and support to help with the research, conservation, and display of the artifacts. This flurry of interest and support made it clear the museum had great responsibilities and a broad audience.

EXHIBITS

A mini-exhibit called "Oh My *Goddard*" was displayed by the Yukon Transportation Museum between July and August 2010 and focused on the local adventure story of the find. The title expresses the general fervor that was occurring in response to the widespread news coverage. The museum and the Government of Yukon Museums Unit worked together to allow visitors to view artifacts in the process of conservation. Valery Monahan, who also oversaw the 2010 recovery of the artifacts, worked on the artifacts while the public came and viewed them. She answered questions and talked about the ongoing research, as did Casey McLaughlin, the museum's executive director and curator, and Cathy Ritchie, assistant executive director. "Oh My *Goddard*" was the first of three planned exhibits curated by the museum. It set the theme for the friendly and productive atmosphere of the next exhibit, "A Very Personal Kind of Wreck: Finding the *A. J. Goddard,*" which opened in November 2011 in downtown Whitehorse.

The museum's decision to create two further exhibits was based on the seasonality of Yukon visitorship. The second exhibit was based on the story of the ship itself and its role in the Klondike Gold Rush. The question that drove the exhibits was how to coherently combine the adventure story, the science, the various disciplines, the lay researchers, images, videos, text, and voices in an engaging way. In the view of museologist John Falk (2009:215), "The most satisfying exhibits for visitors are those that resonate with previous experiences . . . and confirm and enrich their own view of the world." Satisfying museum experiences are the goal of every museum. The Yukon Transportation Museum determined the local resident make-up of a winter audience and chose to create a very personal Yukon story as the first interpretation of the *A. J. Goddard* project.

The Yukon Transportation Museum borrowed space in the Hougen Heritage Gallery on Main Street in Whitehorse from Yukon Archives from November 2011 to January 2012 for "A Very Personal Kind of Wreck." This exhibit juxtaposed the personal local experiences of the researchers and divers with the powerful new technology used to analyze the ship. The most striking technology used on the *A. J. Goddard* wreck was BlueView Technologies' high-resolution BV-5000 mechanical scanning 3D sonar, which takes the viewer on a three-dimensional color voyage through the body of the ship. A partnership was arranged with a supportive Whitehorse Apple dealer to integrate iPads throughout the exhibit to showcase the powerful images of the scan. This application grew to include documents and videos. An additional project allowed interviews with researchers and supporters to be easily searched and listened to at iPod stations. Finally, the haunting photos captured by underwater photographer Donnie Reid, who took the first dynamic photographs of the wreck, were exhibited as framed images, while local diver Larry Bonnett's images were displayed in a slideshow using the internet photography site Flickr on a large-screen television. The interactivity and local adventure story melded into a captivating Yukon narrative that created an intimate connection with visitors, who could choose which documents and videos they wished to observe (Edson and Dean 1994:147). The success of the interactive exhibit has led the museum to further explore technology in exhibit creation by allowing visitors to choose which interviews, videos, and documents they wish to view. Driven by local pride in the story, "A Very Personal Kind of Wreck" appealed to the museum's winter Yukon audience.

In the future, "The Artefact Exhibition" will premiere at the Yukon Transportation Museum and will tell the story of the people and the artifacts of the

A. J. Goddard. A large local audience is anticipated, but this exhibit is intended to reach farther as well. As a summer exhibit of a story of international interest, the "Artefact Exhibition" will target visitors who have no personal connections to the place and the wreck.

The museum has focused on balancing community interest with the international importance of the project and on speaking to both communities effectively. The Yukon Transportation Museum's exhibits have not been hampered by the seasonal nature of museum visitors to a small northern capital. Rather, seasonality has been embraced, allowing exhibits to tell very different stories and to speak to very different audiences. The museum has two year-round staff members, which has been an impediment to its ability to take on large-scale projects in addition to regular operations. The *A. J. Goddard* project has allowed staff to coordinate, accept assistance, and collaborate with professionals of many disciplines. These partnerships effectively removed the limiting factors associated with the museum's staffing. The friendships, partnerships, and collaborations became a way of museum life, a breath of fresh air, and a necessary component to the success of the exhibits.

CONCLUSIONS

During the period of the Klondike Gold Rush, the Yukon Territory developed a rich maritime culture as hundreds of rafts, canoes, barges, and steamboats flooded the area. The *A. J. Goddard* was one of these. Although the rush of vessels was over by 1899, the maritime landscape of the region was forever changed. Of the 266 known Klondike Gold Rush-era sternwheelers, the *A. J. Goddard* is the only known surviving example of one of the smaller steamboats.

The intact state of the wreck and its cargo, which remain virtually undisturbed as a historic site open to diving visitors, provide a tangible link to the past. This, combined with the story of Albert and Clara Goddard, provide a detailed view of the life and times of one of the small sternwheelers that served the prospectors of 1898. Afloat for less than four years, the short story of the *A. J. Goddard* is one that truly conveys the ingenuity and perseverance that characterized the short-lived, but passionate, Klondike Gold Rush.

The collaborations between the many partners involved in the *A. J. Goddard* project created the opportunity for the Yukon Transportation Museum to tell the ship's story locally first. In early summer 2013, lessons learned from the prior two exhibits will be integrated into an exhibit of artifacts that is focused on a broader audience of viewers—many of whom may be unfamiliar with the *A. J. Goddard*. In all aspects of its arrival to the Yukon Territory, tragic final voyage, discovery, research and exhibition, the *A. J. Goddard* has been the keystone in the establishment of friendly, productive, professional, and far-reaching relationships that created an environment for successful research. The *A. J. Goddard* really is, as succinctly noted in 2011 by Valery Monahan, "a very personal kind of wreck."

ACKNOWLEDGMENTS

The *A. J. Goddard* project would not have been possible without the support and collaboration of a large number of organizations and people. Throughout this project, the Institute of Nautical Archaeology, the Yukon Transportation Museum, and the Government of Yukon have provided funds, contributions in kind, and collaborative support. Additional support has been received from the National Geographic Society and the Waitt Foundation, the Royal Canadian Geographical Society, ProMare Inc., Spiegel-TV, the RPM Nautical Foundation, the Texas A&M Nautical Archaeology Program, the Texas A&M Center for Maritime Archaeology and Conservation, BlueView Technologies, Oceangate Inc., the U.S. National Oceanic and Atmospheric Administration, and private donors. OceanGate Inc. and BlueView Technologies, in particular, provided transportation and support for the sonar system.

We would also like to sincerely thank the elders and members of Ta'an Kwäch'än for their hospitality and acceptance of this project, which is located in their traditional territory, and Drs. James P. Delgado and Kevin Crisman for their steadfast support. The Yukon River Survey directors, John Pollack and Robyn Woodward, along with 2008 and 2009 co-director Doug Davidge, started the work that would shed light on an important part of Yukon history. Finally, we would like to thank reviewer Jason Rogers for his critical comments, which improved this article. While the focus of this paper precluded fully addressing all of his comments, we hope that the *A. J. Goddard* publications cited above will answer any remaining questions.

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REPORTS

UIVVAQ: A STRATIFIED IÑUPIAQ OCCUPATION AT CAPE LISBURNE, NORTHWEST ALASKA

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ABSTRACT

The Uivvaq site, near Cape Lisburne in Northwest Alaska, was abandoned in 1950 after its acquisition by the U.S. Air Force. In 2000 and 2002, reconnaissance archaeological investigations (15 m^2) were undertaken at one of the surviving mounds. A trench excavation revealed three principal components dating between AD 950 and 1650, based on a suite of seventeen ^{14}C assays. Paleotemperatures were estimated from associated beetle remains and correlated with storm stratigraphy. The three archaeological components include (a) the lowermost (AD 950–1050) associated with Natchuk and Thule II harpoon heads, succeeded by (b) a middle component (AD 1050–1150) that yielded a Punuk "trident," or counterweight, while (c) the uppermost (AD 1300–1600) contained a Thule IIc multibarbed harpoon head and an Intermediate Kotzebue assemblage.

BACKGROUND TO THE PROJECT

The Uivvaq project originated as an exploratory effort to examine a large archaeological mound that had escaped the attentions of subsistence diggers and archaeologists due to its federal impoundment as an Air Force installation for over fifty years. An archaeological survey by Hoffecker (1998) and the cultural resource management assessment by Reynolds (1989) persuaded the National Science Foundation to support reconnaissance at Uivvaq in 2000. The U.S. Air Force had inadvertently destroyed part of the site in the 1950s and decided in the early 2000s to conduct archaeological mitigation in conjunction with the cleanup of hazardous materials (Mason 2003).

Uivvaq, located in Northwest Alaska, contains a 1- to 2-meter deeply stratified succession of midden deposits and presents a unique opportunity to examine culture and climate change. Uivvaq promised to inform arctic archaeologists on the causes of major shifts in Northwest Alaska prehistory. Two major stumbling blocks are the scarcity of undisturbed archaeological deposits that are well-stratified and the lack of radiometric dates for the region. Although dendrochronology and horizontal beach-ridge stratigraphy were crucial in defining chronologies (e.g., Giddings 1952, 1966), due to uneven research priorities many uncertainties remain concerning the temporal relationships and absolute ages of sites and individual occupation horizons. By conducting interdisciplinary research at Uivvaq, we are able to provide a millennial record as a preliminary step in such reconstructions.

THE IPIUTAK COLLAPSE AND THE MEDIEVAL CLIMATE ANOMALY

During AD 900 to 1200, Northwest Alaska witnessed drastic changes in climate and human population that had far-reaching consequences for the circumpolar zone of North America (Bockstoce 1973; Mason and Barber 2003; McGhee 1969/70, 1981). The tenth century AD opened with a brief cold oscillation and a sustained interval of increased storminess (Mason and Gerlach 1995; Mason and Jordan 1993). However, by the late twelfth century, summer temperatures had significantly warmed, inaugurating the Medieval Climate Anomaly (MCA) (cf. Xoplaki et al. 2011) across the northern hemisphere.

Shifts in the weather associated with the MCA apparently upset the political geography of Northwest Alaska and triggered several social and cultural transformations (Bockstoce 1973, 1976; Mason 1998, 2009a, 2009b; Maxwell 1985; McGhee 1969/70, 1981). As one possible correlate, around AD 900 the regionally dominant Ipiutak polity centered at Point Hope disintegrated as its considerable military and spiritual power dissipated (Mason 1998, 2000, 2006, 2009b). Its demise correlated with climatic shifts, but it is unclear if storm track shifts or warmer or cooler conditions were adverse (Mason and Jordan 1993). The political and economic niche occupied by Ipiutak was subsequently filled after AD 1000 by the Birnirk people, who established a small settlement at Jabbertown, 7 km east of Point Hope (Larsen and Rainey 1948; Mason and Bowers 2009).

Unlike the Ipiutak people, the Birnirk, presumed ancestors of the Iñupiat (Mason 2009a; Mason and Bowers 2009; Maxwell 1985; Morrison 2001; Stanford 1976), employed a sophisticated technology to hunt bowhead whales from Point Hope and other strategic locations in Northwest Alaska (Bockstoce 1976, 1979; Harritt 1995; Larsen and Rainey 1948; McCartney 1995; Stanford 1976). The mechanism of the subsistence and technological transformations was either passive influence (“trait diffusion”) or direct “invasion” or colonization by both Birnirk and Punuk people from the western side of Bering Strait, who occupied sites along the northern and western coasts of Alaska (Collins 1964; Ford 1959:67; Mason 2009b:94). The conventional climate paradigm proposes that warming increased opportunities for open-water whaling (Bockstoce 1976; McGhee 1969/70). In this scenario, Iñupiaq settlements expanded in size and distribution by the thirteenth century AD and eventually spread across arctic Canada to Greenland (Maxwell 1985; McGhee 1969/70, 1981, 2000). Coupled with the expansion of the whaling economy, Bockstoce (1976:42) postulated a broadening of the subsistence base and greater reliance on caribou.

LOCATION AND SETTING

The Uivvaq mounds are 3 km east of Cape Lisburne at 68° 53' North, 166° 08' West along the eastern Chukchi Sea coast of Northwest Alaska. Situated 65 km northeast of Point Hope, Cape Lisburne experiences (1954–1984 baseline) a July mean temperature of 7°C and a January mean of –18°C, although February and March are usually much colder (WRCC n.d.). Annual precipitation averages only 29 cm, with the highest rainfall (7 cm) in August and with about one meter accumulating as snow. Land-fast ice typically forms at the cape and its adjoining coast between October and June (Fig. 1).

Cape Lisburne is a steep and jagged bedrock promontory rising 289 m above sea level that forms the northwest terminus of the Lisburne Hills, composed of Carboniferous limestone and shale interbedded with chert (Collier 1906:16). The abundance of high-quality raw material for stone tool manufacture proved attractive for Uivvaq. Other valuable minerals were available nearby, including coal and black shale (Burch 1981:34–35; Collier 1906). Cape Lisburne marks an abrupt shift in coastal alignment and represents one of the stormiest locales in

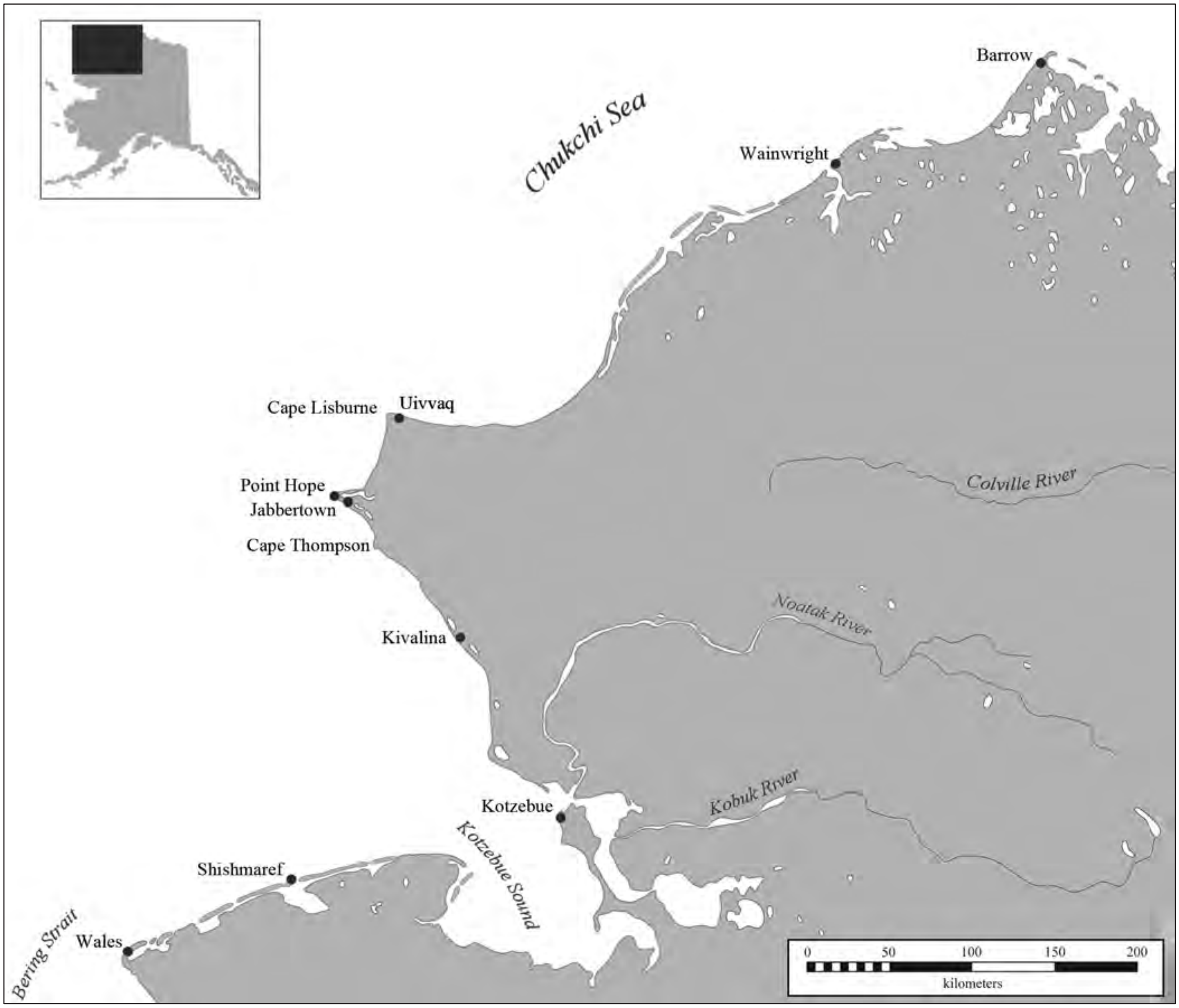


Figure 1. Northwest Alaska.

northern Alaska ("a famous wind hole…passed safely in a small boat only during fair weather" [Collier 1906:8]). However, Uivvaq was sheltered from westerly winds by the Lisburne Hills and protected from northerly winds by formation of a local high-pressure zone at the base of the cliffs (VanStone 1977:67). Oriented west–east, Uivvaq was also protected from the impact of southerly storms along the northern coast by the Lisburne Hills. Recent storm surge events have had only minimal effects on the beach—evidence is lacking for either erosion or beach ridge formation (e.g., Kowalik 1984), and modern driftwood is limited to a few medium-sized logs (Alix 2002, field observations). The Alaska coastal current flows northeast at the cape and subsequently follows a clockwise return flow from Icy Cape (Fleming and Heggarty 1966:705). The southwest counter-current has contributed to sediment accumulation in the form of submarine gravel and sand north of Cape Lisburne (Sharma 1979).

UIVVAQ ARCHAEOLOGY: AN INTERDISCIPLINARY APPROACH

Although the Uivvaq middens (XPH-045) were recorded by several archaeological surveys of Cape Lisburne (e.g., Hoffecker 1998; Neakok et al. 1985; Reynolds 1989), no substantive field research (i.e., shovel probes, excavation, or detailed mapping) had been conducted prior to 2000. NSF funding in 2000 supplemented by a Department of Defense contract in 2002 (Mason 2003) recognized the potential of the deep and relatively undisturbed middens to yield valuable archaeological data. The resulting project sought an interdisciplinary perspective integrating ethnohistory and traditional knowledge with geology, paleoecology, paleoclimatology, and archaeology. Because of Uivvaq's historic bond to Tikiġaq (Point Hope), the project was undertaken in concert with the Elders Advisory Council and the Native Village of Point Hope. Members of the North Slope Borough Commission on Iñupiat History, Language, and Culture (IHLC) also participated in the project.

The research design addressed several issues in the prehistory of Uivvaq: When did occupation of the site begin and by whom? Did subsistence use of the site change in tandem with climate change? How did the sociopolitical relationship between Point Hope and Uivvaq evolve over time, and did their relationship extend back into the Ipiutak phase, i.e., prior to AD 900? What was Uivvaq's relationship to sites across Northwest Alaska and in Chukotka? Hopefully, the archaeological study of Uivvaq could shed light on broader issues, for example, the emergence of the Thule culture and a whaling economy.

Data about Uivvaq's recent past were compiled from several sources, including archived oral history recordings (e.g., Reynolds 1989) and historical accounts (e.g., Burch 1981; Lowenstein 1981, 2009; VanStone 1962). In addition, IHLC staff conducted new oral history interviews with Point Hope elders (Mason 2003). As a consequence, the modern history of Uivvaq provides a cultural context for the investigation of its remote prehistory.

UIVVAQ HISTORY: 1800–2000

Two hundred years ago, Uivvaq was part of a Tikiġaġmiut polity that controlled 10,000 km^2 across Northwest Alaska, as reconstructed from Native informants by Burch (1981, 1998). Although described as a "tribe" by Ray (1975), in Iñupiaq the terminology is similar to a nation or "city" state (Burch 1998:8–12). Around AD 1800, the Tikiġaġmiut nation extended from 25 km below Cape Thompson in the south to near Cape Beaufort in the north. As many as 1,300 people resided within the borders of the Tikiġaġmiut, according to Burch (1981:11–14). The large settlement at Tikiġaq served as the social and spiritual hub of the Tikiġaġmiut—and the winter residence of over half the population (Foote 1992; Rainey 1947).

Uivvaq, despite its small size, was the second most important winter settlement within the *nunatqatigiit* and was the only other place to conduct a spring bowhead whale hunt (Burch 1981:37–42). Uivvaq (or "coming around the point") specifically refers to Cape Lisburne, but served as shorthand for the adjacent village named *Uivaum Initugliat* (Neakok et al. 1985:41). Although the population of Uivvaq declined significantly in the nineteenth century, its numbers were never substantial. Burch (1981:14) inferred that *only* about seventy people inhabited Uivvaq prior to the intrusion of Euro-Americans ca. AD 1850. Even this estimate could be high, considering that the Russian explorer A. F. Kashevarov visited the village in July 1838 and counted only twenty people (VanStone 1977:20). However, a major battle had just occurred near Cape Lisburne (Burch 2005:272–273), and very likely the families at Uivvaq were still recovering from that catastrophe.

The spring bowhead whale hunt at Uivvaq differed from that at Tikiġaq (Lowenstein 1981:62ff; Rainey 1947:257–263). The number of crews was smaller, of course, perhaps only one or two, with eight men each. Crews were positioned on landfast ice one kilometer north of the cape along the margin of a recurring shore lead. On occasion, Uivvaq whalers intercepted and killed escaped bowheads wounded by whalers at Point Hope (Burch 1981:24–25). With its small population, the Uivvaq community (Fig. 2) probably also conducted less elaborate ceremonial feasting, as compared with the regional center at Tikiġaq.

Uivvaq's primary appeal for its inhabitants lay in its variety of food sources, several terrestrial in origin, especially mountain sheep and birds, with access to nearby caribou (Burch 1981:56, Lowenstein 1981:74). Like most coastal locales, walrus were typically available during the early summer and fall, while beluga whales appeared in the spring and summer (Burch 1981:69). Small seals were hunted throughout the year, although not all three species (e.g., ringed seal or *natchuq*) were reliably present, due to turbulent seas (Lowenstein 1981:16). Polar bears were commonly encountered (Lowenstein 1981:40). On land, Uivvaq people hunted caribou, sheep, bear, and foxes, subject to seasonal availability. Birds nested in the cliffs around the cape in the thousands, and their eggs were collected from rock ledges in July (Burch 1981:26–32).

During the nineteenth century, the population of the Tikiġaġmiut nation underwent a nearly catastrophic decline, due to the consequences of internecine warfare

Figure 2. The village of Uivvaq, photographed by Alfred M. Bailey in March 1922. Image Archives, Denver Museum of Nature and Science (cat. no. IV.BA21-033.P).

(Burch 1981, 2005), resource collapse (Burch 2012), and the appearance of outsiders bearing infectious disease, alcohol, and firearms (Lowenstein 2009). Between 1800 and 1840, Point Hope clashed with neighboring nations in three battles that cost many lives and shifted the regional balance of power against Tikiġaq (Burch 2005:111ff). Around 1800, a conflict with Noatak and Kivalina people forced the Tikiġaġmiut (Burch 1981:14) to cede territory as far south as Kivalina (VanStone 1962:19). Shortly thereafter, another sizable Tikiġaġmiut community, *Nuvuraluaq,* was attacked by Dihai Gwich'in from the upper Noatak (Burch 1981:14–15, 2005:111ff). For Uivvaq, a battle in the late 1830s was devastating; it occurred just southwest of the site and its aftermath was described by Kashevarov (Burch 1981:15, 2005:272; VanStone 1977:54): "human bones strewn everywhere and…bodies that had not yet decomposed." This attack involved the Qiqiqtarzurmiut, people from modern-day Kotzebue; the population of Uivvaq was nearly decimated (Burch 1981:14–15). The presence of Russian traders at Bering Strait did lead to a precipitous decline in internecine warfare (Burch 2005:233).

Despite the cessation of warfare, the decades following 1850 were marked by population declines in Tikiġaq and Uivvaq and by collapse of the whaling economy associated with commercial whaling in the Chukchi Sea (Bockstoce 1986; Burch 1981; Lowenstein 2009). The whale and walrus populations were significantly depleted by 1870 (Bockstoce 1986), a catastrophe coupled with the inadvertent introduction of several infectious diseases. One of the first, a measles epidemic in 1865, reportedly caused hundreds of deaths (Burch 1981:15). A subsequent smallpox outbreak in 1900 is termed the "Great Sickness" and led to further population decline (Lowenstein 2009:235ff). Dire effects, possibly climatic, also affected crucial subsistence resources. By 1870, the Uivvaq whale hunt had ceased and by 1880, the U.S. Census recorded only thirteen residents, representing one or two families, although many more people visited the cliffs of the cape to collect murre eggs (Lowenstein 1981:74ff; VanStone 1962:62). The regional collapse of the Western Arctic caribou herd (Burch 2012:83ff) also led to famine in Point Hope in the winter of 1885–1886, and by 1905 the entire Tikiġaġmiut nation was reduced to less than 200 people (Burch 1981:15–21; Foote and Williamson 1966:1046–1048; Lowenstein 2009:235).[1]

An increase in population at Uivvaq after 1910 reflected an economic upturn driven by the resurgent world market for furs, especially the locally abundant arctic fox (Burch 1981:19; Rainey 1947:281). However, when the fur market collapsed with the onset of the Great Depression, permanent residency at Uivvaq declined. Several families remained at the site until 1950, and accounts by Point Hope elders for this project (cf. Mason 2003) record village life during the first half of the twentieth century.

In 1950, the U.S. Air Force constructed a radar station at Cape Lisburne as part of the Aircraft Control and Warning (AC&W) network (VanStone 1962:61). The network was intended to provide early warning of trespass by Soviet aircraft. The radar was emplaced on the cape summit and support facilities were erected below, 1.5 km east of Uivvaq village, although the airstrip was immediately adjacent. During construction of the airstrip, several abandoned sod houses were destroyed (roughly half of the former village), but two large middens remained intact. Possibly, the presence of the Air Force installation protected the surviving midden by inhibiting subsistence digging, a common and long-standing practice in communities across Northwest Alaska from Point Hope to Barrow (cf. Ford 1959; Larsen and Rainey 1948).

THE ARCHAEOLOGY OF UIVVAQ

A principal objective of the Uivvaq project was the documentation of an undisturbed sequence of occupations to obtain a high-resolution record within a well-dated stratigraphic framework. With exceptions (e.g., Tikiġaq [Larsen and Rainey 1948] or Walakpa [Stanford 1976]), deep and stratified multioccupation sequences are rare in northern Alaska, especially those from the Birnirk to Thule transition. Excavation focused on the midden periphery (Fig. 3) to avoid the disruptions resulting from a superimposed series of house constructions and burials in the midden's center (cf. Ford 1959; Reynolds 1995). Mound margins, by contrast, offer greater potential for sequence stratigraphy (e.g., Ford 1959:36–37; Rosen 1986:19). This approach was largely successful, but the uppermost deposits of the midden periphery had been disturbed by the excavation of several cache pits during a late occupation, as described below (Fig. 4).

The site was excavated in 5-cm arbitrary levels. All excavated sediment was sieved through fine mesh (⅛ in.) screens employing pressure hoses, available at the DEW-line facility, which maximized the recovery of small objects. Water screening yielded tiny jet beads largely unknown from other north Alaska sites of comparable age, amber beads and fragments, and substantial quantities of small lithic waste flakes. Water sieving also increased the recovery of smaller pottery fragments, which may be difficult to distinguish from the sedimentary matrix in a coarse midden deposit. In 2002, random sediment samples from each unit and level were water-screened for small fragments of wood and charcoal, providing data on wood technology and fuel use.

CHRONOLOGICAL AND PALEOCLIMATIC RECONSTRUCTIONS

RADIOCARBON CHRONOLOGY

Radiocarbon dates (n = 17) were obtained from a range of materials excavated in stratigraphic context from the midden deposits (Table 1). These ^{14}C assays were supplemented by tree-ring analysis of structural wood. Six beetle chitin macrofossils, identified by Elias, were assayed by the University of Colorado radiocarbon laboratory (CURL) with a further eleven radiocarbon samples measured by Beta Analytic on phocid seal (n = 2), walrus (n = 1), caribou (n = 1), and wood macrofossils (willow [*Salix* spp.], n = 3; spruce [*Picea* spp.], n = 1), identified by Alix.

Overall, the corpus of seventeen ^{14}C ages was stratigraphically consistent, albeit with several nonsystematic departures. Insect remains were initially expected to provide the most reliable basis for the chronology of Uivvaq occupation. Because the AMS radiocarbon technique allows the assay of exceedingly small samples, chitin from insect exoskeletons offers an alternative to bone and is generally less susceptible to younger carbon contamination. However, the dating of insect remains at Uivvaq revealed unexpected ambiguities: Several dates were anomalously old given their stratigraphic position and the other dates, including the other insect assays. For example, the

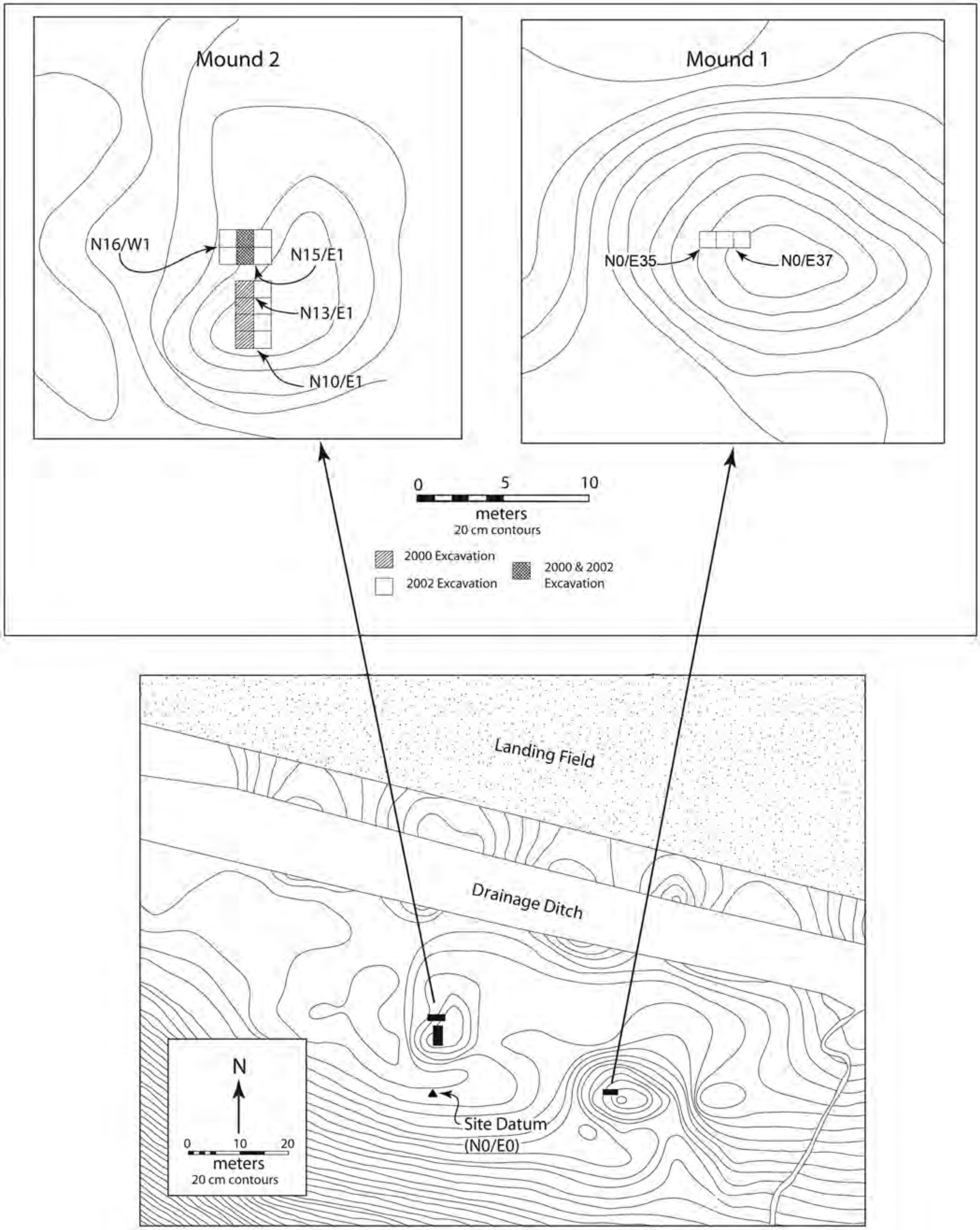


Figure 3. The Uivvaq site, showing the location of the two large middens, Mounds 1 and 2.

Table 1. Radiocarbon assays and calibrated ages from Uivvaq.

Lab Number	Conventional ^{14}C Age BP	Calendar Age AD	$^{13/12}$C (‰)	Stratigraphic Context	Cultural Diagnostics	Material Dated
Beta-173868	260 ± 40	1520–1590, 1620–1670, 1770–1800, 1940–1950	–24.7	N15 E1 (42–47 cm bs)	Intermediate Kotzebue	*Salix* wood and charcoal
Beta-173867	330 ± 40	1460–1650	–27.7	N15 E1 (57–62 cm bs)	Intermediate Kotzebue	*Salix* wood
Beta-173869	390 ± 40	1430–1530, 1550–1630	–22.5	N13 E1 N wall (70–84 cm bs)	Intermediate Kotzebue	Adzed timber; outer ring, *Picea* sp.
CURL-6927	470 ± 30	1410–1454	–25.9	N13 E0 E wall (25–30 cm bd)	Intermediate Kotzebue	Beetle exoskeleton
Beta-174356	610 ± 70	1270–1430 corrected by Beta	–19.0	N12 E1 (41 cm bd of N13 E2)		Seal (*Phoca hispida*) pelvis
CURL-5767	785 ± 65	1153–1306	–24.63	N13 E0 E wall (35–40 cm bs)		Beetle exoskeleton from bulk sample
Beta-173866	840 ± 40	1060–1080, 1150–1270	–24.6	N13 E1 (57–62 cm bs)		*Salix* charcoal
CURL-6928	960 ± 35	1016–1162	–25.5	N13 E0 E wall (50–55 cm bd)		Beetle exoskeleton
CURL-5947	1010 ± 35	980–1153	–25.0 (est.)	N13 E0 E wall (65–70 cm bs)	Punuk counter-weight above, at –67 cm	Beetle exoskeleton from bulk sample
Beta-174357	1210 ± 60	1060–1300	–12.0	N12 E1 (41 cm bd of N13 E2)		Caribou tibia fragment
Beta-174355	1340 ± 70	1342–1664,* 1502–2002**	–13.3	N12 E1 (51 cm bd of N13 E2)		Seal (*Phoca hispida*) tibia
Beta-174354	1410 ± 60	1311–1554,* 1465–1808**	–13.7	N13 E2 (43 cm bd)		Walrus skull fragment
CURL-6929	1620 ± 30	384–536	–25.7	N13 E0 (70–75 cm bs)	Punuk counter-weight above, at –67 cm	Beetle exoskeleton
CURL-5438	1390 ± 35	598–691	–23.4	N13 E0 E wall (95–100 cm bs)	Natchuk harpoon head; Thule 2 harpoon head; human figure	Beetle exoskeleton from bulk sample
Beta-180330	1020 ± 40	975–1041	–28.1	N13 E1 (97–102 cm bd)		*Salix* twigs
Beta-180816	980 ± 40	987–1160	–26.3	N13 E1 (114 cm bd)		*Salix* charcoal
Beta-180331	870 ± 40	1036–1261	–28.6	N13 E1 (112–117 cm bd)		*Salix* twigs

* 510 ± 57 marine reservoir correction

** 720 ± 53 marine reservoir correction (Dumond and Griffin 2002)

bs = below surface

bd = below datum

oldest age from Uivvaq was a beetle assay of 1620 ± 30 BP (CURL-6929) at 70–75 cm below surface, nearly 40 cm *above* a younger beetle age of 1390 ± 35 BP. The anomalously old beetle ages may have resulted from (a) the ingestion of old carbon by the beetles; (b) storm redeposition of underlying older midden not reached by this project; (c) post-depositional digging by the beetles or (d) by people; or (e) upward displacement of beetle parts due to frost action. Upward displacement is unlikely as no evidence of cryogenic processes was apparent in the stratigraphy. Of these possibilities, human agency is the most likely, considering that people could have inadvertently redeposited older sediments containing insect remains in younger layers through the periodic cleaning of house interiors (Reynolds 1995:142–144).

Another source of dating uncertainty at Uivvaq might be the three bone assays: Two on marine mammals and one on caribou are possibly problematic. All three had elevated ∂ ^{13}C values (–12 to –19‰), widely considered to indicate marine or anomalously old carbon. However, by employing the regional marine carbon offset of 512 ± 57 years proposed by Dumond and Griffin (2002), the seal, walrus, and caribou assays do accord reasonably well with the wood or charcoal ages. Nonetheless, one seal pelvis dated to 610 ± 70 BP (Beta-174356) cannot be reliably calibrated since its age would be essentially modern.

To interpret the anomalous ages from the insects and adjusted sea mammal assays, we favor a greater reliance on the ages of the short-lived *Salix* macrofossils. From this perspective, the lower half of the Uivvaq midden was deposited in the eleventh to twelfth centuries AD, adding 50 cm within over twenty discrete storm beds. At its upper end, an angular disconformity, the leading edge of a cultural pit, delineates the upper component from the lower. The ^{14}C ages of the upper midden are generally concordant: e.g., the beetle age of 470 ± 30 BP (CURL-6927) is only slightly older, at AD 1410–1454, than an assay on short-lived *Salix* of 330 ± 40 BP (Beta-173867), calibrated to AD 1460–1650 (Beta-173867).

CLIMATE RECONSTRUCTION FROM INSECT MACROFOSSILS

A local climate history for Uivvaq was reconstructed with insect macrofossils (especially *Coleoptera*) recovered in stratigraphic context within the midden. Radiocarbon-dated beetle exoskeletons allow paleotemperature estimates through the application of the Mutual Climatic Range (MCR) method (Elias 1994:74–79). Direct dating of six chitin fragments (Table 1) produced a paleotemperature curve (Fig. 5) that offers a first approximation for Northwest Alaska (Elias 2003). The MCR temperature estimates derived from the samples were corrected to account for previously observed effects of arctic coastal settings (Elias et al. 1999) and were complemented by observations on midden sediments (e.g., texture, organic matter), which also reflect variations in climate. The MCR and ^{14}C dated insect remains provide an alternative to employing hemispheric models of climate history that are often out of phase with northern Alaska (Mason and Gerlach 1995:102).

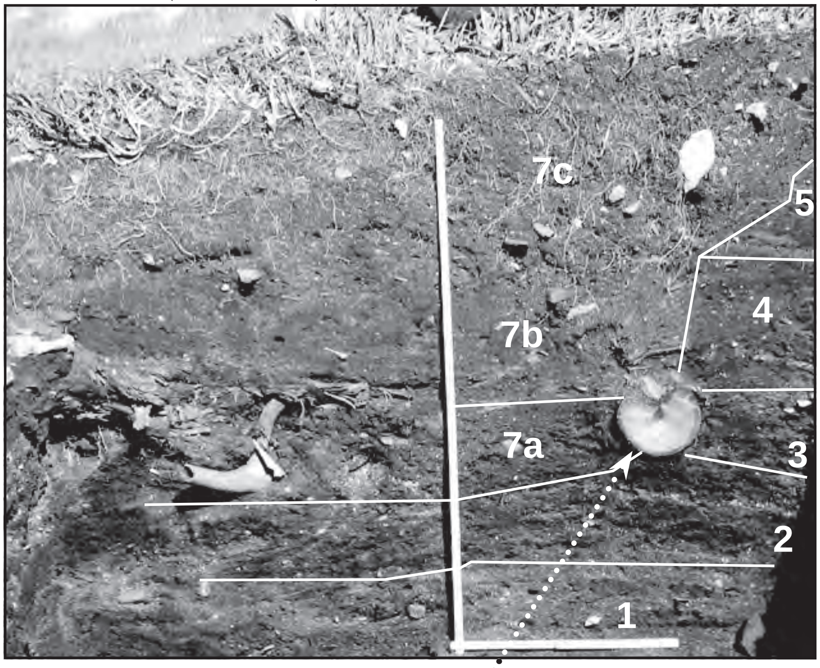
MIDDEN STRATIGRAPHY, CULTURE CHRONOLOGY, AND CLIMATE HISTORY

Field research for the project started in 2000[2] with the excavation of a trench (1 x 7 m) into the smaller of the two major surviving midden mounds at Uivvaq, designated Mound 2 (Fig. 3). Mound 2 occupies an area of 15 x 20 m and has an apparent elevation of 1.5 m above the present ground, although its subsurface extent is unknown. The 2000 trench was expanded in 2002, to a total of 15 m^2. Several smaller test units (1–2 m^2) were also excavated in other areas during 2000 to characterize the site, and a small trench (1 x 3 m) was opened up on the larger midden (Mound 1) in 2002 but excavated only to shallow depth due to time constraints (Fig. 4).

By definition, archaeological middens are the result of a complex interplay of natural and cultural formation processes (Butzer 1982:87–93; Rosen 1986; Waters 1992). Most midden investigations have occurred in temperate or arid environments, including shell middens of the Northwest Coast (Stein 1992); a modern systematic study of midden formation in an *arctic* coastal setting, where cold climate is a factor, has yet to be undertaken. Potentially significant for interpreting the stratigraphy and chronology of an arctic midden is the interaction between frost activity (e.g., frost heaving, cryoturbation) and human ground disturbance and house construction (Hall n.d.; Reynolds 1995).

Mound 2 at Uivvaq accumulated over several periods during the last 1000 years, the result of four major formation processes (cf. Waters 1992): (1) the onshore deposition of sand and gravel during storms, (2) eolian deposition of sand during high wind events, (3) organic decay and downward movement of silt through beach gravels due

Intermediate Kotzebue
Unit 7 (30–0 cm bs)
• AD 1410–1454 (CURL-6927)
• AD 1270–1430 (Beta-174356)
• AD 1153–1306 (CURL-5767)
• AD 1520–1590, 1620–1670, 1770–1800, 1940–1950 (Beta-173868)



Punuk
Units 3, 4 (55–70 cm bs)
• AD 1060–1080, 1150–1270 (Beta-173866)
• AD 1016–1162 (CURL-6928)
• AD 980–1153 (CURL-5947)
• AD 384–536 (CURL-6929)

Birnirk
Unit 1 (95–115 cm bs)
• AD 598–691 (CURL-5438)
• AD 975–1041 (Beta-180330)
• AD 987–1160 (Beta-180816)
• AD 1036–161 (Beta-180331)

Intermediate Kotzebue
Unit 7a (outer ring of spruce timber)
AD 1430–1530, 1550–1630 (Beta-173869)

Figure 4. Stratigraphic profile of the east wall of Unit N13 E0, Mound 2 at Uivvaq with selected radiocarbon dates.

to soil weathering, and (4) purposeful and inadvertent discard behavior and ground disturbance by humans (i.e., pit cut and fill). Slope processes apparently played a negligible role in midden sediment accumulation. Seven principal stratigraphic units were defined in Mound 2 and a summary description of each is presented below, from the bottom up (Table 2). Depth measurements were from the surface in the highest excavation unit, N13 E0. Excavations in both 2000 and 2002 ceased before firmly establishing the base of the midden by reaching culturally sterile deposits, so total depth remains uncertain. Mound 2 could include Ipiutak or earlier occupations, such as Choris, Norton, or possibly Denbigh.

The lithostratigraphy of Uivvaq is divisible into seven depositional units, defined by granulometry, sedimentary structures, and color, as detailed in Table 2. Geological strata were defined by Arabic numbers bottom to top, whereas cultural stratigraphy was defined by Roman numerals. The five lowermost lithostratigraphic units, 1 to 5, resulted predominantly from periodic storm overwash overprinted by cultural practices. Evidence of any modifications for architecture or cache pits is negligible in the lower levels. By contrast, the uppermost lithostratigraphic units, 6 and 7, lack visually discernible internal strata. The lower stratigraphic contacts of units 6 and 7 represent an unconformable truncation of the earlier storm sequence due to pit excavation by site residents.

Unit 1 represents a sequence of storm gravels marking seven discrete events, interstratified with debris produced by human occupation. Unit 1 contained three strata with cultural material (Ia, Ib, and II) that were associated with thin beds (≤ 1 cm thick) of compressed organic material and exhibit sharp upper contacts. Dated beetle remains from the base of the unit indicate

Table 2. Lithostratigraphy of Uivvaq Mound 2.

Elevations refer to depth below surface of grid square N13 E1.

Unit 1 (>130 to 110 cm below surface): The lowermost excavated layer; broadly level with the present-day ground surface surrounding the midden. Very dark brown (10 YR 2/2), poorly sorted, coarse and medium sand and silt with a significant percentage of small pebbles (1–2 cm).

Unit 2 (110–90 cm bs): Coarse angular gravel within a silt matrix; the largest clasts are rounded and only 1 to 2 cm in diameter. Upper and lower contacts defined by thick organic-rich silt beds 1 to 2 cm thick.

Unit 3 (90–75 cm bs): Series of massive silt beds with a small sand fraction that alternates with thin laminae of medium to coarse sand and granules. Highly clayey silt is present in the lower portion of the unit. A thick occupation horizon (Cultural Level IV) at the top serves as a contact with overlying Unit 4. Several discrete lenses (>1 cm thick) of coarse to very coarse sand and granules extend seaward towards the center of the midden.

Unit 4 (75–50 cm bs): Complex internal microstratigraphy containing six very dark brown (10 YR 2/2) beds of pebbly sands and granules separated by silt beds (1 to 2 cm thick) with occasional dense lenses filled with oblong pebbles, some >3 cm.

Unit 5 (50–25 cm bs): Six thin sand beds that alternate with dark, compact silt horizons; contains a high percentage of organics. Sharp contacts between the beds. The unit is only minimally observable in the eastern part of the trench due to post-depositional disturbance. Cultural Level VI lies at the base of this layer, which separates it from underlying Unit 4.

Unit 6 (50–0 cm bs): Massive fine to medium sand with numerous cobbles (10–15 cm) and fire-cracked rocks (7–10 cm). The unit is discomformable, cutting through several older units, primarily Unit 5. Larger clasts are more common in the lowermost 15 to 20 cm of the unit.

Unit 7 (30–0 cm bs): Uppermost portion of the midden is a poorly sorted dark brown (7.5 YR 3/4) silt with a minor fraction of sand and granules. Cobbles measuring up to 15 cm occur in a discrete zone (Unit 7d) about 50 cm below surface. Unit 7 represents cultural fill of a pit excavated into older deposits.

cool weather. However, this material is likely out of context and its climatic significance is problematic, since younger insect samples yielded MCR temperature estimates that reflect gradual warming (Fig. 5). Although one assay on insect chitin suggests an earlier age, most radiocarbon dates from this layer indicate a calibrated age between AD 950 and 1000 (Table 1).

In Unit 2, storms were less intense, as indicated from smaller clast size (Table 2). Cultural materials occur within discrete lenses of fire-cracked rock and bone fragments—including a bowhead whale bone—ca. 100 cm below surface. While Unit 2 gravels resulted from repeated storms, the silt likely accumulated due to human occupation, producing Cultural Level III. MCR temperature estimates derived from the analysis of beetle remains reflect a warming trend as much as 1.7°C warmer than previously during the summer months. The layer is not dated directly, but bracketing ages lead to an inferred age between AD 1000 and 1100.

The alternation in storm intensity is reflected in the contrasts between Units 3 and 4. The lower portion of Unit 3 reflects a period of fewer storms, as recorded in the occasional sand and gravel beds. In general, the massive silt beds accumulated as a result of onshore wind, probably during the winter months. The layer is not dated directly, but apparently antedates AD 1100. By contrast, Unit 4 marks a return to stormy conditions that characterized the deposition of Units 1 and 2 and contains some of the largest clasts in the midden sequence, a circumstance that indicates particularly violent storms. Cultural Level V is associated with these stormy conditions. Temperature estimates based on samples of beetle remains suggest a series of rapid small-scale oscillations (within +1°C of the modern summer mean). Radiocarbon dates indicate an age in the eleventh century AD.

Unit 5 consists of several sand beds, of only limited preservation across the site, with Cultural Level VI at the base of this layer, which separates it from underlying

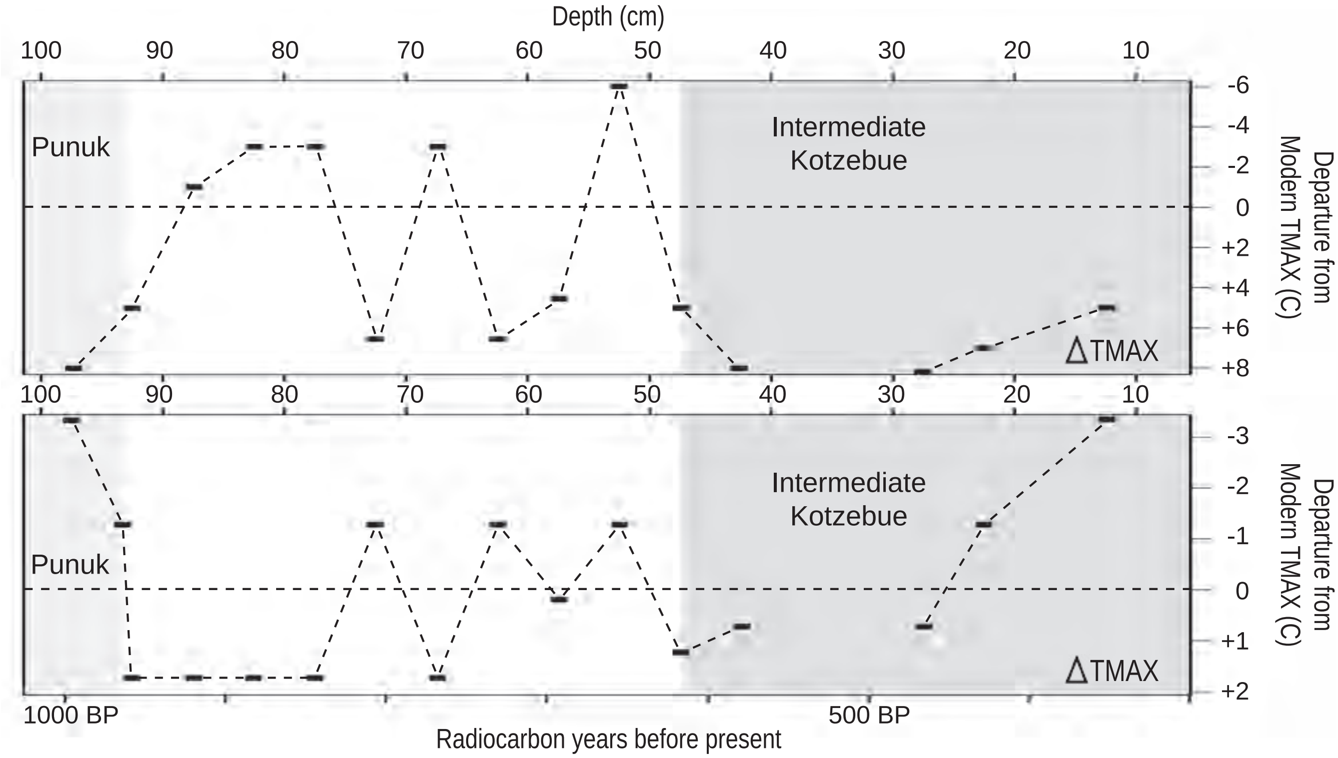


Figure 5. Paleotemperature estimates (TMAX °C) based on MCR analysis of beetle remains by S.A. Elias.

Unit 4. The thin sand beds of Unit 5 represent onshore winds that lofted beach sand on land, very likely during winter; the age of the unit can be bracketed to the twelfth century AD by ^{14}C assays on upper and lower deposits.

The poorly sorted matrix of Unit 6 represents the fill of a series of intrusive pits, which—for reasons that are unclear—were excavated into the slope of the midden. The cultural fill within the pits was likely obtained either from the nearby beach or unoccupied parts of the midden. While some samples sieved for beetle remains from this layer yielded no specimens, others produced temperature estimates that suggest continued mild climates. Two radiocarbon dates, one on insect chitin, indicate the age of Unit 6 falls in the mid-twelfth to thirteenth centuries (Table 1).

The uppermost Unit 7 rests disconformably atop underlying sediments and represents the purposeful horizontal arrangement of wood and sod blocks by site residents. The uppermost sample of beetle remains, recovered from the top 15 cm of the unit, yielded the lowest temperature estimates of the Uivvaq sequence (3°C *below* modern mean summer temperature), corresponding to the cooling associated with the Little Ice Age (Fig. 5). Four radiocarbon dates, one on insect chitin, from Unit 7 provide a calibrated date between AD 1470 and 1640. However, the presence of industrial goods (e.g., iron nails, stove parts) in the uppermost unit suggests that a younger occupation (post-1800) also occurred.

UIVVAQ CULTURE HISTORY: AD 950–1600

Uivvaq was first occupied at least 1000 years ago, discounting the problematic sixth century AD radiocarbon age on insect remains. An age estimate within the tenth or eleventh centuries was younger than expected, because the depth of the midden and the apparent stability of the coastline suggested that the occupation of Uivvaq might span two thousand years. Nonetheless, the midden accumulated rather rapidly, resulting from closely spaced intervals of storm deposition.

Buried artifacts and faunal remains in the Mound 2 sequence are concentrated in dark brown organic-rich beds. These interstratified beds vary in coarseness (often including pea and larger gravel) and were derived from storm events. Sand and silt were deposited by wind action. The pattern does not reflect the long-term occupation and abandonment of Uivvaq, but rather the annual and decadal processes of midden formation. The storm and wind deposits accumulated rapidly, in contrast to the levels with concentrations of cultural debris, which represent stable living surfaces of variable duration from months to years, sometimes in conjunction with limited soil formation. Only one possible hiatus in occupation was identified—between the middle and upper components—and this may simply reflect the limited area excavated so far, combined with the effects of disturbance on the depositional units (6 and 7) forming the upper component.

Three broad archaeological components, "lower," "middle," and "upper," are defined within the Uivvaq midden sequence, described below. Each component includes one or more cultural levels, designated using Roman numerals; these levels do not necessarily represent distinct cultural phases. Levels were defined by both natural levels and in arbitrary 10 cm excavation levels. Although each component yielded one or more diagnostic items (e.g., Natchuk harpoon head) that probably reflect temporal phases in Thule prehistory (e.g., Jensen 2007; Stanford 1976), the overall pattern revealed by Mound 2 reflects cultural continuity that prevails across northern Alaska (cf. Stanford 1976).

OFF-MOUND TESTING, PRE-AD 950

A small, off-mound test excavation in 2000 uncovered traces of occupation in beach sediments inferred as stratigraphically underlying the midden. The test unit (N38–39 E20) was located 15 m northeast of Mound 2 and yielded artifacts and associated mammal remains at 45 cm below the surface in an organic-rich horizon. Among the artifacts recovered was a gray chert stemmed knife similar to specimens recovered from the Birnirk site (Ford 1959:166–170). The undated occupation horizon buried in the beach deposits may precede the lowest unit in Mound 2.

LOWER COMPONENT (AD 950–1050)

The lower component of Mound 2 comprises cultural levels I to III within lithostratigraphic units 1 and 2 and dates between AD 950 and 1050, a relatively stormy century. The lower component marks the transition from the Birnirk to the Thule culture, dated to the eleventh century AD across northern Alaska (Anderson 1984:91–92; Mason 2000; Mason and Bowers 2009; Morrison 2001). Diagnostic artifacts in the lower component fall within late Birnirk and/or early Thule phases (Fig. 6), following Ford (1959:83, 86) and Stanford (1976:18ff), based on an antler Natchuk harpoon head (00-889) and the incomplete basal section of an ivory Thule 2 (or Thule II) harpoon head (00-1029). The Natchuk sealing harpoon head is diagnostic of the Birnirk–Thule transition, according to Morrison (2001:80). Significantly, its inferred age at Uivvaq, during the eleventh century AD, is concordant with similar ^{14}C assays from Jabbertown and Deering (Mason and Bowers 2009) as well as at Birnirk (Morrison 2001:80). Other Birnirk objects include a bone float nozzle (00-886) that resembles the wooden pieces found at the Birnirk site (Ford 1959:101–105) and an antler arrowhead, often considered diagnostic of the Birnirk–Thule transition, that has a shoulder-less base with a tapering tang (00-1025) (e.g., Ford 1959:128; Larsen and Rainey 1948:169–173; Stanford 1976:33 [Type I]). A similar tapering but bulbous tanged arrowhead from Jabbertown was carved in the eleventh century AD (Mason and Bowers 2009:31). Such tanged antler points were used for several centuries, based on the sixteenth-century AMS date on one recovered at Cape Denbigh, far south of Uivvaq (Murray et al. 2003:98–100).

Fishing equipment at Uivvaq reflects both jigging and spearing efforts. Several leister prongs were recovered from the upper component, including a slender multibarbed form (Fig. 6; 02-1735). A twin-barbed fishhook for tomcod (Fig. 6; 02-1724) is identical to one from Qitchauvik in Norton Sound dated to AD 500–600 (Mason et al. 2007: plate IV a, c) but also has similarities to specimens from Kotzebue that are considerably younger, ca. AD 1500 (Giddings 1952: pl. 36).

Two bola weights recovered at Uivvaq (Fig. 7) show affinities with both Birnirk and later Thule assemblages (for typology, see Ford [1959:139–141]). Typically "found only in Birnirk" (Ford 1959:141) is a Type G bola, an oval ivory piece from the middle component (02-648). An ivory bola weight of subspherical form with two holes drilled at one end (02-1611) corresponds to Class E of Ford (1959:139–141) and occurs in both early and late contexts, although precise age estimates are rare from elsewhere. A perforated bone (02-555) from the upper component (27–32 cm bd, N13 E1) may be a bola. Rudenko (1961:pl. 30) identifies similar Punuk objects from Sireniki as amulets.

The majority of the artifacts recovered from all three components are debris produced by the manufacture and resharpening of chipped stone tools. In this respect, Uivvaq seems unique among Thule sites, which have yielded only negligible or modest quantities of lithic debris (e.g., Stanford 1976:68). The abundance of lithic waste in Mound 2 is a function of the local availability of high-quality flaking stone, combined with the sieving

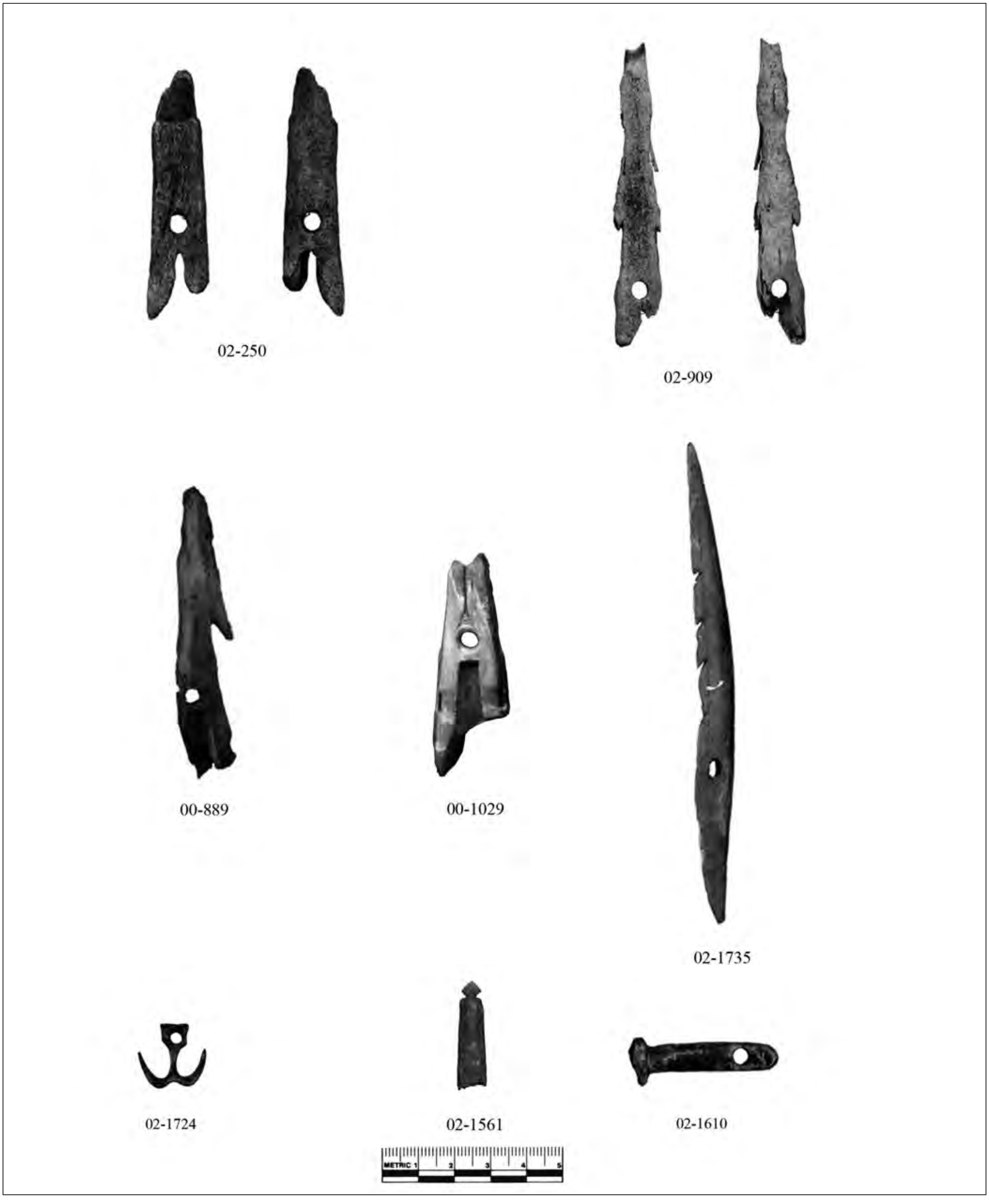


Figure 6. Diagnostic subsistence equipment from Uivvaq. From upper component: closed socket toggling harpoon head with no parallel in the region (upper left; 02-250); open socket multibarbed Thule IIc harpoon head (upper right; 02-909); leister prong (middle right; 02-1735); swivel for dog line (lower right; 02-1610). From lower component: Natchuk harpoon head (middle left; 00-889); Thule 2 harpoon head base (center; 00-1029); tomcod fish hook (lower left; 02-1724); miniature wooden bow fragment (lower center; 02-1561).

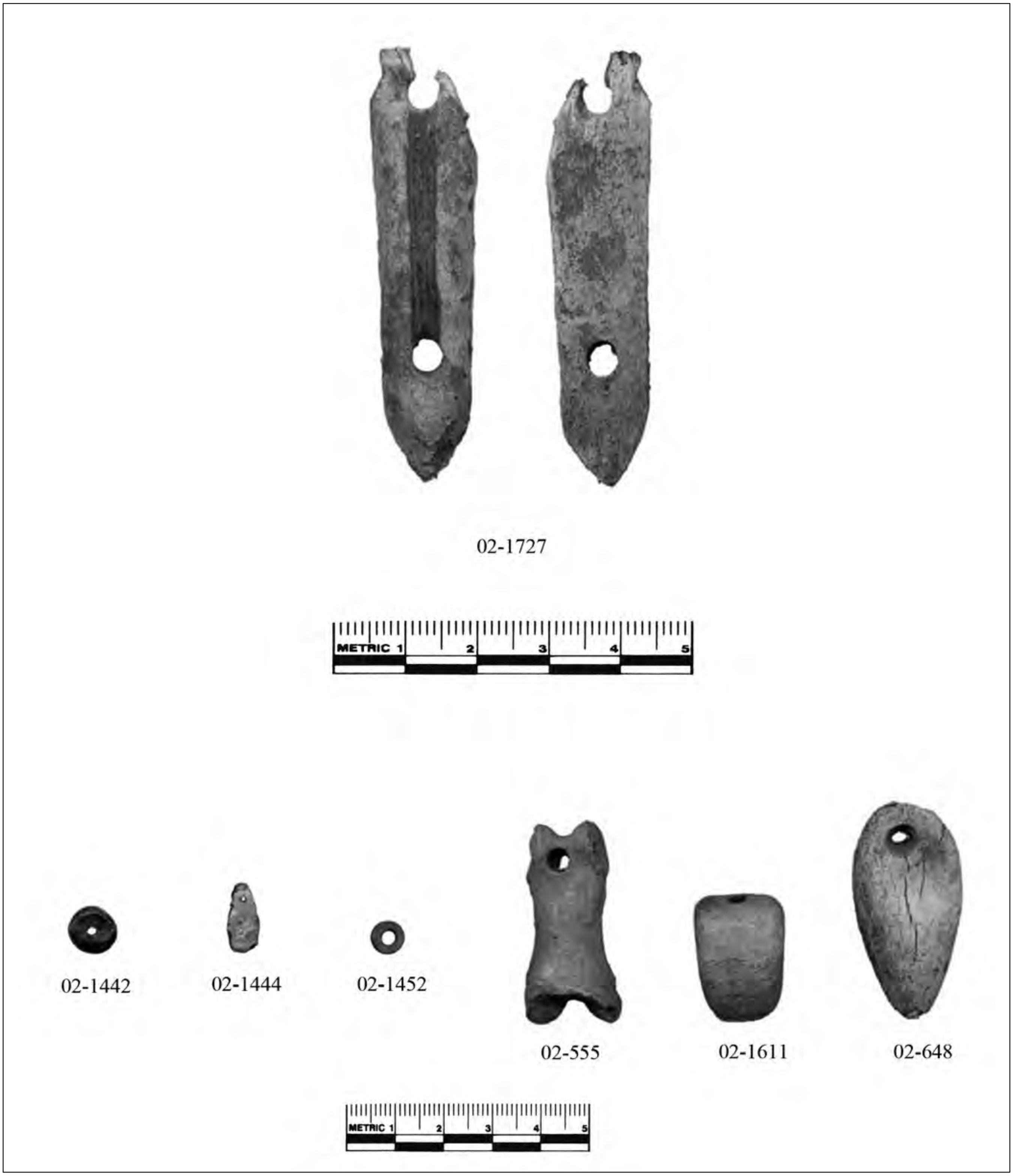


Figure 7. Decorative, fishing, and birding implements from Uivvaq. Top: Antler object of unknown function, possibly used as a net float (02-1727). From left to right: amber bead (02-1442); amber pendant (02-1444); jet bead (02-1452); three perforated objects: bone (02-555; upper component); ivory object similar to Ford's Class E bola (Ford 1959:141) (02-1611; lower component); oval ivory bola similar to Ford's Class G (Ford 1959:141) (02-648; middle component).

of all excavated sediment. Local chalcedony predominates among raw material. Analysis of the waste flakes and cores indicates that chipped stone implements were manufactured on blanks produced from unstandardized flake cores. The majority of finished tools and weapons were bifacially retouched with soft-hammer or pressure-flaking techniques, similar to those used by the Tikiġaġmiut in the late nineteenth century (Driggs 1905:94).

Despite the abundance of high-quality raw material, the occupants of Uivvaq still produced only the small number of finished chipped stone implements typical in Birnirk–Thule sites across northern Alaska (Ford 1959; Giddings 1952; Stanford 1976). The gray chert stemmed knife buried in the beach deposits stratigraphically underlying the midden can be tentatively associated with the lower component. While several bifaces and scrapers were recovered from cultural levels I, II, and III (Fig. 8), none are definitive evidence of the Birnirk–Thule transition.

Ground slate implements (*n* = 44) of both the locally available green and black types (Hoffecker and Mason 2003:153) were recovered in all three components, although diagnostic slate tools and fragments were slightly more common in the middle and upper components. Slate debitage was considerably less frequent than chalcedony debitage and was concentrated in the Punuk cultural levels (Elias 2003). Traces of grinding and polishing on these implements are visible with low-power magnification. Although absent in Ipiutak, slate grinding is broadly characteristic of the Northern Maritime Tradition (cf. Collins 1964). Most ground slate artifacts at Uivvaq represent rounded ulus (women's knives), stemmed knives, or small harpoon end blades.

Most of the ceramics (*n* = 488) were recovered (Mason 2003:table 10-1) in the uppermost levels of Units 6 and 7 (ca. 50%), although the lower component did yield a significant number of pottery fragments (25%). The recovery of small ceramic fragments was enhanced by sieving excavated sediment, although recovery methods may have fostered the fragmentation of ceramics. Uivvaq pottery is typical of Birnirk–Thule assemblages—"crude" in appearance due to its thickness (average = 12.2 mm), coarse grit temper, and blackened due to its low-temperature firing (Oswalt 1955). A small number of sherds (< 0.5%; *n* = 24), especially in the lower component, exhibit curvilinear design on the external surface (e.g., 00-1007). Most are likely fragments of pots (some of them large), although none can be firmly attributed to a lamp.

Wood recovery was enhanced by water-screening, with nearly 1,000 fragments out of a total of nearly 3,000 specimens (Mason 2003:table 12-2). Worked wood fragments or chips (*n* = 228) and several artifacts (*n* = 13) were predominantly recovered from the lower component, with two deserving of special note. One (Fig. 6) is the end fragment of a miniature bow with a triangular nock carved on coniferous wood (02-1561; 30 x 8 mm). Similar miniature bows with triangular nocks are found in early Thule houses, e.g., House 2 at Sisualik (Giddings and Anderson 1986:pl. 54i) and House 1 at Deering (Alix 2009). Miniature bows made of baleen with triangular nocks are known from the Old Bering Sea period (e.g., the Mayughaaq site near Gambell on St. Lawrence Island [Collins 1937:134, pl. 56]), and wooden bow remains are common in Early Thule sites across the North American Arctic (Alix 2001). The most noteworthy wooden artifact is a human figure carved in cottonwood bark (02-1725) (Fig. 9). The 10-cm carving apparently portrays a slender female with small breasts, a pronounced belly and pubis that suggests pregnancy. The head and lower limbs are missing and the arms are stumps. The carving resembles a bark figure recovered from Birnirk, both in its shape and the breakage or purposeful removal of the head and legs (cf. Ford 1959:224, fig. 110a).

Amber beads and fragments were found (*n* = 24; 2002 collection, Fig. 7) in the lower component and presumably represent items that were traded or imported from other areas. The availability of amber during the Birnirk–Thule transition may be unusual, since amber is usually associated with late Thule occupations (e.g., Stanford 1976:60; Young 2002). The sizable quantity of amber recovered from all components at Uivvaq is probably a function of sediment sieving. In 2000, Uivvaq also yielded more than seventy tiny jet beads (02-1452) from the lower component (Fig. 7). Jet beads have not been reported previously in Thule occupations in northern Alaska, although jet was used for beads in the nineteenth century (Burch 2007:257). Such beads were inset in Ipiutak ivories (Larsen and Rainey 1948:74, 120, 141).

MIDDLE COMPONENT (AD 1050–1150)

The middle component comprises cultural levels IV and V within stratigraphic Units 3 and 4 and dates to ca. AD 1100. Analysis of the sediments and beetle remains suggests that this interval witnessed fewer storms and warmer summer

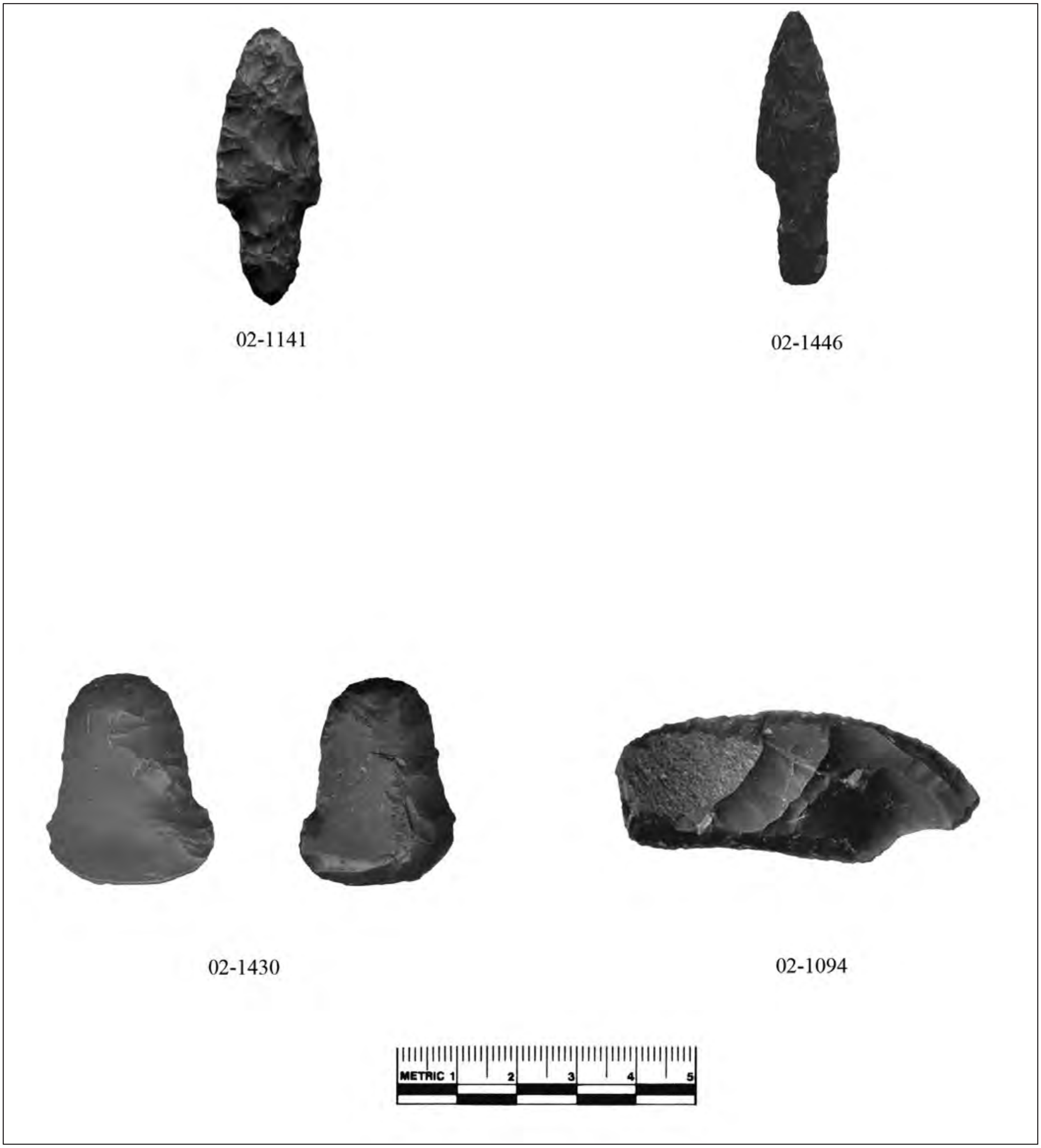


Figure 8. Lithic artifacts from Uivvaq. Top row: (left) gray chert stemmed point, similar to that found at Ekseavik by Giddings (upper component; 02-1141); (right) gray chert point with tapering stem, similar to stemmed points recovered at Walakpa (02-1446). Bottom row: (left) gray chert endscraper (02-1430); (right) unifacial flake knife (middle component; 02-1094).

temperatures, but was followed by a return to stormy conditions and temperature oscillations. The middle component likely reflects the technological and genetic imprint of Bering Strait societies and the western Chukchi Sea coast in Siberia. Uivvaq, as seen below, shows evidence of direct contact with the Punuk culture, known on St. Lawrence Island and from Chukotka (Ackerman 1984:109–113; Collins 1937; Mason 2009a; Rudenko 1961). Some researchers, including several Russians (e.g., Dikov 1977, 1979), have referred to such assemblages as Thule–Punuk (e.g., Collins 1964:99).

The artifact (02-1275) from the middle component most characteristic of Punuk is the decorated ivory "trident"—or more properly, an atlatl counterweight

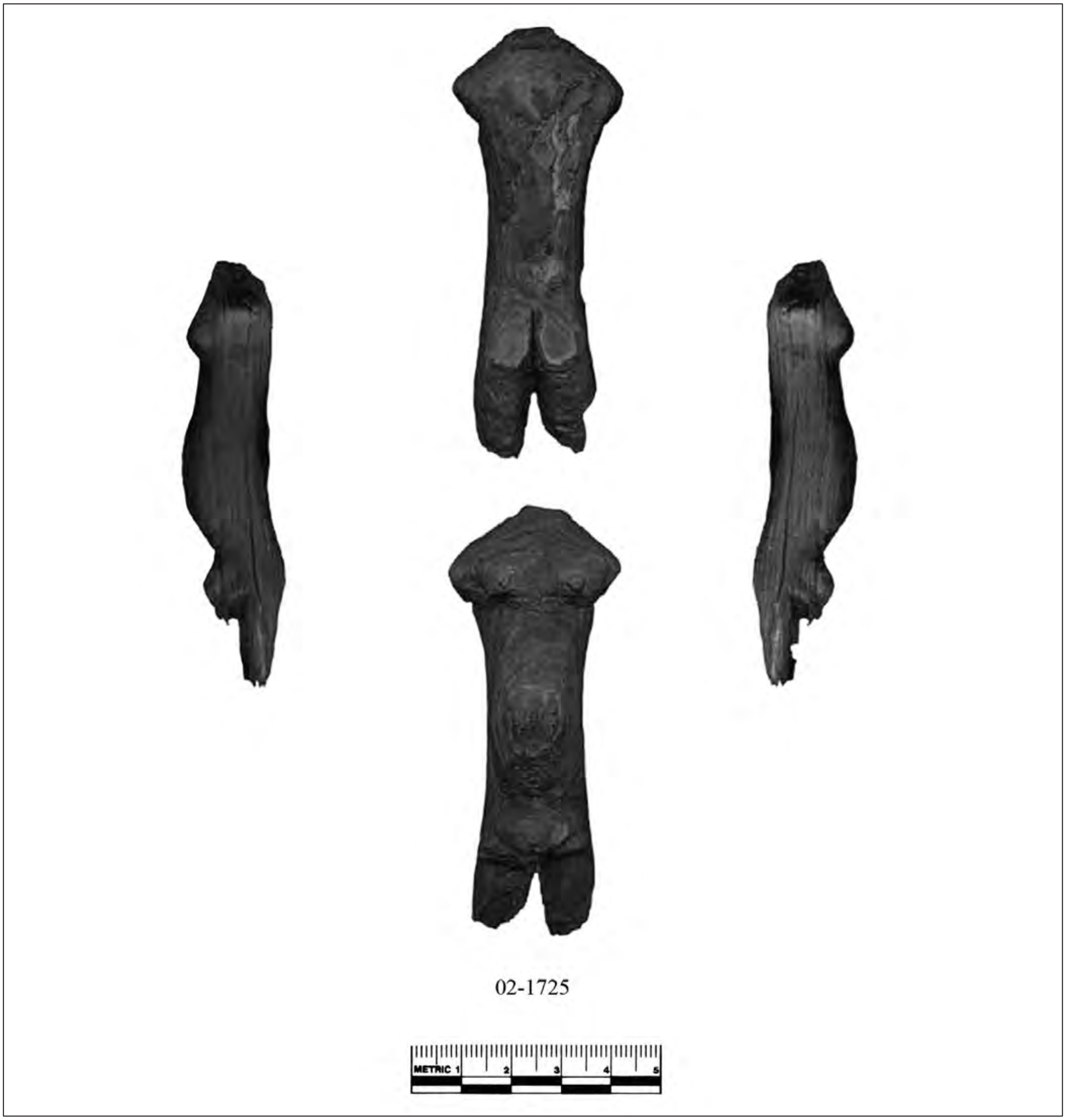


Figure 9. Human figure of cottonwood bark (02-1725) recovered from the lower component in Mound 2; 10 cm.

Figure 10. Punuk counterweight (three views) of ivory recovered from the middle component in Mound 2 at Uivvaq (02-1275).

(Fig. 10). Although one of its lateral prongs and a portion of the adjoining base are missing, the form is nearly identical to Punuk counterweights recovered at Sireniki in Chukotka (Rudenko 1961:pl. 29:24), St. Lawrence Island (Collins 1937:pls. 68, 69), and the northern coast of Alaska (e.g., at Nunagiak near Point Belcher [Ford 1959:61]). The surface of the Uivvaq counterweight exhibits an abstract symmetrical curvilinear/triangular design also nearly identical to designs on those from St. Lawrence Island (Collins 1937:pls. 68, 69). Drilled holes on the central prong and base were probably used to attach it to the end of the harpoon shaft to balance the harpoon head. The Uivvaq specimen, however, is the first counterweight recovered in a stratified and reasonably well-dated context.

The remainder of the middle component assemblage is similar to that of the lower component, although lacking items diagnostic of the early Thule phase (e.g., the Natchuk harpoon head). Seal hunting gear includes a spool-shaped float nozzle (02-1405) similar to the nozzle found in the lower component. Among the bird hunting equipment is a teardrop-shaped bola weight (Fig. 7) of ivory (02-648) that corresponds to Class G of Ford (1959:139–141). Notably, at Walakpa, Class G bola weights were most common in early Thule levels (Stanford 1976:38). Other hunting implements include a fragment of a bow limb; its nock end is missing but the characteristics of the wood, the lashing marks and its general shape are consistent with this identification. It was made of spruce compression wood, commonly used for hunting bows since early Thule (Alix 2003).

As in the lower component, most artifacts are lithic debris from the production of chipped stone tools and weapons. A stemmed bifacial point (Fig. 8) flaked on dark gray chert (02-1446) is similar to long-stemmed points in both early and late Thule levels at Walakpa (Stanford 1976). Ground slate items include ulus, stemmed knives, and harpoon end blades. The middle component also yielded a large quantity of thick pottery fragments similar to those found in the other two components. A small percentage of sherds exhibit curvilinear designs on the outer surfaces. Amber beads and fragments are present, but the small jet beads encountered in the lower component are absent.

UPPER COMPONENT (AD 1300–1600)

The upper component includes Cultural Level VI in lithostratigraphic Units 5, 6, and 7. Units 6 and 7 reflect pit excavation and other human disturbances on the southern periphery of Mound 2. While Unit 5 is undated, Unit 6 may date as early as 1300 and Unit 7 postdates 1400. Local climate conditions were relatively mild during the deposition of both Units 5 and 6, but beetle remains from Unit 7 yielded the lowest summer and winter temperature estimates in the sequence, apparently reflecting the onset of the Little Ice Age.

The upper component is assigned to a later phase of the Thule culture and contains a number of diagnostic "Late Thule" artifacts within an assemblage that remains broadly similar to the underlying components. More specifically, the upper component yields some forms that appear in both coastal and interior sites of Northwest Alaska dating to 1400 and later (Giddings 1952; 1964:28–29; VanStone 1955). These sites exhibit features that probably reflect responses to the cooling climates of the fifteenth century. Some evidence suggests increased fishing, the heavier use of cache pits, and dog traction—all of which may be interrelated (e.g., Anderson 1984:134; Giddings 1952:58ff; Mason 2009a).

Especially diagnostic of Late Thule is a harpoon head (Fig. 6) of antler with multiple sets of barbs, open socket, and a round line hole (02-909). Recovered near the top of the midden, it is similar to harpoon heads from the Late Thule levels at Walakpa, classified by Stanford (1976:22) as Thule IIc. Another harpoon head from the upper component (Fig. 6) possesses dual prongs at the base and a closed socket (02-250), but lacks any regional parallel. Also related to ice hunting and fishing is an ice scoop fragment of bone (02-1165), an object usually associated with later Thule occupations (e.g., Ford 1959:108).

Land hunting equipment includes the square, shouldered base of an antler arrowhead with a knobbed tang (00-1028), a type usually associated with Late Thule (post-1400) across northern Alaska (e.g., Larsen and Rainey 1948:170; Stanford 1976:108; VanStone 1955:95). However, an earlier age is possible, considering the AMS assay of AD 1210 to 1270 on a similar arrowhead from Nukleet on Norton Sound, >1,000 km south (Murray et al. 2003:100). This earlier age may be supportable considering that the arrowhead was recovered from the uppermost 25 cm of the midden trench, possibly in sediments redeposited by the purposeful pit excavation. On the other hand, most artifacts were consistent with post-fifteenth century ages. For example, among chipped stone artifacts related to land hunting, a stemmed point of gray chert from the upper component (02-1141) (Fig. 8) resembles an Ekseavik piece from the Kobuk River dating to ca. 1400 (Giddings 1952:48; 1964:28–29).

Evidence of fishing equipment includes a barbed prong (Fig. 6) of antler (02-1735) that is similar to fish leister prongs from the Late Thule levels at Walakpa (Stanford 1976:41) and Kotzebue (Giddings 1952:pl. 36). Alternatively, this piece might represent the prong of a bird dart. Only isolated fish remains have been found in Mound 2, with none from the upper component. The traces of pits observed in Unit 6 could reflect increased use of cache pits for fish storage. This, in turn, may be related to the development of dog traction. The upper component yielded a dog-line swivel (Fig. 6) of bone (02-1610) that resembles specimens from both ethnographic and archaeological contexts in northern Alaska (e.g., Ford 1959:154; Giddings 1964: pl. 31; Nelson 1899:210).

Other objects of interest include a bone comb with a handle apparently carved in the shape of a bird's head (00-412). It is similar to combs (usually carved out of walrus ivory) found in later Thule or historic contexts (e.g., Ford 1959:208–209; Murdoch 1892:149–150). Traces of industrial technology (e.g., iron nails, possible stove parts) in the upper component postdate 1800. However, some are deeply buried in the uppermost stratigraphic units but presumably were incorporated into older materials as a result of disturbance in the last 200 years.

RECONSTRUCTING SUBSISTENCE

The occupants of Uivvaq appear to have maintained a consistent, broad-spectrum diet and economy much like modern Tikiġaġmiut (Burch 1981:23–34; Foote and Williamson 1966). Fauna were analyzed from multiple units.[3] Elements were quantified using number of identified specimens (NISP) or a bone count. The analysis is incomplete. To date, 979 elements have been identified, 481 coming from N13 E0 (Table 3). Based on the information available, the economically important fauna are small and medium pinnipeds and caribou.

As elsewhere in the Arctic, small and medium seals were the dietary mainstay of the Thule/Iñupiaq economy (Murdoch 1892:61–62; Stanford 1976). Seal bones dominate the Uivvaq assemblage in almost all levels in N13 E0. Pinniped representation was: lower component, 57.2%; middle component, 75.5%; upper component, 62.9%. Most remains identified to species were ringed seal (*Phoca hispida*; $n = 117$); few were identified as spotted or harbor seal (*P. largha/vitulina*; $n = 8$). Many seal bones were placed in a more general *Phoca* spp. ($n = 102$) or medium phocid/not ribbon seal category (not *Phoca fasciata*; $n = 9$). Both axial and appendicular elements are well represented, and it appears that carcasses were transported intact to Uivvaq. Flipper elements are particularly numerous (but not yet quantified), as expected if flippers were stored, processed, and consumed. Butchering marks were observed on many seal bones, including round puncture holes through the blades of three scapulae. The holes may have been from a projectile, punctured to hang meat for drying, or from erosion through the thinnest part of the blade. The hole through a spotted seal scapula blade was intentional and there are cut marks around the hole, possibly to remove a harpoon head. Carnivore chewing is present, but not ubiquitous, on small pinniped elements, and erosion of some elements may have been caused by passing through the digestive system of a carnivore or omnivore.

There are isolated remains of the large bearded seal (*Erignathus barbatus*; $n = 3$ in Unit N13 E0) and a walrus (*Odobenus rosmarus*) skull fragment in N12 E1 (43 cm bd). More walrus bones were expected because there is a haul-out on the west side of Cape Lisburne (Burch 1981:20). Walrus move northward through leads as the ice is breaking up in the spring and summer and haul out on the ice. Males tend to stay in the Bering Sea and females

Table 3. Number of identified specimens for Uivvaq fauna

	Upper Component (0–40 cm bd)		Middle Component (40–80 cm bd)		Lower Component (80–120 cm bd)		Overall NISP (including N13 E0)	NISP (N13 E0)
	overall*	**N13 E0**	**overall***	**N13 E0**	**overall***	**N13 E0**		
Carnivores								
small canids	49	13	49	3	41	32	139	48
canid/medium canid	18	5	11	3	11	4	40	12
Ursus spp. (bear)	6	0	18	3	26	5	50	8
Ungulates								
Rangifer tarandus (caribou)	104	13	98	23	31	15	233	51
Ovis dalli (Dall sheep)	2	0	2	1	1	1	5	2
ungulates	26	2	29	4	9	3	64	9
Pinnipeds								
small/medium pinnipeds	85	79	145	1,421	93	93	323	314
Erignathus barbatus (bearded seal)	1	1	0	0	2	2	3	3
Odobenus rosmarus (walrus)	0	0	1	0	0	0	1	0
Cetacean	41	10	15	3	2	1	58	14
Land Mammal Unidentified	20	4	12	4	15	9	47	17
Gastropod	5	0	3	1	1	0	9	1
Fish	0	0	1	1	1	1	2	2
Unidentified	4		1		0		5	0
NISP	361	127	385	188	233	166	979	481

* overall NISPs include N13 E0

and immature walruses move into the Chukchi Sea (Sease and Chapman 1988). In the fall, they will haul out on shore during their journey south.

Evidence of whaling is of interest because of its historic economic and social importance, but because of the immense size of the prey, large whale hunting typically exhibits low visibility in the zooarchaeological record (McCartney 1995). Historically, large whale carcasses were left on the ice and few elements of the skeleton were brought back to the living areas. Bone appears as artifacts and as byproducts of tool manufacturing and not as recognizable food debris. Two large whale skulls were on the ground surface on either side of Mound 2, and a beluga (*Delphinapterus leucas*) whale skull was on the surface of one mound. They were also observed in back dirt from a bear excavation. A whale skull embedded within the wall of N14 and N15 E1 was not collected, nor was a scapula 120–125 cm bd in the east wall of N13 E0. Most whale bone identified was from the upper levels of Mound 2. Whale bone was identified sporadically in the lower levels. Weathered bones (e.g., crania, mandibles) were on the surface of the middens and surrounding ground, although their age and relation to past occupations is unknown.

Beluga whales winter in the Bering Sea, using polynyas and open leads near Point Hope, Shishmaref, Wales, and the Diomede Islands (Hazard 1988). As the ice melts, the whales migrate northward beginning in April or May, continuing through July (Hazard 1988). A set of eleven beluga vertebrae were found in Unit N16 E1 at 42 cm bd. Traces of meat and blood residue adhered to the ventral surfaces of the bones on the caudal end of the articulated skeleton. The vertebral processes were gnawed by carnivores, and a large chip and transverse processes were torn away from the right side of the caudal end of the skeleton while the bone was fresh. Morseth (1997: 249–250) stated that the vertebrae from the lumbar to the caudal vertebrae and the cervical vertebrae are either eaten shortly after the animal was killed or were given to the dogs in modern Buckland. The abundance of fly pupal cases and soil mites in the samples of insect remains at the site, in general, support the interpretation that some bones were exposed on the midden surface, particularly during the summer months, as may have occurred with this beluga. Two vertebrae on the cranial portion of the articulated skeleton were charcoal stained and burned through the foraminae. The burning probably occurred long after the skeleton was scavenged and after the meat was removed. Three other small cetacean elements were recovered that may be from beluga. A rib fragment from N13 E0 was cut square on both ends and is a manufacturing byproduct (70–75 cm bd); a forelimb fragment was badly chewed by a large carnivore, probably by a bear (88 cm bd, N13 E0). A third element from N14 E15 was a vertebra epiphysis. All other cetacean remains were from large whales.

The only burned bones were sea mammal, except for three fox or small canid bones and three other bones that are either stained or burned. The remaining burned bones were pinnipeds (*n* = 20), cetaceans (*n* = 11), and unidentified mammal bones (*n* = 3). None were from caribou or other ungulates. Spencer ([1959] 1976:471) and Edna Hunnicutt (Hall 1975:65) both noted that sea mammal bones were burned when a house was moved. Hunnicutt (Hall 1975:65) also stated that sea mammal bones were burned when there was no ice:

> At the coast you couldn't go into anybody else's tent. A family always puts all the ugruk and seal bones together in one pile so when there was no more ice, when they don't hunt, they burn those bones, and some bones burn real bright and fast and some people's pile of ugruk and seal bones doesn't burn bright, and that family's pile of bones that don't burn good the family will "be missing" again ["be missing" means one of the family will die or something will happen to the family], and the family's bones that are burning brightly always have good luck. After they burned the bones they could visit other tents.

Beluga bones were burned in the nineteenth century in western Alaska, a pattern that can be inferred and extended to prehistoric Uivvaq and the present-day Buckland area (Morseth 1997:250–251). Burned sea mammal bones were found in association with a number of wood charcoal fragments, burned soil, and fire-cracked rocks in the midden, especially in the lowest levels of excavation Unit N13 E1 (Cultural Levels I, II and III) and in the upper component.

Caribou (*Rangifer tarandus*) was a significant terrestrial food source in the nineteenth century (Burch 1981:27–28) and its remains occur throughout the midden deposits. Caribou were secondary in importance to seals at Uivvaq even factoring in different processing methods, taphonomy, and body weight. When the NISP of caribou (*n* = 51) are compared to the NISP of pinnipeds in N13 E0 caribou are 14% of the sum of the two taxa in all components. Many limb bones exhibit tool cut and/or percussion marks and all limb bones, and most foot bones, were shattered, presumably for marrow extraction.

The over-representation of limb bones relative to the axial skeleton may be attributed in part to the higher fragmentation rate of appendicular elements relative to unfragmented axial elements. The axial elements are also less dense and are more likely to be removed from the assemblage by carnivore chewing. To examine possible effects of post-depositional processes on caribou element representation, dense limb bone articular ends were compared to the more porous portions with thinner cortical bone. In the small assemblage of all ungulate appendicular elements (*n* = 87), there are more dense fragments than fragments with thinner cortical bone and greater porous, cancellous components. The difference in the numbers is small and a larger data set is required to determine if this discrepancy is an accurate reflection of the site assemblage overall, and if it does indicate that thinner, more porous bones were destroyed by carnivore activity.

The only other ungulate identified to species from Mound 2 came from isolated Dall sheep (*Ovis dalli*, *n* = 5) elements. The elements in the trench between 75 and 90 cm bd were a scapula and two first cervical vertebrae. On the surface and 12 cm bd were a mandible and a tooth. There is little basis for interpretation of the importance or use of these ungulates. The low numbers may be due in part to an incomplete comparative collection at the time of analysis. Dall sheep were common on Cape Lisburne during the early historic period, 1825–1840 (Burch 1981), but by the 1920s their numbers were dwindling. Sheep are now rare in the Lisburne Hills (Foote and Williamson 1996:1047; Georgette and Loon 1991).

Large and medium carnivores were important to the Uivvaq economy in the nineteenth century. Four elements were from polar bear (*Thalarctos maritimus*, *n* = 4), but two were molars in the same unit and level, and a third molar may be associated. The remainder (*n* = 46) may be a mix of polar bear and grizzly bear (*Ursus horribilis*), but a comparative polar bear postcranial skeleton was unavailable to make the determination. The elements from Uivvaq tended to be larger than the female grizzly bear skeleton used for comparison. Both bears frequent the Uivvaq area today. Bear bones, chiefly lower extremities, occur in low numbers throughout the midden, with the greatest number in the middle component of N10 E0 (a femur, humerus, skull fragment, and two phalanges between 40 and 60 cm bd) and a fore and hind paw of an immature bear in the lower component of N13 E1 between 107 and 117 cm bd (eighteen metapodials, six phalanges, and a navicular). Of all bear elements recovered, thirty-seven are foot bones, three humeri, two femora, and a fibula. There are no axial elements other than skull fragments (*n* = 2) and teeth (*n* = 4). The numerous foot elements may have traveled with hides brought to the site.

Fox elements (total small canid NISP = 139) were identified as *Alopex lagopus* (*n* = 4), *Alopex/Vulpes* (*n* = 118), canid (fox) (*n* = 10), or small canid (*n* = 8). One bone was recovered during cleanup and is not included in Table 3. Fox elements are evenly distributed through all components. Both axial and appendicular elements of fox are well represented, reflecting the transport of whole carcasses, with butchering marks noted on some specimens. Arctic foxes must have been attracted to Cape Lisburne since they eat eggs and small birds from sea bird rookeries in the summer, and ringed seals in their dens in the winter, and will follow polar bears and scavenge their kills on ice (Banfield 1974:297; Bee and Hall 1956). Medium-sized canid elements from Uivvaq (*n* = 40) are stocky and shorter than wolf comparative specimens and are assumed to be from dogs (*Canis familiaris*). Axial and appendicular elements are both represented, as would occur if whole carcasses were deposited on the site. Gnawing on other bones at the site also support the conclusion that dogs were present. Medium-sized canid elements occur in similar numbers in all components. Nine of the medium canid elements were in the vegetation mat or on the surface and may be associated with historic activities at Uivvaq.

Bird bones were not as plentiful at Uivvaq as expected given its proximity to Cape Lisburne, one of the largest murre (*Uria* spp.) and kittiwake (*Rissa* spp.) colonies in northwestern North America. A cursory examination of the assemblage confirms the presence of gulls, murres, and ducks. There does not appear to be a selection for particular body parts, and the birds were likely brought back whole. Small bones from the ends of wings and the small toe bones are missing, but this may be due to sampling bias. Because birds were not systematically identified, they are not included on Table 3.

Fish were represented by two isolated vertebrae (N13 E0, 50–55 cm bd, and N13 E0, 100–105 cm bd). Both elements were eroded, as is typical of bones that have passed through a digestive system. The elements may come from gut contents of seals and therefore are not representative of subsistence activities at Uivvaq.

Isolated remains of gastropod opercula (*n* = 9) were found in all units and were presumably from stomachs of butchered pinnipeds. Walrus and bearded seal eat gastropods, and the opercula are recovered from the gut contents, sometimes in the absence of shell (Johnson et al. 1966:911). Historic observations confirm that people consumed shellfish extracted from pinniped stomachs (Burch 1981:33). Three shells were also recovered but are not yet identified: a medium-sized bivalve (N13 E1, 27–31 cm bd), a fragment that appears to be a scallop (N13 E1, 42–47 cm bd), and another fragment from a barnacle (N13 E0, 0 cm). Little can be concluded about the use of invertebrates by the people of Uivvaq from this small assemblage.

The condition of the bone in the site varied, even within the same arbitrary level. Some bone appears nearly fresh; gastropod opercula, a keratinous material, came from 112–117 cm bd; and a caribou sternebra, a porous bone, also came from the lowest levels. These are evidence for excellent preservation at the site. At the same time, other bone is exfoliating badly or is so severely eroded that it was difficult to identify the element. Based on research from summer and winter houses at Cape Krusenstern, Darwent (2003) suggested that the season bones are discarded may affect their condition. Bone condition and a better understanding of their context may provide additional information about season of occupation, and from that, subsistence and other activities at Uivvaq.

Based on the analysis of the faunal sample from the N13 E0 quad, the relative proportions of seals and cervids changed little during the occupation at Uivvaq, contrary to Bockstoce's (1976) hypothesized increased reliance on caribou. The primary economically important animals at Uivvaq are small and medium seals, followed by caribou. Fox were brought back whole and skinned at the site, while bears appear to have been processed elsewhere and the hides and skulls brought back. The role of whales is more difficult to determine because meat, rather than bone, was usually transported back to settlements. The size of whale elements also create a sampling problem because the large bones may be more widely distributed and would require a large excavation to sample adequately. The skulls on the ground surface may be an indication of a more extensive assemblage of buried elements.

The interpretation of season of occupation from the animal remains is ambiguous. A walrus haul-out and an adjacent bird rookery do not seem to have contributed significantly to fauna or egg shells in the assemblage. The walrus haul-out would have been used in either the spring or fall migrations, and the bird rookery in the summer. Bird abundance is affected by climate, and if the ice melts late in the season, fish with which the birds feed their young are inaccessible and bird populations plummet (Roseneau 2000:12). Temperatures, either cooler or warmer during the MCA or the Little Ice Age, may have limited bird populations at Cape Lisburne. Ringed seal are more accessible in the winter and spring (Burch 1981), and fox furs are likely to be in better condition in the winter. Caribou were hunted in the Lisburne area during the summer until the ice formed and seal hunting became the focus of subsistence activities (Burch 1981). The highly fragmented condition of caribou limb bones indicates that the marrow was heavily used, which could occur soon after a hunt was over (Spencer [1959] 1976:270). Alternatively, the appendicular bones might be stored and used later. Beluga whales were hunted in midwinter in polynyas and near shore by May or June (Hazard 1988:200; Huntington 1996). The insect larvae identified by Elias (2003) that are associated with rotting meat could be from meat scraps left behind to thaw through the summer months. Larvae do not indicate the season of capture, however. Based on the animals present and the animals expected but not present, it appears that Mound 2 at Uivvaq was used at least during the winter into the spring. However, the site may have been used during other seasons as well. Warmer seasons would have caused the sod houses, like the one at Mound 2, to be abandoned for drier tents, and the summer fauna may be found there.

DISCUSSION AND CONCLUSIONS: CONTINUITY AND DISCONTINUITY AT UIVVAQ

Excavations at Uivvaq represent only a sample of the site deposits and are biased due to concentration at the perimeter of Mound 2. We cannot confidently state that the base of the midden was established. Therefore, any conclusions must be tempered by such limitations. Uivvaq has a Thule component, linked to the historic Iñupiaq occupants of the site; its lower component was possibly transitional between the "late" Birnirk and early Thule (cf. Jensen 2007; Morrison 2001; Stanford 1976). Both are commonly included in the Northern Maritime tradition, as defined by Collins (1964:90–101), and believed to (a) derive from the western side of the Bering Strait and St. Lawrence Island, and (b) be ancestral to historic Iñupiat, including the Tikiġaġmiut. Although this conclusion currently rests on a very limited excavation, no other archaeological cultures or traditions have been identified at Uivvaq.

By the time that the lowest level of Mound 2 was deposited, Uivvaq may have assumed the political and economic roles that it enjoyed until the decline of the Tikiġaġmiut polity in the late nineteenth century. Although absolute dates remain scarce, sites such as Jabbertown, in the Point Hope region, were occupied by Iñupiat in the wake of the Ipiutak collapse (cf. Mason 2000, 2006, 2009a, 2009b). Uivvaq represents a contemporaneous occupation. Harpoon heads (i.e., the Natchuk and Thule 2 types) and other artifacts from the base of Mound 2 resemble those from Jabbertown (Qimiarzuq) House 2, seven km east of Point Hope (Larsen and Rainey 1948:170–175; Mason and Bowers 2009), which is of comparable age, ca. AD 1100. Assuming that whales were available, the Ipiutak people were unable to or uninterested in exploiting the potential of Point Hope for whaling—as evident from the dearth of both whale bone and artifacts related to whaling. With their improved techniques and equipment (cf. Bockstoce 1976), the new Thule occupants of the region established Point Hope as a major whaling center, later moving their village from Qimiarzuq to a position near the terminus of the spit. Termed Tikiġaq, the earliest record of this settlement is inferred to fall ca. AD 1300 based on comparison to the tree-ring dated assemblages in the Kobuk River sequence (Giddings 1952; Larsen and Rainey 1948:270).

The sequence of occupation in Mound 2 and the existence of four similar mounds suggests that Uivvaq was a small Iñupiaq settlement used prior to contact in a manner similar to its use in the early nineteenth century. Both the artifacts and faunal remains recovered from the three major components suggest a pattern of year-round habitation and broad-spectrum foraging at Uivvaq prior to ca. 1870 (Burch 1981; Lowenstein 1981). This likely included a modest but consistent spring whaling effort, with heavy reliance on winter sealing, combined with hunting of caribou, bears, and foxes and exploitation of the many birds in the Cape Lisburne area.

Historical accounts reveal that by AD 1800, Uivvaq served as an important, but small, satellite community within the Tikiġaġmiut polity—possibly second only to Tikiġaq (Point Hope) itself. Although it was a very small northern outlier, possibly one-twentieth the size of Tikiġaq, the area was indeed occupied throughout the year by several families and was the staging point for a spring whale hunt, although the small size of the population at the site may have constrained whaling at certain points in its prehistory. During the warmer months (and perhaps at other times as well), visitors from other Tikiġaġmiut settlements came to Uivvaq to exploit its abundance of marine and terrestrial resources (Burch 1981; Lowenstein 1981).

The Uivvaq investigations provide a window into several macroscale processes across Northwest Alaska during the last millennium. These include the Birnirk–Thule transition, the development of the whaling economy, the pan-arctic spread of Thule, and the impact of Little Ice Age climates. Unfortunately, the Uivvaq data from 2000 and 2002 do not extend into Ipiutak deposits. For the Thule sequence, the preliminary results from Uivvaq Mound 2 indicate economic trends broadly similar to that at Walakpa (Stanford 1976:111–114), which is not surprising given the two sites' contemporaneity. The lengthy and uninterrupted stratigraphic succession at both sites suggests a stable society and economy, despite climate fluctuations that must have affected principal resources. Further, both Walakpa and Uivvaq were comparatively minor satellite communities distant from their respective polity centers at Utqiagvik and Tikiġaq. The most important change occurred after the onset of Little Ice Age climates, ca. 1400, with increased fishing and dog traction, which had considerable effect on Thule settlement and economy farther east (e.g., Maxwell 1985; McGhee 1969/70, 2000). However, no fundamental changes are evident in either artifact assemblages or faunal remains from the upper component at Uivvaq or the Late Thule levels at Walakpa (Stanford 1976:92–95).

The Uivvaq midden was younger than anticipated—its depth reflects rapidly accumulating storm deposits and numerous occupations. Insect remains were hypothesized to be the best means for high-precision dating; however, the results were ambiguous. The insect ages were no better, and possibly worse, than those of other materials. In contrast to the other assays, the radiocarbon assays on insect chitin suggested that, despite the well-stratified sequence, postdepositional admixture of materials occurred, very likely due to house cleaning. Major anthropogenic disturbance is evident in the uppermost levels and is apparently due to pit excavation and construction activity. These observations underscore the need for an improved understanding of formation processes in arctic coastal middens.

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NOTES

1. In response to the outsider perception of a deteriorating social situation at Tikiġaq, an Episcopal missionary, Dr. John B. Driggs, was dispatched to Point Hope in 1890 (Driggs 1905; Lowenstein 2009; VanStone 1962:24ff). Suffering a psychological breakdown (Lowenstein 2009:217ff, 299ff), Driggs was relieved of his post in 1908 and retired to Uivvaq, constructing a small wood frame house. Rev. Driggs died in 1914 and was buried on the slope behind the village, where at least a dozen unmarked graves are also located (i.e., *Iglak* cemetery).
2. The 2000 Uivvaq materials are curated at the Iñupiat Heritage Center, Barrow; 2002 materials are curated at the University of Alaska Museum of the North, Fairbanks.
3. Fauna from the following units were analyzed: From 2000 excavations: Units N8 E0, N10 E0, N13 E0, N14 E15, N38 E20, N39 E20, S20 E59, S19 E59, S7 E60, S65 E70. From 2002 excavations: Units N10 E1, N13 E1, N15 E1, N15 W1, N16 E1, N16 W1, N0 E37. The faunal analysis is incomplete. Collections used for identification were the Alaska Consortium of Zooarchaeology and the Department of Anthropology faunal collections housed at the University of Alaska Anchorage and comparative pinnipeds, Dall sheep, and bear skeletons from the University of Alaska Museum of the North, Fairbanks.

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RESEARCH NOTES

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Research Notes (RN) is intended to be a useful venue for making colleagues aware of ongoing or recent research and for disseminating brief notes of new ^{14}C dates or other interesting finds, particularly those that may not be otherwise published. We intend to include information on research anywhere in the circumpolar Arctic and sub-Arctic.

Alaska anthropology has tended to be a bit insular. Many people are trained in Alaska and remain in the state to work. Perhaps as a result, relevant research from elsewhere in the circumpolar Arctic and sub-Arctic is often not considered by Alaska researchers. Even worse, much of the interesting and highly relevant work being done in Alaska is ignored by researchers working outside the state. We hope that *AJA* RN will foster connections between Alaska researchers and those working elsewhere on similar problems. In particular, many of the European contributors to this column are eager to learn about similar projects and to make connections that could lead to possible collaborations.

NORTHERN ALASKA

ANCIENT DNA IDENTIFICATION OF A POLAR BEAR BONE DAGGER FROM CAPE ESPENBERG, ALASKA

Submitted by Sarah K. Brown, Department of Anthropology and Veterinary Genetics Laboratory, University of California Davis

T. Max Friesen, University of Toronto

Owen K. Mason, GeoArch Alaska

Christyann M. Darwent, University of California Davis

Cape Espenberg lies on the southwestern margin of Kotzebue Sound, Alaska, and is part of Bering Land Bridge National Park and Preserve. The crew of the Cape Espenberg Project, a multidisciplinary research project directed by John Hoffecker and Owen Mason (NSF ARC-0755725), undertook excavation of six house features at three Thule-period sites (KTZ-087, KTZ-088, KTZ-304) between 2009 and 2011. A bone dagger (Fig. 1; BELA-00115-36727) was found by Patrick Barr of Deering at KTZ-087, Feature 87, in 2011. It was recovered from the midden area two meters in front of the Thule house structure in Unit 15S, 2E, Level 2C (82 cm N, 41 cm E, 149 cm bd), at a depth of approximately 50 cm below the surface vegetation. The house dates to approximately 1280–1420 cal AD, based on six AMS radiocarbon assays, five of which were on caribou bone, the sixth on charcoal. The artifact was initially identified as having been produced from the long-bone shaft of a large, terrestrial mammal.

The bone artifact yielded DNA, following extraction as per Brown (2013) in the Ancient DNA lab in Veterinary Genetics at the University of California, Davis. A 363 base pair sequence was entered into the searchable DNA database, BLAST (NCBI), and the first twenty-seven out of 100 sequences returned with 100% identification as the *Ursus maritimus* control region. Our sequence was aligned to polar bear sequences from Edwards et al. (2011) (Genbank accession numbers JF900105.1–JF900157.1). BELA-00115-36727 has a novel haplotype (Genbank # KC794784), two mutations away from a haplotype shared by the following localities: Alaska, Zhokov Island (Siberia), Herschel Island (Yukon Territory), and a voucher specimen from the St. Petersburg Museum (Genbank accession numbers JF900110.1, JF900111.1, JF900114.1, JF900141.1, JF900152.1, JF900157.1).

The identification of polar bear bone as the material used for this dagger is significant in terms of both methodology and the reconstruction of long-term patterns of

Figure 1. Bone dagger recovered from midden area in front of house Feature 87 (KTZ-087) at Cape Espenberg, Alaska. Top: inner bone surface; bottom: outer surface. Photo by Jeremy Foin.

Iñupiaq social organization. Bone artifacts such as this one, which are shaped by grooving, grinding, and polishing, are often modified to an extent that the species of origin cannot be reconstructed based on morphology alone. While the dagger was clearly made on the long bone of a large terrestrial mammal, it could have originated from a range of species, including muskox, moose, or grizzly bear. Thus, in a case such as this one, only ancient DNA can provide definite identification.

The fact that the dagger is made of polar bear bone links it directly in function and symbolic association with a remarkable artifact category seen in the ethnographic record. Both Murdoch (1892:191) and Stefansson (1919:187) refer to daggers made of polar bear bone as the chief weapon used for fighting (as opposed to manufacturing, butchery, etc.) in the Barrow region. According to Murdoch (1892:191) "the commonest weapon of offense was a broad dagger made of a bone of the polar bear. . . . the use of bears' bones for these weapons points to some superstitious idea, perhaps having reference to the ferocity of the animal."

Similar daggers have been recovered from a number of archaeological sites in Northwest Alaska and in the Mackenzie Delta region, dating to at least as early as AD 1400 on the Kobuk River (Giddings 1952:92). However, in most cases the species of origin of the dagger could not be determined with certainty. This present identification not only extends this singular artifact category back in time but also reinforces the long-term symbolic association between interpersonal conflict and polar bears, providing a window onto the dynamic social relations of this critical period in Arctic culture history.

The Cape Espenberg Project was funded by an NSF grant (ARC-0755725) awarded to John Hoffecker and Owen Mason. Ancient DNA analysis was supported by an NSF grant (ARC-0330981) awarded to Christyann Darwent and Ben Sacks.

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NUVUK ARCHAEOLOGICAL PROJECT, 2011

Submitted by Anne M. Jensen, UIC Science, LLC

The Nuvuk Archaeological Project completed the seventh large-scale field season in July 2011 at Point Barrow. The crew was composed largely of North Slope high school students. We excavated six graves, for a total of eighty-six excavated graves from Nuvuk.

An Ipiutak structure with what appears to have been a central box hearth was discovered during the 2011 season. Additional funding was secured to complete emergency salvage prior to the fall storms. The Ipiutak structure from 2011 contained quite a bit of fish bone on the floor. This has been recovered (the entire floor was sifted and floated in the lab). The history of fishing in nearby Elson Lagoon is a current research topic for local fisheries biologists, and we are partnering to identify the fish. We will be preparing a proposal to do aDNA on many of the fish remains, as they are fragmented enough that species-level identification by means of morphology alone will prove difficult.

Work included ground penetrating radar (GPR) surveys carried out by a team from Radford University led by Dr. Rhett Herman, which indicated that this technology works well in the gravel matrix at Nuvuk. We recovered one extremely deep burial at the exact depth calculated from the GPR data. There are several clear returns at the exact depth that the two Ipiutak features have been recovered, located along the line along which the beach was trending in AD 300–400.

Thirteen students worked in the laboratory during the 2011–2012 school year and summer 2012. We hosted twelve Ilisaġvik STEM camp participants for a day of activities, including mock excavation, shovel tests on the beach and working in the laboratory. We also hosted elementary students after school and from the City of Barrow recreation program through the Barrow Arctic Science Consortium outreach program.

YUKON RIVER

ARCTIC DOMUS: HUMAN-ANIMAL RELATIONS IN THE NORTH

Submitted by Jan Peter Laurens Loovers and Gro Ween, Department of Anthropology, University of Aberdeen

Arctic Domus is a five-year international European Research Council project hosted by the Department of Anthropology at the University of Aberdeen. The project leader is David G. Anderson; his team consists of members from the University of Aberdeen, University of Tromsø (Norway), Universities of Saskatchewan and Alberta (Canada), the University of Irkutsk, and the Kunstkamera in St. Petersburg (Russian Federation). The project interrogates the particular relations that exist between humans and animals in the Arctic, in North America (subarctic Canada and Alaska), Fenno-Scandinavia, and Siberia. The study focuses non-exclusively on fish, dogs, and reindeer. The objectives of the project are: (1) to place arctic field examples at the forefront of debates on animal domestication, human-animal co-evolution, and commensualism; (2) to build a new model of human-animal relationships by establishing new discourses and opening understandings on how these relations change, advance, and retreat; and (3) to critically apply several analytical techniques to a range of sites, including ethnography, the history of science, environmental archaeology, osteology, and animal genetics.

The North American group aims to map the Yukon River, concentrating on several sites both upstream and downstream such as the Yukon delta, the Porcupine River, and overland connections with the Mackenzie Delta and Peel River systems. The upstream sites include Old Crow, Dawson City, Whitehorse, Fort McPherson, and Tsiigehtchic; downstream locations include St. Marys, Emmonak, and Pilot Station. The Yukon was chosen in order to (1) compare understandings of salmon and other fish at different locations from the perspectives of different knowledge communities; (2) observe the historical circulation of salmon through various networks, such as in gifting, trading, national and international politics; and (3) study changes in interspecies relations in different historical and economic periods.

Ethnographic work in Alaska will focus on the past and present knowledge communities that the river and the salmon connect; that is, Yup'ik fishermen, other communities upstream or downstream, and more recently, fishery biologists and natural resource managers. The study will focus on interfaces between each of these communities but also on particular aspects of each knowledge set, such as interspecies relations and morality in human-salmon relations.

The ethnographic work in the Yukon and Northwest Territory sites examines: (1) the changes in fishing and fishing technologies through an ethnohistorical approach to analyze past and present trade and economics; (2) the history and changes in dog use, including changes in fishing and hunting for dogs; (3) the connections of trails and relations between Gwich'in in Alaska, Yukon, and the Mackenzie Delta and between Gwich'in and neighboring communities; and (4) interspecies relations and morality. Work will be primarily with Gwich'in, in collaboration with the Gwich'in Social and Cultural Institute and the Vuntut Gwitchin Heritage Commission, but will extend to some work with fish and wildlife biologists and natural resource managers.

CENTRAL ALASKA

ARCHAEOLOGICAL INVESTIGATIONS IN THE MOLYBDENUM RIDGE AREA, TANANA VALLEY

Submitted by Julie Esdale and Kate Yeske, Colorado State University, Center for the Environmental Management of Military Lands

Archaeological survey and site testing in the Molybdenum Ridge area in the northern foothills of the Alaska Range took place during the summer field seasons of 2011 and 2012. Molybdenum Ridge is located between the Little Delta River and Delta Creek, south of the Tanana River. Past surveys by Charles Holmes and Northern Land Use Research near the East Fork of the Little Delta River uncovered small surface lithic scatters and sites with large subsurface concentrations, including formal tools (Higgs et al. 1999; Holmes 1979). Surveys during 2011 and 2012 revealed 22 new prehistoric sites.

The archaeological sites are mainly small surface and subsurface lithic scatters. Sites range in location from knolls on high plateaus up to 1,500 m above sea level to glacial moraines and creek terraces. One site, XMH-01438, consists of over 350 lithic artifacts on the surface and shallowly buried over a 1,000 m^2 area. Raw materials from this site are dominated by a variety of cherts (94%) and local rhyolite (6%). The tools collected include a triangular projectile point, a bifacial projectile point fragment, five projectile point preforms, eighteen biface blanks, one scraper, and several retouched flakes. A notched projectile point was found in a test pit at high elevation at XMH-01444. No other diagnostic tools or charcoal samples were uncovered during limited evaluations of these twenty-two new sites.

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SURVEY AND TESTING IN THE BLAIR LAKES ARCHAEOLOGICAL DISTRICT

Submitted by Julie Esdale and Kate Yeske, Colorado State University, Center for the Environmental Management of Military Lands

Archaeological survey and site testing is planned for the region encompassing the Blair Lakes Archaeological District in the Tanana Flats for the summer of 2013. This area began attracting attention from the archaeological community after 2009 and 2010 surveys by Edmund Gaines and others (Gaines et al. 2011) uncovered sites in deeply buried, stratified deposits dating to the late Pleistocene. Before 2009, fourteen sites were known from the area, the majority of which were discovered by James Dixon and others (Dixon et al. 1980) during a 1979 survey of the area. The Blair Lakes Archaeological District (FAI-00335) currently encompasses six sites located on the north shore of Blair Lakes South that contained sufficient data to make them eligible for the National Register of Historic Places (Dixon et al. 1980).

Forty-eight additional sites were located in 2009 and 2010 (Esdale et al. 2012; Gaines et al. 2010). These sites were found north and east of the lake along an ancient alluvial terrace edge. Two sites in particular, FAI-02043 and FAI-02077, have deeply buried lithic material and associated charcoal dates of 11,600 ± 50 (FAI-02043) and 10,130 ± 50 (FAI-02077) RCYBP (Gaines et al. 2011). Faunal material from bison, goose, and hare were also recovered from the lowest component of FAI-02043.

The Colorado State University and the U.S. Army are partnering with archaeologists and graduate students at Texas A&M University to conduct a field school at Blair Lakes during the 2013 field season. Continued survey and testing for stratified archaeological sites in the ridges and terraces adjacent to the lakes will also take place. We plan to investigate several of the sites in the region to determine their eligibility for the National Register and inclusion in the Blair Lakes Archaeological District.

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KODIAK

RECENT EXCAVATION IN WOMENS BAY

Submitted by Patrick Saltonstall and Amy Steffian, Alutiiq Museum & Archaeological Repository

Alutiiq Museum archaeologists have been studying prehistoric sites in Womens Bay for sixteen years. This broad inlet, overlooking the city of Kodiak, provides access to all of the resources Kodiak foragers typically harvest in a year. Moreover, the bay has a wealth of archaeological sites spanning Kodiak prehistory. As such, it offers opportunities to investigate a variety of sites and the changing patterns of land use they represent.

In recent years, excavations led by museum curator Patrick Saltonstall focused on sites at the head of the bay, adjacent to quiet inner waters and a salmon stream. Inner bays typically hold small deposits and have not been a focus of research. Archaeologists often interpret these locales as areas for anadromous fishing and waterfowl hunting. In reality, the archaeological record is more complex. Here, a variety of sites represent a broad range of activities and settlement intensities. The most unique finds come from the Amak site (KOD-1053), investigated from 2011 to 2012.

Today the Amak site lies roughly a mile from the active beach. When occupied, it rested beside a riverine lagoon, behind the beach. The site has three components dating between 3800 and 7100 BP, with the most intensive

Figure 2: Ground slate points and flensing knives from the 2011 Amak excavation.

occupation during the Ocean Bay II tradition. The site's artifact assemblage is focused, heavily dominated by ground slate lances and also containing whetstones, scoria shaft abraders, flensing knives, and *pièces esquillées*; tools associated with sea mammal hunting, tool refurbishment, and butchery.

The central feature appears to be a meat-processing structure dating to 4830 ± 30 BP (uncalibrated conventional). This oval depression measured five meters across, with numerous small pit hearths and a dense fill of fire-cracked rock, burned sod, and charcoal-stained soil. The structure was open along the front with a sod wall over 50 cm high along the back. Fire-cracked rock and hearth material were dumped in front of the feature—an area where most of the slate lances were also found. Together, the site's artifacts and features suggest a small, revisited hunting camp, where foragers harvested and processed harbor seals. This is the first view from such a site in the Kodiak region and broadens understanding of the activities that took place in sheltered inner bays 5,000 years ago.

YUKON TERRITORY, CANADA

PLANNED WORK IN THE DAWSON AND MAYO MINING DISTRICTS

Submitted by Greg Hare, Cultural Services Branch, Yukon Government

One of the largest archaeology projects ever conducted in the Yukon will be carried out over the next two years. The Yukon Government, in cooperation with Tr'ondëk Hwëch'in and Na-Cho Nyäk Dun First Nations, initiated the project at the end of 2012 with funding from the Canadian Northern Economic Development Agency. The $480,000 project will consist of the development and testing of a GIS-based predictive model for the Dawson and Mayo mining districts of the Yukon, both areas that have experienced large increases in placer gold mining in recent years. These areas are relatively remote with very little baseline archaeological data. The work will be carried out by Matrix Research Ltd. of Whitehorse, led by Ty Heffner.

NORTHERN EUROPE

Submitted by Svetlana Usenyuk, Aalto University School of Art, Design, and Architecture (Aalto ARTS), Helsinki, Finland

The research project Arctic Technologies of Adaptation and Survival: Traditions and Innovations (ATAS) opens a new transdisciplinary track in the study of arctic technology by exploring forms of indigenous adaptation to local conditions, using local materials and locally developed skills that lead to particular modes of mobility. This kind of comprehensive approach coupled with design has not been used before to address diverse technological, environmental, social, and cultural challenges related to the sustainable development of the Arctic. By applying an indigenous vision of mobility to the transportation sector, the intent is to come up with innovative road construction plans, mobile shelters, and energy-efficient vehicles.

The Arctic is home to a mosaic community of newcomers, now the most numerous subpopulation of the North. The spontaneous and uncontrolled movements of humans between opposite climatic zones inevitably leads to physical, psychological, environmental, and cultural conflicts. To minimize such conflicts, we have to use the best available knowledge, i.e., the knowledge gained by indigenous nomads while struggling with severe conditions on a daily basis. Thus, the broad question of "how to survive" becomes the more concrete question of "how to move."

"Movement is not simply something imposed on humans by the movement of animals, it emerges as the foundation of nomadic aesthetics," Piers Vitebsky (2011) discovered during his long-term study of reindeer herders. Human and animal migrations constitute the very essence of adaptation to extreme environments and bring a specific quality to people's lives, involving regular resettlement of whole families with all of their belongings, their entire culture: everything is directly or indirectly related to continual movement.

The Arctic Technologies project explores the phenomenon of the nomadic "art of movement" in its different forms: from physical locomotion and mobility, facilitated by machines, to "mind-walking" (Ingold 2008). Arguing that every object in the indigenous world of "necessity and sufficiency" is an impetus for movement, the research aims to answer what types of movement are suitable or essential in the extreme environment of the Arctic at present and in the future and, from a designer's point of view, how to create tangible "provocations" to a particular type of movement. For further information, contact Dr. Usenyuk at svetlana.usenyuk@gmail.com.

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RUSSIA

LIVES ON THE MOVE: MOBILE LABOR IN THE RUSSIAN ARCTIC PETROLEUM INDUSTRY

Submitted by Gertrude Eilmsteiner-Saxinger, Institute for Urban and Regional Research (ISR) at the Austrian Academy of Sciences (ÖAW), Vienna, and Austrian Polar Research Institute

While the population of the Russian North is shrinking in size, the activities of the extractive industries are continuing to grow. The demand for highly qualified staff is great, but cannot be fully met by those living in monoindustrial towns in the arctic and subarctic regions. Therefore, long-distance commuting or so called fly-in/fly-out (FIFO) operations are employed to bring an additional workforce from all over Russia on a rotational shift basis into the Russian North; specifically, to the work sites in the tundra or taiga and to monoindustrial cities there.

The research project Lives on the Move (2010–2015), financed by the Austrian Science Fund (FWF; P 22066-G17), explores how these workers organize their itinerant lifestyle, which consists of spending one month at home in the temperate regions and from one to three months in the North (G. Eilmsteiner-Saxinger). It examines the changes in the social fabric in the "sending regions" (such as the Republic of Bashkortostan) that have come about due to the regular periodic absence of primarily male workers (E. Öfner). In addition, it traces the ways in which northern towns such as Vorkuta (E. Nuykina) and Novy Urengoy (G. Eilmsteiner-Saxinger) see their future as distribution hubs for this itinerant workforce and as socially and economically viable towns. Furthermore, the project looks at the interaction of the local populations with the influx of mobile commuters.

The team explores the impact of the way neoliberal approaches in human resource management function in the circumstances of a weak state in terms of control of working conditions and enforcement of labor laws and limited action against corruption. These impacts relate to people's well-being as well as to their motivation to continue or to take up a life on the move. This is an interdisciplinary research project drawing on geography, anthropology, and political science and employing ethnographic methodology. For further information, contact Gertrude Eilmsteiner-Saxinger at gertrude.eilmsteiner-saxinger@univie.ac.at.

REVIEW

CARIBOU HERDS OF NORTHWEST ALASKA, 1850–2000

Ernest S. Burch, Jr., edited by Igor Krupnik and Jim Dau, 2012. University of Alaska Press, Fairbanks; 203 pages, photos, maps, tables, appendices, index. ISBN: 978-1-60223-178-8, $45.00 (cloth); ISBN 978-1-60223-179-5, $29.95 (paper).

Reviewed by Dale C. Slaughter
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This small but important work was unfinished at the time of Ernest S. Burch's death in 2010. It might have languished indefinitely except for the determined efforts of a small group of Burch's colleagues and friends who assumed the task of publishing the manuscript. We should thank them for bringing the volume to fruition. The book contains seven chapters, two postscripts, and five appendices. The first five chapters and the appendices are in Burch's hand. The final two chapters, unfinished by Burch, are synopses gleaned from his notes by the editors, Igor Krupnik and Jim Dau.

Chapter 1 describes the geographic and methodological parameters of the book. The study area includes the Alaska mainland north of the Yukon River and adjacent portions of Canada; the study period is 1850–2000. Burch formulated two hypotheses: (1) the same four caribou herds present today were present throughout the period of study; (2) wolf predation was the primary factor limiting caribou numbers. In response to the first hypothesis, Burch developed models of annual caribou movements based on modern biological research and tested them against data obtained from historical records and Native historians. The second hypothesis was similarly tested. Burch, a master at working with Native historians, acknowledges that many view Native observations as anecdotal and thus unreliable. To those critics, he replies that if Native observations were empirically unsound Native societies would have perished millennia ago.

Chapters 2 (Caribou versus Reindeer) and 3 (Predators) are essentially primers intended for those lacking northern expertise. Although reindeer and caribou are the same species (*Rangifer tarandus*), there are critical differences between the two. Reindeer are part of the discussion because their introduction profoundly influenced the fate of caribou and thus the path of Burch's story. Chapter 3 discusses caribou predation, focusing primarily on humans, wolves, and brown bears, but other predators are discussed as well. For example, sled dogs, which Natives preferred over reindeer as draft animals, were serious reindeer predators.

Chapters 4 and 5 summarize the history of caribou during the "traditional period," which Burch defines as the period immediately prior to about 1850. Chapter 4 discusses the Western District, which extends from Harrison Bay to the Chukchi Sea and southwest to the Yukon River delta, an area coinciding with the contemporary range of the Western Arctic caribou herd. Burch's data suggest that the southern portion of the district was occupied by at least one and possibly as many as three herds in addition to the Western Arctic herd. Caribou numbers fell precipitously during the latter half of the nineteenth century, and the additional herds ceased to exist by 1900. Only the Western Arctic herd remained, albeit in greatly reduced numbers. Similarly, the caribou population of the district's northern section crashed in the 1880s. Severe famine was felt first at Kivalina but soon spread throughout the area, leading to starvation and human relocation.

Chapter 5 discusses the Northern District that comprises the remainder of the study area and is currently occupied by three contemporary herds (Teshekpuk Lake, Central Arctic, and Porcupine River) cumulatively containing about 200,000 individuals. Unfortunately Burch was unable to obtain oral history data for this region. West of the Colville River mouth, caribou appear to have been relatively abundant until the late nineteenth century. Charles Brower, a long-time resident of the region, claimed there were more caribou in the area in the winter of 1897–1898 than he had ever seen before, but they were virtually absent there afterward. East of the Colville River, early reports suggest caribou were abundant until about mid-century when there was a sharp population decline. The population had rebounded by the time commercial whalers began overwintering at Herschel Island in 1890, however. The overwintering whalers depended heavily on caribou, largely supplied by Native hunters, for meat. Although it is not possible to plot the decline of caribou during this period, it is clear that by 1908 caribou were practically absent from all of northern Alaska. Burch vigorously argues that the decline was largely caused by overhunting.

Chapter 6 addresses the introduction of reindeer to Alaska. Unfortunately, only a single page of this chapter was written before Burch's death. The editors wisely, I think, chose to present a synopsis of the chapter based on Burch's notes rather than to complete it on the author's behalf. From the introduction of about 1,300 reindeer during the decade following 1892, the herd grew to 600,000 by 1930, slightly more than half of which occupied the study area. Unfortunately, Burch didn't live to fully present the fascinating relationship between reindeer, wolves, and caribou. That relationship can be briefly summarized as follows: wolves selectively preyed on reindeer because they are more easily captured than caribou; reindeer have the proclivity to join caribou herds; reduced wolf predation allowed caribou numbers to increase, thus providing more opportunities for reindeer defection. The net result of this was that reindeer numbers declined precipitously while caribou numbers slowly increased.

Chapter 7, presented as a synopsis, summarizes the volume and presents conclusions. Burch maintains that the primary cause of the caribou population crash was human overhunting. Only two of the historic caribou herds survived, the Western Arctic and Porcupine River herds, and these gradually expanded to occupy the ranges of the nineteenth- and early twentieth-century herds. The principal cause of caribou population increase was the shift of wolf predation from caribou to reindeer.

The idea that overhunting was the primary cause of the caribou population crash has been disputed for years and warrants critical examination, although spatial constraints preclude all but the briefest scrutiny here. In the discussion of the Northern District (Chapter 5), Burch accepts Bockstoce's careful argument that whalers overwintering on Herschel Island between 1890 and 1908 bartered for 12,308 caribou carcasses. Burch contends that this figure is accurate but fails to reflect the overall caribou kill because it overlooks the Native consumption of caribou. Although not discussed by Burch, Bockstoce (1986:275) indicates that whalers consumed only slightly more than one percent of the herd annually. Even if whalers and Natives were present in the region in equal numbers, which seems unlikely, the consumption of caribou would have been no more than three percent of the herd per annum. It is difficult to see how a harvest of this size could almost completely destroy the herd(s) in nine years.

Similarly, Burch quotes Charles Brower regarding the large number of caribou present in the Barrow area during the winter of 1897–1898 and an estimate that 1,200 caribou were required that winter to sustain the whalers stranded there. Brower also commented that the following year there were no caribou in the area. It is simply inconceivable that harvesting 1,200 caribou beyond the requirements of local residents would exterminate the herd. Clearly, heavy hunting pressure reduces animal populations. It is equally clear, however, that other factors must have been responsible for the sudden and catastrophic decline in caribou numbers and that one of these factors, or perhaps several in concert, were far more destructive than overhunting alone.

In conclusion, this is an excellent volume. I have focused on parts of the text of interest to anthropologists, but there is a great deal here for biologists as well. The volume is meticulously researched, thoroughly documented, and well thought out. It is . . . well, classic Burch.

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REVIEW

VEKHI NA MYSAKH [LANDMARKS ON CAPES]: PAPERS IN HONOR OF SERGEI ARUTYUNOV ON HIS EIGHTIETH BIRTHDAY

Edited by Mikhail Bronshtein and Igor Krupnik, 2012. Moscow State Museum of Oriental Art. Paper, 180 pages, photographs, drawings. ISBN 978-5-903417-33-9; approx. $40.

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Editors Mikhail Bronshtein and Igor Krupnik present this volume in recognition of Sergei Arutyunov's efforts to advance the study of arctic societies. The volume focuses almost exclusively on Chukotka but also features a broad view of the peopling of the Arctic in the context of world civilizations and trade (Plumet, pp. 114–119). It includes contributions by thirteen authors and drawings by two artists. Among other visual materials are depictions of museum objects, images pertaining to the themes of individual articles, and photographs of Arutyunov at different stages in his career. The book is in Russian, with a volume overview and brief descriptions of most chapters in English, offered at the end (pp. 178–179). The main contents feature archaeological investigations (Bronshtein and Dneprovsky; Dneprovsky and Lopatin; Lopatin; Mikhailova), analyses of museum objects (Sukhorukova), description of a Yupik language archive (Vakhtin), and several detailed ethnohistorical reconstructions (Chlenov and Krupnik; Nefyodkin; Weinstein-Tagrina). The cover photograph shows a prehistoric maritime residence in the process of being excavated. Evoking fairytale imagery, the back cover simulates the feel of Soviet-era children's books, set in Chukotka.

Presented in a less-expected format are two contributions by Charles Weinstein: excerpts from his diary chronicling experiences in Chukotka from 1993–1999 (pp. 130–141) and the Chukchi-Russian-French-English dictionary of the Chukchi lexicon pertaining to cosmology and shamanism. A number of Weinstein's diary entries mourn the decline of indigenous language use, while the appended vocabulary manifests the semantic and cultural richness of what is being lost. Some terms are followed by an expression or a sentence in Chukchi, further elucidating their cultural context. The introductory narrative explains that the material is actually a small part of the thematic dictionary (yet to be published in its entirety), in which Weinstein organizes the linguistic and interpretive material he has assembled into a total of thirty-seven themes, each illuminating a particular domain of Chukchi indigenous knowledge as expressed through language.

On a similar topic in Chukchi spirituality, but focusing in depth on its specific expression, is the article by Zoya Weinstein-Tagrina, which takes on the challenge of reconstructing the tradition of shamanic family singing. Weinstein-Tagrina chooses the type of celebration called Mn'egyrgyn, a thanksgiving to and for the animals that are central to Chukchi livelihood, as an example of a cultural milieu where the shamanic family singing is performed. The author synthesizes Bogoras's documentation of the Chukchi ceremonial celebrations with her own analyses of rhythmic structure, content, sound qualities, and the performance context of select songs. She succeeds in simulating an immersion experience for the reader.

The reconstruction of Mn'egyrgyn and Weinstein's shamanic vocabulary could assist in developing teaching materials for secondary and higher education curricula in Chukchi studies. Due to a lack of access to newer instructional aids, Native language teachers in Chukotka are constrained by the use of Soviet-era books, which are deprived of such content. If properly adapted for local educational needs, the work of Weinstein-Tagrina and Weinstein could help connect such contemporary aesthetic expressions as indigenous dances to the worldview that forms their ancestral foundation. Similarly, the description of "lullaby" singing to polar bears unveils the sentience ascribed to bears and speaks to the kind of human-animal relationship that is being disrupted by the denial of polar bear quotas for Chukotka hunters.

Vakhtin's review of material collected by Ekaterina Rubtsova on Yupik language and lore may serve a similar educational purpose. The article describes Yupik texts, currently being prepared for publication, according to the author (p. 94), assembled into a nearly five-hundred-page reference. Vakhtin comments on the linguistic geography of the Chukotka Yupik (usually called "Asian/Asiatic Yupik" in Russian literature and "Siberian Yupik" in most English language sources). He lauds the progressive and "brave" (p. 92) foresight of Rubtsova to have documented regional diversity in Yupik speech. Interwoven with the archive review is a very moving and admiring portrait of Rubtsova, one the first Soviet teachers in Chukotka and a dedicated scholar of Yupik language and storytelling. Vakhtin is critical of the tendency to overlook the seminal contributions of ethnolinguists like Rubstsova to ethnographic studies (and vice versa).

Scholars of archaeology may benefit from the methodological insight provided by Dneprovsky and Lopatin's overview of best practices in excavating permafrost-embedded semisubterranean dwellings, such as modifying the quadrant method and implementing conservation steps between excavation seasons. In a separate chapter, Lopatin analyzes the pottery from the Ekven and Paipelghak sites, establishing a typology based on five criteria—shape, slab mold, texturing, edge thickness, and molding technique. In part through the lens of his own experimentation with locally harvested clay, Lopatin comments on the relative homogeny of prehistoric pottery on the peninsula, in contrast to claims of diversity in shape and technique made by previous authors.

Chlenov and Krupnik provide an account of the last voluntary Soviet-era Yupik migration. The experience of the Ungazmiut, the Chaplino Yupiget, migration to the shores of Kresta Bay and Gulf of Anadyr illuminates the centrality of cohesive hunting crews in the social system of arctic maritime societies. Another ethnohistorical reconstruction in the volume is Nefyodkin's article on Chukchi maritime warfare of the mid-seventeenth to mid-nineteenth centuries, which offers a condensed version of the author's book on this subject.

The two names appended to the volume contributor list (pp. 176–177) are those of the artists Sergei Bogoslovsky and Nina Survillo. Numerous drawings of Old Bering Sea artifacts are incorporated as visual aids in Sukhorukova's article, which analyzes the transition from object ornamentation to a stylized visualization of narrative composition between the early and later periods of the Old Bering Sea (pp. 42–51). We deduce from the specialization mentioned in Survillo's bio-sketch that these illustrations should be credited to her. The featured field drawings by Bogoslovsky were created over the course of his expeditions to Chukotka between 1980 and 1988. Choosing to emphasize what he perceived as the significant features of each place, the artist sheds many details of the physical environment while retaining recognizable likenesses of each location. The artist's hand elevates the atmosphere of the drawing's content, triggering a different feeling in the viewer than would a photographic depiction. Readers would benefit from a professional critique of this impressive body of work. However, the drawings are marginalized by their presentation at the beginning of each chapter—seemingly at random and unconnected with the chapter contents. They function decoratively, merely as part of the layout.

We save our concluding remarks for the volume's lead article: "Sergei Arutyunov: A Scholarly Portrait in the Setting of Eskimology," by Bronshtein and Krupnik. Written affectionately by close colleagues, this reverent account of Arutyunov's career "landmarks" takes the reader to the most significant "capes" of Chukotka's cultural legacy. Arutyunov first came to Chukotka when he was 26, to work on an Ekven excavation with his graduate advisor Maksim Levin. The "commute" entailed a train trip across country, a steamship voyage from Vladivostok to Provideniya, and passage by whaleboat along the coast of the Chukotka Peninsula. Members of this 1958 expedition had the good fortune to visit Chaplino and Naukan in the final year before these communities were subjected to forced closure and relocation. The trip laid the groundwork for over sixty contributions to arctic scholarship, noted in the bibliographic compilation of Arutyunov's select works (pp. 172–175). "Everyone has their own Arutyunov," say Bronshtein and Krupnik (p. 9). "Goosyaba," "Goosiaplik," and "Little Goosyik" (lit. "little gosling") are among the nicknames mentioned in the book (pp. 71, 72). Still thinking of him as "Sergei Aleksanrovich," we join the volume contributors in sending best wishes to Professor Arutyunov on his eightieth birthday.

REVIEW

HAA LEELK'W HÁS AANÍ SAAX'Ú / OUR GRANDPARENTS' NAMES ON THE LAND

Edited by Thomas F. Thornton. 2012. Sealaska Heritage Institute, Juneau, and University of Washington Press, Seattle. Paper, 254 pages, photos, maps, tables. ISBN: 978-0-295-98858-0, $30.00; ISBN: 978-0-295-99217-4 (hardcover), $60.00.

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Haa Léelk'w Hás Aaní Saax'ú / Our Grandparents' Names on the Land, edited by Thomas Thornton, is an encyclopedic resource that focuses on Tlingit knowledge of place as maintained in place names. This is the most detailed documentation of Tlingit place names available, and it will attract readers who are interested in Tlingit traditions of place or the cultural history of Southeast Alaska. Thornton makes excellent use of earlier sources on Tlingit place names, while also updating earlier spellings to the contemporary standard of the Naish/Story orthography (1963; Story and Naish 1973). In his introduction, Thornton provides an overview of the sounds of Tlingit and common components of Tlingit place names, as well as the range of semantic referents found in the names. In his introduction and throughout the work, he shows how place and culture are intertwined in Tlingit place names and associated oral traditions. Each section also has black and white photos showing Tlingit elders, community members, ceremonial objects relating to place traditions, including poles, blankets, and house panels, as well as pictures of significant geographic features.

The volume organizes Tlingit place names in broad regions associated with the main Tlingit settlements, proceeding from Yakutat territory in the north to the Hydaburg region in the south. It was nice to see even place names from Tlingit regions in the Yukon, such as Deisleen (Teslin) and Taagish Áayi (Tagish Lake) included. In each section, Thornton provides an overview that includes some of the main physiographic features, archaeological data, and the cultural history of the region. He also identifies the Tlingit elders, community members, researchers, and non-Tlingit scholars who assisted him with various aspects of his studies and who are the main sources of the place names that he documents.

Each section includes engaging discussion of particularly significant locations that were discussed with the elders in detail, as well as tables documenting the place names, English translations, and locations of these features for the entire region. Some sections also include translations of recorded Tlingit narratives concerning place, which are especially interesting for the detailed information they provide, often from elders who have since passed on. Given the endangered status of Tlingit, the Tlingit text of these narratives would be interesting as well, but providing the Tlingit versions may have been beyond the scope of this project or not in keeping with the intended audience. For each of the places identified, only a single Tlingit place name is provided, even though one might expect that there are some places with alternate names or alternate dialectal forms. I found myself wondering whether there was a process by which the Tlingit elders reached consensus about what name to use or whether alternate forms were simply ignored.

Haa Léelk'w Hás Aaní Saax'ú is an amazing work with respect to the breadth and depth of Tlingit knowledge of place that it represents and the work of Thomas Thornton and the Tlingit elders in compiling this knowledge. The book represents a forward-thinking contribution to future Tlingit generations. There are at least two significant ways that this type of research on place names could be expanded in the future. While place names are indeed a rich index of Tlingit history, values, and cultural practices, the Tlingit sense of place is expressed through multiple linguistic systems, including motion verbs and direction terms. Tlingit texts offer rich examples of the interplay of place names and other terms that conceptualize and evoke a sense of place. While collections of Tlingit texts, such as those by Richard and Nora Dauenhauer, have documented the rich Tlingit oral traditions, there is room for more analysis of how Tlingit senses of place are evoked through multiple linguistic systems. Much of the recent research on place names has also been motivated by the need to record indigenous land use and land rights and to document the Tlingit language in the context of language shift. Thornton necessarily worked mostly with fluent speakers of Tlingit, but it would be interesting to learn more about which names and traditions are being learned by younger Tlingits. It would also be interesting to know what knowledge is being maintained by Tlingits whose first language is English and what place names and other terms they draw on from Tlingit even as they speak English. As language activism assumes greater importance in maintaining and reviving cultural and linguistic traditions, language learners will inevitably turn to resources such as this one to expand their own knowledge of Tlingit, especially when well-informed elders are not available to meet those needs.

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REVIEW

THE PEOPLE BEFORE: THE GEOLOGY, PALEOECOLOGY, AND ARCHAEOLOGY OF ADAK ISLAND, ALASKA

By Dixie West, Virginia Hatfield, Elizabeth Wilmerding, Christine Lefèvre, and Lyn Gualtieri. BAR International Series 2322. Oxford: Archaeopress, 2012. Paper, xiv + 325 pp., illustrations, bibliographies; ISBN 978-1-407309-05-7; £48.00.

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Embodying work by an international cast of nearly three dozen researchers, in this compendium the Central Aleutians Archaeological and Paleobiological Project (or CAAPP), reports its preliminary brush with the geology, paleoecology, and archaeology of Adak in seventeen interrelated chapters, each a largely self-contained report by separate authors. The specific geographic universe is the north-trending, bilobate peninsula that encompasses about a third of the landmass of Adak Island (Fig. 1)—a tract that formerly included a U.S. Navy base and now is property of the Aleut Corporation. The bulk of the fieldwork was conducted by CAAPP between 2005 and 2007, although there was a two-week stint in 1999 by the crew of CAAPP's predecessor, the Western Aleutians Archaeological and Biological Project (WAAPP) (Corbett et al. 2010). All of these efforts involved sites that had been previously identified by crews of the Bureau of Indian Affairs and through some surveys by the U.S. Fish and Wildlife Service and by Douglas Veltre for the Aleut Corporation (West et al., Chapter 1).

Within this northern Adak tract, research centered around five sites. Human occupation is in evidence at some sites from around 6000 to 5000 RCYBP and during a later period overall from about 2600 to 170 RCYBP, with some shorter breaks. Despite these hiatuses, conclusions from stone artifacts (Wilmerding and Hatfield, Chapter 12), geomorphology (Gualtieri et al., Chapter 3), and ecology (Savinetsky et al., Chapter 5) are that there is no evidence of any significant interruption of occupation during the entire period from 6000 BP onward, although there were clearly changes in overall ecology to which ancestral Adak people apparently adapted.

Field recognition of temporal elements is aided by five major tephras deposited at intervals over the past eight or nine thousand years, described in earlier works by the geologist Robert F. Black (1976; see also O'Leary 2001) and others. The latest four of these major deposits—the so-called Intermediate, Sandwich, YBO, and Forty Year ashes—are stratigraphically related to traces of human occupation in one or more of the four sites. The earliest, Intermediate Ash dated at 6000 RCYBP, immediately underlies occupation debris on the earliest site (ADK-171); an apparently wind-blown lens of it also overlies some artifacts. Radiocarbon ages from the occupation itself (among the impressive total of 104 age determinations obtained in this project; West et al., Chapter 1, App. 1B) are concordant. Chemistry and size particles of the three earliest of the four tephras (Intermediate, Sandwich, and YBO) suggest a common source, which the tephra analysts (Okuno et al., Chapter 4) conclude was probably a submerged volcano somewhere near northern Adak.

The principal vehicle for inferring material cultural development is the analysis of stone tools and debitage (Wilmerding and Hatfield, Chapter 12) from three of the five sites, one of which had two temporally distinct components. There is a marked difference in tool sample sizes. The earliest and smallest assemblage (from ADK-171) consists of only twenty-four; the latest and largest (ADK-011, Component 2, 400–170 RCBP) of 403 (Table 12.1). To some extent, the small sample of the earliest tools may

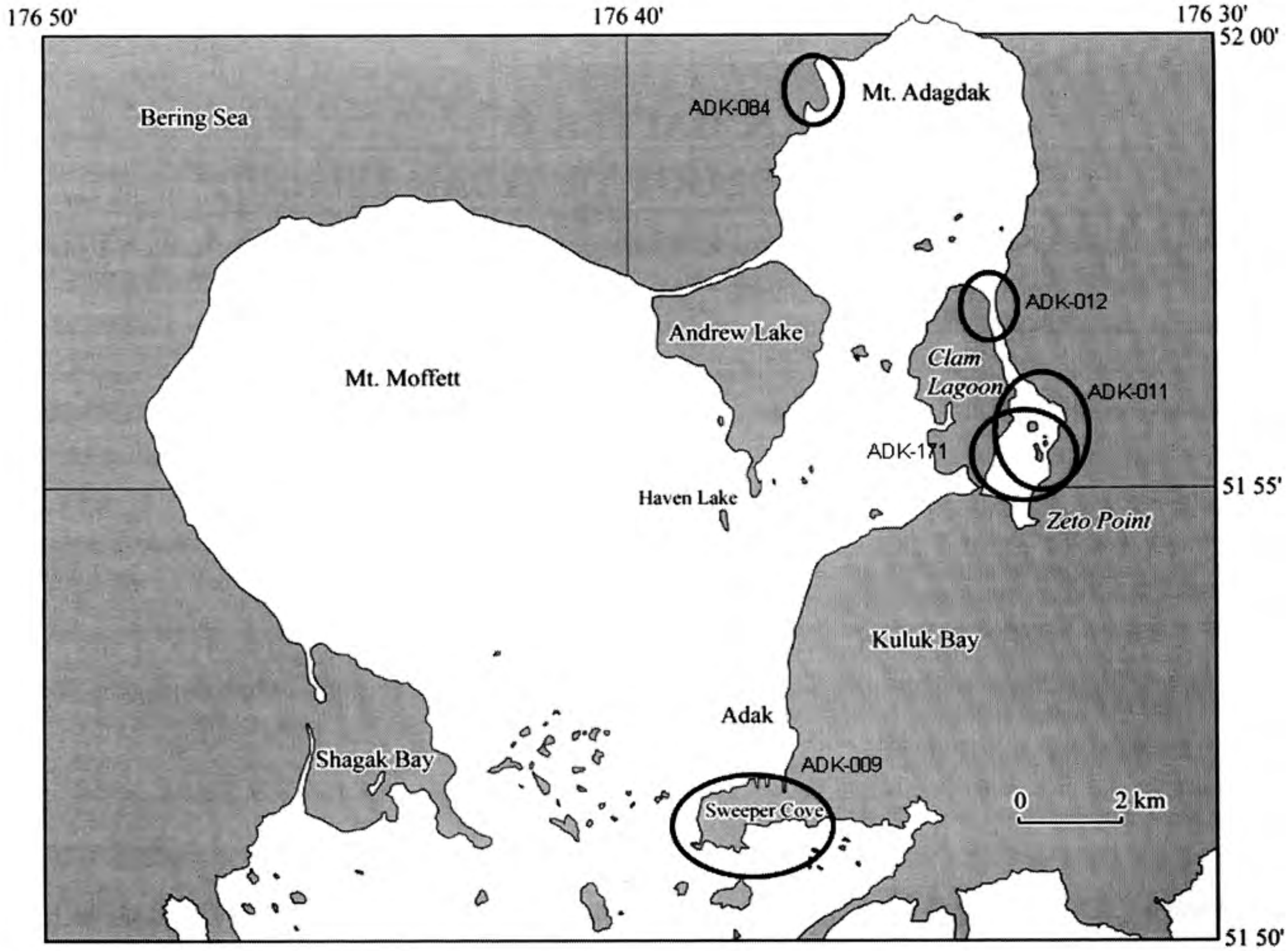

Figure 1. The northern segment of Adak Island, showing the general vicinities of sites studied by CAAPP researchers. From **The People Before***, Figure 6.1, reprinted with permission of Archaeopress and the volume authors.*

be offset by the larger debitage sample (*n* = 377 items). The sample size of the debitage (*n* = 5,073) from the latest component again outweighs the earliest (Table 12.2). The general possibilities of uncertainties in analytic conclusions as a result of sample sizes and numerical imbalance is mentioned in the very brief history of archaeology in the Central Aleutians (Veltre, Chapter 2). In any event, the conclusion with regard to the stone assemblages is that the initial occupation of northern Adak at around 6000 BP was by people who favored chert and obsidian for many tools, used biface technology, and depended on irregular flakes as a tool-making basis (see also Wilmerding and Kay 2011). Comparisons are made to the Late Anangula phase of the eastern Aleutians (Knecht and Davis 2001), while noting the absence at ADK-171 of any evidence of blade or microblade technology, although recognizing the possible inadequacy of the Adak sample size. The nearest known sources of both chert and obsidian are well to the east. Obsidian analysis by a mass spectrometric technique (Nicolaysen et al., Chapter 11) indicates that the most likely known obsidian source is Okmok Volcano on Umnak Island, around 1,000 km distant in the eastern Aleutians.

In contrast to ADK-171, later components indicate a preferential use of basalt and andesite for stone tools. Only in the latest component (ADK-011, Component 2) was there clear evidence of constructed habitations. Although test pits were sunk into a single house at that site, described as a bowl-shaped depression, no complete features were excavated. In addition to chipped stone artifacts, the sample from this latest component included plummets, lamps, and net sinkers. Component 2 was the only one to yield polished ulus. A very few blade-like flakes were presumed to be simply accidental productions from irregular cores (Wilmerding and Hatfield, Chapter 12).

Preservation of bone implements was even less uniform through the sequence than was the incidence of stone tools. Bone was clearly used, but only—again—in the latest component is the sample adequate to support even minimal discussion (West and Hatfield, Chapter 15).

The evidence of climate and ecology may prove to be the most provocative aspect of this report. Savinetsky et al. (Chapter 5) provide the major basis for conclusions on paleoclimate in their examination of the faunal remains preserved in the sites as well as the soils and diatoms obtained from a peat core at nearby Haven Lake. The earliest levels suggest a climate shift toward boreal conditions, but by about 6000 RCYBP, very low diatom abundance and diversity, with a maximum of cold species, suggests that the most severe climate conditions of the past ten millennia came at this time, with amelioration thereafter. This cold period was confirmed by barnacle species and also by recovered remains of saffron cod (*Eleginus gracilis*), a cold-water species otherwise unknown in the Aleutians, in occupation levels at the earliest site, ADK-171. The conclusion, then, is that the arrival of humans at that site at about 6000 RCYBP occurred during this coldest period sampled.

The later periods of the faunal sequence are filled in with zoological remains preserved in the more recent sites, especially ADK-009 (Crockford, Chapter 6), where the sample was essentially confined to the most recent 2000 years. A note in the chapter deals with the presence of fur seals, including newborn pups and age sets that suggest the animals were not migratory, and other fauna (sea otters, harbor seals, and rock greenlings) in numbers that suggest the presence of kelp forest habitat. This evidence leads Crockford to suggest that before the Russian arrival in the eighteenth century, local fur seal populations were fairly widespread in the Aleutians but were dependent upon mature kelp forest for certain rookery behaviors. The arrival of the Russians and the ensuing reduction of sea otters permitted the explosion of their usual prey, the sea urchin; the resultant increased exploitation of kelp by sea urchins led to destruction of the kelp forest. This spelled the demise of local, nonmigratory fur seals. Speculative, of course, but fascinating.

In addition to these chapters, which seem especially meaty for anthropologists, there are other reports that provide grist for the future, yet without arriving at real closure on the subjects thus far discussed. Two of these studies involve subjects of archaeological import. One reports an inconclusive attempt to recognize organic residue on the flat "griddle stones," which are known widely in the Aleutians, to identify foodstuffs (Jeannotte et al., Chapter 14). A second attempts to define an overall stone tool technological system, including use wear of implements. Although conceptually reasonable, the study is hampered by an inadequate sample of purposeful tools in all stages of manufacture, remanufacture, and use (Kay, Chapter 13; see also Wilmerding and Kay 2011).

Other chapters discuss sea otter remains from the sites. One is an ancient DNA study (Nishida et al., Chapter 7) that concludes that the matrilines of sea otters hunted by the prehistoric occupants of Adak do not precisely duplicate those of the present Adak sea otter populations. Another deals with the isotopic composition of bone and tooth enamel of the archaeological sea otter remains (Garong et al., Chapter 8), which indicates there were two probably largely distinct resident populations hunted at the time, one from a kelp-dominated ecosystem, the other from the open ocean. Koike et al. (Chapter 9) report on a study of the cockles recovered at the sites; West et al. (Chapter 10) provide a pan-Aleutian comparison of invertebrate remains. In addition, there is a descriptive analysis of a single juvenile human burial from an unspecified location in the Andreanof group of islands (West et al., Chapter 16), which stands rather aside from the subjects treated in the rest of the book.

These chapters constitute an excellent preliminary approach to a portion of Aleutian Island paleogeography that has been essentially blank in terms of available information, yet a number of questions remain. First, the ^{14}C age obtained for the earliest occupation is in line with information more recently reported for the age of initial occupation of Amchitka in the Rat Islands, the group immediately west of the Andreanofs. Sites on Amchitka Island are reported to have yielded RCYBP of 4500–4800 (e.g., Funk 2011), which places the occupation possibly within a millennium of the Adak occupation reported in *The People Before*. For Shemya Island, at the eastern edge of the Near Island group, occupation is estimated to date as early as RCYBP 2500 (correcting for ages on sea mammal bone) (Corbett et al. 2010), which again is in line with ages obtained from Agattu a half century ago (Spaulding 1962). Thus, the Amchitka ages fall nicely into line with occupation of the Aleutians that proceeded from the east, beginning sometime after 8000 RCYBP and lasting until about 2500 RCYBP.

But this raises a tantalizing question of stone technology, specifically the appearance of bifaces. Wilmerding and Hatfield (Chapter 12) refer to biface technology at the Amaknak Quarry site at Unalaska, citing only a personal communication as their reference. They cannot be blamed if their chapter was written before a published account of the Amaknak Quarry site appeared. Rogers et al. (2009) reported a single fragmentary biface of obsidian with RCYBP around 6200 to 6000. As noted by the authors, this appears to be the earliest bifacial implement thus far dated anywhere in the Aleutians. Again, this date can be reconciled with that of about RCYBP 6000 on Adak. Nevertheless, the Amaknak Quarry site is described as heavily dominated by blade and microblade technology, in a trend that continued in the Unalaska area (as reported by Rogers et al. 2009 with reference to the Amaknak Bridge site) until about RCYBP 3000. This is some three millennia after the apparent initial occupation of Adak by people lacking blade technology. Notably, no blades are reported anywhere in the Aleutians west of the Fox Islands at the eastern end of the chain. What are the complications, then, if one tries to account for a blade-less biface technology on Adak—and islands west of Adak—by inspiration from the east? As of now, we do not know.

A reviewer can always find things to carp at. There is a sometimes misleading lack of consistency in the use of "BP," with some authors consistently meaning RCYBP, and others meaning calibrated age before present. But this is trivial stuff. More seriously, as noted earlier, the sample sizes in general tend to be minimal. This is a matter addressed briefly in the final summation, in which West and Crockford (Chapter 17) state the obvious—that if more research at any one site or subject had been pursued, the breadth of overall coverage would have been significantly reduced.

As it stands, the material presented is consistently provocative as an introduction and provides an excellent basis on which to proceed. Thus, the work is of great value for the information it gives us, while it also leads to a variation of that cliché so well known to archaeologists: More work literally *cries* to be done!

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