

REPORT

PREHISTORIC SETTLEMENT PATTERNS AND THE ROLE OF CARIBOU (*RANGIFER TARANDUS*) IN THE REGION OF THE WESTERN CHUGACH MOUNTAINS, ELMENDORF MORaine, AND ANCHORAGE LOWLANDS

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ABSTRACT

This paper explores the roles that caribou played in the prehistoric cultural history of eastern Knik Arm, the western Chugach Mountains, and the Anchorage Lowlands. The Anchorage Lowlands, located between the Elmendorf Moraine and Turnagain Arm, represent a unique geographic feature that constricts the overland movement of animals and humans between the Matanuska and Susitna River drainages to the north and the Kenai Peninsula to the south. The lowlands were sparsely populated by human groups prior to the expansion of the prehistoric Dena'ina people, and the populations of past faunal species is largely unknown. The finding of a naturally shed caribou (*Rangifer tarandus*) antler from a tributary of Ship Creek is presented within the context of the local prehistoric record of the area. Direct evidence of prehistoric caribou use in the Anchorage Lowlands is almost entirely absent; therefore, a review of the ethnographic and historical records is provided to present a picture of the role that large game procurement may have played for pre-Euroamerican inhabitants. Caribou were a valued and actively sought-after resource by the Dena'ina on the eastern shore of Knik Arm. Informants from these bands, who typically traveled seasonally into the Talkeetna Mountains to procure caribou, also reported their presence in the upper Ship Creek area.

INTRODUCTION

A naturally shed caribou antler (*Rangifer tarandus*) was recovered during archaeological and ecological surveys on Joint Base Elmendorf-Richardson (JBER) in the western Chugach Mountains in July 2018. The recovery of the antler spurred the following research into the local protohistoric use of this resource. Caribou have never before been documented in the eastern Knik Arm or northern Turnagain Arm area, either in modern or historic times (the continuous historic record in this area only begins in the late nineteenth and early twentieth centuries).

The geographic region of the Anchorage Lowlands (representing the lower-elevation landscape south of Elmendorf Moraine, west of Knik Arm, and north of Turnagain Arm) is about midway between the historic ranges of the closest two herds: the Nelchina herd to the north and the Kenai herd to the south (Bangs et al. 1982; Hemming 1975). This paper explores the results of a radiocarbon assay on the remains within the context of the historical and archaeological record of the western Chugach Mountains and the Anchorage Lowlands.

BACKGROUND

The antler was recovered on a mountainside just above the Snowhawk Shelter Cabin near the split of the eastern and western headwater forks of Snowhawk Creek (a tributary of upper Ship Creek), at an elevation of ~910 m (~2985 ft) (Fig. 1, Fig. 2). Both valleys were surveyed in July 2018 to investigate reports of numerous stacked stone blinds in the vicinity of Tanaina Lake, likely built during military training exercises during the Vietnam War era (1965–1975) (Smith et al. 2019). Both valleys gradually increase in elevation above the existing tree line. The southeastern valley terminates in a box canyon surrounded by steep mountains, while the southwestern valley terminates at Tanaina Lake. The inclines on all sides of the valleys are steep and consist of intermittent cliffs, scree fields, and areas of alpine/tundra vegetation (Hultén 1968). Several large permanent or semipermanent snow and ice patches

were observed and investigated on the slopes. None of them exhibited any preserved evidence of caribou use, such as layers of preserved ungulate dung, as found in central Alaska and southwestern Yukon ice patches (Hare et al. 2004, 2012; VanderHoek et al. 2012). We did not observe other antlers or additional evidence of caribou presence during this survey. The exposed tip of the bez tine protruding from above the tundra vegetation facilitated its discovery high on a 20-degree slope on the northern end of the central ridge that separates the two upper forks of Snowhawk Creek. Most of the antler, except for the heavily weathered bez, was covered by moss and lichen before recovery, aiding its preservation (Fig. 3). The base of the antler was well preserved and suggested that it represents a natural shed. There is no observed evidence that the antler was directly associated with any past human activities.

Despite the lack of directly associated human activities, the documented presence of a caribou antler in the

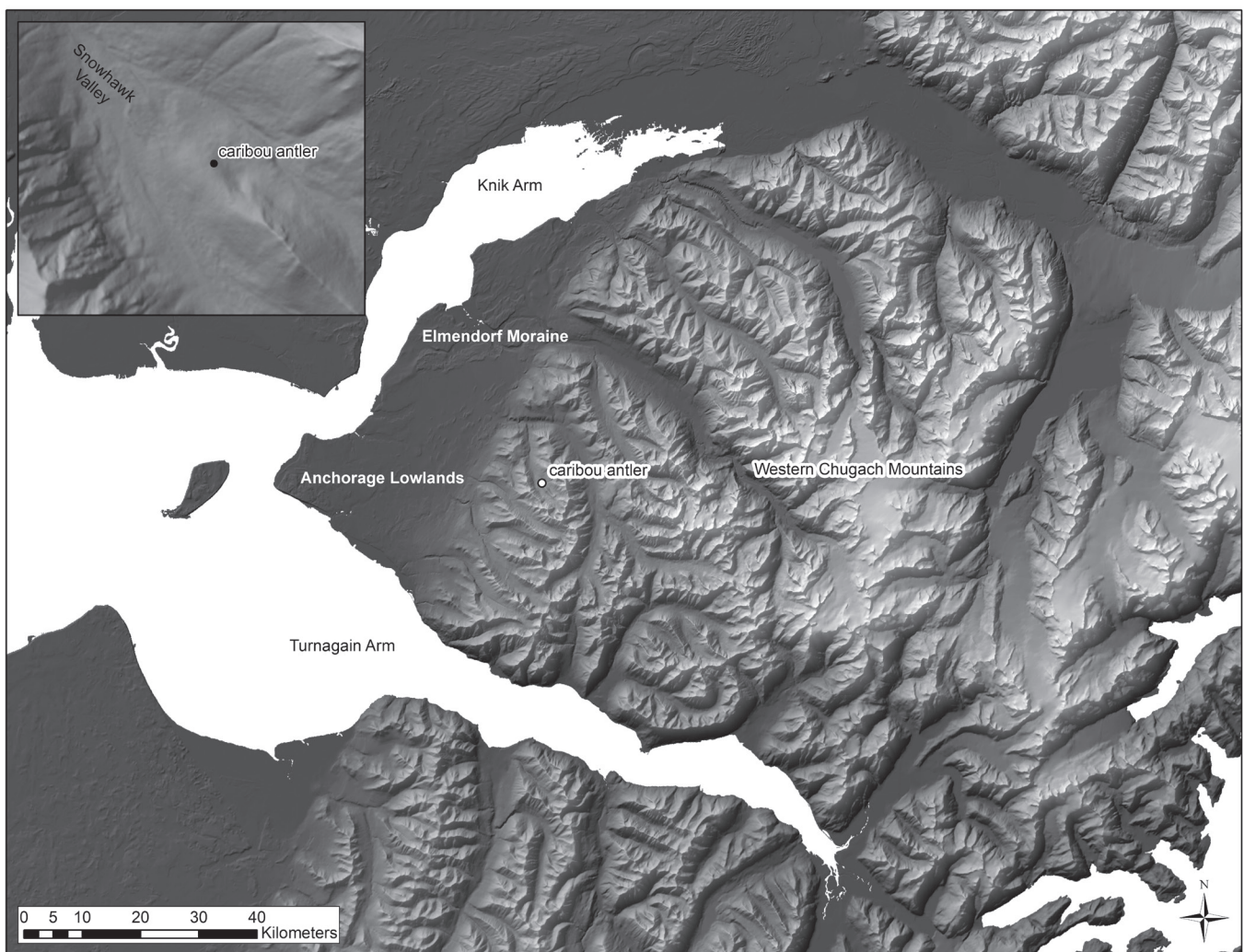


Figure 1. Location of caribou antler. Map by Gerad M. Smith.



Figure 2. Antler at discovery location. Knik Arm can be seen to the north in the background. Image by John Hill (July 16, 2018).

region is important for understanding the area's ecological and cultural history. Caribou was one of several species that played a vital role in the seasonal movements of the Dena'ina people of Knik Arm historically (Osgood [1937] 1966). Their documented presence in the western Chugach Mountains offers a further line of evidence in interpreting subsistence strategies. Despite not being associated with any cultural remains, we report on this finding as it represents the first direct evidence of the presence of caribou in the western Chugach Range, and even a single representative fossil assists as an ecological proxy in reconstructing the past environments within which prehistoric people interacted.

Table 1. Radiocarbon results from antler.

Lab Number	Material	^{14}C Age (years BP)	$\delta^{13}\text{C}$ (‰)	2 σ Calibration ¹ (95.4%)
Beta-507442	Bone collagen	210 \pm 30	-33.78	144–216 cal BP (54%)
				267–305 cal BP (32%)
				0–21 cal BP (14%)

¹ 1 σ , Calib 7.10, using IntCal13 (Reimer et al. 2013; Stuiver et al. 2018).



Figure 3. Recovered antler, with broken bez tine. Radiocarbon samples were removed from the main beam midway between the bez beam and rear point. Image by Margan Grover (October 10, 2018).

The prehistoric record of the geographic terrain east of Knik Arm and north of Turnagain Arm has thus far only been discussed comprehensively in cultural resource management reports associated with local infrastructure surveys (e.g., McMahan and Holmes 1996; Smith et al. 2019), and is largely only discussed as a side note to larger regional analyses (Reger 1998; Wygal and Goebel 2012). To clarify the importance of the artifact, this paper will also explore the known local cultural and ecological landscape. This model will also highlight important research gaps for the area.

METHODS

After recovery, samples of the antler were submitted to Beta Analytic Radiocarbon Dating in September 2018. The results from the bone collagen produced a date range of 210 \pm 30 BP or 144–216 cal BP (Table 1). The results are similar to another radiocarbon assay on protohistoric bison (*Bison bison athabasca*) remains (also devoid of cultural context) recovered from Chester Creek (170 \pm 30 BP),

which, along with caribou, is not considered endemic to the area (Stephenson et al. 2001). The presence of bison in the Anchorage Lowlands has not been corroborated by any historic or ethnographic data. A single statement about the presence of caribou in the area was provided by Dena'ina historian Shem Pete (Kari and Fall 2016:332). Both species were utilized throughout the state in places and times where they could be obtained either as part of predictable, seasonal rounds, or when they could be taken opportunistically. Stephenson et al. (2001) provide a comprehensive analysis of the presence and ethnohistoric use of Alaska bison prior to extirpation.

The following discussion explores the role of late Holocene caribou exploitation in the upper Cook Inlet region. It derives from a comprehensive review of all prehistoric sites in the Anchorage Lowlands region and western Chugach Mountains, as recorded in the Alaska Heritage Resource Survey database (2018) and the Alaska Office of History and Archaeology archives. We present a preliminary intersite model of landscape use based on temporal and geographic records, and correlate this with a published ecological reconstruction of the area.

THE STUDY AREA

A robust reconstruction of the prehistory of the Anchorage Lowlands remains lacking, and meaningful inferences must be made with the regional record throughout the Cook Inlet region. The local cultural history record that has been documented is primarily informed through lithic typology and surface feature characteristics, as many representative sites lack associated radiocarbon or stratigraphic integrity, or detailed excavations. Finally, the archaeological signal of these settlement systems may be the result of research bias or taphonomic bias. Despite these problems, a broad, if piecemeal, picture does emerge.

Despite having become deglaciated and vegetated by ~14,000 cal BP (Ager et al. 2010; Reger et al. 1995), the earliest occupied site in the Anchorage Lowlands appears to date well into the Holocene Thermal Maximum that dramatically affected the Arctic and Subarctic climate (Anderson and Brubaker 1993; Kaufman et al. 2004; and see discussion of its negative preservation effects on the archaeological record in Hare et al. 2012). To the north, an initial human occupation in the lower and middle Susitna Valley occurred during the earlier Younger Dryas (Wygall 2009, 2010; Wygall and Goebel 2012). The Beluga Point Site (ANC-00054) on the northern rocky shore of

Turnagain Arm represents perhaps the earliest known site in the study region. It is representative of the Northern Paleoarctic tradition and has been cautiously typologically dated to ~7000–8000 cal BP (Reger 1996:433). The appearance of the early Beluga Point component coincides with a long period of local ecological stabilization. After ~8700 cal BP to ~1800 cal BP, the local vegetation regime can be characterized as a stable *Betula*, *Alnus*, and *Picea* dominated boreal forest. The cultural history of subsequent pre-Dena'ina archaeological traditions is also only ephemerally known. They include the Northern Archaic tradition (represented at the site of ANC-03961), Ocean Bay II (ANC-00054, ANC-00816), Arctic Small Tool tradition (ANC-00054, ANC-00078), and Riverine Kachemak (SEW-00131, TYO-00058) (Fig. 4). All of these sites appear in the southern Anchorage Lowlands region to the southeast, along the northern shores of Turnagain Arm. This suggests that if the sites truly are representative of the actual interaction patterns of these cultures with the Anchorage Lowlands landscape, these early groups only found themselves briefly in the area—possibly during times of expanded mobility (Dumond and Mace 1968; Reger 1981:185–186; Reger and Bacon 1996; Reger and Boraas 1996).

The signal of these middle Holocene traditions may have been regionally affected by seismic activity. Great earthquakes (those on par with the 1964 “Good Friday” earthquake) have been correlated with possible cultural hiatuses throughout the Cook Inlet region (mainly informed using data from the Kenai Peninsula). These were modeled as occurring around 800, 1400, and 2200 cal BP, with fragmentary evidence suggesting older earthquake-related hiatuses possibly around 2700 and 3200 cal BP (Hutchinson and Crowell 2007). Alaska Range volcanism may also have played a defining role, potentially causing periodic interruptions in long-term settlement patterns throughout the upper Cook Inlet (Dixon et al. 1985; Krasinski 2018; Mulliken et al. 2018; Reger et al. 2007), though a proxy record directly from the study area does not yet exist. Coastal erosion rates may also have muted preservation of early settlement sites. Erosion rates of the prominent bluffs of Knik Arm (10–65 m above the mean sea level) have been estimated at around 0.2 to 0.4 m per year (Dillely 1996).

That the later Holocene Marine and Riverine Kachemak traditions also made use of caribou throughout the Cook Inlet region has long been recognized. Evidence published by Frederica de Laguna ([1934] 1975)

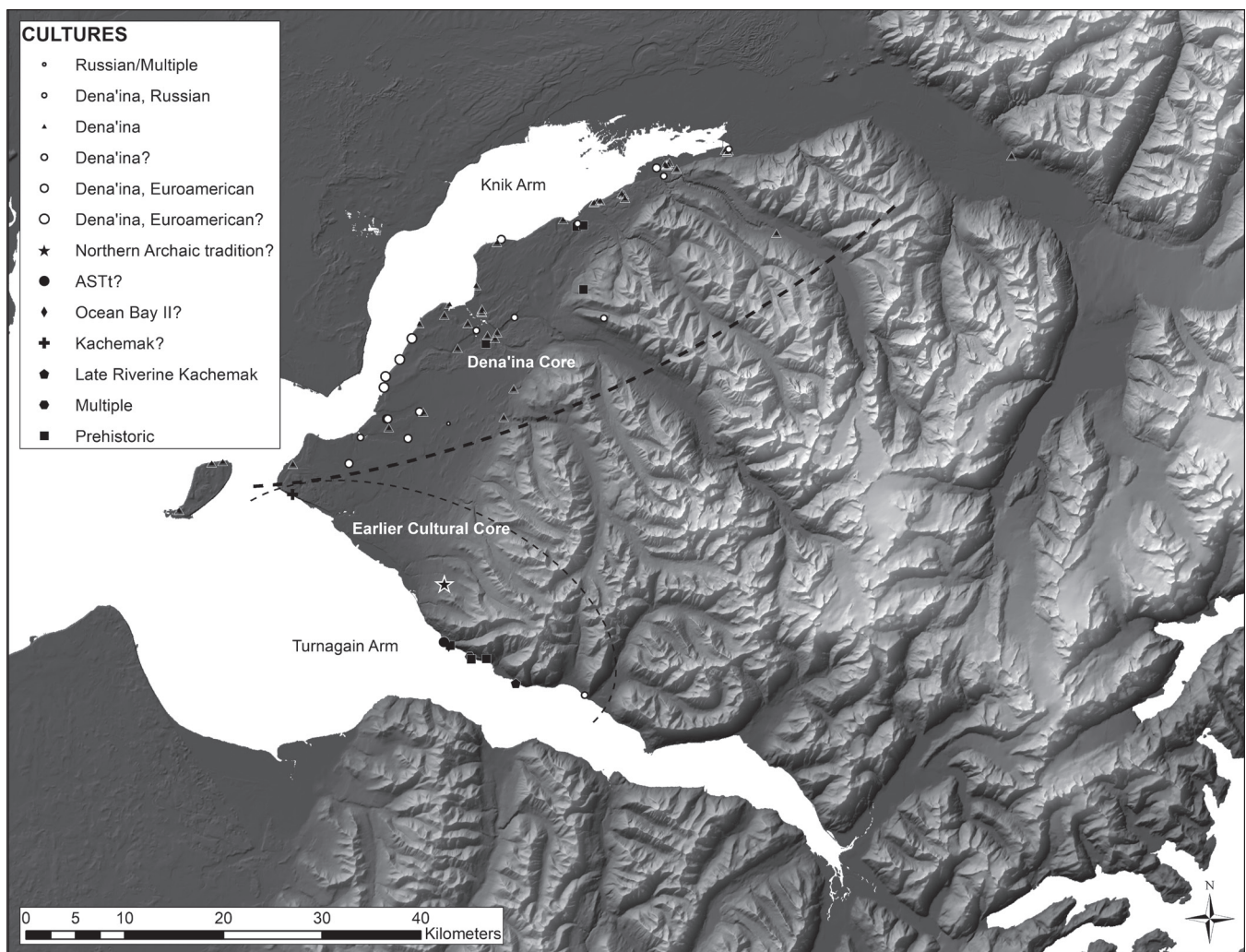


Figure 4. Sites representing archaeologically defined cultures in the study area, and associated cultural cores.

suggests that caribou exploitation occurred continually throughout most of that tradition's occupation of the inlet (~3000–1100 cal BP) (Reger and Boraas 1996; but see also Workman 1998). With the exception of the earliest Phase I Kachemak Bay culture, de Laguna's three sequential periods from the Yukon Island excavations (Kachemak Bay Periods II, sub-III, III, and the much later IV) all contained evidence of caribou use, though represented primarily through antler elements with minimal recovery of other skeletal remains (de Laguna [1934] 1975:31–38). The modified caribou faunal artifacts found included antler pins, awls, and bone scrapers (de Laguna [1934] 1975:95–98). The scarcity of postcranial remains was possibly due to consumption during hunting activities far from the village locales (de Laguna [1934] 1975:32). William Workman's (1980:393) work in the Kachemak Bay area later confirmed de Laguna's interpretations. He also noted that in addition to the caribou remains, sea mammal, moose, bear, and rab-

bit bones were present but rare, presenting a similar pattern (see also discussion by Harold John Lutz 1974:27–30).

The first archaeological tradition to leave an extended presence in the study area is the Athabascan tradition, whose culture is considered to be synonymous with the protohistoric Dena'ina people who appear throughout Cook Inlet between 1500 and 500 cal BP (Boraas 2007; McMahan et al. 1991; Reger 1998; Workman and Workman 2010). Ecologically, their presence coincides with the Anchorage Lowlands' landscape becoming increasingly paludified after ~1700 cal BP, becoming a *Betula*, *Alnus*, and *Picea* boreal forest and bog landscape typical today throughout the upper Cook Inlet area, Copper River, and the middle and upper Kuskokwim River regions (Ager et al. 2010).

Through a detailed analysis of the Dena'ina language and traditional place names, James Kari (1988) proposed a probable geographic origin point of the Dena'ina language and culture in the western foothills of the Alaska Range

along the eastern tributaries of the middle Kuskokwim River. Alan Boraas (2007) further proposed that the Dena'ina flourished in tandem with expanded salmonid populations during the Medieval Warm Period ~1050–600 BP (see Finney et al. 2002; Holtham et al. 2004; Hu et al. 2001; Mann et al. 1998; Uchiyama et al. 2008), with one branch migrating east across the Alaska Range into Upper Cook Inlet, eventually occupying the lower Susitna River, Knik Arm, and northern Kenai Peninsula.

As opposed to the previous traditions that have only been described along Turnagain Arm, Dena'ina sites ($n = 65$) (AHRs 2018) are found almost exclusively along the east shores of Knik Arm and Fire Island. The traditional place names collected in the twentieth century by James Kari and James Fall (2016; Kari and Smith 2017), while scattered throughout the Anchorage Lowlands and western Chugach Range, also tend to be focused along Knik Arm. The place names also include landforms along Turnagain Arm, though this area seems to have been treated as a cultural periphery. Native villages of the nineteenth century have been found near the mouth of Ship Creek, near the modern village of Eklutna, and near the original settlement site of Anchorage (Kari 1988; Yaw Davis 1994). Principal sites (such as seasonal fish camps) were also found along all major anadromous streams flowing into Knik Arm (Fall 1981; Osgood [1937] 1966). The lowlands were primarily used for seasonal anadromous fish and waterfowl harvests, while caribou hunting would occur throughout the autumn in the central Chugach and Talkeetna Mountains. Moose, Dall sheep, mountain goats, and bears could be hunted year-round (Townsend 1981:626–627). The Dena'ina of the area spoke the Upper Inlet dialect and maintained friendly relations through extended kinship networks throughout the Upper Inlet (Kari and Fall 2016; Osgood 1976). However, the nineteenth-century cultural landscape was punctuated by increasing cultural and social tensions due to trade network disruptions and intensified raiding/warfare between the Dena'ina and Alutiiq (Boraas 2007).

Smith has observed both in the field and through extensive geospatial modeling that Dena'ina village sites are typically located near anadromous river confluences or stream confluences entering Cook Inlet, and food caching sites were generally not found more than 150 meters from any flowing water source. This supports Boraas's (2007) hypothesis that salmon population density and intensified exploitation of that resource, rather than ungulate availability, was a driving force in Dena'ina expansion across

the inlet. The archaeologically visible settlement features that are associated with Dena'ina village sites include the remains of semisubterranean cold-season houses, usually indicated as bermed ovoid, rectangular, or trapezoidal surface depressions. Food caching sites can include surface pits consisting of one to multiple ovoid surface depressions, usually about 1–2 m in diameter (Higgs et al. 2014).

Cornelius Osgood's early ethnographic research in the Dena'ina villages of Seldovia, Iliamna, Eklutna, Tyonek, Susitna, and Kenai describes the use of caribou in each village in various ways, including for food, clothing, adornments, bone tool construction, art, and musical instruments (Osgood [1937] 1966:33, 43–54, 103, 117, 121). Osgood noted very few differences between the Upper Inlet, Kenai, and Kachemak Bay people's use of caribou. The Upper Inlet area is the only place he documented that caribou were hunted using spruce fences and not dogs (Osgood [1937] 1966:33). The Dena'ina in the upper Knik Arm reportedly also used hunting surrounds made with long poles lashed together attached to trees and posts, without the use of rock hunting blinds (Osgood [1937] 1966:33). As a food, the meat was valued as well as the kidneys, heart, liver, stomach, nose, tongue, bone marrow, and hooves (Osgood [1937] 1966:43–44). Grubs from caribou were especially welcome for consumption (Osgood [1937] 1966:44). The majority of clothing articles and footwear were sewn from caribou or sheepskin, though variations depended on the area and the season (Osgood [1937] 1966:46–15). Other uses included needles made of caribou bone, tambourines made with caribou skin on both sides, sleeping bags made using two caribou hides in the Kachemak Bay area, and a toothed comb in the Upper Inlet area made of caribou hoof.

DISCUSSION

In assessing caribou's significance for the Dena'ina of Knik Arm, a general pattern emerges that while caribou were considered an important source of food and other material items, the Knik Arm groups were used to harvesting these items from the Nelchina herd to the northeast. While the presence of caribou in the Ship Creek headwaters was noted (Kari and Fall 2016:332), the sense from the historic documents is that those animals belonged to an endemic herd.

Despite the ethnographically documented regional use of caribou, the artifacts and habitat in the Tyonek and lower Susitna regions of the Upper Inlet Kachemak Bay

and Kenai areas do not suggest that caribou ever formed a substantial part of the prehistoric Dena'ina diet (Osgood [1937] 1966:26). But there is evidence that precontact people attempted to ceremonially purify, through cremation and ritual disposal, all faunal remains in accordance with the concept of *Beggesh* to ensure the continuance of good cooperation with the animals they hunted (Boraas and Kalifornsky 1991; Boraas and Peter 2008). This suggests a cultural belief that might affect the visibility of caribou and moose remains in the archaeological record.

Caribou herd populations go through cyclical expansions and contractions, which can be affected by hunting pressure, predation, food limitation, insects, parasites, climatic extremes, disease, competition between species, and human activity (Klein 1991). The population cycles of Alaska's caribou herds appear to follow century-long trends. Ronald Skoog (1968:318) recorded Alaska caribou herd population highs during the 1860s and 1920s and population lows in the 1890s and 1940s. The Nelchina herd specifically experienced a population decline in the 1870s and a subsequent increase in the 1960s with "widespread, erratic movements" (Skoog 1968:317), suggesting an earlier population maximum during the mid-nineteenth century (Hemming 1975). It is possible that when the period of sustained historic documentation began within the study area (ca. 1900), the Nelchina caribou herd's population was at a low point.

To our knowledge, no historical documentation exists mentioning the presence of caribou in the Anchorage Lowlands or the western Chugach Mountains (e.g., see Capps 1916; Gideon 1967). The following anecdote by Shem Pete is the only direct written evidence mentioning the species in the area:

On upper Ship Creek, in that large, level area, that one called Deafy Dan [Bigoff] used to walk around. He told me that he used to see caribou horns up there. He said they were sticking up there all over. Long ago there were caribou there, but I never killed any there. Now there are none. He saw one place with many caribou horns, so many that you could not sit down. So many bones there. (Kari and Fall 2016:332)

In the Kachemak Bay area, it was reported that "Caribou, formerly plentiful, the Indians say moved away during the historical period, and that moose took their place" (Osgood [1937] 1966:192). The original herd was not observed after 1912 on the Kenai Peninsula; their decline was tied to habitat destruction by a major wildfire

that burned for several months (reported by wildlife biologist Frank Dufresne in Lutz 1960, see also Cassidy and Titus 2003:31), as well as unregulated hunting (Bangs et al. 1982; Cassidy and Titus 2003:16). The people Osgood had interviewed in the 1930s could potentially have remembered high populations in the 1860s and before. The scarcity of caribou on the Kenai Peninsula in the late nineteenth and early twentieth centuries was documented by exploratory faunal surveys by biologist Wilfred Osgood (1901), who spent several months in the Hope and Tyonek areas, and Andrew Stone, who spent several months collecting specimens on the Kenai Peninsula for the American Museum of Natural History (Allen 1902). Additionally, the latest mention of caribou in the lower Susitna region was just before the outbreak of the First World War in 1914 (Leopold and Darling 1953). Skoog notes that in 1898 the Walter Mendenhall party had traveled near the Eagle River area and not seen any evidence of caribou in local camps or elsewhere, but the party did see significant evidence of moose and sheep remains (Mendenhall 1900:279). Caribou sign was reported in 1898–1899 to the northeast of the study region on the Chickaloon River headwaters and Hicks Creek/Caribou Creek area, which is the closest documented historic sighting to our study area (Glenn and Abercrombie 1899:59).

The antler that inspired this study may have originated from an individual associated with the Nelchina herd. Today, the Nelchina herd range does not extend past the Chugach Mountains into the Cook Inlet area, being confined mainly to the upper Nenana and Susitna River basins and the western Copper River basin (Hemming 1975). In response to increasing population numbers, caribou herds expand their winter foraging grounds until spring, when each returns to its calving grounds (Hemming 1975; Klein 1991; Skoog 1968:290). Given their geographic proximity, the caribou that did disperse into the western Chugach Mountains were more likely from the northern Nelchina herd of the Upper Cook Inlet (rather than from the southern Kenai herd), which possibly used it as an "overflow area" when the herds' population was high (Murie 1935:77; Skoog 1968:276).

The antler, while not a cultural artifact, retains great importance to the archaeological community as it acts as a proxy for local ecological breadth and additional confirmation of Shem Pete's description of the past presence of caribou in the study area. It indicates that caribou occasionally dispersed into the Anchorage Lowlands, though it seems never in sustainable herd numbers.

CONCLUSION

This study was spurred by the recovery of a naturally shed caribou antler that was not associated with any cultural remains. A radiocarbon assay was performed on the remains, suggesting that the antler dates to within the past three centuries, but statistically was likely dropped during the mid-to-late eighteenth century AD. The date is considered to be essentially modern, but historic records summarized above pertaining to caribou movements and extirpations throughout the greater region into the early twentieth century confirm the statistical likelihood that the antler predates the historic period. Currently, the Anchorage Lowlands and associated western Chugach Mountains have no endemic caribou herds. Despite the lack of historical documentation of their presence, the oral history and early written anecdotal evidence suggests caribou were occasionally present on the local landscape during the protohistoric period. Geographically, the location of the antler's recovery is well outside any observed herd range.

Archaeological evidence of prehistoric caribou use has been recovered on the Kenai Peninsula to the south of our study area, and, presumably, the ancestral individuals of those herds must have passed through the western Chugach Mountains and Anchorage Lowlands to disperse throughout the peninsula. However, there is comparatively little direct evidence that caribou ever established a long-term presence in the immediate areas of eastern Knik Arm or northern Turnagain Arm.

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