

# Recent Archaeological Investigations near the Native Village of Shaktoolik, Norton Sound, Alaska

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**ABSTRACT.** Since the early 1950s, when J.L. Giddings completed his work at Cape Denbigh, archaeological investigations in the area of Shaktoolik, Alaska, have been limited. Here we report on renewed investigations in the region that have led to the identification of 134 house features, dating from AD 1100 to the early 1900s, at a site next to the village's airport. This period spans one of continuity from the Nukleet archaeological culture to the ethnographic Yupiit, followed by a period of upheaval related to Russian trade and a smallpox epidemic that devastated the Indigenous population of the area. Inupiat from the north migrated to Shaktoolik and have occupied the area since the mid-1800s. Sixteen test units were excavated to understand the density of site occupation, extent of organic preservation, age of the deposits, and changes in subsistence over this 800-year period. The most recent Inupiat inhabitants built houses typical of mid 19th- to early 20th-century structures described for the northern Seward Peninsula, which were square, one-room structures with a single, long entrance tunnel. This house style replaced the previous Yup'ik-style multi-roomed structures replete with a labyrinth of tunnels used for defense and escape during inter-village conflict.

**Key words:** archaeology; Shaktoolik; Nukleet; Yupiit; Inupiat; house architecture; Norton Sound

**RÉSUMÉ.** Depuis le début des années 1950 quand J.L. Giddings a effectué ses travaux au cap Denbigh, les fouilles archéologiques dans la région de Shaktoolik, en Alaska, n'ont pas été volumineuses. Ici, nous présentons de nouvelles fouilles effectuées dans la région, fouilles qui ont permis de cerner 134 caractéristiques appartenant à des habitations datant de 1100 A.D. jusqu'au début des années 1900, à un emplacement situé près de l'aéroport du village. Cette période témoigne d'une continuité depuis la culture archéologique des Nukleets jusqu'à l'ethnographie des Yupiits, suivies par une période tumultueuse en raison du commerce russe et d'une épidémie de variole qui a décimé la population autochtone de la région. Les Inupiat du Nord ont migré pour s'installer à Shaktoolik et occupent l'endroit depuis le milieu des années 1800. Seize sondages ont été effectués afin de comprendre la densité d'occupation du site, l'ampleur de la préservation biologique, l'âge des dépôts et les changements en matière de subsistance pendant cette période de 800 ans. Les Inupiat les plus récents ont aménagé des maisons typiques des structures du milieu du XIX<sup>e</sup> siècle au début de XX<sup>e</sup> siècle, telles que décrites pour le nord de la péninsule Seward. Ces structures étaient carrées, comportaient une seule pièce et étaient dotées d'une longue entrée en forme de tunnel simple. Ce type d'habitation a remplacé les anciennes structures de style Yup'ik munies de plusieurs pièces et d'un labyrinthe de tunnels servant à se défendre et à s'évader en cas de conflits entre les villages.

**Mots clés :** archéologie; Shaktoolik; Nukleet; Yupiit; Inupiat; architecture d'habitation; détroit de Norton

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## INTRODUCTION

J. Louis Giddings (1964) laid down the framework of the culture historical sequence for the southern Norton Sound region in the late 1950s and early 1960s with his seminal work at Cape Denbigh, where he defined a tripartite scenario of culture change. The sequence began with Denbigh Flint complex (2300–1700 BC), which was followed, after a 1200-year gap, by the Norton culture (500 BC–AD 400) (dates from Tremayne, 2015). The next group, which Giddings called the Nukleet, arrived around AD 1150, after another several hundred years' break in use of the area. This group is considered a regional variant of

the broader Thule culture, which spanned the Arctic from the Bering Strait to eastern Greenland (Giddings, 1967; Stanford, 1976; Morrison, 1991). Giddings (1964) based his cultural sequence on excavations conducted on Cape Denbigh at the sites of Iyatayet and Nukleet.

At the time of his investigations, Giddings (1964) employed several families from the local Native Village of Shaktoolik to assist and support his work. The community was one of the focal points of archaeological research in northwestern coastal Alaska, something that residents of the community still remember today. However, once finished with his work on Cape Denbigh, Giddings turned his attention north to the Kotzebue Sound area (Giddings,

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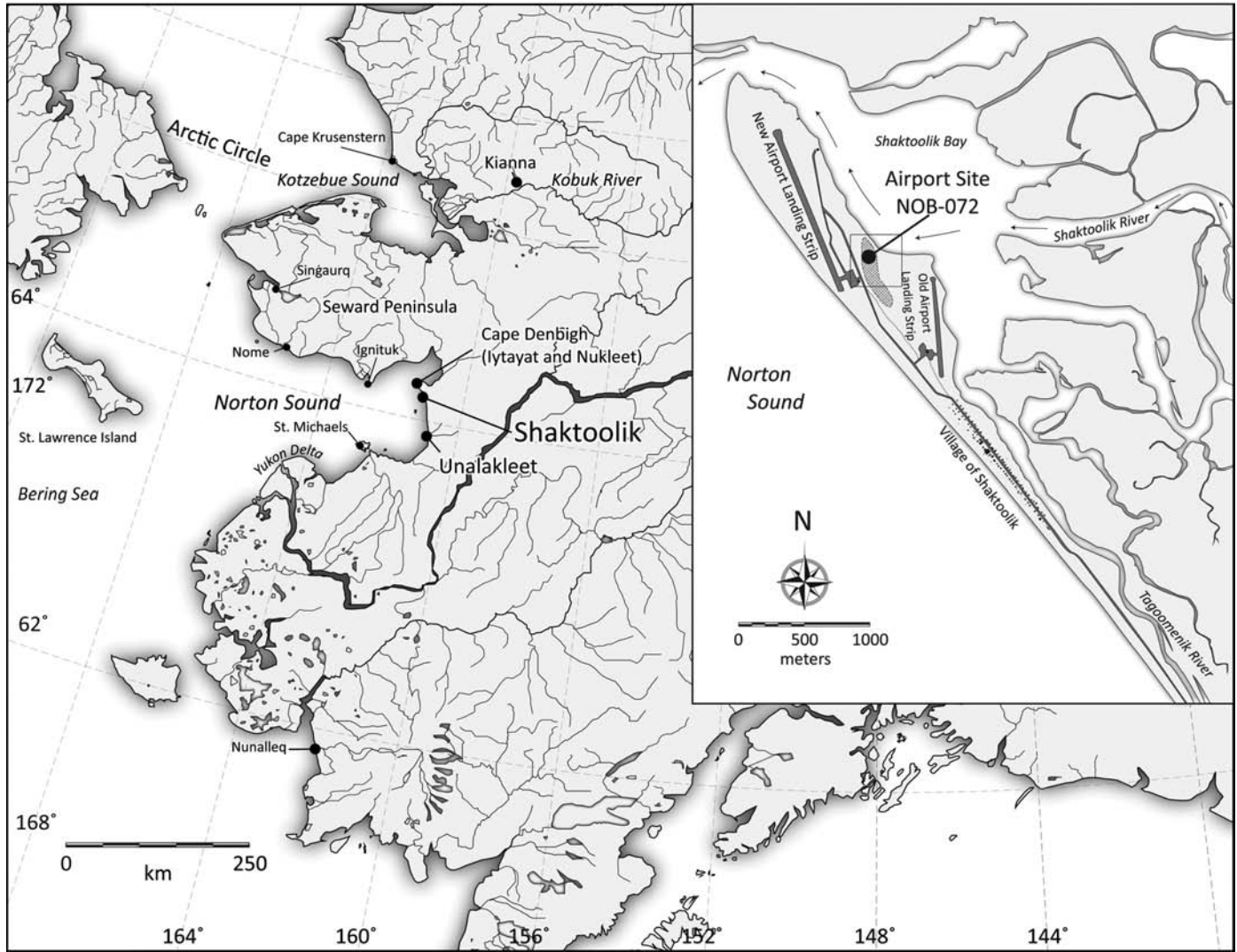


FIG. 1. Location of the Shaktoolik Airport site in Norton Sound, Alaska. The box around the airport site within the inset shows the area that is enlarged in Figure 3.

1967; Giddings and Anderson, 1986). Effectively, his departure curtailed archaeological research in the Shaktoolik region, with few exceptions (e.g., Harritt, 2010).

In 2013, the rediscovery of a large site, essentially hidden in the grass next to the airport, led to renewed archaeological interest in the area. The Shaktoolik Airport site (NOB-072) appears to have been used intensively, and almost continually, for nearly 800 years (Fig. 1). Here we discuss the beginning of a renewed program of research into the history of occupation, including changing house shapes, based on initial results of test excavations and mapping of this extensive site in 2014 and 2015.

## BACKGROUND

The Shaktoolik area is intriguing from the perspective of culture contact as it forms a juncture of Inupiat, Yupiit, and Athabascan peoples today. Inupiat speakers currently inhabit Shaktoolik; however, according to oral histories

collected by Ernest Burch (2005) in the 1960s–80s, the eastern Norton Sound region was Yup'ik territory around AD 1800. Burch's informants, most of whom were from the Seward Peninsula/Kotzebue Sound region to the north, referred to the Yup'ik speakers of this area collectively as the "Unalit," a term used to describe a specific Yup'ik dialect (Burch, 2005:40). This assessment is corroborated by the first European exploration into eastern Norton Sound in 1778, when Captain James Cook charted the area and communicated with Alaskan Natives near Besboro Island (Cook and King, 1784). Cook recorded the term "Chacktoole" as the name for the area (Conder, 1779; Ledyard, 1783), which, in addition to all the other place-names he recorded for the region, has been identified as an Unalit pronunciation (Ray, 1975:89).

More extensive Euro-American contact occurred in the area after 1838, when the Russian-American Company established a trading post near an old Native village on St. Michael Island (Zagoskin, [1847] 1967:96; Ray, 1975:122; Burch, 2005:47, 201). It is at this point that the

historical period truly commences in Norton Sound. With the construction of the post and the advent of commercial whaling in the Bering Strait in 1848, Norton Sound became a hub for trade among the Inupiat, Yupiit, Athabascans, Russians, and Euro-Americans (Zagoskin, [1847] 1967; Ray, 1975; Burch, 2005:233). With this increased contact inevitably came disease; a smallpox epidemic swept through the region and decimated the local Yup'ik population between 1838 and 1844 (Zagoskin, [1847] 1967; Ray, 1975; Fortuine, 1989). The few remaining survivors moved south. Whether taking advantage of new ecological voids or trading opportunities, Inupiat (Malemiut) migrants from the north moved into the Shaktoolik region (VanStone, 1973; Ray, 1975; Ganley, 1995; Burch, 2005; Pratt, 2012). Their descendants inhabit the village to this day.

It is difficult to determine when ancestral Yup'ik speakers first moved into the Shaktoolik region since that date is beyond the time depth of historical documents and difficult to pinpoint using oral tradition. And in general, moreover, identifying specific ethnic, linguistic groups of people using the archaeological record is a tricky and sometimes impossible objective (Emberling, 1997). Undertaking such a study to trace back into the past is known as the direct historical approach (e.g., Strong, 1933; Steward, 1942; Lyman and O'Brien, 2001). What it involves is finding key chronological anchors—unique or distinctive combinations of physical traits in the present—and tracing them back (O'Brien and Lyman, 2000).

Unfortunately, there is a gap in our knowledge of the archaeological record from the historical period that extends from the early 20th back to the 15th century. Giddings (1951, 1964, 1967) documented the presence in the 1400s of what he defined as the Nukleet culture at both the Iyatayet and Nukleet sites on Cape Denbigh. Much of the material culture recovered from the Nukleet deposits at these locations, including socketed harpoons and pottery, bears a strong resemblance to the Western Thule Culture (Giddings, 1964; Bockstoce, 1979; Anderson, 1984; Giddings and Anderson, 1986). These similarities led Giddings (1967) and others (e.g., Stanford, 1976; Morrison, 1991) to conceive of Nukleet as a regional offshoot of the Western Thule Culture. From the Seward Peninsula northward, it is clear that the Inupiat are directly descended from the Thule. However, the same cannot be said for the Nukleet/Thule or the Yupiit to the south (Giddings, 1967; Giddings and Anderson, 1986).

#### THE SHAKTOOLIK AIRPORT SITE (NOB-072)

The Shaktoolik Airport site sits on a slightly elevated series of beach ridges associated with an aggrading spit just to the north of the current Native Village of Shaktoolik. It was initially recorded in 1992 and described as having “many semi-subterranean house depressions, several of which contain in-place structural timbers. The site extends about 1000' along the runway alignment, and is about 400'

wide” (Livingston and Gannon, 1993:4). Unfortunately, further details concerning the site were lacking.

In 2013, during an informal survey of the area while waiting for a boat to Cape Denbigh, we “rediscovered” this massive complex of houses. Many depressions were visible over a raised area adjacent to the airport; however, the vegetation covering the area consisted of waist-high grasses and shrubs, along with clusters of alders. Thus, it was difficult initially to gauge the magnitude of this site. Many features were large (> 5 m) one-room houses with meter-high berms and in line with the shapes associated with semi-subterranean winter houses from the Late Prehistoric period (Giddings, 1967; Giddings and Anderson, 1986). We also observed that considerable erosion was occurring along the eastern margin of the site adjacent to Shaktoolik Bay.

Because of the site's research potential and vulnerability to erosion, we initiated field investigations in 2014. Our goals were to identify and map all visible cultural and topographic features, to define the site boundaries and the extent and threat of erosion, and to test a sample of features to assess the cultural occupations of the site.

#### MAPPING

The objective of the mapping program was to identify all cultural features visible on the surface of the site, as well as record their perimeters, and accurately depict the surrounding topography. Before fieldwork in 2014, we assessed aerial images available for the site and noted the presence of approximately 25 larger house depressions. Once we were on the ground, it became evident that the vegetation had concealed the site considerably (Fig. 2), and “ground-truthing” revealed more than four times the number of houses originally estimated.

We used a total station to map the topographic relief through measurement of transect data points. Features were recorded during this process as discovery occurred. Because of poor visibility, we discovered many features within the vegetation by stepping (or in some cases, falling) into them. Once we encountered a feature, we recorded its outline and depth. In most cases, the features were winter-house depressions. For these depressions, we used the house walls indicated by berms to create outlines. Shots (measurements) were taken at corners and any changes in berm direction. Often the presence of upright posts emerging slightly through the sod facilitated this process; other times, posts were detectable immediately below the surface. Vegetation occasionally aided in the discovery of various depressions, as certain plants preferred to grow in culturally disturbed soils. While it is clear that what is visible on the surface may not exactly reflect subsurface structures, this approach allowed us to generate a general overall plan-view map for each house.

Because of the size of the site and the number of depressions, it took nearly five weeks over two seasons to



FIG. 2. Two views of the Shaktoolik site showing the extent of vegetation cover. The top image is looking east towards the elevated central area of the house. A crew person is standing in the location of House 99. The lower image is a view looking northeast from House 63 adjacent to John Darwent excavating in Unit J. Approximately 40 houses, many possessing multiple rooms, are present in the grass along the ridge. Photo credit: John Darwent (top photo) and Jason Miszaniec (bottom photo).

complete the mapping. Topographically, the site is located on three arc-shaped beach ridges that come together in the south to form one larger ridge. These ridges formed through sediments dropping at the interface of Norton Sound with the outlets of the Shaktoolik and Tagoomenik Rivers during the build-up of the Shaktoolik Peninsula. Most human occupation of the site was concentrated on the central ridge of the three, which is the most elevated. However, as discussed below, it is likely that a substantial portion of this elevation relates not to natural processes but rather to human activity (i.e., it is a midden mound). At present, it is not known when the deposition of the beach ridges transpired in relation to human occupation. Substantially fewer features were recorded scattered outside this core area; however, on a smaller, lower lying beach ridge there is a linear arrangement of houses, which suggests that they were constructed around the same time.

We identified 134 individual houses; however, many had multiple rooms. Thus, we recorded a combined total of 362 larger cultural depressions and another 65 smaller discrete depressions, which were usually adjacent to the houses and likely the remnants of cache pits (Fig. 3).

### *House Shapes*

The configurations of the houses (house shapes, or HS) at the Airport Site fall into 12 groups. Most of the houses in the groups are relatively simple and consist of little

more than a room with an entrance tunnel (see online supplemental data, Table S1, and Fig. S1 for details and temporal assessments), but three groups of houses are most significant for interpreting site use over time.

The first group consists of large rectangular houses (HS 11). While only two of these structures are present, one intrigued us because its size and shape match ethnographic descriptions for men's houses, (e.g., Zagoskin, [1847] 1967:115; Nelson, [1889] 1983:245–247). On the surface, House 99 consists of a  $9 \times 13$  m square-shaped berm, raised 1 m from the ground surface, with a mounded area on the west end (Fig. 4). As discussed in the next section, the mounded area is a midden associated with this structure. The second example of this house form (House 87) is similar in size but less well preserved.

Members of the second significant group of houses (HS 7) are also large in size. These are characterized by a deep, main-room depression ( $> 0.6$ – $0.8$  m deep) often with visible remnants of sleeping platforms (Fig. 5). A single deep tunnel extending from the main room likely denotes a cold-trap entrance that extends to an entrance “foyer.” The 16 examples present were located primarily in the northern portion of the site. The house shape is significant because it is similar to houses identified by Schaaf (1995:231, 251–252) on the Seward Peninsula from the late 19th and early 20th centuries. These houses are associated with Inupiat groups. They are likewise comparable in shape to those described by Powers et al. (1982:96–100) for the Singaurq site at the mouth of the Tuksuk River, a village known since 1827 and still present in the 1890s. Ethnographically, Nelson ([1889] 1983:252–254) also describes similar houses from Ignituk (Cape Darby) and Cape Nome from the late 1800s.

The third significant form of house (HS 4) is the most numerous group on the site ( $n = 27$ ). The defining characteristic of these houses is that they consist of multiple small rectangular to square rooms interconnected with what appear to be short, relatively narrow tunnels or passageways (Fig. 6). The tunnels often have upright poles at regular intervals, suggesting walls, and thus even if not covered in the strictest sense of a tunnel, they are minimally corridors dug into the ground surface to connect rooms. There is no one universal form—some are large, spanning over  $800 \text{ m}^2$  with more than 25 rooms, whereas others are considerably smaller with just a few rooms (range = 3 to 29 rooms). The largest examples are in the northeastern portion of the site. Where they are found at the southern extent of the site, many were excavated into mound-like geomorphic landforms. At first, we assumed that these mounded areas were of human construction, but after noting several similar mounds with no cultural modification, we believe that people were likely seeking these natural topographic features into which to excavate their houses rather than constructing earthen walls.

Multi-roomed houses of this type are not well reported in the archaeological literature. Similar houses have been noted at the former Yup'ik village at Unalakleet on

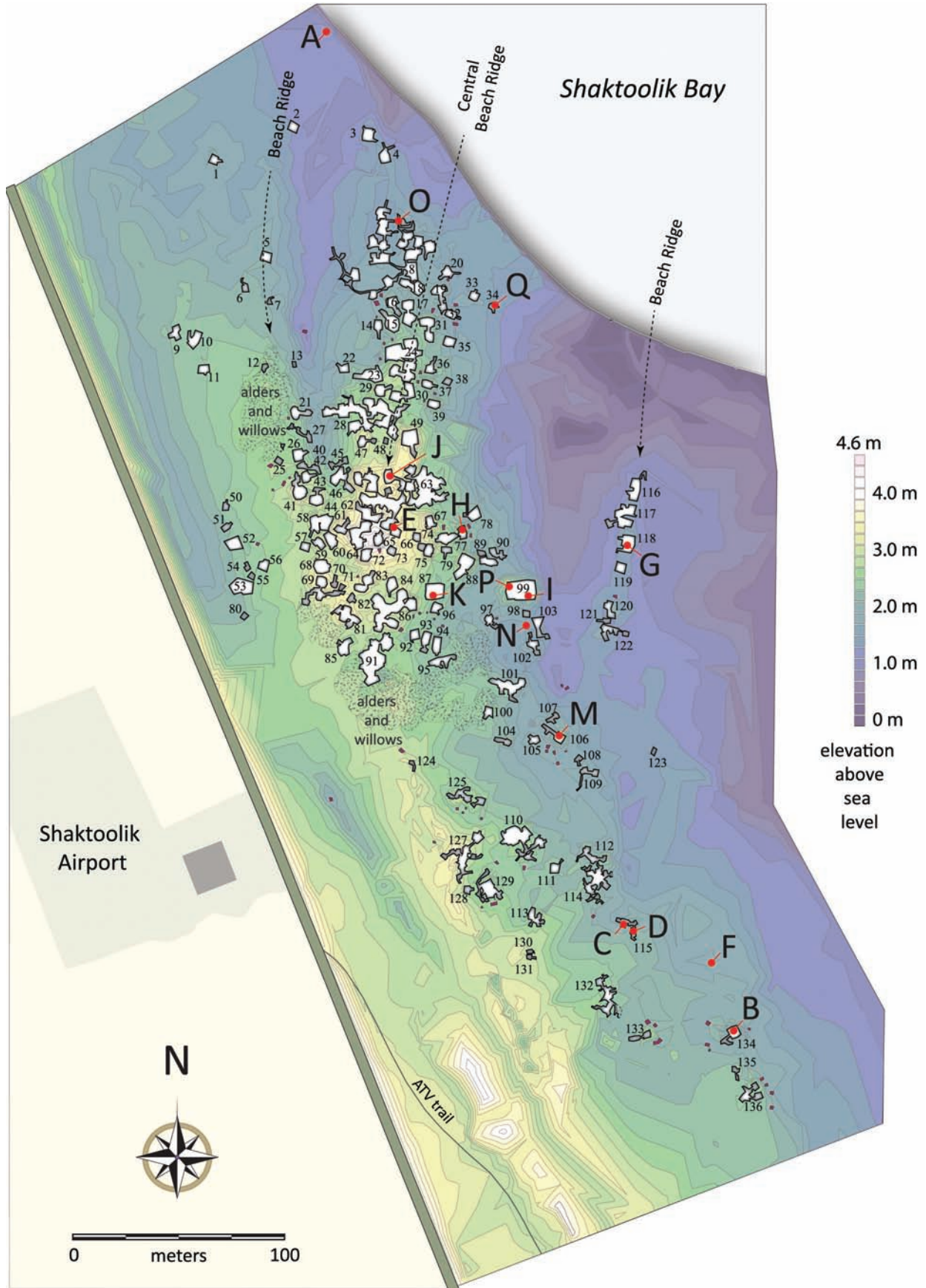


FIG. 3. Contour map of the Shaktoolik Airport site showing the location of houses and test units based on total-station measurements collected in 2014 and 2015. Details on the house shapes present are in the online supplement.



FIG. 4. Images and map depicting House 99, which is interpreted as a men's house. The larger image is looking northeast, and the smaller inset image of Andy Tremayne, who is standing in front of the mounded area associated with the house, is facing west. The inset map depicts the changes in elevation of the house berm. Photo credit: Kelly Eldridge.

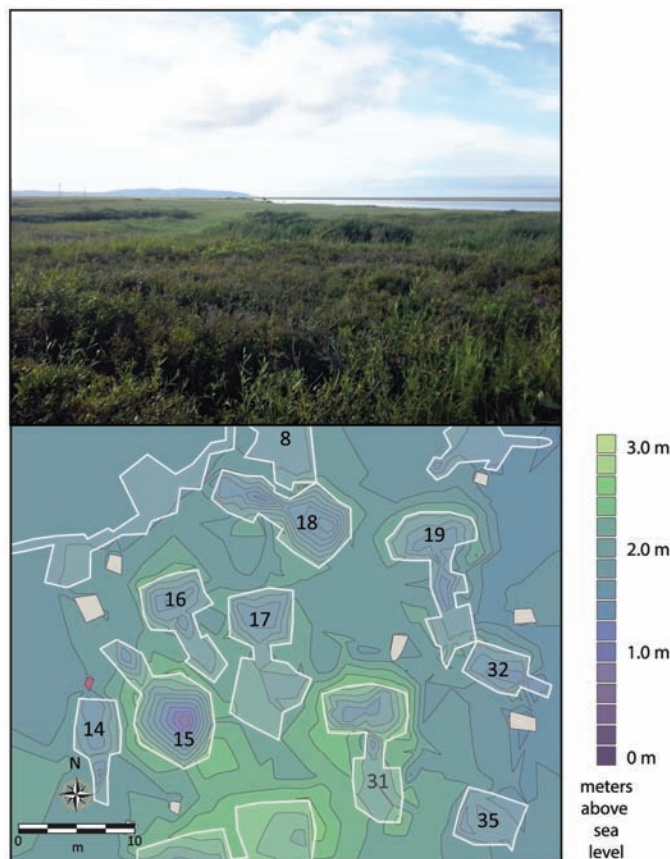


FIG. 5. At the bottom of the image is a small-scale map depicting houses 16–19, which appear to be Inupiat houses from the late 1800s. House 15 is a related form without an entrance room. The image on top is a photograph of the same group of features. Note that heavy vegetation conceals most of the depressions. Photo credit: Kelly Eldridge.

the south side of the river and possibly near the airport (Kenneth Pratt, pers. comm. 2015). It is also possible that this style extends north to the Kobuk River region,

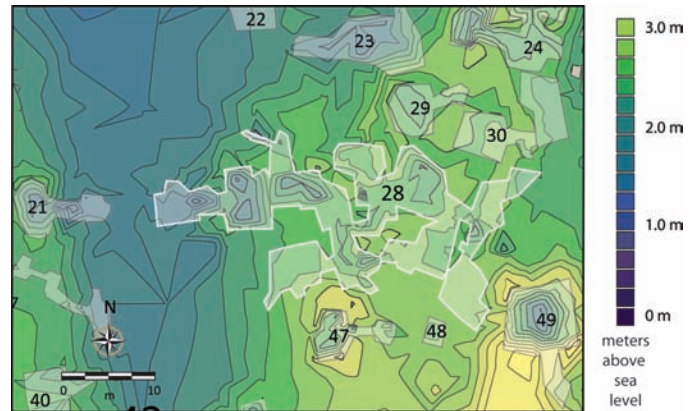


FIG. 6. A small-scale map depicting House 28, which is a multi-roomed house likely associated with late prehistoric/early historical period Yupiit occupants of the site.

as Douglas Anderson describes similar multi-roomed houses with interconnecting tunnels uncovered during recent excavations near Kiana (Restino, 2013). Similarly, McManus-Fry et al. (2016) describe encountering multi-roomed houses at the Nunalleq site. The houses at the Shaktoolik Airport site seem to most closely resemble those described ethnographically by Nelson ([1889] 1983) and others (e.g., Frink, 2006, 2016, and references therein) for the Yukon-Kuskokwim/Nunivak Island area. In this area, these interconnected networks of tunnels served as clandestine escape routes during warfare and raids (Funk, 2010; Fienup-Riordan and Reardan, 2016).

## TEST EXCAVATIONS

The primary purpose of our test excavations was to establish the age of site occupation(s) and to assess the density and degree of preservation of cultural materials. Determining feature function and architectural details, though important, was a secondary consideration. Sixteen test units were excavated in 2014–15 (online supplement Table S2; Fig. 2). We placed one unit in a midden area eroding into Shaktoolik Bay (Unit A), another into an unknown feature form (Unit F), and a third outside of a house (Unit N). The remaining 14 units were placed within different house depression shapes across the site to assess the temporal and spatial use of the site.

Testing revealed that the greatest density of artifacts is in the elevated area at the center of the site. At all elevations less than 1.5 m above sea level, there is a significant decrease in organic-artifact preservation, which seems to be related to the absence of permafrost combined with seasonal flooding of Shaktoolik Bay. In the central elevated area, permafrost was present in all of the excavated units, and in units E, J, and P, there was a particularly high density of artifacts and bone, which included many well-preserved antler, wood, bone, and ivory artifacts. A complete inventory of the artifacts recovered from each unit is

TABLE 1. AMS radiocarbon dates from the Shaktoolik Airport Site (NOB-072).

Lab number	Provenience	Material	Conventional radiocarbon age	$\delta^{13}\text{C}$	$\delta^{15}\text{N}$	INTCAL13 (2-sigma) range <sup>1</sup>	Cal. mean age <sup>2</sup>
Beta-397376	House 66: Test Unit E, Level 3c	caribou, mandibular 2nd molar	140 ± 30 BP	-18.1‰	n/a	AD 1669–1945 <sup>3</sup>	AD 1805 ± 82
Beta-427487	House 63: Test Unit J, Level 14	caribou, cervical vertebra	330 ± 30 BP	-19.3‰	2.5‰	AD 1465–1645	AD 1560 ± 48
Beta-397377	Midden: Test Unit A, Level 2	caribou, mandibular 2nd premolar	430 ± 30 BP	-17.3‰	n/a	AD 1421–1616	AD 1464 ± 39
Beta-397378	House 63: Test Unit J, Level 7	caribou, 3rd phalanx	450 ± 30 BP	-17.5‰	n/a	AD 1415–1479	AD 1445 ± 23
Beta-427485	House 99: Test Unit P, Level 2	caribou, 3rd phalanx	530 ± 30 BP	-18.7‰	3.2‰	AD 1320–1440	AD 1397 ± 35
Beta-427486	House 99: Test Unit P, Level 10	beaver, mandible <sup>4</sup>	650 ± 30 BP	-22.5‰	4.4‰	AD 1280–1395	AD 1339 ± 37
Beta-397375	House 99: Test Unit I, Level 4	birchbark	890 ± 30 BP	-27.2‰	n/a	AD 1041–1218	AD 1131 ± 54

<sup>1</sup> Reimer et al. (2013), calibrated with OxCal 4.3 (Bronk Ramsey, 2001).

<sup>2</sup> Calibrated mean radiocarbon ages calculated using OxCal 4.3 (Bronk Ramsey, 2001).

<sup>3</sup> No historical artifacts from this level; 80% likelihood date is between AD 1665 and 1895.

<sup>4</sup> We chose the beaver mandible for dating since neither terrestrial mammal bone nor charcoal was recovered from the lowest level of the unit. Dates from beaver could be subject to the freshwater reservoir effect because of the species’ freshwater environment. However, the beaver’s primary food is the outer layer of bark and cambium of terrestrial trees, such as willow, alder, birch, and poplar (Müller-Schwarze and Sun, 2003), which contain atmospheric carbon, likely incorporated into the wood during the beaver’s lifetime. Therefore, the effects of older carbon in freshwater transferring to beavers through wood consumption would be insignificant. See Philippsen (2012) for discussion of freshwater reservoir effects.



FIG. 7. Adzed planks associated with the historical cabin encountered in Unit E. Photo credit: Kelly Eldridge.

available in online supplemental Table S2. We highlight the more significant finds below.

*Unit E (1 × 2 m)*

Unit E, a 1 × 2 m test, was excavated to investigate a flat, rectangular area near the top of the elevated central portion of the site, designated House 66. After removal of the sod, it was apparent that a wood floor of adzed planks had been constructed for a cabin; also present were two upright posts and remnants of a wall (Fig. 7). Small sherds of indigenous pottery were in direct association with the floor, along

with some degraded strips of rusted iron; underneath the planks were glass beads of Russian manufacture (Grover, 2016). At a minimum, the floor could date to as early as the mid-1800s; however, given the similarities to Euro-American architecture, it was likely constructed after the abandonment of traditional house shapes in the early 20<sup>th</sup> century (Schaaf, 1995).

After removal of the timbers, it became evident that the cabin pad was built on top of a midden deposit, as a considerable amount of wood, faunal remains, and organic-enriched soil was encountered. By the end of the 2015 field season, Unit E had been excavated to a depth of 1.15 m below surface (bs), but persistent permafrost prevented further excavation. The depth of these deposits suggests that at least 1 m of midden deposit (but likely even more) covers the central elevated area of the site.

Historical blue-and-white glass beads were recovered to a depth of about 0.3 m in the midden. These, along with some metal fragments, suggest that deposition of the upper portion of the midden occurred after the mid-1800s. However, earlier trade through the Siberian system cannot be ruled out (Dovgalyuk and Tataurova, 2010). Below this level, approximately 0.6 m bs, no further Euro-American/Russian artifacts were recovered. A single radiocarbon date (Table 1) from this depth of 140 ± 30 BP (cal AD 1669–1945; calibrated with OxCal 4.3 [Bronk Ramsey, 2001]) suggests occupation between AD 1669 and the late 1800s. Unit E had the best wood preservation of all of the units excavated at the site (see Fig. 8 for examples) and the second largest number of pottery sherds (see online Table S2).



FIG. 8. Artifacts recovered from excavations at NOB-072: a, antler comb, Unit H; b and e, antler harpoon darts, Unit J; c and d, antler leister bars, Unit J; f, pottery, Unit J; g, box part, Unit E; h, ivory labret, Unit H; i, chipped slate ulu preform; Unit I; j, chert scraper, Unit G; k, wood snowshoe crosspiece, Unit J; l, kayak deck beam, Unit E; m, bone snow goggles, Unit E; n, wood fish-net float, Unit E; o, birchbark spoon, Unit I; p, wood skin scraper, Unit E.



Faunal remains from the historical levels of the midden are significantly different from those in our well-preserved prehistoric Yup'ik sample (see below; Table 2). More than half of the historical midden assemblage consists of hare bones, followed distantly by small seal, caribou, ptarmigan, dog, and salmon or cod bones. Most likely, deposition of this midden occurred during winter given the limited number of taxa represented and the dominance of hare, which was preferred during its white pelage phase by both Native peoples and Russian-American fur traders (Bockstoce, 2010).

#### *Unit J (1 × 2 m)*

After the complexity of the multi-roomed houses had become apparent during the mapping, we deemed it necessary to determine when they were used. Unit J was placed in a relatively deep room associated with House 63, a multi-roomed house located on the northeastern side of the central elevated area. Excavation revealed a small amount of fill debris overlying the remains of floor deposits at 30–40 cm bs (Fig. 9). Under the floor, further excavation revealed that the midden continued to a depth of 1.4 m bs, where we encountered sterile sand and gravel. These deposits suggest that the midden extends from the central elevated area of the site along the central northeast-oriented beach ridge. Like the house on top of Unit E, House 63 was built into and on top of these midden deposits.

Euro-American/Russian artifacts, consisting of red glass beads with a clear center, a sherd of red transfer-printed whiteware, and shards of olive-green bottle glass, were recovered from the first 0.4 m bs (online Table S2). The beads, known as Cornaline d'Aleppo beads, are present in other archaeological sites in Alaska and the Northwest Coast from the 1840s (Crowell, 1997:171; Grover, 2016). Thus, it is reasonable to expect that these artifacts could have entered into the archaeological record in the mid-1800s.

It is possible that the dates associated with these historical artifacts are proxies for the time when the house depression was excavated and used, which, because this room seemingly connects to the rest of House 63 via a tunnel, implies that this was the time when the dwelling complex was used. However, it is also possible that later occupants of the site, rather than its constructors, deposited these artifacts since re-use of house depressions is a common phenomenon (e.g., Giddings, 1967; Darwent et al., 2013). Thus, at this time is impossible to assess either case without further excavations.

Recovery of historical artifacts did not occur below 0.4 m bs. At this depth, the deposit consisted of alternating layers of dark silty loam, gravel, sand, and shell, many layers of which were discontinuous across the unit, suggesting that they represent individual dumping events. Two radiocarbon samples obtained from caribou bone,  $330 \pm 30$  BP (AD 1465–1645) and  $450 \pm 30$  BP cal (AD 1415–1479)

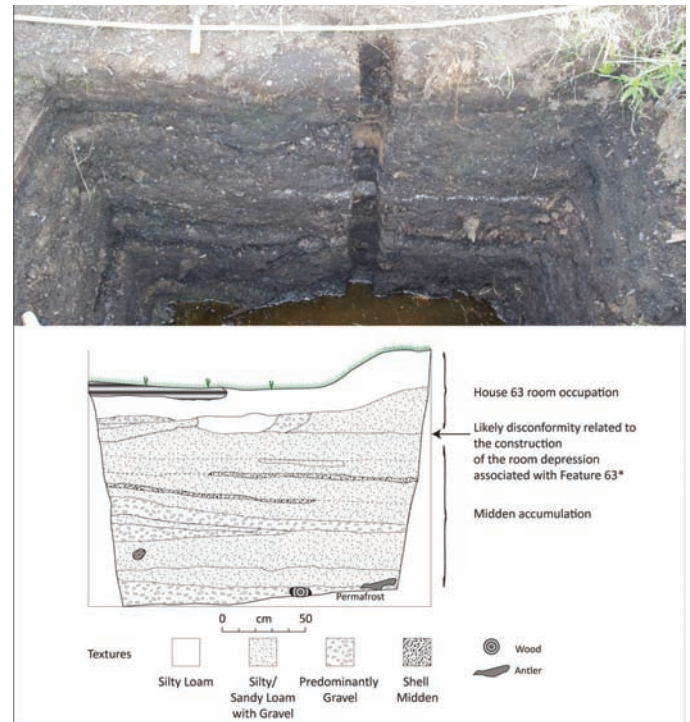


FIG. 9. North wall profile of Unit J showing the midden underneath the construction of House 63. Photo credit: John Darwent.

(Table 1), suggest that the midden accumulated during the 15th to 17th centuries AD.

Faunal remains from levels associated with the radiocarbon dates are distinctly different from the historical deposits in Unit E. Taxonomic richness is nearly double and may relate to the fauna being caught or hunted during the summer months (Table 2). Close to 60% of the remains were fish, including herring, salmon, cod, and flounder. Bird elements constituted 25% of the assemblage and included various ducks and geese, loons, cormorants, gulls, and murre. Although the difference between the analyzed faunal assemblages appears to be seasonal, it could also reflect a shift to trade-oriented fauna (e.g., hares) during the historical period.

Large quantities of pottery sherds occurred throughout the unit, most of which were body sherds. Most of this pottery is thick, undecorated, and tempered with sand and fibers. However, some sherds had a design of three-line parallel grooves and punctate patterns encircling the vessel close to the rim (Fig. 8f).

#### *Units C (1 m<sup>2</sup>) and D (1 m<sup>2</sup>)*

Units C and D were placed in House 115, which is a multi-roomed house on the southern end of the site. The excavation of these two units was one of the first indications that the lower elevation areas yielded poor preservation of organic artifacts. Unit C had one piece of chert debitage, and Unit D had a small fragment of indigenous pottery, as well as remnants of floorboards. While this conclusion is

TABLE 2. Vertebrate faunal remains recovered from Test Unit J, levels 6–7 (House 63; Nukleet/Yup'ik midden deposits; dated to ca. AD 1420–1645), and from Test Unit E, levels 3a-b (House 66; Historical house deposits; ca. AD 1830–1900).

Tax	Nukleet/Yup'ik		Historical	
	NISP	%NISP	NISP	%NISP
<b>Fish:</b>				
Herring ( <i>Clupea</i> sp.)	16	7.4	–	–
Char/trout/salmon/whitefish (Salmonidae)	14	6.5	87	1.2
Cod (Gadidae)	18	8.4	73	1.0
Sculpin (Cottidae)	1	0.5	–	–
Flounder (Pleuronectidae)	19	8.8	–	–
Fish unidentified	235	–	133	–
Total fish	303	59.9	293	24.9
Fish richness (N taxa)	5	–	2	–
<b>Bird:</b>				
Duck/goose/swan (Anatidae)	25	11.6	5	0.7
Goose (Anserinae)	1	0.5	–	–
Swan ( <i>Cygnus</i> sp.)	–	–	1	0.1
Eider ( <i>Somateria</i> sp.)	7	3.3	–	–
Dabbling duck (Anatinae)	20	9.3	–	–
Ptarmigan ( <i>Lagopus</i> sp.)	1	0.5	36	4.8
Loon ( <i>Gavia</i> sp.)	5	2.3	–	–
Cormorant ( <i>Phalacrocorax</i> sp.)	6	2.8	–	–
Murre/guillemot (Alcidae)	3	1.4	–	–
Gull/tern (Laridae)	10	4.7	–	–
Bird unidentified	48	–	31	–
Total bird	126	24.9	73	6.2
Bird richness (N taxa)	9	–	3	–
<b>Mammals:</b>				
Ground squirrel ( <i>Spermophilus</i> sp.)	–	–	6	0.8
Rodent (Rodentia)	–	–	4	0.5
Hare ( <i>Lepus</i> sp.)	2	0.9	409	54.2
Dog/wolf ( <i>Canis lupus</i> )	4	1.9	20	2.6
Fox ( <i>Vulpes</i> sp.)	2	0.9	–	–
Walrus ( <i>Odobenus rosmarus</i> )	–	–	1	0.1
Bearded/ribbon seal ( <i>Erignathus/Histriophoca</i> )	5	2.3	1	0.1
Ringed seal ( <i>Pusa hispida</i> )	1	0.5	–	–
Harbor/spotted/ringed seal ( <i>Phoca/Pusa</i> )	31	14.4	58	7.7
Pinniped (Pinnipedia)	1	0.5	18	2.4
Caribou ( <i>Rangifer tarandus</i> )	23	10.7	36	4.8
Mammal unidentified	8	–	259	–
Total mammal	77	15.2	812	68.9
Mammal richness (N taxa)	6	–	7	–
Total NISP	506	–	1178	–
Total richness (N taxa)	20	–	12	–
Unidentified bone	89	–	149	–
Total	595	–	1327	–

tentative, the lack of historical items in House 115, such as glass beads, bottle glass, European ceramics, and possibly metal—all of which should have preserved—suggests that the structure is likely prehistoric, constructed before the 1830s.

#### Units I ( $1 \times 2$ m) and P ( $1$ m<sup>2</sup>)

In addition to obtaining materials and artifacts to establish the temporal nature of House 99, we excavated units I and P (Fig. 10). We placed Unit I inside the depression in a location that would allow us to test the floor, but also to determine whether a bench was present around the outside wall. Excavations revealed that the house floor was relatively shallow, located approximately 0.25 m bs, and there was no evidence of roof fall. While it is possible

that the remains of the roof are not present because they decayed (the structure is located at around 1.5 m above sea level threshold, where most organic materials have decayed at the site), it is also conceivable that the structure was disassembled and the timbers used elsewhere. However, on the south side of the unit, two upright posts abutting a large, horizontally lying timber were present, which appear to be the remnants of a bench that would have run along the south wall (Fig. 11). This bench compares favorably to descriptions of men's house architecture from coastal Alaska made by Zagoskin [1847] 1967:115).

Artifacts recovered from the floor were predominantly stone (46 stone tools and 427 pieces of debitage; see online Table S2 for objects and materials). Organic materials were present as well, including a birchbark spoon (Fig. 8o), bark curls ( $n = 2$ ), a wooden arrowhead, a large ivory harpoon

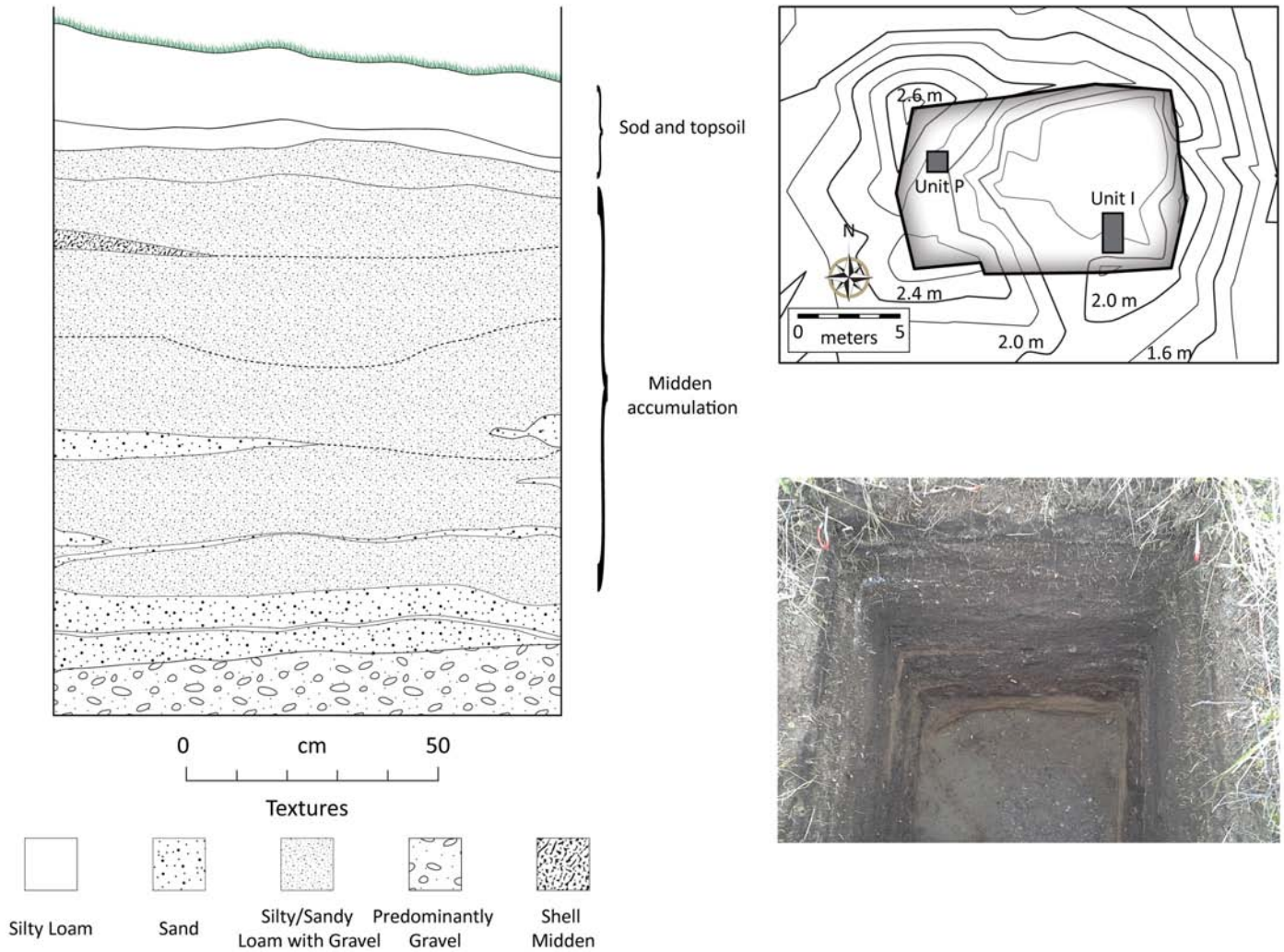


FIG. 10. North wall profile of Unit P showing the area of midden accumulation. Inset map shows the location of Unit P in relation to Unit I.

blank (likely for beluga), and a caudal vertebra of a large whale. The only pottery consisted of a few fragments ( $n = 3$ ). Faunal remains were rare, and those that were recovered were calcined. Compared to the other units, the percentages of different artifacts recovered from Unit I are considerably different; artifacts recovered are consistent with an assemblage associated with a men’s house (Lutz, 1973).

Lacking terrestrial bone in the faunal assemblage, we submitted a fragment of birchbark for AMS radiocarbon dating. This fragment was recovered from the lowest level of the house in floor contexts and therefore is likely related to the occupation of the house. The sample yielded a date of  $890 \pm 30$  BP, or cal AD 1040–1220. If the date is indicative of feature use, then the occupation of the house was coincident with the Nukleet occupation of the Iyatayet and Nukleet sites at Cape Denbigh (Giddings, 1964; Murray et al., 2003; Tremayne, 2015).

An unusual aspect of House 99 was a raised, mound-like area in the western third of the feature. Our initial speculation was that it could represent a second room

attached to the main room. To test this hypothesis, we placed Unit P in this area in 2015. This test revealed that the raised area is a thick and exceptionally rich midden deposit. Immediately below the sod layer, the unit consisted of multiple interleaved layers with considerable quantities of fish bone present, and in some instances shell, which continued to 1 m below the surface. Interspersed among the fish bones were stone debitage, broken bone tools, and wooden artifacts.

To estimate the length of time it took for the midden to accumulate, we dated a caribou phalanx from the top of the midden and a beaver mandible from the bottom of the midden. The higher sample dated to  $530 \pm 30$  BP (cal AD 1325–1435), and the lower dated to  $650 \pm 30$  BP (cal AD 1280–1395) (Table 1). On the basis of these dates, the means of which are only 120 radiocarbon years apart, we consider it likely that the midden built up over a period of 150 years or less. These dates put the midden at a slightly younger age than the house floor, so future radiocarbon dating is necessary to clarify whether there is a true difference, or one or more of the dates is erroneous.



FIG. 11. Upright posts and structural beam associated with a bench running along the south wall of House 99. Photo credit: Kelly Eldridge.

#### *Unit G (1 m<sup>2</sup>)*

Unit G was placed into House 118 to investigate the nature of the linear arrangement of houses situated on the low-lying beach ridge. Assorted stone artifacts and pottery fragments were recovered, but organic preservation was exceptionally poor. The only faunal remains recovered were severely burned or calcined. The pottery fragments derive from thick-walled vessels, suggesting a Nukleet affiliation, but we did not recover any dateable organic material to refine this temporal window.

#### *Unit H (1 m<sup>2</sup>)*

Unit H was placed in a foyer or entrance room of House 77, a potential Inupiat-style house. We excavated Unit H to a depth of 0.6 m bs, at which point we encountered an original ground surface that had been buried during the construction of the house. Thus, the berm surrounding the room was built up rather than excavated into the ground.

Throughout all levels of the unit, we recovered a variety of Native artifacts, including pottery ( $n = 84$ ), bone artifacts ( $n = 9$ ) (including a comb and labret; Fig. 8a, h), and stone artifacts ( $n = 41$ ). Historical artifacts were recovered throughout all levels of the unit as well, including the base of an olive-green glass bottle, three metal fragments (one possibly the remnant of a cartridge), and seven glass beads. These historical artifacts indicate that the occupation of this feature likely occurred in the mid- to late 1800s. If correct, this temporal assessment corresponds with the movement of Inupiat into the region (VanStone, 1973; Ray, 1975; Ganley, 1995; Burch, 2005; Pratt, 2012) and supports the notion that HS 7 style houses are associated with this migration.

#### *Unit A (1 × 2 m)*

Unit A was opened in the far northeastern area of the site next to a cutbank along Shaktoolik Bay to investigate a thin

midden deposit that appeared to be rapidly eroding. Most of the cultural materials recovered consisted of pottery fragments ( $n = 70$ ) and poorly preserved faunal remains, along with some stone and bone artifacts. Flooding during the summer of 2014 resulted in 0.2 m of the cutbank falling into the bay after we completed our excavation. A radiocarbon date on a caribou tooth produced a date of  $430 \pm 30$  BP (cal AD 1421–1616), which coincides with dates from Unit J in the central portion of the site.

## DISCUSSION

The results of mapping and test excavations indicate that the Shaktoolik Airport site appears to have four main periods of occupation: 1) Nukleet (AD 1100–1400), 2) late prehistoric/early historical Yupiit (AD 1400–mid-1800s), 3) early historical Inupiat (mid-1800s–1900), and 4) early 1900s Inupiat. Whether there was continual occupation of the site over this time cannot be ascertained without further investigation, both at this location and on settlement patterns in the wider Shaktoolik region. We surmise that the site was, at a minimum, frequently reoccupied on a regular basis.

#### *Nukleet: AD 1100–1400*

At present, the only feature we can place in this period is House 99. While the temporal relationship between the house floor and midden needs to be refined, we do believe them to be related on the basis of their proximity to one another. Both the floor (Unit I) and the midden (Unit P) have dates that fall within the period of Nukleet occupation of Norton Sound between AD 1100 and AD 1400. It is conceivable that the house floor could precede this period; however, as previously stated, more radiocarbon dating is needed. It is also possible that other houses also fit this AD 1100–1400 period on the basis of architectural style. For example, Houses 106, 107, and 134 all have a long tunnel with a kitchen spur connected to a single main room reminiscent of early Thule-style houses to the north (HS 12, online Table S1; see Giddings and Anderson, 1986). Unfortunately, test units B in House 134 and M in House 106 both failed to produce dateable organic material that could confirm the link based on architectural style alone.

Radiocarbon dates indicate that House 99 was occupied at the same time as the earliest Nukleet occupation at both the Iyatayet and Nukleet sites at Cape Denbigh (Giddings, 1964; Murray et al., 2003; Tremayne 2015). Giddings (1964:115–116) regarded Nukleet as a culturally stable entity on the basis of dendrochronological research; any changes that occurred would not have “upset a basic economy or imply successions of people.” He notes that the “Nukleet culture is literally an extension backward in time of the culture of modern-day Norton [Sound] people” (Giddings, 1964:118). Nevertheless, Giddings (1964:115) viewed the cultural development of the southern Norton Sound region

over the last 1000 years as in tandem with the Kobuk Valley because Inupiat was spoken both on the southern Seward Peninsula and along the Kobuk River (Giddings, 1964:115). Also, his archaeological crew, which he drew from Shaktoolik, were Inupiat speakers. However, Giddings erred in his assumption that the Inupiat were long-term residents of this area. Historical accounts, place-names, and oral tradition, as previously discussed, all suggest that Yup'ik peoples lived in this region before the Inupiat migration in the mid-1800s (Ray, 1975; Burch, 2005:233). Thus, the stability over time described by Giddings should be viewed as one of continual occupation by Yup'ik speakers for the past 800 years. However, until further work is undertaken to explore links in material culture between Nukleet and Yup'ik, such connections are tentative.

We believe that House 99 was a men's house because of its architecture, which includes benches around the perimeter and similarity to historical descriptions of Yup'ik men's houses (e.g., Zagoskin, [1847] 1967; Nelson, [1889] 1983:245–247). However, we base our interpretation on its artifact assemblage as well. The types and quantities of artifacts present are in line with manufacturing of tools and other activities associated with men and follow criteria set forth by Lutz (1973) for identifying such structures in the archaeological record. The presence of such a structure during this early period points to the antiquity of this institution in Norton Sound.

#### *Prehistoric/Early Historic Yup'ik: AD 1400–mid-1800s*

The two-sigma ranges for the radiocarbon dates from Unit J suggest that deposition of the midden on the central beach ridge began as early as AD 1425. Use of this site is concurrent with the latter stages of Nukleet occupation at both the Iyatayet and Nukleet sites at Cape Denbigh (Giddings, 1964; Murray et al., 2003; Tremayne, 2015). More work at the Airport Site needs to be undertaken, but current evidence from Units J and E indicates that site use continued through the period with no sign of a major break in cultural continuity, which suggests a direct connection between the archaeological Nukleet and ethnographic Yup'ik peoples.

At present, it is not possible to specifically tie any house shape to the start of this period. However, we do believe that the use of the multi-roomed houses occurred during this time based on the results from units J, C, D, and O. While C, D, and O were not overly productive in terms of artifacts, they lacked historical trade items, which suggests Houses 8 and 115 are prehistoric. Evidence from Unit J, however, indicates that House 63 could have been used into the mid-1800s.

These houses, along with a potentially related form (HS 3, Supplemental Data), are the most numerous on the site and strongly support intensified occupation during this period. We believe that these houses are of Yup'ik affiliation, for the following reasons:

1. The ethnographic and oral history record strongly suggests that the area was Yup'ik territory during the time in which the houses were constructed;
2. It appears that the overall configuration of the Shaktoolik Airport site falls within a pattern attributed to Yup'ik settlements in southwestern Alaska (Shaw, 1983:241, 1998) with groups tending to re-use suitable areas for villages in roughly circular patterns, tightly clustering houses together. This concentration led to the development of built-up midden deposits over time, which continued to be lived on. We suggest a similar site evolution occurred at the Shaktoolik Airport site.
3. Other examples of multi-roomed houses of this form are relatively unknown in the literature. Several large-scale surveys have been undertaken on the Seward Peninsula to the north (e.g., Bockstoce, 1979; Powers et al., 1982; Schaaf, 1988, 1995; Harritt, 1994; Darwent et al., 2013), but none of these studies identified such multi-room houses. These houses do, however, resemble those described by other authors for the Yupiit during the “Bow-and-Arrow War days.” McManus-Fry et al. (2016) and Ledger et al. (2016: Fig. 3) described such houses at Nunalleq, while Frink (2006, 2016) noted others elsewhere in southwestern Alaska (see also Nelson, [1889] 1983; VanStone, 1968; Funk, 2010; Fienup-Riordan and Rearden, 2016). Various authors describe a series of rooms connected by a labyrinth of tunnels, which functioned as escape routes and defensive holds during inter-village attacks. Their descriptions closely match the maze of tunnels and rooms that comprises the houses at the Shaktoolik Airport.
4. Some of the wooden artifacts (e.g., a kayak part, a snowshoe brace, and a peculiar skin scraper) recovered from this period are consistent with ethnographically recorded Yup'ik-style artifacts (Nelson, [1889] 1983; Fig. 8).

#### *Early Historic Inupiat, mid-1800s–1900 and Early 1900s Inupiat*

Sometime in the mid-19th century, there appears to have been an abrupt change in architecture at this site: construction of houses with one large, main room, and a long tunnel leading to an entrance foyer began. It is hard to say with certainty when the construction of the previous multi-roomed houses ceased, but this new house form closely resembles early 19th- to 20th-century houses on the Seward Peninsula (Schaaf, 1988, 1995). VanStone (1968) described similar houses at Tikchik Village in the Nushagak River region in southwestern Alaska, and we acknowledge the possibility that this architectural influence comes from the south. However, given the consistency of historical accounts and oral tradition, it seems more likely that this architectural style arrived from the north. The most

parsimonious explanation is that the new single-roomed houses are associated with recent Inupiat migrants from the Kobuk River and Kotzebue Sound regions in the mid-1800s (VanStone, 1973; Ray, 1975; Ganley, 1995; Burch, 2005; Pratt, 2012). The evidence collected from the excavation of Unit H in House 77 appears to support this conjecture because the house was built and occupied in the mid-to-late 19th century. In addition to changes in architectural form, settlement at the site shifted from the elevated core area to the northeastern end of the site. Accompanying changes in house shape, there is evidence for subsistence changes as well, which begin in the mid-1800s. Faunal remains from the midden deposits in Unit E suggest a shift from the previous more marine mammal- and fish-based economy to the exploitation of species with greater market value.

Lastly, in Unit E (House 66), where we encountered the adzed-plank floor, which appears to be from a more Euro-American form of house, we still found indigenous artifacts present, which suggests that the last occupation of the site was by Inupiat who had abandoned traditional housing.

## CONCLUSIONS

Despite its size and proximity to Shaktoolik, the Airport site has sat hidden in the grass since professional archaeology began in the region nearly 60 years ago. We doubt this site is the only large, overlooked archaeological gem in the Shaktoolik area and Norton Sound more generally. As we have demonstrated here, sites like the Shaktoolik Airport site have the potential to greatly increase our understanding of the recent history of the past 800 years. We believe there is strong evidence for Yupiit occupation since the 14th century, and possibly back to the 11th century. As few Yupiit now reside in this region, one of the only ways to understand their history is through archaeological research. Although we have suggested a cultural link between Nukleet and Yupiit on the basis of our research at this site, additional excavations and comparisons of material culture are needed to better understand this link and how these groups relate to early Thule groups to the north.

The Shaktoolik Airport site also provides the potential to examine the tumultuous events of the 1800s when the Yupiit disappeared, and the Inupiat moved in—not to forget interactions with Athabascan groups to the east and incursions of Russian and later American traders. Already, the faunal remains have demonstrated that there is a significant change in hunting practices in the 1800s that may coincide with market demands at trading posts. The organic artifacts needed to trace these culture-historical changes lie frozen and well preserved in the central elevated area of the site. Unfortunately, time is of the essence: as climate change continues, the permafrost will decrease, and Shaktoolik Bay will continue to flood and whittle away at the site's eastern margin.

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## APPENDIX 1

A description of house shapes, one figure, and two tables are available in a supplementary file at:

<http://arctic.journalhosting.ucalgary.ca/arctic/index.php/arctic/rt/suppFiles/4677/0>

FIG. S1. Generalized shapes of house depressions at the Shaktoolik Airport Site, to scale.

TABLE S1. House shapes from the Shaktoolik Airport site identified and classified.

TABLE S2. Artifacts recovered from test units at the Shaktoolik Airport site.

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