REPORT

RECENT ARCHAEOLOGICAL INVESTIGATIONS OF GLACIAL LAKE ATNA SHORELINES IN WRANGELL–ST. ELIAS NATIONAL PARK AND PRESERVE, ALASKA

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ABSTRACT

This report provides preliminary results of recent archaeological investigations of terminal Glacial Lake Atna shorelines and associated areas of high probability for archaeological sites in Wrangell–St. Elias National Park and Preserve (WRST), located in Southcentral Alaska. Before this research, no direct archaeological evidence of late Pleistocene human occupation in WRST had been identified. However, obsidian from Wiki Peak, located in the northeastern corner of the park, is present in some of the earliest archaeological deposits in Alaska. Recognizing that the presence of Lake Atna would have influenced land use for people living in the region during the late Pleistocene, identification of Glacial Lake Atna shorelines and associated geomorphological features was undertaken in an attempt to better understand concurrent human land use. As a result of recent investigations, 69 archaeological sites have been identified. The majority of these sites are surface lithic scatters located in areas subject to deflation and other natural disturbances; however, one recently identified site revealed a subsurface hearth feature in a buried and stratified context that produced radiocarbon results dating the site to the late Pleistocene. Although obtaining reliable, datable material for most of these sites is challenging, numerous diagnostic artifacts consistent with other early prehistoric assemblages are present throughout the majority of these site locales. While typological comparisons do not always facilitate accurate temporal assumptions, the high quantity of diagnostic artifacts identified as a result of recent investigations is promising.

INTRODUCTION

Archaeologists have spent considerable time and effort attempting to identify Pleistocene-era sites in central Alaska, notably in the Tanana and Nenana River drainages (Cook 1996; Dixon 1985; Goebel and Buvit 2011; Hoffecker 2001; Holmes 2001; Lynch et al. 2018; Powers and Hoffecker 1989; West 1996). These discoveries have contributed to a general understanding of Alaska prehistory, which encompasses approximately 14,200 years, with the oldest recorded occupation at the Swan Point site located in the Tanana River Valley (Holmes 2001, 2011). Although this research has led to a basic understanding of Alaska prehistory, many questions remain regarding terminal Pleistocene land use of areas located in the Copper River Basin and WRST.

Glacial Lake Atna has long been recognized as a terminal Pleistocene proglacial feature (Ferrians 1963;

Ferrians and Nichols 1965; Nichols 1965; Schrader 1900; Schrader and Spencer 1901; Smith, this volume; Wiedmer et al. 2010) that would have affected land use and settlement patterns in Southcentral Alaska, specifically areas in the Copper River Basin and WRST. Previous research indicates that Lake Atna formed before 40,000 years BP at various levels due to glacial ice dams that existed until approximately 10,000 years BP (Ferrians 1989; Muhs et al. 2013; Pigati et al. 2013; Wiedmer et al. 2010; Williams 1989). These ice dams forced the lake to drain via high spillways until the time of dam failure. Dam failures resulted from either gradual glacial retreat or catastrophic collapse of the ice dam itself and led to massive outburst floods (M. Loso, pers. comm., 2 May 2019). The final ice dam was located in the lower Copper River drainage, presumably near the Miles and Allen Glaciers (Ferrians 1989; Nichols 1965; Wiedmer et al. 2010).

Minimal geomorphological and archaeological work regarding Glacial Lake Atna in WRST has been previously undertaken. The geomorphological investigations have been largely dominated by field-mapping efforts, which have led to the development of projected locations of Lake Atna shorelines (Nichols and Yehle 1969; Williams and Galloway 1986). These early field-mapping efforts have served as the foundation for subsequent investigations concerned with the lake's morphological and chronological characteristics. Recently, new research has focused on the lake's drainage routes and discharge behavior (Wiedmer et al. 2010), resulting in the identification of several spillways, one of which was previously unknown. It is important to note, however, that this new spillway refers to a high-elevation shoreline that enclosed a lake which exceeded the boundaries of the modern Copper River Basin. As a result, the higher-elevation lake is referred to by some investigators as Lake Susitna, although both names essentially refer to the same body of water (Ferrians 1989; M. Loso, pers. comm., 27 January 2019; Reger et al. 2011; Wiedmer et al. 2011; Williams 1989). Much is still unknown about Lake Atna, as geologic processes such as erosion and glacial activity have affected the preservation of strandlines, making accurate reconstruction of the lake challenging. Further, the effects of isostatic rebound resulting not only from the immense weight of Lake Atna on the earth's crust but also from the extreme amount of glacial ice that preceded the formation of the lake are still unknown. These factors undoubtedly would have affected any extant morphological characteristics associated with Lake Atna (Ferrians 1989).

In addition to the presence of Lake Atna, it is commonly thought that extensive glaciation during the late Pleistocene would have severely impeded human occupation of WRST and the Copper River Basin. While models mapping late Wisconsin glacial extents in Alaska have been produced (Briner and Kaufman 2008; Kaufman and Manley 2004), the exact timing of these glacial extents has yet to be solidified. During the late Pleistocene, the glaciers may have receded enough to allow for human dispersal throughout the area. Numerous early Holocene-age sites have been identified in areas bordering the Copper River Basin and WRST, particularly in the Tangle Lakes Archaeological District (TLAD) and the Susitna River Valley, which would have bordered the north and northwestern shores of Lake Atna (West 1996; Wygal and Goebel 2011, 2012). While not located on a shoreline of Lake Atna, two additional late Pleistocene/early Holocene sites, KdVo-6 (Little John) and KaVn-2, are located just east of the Canadian border from WRST (Easton and MacKay 2008; Easton et al. 2011; Heffner 2002). However, prior to this project, no archaeological evidence of early Holocene or late Pleistocene human occupation in WRST had been identified. The oldest previously documented cultural occupation is a Northern Archaic site with a C^{14} date of approximately 3100 years BP. However, obsidian from Wiki Peak (Cook 1995), located in WRST, has been identified in some of the earliest archaeological deposits in Alaska (Dixon 2013:107; Reuther et al. 2011), signifying that people not only inhabited WRST during the late Pleistocene but also had an intimate knowledge of the available resources and the accompanying landscape.

This research project was developed specifically to identify late Pleistocene archaeology in WRST and is a four-year field study initiated in collaboration with Ahtna, Inc. This report provides insight into the prehistory of Southcentral Alaska and may have the potential to contribute significant information relevant to broader research questions regarding the archaeology of Beringia.

METHODS

The identification of geomorphological features associated with Glacial Lake Atna and the subsequent archaeological survey of those features are two project goals developed to assist with the identification of late Pleistocene archaeology in WRST. Initial investigation relied heavily on aerial reconnaissance along projected Lake Atna shorelines to identify evidence of strandlines, deltas, and related geomorphological features. Special attention was given to terrain considered high probability for the presence of archaeological sites. These areas include locales with high, dry ground (such as ridges and hilltops), areas with access to fresh water, and areas with commanding views of the surrounding landscape. In addition, blowout exposures were considered high-probability areas of particular interest, as exposed areas with less vegetative cover require less intensive archaeological and geomorphological investigation methods and also tend to be good places to find archaeological sites. Due to the expansive nature of the project area, not every identified high-probability area received investigation. Rather, pedestrian survey of select areas most likely to yield evidence of human use ensued, with a focus on several prominent landforms. Additional areas of high probability identified during previous archaeological investigations resulting from cultural resource management activities in WRST were also investigated. These included areas located along projected Glacial Lake Atna shorelines and where artifacts reminiscent of late Pleistocene occupations in Alaska were previously recorded.

Archaeological investigations consisted primarily of pedestrian survey of ridge exposures with limited subsurface testing in adjacent vegetated areas likely to contain intact subsurface deposits. Additional excavation was undertaken when initial testing results were positive. All observed surface artifacts were marked with pin flags and photographed, and their locations were recorded with a Trimble Geo7x survey-grade GPS receiver. Observed tools were collected if diagnostic, and flakes were collected if representative of nonabundant raw material types or were of a material that could be used for lithic sourcing. All other surface debitage was left in situ.

Aerial reconnaissance identified numerous areas that warranted further investigation, with the highest probability areas being a series of exposed ridge systems concentrated between the projected 777–914 m Lake Atna shorelines. These ridge systems circumscribe the south and west flanks of Mount Drum and Mount Wrangell and the north and west flanks of Mount Sanford. These ridges, although located on or near projected Lake Atna shorelines, are subglacial features that predate the formation of Lake Atna (Mendenhall 1905; Nichols 1965; Williams and Galloway 1986).

Aerial reconnaissance suggests these ridges would have offered the best paths of travel for people following large game or circumnavigating the lake for other purposes. It is logical to assume that these geomorphological features would have been incorporated into a larger travel network, as the results of aerial reconnaissance also suggest that these features would have been the best route for travel along the western flanks of the Wrangell Mountains. In addition to ease of travel, these ridge systems form a direct path to higher-elevation areas ideal for upland hunting activities. Further, during past periods of cooler climate, when alpine vegetation would have extended to lower elevations, the ridges themselves may have also served as habitat for upland game. Regardless, it is likely that these ridge systems would have served as a travel corridor, even during times of lower lake levels. This is corroborated by ethnographic accounts, which document a well-used trail in the same vicinity (Mendenhall 1905; Simeone 2014).

Although the lower shoreline areas are still considered to have high probability for containing archaeological sites, due to the enormous scale of the project area, compounded with the heavy vegetative cover and presumed more recent age of any sites located in the lower elevations, attention was focused on the higher-elevation ridge systems.

FIELD RESULTS

As a result of initial investigative methods, four identified high-probability areas located along or adjacent to Lake Atna shorelines were investigated (Fig. 1). To date, 69 individual archaeological sites have been identified, some of which may date to the late Pleistocene/early Holocene.

UPPER COPPER RIVER AND COPPER LAKE TRAIL CORRIDOR

The Copper River originates in the heart of the Wrangell Mountains and serves as the western boundary of WRST. During the last glacial maximum, the Copper River drainage was engulfed by massive ice sheets, leaving behind a series of subglacial features that would later be submerged by the waters of Lake Atna (Mendenhall 1905; Nichols 1965; Williams and Galloway 1986). During the end of the Pleistocene, the upper Copper River drainage would have served as the northeastern boundary of Lake Atna.

The Copper Lake Trail is a modern off-road vehicle trail that roughly follows a portion of an extensive indigenous trail system (Simeone 2014). The Copper Lake Trail runs parallel to the Copper River from the Nabesna Road to the river's headwaters at Copper Glacier. The Copper Lake Trail recently received trail improvements, and as a result of the Section 106 review process, archaeological

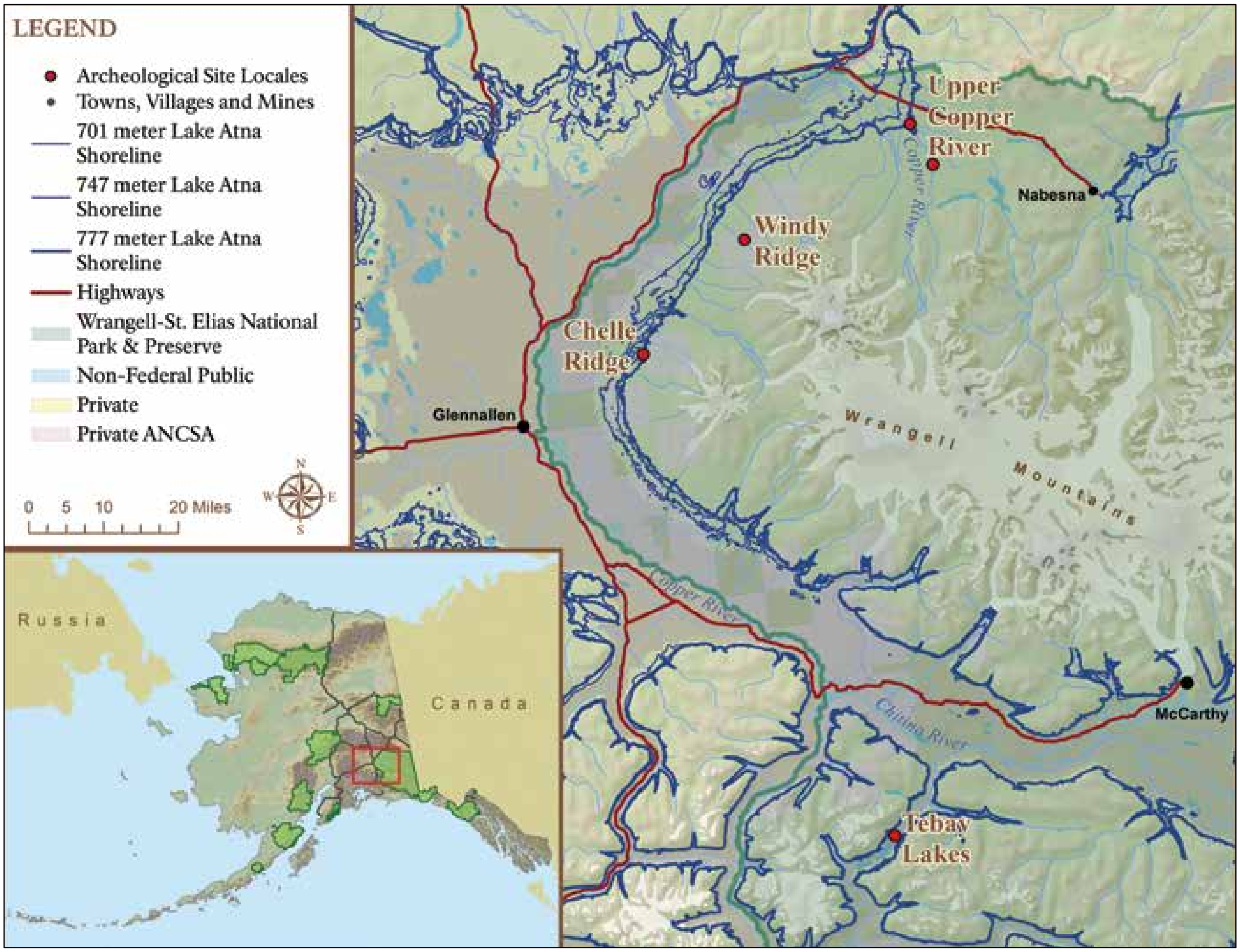

Figure 1. Overview of project area and site locales.

monitoring of trail repairs and archaeological inventory of the Area of Potential Effect (APE) was deemed necessary to avoid unwanted impacts to historic properties. The APE included not only areas of direct effect but also areas subject to indirect and cumulative effects of trail use and maintenance. As such, field staff were directed to investigate high-probability areas along the trail corridor, including geomorphological features associated with Lake Atna. The vicinity of Tanada Creek, located roughly 6.5 km from the Copper Lake trailhead, was of particular interest, as the area is situated on the 777 m projected Lake Atna shoreline. Numerous prehistoric sites have been identified along the Copper Lake Trail as a result of these investigative efforts, including sites NAB-00533 and NAB-00538. Numerous other lithic scatter sites have been identified in this vicinity; however, no datable material or diagnostic artifacts have been recorded.

NAB-00533

NAB-00533 is a prehistoric, multicomponent, subsurface occupation and lithic scatter site situated on a low, aspen-and-spruce-covered knoll. The geographic feature is situated adjacent to Tanada Creek, just above the 777 m projected Lake Atna shoreline, and is comprised of fine-grained sand overlain by approximately 40 cm of soil deposition below the root mat. These sand deposits appear similar to sandy outcrops exposed by modern creek erosion located approximately 100 to 900 m from the site along Tanada Creek. Those outcrops exhibit clear stratigraphic and morphologic evidence of having been deposited by deltaic processes associated with Lake Atna (M. Loso, pers. comm., 27 January 2019). Due to the similar morphology and close proximity of the sand deposits, it is presumed that the knoll feature formed as a result of deltaic processes associated with Glacial Lake Atna.

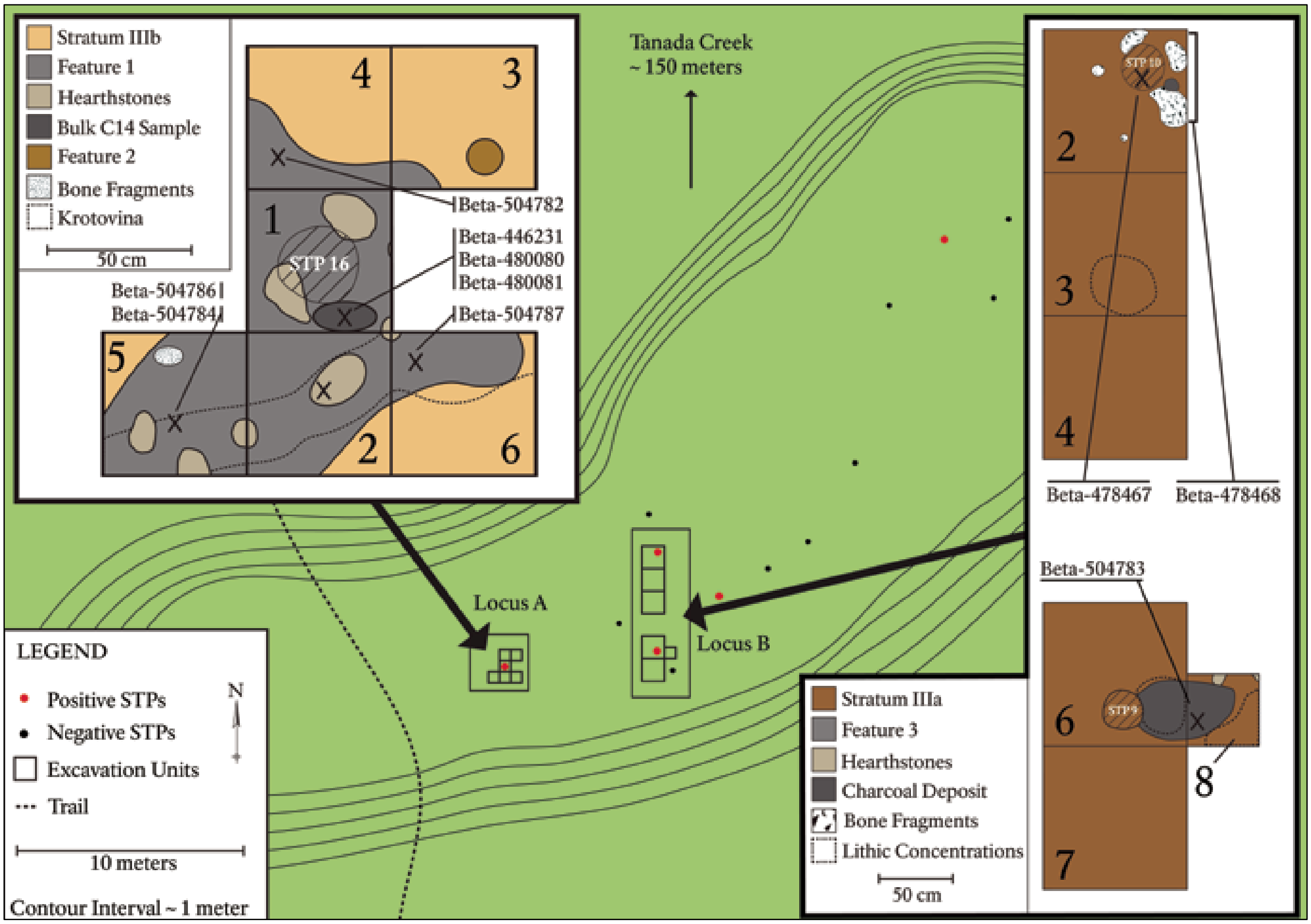

Figure 2. Plan view site map of NAB-00533.

The site was discovered in 2016 as a result of investigations of shoreline areas in the Tanada Creek vicinity. Fourteen 30 cm diameter shovel test pits (STPs) were excavated on the knoll, with five being positive for cultural material. Two of the STPs were expanded into 50 x 50 cm test units. One unit (STP16/TU1) revealed a subsurface stone-lined hearth feature at approximately 45–50 cm below datum, and the other (STP10/TU2) revealed concentrations of flakes, charcoal, and bone, materials consistent with those of a midden deposit, at depths of approximately 25–30 cm below datum (Fig. 2). Radiocarbon dates obtained from the features revealed two separate cultural occupations, with one dating to the late Pleistocene (Table 1).

Continued excavation was undertaken during the 2017 and 2018 field seasons, which resulted in the identification of four features in two separate excavation loci. Radiocarbon dates were obtained from three of these features, confirming the presence of at least two separate cultural occupations (Table 1).

Six 50 x 50 cm test units were excavated in locus A, which revealed two cultural features. Feature 1 is a buried stone-lined hearth situated just above a discrete paleosol lens at the lower levels of Stratum IIIb at approximately 45–48 cm below datum (Fig. 3). The feature is concentrated in Test Units 1, 2, and 5; however, charcoal deposits from the feature are present in all test units. Numerous flakes were uncovered within the feature deposits, as were several small unidentifiable fragments of cremated faunal remains. A large krotovina bisected units 2, 5, and 6, resulting in the displacement of several large hearth stones and feature debris. However, the krotovina was located in depths below the actual hearth feature, leaving the majority of feature deposits intact. Seven charcoal samples obtained from the feature provide a radiocarbon date range of 12,188–11,324 years cal BP (Table 1).

Feature 2 is a small, circular depression located in Test Unit 3 measuring approximately 15 cm in diameter. The feature originates in Stratum V. The morphology of the hole is consistent with that of a posthole for a small struc-

Table 1. Radiocarbon dates from NAB-00533

Lab Number	Context	Material	δ13C	Uncalibrated RCYBP (1σ)	Cal BP (2σ)
Beta-446231	Locus A TU1/Feature 1	Charcoal	–25.6	10110 ± 30	11915–11510
Beta-480080	Locus A TU1/Feature 1	Charcoal	–24.6	9870 ± 30	11324–11215
Beta-480081	Locus A TU1/Feature 1	Charcoal	–25.9	10300 ± 30	12188–11948
Beta-504782	Locus A TU4/Feature 1	Charcoal	–25.8	10160 ± 30	12020–11708
Beta-504784	Locus A TU5/Feature 1	Charcoal	–24.6	10130 ± 30	11985–11620
Beta-504786	Locus A TU2/Feature 1	Charcoal	–23.1	10300 ± 30	12188-11948
Beta-504787	Locus A TU6/Feature 1	Charcoal	–25.1	10130 ± 30	11985-11620
Beta-478467	Locus B TU2/Feature 4	Bone, cremated	–23.3	3070 ± 30	3364–3209
Beta-478468	Locus B TU2/Feature 4	Bone, cremated	–23.3	2880 ± 30	3080–2922
Beta-504783	Locus B TU8/Feature 3	Charcoal	-24.5	3970 ± 30	4524-4401

Radiocarbon dates calibrated with INTCAL13 (Reimer et al. 2013).

ture such as a tripod or rack; however, it is not clear if the feature is cultural in origin, as it originates in Stratum V, a culturally sterile deposit. It is possible that the feature is associated with the krotovina present in units 2, 5, and 6, although morphological characteristics consistent with a krotovina were not discernible.

Five 1 x 1 m test units and one 50 x 50 cm test unit were excavated in locus B, revealing two cultural features. Feature 3 is a subsurface hearth situated in Test Units 6 and 8 at the upper levels of Stratum IIIa (Fig. 3). A charcoal sample obtained from the hearth produced a radiocarbon date of 4524–4401 cal BP. Feature 4 is a deposit of flakes, charcoal, and cremated faunal remains and is interpreted as being a midden deposit from Test Unit 2 in Stratum IIIa at a depth of 25–35 cm below datum. Radiocarbon analysis of the carbonate fraction extracted from the cremated bone produced a date of 3364–3209 cal BP.

In total, 1522 lithic artifacts were recovered from NAB-00533 during the 2016–2018 field seasons. Although analysis of the collection is still ongoing, preliminary assessment indicates that the assemblage is dominated by unmodified debitage, with only two tool fragments identified. Basalt is the primary material in both components; however, several more fine-grained material types consistent with a dacite and rhyolite are also present.

The stratigraphy at NAB-00533 is comprised of nine stratigraphic levels below the root mat with consistent stratigraphy between both excavation loci (Fig. 3). Directly below the root mat is Stratum I, a topsoil comprised of a very dark brown silt with high concentrations of charcoal and organic matter. Stratum II is an eluvial horizon comprised of a very dark grayish-brown silt with a prevalent, naturally occurring charcoal layer situated at the bottom of the stratum. Discontinuous tephra pockets are situated at the interface of Strata I and II and are presumed to be from the east lobe of the White River Ash. Strata IIIa and IIIb are both yellowish-brown loess deposits; however, Stratum IIIa is an illuviated horizon demarcated by a noticeable reddish hue resulting from the podzolization of the upper deposits. Stratum IV is a thin, distinct dark yellowish-brown paleosol complex. Strata Va and Vb are aeolian sand deposits, while Stratum Vc is a gray translocated silt. Strata IV, Va, Vb, and Vc are all culturally sterile deposits that overlie Stratum VI, the presumed deltaic deposit, which is comprised of fine-grained, dark grayish-brown sand.

NAB-00538

NAB-00538 is approximately 7 km upriver from NAB-00533 and is situated at an elevation of approximately 850 m. The site is a displaced subsurface lithic scatter bisected during the construction of a new alignment of the Copper Lake Trail. The site was identified when a lanceolate-shaped projectile point base, manufactured from white chert, was discovered in situ along the newly excavated trail tread at a depth of approximately 35 cm below the surface (Fig. 4). The projectile point base is typologically reminiscent of Sluiceway points; however, Sluiceway points are not known to occur outside of Northwest Alaska. Further, lanceolate bifaces have been considered to be unreliable chronological markers barring comparative analysis of specific manufacture attributes (Rasic 2011), as they are known to be present in a variety of assemblages ranging in age from the late

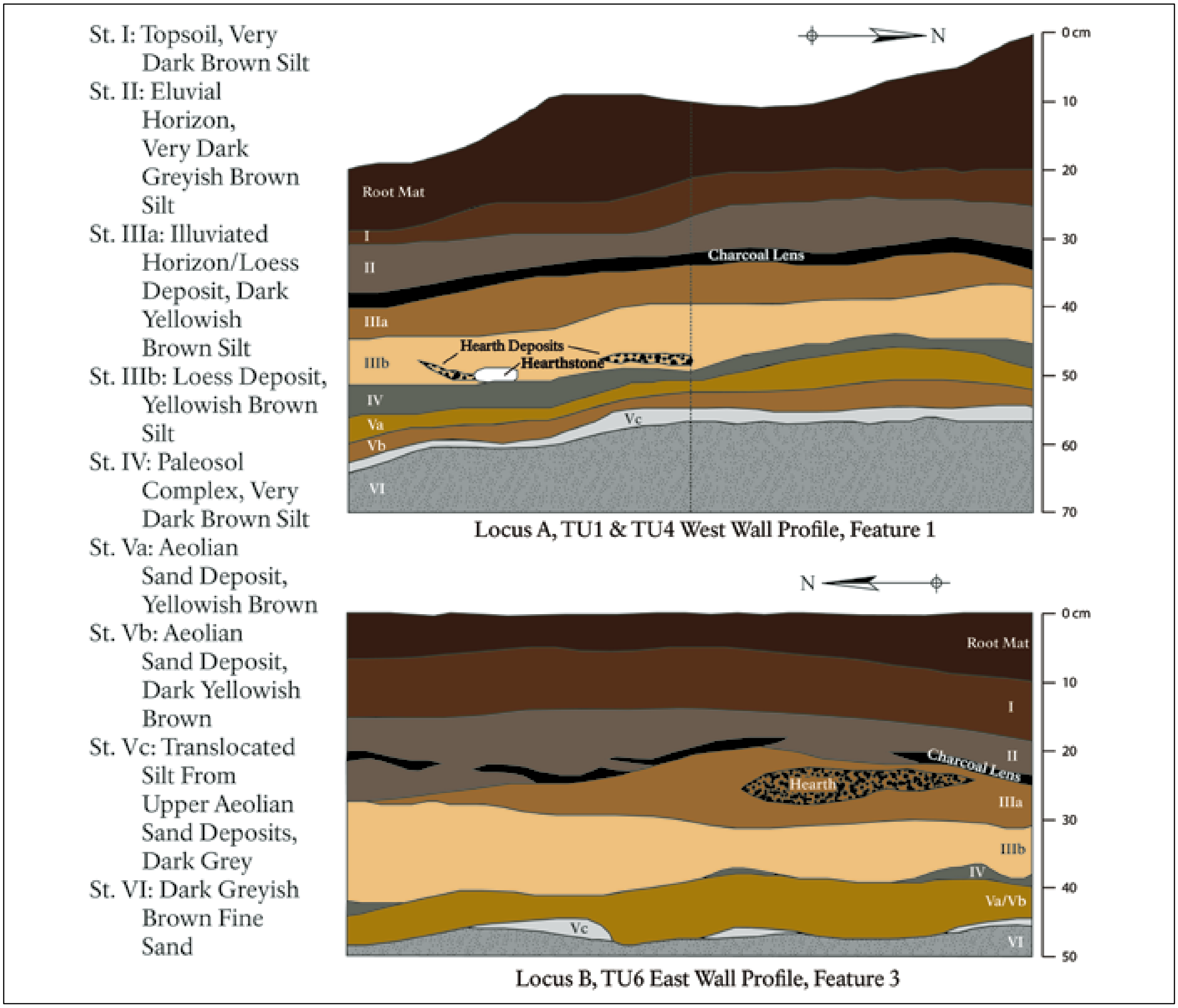

Figure 3. Stratigraphic profiles from NAB-00533.

Pleistocene to the late Holocene (Esdale 2008; Easton and MacKay 2008; Hare et al. 2008).

Fifteen STPs and one 50 x 50 test unit were excavated, with four of the STPs uncovering cultural material consisting of two pieces of fire-cracked rock (FCR) and two unmodified flakes (one basalt and one rhyolite). Additional displaced material identified on the surface of the trail included a spurred graver (dacite), two additional pieces of FCR, and two unmodified flakes (dacite and what appears to be a quartzite).

Although the site is not directly associated with a Lake Atna shoreline, its close proximity to NAB-00533 indicates the site may have been occupied during the late Pleistocene or early Holocene. While the recovered artifacts are typologically consistent with these early occupation assemblages, they are not dependable chronological markers. Without intact datable subsurface remains, reliable temporal assertions for this site are not possible.

WINDY RIDGE

Windy Ridge is a prominent exposed ridge system, likely an ancient kame terrace, situated on both National Park Service and

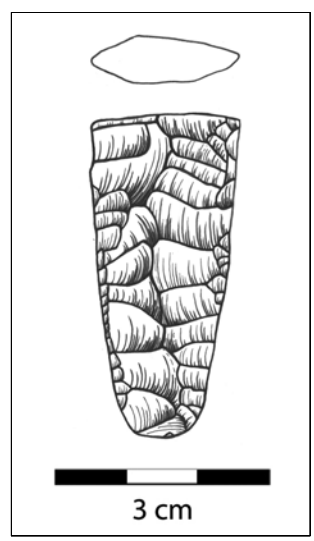

Figure 4. Lanceolate point base from NAB-00538.

Ahtna, Inc. lands. The area is located just above the 975 m projected Lake Atna strandline, which is generally accepted to predate human occupation in North America (Ferrians 1989; Wiedmer at el. 2010). Windy Ridge, while not directly associated with a shoreline active during the late Pleistocene, is strategically placed at the flank of Mount Sanford and provides a commanding view of the Copper River Basin. In addition, freshwater is, and presumably was, located adjacent to the site, making this area an ideal place for an upland hunting camp.

Thirty-five prehistoric archaeological sites have been identified over an approximate 20 km^2 area at Windy Ridge (GUL-00458–00460, GUL-00465–00473, GUL-00512–00534), with all of them being surface lithic scatters located on ridge exposures. In addition, two lithic scatter sites (GUL-00277 and GUL-00278) were previously recorded during a 2003 survey of high-visitor-use areas in the park. While most of these sites are ephemeral lithic scatters, several are more expansive and also contain dense concentrations of lithic tools and debris. The vast majority of artifacts are manufactured from local basalt cobbles; however, obsidian, rhyolite, and chert are also present in the lithic assemblage.

Numerous artifacts were identified at Windy Ridge and include a microblade core, an obsidian microblade core tablet, several microblade fragments, biconvex knives/knife fragments, gravers, and a burin on a snap. Numerous lanceolate dart points, projectile point fragments, and by-products from projectile point manufacture are also present and dominate the lithic assemblages. In addition, numerous ovate biface blanks and preforms are also present throughout the assemblage. Other identified artifacts include ovate side scrapers, end scrapers, unifacial and bifacial blades, a thumbnail scraper, and a Northern Archaic side-notched projectile point, which typologically dates to the middle Holocene (Fig. 5). Collectively, the artifact assemblage suggests Windy Ridge was used as an upland hunting camp and raw material procurement site. While many of the identified artifacts are consistent with Denali Complex assemblages, the majority of the artifact types have also been found in a variety of other artifact assemblages dating from the early to middle Holocene (Esdale 2008).

Limited subsurface testing was undertaken at GUL-00469, GUL-00519, and GUL-00533, as these sites displayed the heaviest concentrations of surface artifacts and exhibited areas of vegetation in close proximity to artifact densities. Three 50 x 50 cm test units were excavated at GUL-00469, and two yielded cultural material. Test Unit 1 contained four basalt flakes from depths of 25–30 cm below datum. Test Unit 2 contained six basalt flakes from depths of 15–32 cm below datum, while Test Unit 3 was negative for cultural material. The stratigraphy at GUL-00469 is comprised of approximately 50 cm of sediment deposition overlying a culturally sterile surface comprised of large rounded cobbles. Both Test Unit 2 and Test Unit 3 were excavated to the cobble layer with somewhat variable stratigraphy between the two, suggesting that aeolian processes have affected the postdeposition of sediments throughout the site (Fig. 6). Eight stratigraphic levels below the root mat were identified in Test Unit 2, with Stratum I being a very dark brown silty sand. Stratum II is a very dark grayish-brown silt underlain by Stratum III, a yellowish-brown silt. A pocket of tephra was visible in the north wall profile of TU2 just below Stratum III and is presumed to be (east lobe) White River Ash. Stratum IV is a yellowish-brown sandy silt underlain by Stratum V, a yellowish-brown silty sand. Stratum VI is a light yellowish-brown silty sand underlain by a mottled yellowish-brown sandy silt with a dark brown sandy silt and interspersed, naturally occurring charcoal flecking. Stratum VIII is the cobble surface. Four stratigraphic levels below the root mat were identified in Test Unit 3. Stratum I is a very dark brown silt underlain by Stratum II, a yellowish-brown silt. Stratum II is underlain by Stratum III, a mottled yellowish-brown and dark brown sandy silt with charcoal flecking. Stratum IV is the cobble surface.

Two 50 x 50 cm test units were excavated at GUL-00519, both of which were positive for cultural material. The sediments at GUL-00519 consist of three stratigraphic horizons below the root mat, underlain by a culturally sterile surface consisting of rounded cobbles intermixed with a very dark grayish-brown sand (Fig. 6). Although the stratigraphy is consistent between the two units, aeolian activity has resulted in variation of total depth of sediment deposition between the two test units, which ranges from 15 to 30 cm below the root mat. Stratum I is a dark yellowish-brown silt intermixed with fine sand. Stratum II is a dark yellowish-brown sandy silt with pea-sized gravels and some cobbles. Stratum III is the cobble surface. Due to the voids created by the great quantity of cobbles present in Stratum III, sediment and cultural material has moved down into these sterile deposits from more recent contexts. As such, cultural material was uncovered at depths of over 60 cm. In total, Test Unit 1 contained 38 basalt flakes and three nonheated bone

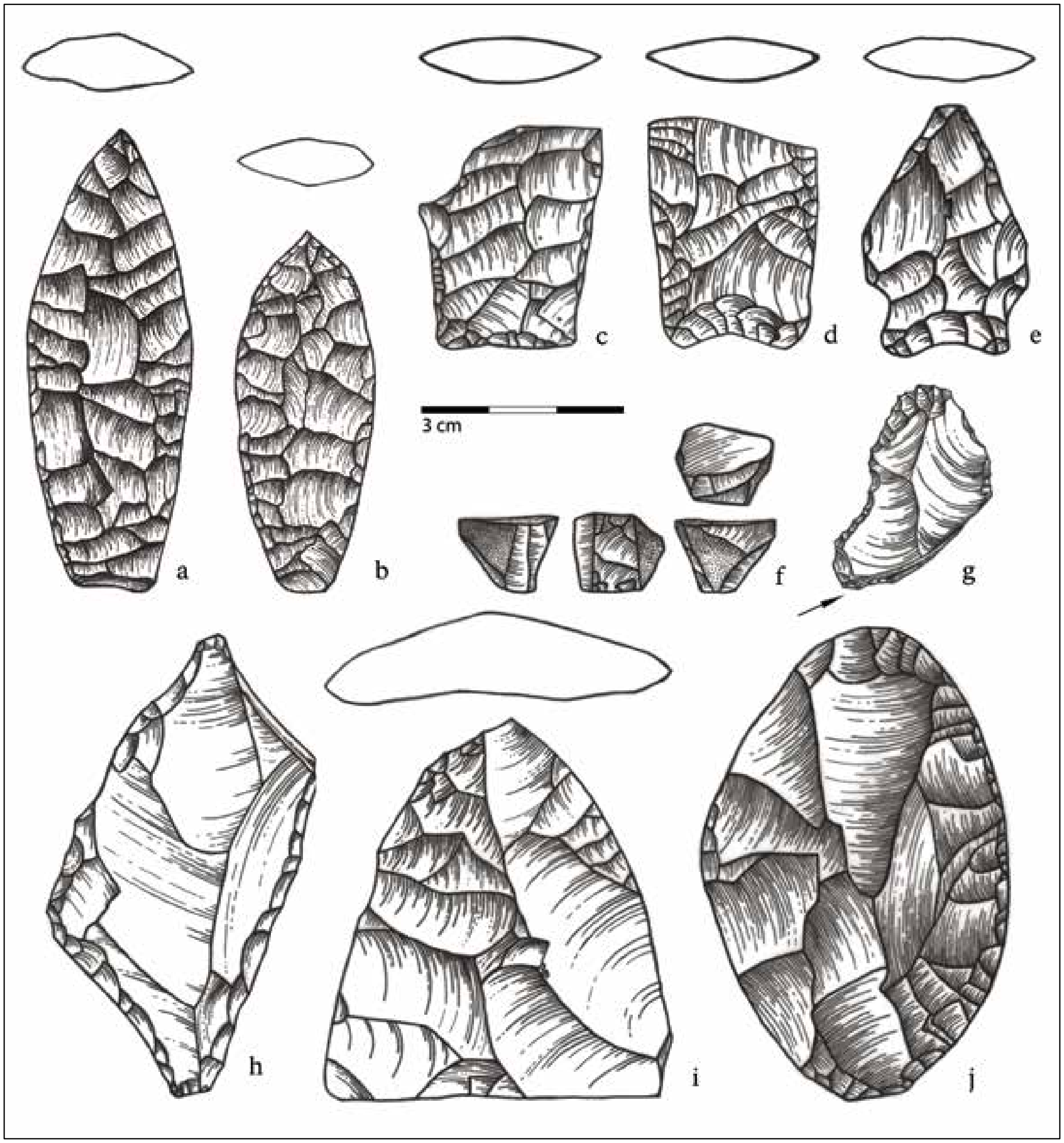

Figure 5. Windy Ridge artifacts: (a–e) projectile points; (f) microblade core; (g) burin on a snap; (h) double spur graver; (i) biface fragment; (j) ovate biface.

fragments from a single avian femur. All artifacts were uncovered at depths between 0 and 20 cm below datum. Radiocarbon analysis of the bone fragments indicates that the bone is modern and not associated with the lithic artifact assemblage. Test Unit 2 contained 128 basalt flakes from 0 to 65 cm below datum and one basalt microblade from 24 to 34 cm below datum.

Four STPs were excavated at GUL-00533, with only one of these yielding a single basalt flake. The STP was expanded into three adjacent 50 x 50 cm test units. All three test units produced artifacts. The sediments at GUL-00533 consist of four stratigraphic levels below the root mat (Fig. 6). Stratum I, the topsoil, is comprised of a dark brown silt. Stratum II is a dark grayish-brown silty sand with several natural charcoal lenses. Stratum III is a dark yellowish-brown sandy silt underlain by Stratum IV, a culturally sterile surface comprised of fine sand with intermixed gravels. Test Unit 1 contained five basalt flakes and one basalt flake tool from a depth of 13–33 cm below datum. Test Unit 2 contained six basalt flakes and one possible piece of FCR from depths of 27–54 cm below datum. Test Unit 3 contained a single basalt flake from 50 to 60 cm below datum.

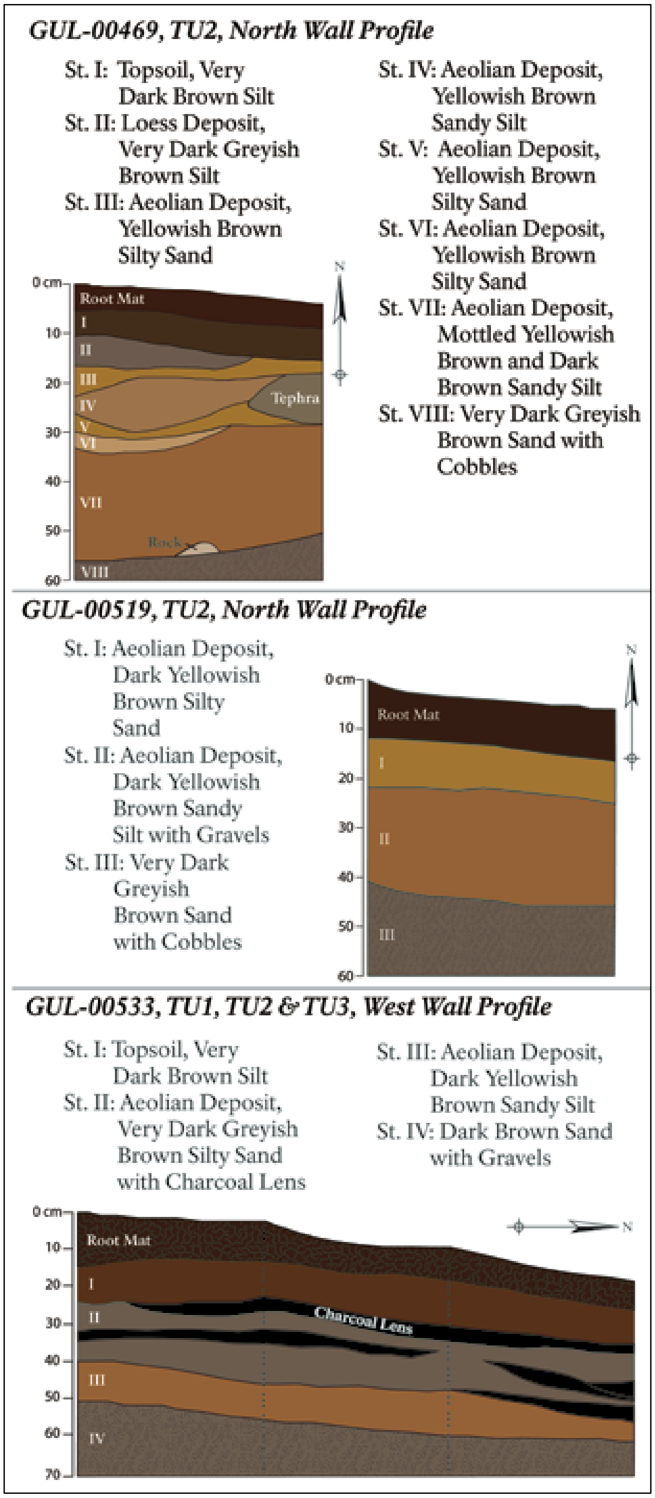

Figure 6. Stratigraphic profiles from Windy Ridge.

As a result of limited subsurface testing at Windy Ridge, it is evident that variability in sediment deposition is present throughout the geographic area (Fig. 5). As the name of the area suggests, aeolian processes have likely been affecting the postdeposition of cultural material. This is further implied by the presence of modern faunal remains with prehistoric lithic remains. However, further testing is warranted and may result in the identification of areas with well-preserved stratigraphy and intact cultural features.

CHELLE RIDGE

Chelle Ridge is a 6 km long esker ridge located just south of the Sanford River along the 777 m projected Lake Atna shoreline. It is a prominent landform characterized by numerous sandy exposures surrounded by dwarf birch and mixed spruce stands and has a commanding view of Mount Drum and the surrounding Copper River Basin. The northern portion of the ridge is located on Ahtna, Inc. lands, while the remainder is situated on NPS lands.

The entire length of the ridge system received pedestrian survey of exposure areas, resulting in the identification of 33 prehistoric archaeological sites (GUL-00298–299, GUL-00311–313, GUL-00474–501). As at Windy Ridge, the majority of these sites are ephemeral lithic scatters. Numerous artifacts were identified in these deposits, which include triangular and leaf-shaped bifaces, biface fragments, and products of microblade manufacture (Fig. 7). Additional artifacts include an angle scraper, a planoconvex scraper tool with a burinated edge, utilized flakes and modified flake tools, bifacial and unifacial scrapers, and biface fragments consistent with biconvex knife tips. The vast majority of lithic material is constructed from local basalt cobbles, with some rhyolite and several cryptocrystalline silicates also identified. Of note is the overwhelming presence of basalt shatter at the majority of the site locales, which may be indicative of bipolar reduction techniques.

Subsurface testing consisted of limited shovel testing and soil probing, undertaken both on and alongside the esker ridge in an attempt to identify intact archaeological deposits as well as to gain a better understanding of the depositional characteristics of the esker ridge. No subsurface artifacts were identified. The ridge feature was found to be comprised of fluvial material consisting of course sand with rounded gravels and cobbles with overlying layers of active aeolian sand deposits. The ridge exposures are

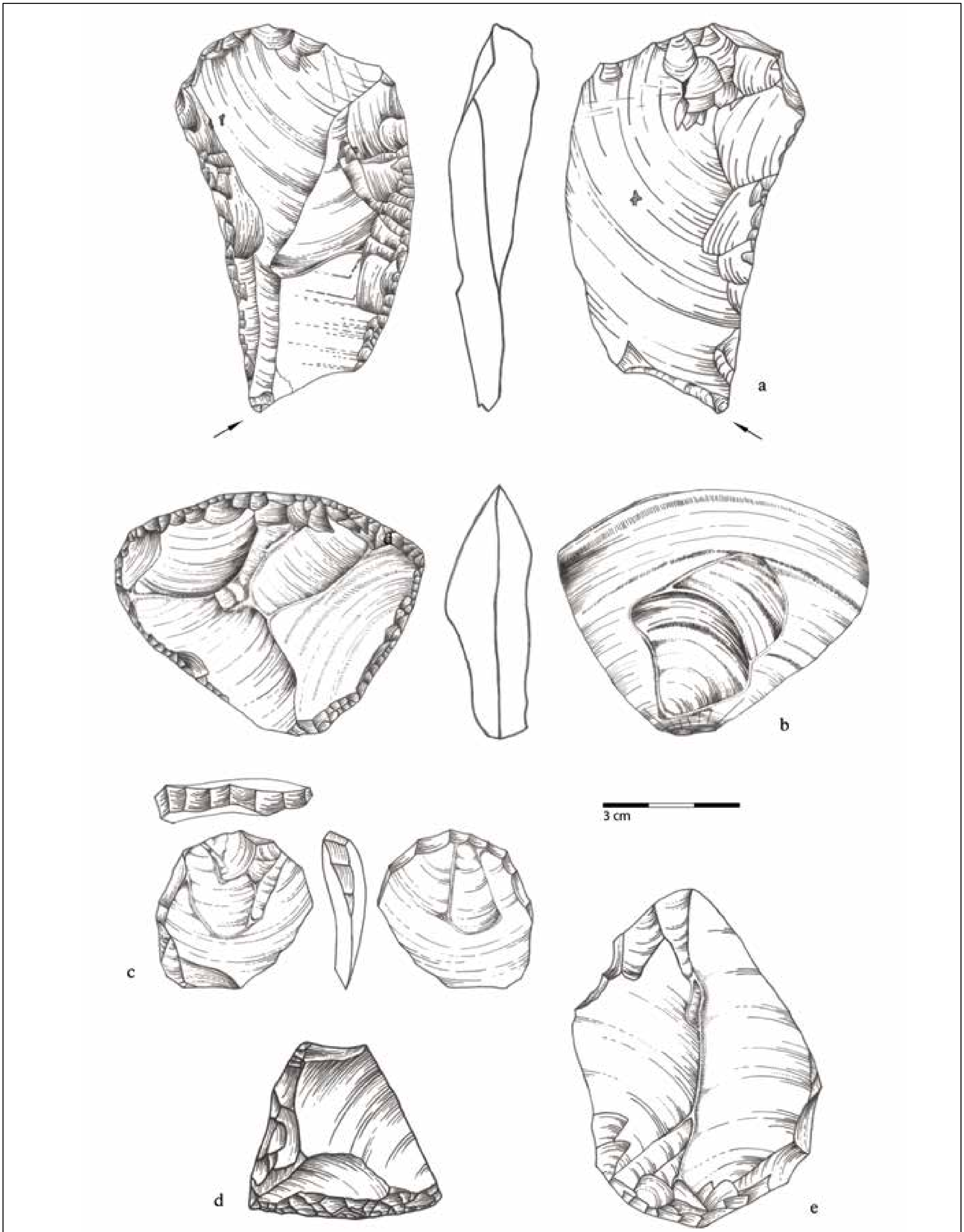

Figure 7: Chelle Ridge artifacts: (a) planoconvex scraper tool; (b) angle scraper; (c) microblade core tablet; (d–e) bifaces.

devoid of all aeolian sediment deposition. In most cases, where stratigraphy was present, the root mat was underlain by one or two layers of unconsolidated sand deposits with much variability in deposition throughout the ridge feature. Due to the active nature of the aeolian deposits, intact stratigraphy along the ridge feature is likely absent. As such, it is presumed that the recently identified surface lithic scatters and any unknown subsurface assemblages are derived from undatable contexts, as they have most likely been subject to heavy intermixing.

TEBAY LAKES

The Tebay Lakes are a chain of three lakes situated at the head of the Tebay River located in the Chugach Mountains. The lakes occupy a glacially scoured valley characterized by exposed bedrock, which serves as a drainage divide between the Chitina and Bremner Rivers.

The Tebay Lake site (VAL-00240) is an ethnographically documented prehistoric site situated at the outlet of Tebay Lake just below the 701 m projected Lake Atna shoreline. The site location was field verified by the Bureau of Indian Affairs (BIA) in the early 1990s, at which time several site features were identified, including a surface lithic scatter and a cultural depression feature. In 1997, shortly after the site was recorded by the BIA, a large debris flow, derived from a sudden drainage beneath a glacier located at the head of a tributary drainage, blocked the outlet of the lower Tebay Lake. This event caused the lake level to rise dramatically, with the lake volume estimated to have increased by approximately one billion gallons (Winkler 2000:136). In 2006, heavy rainfall resulted in abnormally high water levels, which effectively cleared the river blockage, allowing for the lake to recede to its original pre-1997 water level (E. Veach, pers. comm., 9 December 2014).

During a routine condition assessment of the site undertaken in 2014, two previously undocumented artifacts were identified on the surface approximately 8 m from the modern lakeshore just below the high-water line. The artifacts consist of a basalt lanceolate dart point tip and a crescent-shaped biface manufactured from a butterscotch-colored chert (Fig. 8). It is presumed that these artifacts were uncovered during the 1997–2006 flooding event. While both artifact types have been found in association with late Pleistocene and early Holocene assemblages, they have also been identified in more recent assemblages ranging in date from the middle to late Holocene (Dixon et al. 2005; Esdale 2008; Holmes 2001; Potter 2008; Younie and Gillispie 2016; and see Wygal and Krasinski, this volume, for similar crescent-shaped bifaces from the middle Susitna Valley).

Subsequent aerial reconnaissance of the area identified several high-probability areas that warrant further investigation. However, the general lack of soil deposition surrounding the Tebay Lakes resulted in directing investigative efforts to areas where intact cultural deposits were more likely to be present. As such, Tebay Lakes remains largely uninvestigated for cultural material.

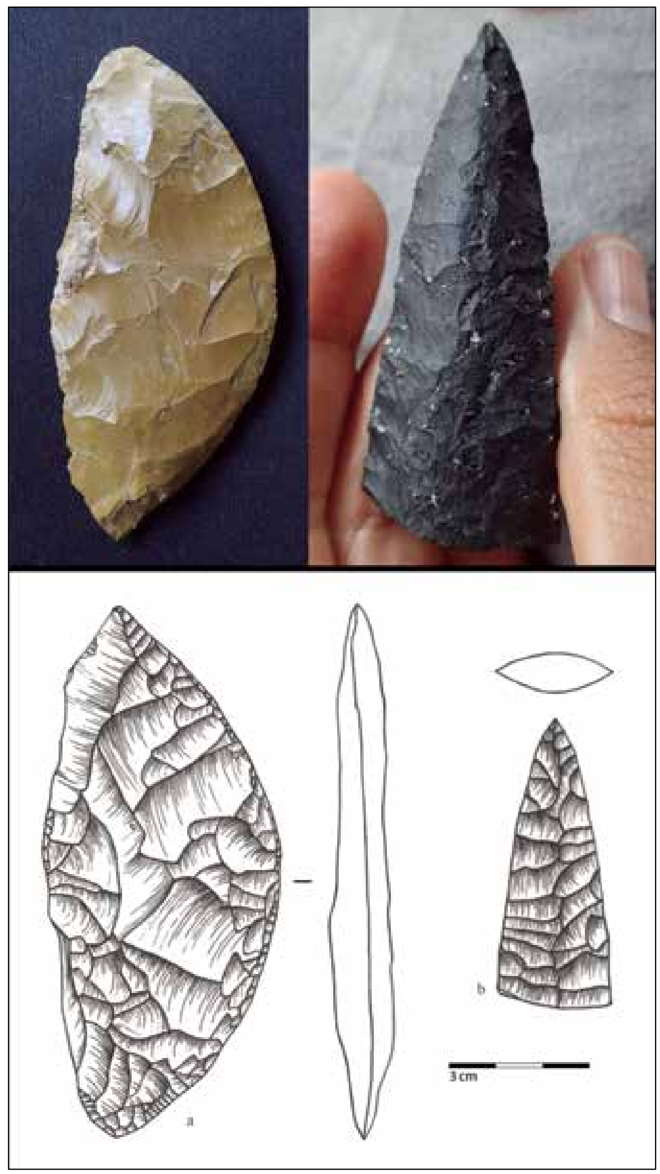

Figure 8. Tebay Lake artifacts: (a) crescentric biface; (b) projectile point tip.

DISCUSSION AND CONCLUSION

Initial reconnaissance of Glacial Lake Atna shorelines has confirmed the presence of late Pleistocene/early Holocene archaeology in WRST. Sixty-nine individual archaeological sites have been identified, with one site producing radiocarbon results dating to the late Pleistocene. The majority of these sites are surface lithic scatters located in areas that have been subject to deflation and other natural forces, resulting in a lack of datable material. Further, the deflated soils have resulted in the intermixing of artifacts, making intrasite analysis difficult. However, numerous artifacts that are consistent with late Pleistocene/early Holocene artifact assemblages have been identified throughout the majority of these site locales with artifact types indicative of Denali Complex and potentially other lithic industries.

The results of this project, while preliminary, have the potential to provide insight regarding late Pleistocene/early Holocene archaeology in eastern Beringia and specifically in southcentral portions of Alaska. In addition, many of these site locales appear to have also been used during the middle to late Holocene, providing researchers with a unique opportunity to assess the relationships between earlier and more recent occupations. Further, the identification of more recent artifact assemblages supports the assertion that the ridge systems remained the most effective travel route around the western flanks of the Wrangell Mountains even after Lake Atna was no longer in existence.

Furthermore, this research may also provide chronological insight regarding Lake Atna and the surrounding terrain. While the locations of strandlines are generally easy to find, as they are visible from the air, dating the identified strandlines is considerably more difficult. Most of the previously obtained radiocarbon dates are old assays derived from strata in outcrops rather than the strandlines themselves. The presence of a reliably dated archaeological site situated on a Lake Atna shoreline has provided unequivocal evidence that the level of Lake Atna was at or below the 777 m strandline level when NAB-00533 was occupied circa 12,000 cal BP.

Although the results of this research have provided valuable new knowledge regarding the prehistory of the Copper River Basin and WRST, additional geomorphological and archaeological research is required to fully understand Lake Atna and its relationship with the late Pleistocene archaeological record. Many important questions with direct implications regarding late Pleistocene archaeology are still unanswered, such as what the glacial extent was during the late Pleistocene. Further, it is unknown what isostatic effects would have resulted from the weight of both Lake Atna and the preceding glaciation. Isostatic depression and rebound would have a direct impact on extant shoreline features, as well as any spatial analysis between Lake Atna associated archaeological sites. Only through further research and interdisciplinary collaboration will we be able to attempt to answer these questions and, in doing so, gain a better understanding of Glacial Lake Atna and its interaction with prehistoric populations of eastern Beringia.

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