HISTORICAL CONTEXT FOR THE PRE-CONTACT ERA

On Army-Managed Lands in Alaska

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CHAPTER 1 – INTRODUCTION

Army regulations (AR 200-1, Chapter 6) ensure that installations make informed decisions regarding the cultural resources within their managed lands. Cultural resources are any pre-contact or historic remains of past human activities. They include artifacts, sites, structures, landscapes, and objects of importance to a culture or community for scientific, traditional, religious, or other reasons (Hirst 2018). The military is tasked with complying with public laws protecting cultural resources in support of the military mission.

U.S. Army Garrison (USAG) Alaska is responsible for safeguarding cultural resources on the USAG Alaska-managed and Fort Greely cantonments and nearly 1.5 million acres of associated training lands located in Interior Alaska. As stewards of this land, cultural resource managers assess and mitigate the impact of projects and training on cultural resources that date from the end of the last glacial period to the Cold War.

Interior Alaska has been continuously inhabited for the last 14,000 years, and evidence of this continuum of human activity has been preserved within and around USAG Alaska-managed training lands (Esdale et al. 2021; Graf et al. 2021). Interior Alaska's ice-free status during the last glacial period provided a corridor connecting the Bering Land Bridge and eastern Asia to North America. This allowed small bands of nomadic peoples to settle in Alaska and began a period of habitation in Interior Alaska that has persisted through the entire Holocene, the arrival of European traders in the late 1810s, the Klondike Gold Rush of the late 19th and early 20th centuries, and the military development of the Interior during the middle of the 20th century. The lands managed by USAG Alaska comprise a vast and still relatively unexplored region with areas of high potential for yielding evidence of this activity (Esdale et al. 2021). This document summarizes the pre-western history of the people inhabiting these lands based on archaeological evidence derived from sites in and around the region.

The purpose of this context is to: (1) familiarize the reader with cultural resource legislation and the ways in which cultural resources managers work to protect the past, (2) explain some of the common archaeological methods used to decode clues from the past, (3) provide the current status of archaeological resources on USAG Alaska-managed lands, (4) show how data from sites on these lands have contributed to broader questions about the people living in Interior Alaska over the last 14,000 years, and (5) provide a context against which future discoveries can be placed in a meaningful timeline of the area's prehistory.

Chapter one describes the lands managed by USAG Alaska and the archaeological investigations that have taken place over the last 50 years. Chapter two covers why and how cultural resource managers and archaeologists identify and evaluate archaeological sites and the federal laws that aim to protect cultural resources. Chapter three describes the current status of archaeological resources on USAG Alaska training lands and identifies the pre-contact themes that structure the remainder of the document. This text explores major research themes in Interior Alaskan archaeology, including the populating of America, changing climate regimes, shifts in hunting and tool use, and the spread of modern Dene culture. These themes are organized by time period. Chapter four explores the populating of the Americas during the Late Pleistocene (the Pleistocene epoch is a unit of geological time between about 2.5 million years ago to the end of the ice age, 10,000 years ago), chapter five explores the receding of the ice-sheets and the spread of the spruce-poplar forest during the Middle Holocene (the Holocene epoch is the most recent geological time period dating to the last 10,000 years), and chapter six discusses the expansion of Athabaskan culture during the Late Holocene.

The final purpose of this project is to highlight the significance of the archaeology on USAG Alaska-managed lands. Without the protection of our shared heritage, we would lose insight into a very important part of American history. We hope to emphasize the importance of the prehistory and paleoecology recorded in sediments of the Middle Tanana Valley and the need to protect archaeological sites in the region.

1.1 USAG Alaska-Managed Lands

USAG Alaska-managed lands are located in Interior Alaska near the cities of Fairbanks and North Pole in the Fairbanks North Star Borough, and Delta Junction in the Southeast Fairbanks Borough. Properties consist of USAG Alaska-managed and Fort Greely cantonments and associated training lands, including three main areas: the Yukon Training Area (YTA), the Tanana Flats Training Area (TFTA), and the Donnelly Training Area (DTA). These are located in central Alaska, north of the Alaska Range in the Tanana River Valley. Other smaller training lands include the Gerstle River Training Area (GRTA), Tok Fuel Terminal, the Black Rapids Training Area (BRTA), and Whistler Creek Training Area (WCTA) (Figure 1). This area has a northern continental climate characterized by short, moderate summers; long, cold winters; and little precipitation or humidity (Alaska Climate Research Center 2020; Esdale et al. 2021). Interior Alaska's unique climate has fostered an ecosystem rich in large animals and a variety of edible plant species, which humans have adapted to over many millennia.

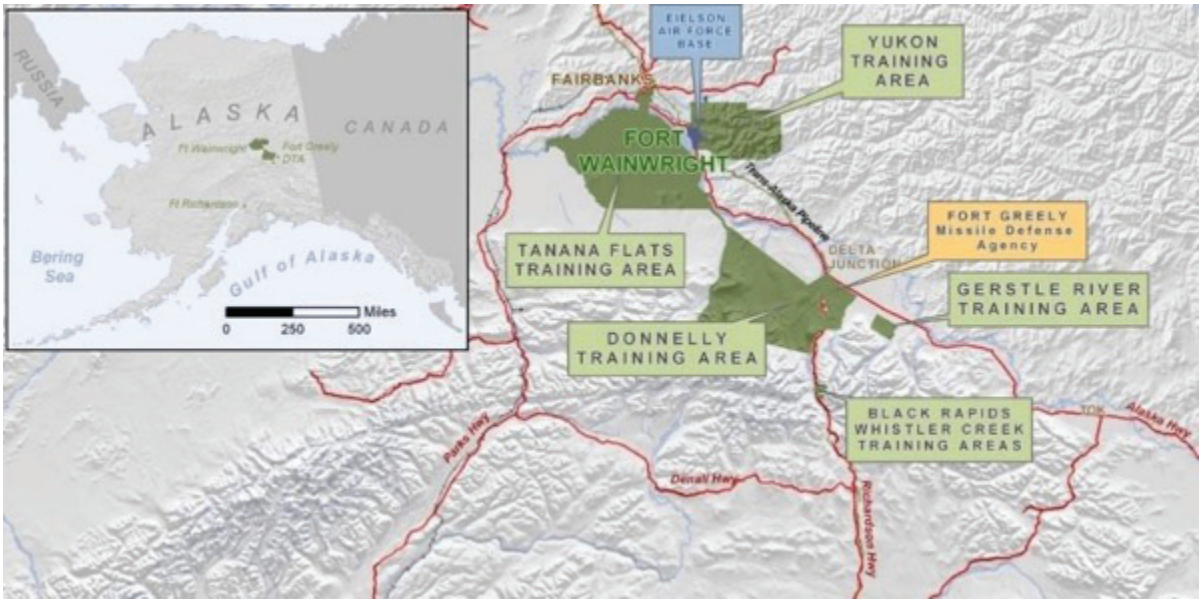

Figure 1. USAG Alaska training lands.

1.2 Previous Archaeological Work

Archaeological surveys of the USAG Alaska-managed Main Cantonment area began in 1979. Jim Dixon surveyed the north side of the Chena River and Birch Hill area, discovering and relocating six pre-contact archaeological sites (Dixon et al. 1980). Surveys of the Main Post building areas continued in the 1980s by Julia Steele (Steele 1983a, 1982a) and Georgeanne Reynolds (Reynolds 1983, 1985). John Cook surveyed the River Road pond in 1996 and found one site, which has failed to be relocated in subsequent attempts. In 2001, the Army began partnering cultural resources

surveys and evaluations with Colorado State University's Center for Environmental Management of Military Lands (CEMML). Surveys by several different principal investigators have targeted areas of construction undertakings. Two historic sites and one additional pre-contact site were found in these investigations. In 2011 and 2012, CEMML completed survey of the entire cantonment, north and south of the Chena River, discovering three additional historic sites.

Archaeological sites were first identified in TFTA in 1973 by Zorro Bradley and others who conducted a survey in the Blair Lakes area (Bradley et al. 1973). James Dixon continued surveys for archaeological district designations in the regions of Blair Lakes, Clear Creek Butte, and Wood River Buttes (Figure 2) (Dixon et al. 1980). In 1993, proposed work in the Clear Creek Butte area prompted a contract to relocate several archaeological sites (Staley 1993). These three districts have been revisited by CEMML archaeologists a few times over the last decade, and, notably, 92 new sites were found in 2009-2010 during survey of the Wood River Buttes, Salmon Loaf, and north and east of Blair Lakes. The district boundaries were adjusted in 2016 to accommodate the new discoveries (Carlson et al. 2017).

The road system was the first of many areas to be investigated in YTA. Charles Holmes discovered eight sites in a 1978 road survey (Holmes 1979). Michael Kunz surveyed the Stuart Creek area in 1992 but discovered no archaeological sites, and Northern Land Use Research's 1999 survey of Stuart Creek and the YTA road system uncovered one historic site (Higgs et al. 1999). CEMML archaeologists have been surveying portions of YTA in conjunction with development projects on an annual basis since 2001 and have completed surveys of the entire road system and adjacent high points.

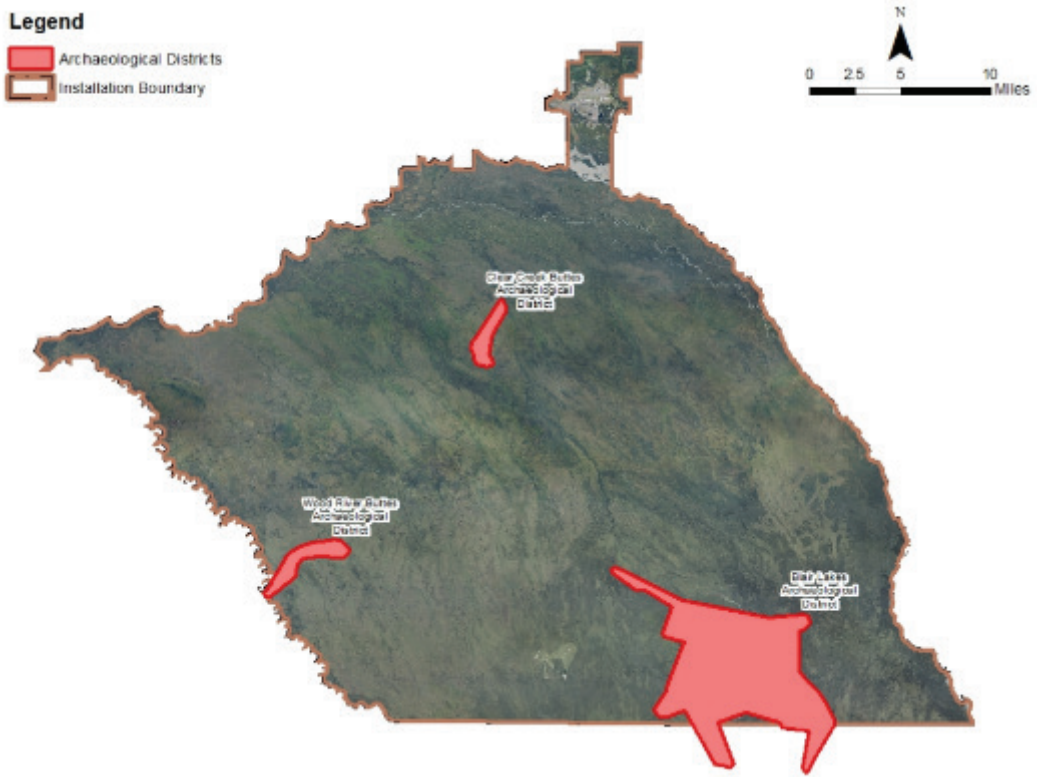

Figure 2. Archaeological Districts in TFTA

Learn More

ATHABASCAN

The word Athabascan (also Athabaskan, Athapaskan) comes from the Cree name of a large lake in northwest Saskatchewan, Lake Athabasca. The name was given to the groups of people who lived west of this lake and also refers to a large language family made up of related languages spoken in central Alaska and northern Canada. The Athabascan people instead called themselves *Dene* meaning "the people" (depending on dialect, you may also see Dena or Dena'ina). In this report, the modern inhabitants of central Alaska are referred to as *Dene*, and the language group as *Athabascan*. The word *Athabaskan* is reserved for the archaeological tradition related to *Dene* ancestors.

Archaeological investigations in what is now DTA began in the 1960s, when Frederick West was searching for sites related to the first Americans (West 1967). He excavated the Donnelly Ridge site in 1964 and found an assemblage containing microblade core technology similar to Early Holocene Denali Complex sites. Several surveys of Fort Greely and adjacent training lands in the late 1970s documented 64 new sites (Rabich and Reger 1978; Bacon 1978; Holmes 1979; Bacon and Holmes 1980). Julia Steele surveyed various locations in DTA from 1980-1983, finding four additional new sites (Steele 1980a, 1980b, 1982a, 1982b, 1983a, 1983b), and Georgeanne Reynolds surveyed the Donnelly Dome area in 1988, locating one more site (Reynolds 1988). Investigations in DTA from 1992-2002 were made by David Staley (Staley 1993), Thomas Gamza (Gamza 1995), Northern Land Use Research (NLUR) (Higgs et al. 1999), and the University of Fairbanks Museum (Odess 2002). Sixteen new sites were found during this decade of fieldwork.

Concentrated efforts to expand survey coverage of DTA East began with CEMML archaeologists in 2002 (Hedman et al. 2003). Over 200 new sites were located in the Texas Range, Donnelly Drop Zone, and Eddy Drop Zone in the first half of the decade. In recent years, CEMML research aimed to evaluate many known archaeological sites in DTA for inclusion in the National Register of Historic Places (NRHP) in conjunction with use of the Battle Area Complex (BAX) and its Surface Danger Zone (SDZ). Sites have also been discovered during surveys for road and trail maintenance. Major excavations have taken place in training area that have greatly increased our understanding of the pre-contact history of the area, including the Middle Holocene Banjo Lake site (Esdale et al. 2015) and the multicomponent The Delta River Overlook site and Hurricane Bluff sites (Potter et al. 2018). Three archaeological districts are located within the boundaries of DTA (Figure 3). The

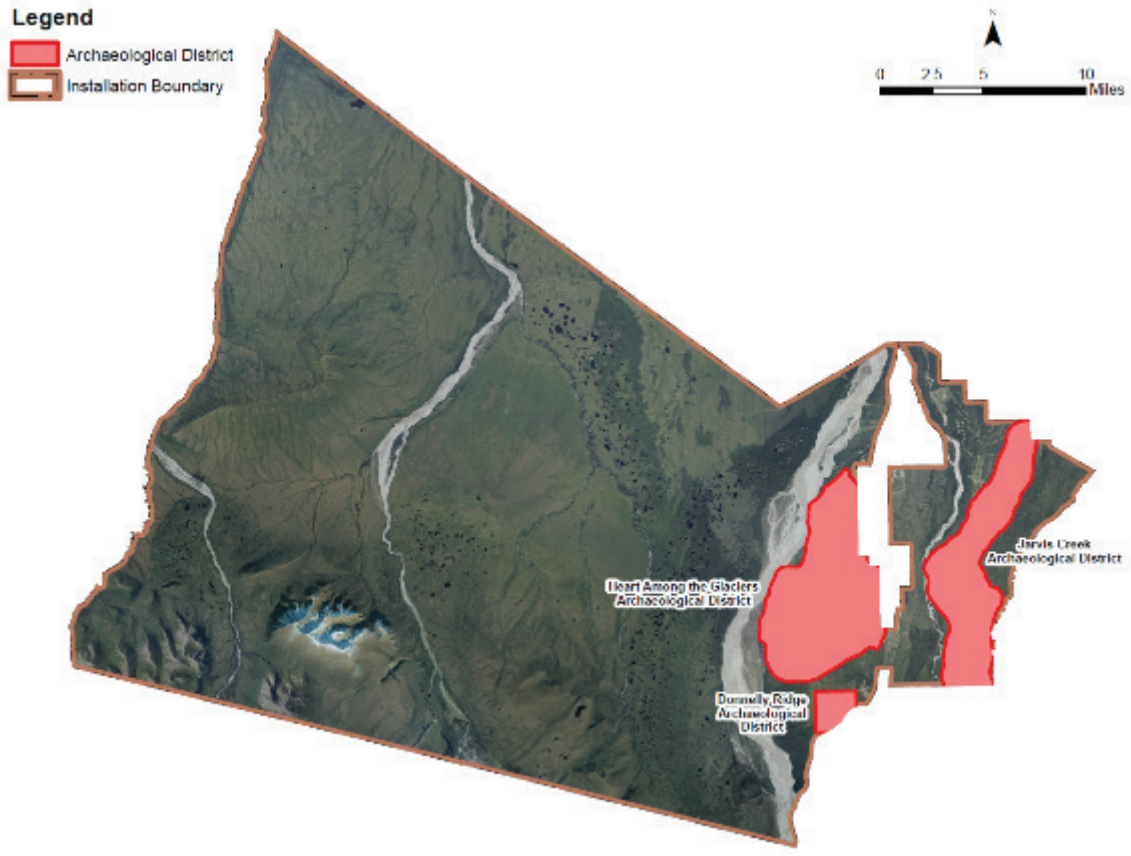

Figure 3. Archaeological Districts in DTA.

Donnelly Ridge Archaeological District was established after West's original finds in the area in 1985. The Jarvis Creek Archaeological District (east of Jarvis Creek) and Heart among the Glaciers Archaeological District (west of Jarvis Creek) were created in 2016 to encompass the many archaeological site discoveries on glacial deposits in the area. Archaeological surveys have now covered over 90% of DTA East.

In 2020, USAG Alaska reacquired cultural resources responsibilities for the Fort Greely cantonment. Sixteen pre-contact sites are known from this parcel of land, and NRHP evaluations were completed for all sites in 2010 (Gaines et al. 2010). Sites are situated on outwash deposits west of Jarvis Creek.

Surveys in DTA West, west of the Delta River, have only reached small portions of the training area. In the late 1970s, surveys for the DTA land withdrawal by Glenn Bacon and Charles Holmes (Bacon and Holmes 1989; Holmes 1979) focused on moraine features north of the Alaska Range. Another survey by NLUR in 1998 also just hit high points in the southern part of the training area. Survey efforts by CEMML for project proposals have focused on Molybdenum Ridge in the southwest part of DTA West and the OP road, just south of the northern boundary, and approximately 30 sites were discovered (Esdale et al. 2012, 2021).

Survey efforts have now covered all portions of BRTA and WCTA in areas with less than 30% slopes. Sites consist of surface isolates and shallow flake scatters. Most of these sites were evaluated for the NRHP in 2021. Only small portions of GRTA have been surveyed by CEMML in 2011-2013 and 2021. Several lithic scatters have been identified. Six sites were discovered at Tok Fuel Terminal by John Cook in the early 1980s. Since that time, the entire Army-operated portions of the landform outside of the Fuel Terminal boundaries have undergone subsurface testing (Esdale et al. 2021). Several pre-contact sites were discovered in disturbed and undisturbed contexts across the top of the landform.

As of the end of 2022, systematic surveys have covered 15.3% of Army-managed lands in central Alaska, totaling nearly 240,000 acres (Table 1) (Esdale et al. 2023).

Table 1. Archaeological surveys on USAG Alaska-managed lands.

Training Area	Total Acres Surveyed	Percent Surveyed
Cantonment	13,525	100
TFTA	28,534	4.9
YTA	63,788	25.8
DTA and Fort Greely	130,296	25.1
GRTA	443	2.5
BRTA & WCTA	1,820	57
Tok Fuel Terminal	68	100
Seward Military Resort	0	0
Sears Creek Pump Station	0	0
Haines Fuel Terminal	96	53
Total	**238,570**	**15.3**

CHAPTER 2 – WHAT IS ARCHAEOLOGY?

Archaeology is the scientific reconstruction of past human lifeways through the excavation and analysis of the items and traces that people left behind. Archaeology is concerned with the full range of past human experience including how people organized themselves, how they interacted with the environment, what they ate, what they believed, how they communicated, and why cultures changed. The archaeological discipline is under the wider umbrella of anthropology. Anthropology, at its simplest, is the study of humanity including our physical characteristics as animals and our unique nonbiological characteristics known as culture (Renfrew and Bahn 2016). Anthropology encompasses cultural anthropology, the study of modern human culture and society; biological anthropology, the study of the biological and physical characteristics and evolution of humans and their close ancestors; archaeology; and linguistics, the study of language change.

Pre-contact archaeology is concerned with the study of past human societies, or societies before the advent of writing. This era is referred to as prehistory, although the application of the terms 'pre-contact history', 'pre-colonial history' or 'ancient history' appear frequently in archaeological writing. These terms refer to the era before mass colonization, when the western writing system was introduced. Some archaeologists propose replacing the term 'pre-contact' to convey the continuity of indigenous cultures as existing before and after colonization and to acknowledge oral traditions as part of the historical record (Echo-hawk 2000). European contact in central Alaska took place around the late 1800s and generally has very close ties with the historic period afterwards (Renfrew and Bahn 2016). In this report, we refer to archaeological evidence from this era as 'pre-contact'. Historic archaeology refers to the study of the recent human past, which normally coincides with the post-colonial era.

Studying the past affects how we understand our own culture, influences our interpretations of cultural change and the interactions between cultures, broadens our perspectives on the people around us, and makes us more appreciative of our shared heritage. Archeological research is instrumental in modern land management and stewardship. Archaeologists are frequently consulted to protect culturally significant areas and keep land managers compliant with federal laws protecting cultural resources.

2.1 Lines of Evidence

Archaeological research is based on uncovering material culture left behind by past societies. Material culture includes artifacts, ecofacts, features, and structures. Artifacts are objects modified by humans and can include stone tools and tool-making debris, faunal remains, wooden objects, and pottery. Ecofacts are unmodified organic materials that contribute to the general construction of the archaeological site, including the vegetation and landscape. Features are a collection of non-portable cultural remains and activity areas which include hearths (fire places), cache pits, stake holes, trenches, walls, graves, middens, and pit-houses. Structures can include tent frames, houses, granaries, mounds, or pyramids, for example. Pre-contact structures in Alaska are often difficult-to-detect semi-subterranean houses or the traces of campfires or cache pits.

Remains from archaeological sites are analyzed to interpret how people interacted with the materials left behind. Researchers generally set out to answer specific questions about pre-contact people such as: How were objects used? What are the objects made from? How and where were raw materials gathered? What types of activities were taking place with the objects and features at the site? How did people acquire food plants and animals? How did they prepare them?

To draw conclusions about pre-contact cultures, archaeologists conduct research in three parts. The first part is the identification of archaeological sites and the recovery of material remains. Sites can be identified by locating artifacts on the surface of the ground, excavating holes, or shovel tests, in likely site locations, or using scientific methods like ground-penetrating radar or magnetometry. Once a site is located, it is often tested to determine its size and to recover evidence that might be relatable to its age or cultural affiliation. Full excavation of archaeological sites generally only takes place when it has been shown to be able to answer important scientific questions or if the site is important and in the way of a modern project.

After the collection of artifacts from any of these stages, artifacts are analyzed and catalogued, the data collected from site analyses are written into a report, the information is given to state and federal archaeological data collection agencies (archaeological site information for the entire state of Alaska is recorded by the Office of History and Archaeology in the Department of Natural Resources), and finally, all cultural remains and notes are housed at authorized repositories. Materials collected on USAG Alaska-managed lands are located at the University of Alaska's Museum of the North. While at repositories, artifacts can be accessed and analyzed by researchers and descendent populations. Research is usually shared in agency reports, articles, museum displays, and presentations.

Archaeological questions are answered using a variety of scientific analyses and inferences based on observation of modern cultures. Scientific methods are used to find out the age of archaeological sites and remains; reconstruct ancient plants, animals, and environments; discover where materials came from; or reconstruct diet, health, and patterns of activity. Many of these techniques used regularly in the analysis of archaeological materials found on USAG Alaska-managed lands will be highlighted throughout this report. In addition to the objects themselves, the relationship between artifacts, ecofacts, and features, and their positions within the surrounding sediment, or their *context*, is extremely important. Site context is integral for reconstructing site activities and understanding relationships between different visits to the site through time. Because these relationships are so important, if an archaeological site is disturbed or the context damaged, the site may no longer be useful for answering research questions.

Archaeologists rely heavily on ethnographic research for making interpretations about activities of the past. Ethnoarchaeology is the method of studying contemporary cultures and their use of materials to reconstruct ancient lifeways. To interpret the pre-contact history of Interior Alaska, archaeologists draw on ethnographic studies and historic accounts of Dene and Nunamiut groups that were living in central Alaska in the late 1800s and early 1900s (e.g., see Andrews 1975; Binford 1978; McKennan 1959; Smith 2000).

Because archaeological investigations are usually destructive processes, archaeologists attempt to glean as much information from a site as possible by stitching together clues from research into other similar sites, scientific methods, and ethnographic data. It is imperative that researchers and land managers make sure that this kind of information is communicated to the public and descendants and that it is secured for future studies.

2.2 Archaeological Stewardship

It is the responsibility of land managers to protect and maintain irreplaceable cultural heritage represented by archaeological sites for future generations. The Army accepts this responsibility under Army Regulation (AR) 200-1 (Environmental Protection and Enhancement), Chapter 6. AR 200-1 states that Army installations are required to make informed decisions regarding cultural

resources (including archaeological sites, historic buildings, and paleontological finds) located on the lands they manage. To produce informed decisions about cultural resource management, the Army requires installations to employ a qualified cultural resource manager or archaeologist. The cultural resource manager must develop and maintain programs for protecting and conserving archaeological sites, develop consultation processes to communicate Army activities with stakeholders, integrate archaeological stewardship and compliance with Army operational requirements, and establish consultation with federally-recognized Tribes who are stakeholders in the cultural resource. Additionally, the Army must follow all federal laws pertaining to cultural resource management. These laws include the National Historic Preservation Act (NHPA), the Archaeological Resource Protection Act (ARPA), and the Native American Graves Protection and Repatriation Act (NAGPRA).

2.3 Federal Laws

The earliest federal laws protecting cultural resources were established at the beginning of the 20th century. These laws, like the Antiquities Act of 1906, recognized important cultural sites, set aside protected lands, and provided penalties for their destruction. Modern cultural resources management that takes into consideration the effect of current human activities on the remains of past ones did not come about until much later. The principal cultural resource statutes guiding AR 200-1 are the NHPA of 1966, ARPA of 1976, and NAGPRA of 1990.

The establishment of the NHPA in 1966 gave rise to modern-day cultural resource protection. Under this act, federal agencies are required to consider the effects of their activities, called *undertakings*, on historic and cultural resources. Any activities or development that may damage or destroy archaeological sites, historic buildings, or traditional cultural places (places of importance to modern indigenous groups) require a transparent consultation process that involves identifying cultural resources (called *historic properties*) within the project area, assessing their significance, and working with Tribes, stakeholders, and the State Historic Preservation Officer (SHPO) to assess and resolve the effects of those activities on the identified historic properties. Under this act, federal agencies are required to evaluate if archaeological sites on federal land are eligible for inclusion to the National Register of Historic Places (NRHP). The NRHP is composed of archaeological sites, historic buildings and structures, archaeological and historic districts, and objects significant in American history.

Not all archaeological sites are eligible for the NRHP because not all sites are considered significant or have sufficient integrity. To be eligible for the NRHP, cultural sites must meet one of four criteria: the site must be associated with significant events (Criterion A); related to activities of specific, important individuals (Criterion B); be of a distinctive type or period or have an artistic value, or be a component of an identifiable historic district (Criterion C); or have potential to yield information important in prehistory or history (Criterion D) (National Park Service 1990). When determining significance under Criterion D, one must keep in mind that while all archaeological sites can yield some kind of information, the key is to determine if that information is significant to a research question or when considered within the framework of a historic context. Sites under the NRHP are offered special protections under federal law. As of 2021, there are 82 archaeological sites eligible for the NRHP on Army-managed lands in Alaska.

In accordance with Section 106 of the NHPA, federal agencies must employ professional archaeologists and historians to create inventories of building, structures, and archaeological sites on lands under their jurisdiction and evaluate the effects of activities on these properties. Archaeologists working for USAG Alaska follow this law by recording and maintaining an inventory

of these assets on Army-managed lands. Archaeologists also periodically monitor these sites to assess inadvertent impacts by training activities, development, and recreation.

ARPA was signed into law in 1976 to further protect cultural resources on public lands. Protections include a permitting process for scientific excavation of archaeological sites, and criminal and civil penalties for looting archaeological sites and trafficking artifacts. Under ARPA, no person may excavate, remove, damage, or alter any known or undiscovered archaeological resources located on public lands without a permit. No person may sell, purchase, exchange, transport, receive or offer to sell, purchase, or exchange any archaeological resources removed from public lands. USAG Alaska has an application process for scientific excavations of sites on Army-managed lands. The ARPA permit is signed by the Garrison Commander.

NAGPRA was enacted in 1990 to require federal agencies and agencies that receive federal funding to return Native American human remains, funerary objects, and objects of cultural patrimony to the descendants and/or culturally affiliated Indian Tribes. NAGPRA makes it a criminal offense to traffic Native American remains and funerary objects with penalties for up to $100,000 and up to 12 months imprisonment. Graves and human remains are extremely rare and have never been found on USAG Alaska-managed lands. In the unlikely event that bone is found during a scientific excavation or development project and is suspected to be human, activity must be stopped at the site and USAG Alaska's Cultural Resource Manager (CRM), who will coordinate with the SHPO, must be notified immediately. Alaska State Troopers are also called to rule out a recent crime scene. If the remains are assessed (or radiocarbon dated) to be older than 100 years, USAG Alaska will coordinate government-to-government consultation with affiliated Alaskan Tribes.

These three federal laws provide comprehensive directives for stewardship of cultural resources on USAG Alaska-managed lands by retaining staff meeting the Secretary of the Interior's qualifications under Section 106 of the NHPA, inventorying and monitoring archaeological sites and buildings within the installation boundaries, surveying for cultural resources prior to training activities and development projects, and consulting on these activities with federally-recognized Tribes, stake holders, local interest groups, and state regulators. They provide protections of cultural resources for the legacy of cultural, educational, aesthetic, inspirational, and economic benefits to enrich future generations of Americans.

CHAPTER 3 – PRE-CONTACT USAG ALASKA-MANAGED LANDS

Central Alaska is the homeland of modern Dene people, and, in recent years, the Tanana Valley has proven to be an early New World population center with a number of reliably dated archaeological sites placing humans in the area at the end of the last glacial period. This region has likely been occupied for over 3,500 generations and traces of this habitation are found all over the landscape. Over 1,500,000 acres of land are managed by USAG Alaska in the Tanana River basin. Approximately 15% of this area has been examined for archaeological sites.

Archaeologists generally divide Interior Alaska's pre-contact history into three broad time periods which are explored later in this chapter: the original settlement of Alaska encompassing several cultural traditions (14,000-7,000 years ago), the Northern Archaic Tradition (7,000-1,500 years ago), and the Athabaskan Tradition (1,500-800 years ago) (Potter 2008a, 2008b, and 2010). Archaeological materials from these cultures are generally limited to lithic artifacts such as projectile points, cutting tools, scrapers, waste flakes from tool manufacturing, faunal remains, and hearths.

Pre-military historic period archaeological sites in the area are related to three main themes: mining sites related to Alaska's gold craze in the early 1900s (see Neely 2001), homesteads and roadhouse of the first half of the 20th century (see Price 2002 and Woster 2019), and fur trapping and farming sites from the 1920s (Bateman and Freeman 2021). These themes have been covered in detail elsewhere and won't be discussed in this report.

3.1 Summary of Archaeological Sites on USAG Alaska-Managed Lands

As of 2022, USAG Alaska-managed training lands contain 735 known archaeological sites dating from 14,000 years ago to the homestead era. Many of these sites are found within one of six archaeological districts. Seventy-seven sites are eligible for the NRHP, 516 sites have not been evaluated, and 142 additional sites have been determined not eligible for the NRHP. Of the eligible or un-evaluated sites, six are historic and 587 are pre-contact sites (Esdale et al. 2023).

On the USAG Alaska-managed cantonment, 11 archaeological sites have been identified. Some of these are pre-contact stone tool scatters on hills overlooking the Chena River, others are remains of structures and farming equipment on lowland homesteads. Ten sites have been determined not eligible, and one has been determined eligible for the NRHP. In YTA, 22 archaeological sites have been identified. Most of these sites are composed of small numbers of stone tool-making debris (flakes) or isolated tools. Of these, 17 have been determined not eligible for the NRHP, and five have not yet been evaluated (Esdale et al. 2023).

In TFTA, archaeologists have identified 168 archaeological sites within three archaeological districts. Of the sites, 17 have been determined eligible for inclusion in the NRHP, five site are not eligible, and 146 remain to be evaluated (Esdale et al. 2023). Sites in this area are commonly the buried remains of pre-contact camps. Covered with windblown silt and sand from the Tanana River floodplain and Alaska Range, these sites are sometimes deeply buried and have well-preserved organic remains of campfires and meals. Some of the sites have evidence that people revisited the locations many times throughout the last 14,000 years. Currently, sites in this area date from the earliest traces of people in North America (such as the 13,900-year-old They Were There site/Shég'

Xdaltth'í' site [FAI-02043]), to Alaska's fur trapping boom in the 1920s. Many more pre-contact sites are likely hidden deep within the sediments of hills, dunes, lake edges, and river terraces.

The largest number of archaeological sites managed by USAG Alaska are located in DTA south of the town of Delta Junction. To date, 491 archaeological sites have been identified within the training area and most are located within the three archaeological districts. Fifty sites have been found to be eligible for the NRHP, and 95 were found not eligible. An additional 346 sites remain to be evaluated. There are an additional 16 pre-contact sites identified within the boundaries of the Fort Greely cantonment. These sites are situated on outwash deposits west of Jarvis Creek, seven are eligible for the NRHP, and nine have been found not eligible (Esdale et al. 2023).

The archaeological record known from DTA encompasses sites representing all of the currently recognized pre-contact cultures of the Alaskan Interior. The oldest dates for human habitation at DTA are roughly 10,100 years at site XBD-00167 (Higgs et al. 1999) and 12,000 years at the Delta River Overlook site (XMH-00297) (Potter et al. 2018); however, undisturbed stratigraphic deposits that are 12,800-12,930 years old indicate the potential for intact archaeological occupations of this age. Sites yielding Northern Archaic, a Middle-Holocene era, side-notched points are common (Robertson et al. 2004; Raymond-Yakoubian and Robertson 2005). In DTA, the Banjo Lake site (XMH-00874) yielded a date of 6500 cal BP (calendar years before present) from hearth charcoal associated with a microblade component (Esdale et al. 2015). The Delta River Overlook site may prove to be one of the most significant pre-contact sites in the region. The site, overlooking the Delta River from a high bluff, has deeply stratified deposits and contains evidence of at least 12 occupations over the time span of 2,000 to 12,000 years before present (Potter et al. 2018). People using the site were hunting bison in the river valley and processing the animals on the bluff edge (Potter et al. 2018).

At BRTA, 11 sites have been identified on the surface of the very rocky landscape. Four sites have been determined ineligible for the NRHP, and all sites are small surface lithic scatters and isolated artifacts. Two additional surficial pre-contact sites were found in the small WCTA to the south of BRTA (Esdale et al. 2021). At the Tok Fuel Terminal, eight pre-contact sites are along the crest of Six-Mile Hill, and two are eligible for the NRHP. One eligible traditional cultural property is also known from this Army-managed property (TNX-00067) (Simon and Gelvin-Reymiller 2002). At the GRTA, there are five known pre-contact sites. One site, XMH-01494, was determined not eligible in 2013 (Esdale et al. 2013). Sears Creek Pump Station and Seward Military Resort are two additional small properties that have not yet been surveyed for archaeological sites. One ineligible historic site is know from Haines Fuel Terminal (SKG-00043) (Esdale et al. 2023).

3.2 Pre-Contact Background and Themes

Alaska has long been regarded as the gateway to the Americas and has held archaeological interest as the possible location for the oldest archaeological sites in the New World. This is because of Alaska's proximity to Asia, the ice-free condition of Interior Alaska at the end of the Pleistocene, and similarities between artifact assemblages in Siberia and Alaska. Additionally the discovery of lanceolate projectile points in the muck deposits around Fairbanks in the early 1900s sparked interest in Alaska as a potential source for all indigenous Americans.

Reconstructions of paleoecological evidence suggest that the end of the Pleistocene was marked by a warming trend in Interior Alaska that may have contributed to initial colonization of the area (Bigelow and Powers 2001). The oldest site in Alaska is the Swan Point site in the Shaw Creek Flats (Figure 4) (Holmes 2001, 1998). This site dates to 14,000 years ago, and artifact styles show ties to Siberian sites dating to the same time period. Some archaeologists refer to this as the Beringian or Eastern Beringian tradition (Holmes 2011; Potter 2010). The nearby They Were There site/Shég' Xdaltth'í' site, located in TFTA, also dates to this earliest period, 13,800 years before present (Gaines et al. 2011; Goebel et al. 2016; Graf et al. 2018).

Several sites in areas surrounding Army-managed lands demonstrate that people were well established in Interior Alaska by 13,000 years ago. Significant sites in the Tanana Valley dating between 13,500-12,000 years ago include Healy Lake (Cook 1996), Walker Road (Goebel et al. 1996), the Mead site (Holmes 2001), the Upward Sun River site (Potter et al. 2011), Keystone Dune (Reuther et al. 2016), the Broken Mammoth site (Holmes 1996), and the Delta River Overlook site (Potter et al. 2018) (Figure 4). The Younger Dryas cooling event from 13,000-12,000 years ago may have led to a temporary population decline (Potter 2008a, 2008b) in the Interior before permanent, wide-spread colonization. Evidence of habitation in these sites include stone tool debris, human-altered animal bone, and remains of extinct Pleistocene fauna in well stratified sediments with radiocarbon dates from charcoal and faunal material in cultural contexts.

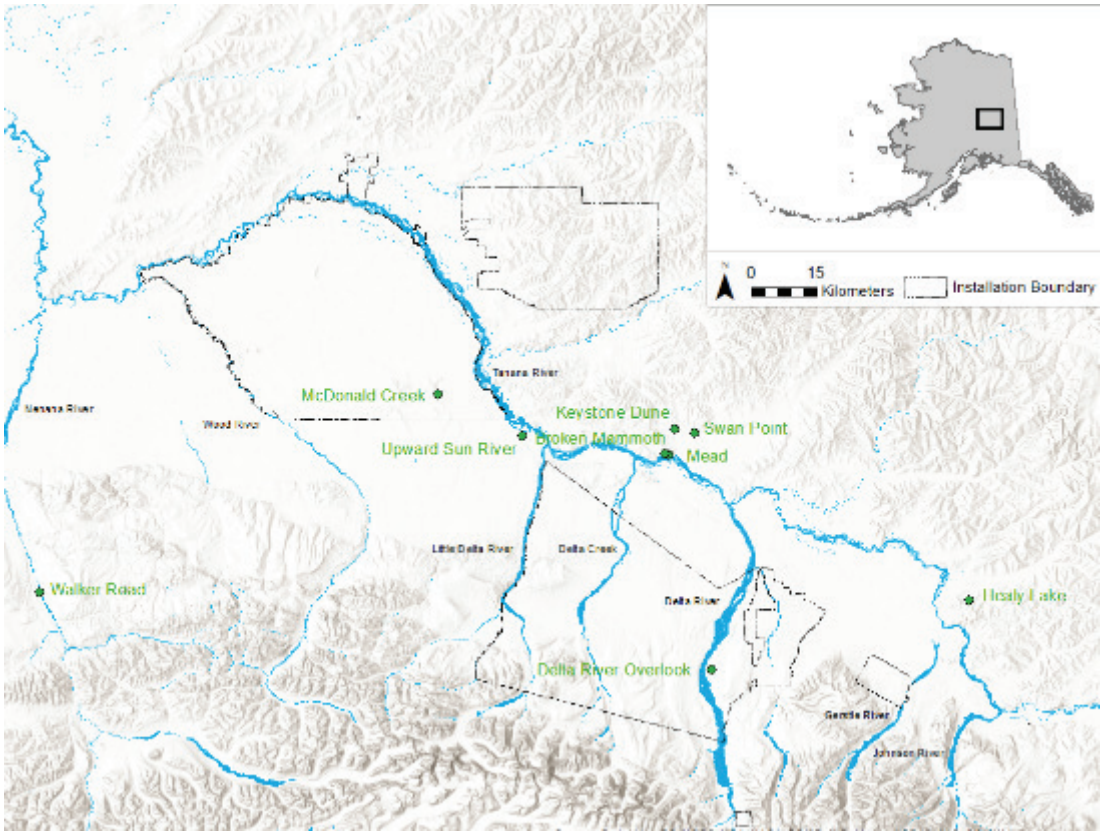

Figure 4. Late-glacial archaeological sites in the Tanana River Valley.

The Paleoarctic Tradition is a term now generally used by archaeologists to refer to the first settled people known from all over Alaska. It was originally defined as the earliest microblade-using tradition in the American Arctic, with a proposed relationship to Late Pleistocene northeast Asian cultures based on similarities in these distinctive artifact types (Figure 5) (Anderson 1968, 1970). Archaeological evidence indicates that early settlers camped on terraces, lakeshores, buttes, and bluffs. By using these locations on higher ground, they could locate and track prey that included large mammals such as mammoth and bison. Evidence from the Upward Sun River site, located on the south side of the Tanana River between Army training areas, for example, demonstrates that hunter-gatherers in Interior Alaska were concentrating on harvesting bison and wapiti at the end of the Pleistocene (the Upward Sun River site is also known for one of the earliest burials in the Americas [Potter 2008a, 2008b; Potter et al. 2011, 2014]). The They Were There site yielded artifacts in association with bison, waterfowl, and small game (Esdale et al. 2012; Gaines et al. 2011; Goebel et al. 2016; Graf et al. 2018). The Delta River Overlook site, in DTA, also contained an archaeological record with early diet indicators. This site was visited twelve times between 12,000 and 2,000 years ago, and its earliest inhabitants were big game hunters concentrating on the procurement of bison and wapiti (Potter et al. 2018). It is likely that the treeless environment and nomadic nature of these peoples had a direct impact on the kinds of tools they fashioned. Stone, bone, antler, and ivory provided the most abundant material for manufacturing weapons and cutting tools. Artifacts typically associated with this culture include small stone microblade cores and projectile points with inset microblades (Figure 5), lanceolate projectile points (Figure 6), knives, and hide scraping tools.

In Interior Alaska, this tradition historically included two cultural divisions called the Nenana and Denali Complexes. The Nenana Complex was initially identified at sites in the Nenana Valley (Powers and Hoffecker 1989). This complex began approximately 13,000 years ago with an artifact assemblage that included triangular or teardrop-shaped, bifacially worked projectile points ("Chindadn" points [Cook 1969, 1975; Holmes and Cook 1999]) (Figure 7); large chopping tools; and cutting tools made from thin pieces of stone. The Nenana Complex is defined as lacking microblades, microblade cores, and burins, and was proposed to predate the microblade-rich Denali Complex. The Denali Complex, dated roughly to 10,500 to 8,500 years ago, was originally defined by West (West 1967, 1975) and includes distinctive wedge-shaped microblade cores, their derivative microblades and core shaping debris, large blades, knives, hide scraping tools, and burins (stone engraving tools). West later defined the Denali Complex as a regional variant of the American Paleoarctic Tradition (West 1981). Many Nenana and Denali Complex archaeological sites are located in the Tanana Valley, in and adjacent to Army training areas (The Broken Mammoth site [Holmes 1996; Yesner et al. 1999], the Chugwater site [Lively 1996], the Donnelly Ridge site (XMH-00005) in DTA [West 1967, 1996], the Gerstle River site [Potter 2001], the Healy Lake site [Cook 1989], the Mead site [Holmes 2007], and the Swan Point site [Holmes et al. 1996; Holmes 1998, 2007]). Several sites in DTA and TFTA have been dated to this period (including the Delta River Overlook site [Potter et al. 2018], the Hurricane Bluffs site (XMH-00838) [Esdale et al. 2015], and the They Were There site [Graf et al. 2018]).

The relationship between the proposed Nenana and Denali Complexes is as of yet unresolved. As discussed above, some researchers view the Nenana Complex as a bifacial industry that predates the microblade-based Denali Complex. However, current research at sites such as the Swan Point site and the Broken Mammoth site indicates that microblades and burins were used by the earliest known cultures in Interior Alaska, with a later co-occurrence with Chindadn points – the defining artifact type of the Nenana Complex. Although many archaeologists still believe that there is a cultural distinction between the Nenana and Denali Complexes (e.g., Dumond 2001), other Interior Alaskan archaeologists hypothesize that there is a behavioral explanation for the presence or

Figure 5.

Figure 6.

Figure 7.

Figure 5. Microblade core and microblades inset into the side of a bone or antler tool.

Figure 6. Lanceolate spear or dart point.

Figure 7. Chindadn point from the Delta River Overlook site.

absence of microblades in different assemblages (Holmes 2001; Potter 2008a, 2008b; Yesner 2001; Yesner and Pearson 2008). Moreover, components of both Nenana and Denali technology persist in central Alaska throughout the Holocene (Bever 2006).

Theme: Who were the first Alaskans? How did they live in the harsh subarctic environment?

Following initial population of Alaska, the spruce-poplar forest expanded to cover most of the Interior, diversifying the landscape inhabited by Holocene groups. Archaeological sites dating to this period are identified on lake shores, tall glacial moraines, eskers, knolls, and along glacial and river floodplains. Use of these locations greatly varies from single-use occupations to long-term, semi-permanent camps.

The site density increased in the area after about 6,000 years ago (Potter 2008a, 2008b). This population increase coincides roughly with the emergence of the Northern Archaic Tradition and the appearance of side-notched dart points (Figure 8, Figure 9). Anderson originally defined the Northern Archaic Tradition to specifically address notched point-bearing stratigraphic horizons that did not contain microblades at the Onion Portage site in northern Alaska (Anderson 1968). Alaskan notched points were generally similar to Archaic-age dart points in the contiguous United States. Time has shown Middle Holocene assemblages in Alaska to be quite diverse, however, and it is questionable whether this trait is related to southern forms or if it is a reliable indicator of cultural affiliation (Clark 1992; Cook and Gillispie 1986). Artifact assemblages associated with this culture can vary but generally contain tools ranging from bifacial knives and microblades to end scrapers

Figure 8. Atlatl tool used for throwing darts at high velocity.

and side-notched dart points. Middle Holocene hunter-gatherers had a subsistence economy focused on seasonally abundant game including caribou, fish, and moose (Potter 2008a, 2008b). Notched point assemblages occur in many sites in Interior Alaska, including over one dozen on Army-managed lands. Several sites (XBD-00270, XMH-00915, XMH-00925), including the excavated Banjo Lake site in DTA (XMH-00874), have also produced Middle Holocene dates from hearth charcoal. The 6,300-6,700-year-old dates from Banjo Lake were also associated with a microblade component (Robertson et al. 2008).

Figure 9. Side-notched atlatl dart point.

Theme: What Holocene environmental changes impacted the resources used by people during this time? How did Middle Holocene hunter-gatherers adapt to these changes?

Use of microblade and burin-based industries appears to continue through the Middle and Late Holocene in Interior Alaska (Esdale 2008; Potter 2008b). By the Late Holocene, archaeologists see a shift from seasonal large mammal hunting with a nomadic lifestyle to a focus on seasonally over-abundant resources, use of storage, and more permanent settlements (Potter 2008b). Artifact assemblages do not drastically change until the last millennium of the Holocene when microblades gradually disappear from the archaeological record (Potter 2008a, 2008b). At about the same time, bow and arrow technology appears in central Alaska and northwestern Canada for the first time (Hare et al. 2012). Although these artifacts are made out of perishable organic materials such as bone and antler and are rarely preserved in archaeological sites, Yukon ice-patch research has uncovered dozens of atlatl dart and bow and arrow parts,

remains from caribou hunting at high altitudes. There is an abrupt shift to bow and arrow technology at 1200 years before present (Hare et al. 2012).

Linguistic evidence suggests that the Dene culture may have appeared in the Tanana Valley as early as 2,500 years ago, or earlier (Kari 2016; Kari and Potter 2010). Through ethnography, oral history, and a broad array of cultural items, much has been learned about Dene culture and history in the region. The artifacts associated with the Dene culture are exceptionally diverse and include bone and antler arrowheads, fishhooks, beads, buttons, birch bark trays, and bone gaming pieces. In the Upper Tanana region, copper was available and used in addition to the traditional material types to manufacture tools such as knives, arrowheads, awls, ornaments, and axes (Clark 1981). A late pre-contact Athabaskan occupation is recognized at several sites in and around Army training lands (Andrews 1975, 1987; Cook 1989; Mishler 1986; Sheppard et al. 1991; Shinkwin 1979; Yarborough 1978). Of particular interest in this regard is a copper arrowhead found in a buried context at DTA (Figure 10) (Robertson et al. 2009b).

Figure 10. Copper arrowhead.

The Athabaskan Tradition includes late pre-contact and proto-historic cultures generally believed to be the ancestors of Dene Tribes who currently inhabit Interior Alaska. Excavated Athabaskan sites in the Interior are rare, but the limited body of evidence allows for several generalizations. In this tradition archaeologists see an increased emphasis on the manufacture of items from native copper and organic materials over stone (Cooper 2011; Dixon 1985). Assemblages include ground and pecked stone artifacts and an increased use of expedient tools. There was a broadening and diversifying of the resource base at this time to include small mammals and freshwater marine animals such as fish and mollusks (Clark, A.M. 1981, 1996; Ream 1986; Sheppard et al. 1991; Shinkwin 1979). Athabaskan sites tend to occur in resource-rich areas near lakes, streams, and rivers and are generally characterized by large house pit and cache pit features. Proto-historic Athabaskan assemblages include Euro-American trade goods such as glass beads and iron implements. Sites of this time period reflect an increased reliance on outside trade and include log cabins co-occurring with traditional house pits, as well as a change in site location to maximize trading opportunities (Andrews 1975, 1977, 1987; Clark, A.M. 1981; VanStone and Goddard 1981).

Athabaskan settlement patterns depended greatly on the availability of subsistence resources, and Interior bands lived a nomadic lifestyle. They often traversed vast areas to support themselves and spent considerable time engaged in subsistence activities. It was often necessary for bands to divide into smaller groups to find game, and preserved fish were used as a staple of the diet in addition to fresh game (Andrews 1975).

Four Athabascan linguistic and geographic groups have inhabited the Tanana Valley: the Upper Tanana, Tanacross, Tanana, and Koyukon. Each group is further distinguished according to geographic location. The bands of the Tanana and Tanacross groups are historically associated with the geographic area that embodies Forts Wainwright and Greely. Salcha, Chena, Wood River, Goodpaster, and Healy Lake bands have inhabited the region since proto-historic times and possibly even pre-contact times (Andrews 1975). Use of the region varied from one band to the next. The Salcha, Chena, Goodpaster, and Wood River bands of the Tanana Dene and the Healy Lake band of the Tanacross Dene used certain parts of what are now USAG Alaska-managed lands (McKennan 1981). Several villages have been reported on or near training lands. One occupied by the Wood River band is said to have been located in the southern part of TFTA but has not been found (Dixon et al. 1980; Reynolds 1986). Several sites in the Blair Lakes Archaeological District (FAI-00335) in TFTA may relate to the pre-contact history of the Athabaskan Tradition.

Theme: Is there continuity or change between the Middle and Late Holocene occupants of the Tanana Valley? What are the origins of modern Dene groups in the area? What enduring ties do people have to the land and its resources?

Archaeological evidence provides only a small window into the lives of people that lived here in the past. As we examine sites on lands managed by USAG Alaska and compare them to other sites in the area since the end of the last glacial period, several common research themes emerge. These themes revolve around human interactions with the changing subarctic environment and their relationship with the plants and animals that prospered in those changing environments. Deciphering archaeological remains is detective work. Using scientific techniques, we can elucidate when people occupied different spaces, what they ate, and what tools they used to capture animals, cook, make clothes, and travel across the landscape. While we don't know precisely who they were or what stories they told to make sense of the world around them, we know that they had rich lives and profound ties to and knowledge of the land and its resources that persist into modern times.

3.3 A Brief Time Line

14,000 cal BP	First evidence of people in Alaska.
12,800 cal BP	The Younger Dryas cooling event. Then widespread Nenana Complex-related sites in central Alaska.
11,500 cal BP	Glaciers recede into the Alaska Range and extinction of some Pleistocene large-bodied mammals. Widespread Denali Complex-related sites in central Alaska.
10,000 cal BP	Early Holocene warming trend.
9,000 cal BP	People occupy lookout areas including glacial moraines, eskers, knolls, and alluvial ridgelines.
8,000 cal BP	Paludification and expansion of spruce-poplar forest into Interior Alaska.
7,000 cal BP	The emergence of the Northern Archaic archaeological tradition. People focus on caribou and start manufacturing side-notched dart points.
2,000 cal BP	The emergence of the Athabaskan archaeological tradition. People winter in semi-subterranean houses. The remains of fish, birds, and furbearing animals are found more regularly at archaeological sites.
1,500 cal BP	Volcanic eruptions in the Wrangell-St. Elias Mountains, falling ash found in tephra layers at archaeological sites. Evidence of bow and arrow technology.
1,800 cal AD	Early contact with Russian explorers followed by American exploration.
1,900 cal AD	Gold Rush in Interior Alaska.
1,940 cal AD	Army established in Alaska and Statehood.

CHAPTER 4 – FIRST INHABITANTS OF THE TANANA VALLEY

4.1 Statement of Significance

The prevalent genetic and archaeological data suggests that people first migrated to the Americas at the end of the last glacial period, after approximately 16,000 years ago (Potter et al. 2021; Willerslev and Meltzer 2021). Traditional models propose that the migration began with small nomadic groups following large game animals into the vast grassland of the Bering Land Bridge (called Beringia). Once across the Beringian landform, groups moved into ice-free Interior Alaska and then into North and South America by one of two routes. The first route was via the west coast of Alaska and British Columbia by watercraft (Davis and Madsen 2020). After 14,000 years ago, a second viable route was the ice-free corridor between the Cordilleran and Laurentide ice sheets east of the Rocky Mountains through what is now Canada (Pedersen et al. 2016; Potter et al. 2017).

Regardless of the route into the Americas, archaeological evidence from the Middle Tanana Valley demonstrates that ancient people were well established in the area between 14,000 and 12,000 years ago and were already adapted to an arctic environment, hunting both large game including wapiti, bison, and maybe mammoth in addition to small game, fowl, fish, and plant resources (Graf 2021; Potter et al. 2013; Potter et al. 2018). Genetic data from two Late Pleistocene/Early Holocene individuals living in Alaska tells us that a population of people lived in Alaska between approximately 14,000 and 8,000 years ago (Willerslev and Meltzer 2021; Moreno-Mayar et al. 2018a, 2018b). This population, called *Ancient Beringians*, is genetically distinct from those people living in the Americas south of the ice sheets at the same time but had common ancestors in northeast Siberia approximately 20,000 years ago (Willerslev and Meltzer 2021).

Current archaeological research conducted in the Middle Tanana Valley, in and around USAG Alaska-managed lands, is integral in the arguments concerning peopling of the Americas. It is impossible to write about the human settlement of the Western Hemisphere without including data from archaeological sites of the Tanana Valley. This section pulls from geographic, paleoenvironmental, archaeological, and genetic evidence from the region to discuss early human settlement and adaptation of Alaska and its implications for broader questions concerning the peopling of the New World.

4.2 Geographic Location

Based on available evidence, permanent settlement of Interior Alaska took place during the Late Pleistocene, the geological time period that includes the earth's last glacial period, approximately 2.5 million years ago to 10,000 years ago. Occupation began during a warming period called the late glacial interstadial (17,000-12,800 years ago), an intermediate period between the Last Glacial Maximum (LGM) (23,000-17,000 years ago) and the onset of the Younger Dryas cooling period (12,800-11,400 years ago) (Hoffecker and Elias 2007). During the LGM, the Northern Hemisphere experienced massive ice sheet growth. The corresponding sea level drop exposed the shallow Bering-Chukchi oceanic shelf between eastern Asia and Alaska (Hoffecker and Elias 2007). This new piece of land, called the Bering Land Bridge, stretched over 1,000 km and connected the Kamchatka Peninsula to the Alaska Peninsula and northern Siberia to the Alaska Arctic Coastal Plain.

Although the ice sheets expanded during the LGM, the Interior Alaskan lowlands, between the Alaska Range and the Brooks Range, was an arid desert. This area left an ice-free corridor into North America. The corridor included what is now the Norton Sound, parts of the Alaska's Arctic Coastal Plain, and the Yukon-Kuskokwim River Basin. After approximately 14,000 years ago, the ice-free corridor continued south between the Cordilleran Ice Sheet over the Rocky Mountains and the Laurentide Ice Sheet, which covered most of Canada, the northern United States, and southern Alaska (Pedersen et al. 2016). This corridor may have effectively funneled people from Asia into Interior Alaska (Potter et al. 2017).

As the ice sheets advanced and retreated from the mountains and foothills surrounding the Yukon-Kuskokwim River Basin, they carved the landscape seen today. A variety of landscape features in the training areas south of Delta Junction are formed by the advance of ice sheets, including U-shaped mountain valleys and scoured bedrock surfaces in BRTA and broad compressed moraines composed of glacial till (unsorted silts, sands, gravels, and boulders) in DTA. The substrate of the Jarvis Creek Archaeological District is composed of moraines from glaciers that wasted away over 70,000 years ago (Figure 11). West of the Delta River and south of Donnelly Dome, the landscape was shaped by a younger glaciation that retreated after the LGM, 17,000 years ago.

Gravel filled ice-free pockets in the glaciers and, as the ice melted, the pockets of gravel were deposited, forming irregularly shaped mounds called kames. The melting of the ice sheets additionally formed subglacial streams that deposited debris, producing smaller ridgelines called eskers (Figure 12). Kettle lakes were developed when eskers formed around large ice blocks,

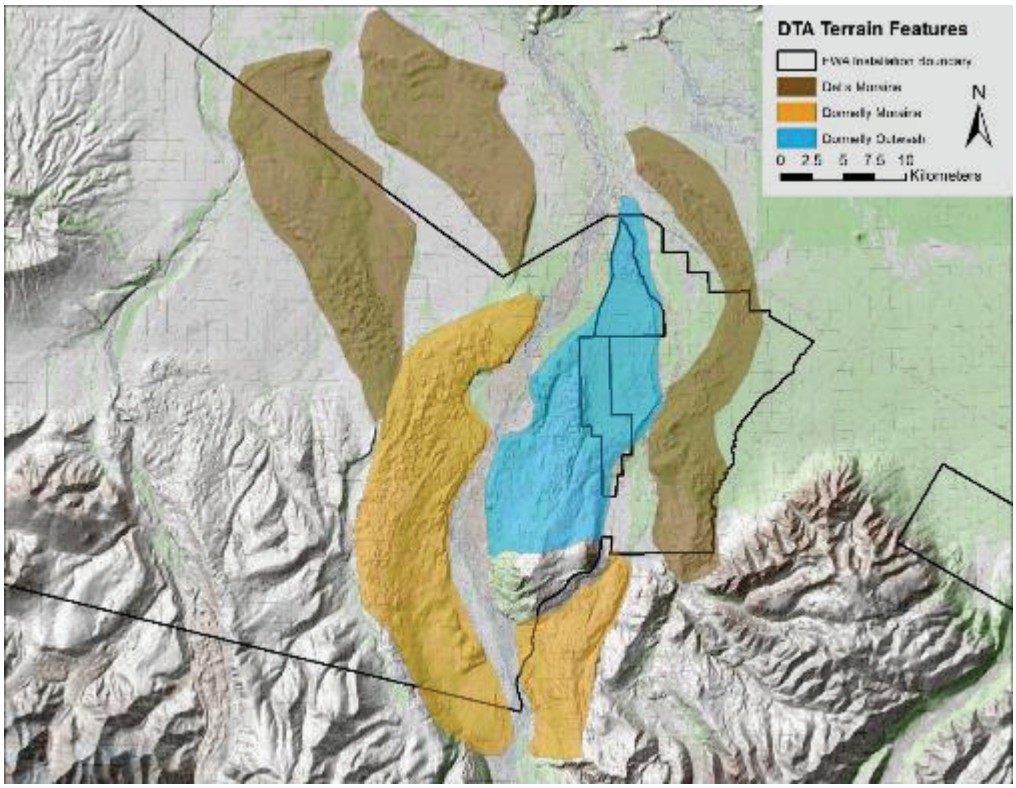

Figure 11. Glacial deposits of DTA.

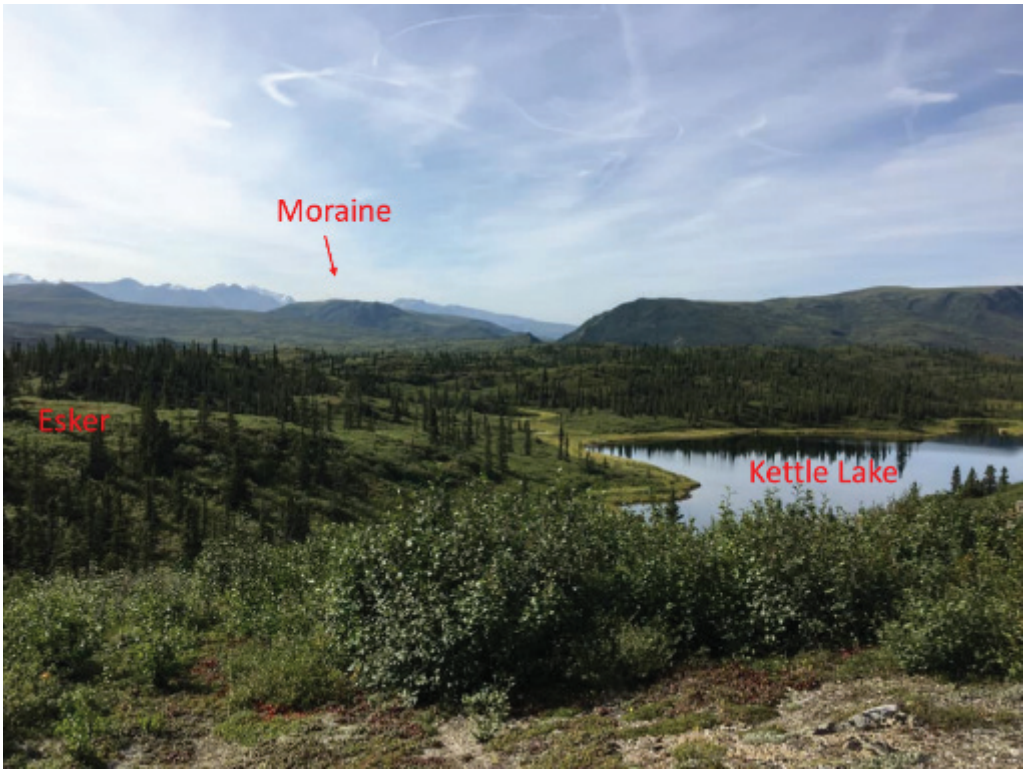

Figure 12. Moraines, eskers, and a kettle lake in the lowlands of DTA near Fort Greely.

separated from the glacier, and the ice blocks melted, leaving round depressions which then filled with water. Eskers, kettle lakes, and moraines compose much of the landscape on USAG Alaska-managed lands (Figure 12). Between the Delta River and Jarvis Creek, water from the melting glacier overflowed the Delta River valley and deposited rounded gravels and softening landscape features left behind by previous glaciations.

People living in the area in the distant past would have regularly engaged with the glaciers (Vanderhoek et al. 2012; Hare et al. 2012). The Athabascan place name for Donnelly Dome in DTA is *Łuu Tadzeey* or 'heart among the glaciers'. This suggests that this landform was named over 10,000 years ago, when the Delta Glacier abutted the southern flank of the hill, and the name has been passed down through people living in the area since that time.

Ice-free areas of Interior Alaska have been shaped by river action and the deposition of wind-blown sands and silts, known as loess. Fine sediments are constantly created by the grinding away of glaciers on bedrock in the Alaska Range. Peak loess creation occurred during the last glacial period. Winds from the glaciers blow the loess onto the landscape of Interior Alaska where it accumulated through the glacial and post glacial period (Jensen et al. 2016; Muhs et al. 2003). Vegetation growth during warming periods trapped the loess, and it accumulated in deep sheets in places like TFTA. Archaeological sites are found buried within the loess. In areas with deep loess accumulations, separate visits to sites through time can be clearly seen where artifacts, fire places, and other human debris is separated by silt layers. Areas with deep loess accumulation have the potential for housing some of the oldest archaeological sites in the Americas (Figure 13).

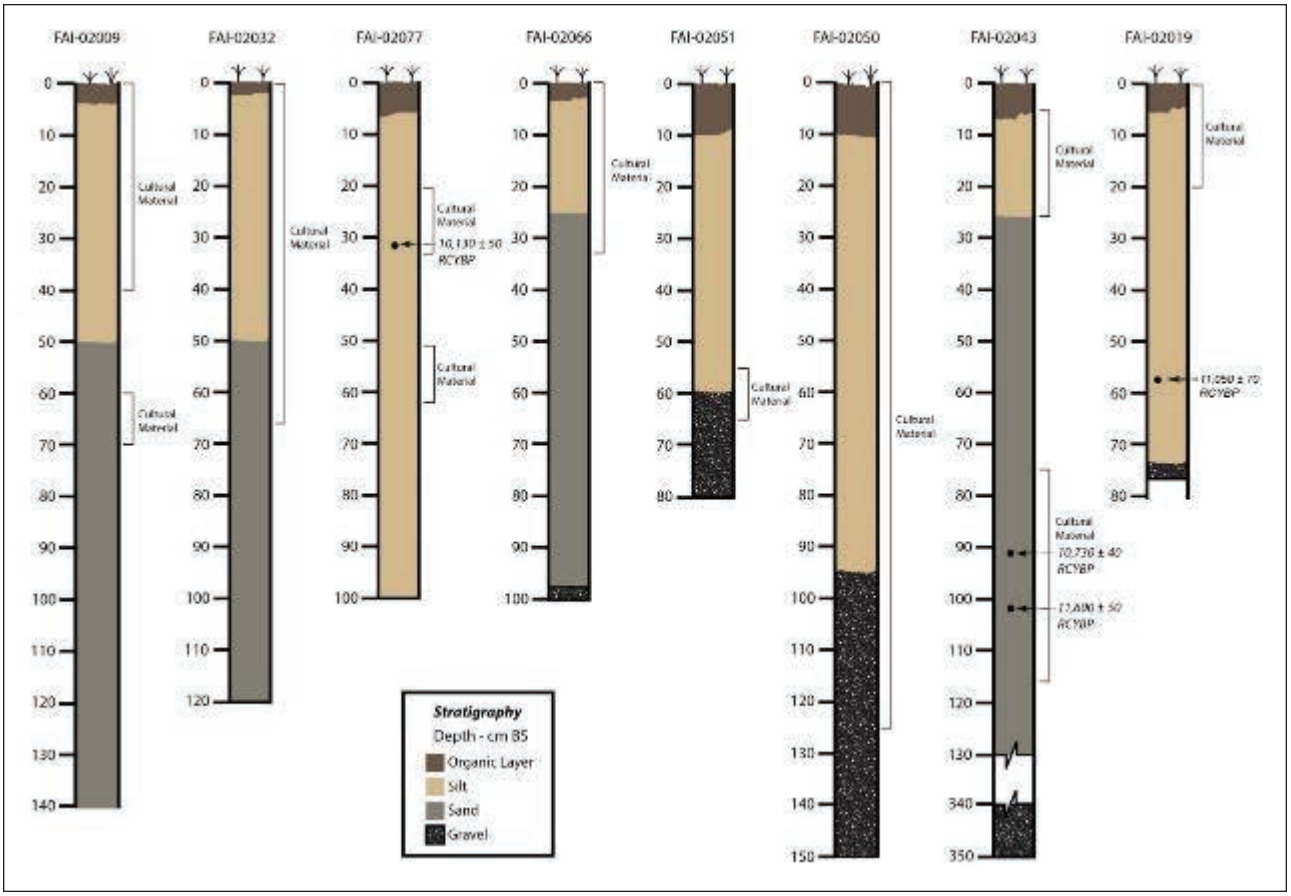

Figure 13. Stratigraphic profiles from archaeological sites in TFTA. Note their deep silt profiles and deeply buried cultural material.

4.3 Environment and Ecology

Paleoenvironmental reconstructions based on pollen data from lake-core sediments characterize the Tanana Valley region as arid and dry during the LGM (Bigelow and Edwards 2001; Hoffecker and Elias 2007; Hopkins et al. 1982; Finkenbinder et al. 2014). Although temperatures were cold, the lack of moisture prevented glacial expansion over the Beringian continent and Interior Alaska. Paradoxically, the Bering Land Bridge cut off the warm Pacific current from the Arctic Ocean, creating an even colder and more arid environment (Hoffecker and Elias 2007).

Microfossil and pollen research from Harding, Birch, and Windmill lakes, surrounding the Tanana Valley, indicate a grassland or steppe biome across Beringia (Bigelow and Edwards 2001; Finkenbinder et al. 2014; Hoffecker and Elias 2007). The steppe supported large mammals including the mastodon, woolly mammoth, woolly rhino, lion, short-faced bear, bison, and horse during full glacial times. Additionally there were large species that still live in Alaska today including muskox, moose, caribou, mountain sheep, brown bears, and elk (Guthrie 2001).

An abrupt increase in organic matter and biogenic silica circa 15,000 cal BP in lake cores indicates a warming trend and expansion of shrub-tundra (Finkenbinder et al. 2014; Hoffecker and Elias 2007). The expansion of mesic shrub tundra coincides with the earliest known human occupations of the Tanana Valley (Graf et al. 2021; Graf and Bigelow 2011; Hoffecker and Elias 2007). Some

researchers speculate that people were unable to permanently occupy Interior Alaska until willow and birch expanded into the region, due to lack of fuel for fire. However, recent research has shown evidence of bone fuel for fires along with willow during the late glacial period (Graf 2021; Hoffecker and Elias 2007; Crass et al. 2011, Potter et al. 2018).

Stratigraphy from archaeology sites in the Tanana Valley also suggest a period of warmth between 15,000-12,800 cal BP. Typically during cold and arid periods, there are heavy accumulations of loess or windblown silts and sands. During several early occupations in the Tanana Valley, there are thin layers of ancient organic growth, suggesting landform stabilization, warmth, and more a temperate environment (Kielhofer et al. 2020).

The last glacial interstitial ended in 13,000 cal BP when much of the Bering Land Bridge was inundated by rising sea levels (Manley 2002). Increasing sea levels, and the introduction of the Pacific Current to the Arctic Ocean, presumably increased moisture over Interior Alaska. The increased moisture and warmth saw a rapid spread of shrub-tundra, birch forests, and cottonwood. Due to climate change and the expansion of shrubs rather than grasses by 13,500 cal BP, many of the large Pleistocene mammals were extinct in Beringia, leaving mammals including bison, wapiti, caribou, moose, and brown bears (Hoffecker and Elias 2007). Smaller mammals and birds were similar to those found in the modern subarctic. Small animal remains identified at archaeological sites from this period include rabbits, lemmings, fox, small rodents, furbearing carnivores, grouse, and swans (Doering et al. 2021a; Potter et al. 2018; Graf 2021).

The Younger Dryas (12,800-11,400 cal BP) separates the terminal Pleistocene from the Holocene. Fossil beetle assemblages indicate a decline in summer temperatures at this time, while the pollen-spore record in many regions reflects a resurgence of herb tundra vegetation (Hoffecker et al. 2016; Bigelow and Edwards 2001). Lake levels, which had risen significantly during the late glacial interstadial, fell during the Younger Dryas, indicating increased aridity (Finkenbinder et al. 2014; Mann et al. 2001). This suggests a general cooling trend during the Younger Dryas and a return to dry and windy conditions. These conditions are corroborated by the thick loess stratum in archaeological sites, indicating an increase in windblown silt and sand (Doering et al 2021; Graf 2021; Kielhofer et al. 2020; Potter et al. 2018). Although there was a general cooling trend during the Younger Dryas, the number of archaeological sites still increases in the Tanana Valley into the Holocene.

4.4 Regional Archaeological Evidence

The Middle Tanana Valley encompasses the densest concentration of Late Pleistocene sites in the Western Hemisphere. Researchers have reported 47 cultural components older than 10,000 cal BP from 34 sites around the Tanana Basin (Potter 2011; Potter et al. 2013). The earliest dated archaeological sites around the valley include the Swan Point site, the Healy Lake site, the Mead site, the Holzman site, the Broken Mammoth site, the Upward Sun River site, the They Were There site, the Quartz Lake site, the Delta River Overlook site, and the Gerstle River site (Holmes 2001, Holmes 2011; Potter 2005; Potter 2011; Potter et al. 2014; Wooller et al. 2012; Wygal et al. 2018; Yesner et al. 2011).

Ties between the people of western and eastern Beringia (Siberia and Alaska) were firmly established with the discovery of the Swan Point site archaeological site located in the Shaw Creek Flats area, northwest of Delta Junction (Holmes 2011). The site has yielded substantial technological and faunal information from the oldest-to-date Alaskan archaeological component (14,150-13,870 cal BP). The Swan Point site's tool assemblage is composed almost entirely of

microblade and burin technology. Microblades were made on cores prepared similarly to techniques found in Asia, suggesting cultural transmission (Gómez Coutouly 2012). Burins were used to groove, carve, whittle, scrape, or plane animal bones and ivory. Both antler and ivory would have played an important role in material culture, being substitutes for wooden handles, shafts, traps, etc., in an environment where wood was scarce. By far, the most important role the Swan Point site plays in understanding early Alaskan economy is in the faunal remains. A major activity at the site was reducing mammoth tusks into smaller pieces, presumably to manufacture tools and other objects. The site is littered with small, 5-25 cm long, unworked ivory fragments. It is unclear whether mammoth was hunted or the ivory was collected. Significantly, the Swan Point site also contains the oldest known Pleistocene horse remains in Alaska (Holmes 2011; Potter et al. 2013).

Also located in the Shaw Creek Flats near the Swan Point site are the Mead site, the Holzman site, and the Broken Mammoth site. The Broken Mammoth site was discovered in 1989, one of the earliest Late Pleistocene sites found in the area. The earliest component dates between 13,440 and 11,440 cal BP. Artifacts include unifacial tools (interpreted as hide scrapers), flake cores, cobble tools, and, most significantly, mammoth ivory foreshafts. Bison contributed to 80% of the faunal assemblage, which also included wapiti, caribou, and moose. However, the assemblage included an impressive collection of waterfowl including tundra swans, white-fronted geese, and a variety of dabbling ducks. Additionally wolf remains were identified along with small mammals like otter, muskrat, beaver, marmot, pika, ground squirrel. The fauna suggests that the earliest components of the Broken Mammoth site contained short-term occupations with opportunistic hunting similar to the Mead site and the Holzman site (Potter et al. 2013; Yesner et al. 2011).

The Mead site and the Holzman sites are situated below the Broken Mammoth site on a ridgeline facing Shaw Creek and the Tanana River floodplain. The earliest cultural component at the Mead site dates to 13,440-11,850 cal BP. The stone tool assemblage is made up of bifacial flake remains composed of local raw materials and a few obsidian flakes. The occupation is relatively small and contains large mammal materials and few lithic tools, suggesting it was likely a vantage point for hunting (Potter et al. 2013). The Pleistocene components at the Holzman site date between 13,215 and 11,324 cal BP, and contain the remains of mammoth ivory, bison, and fowl. The remains suggest that people were bringing large mammal remains, including mammoth ivory, back to the site as well as opportunistically hunting fowl (Wygal et al. 2018).

Across the Tanana River from the Shaw Creek Flats are several contemporaneous archaeological sites: the They Were There site (see page 27, Sites on USAG Alaska Training Lands) and the Upward Sun River site (also known in the Athabascan language as Xaasaa Na'). The Upward Sun River site is located on a loess-mantled sand dune in the Middle Tanana Basin and dates to 11,500 cal BP (Potter et al. 2014). The Upward Sun River site is one of the most important sites in all of the Americas because it contains one of the oldest human burials (Potter et al. 2011; Potter et al. 2014). The site is composed of a residential tent structure and a variety of activity areas. The presence of a tent structure is inferred from artifacts surrounding a hearth feature in an arc-like pattern that stops abruptly and the presence of post holes.

The remains of three children were identified at the site. All were partially cremated in previously-used fireplaces. The first hearth contained the remains of a three-year-old child. Buried just below this hearth was a double infant cremation with the remains of a six-week-old baby and a late term fetus. The infants were cremated in the central hearth feature of the residential structure and the structure was not used again. Associated grave goods include four antler foreshafts (three of which were highly decorated). Two of the foreshafts were directly adjacent to willow-leaf points, representing the oldest hafted bifaces in the New World. The site was then abandoned until the

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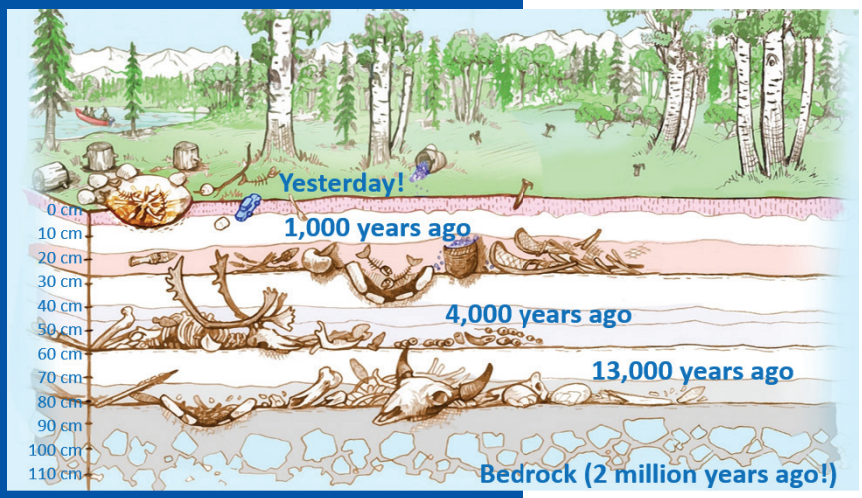
RADIOCARBON DATING

Carbon is one of the most abundant elements on earth and comes in three main forms with the same number of protons but different numbers of neutrons, called *isotopes* (carbon-12, carbon-13, and carbon-14). Carbon-14 is an isotope of carbon that isn't stable and loses electrons to become nitrogen-14 over time. The time it takes for half of the carbon-14 in a sample to decay to nitrogen-14 is approximately 5,730 years. Organisms absorb carbon-12 and carbon-14 from the atmosphere by respiration and by consuming food. When they die, they stop absorbing new carbon, and the carbon-14 in their systems begins to break down. Because scientists know the rate at which carbon-14 decays, they can then measure the ratio of carbon-12 to carbon-14 left in a sample (piece of charcoal, animal bone, or plant remains, for example) today and calculate the date that the organism containing carbon was alive. This method is called *radiocarbon dating*. It is very useful for getting accurate measurements of organic archaeological remains dating between 100 and 50,000 years ago.



The basic calculations used in radiocarbon dating assume that the levels of atmospheric carbon-14 have been constant through time, but it hasn't. **Planetary magnetic field reversals and solar flares both naturally** increase the amount of carbon-14 in the atmosphere. Humans have affected the amount of carbon as well, through the burning of fossil fuels and detonation of atomic and nuclear weaponry. Oceans further complicate things as they act as carbon reservoirs, absorbing carbon for centuries before it is released again. Because of all these variations, radiocarbon dates need to be calibrated in order to increase their degree of accuracy. One method of calibration is to match radiocarbon dates with tree ring counts, but this method only reaches back to about 14,000 years ago. Calibration for the deeper past includes thousands of data points from lake and ocean sediments and corals. Recently, stalagmites from caves in China were successfully used to further extend the chronology (Cheng et al. 2018).

In an archeological context, the use of radiocarbon dating takes significant planning and expertise. The carbon sample chosen for dating needs to be associated with the artifacts present and, ideally, a result of human activities **(charcoal from a fire or part of a textile, for example). Radiocarbon dating is the** most accurate and available tool archaeologists have to date archaeological sites and events. It is heavily relied upon for comparing artifact assemblages between sites; understanding changes in people, their activities, and the tools they make over time; and relating human events to the broader environment.

Holocene (Potter et al. 2011; Potter et al. 2014). Anadromous salmon vertebrae were identified in the lowest hearth. Additionally, isotopic results from the infant burials show that salmon and large mammals like bison and wapiti were important components of the diet of the people who lived there (Choy et al. 2016; Halffman et al. 2020).

Further up-river along the Tanana is another Late Pleistocene site located near the modern Dene village of Healy Lake. The ancient site is situated on a peninsula projecting into a lake from the northeast shoreline. The village location presents an ideal setting along the margin of the fluvial lowlands and Yukon-Tanana uplands (Hilmer 2019; Younie 2015). The Healy Lake Village site was seasonally occupied for large game hunting, fishing, and fowling. The earliest component at the site contains the small tear-dropped Chindadn points that were later recognized in other Late Pleistocene components in the Tanana and Nenana basins.

4.5 Sites on USAG Alaska Training Lands

Late Pleistocene archaeological sites located within the boundaries of USAG Alaska-managed lands are identified along river bluffs, bedrock-cored hills, and glacial features. These sites are generally deeply buried under aeolian, or windblown, silts, marked by paleosols. Paleosols are ancient soils that form under relatively stable climate regimes. Late Pleistocene sites have been located on bluffs overlooking rivers in DTA and in the hills surrounding the Blair Lakes in TFTA.

4.5.1 They Were There/Shég' Xdaltth'í' Site

The They Were There/Shég' Xdaltth'í' site (FAI-02043) is the oldest known archaeological site on USAG Alaska-managed lands and is one of the oldest known archaeological sites in Alaska (Goebel et al. 2016). The site contains three human occupations, the earliest occurring at 13,900 cal BP and the second closely following at about 13,000 cal BP (Graf et al. 2021). Because the site is among the oldest in eastern Beringia, the They Were There site has much important information to provide about the behaviors and practices of early Americans and routes taken during the early peopling of the continent.

The Shég' Xdaltth'í' site is located in the Blair Lakes Archaeological District about 7 km northeast of Blair Lakes and 40 km south of Fairbanks (Goebel et al. 2016; Graf et al. 2021). The site is situated on a south-facing bluff made of ancient water-lain gravel under thick aeolian loess deposits. The bluff is approximately 435 m above the surrounding lowland muskeg bog and is covered with spruce forests (Figure 14). The bluff face would have had a 300 degree view of the surrounding area during Late Pleistocene times when no spruce-poplar forest grew in the area. Today, local wildlife includes small fur-bearers, moose, wolf, and both black and brown bear. Additionally, Interior Alaska is home to a multitude of birds and migrating waterfowl that nest and feed in lowland areas close to water. In addition to the birds and small mammals, the first human inhabitants at the site would have encountered bison, caribou, elk, and mammoth in the flat grassland of the Tanana River Valley.

The site was first identified in 2010 during a survey to identify gravel sources in TFTA (Esdale et al. 2012; Gaines et al. 2010, 2011). When shovel tests encountered deeply buried stone tool fragments, archaeologists excavated a 1x2 m area, uncovering more artifacts, bone, and charcoal which provided a 13,000-year-old radiocarbon date. These ancient remains in stratified deposits piqued the interest of archaeologists from Texas A&M University's Center for the Study of the First Americans (TAMU-CSFA), and in 2014, they entered into an agreement with USAG Alaska and the SHPO to conduct scientific excavations at the site (Figure 15). In 2016, Kelly Graf (TAMU-CSFA)

Figure 14. The Shég' Xdaltth'í' site is marked in red on the southern edge of the landform.

and Julie Esdale (CSU-CEMML) were awarded a grant from the National Science Foundation to conduct work at the site. Excavation of the site has taken place every summer since 2013, except for 2019, when a fire interrupted work after the first day out at the site, and 2020, when the COVID 19 pandemic led to travel restrictions.

The Shég' Xdaltth'í' site's earliest cultural occupation, Component 1, occurs approximately 13,500-13,900 cal BP (Graf et al. 2021). The occupation occurs just before the onset of the Younger Dryas cooling period, but the environment still would have been relatively cold, arid, and likely windy. Strata from this period contain intermingled sand and silt layers, suggesting that there was heavy aeolian activity, which led to the amazing preservation of the organic artifacts and animal remains.

Figure 15. The Shég' Xdaltth'í' site main excavation block, 2016.

The largest artifact assemblage of lithic and faunal remains at the site are found in this early cultural component (Figure 16). Eighteen tools and more than 43,015 pieces of lithic debris (flakes from shaping and sharpening stone tools) and fauna have been recovered. Tools include hide scrapers and bifacially flaked tools used for hunting, butchery, and cutting.

Preservation of animal bones in Component 1 is exceptional compared to other archaeological sites on USAG Alaska-managed lands (Figure 16). Faunal preservation in Interior Alaskan archaeological sites is relatively poor due to soil acidity; however, the dry and aired conditions during the first two occupations at the Shég' Xdaltth'í' site made for excellent organic preservation (Doering et al. 2020a; Esdale et al. 2015; Ping et al. 2008). The remains of at least three bison, 16 large artiodactyls (likely bison and possibly elk), 129 small artiodactyls (likely caribou), seven birds (including grouse and swan), 20 hare, two canid, one small carnivore (such as fox), a variety of fur-bearing mustelids, as well as several rodents, are present in the assemblage (Graf et al. 2021). Evidence of multiple bison bodily elements, the presence of butchery tools, and burnt bones suggest at least one bison was fully processed and consumed at the site. Fur-bearing carnivores and rabbits were likely trapped, and terrestrial and wetland birds were captured by inhabitants, likely very near to the site. A canine mandible was also discovered among the faunal debris (Figure 17). Genetic work is ongoing to discover if the canine was a wolf or domesticated dog. In addition to animal bones, two broken needles made from bone were found in the assemblage (Figure 18). These will provide insight into residential activities and clothing production. The diversity of taxa and behaviors already identified in Component 1 indicate the site served as a residential location, where families were likely gathering and camping for extended periods that would have included a summer through winter occupation (Graf et al. 2021).

Figure 16. Example of an excavated animal bone scatter in Component 1.

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ANCIENT DNA

Deoxyribonucleic acid, or DNA, is found in every living cell and contains the genetic information that allows all forms of life to function. As DNA is replicated during cell division, errors can occur, causing mutation which can sometimes be passed to offspring. Changes in DNA between generations also occur because of the mixing of two parents' DNA in their offspring. In general, the more closely two people are related, the more similar their DNA. By comparing DNA from ancient sources with that of modern populations, scientists can begin to **reconstruct where an ancient ancestor fits in the human family tree on the scale** of entire populations.

Samples of ancient DNA can be retrieved from the physical remains of a person or animal (most often their bones or teeth) or from the environment. Environmental DNA (eDNA), collected from sediment, is genetic material released from an organism into the environment through feces, mucus, shed skin, or hair. Unfortunately, DNA degrades over time, depending on environmental conditions, limiting whether or not it can be successfully **sequenced. Another difficulty is contamination by modern samples, either by the** sample collector or by the laboratory technician testing the sample.

In recent years, the genomes from one individual who lived 9,000 years ago in western Alaska and two individuals who lived 11,500 years ago in the Tanana Valley have been sequenced and compared to modern populations (Moreno-Mayar et al. 2018a, 2018b). The genetic sequences showed that all three individuals came from the same, now extinct, Alaskan population that is only distantly related to modern Native Americans in Alaska and the rest of the United States and Canada. This population, named *Ancient Beringian*, had a common ancestor with all other North and South American groups somewhere in eastern Siberia just over 20,000 years ago (Willerslev and Meltzer 2021). Modern Dene people living in central Alaska are closely related to other northern North American groups and likely moved back up to Alaska during the Holocene. The **Dene genetic sequence also shows some gene flow with more recent northeast** Asian groups (Willerslev and Meltzer 2021).

Figure 17. Excavation of the canine mandible.

Figure 18. Bone needle found within the excavation.

Component 2 contained five hearths spread throughout the excavated area, with two hearths stacked on one another in two separate occupations. The older hearth contained charcoal radiocarbon dating to 13,100-12,800 cal BP, while the younger hearths date to 12,750-12,600 cal BP (Graf et al. 2021). These dates correspond with the onset of the Younger Dryas when conditions cooled in the Northern Hemisphere. Stone tools were similar to those in Component 1 and suggested people were bringing in outside materials and making tools on site. Floral data from charcoal, macrobotanical identifications, and phytolith studies indicate that willow was the main source of fuel used by people living at the site during these occupations (Graf et al. 2021).

Research is ongoing at the They Were There site; however, preliminary data suggests that this may be the earliest known residential site in Eastern Beringia. The unique faunal preservation also allows researchers a deeper understanding of subsistence, butchery, and cooking activities of early populations in Alaska. The mix of large ungulates, medium mammals, furbearers, and birds suggest that people were living and hunting during the summer, fall, and winter months. The two Late Pleistocene components are significant, not only to our understanding of early people in the Tanana Flats, but to arctic adaptions and first people continent-wide.

4.5.2 The Delta River Overlook site

The Delta River Overlook site (XMH-00297) is a deeply stratified pre-contact site spanning 14 distinct human occupations occurring over 13,000 years (Figure 19, Figure 20). The site is situated on a bench overlooking the Delta River and the floodplain. The terrace sharply drops to the south towards the floodplain and plateaus north of the archaeological site. The steep terrace edge allows for clear views of the floodplain, the Delta River, the Alaska Range, and the occasional bison herd. Wind erosion and bulldozer cuts have impacted the surface of the site, while the older stratigraphy remains intact and undisturbed (Figure 19).

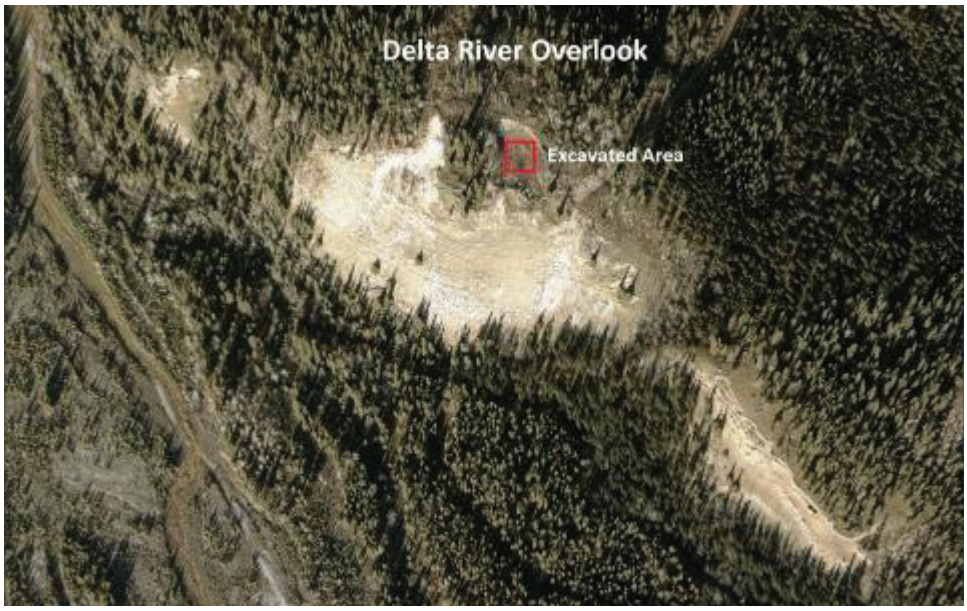

Figure 19. The Delta River Overlook site aerial photograph.

Figure 20. The Delta River Overlook site contains 32 stratigraphic layers, including loess, paleosols, tephra, and glacial outwash.

The Delta River Overlook site was identified in 1978 by archaeologist Charles E. Holmes during a survey. Holmes located artifacts scattered in the disturbed area and excavated a single 1x1 m test pit. The excavation revealed almost 2 m of intact loess containing a volcanic ash layer, multiple paleosols (buried soils), and stone artifacts (Holmes 1979). In 1979 Holmes returned to the site with a three-person crew, opening two excavation units. Holmes identified six cultural components among the highly stratified sediments (Bacon and Holmes 1980). In 2015 and 2017, a crew led by Ben Potter from the University of Alaska returned to the Delta River Overlook site and excavated 79 m2 of soil in 1x2 m blocks, identifying 12 distinct cultural occupations and 32 soil complexes (Figure 21, Figure 22) (Potter et al. 2018).

The Delta River Overlook site's earliest cultural occupation, Component 1, occurs approximately 13,000 cal BP, near the onset of the Younger Dryas cooling period. Artifacts found in this occupation included four bifacially-flaked tools that included the base of a small Chindadn-like projectile point (Figure 23), flake cutting tools, microblades, flaking debris related to making and sharpening stone tools, and the remains of a ground squirrel and grouse. No features were identified, indicating the occupation was brief and likely a site for tool maintenance and opportunistic hunting (Potter et al. 2018).

The subsequent cultural occupation, Component 2a, occurred approximately 11,600 cal BP during a period of rapid loess deposition reflecting arid environmental conditions. Component 2a consisted of a very large hearth-centered activity area surrounded by several satellite activity areas. Each activity area contained similar late-stage bifacial reduction activities from a variety of source materials. Lithic tools included bifacial knives (Figure 24), burin spalls, burins, microblades,

Figure 21. The Delta River Overlook site 2015 excavation, view southwest.

Figure 22. The Delta River Overlook site 2017 excavation, view north.

Figure 23. Component 1 bifacial projectile base.

Figure 24. Component 2a biface.

and flake tools. Raw materials included a variety of cherts, rhyolite, and quartzite. Remains of bison-sized artiodactyl long bones were identified primarily around the large hearth, while a sheep mandible was identified in a satellite activity area. The presence of the sheep mandible suggests the site was occupied during the summer months (Potter et al. 2018). The occupation likely represents multiple seasonal logistical hunting camps where early processing of large ungulates, stone tool production, and some wood working occurred.

Cultural Component 2b occurred at 11,500 cal BP, at the end of the Younger Dryas during the same period of loess deposition as Component 2a. Cultural Component 2b is a single concentrated activity area around a central hearth. Lithic analysis indicates late stage tool production using soft-hammer percussion and pressure flaking. Fauna is dominated by bison and bison-sized artiodactyl remains, suggesting the component was a short-term hunting site where biface tools were being produced and early-stage bison processing occurred (Potter et al. 2018).

All Younger Dryas occupations likely reflect small logistical camps. Based on the recovered faunal remains, people gathered at the Delta River Overlook site during summer and fall. They brought raw stone materials from outside sources to the site where then they made finished tools while opportunistically hunting and processing small and large game. Although the earliest component at the site reflects a

very short occupation, Components 2a and 2b represent longer occupations. The presence of large portions of bison and sheep skeletal remains indicate the camp was occupied in the summer and fall when large ungulate hunting occurs in the ethnographic record. Stone tools and tool-shaping flakes suggest hunting tools were being produced on site and later removed with site occupants, while discarded microblades and unifaces were used in the butchering processes.

4.5.3 The Delta Creek/Niidhaayah Na' Site

The Delta Creek/Niidhaayh Na' site (XBD-00110) contains four separate human occupations situated in a mantle of silt, ranging from 130-190 cm in depth, overlying a glacial moraine (Figure 25). The moraine forms a steep, west-facing bluff approximately 25 m above Delta Creek in DTA West. Summer Lake, a large marshy lake on top of the bluff, is located 300 m east of the site. Vegetation consists of several old growth needle and broadleaf species with a brushy understory of willow, rose, dogwood, fireweed, and *Delphinium* (Figure 25). Archaeologist Charles Holmes identified lithic and faunal material eroding out of the bluff face at the site in 1978. No excavations were completed at the time (Holmes 1979; Bacon and Holmes 1980).

The site and old shovel tests were relocated in 2012. Cultural remains were found in four shovel tests along the bluff edge. One test unit was excavated to 100 cm below surface and yielded numerous flakes (Esdale et al. 2013). In 2017 and 2018, crews returned to the site and excavated eight north-south oriented 1x1 m test units along the bluff edge (Figure 26) (Doering et al. 2019a, 2021a). A total of five tools, 5,781 pieces of lithic debris, 758 faunal fragments, 40 charcoal samples for radiocarbon dating, two pieces of ochre, two tephra samples, and one piece of fire-cracked rock were collected from four cultural occupations (Doering et al. 2019b, 2021a).

The two oldest occupations at the site date to the Late Pleistocene and Early Holocene. Both cultural occupations are found within a single buried soil and are separated by a thin layer of

Figure 25. The Delta Creek/Niidhaayh Na' site overview with Delta Creek on right and Summer Lake on left.

Figure 26. Excavations at the Delta Creek site in 2018.

aeolian silts. Pieces of wood charcoal associated with artifacts were radiocarbon dated from each occupation. The oldest cultural layer dates to 11,800 cal BP and the younger dates to 9,300 cal BP (Doering et al. 2019a, 2021a).

The Pleistocene occupation is composed of 854 artifacts, including three microblade fragments, 21 bone fragments, and 146 pieces of lithic debris. Over 5,000 artifacts were recovered from the Early Holocene component, including three tools, 23 bone fragments, and 617 pieces of diagnostic debitage, making this the richest component identified at the site. Faunal remains were severely affected by diagenesis in both occupations and were only generally identifiable as the remains of large or extra-large mammals like bison or wapiti (Figure 29). Gray chert and black chert compose the majority of raw materials. The majority of the stone debris is consistent with shaping and sharpening bifacial tools (Doering et al. 2019a, 2021a). Some of the stone tool-making debris is the result of breaking down cobbles into large flakes for making into knives, projectile points, and other tools. The cobbles were likely collected from the creek bed below the site.

The Late Pleistocene occupation at the Delta Creek site may have been a seasonal logistic location for collecting raw stone materials. Additionally, the site is located on the periphery of upland and lowland ecological zones, offering residents the opportunity to hunt a diverse array of large game, fish in nearby rivers and lakes, and gather berries. The faunal remains, although unidentifiable, are large in size, indicating they are likely from bison and wapiti. Based on ethnographic research in Interior Alaska, large game is generally hunted during the fall season. This is when the site was likely occupied (Doering et al. 2019a, 2021a).

The Early Holocene occupation is the richest component at the Delta Creek site and demonstrates continuity with the Late Pleistocene component. Faunal remains are consistent with large animals such as bison or wapiti. Lithic materials are more diverse than in the older assemblage and represent the entire sequence of production for bifacial tools like knives and projectile points.

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STRATIGRAPHY

One of the first steps in analyzing an archaeological site is to evaluate the site *stratigraphy*. Stratigraphy refers to the layers of sediment that have been laid down over time, the position of cultural remains within those layers, and the changes that have taken place in the layers over time. Archaeologists study stratigraphy to determine the relative age of different cultural layers and their relationship to the environment at the time they were deposited.

Figure 27. Volcanic ash layer at the Delta River Overlook site (Potter et al. 2018: Figure 5.4).

Stratigraphy follows the *Law of Superposition* which states that where one layer overlies another, the lower **layer was deposited first. Hence, excavated vertical profiles illustrate a series of** layers that have accumulated through time, providing a relative chronological **sequence of cultural layers (Renfrew and Bahn 2016). Cultural artifacts identified** within the same stratigraphic deposit are generally associated with one another (they were deposited approximately the same time) and compose an archaeological component or occupation.

Stratigraphy is essential to interpreting archeological site formation processes: the events (natural and human) that created and altered an archaeological site before, during, and after its occupation by humans. Natural processes such as soil development, faulting, frost heaving, wind erosion, and animal disturbance can alter the position of cultural materials within the stratigraphy. Human actions can also modify older stratigraphic layers or alter natural sediments (digging of pits through sediments, intentionally burying the remains of loved ones, burning organic matter in hearths, or constructing buildings, for example) (Schiffer 1983). By carefully analyzing stratigraphic **profiles, changes to sites after they have been deposited can be identified.**

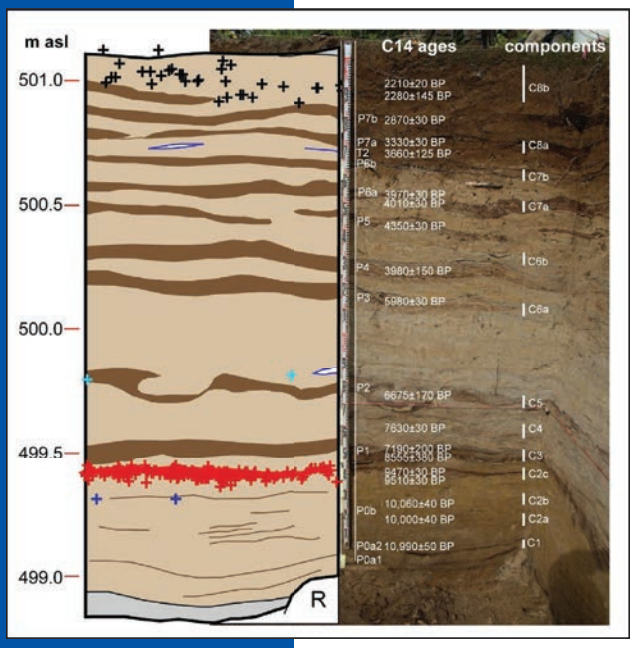

Figure 28. The Delta River Overlook site stratigraphy, cultural components, and ages. Potter et al. 2018 Figure 4.1. DRO stratigraphy and radiocarbon dates (Block 12 North Wall).

The deposits making up the stratigraphic record on USAG Alaska-managed lands are generally an accumulation of windblown sands and silts overlying river and glacial deposits or bedrock. These silt and sand layers often contain dark, organic-rich layers formed during periods of vegetation growth and soil development. These are called *paleosols*. Occasionally, *tephra* **is also identified in thin layers within stratigraphic profiles** (Figure 27). In this portion of the Tanana Valley, volcanic ash deposits are derived from eruptions of the Mount Hayes and Mount Churchill volcanoes 4100 and 1150 years ago (Davies et al. 2016; Worden et al. 2018). The Delta River **Overlook site has a deep stratigraphic profile and provides excellent examples** of layered windblown silts, volcanic ashes, and stable periods where soils developed (Figure 28) (Potter et al. 2018).

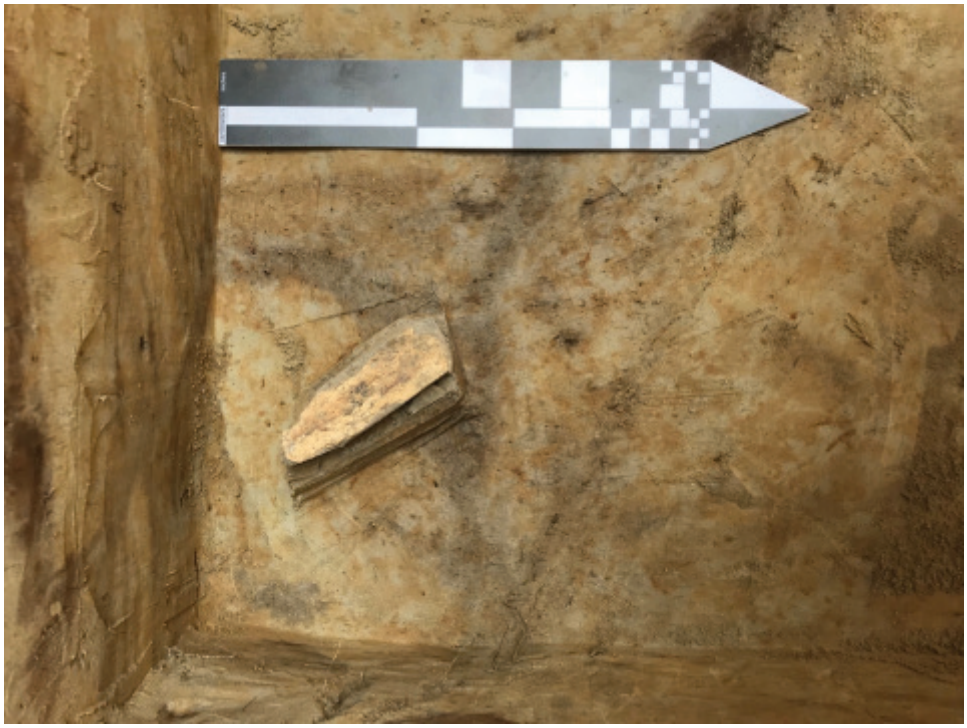

Figure 29. Large bone fragment found in the Late Pleistocene occupation (Doering 2019: Figure 9).

Interpretations from the pieces of stone left behind at the site suggest that cobbles were collected from the river and manufactured into tools on site. Two complete biface tools were identified in this component (Figure 30). Similar to the Late Pleistocene occupation, the artifacts indicate that the site was likely used as a fall logistical camp for hunting game and manufacturing tools.

4.6 Technology and Subsistence

Investigations from the USAG Alaska-managed training lands and surrounding Tanana Flats/Yukon-Tanana Uplands suggest during the Late Pleistocene people were primarily hunting large game such as bison and wapiti and supplementing seasonal game such as fowl, fish, and medium-size animals, and small fur-bearing mammals. Sites are identified on tall glacial moraines, ridgelines, and alluvial deposits, which would have served as lookout points. Other Pleistocene-era sites are located along lake beach-lines and rivers, suggesting people were using waterways as vantage points as well. The majority of identified sites are seasonal hunting camps, with the exception of the Upward Sun River site and the Healy Lake site, which were likely residential base camps.

Tools identified from these components are primarily composed of stone. Organic tools made from wood, bone, and antler were certainly used during this period; however, the organics rarely preserve. Instead archaeologists identify tools composed of local and non-local cherts, rhyolite, basalt, sandstone, chalcedony, and andesite. Obsidian is also occasionally identified in early components and can be traced to several locations, including Wiki Peak in the Wrangell-St Elias National Park and Batza Tena in north-central Interior Alaska along the Koyukuk River. Obsidian is sourced using x-ray fluorescence (XRF) or Inductively Coupled Plasma-Mass Spectrometry (ICP-MS) to detect the combination and proportions of trace elements. Alaskan sources can be

Figure 30. Bifacial tools recovered from Early Holocene component (Doering 2019: Figure 8).

differentiated from one another using such elements as iron, rubidium, strontium, zirconium, and yttrium (National Park Service). Identifying obsidian from hundreds of miles away suggests an established trade network.

Some researchers suggest tool patterns from Late Pleistocene sites indicate the presence of two cultural traditions, Chindadn and Denali. The Chindadn Tradition is characterized as containing small teardrop-shaped points, unifacial scrapers, and no microblades. This tradition originated from the Healy Lake archaeological site. Conversely, the Denali Tradition was almost entirely composed of microblade technology and researchers often refer to the earliest component at The Swan Point site as Denali (Esdale et al. 2020; Holmes 2011; Potter 2008b). However, current research suggests that rather than two separate cultural traditions, the artifacts may just represent differential tool kits used by the same people. This single Late Pleistocene tradition is referred to as the Beringian Tradition (Holmes 2001; Potter 2008b). The Delta River Overlook site further supports the Beringian theory. In 2018 excavators located contemporaneous Chindadn points and microblades, indicating one group of people were using both tools, just in different ways.

Evidence from Late Pleistocene archaeological sites paint a picture of logistical hunting camps and residential homes along ridgelines, dunes, and glacial outcrops. The people were focused on hunting large game animals such as bison and wapiti, but highly supplemented their diets with small game, fish, and fowl. Isotopes from the Upward Sun River site burials also support a varied diet breadth and give us a glimpse into ancient cultural rituals.

4.7 Conclusions

The unique environment of the Tanana River Valley made it an ideal home for early migrants into Alaska at the end of the last glacial age. Three components of this environment were key to the later discovery of ancient sites pertaining to the peopling of the Americas. The first was that the area was never glaciated. Alaska was too arid for glaciers to advance far beyond the mountains in which they originated. The Tanana River Valley maintained a broad grassland for many millennia. Second, this grassland supported large herbivores that were the mainstay of the diet of early inhabitants. People were able to explore far outside of their previous homelands because of access to consistent, high-value food sources of animals such as bison, mammoth, and caribou. Finally, the continual deposition of loess during the Late Pleistocene and Holocene provided a blanket for

preserving the remains of camps and meals in many parts of the landscape. Not only does the area house the densest quantity of Late Pleistocene sites in all of North America, but it has the potential to contain many more significant traces of the ancient past and to contribute more to our knowledge of the lives of people during this significant part of the human history of the continent.

CHAPTER 5 – HOLOCENE OCCUPATIONS

5.1 Statement of Significance

The end of the Pleistocene and onset of the Holocene Epoch brought changes to the environment, ecology, and the behavior of people. Between 10,000 to 7,000 years ago, there are very few radiocarbon dated archaeological sites in central Alaska (Potter et al. 2008b). Some researchers propose the weather was inhospitable for occupation during the Early Holocene, while others suggest there is simply not enough research done in high probability areas outside of the Tanana Valley. A small number of Army-managed sites in the area have dates within this period (described below).

The Middle Holocene brought moister conditions and a significant change in the ecosystem of Interior Alaska. The modern spruce-poplar forest spread across ecoregions of Alaska starting in 9,000 cal BP, and by 6,000 cal BP, the environment looked similar to today. Between 7,000 and 3,000 cal BP, there is a marked shift in the locations, technology, and inferred subsistence at archaeological sites across Alaska (Bigelow and Edwards 2001; Esdale 2008, 2009: Fuqua 2020; Potter 2008a). Sites from the Middle Holocene appear most frequently on ridges, followed by lake shores and river terraces. Less inhabited areas include forested areas, glacial deposits, beaches, ice patches, and dunes.

The use of microblades, burins, and large lanceolate points persist from the Late Pleistocene components, but new signature tools from the Holocene toolkits include notched bifaces, specialized scrapers, and notched pebbles (Esdale 2008, 2009; Potter 2008a). Yukon ice-patch data suggests that the notched projectile points were used as atlatl darts (Hare et al. 2004, 2012). Complete atlatl darts with notched projectile tips have been identified in melting icefields from Yukon and contain dates from 3,000 to 6,000 cal BP (Hare et al. 2004; Helwig et al. 2021).

Archaeological sites dating to the Holocene and containing notched projectile points are identified across North America. The arctic and subarctic notched projectile styles are found throughout Alaska and the Yukon, Canada, although researchers suggest that the spread of notched projectile technology may be related all over North America. The points are often used as an index tool for dating sites to the Middle Holocene in Alaska if radiocarbon dating is not available. Researchers refer to assemblages from the Middle Holocene containing typical tools for this time period as part of the Northern Archaic Tradition. The term was originally conceived to describe northern Alaska artifact assemblages containing side-notched atlatl darts (Anderson 1968), but was later expanded to include any site in the Interior of Alaska dating between approximately 7,000-3,000 years ago, regardless of the types of artifacts (Esdale 2008).

The Northern Archaic Tradition is marked by a rapid shift in technology, site location, and subsistence practices from the earlier Paleoarctic Tradition. Toolkits expanded to contain a wider variety of atlatl dart tips as well as fishing equipment. Faunal remains indicate a focus on caribou hunting supplemented with wapiti, moose, sheep, smaller mammals, fish, and some birds. Many Northern Archaic faunal collections are limited to small, unidentifiable, and often calcined animal remains due to soil acidity (Doering 2020a; Esdale 2008; Ping et al. 2008; Potter 2008a). From the rare identifiable remains, caribou are the overwhelming focus. In the foothills of the Brooks Range, the remains of caribou fences and large processing camps from the Northern Archaic era indicate people were gathering to collectively hunt and butcher animals (Ackerman 2004; Driver 1990;

Esdale 2008, 2009; Wilson and Slobodina 2007). Small game is often lost to post-depositional processes, but archaeologists have identified some fish, small furbearing animals, and birds in Northern Archaic assemblages.

Several theories have emerged during the past half century on the origins of the Northern Archaic. Some researchers suggest the Northern Archaic Tradition was a population of people who replaced the earlier Paleoarctic Tradition (Workman and Lawhead 1978), while others propose the toolkit was introduced to the arctic and subarctic people through transmission and diffusion of ideas (Morrison 1987), and others have suggested that people were adapting to the expanding boreal forest (Anderson 1968). For many years the consensus among arctic archaeologists was that it was unlikely that the Paleoarctic population was completely replaced during the Middle Holocene because of the direct transmission of tool forms from the Late Pleistocene, including microblade technology, lanceolate points, and burins (Esdale 2008, 2009; Potter 2008a). Environmental data also indicated that the expansion of white and black spruce across the state was time-transgressive: spruce was in central Interior Alaska by 10,000 cal BP, but did not spread into northwest Alaska until the Middle Holocene and into southcentral Alaska until approximately 2,000 years ago (Mason and Bigelow 2008). Furthermore, peatland distribution did not reach modern limits until the Middle Holocene, indicating the expanding toolkit was not an adaptive strategy to an already well established spruce-poplar forest in the Alaskan Interior (Esdale 2008, 2009; Mason and Bigelow 2008; Potter 2008a).

The expanding toolkit likely indicates diversifying subsistence strategies (Esdale 2008, 2009; Potter 2008a). This is also evident in the expanding range of occupation locations. With the expanding forest and wetlands, bison, a major food source in the Late Pleistocene, disappears from the Tanana Valley. Subsistence strategies focus on the mass butchery of caribou, as well as logistical hunting for game including sheep, wapiti, moose, and medium/small mammals. Settlement patterns reflect aggregate occupations, where the presence of almost exclusively microblades and scrapers indicate mass butchery and processing activities, likely done with multiple families, while residential occupations reflect a single family or smaller family aggregation with multiple tool forms present. Small logistical camps are reflected in the remains of hunting tools and bifacial/microblade reduction flakes indicative of small hunting forays. The presence of small occupations along waterways also suggests families were fishing or hunting for migratory waterfowl (Doering et al. 2021a; Driver 1990; Esdale 2008; Potter 2008a).

Recent genetic data is causing archaeologists to reconsider population replacement ideas. Modern Dene people are directly related to people in the central United States with the northern North American genetic sequence (and not directly related to the Ancient Beringian population that lived in Alaska until 9,000 years ago) (Willerslev and Meltzer 2021). They must have moved northward into Alaska sometime after the Ancient Beringian population disappeared. This is likely between 9,000 and 5,500 years ago, based on genetic material in their DNA sequence that derived from ancient Palaeo-Siberian people (ancestors of modern Siberian, Alaskan Paleoeskimo, and Inuit populations) (Willerslev and Meltzer 2021). These relationships are complex, and future genetic studies should clarify them further.

Studies of archaeological sites located on Army-managed lands dating to this period have already contributed to the conversations about continuity and replacement of populations through time, changes in Holocene subsistence strategies and associated technologies, and human behavior at multiple scales. Several examples from sites in the Tanana and Delta river valleys dating between 9,000 and 3,000 years ago are provided in this section.

Learn More

MAGNETOMETRY AND GROUND PENETRATING RADAR

Discovering archaeological sites is a time-consuming endeavor involving excavating large numbers of shovel tests over vast landforms, the majority of which yield no cultural material. Luckily there are a few techniques that archaeologists can use to locate some sites without digging. These methods can also complement excavations by identifying areas of dense cultural material, structures, and hearths. Three common non-ground-disturbing methods of detecting subsurface features are magnetometry, electromagnetic surveys, and ground penetrating radar (Urban et al. 2012; Witten 2017). Although they can be helpful in some situations, these methods employ large mechanical devices which have limited maneuverability and effectiveness, depending on site vegetation and variable topography (Urban et al. 2012).

Magnetometry is a technique that studies variations in the earth's **geomagnetic field. Magnetometers most easily detect magnetic** metals like steel and iron, but also heat-treated soils and bricks. At sites without structures, it is sometimes possible to detect subtle variations in the ground composition, including decaying organic materials and even disturbed soil. Magnetometers are limited by magnetic 'background noise' caused by many sources including the sun, materials in the sensor itself, and any metal on the clothing of the sensor operator, all of which can distort or obscure the reading. These discrepancies occur more often in arctic regions with false positives caused by frost boils, which contain natural concentrations of iron oxides. Despite this and other anthropogenic false positives, magnetometry can be a very useful tool in identifying ancient hearths in known site areas and in broader searches for sites with minimal surface indicators as demonstrated in eight case studies from Alaska (Urban et al. 2019).

Electromagnetic survey is another method similar to magnetometry except that **it projects an electromagnetic field into the ground and reads the returning field,** comparing the transmitted and received data to produce a conductivity map. The method is primarily used for locating large features, such as buried historic **debris, due to its lack of fine resolution (Witten 2017).**

Ground penetrating radar (GPR) emits high frequency radio waves into the ground. When the waves bounce off underground objects, the GPR reads the **variations in the reflected waves and indicates where there may be objects of** interest. GPR has the advantage of being able to detect small objects at great depth and the ability to differentiate the depth of objects. Data can be presented as three dimensional images or horizontal or vertical cross-sections. GPR's use is drastically limited by less-than-ideal conditions. Fine grained sediments are too conductive, causing loss of signal strength, and rocky sediments scatter the **signal. Archaeologists in Alaska have used GPR to delineate soil layers, find out** how deep bedrock is, and locate disturbances in the ground that may indicate ancient digging or clusters of material that have different characteristics than the background sediment (Urban et al. 2019).

5.2 Geographic Location

The Holocene began with world-wide warming temperatures, leading to receding glaciers and the complete submergence of the Bering Land Bridge. By the Early Holocene (11,700-8,000 cal BP), glaciers were completely absent from lowland valleys, and by the Middle Holocene (8,000-4,000 cal BP), glacial extent was similar to the pre-industrialization modern era. Landforms of the Holocene were shaped by the deposition of aeolian loess and erosion by wind and water.

Archaeological sites during the Holocene are primarily situated on ridges, followed by lake shores and river terraces. Less inhabited areas include forested areas, glacial deposits, beaches, ice patches, and dunes. Aeolian bluffs and tall glacial moraines, similar to the Pleistocene occupations, were likely vital for viewing game in lowland areas. By the Middle Holocene, sites span low-lying eskers and lake shores, suggesting there was widespread landscape stabilization and a diversification of food sources.

5.3 Environment and Ecology

Sea level rose as glaciers retreated during the transition between the Pleistocene and Holocene periods. Warmer and wetter conditions caused by the introduction of the Pacific Northern Current caused warm and moist conditions in Alaska and the Middle Tanana Valley (Finkenbinder et al. 2014). Pollen data from eastern Beringia indicate that between 11,700 and 7,000 cal BP, the temperature was 3°C warmer than at modern times with a higher average rainfall (Kaufman et al. 2016). The most significant climate impacts on humans, animals, and vegetation are related to these increasing summer temperatures and moisture levels (Guthrie 2006). Pollen, stratigraphy, and organic analysis of lake deposits suggest that there were dramatic changes in vegetation during the early and Middle Holocene, shifting from a mosaic tundra to lowland peatbogs and upland deciduous woodlands.

Studies show that the paludification (formation of peatlands across the boreal zone) of Alaska mainly occurred during the Holocene Thermal Maximum, 11,500-8,600 years ago, but continued to accumulate through the Late Holocene (Jones and Zu 2010). This accumulation of water-logged organic matter in lowland areas transformed summer movement around the landscape for both animals and people. It would have played a significant role in the alteration of seasonal subsistence rounds and even the types of plants and animals that were concentrated on by Holocene people in Alaska. Pollen and microfauna from lake cores also show the north and westward movement of spruce and alder across the state (Bigelow and Edwards 2001; Kaufman et al. 2016). Mammoth had completely disappeared from Alaska by the onset of the Holocene, and the ranges of other large fauna such as bison and elk became more and more restricted through time (Guthrie 2006; Rasic and Matheus 2007). Habitat loss eventually led to the extinction of the bison and wapiti in most areas of Alaska, leading to a focus on caribou hunting and a diversity of small game, fowl, and fish.

5.4 Regional Archaeological Evidence

Over 250 Northern Archaic sites have been recorded throughout Alaska and the Yukon Territory, Canada (Esdale 2009: Fuqua 2020). Many radiocarbon-dated Middle Holocene components, with and without notched projectile points, are found in sites in the central Tanana Valley. The Campus Site was one of the first Middle Holocene-aged sites discovered in this area (Pearson and

Powers 2001). It was located on the University of Alaska Fairbanks campus in 1933 and contained microblade cores, microblades, and microblade core reduction flakes. A re-evaluation of the site stratigraphy and new radiocarbon dates demonstrates that these materials date to 6,850 years ago and that they may or may not be associated with side-notched projectile points (Pearson and Powers 2001).

Several sites with evidence of Northern Archaic occupations have long cultural sequences dating back to the Middle Holocene. These include the Swan Point site (Smith 2020), the Mead site (Potter 2008a, 2011), the Broken Mammoth site (Yesner et al. 1992), and the Healy Lake site (Cook 1969, 1996; McKennan and Cook 1968). The key artifacts identified at all these sites include microblade technology and notched bifaces. The Swan Point site contains multiple Holocene components dating to the Middle and Early Holocene. The Middle Holocene assemblage (Level 5-6, 4,800-5,530 cal BP) contains burins, microblades and microblade core-shaping flakes, scrapers, unifaces, and a wide variety of biface forms, suggesting that an extensive amount of tool crafting, hide work, and meat butchery was occurring. The double-ring-like disturbance pattern of artifact discards indicates the presence of either tents or a circular, heavily utilized work area surrounded by smudge fires, or perhaps a combination of both. The earlier Holocene assemblage (level 7-8, 7,500-8,200 cal BP) is dominated by biface forms and fragments, discarded microblade cores, and several scrapers. Site activities throughout the Holocene were consistent with retooling efforts and food processing and consumption activities (Smith 2020). Other sites in the Shaw Creek Flats, the Mead site and the Broken Mammoth site, contain multiple Holocene components that contain toolkits with both microblade and bifacial technologies, including side-notched points.

Few Northern Archaic sites in the Tanana Basin contain faunal material (Potter 2008a). The Fog Creek site, the Jay Creek Mineral Lick site (Dixon et al. 1985), the Kuparuk Pingo site (Lobdell 1986), the Delta River Overlook site (Potter et al. 2018), and the Matcharak Peninsula site (Keeney 2019) have provided the largest faunal assemblages associated with the Northern Archaic in Alaska (Fuqua 2020). The Fog Creek site in the middle Susitna River Valley dates to approximately 6,210-3,210 cal BP and contains remains of medium/large mammals, several small/medium mammals, and one possible bird bone (Dixon et al. 1985). Located in the same region, the Jay Creek Mineral Lick site dates to 4,440-5,460 cal BP and contains an abundance of medium/large mammal remains. It was thought to be a hunting camp for exploiting animals using the nearby mineral lick (Dixon et al. 1985). The Kuparuk Pingo site, off the Beaufort Sea in northern Alaska, dates to 7,430-6,120 cal BP and contains several caribou and four bird species (Lobdell 1986). The Matcharak Peninsula site has been interpreted as a repeatedly utilized, short-term hunting camp, dating to 6,190-3,780 cal BP. The fauna included caribou, Dall's sheep, locally available fish, and Arctic ground squirrel (Keeney 2019). Lake Minchumina, 2,750-800 cal BP, contained faunal remains identified as caribou, moose, bear, hare, duck, and fish and is suggested to be a spring-fall occupation, estimated by the presence of seasonal waterfowl (Fuqua 2020; Holmes 1986). These sites have led archaeologists to theorize that the Northern Archaic diet was centered on caribou and supplemented by smaller animals and plants.

5.5 Sites on USAG Alaska Training Lands

Holocene era archaeological sites in USAG Alaska-managed lands have been found along lake shorelines, on river bluffs, and among esker and kame complexes. These cultural components are generally shallowly buried in silts with weak soil development, or along the surface of exposed bluffs or glacial outcrops. Often archaeologists cannot directly date surface sites, due to lack of organic remains, but the artifacts identified at the sites (such as microblades and notched projectile

points) are associated with the Holocene period. Several portions of training lands, including the Blair Lakes and Clear Creek Buttes Archaeological Districts in TFTA and the Jarvis Creek and Heart among the Glaciers Archaeological Districts in DTA, contain landforms topped with sediments of appropriate age to contain Northern Archaic sites. Five such sites are discussed in detail here.

5.5.1 They Were There Site/Shég' Xdaltth'í'

The Shég' Xdaltth'í' archaeological site contains a Northern Archaic component representing at least one Holocene occupation (Graf et al. 2021). The site is located on a bluff overlooking the Tanana Flats. It is about 7 km from Blair Lakes and 40 km south of Fairbanks. The site has had a large scientific excavation that uncovered at least three different cultural components dating back to the Late Pleistocene. The substrate in which the archaeological materials are buried is a deep bed of silt and sand layers that get finer toward the surface because stronger winds at the end of the Pleistocene carried larger sand particles to the site, and over the last 12,000 years, the Tanana River has slowly moved northeastward away from the edge of the site to its modern position approximately 10 km away.

The Northern Archaic occupation, Component 3, is located 25-35 cm below the surface in a silty lens of the modern soil's B horizon. Radiocarbon dates from hearth charcoal associated with artifacts in Component 3 range between 5,990-5,300 cal BP. Over 1,000 artifacts, including a scraper, a burin, five bifaces, biface fragments, one notched projectile point, and three retouched flakes, were recovered from the component. Stone debitage is associated with late stage of tool production and tool resharpening, indicating that stone was picked up in another area and roughed out into tool shape then brought to the site where they were made into finished tools. There is also evidence of microblades and microblade core reduction in this component, unlike earlier occupations at the site where it is not present. Interestingly, the clear patterning of raw materials and tool debitage indicates specific tool production activity areas and potentially different short-term occupations. Only a few pieces of unidentifiable, fragmented, and decayed faunal remains are present. The patterning of specific lithic activity areas and the 4,000 year gap between the earliest and latest radiocarbon dates indicate that the multiple occupations were short, sporadic, and likely subsistence-based (Graf et al. 2021).

Figure 31. Notched projectile point and microblades from the Northern Archaic component at the Shég' Xdaltth'í' site.

5.5.2 The Delta River Overlook Site

The Delta River Overlook site contains nine cultural components from two cultural traditions spanning approximately 10,740 to 2,240 cal BP. Occupations are marked by highly resolved periods of aeolian silt deposition punctuated by layers of volcanic ash and periods of paleosol development. Eight hearth features produced floral remains, indicating availability of plants and site seasonality throughout the Holocene. Excavated fauna suggest a shift in large ungulate hunting to smaller more diverse game capture through time. Additionally, isotope analysis on bison teeth suggests

bisons' mobility increased during the Middle Holocene before their extinction, corresponding to the expanding spruce forest (Potter et al. 2018).

The Delta River Overlook site's earliest Holocene occupation, Component 2c, occurred around 10,740 cal BP. Component 2c consists of two dense activity areas surrounding hearth features (Figure 32). Stone technology in the two activity areas are very similar, and tools include bifaces, burins, burin spalls, cobble-spall tools, modified flakes, unifaces, microblades, microblade cores. The Component 2c faunal record is dominated by large artiodactyl (two toed, hooved mammals) long bones and tooth enamel fragments. The two main faunal clusters overlap with the central hearth activity areas. The large bison or wapiti-like remains indicate the site was likely a fall hunting camp. Additionally, researchers studied the carbonized botanical remains from the hearth features (Figure 34) and identified bearberry, wild raspberry, and wild strawberry seeds. Bearberries ripen in the early fall, while raspberries ripen in the late summer, and strawberries in the early summer. This indicates the site was used from the summer to late fall (Potter et al. 2018). The spatial arrangement of artifacts suggests that there was a tent or sheltered structure encompassing the hearths and activities (Figure 32) (Potter et al. 2018). Overall, the similarities between the activity areas are striking and suggest multiple groups cohabiting the location simultaneously or the same group visiting the site multiple years in close proximity.

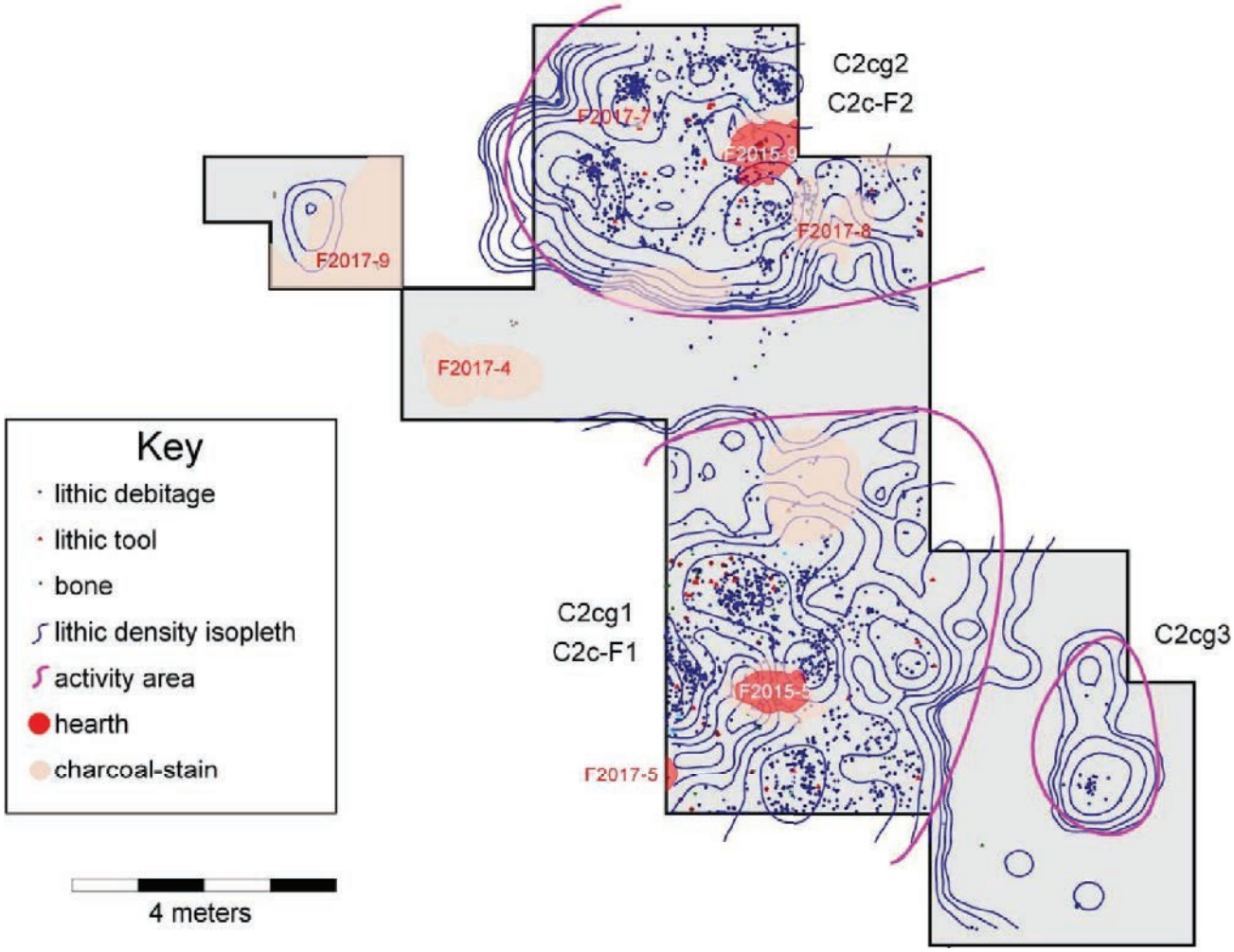

Figure 32. Component 2c activity areas (Potter et al. 2018: Figure 12.3).

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PALYNOLOGY

Pollen is made up of microscopic silica structures **that flowering plants** use to transfer genetic material to other plants of the same species for sexual reproduction. Each species produces a uniquely structured pollen, often in massive amounts, and by studying the presence and quantity of each type of pollen in the stratigraphic record, scientists can surmise the variety and abundance of plants present during different time periods. This record can also be used by archaeologists to reconstruct what the landscape would have looked like and what vegetable resources were available during the past.

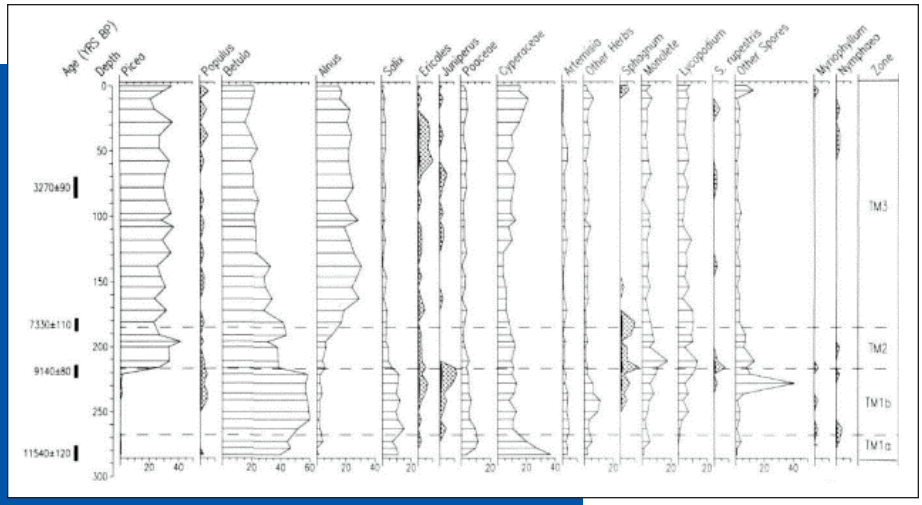

Figure 33. Pollen diagram from Ten Mile Lake (Anderson et al. 1994: FIgure 3-a). The depth of the core is represented along the y axis, indicating time. Percentage of each major taxa are along the x axis. Stipple pattern indicates 7x exaggeration for underrepresented species.

Pollen diagrams, or graphs of the percentage of pollen by species through time, are used to visualize pollen data. Pollen is collected in sediment by coring lake beds and peat bogs. The core is carefully divided into small sections and organic material is radiocarbon dated to provide age markers along the core. Each individual sediment sample is chemically treated to remove all organic matter, sediment, and other microscopic particles, leaving only pollen behind. The samples are then examined under a high-powered microscope and grains of pollen are counted. Each species or genera has a different shape of pollen grain that can be distinguished using the microscope. Pollen grains of each species are counted and reported as a percentage of the total number of pollen grains and graphed (Figure 42). Pollen diagrams differ for each site across a landscape based on elevation, geography, winds, and local vegetation composition (Anderson et al. 1994a, 1994b).

The pollen diagram in Figure 33 is broadly similar to other diagrams from other lakes across Interior Alaska, although much variation occurs from site to site (Anderson et al. 1994a). As the climate changed at the end of the Pleistocene and into the Holocene, vegetation changed as well. Dry grasslands (represented by *Poaceae*, *Cyperaceae*, and *Artemesia*) were replaced by shrubs (*Betula* and *Alnus*) and trees (*Betula*, *Populus*, and *Picea*). Peatland development can be seen with the introduction of *Sphagnum* moss into the pollen cores. By the Middle Holocene, vegetation in Interior Alaska was similar to modern day (Anderson et al. 1994a, 1994b).

Figure 34. Component 2c hearth feature (Potter et al. 2018: Figure 9.2).

Component 3 dates to 9,680 cal BP and contains two small activity areas with no features. Lithic remains in one activity area reflect bifacial tool maintenance of a single raw material type, and in the other, microblade use, discard, and tool maintenance. Faunal remains include bison. A bison mandible (Figure 35) with attached teeth was used for strontium (86Sr/87Sr), oxygen (δ18O) and carbon (δ13C) isotopic analyses, to infer bison mobility. The results suggest that the bison was inhabiting the lowland during the winter months (Potter et al. 2018). This component likely reflects one or two very brief winter hunting camps.

Components 4 (8,420 cal BP) and 5 (7,250 cal BP) consist of several very small activity areas. Lithic behaviors include late stage biface shaping and flake tool maintenance. The faunal record is dominated by large bison-like long bones and teeth; however, in Component 5, there are some high meat-yielding bones like ribs and vertebra and rabbit remains (Potter et al. 2018). Components 4 and 5 may represent short-term logistical camps (long distance travel stops) where tools were maintained and meat was consumed after opportunistic hunting in the area.

Component 5 and 6a are separated by 1,000 years of thick aeolian silts followed by a period of environmental stabilization and vegetation growth. Component 6a is the first cultural component at the Delta River Overlook site consistent with the Northern Archaic Tradition. Component 6a contains three concentrations of cultural materials in close proximity to each other, all associated with a hearth feature that dated to 6,820 cal BP. Most of the stone tool remains are consistent with late-stage biface shaping and sharpening. A wide range of fauna, including caribou, wapiti, canid, mink, beaver, and grouse, were identified from this component. In the local ethnographic record, furbearers (particularly beaver) were hunted in the winter and spring, while large ungulates like

Figure 35. The Delta River Overlook site bison mandible.

caribou were hunted in the fall. This suggests the site may have been occupied throughout the fall and winter seasons (Potter et al. 2018).

Components 6b (5,940 cal BP) and 7a (4,470 cal BP) consist of small activity areas containing late-stage biface shaping. Component 7b (4,150 cal BP) contains multiple activity areas, including one which only contains faunal remains. End scrapers are the most common tool type in these activity areas, highlighting the importance of butchery and hide working activities (Potter et al. 2018).

Component 8a (3,560 cal BP) contains a dense concentration of 1,011 flakes and a cache of ready-to-use flakes and bifaces (Figure 36). Fauna found in the component includes highly fragmented bone of small, medium, and very large-sized mammals, including bison. This component likely represents a short-term hunting and processing camp within a logistically organized settlement system where site occupants may have expected to return seasonally to use the site (Potter et al. 2018).

The most recent component, 8b, occurred approximately 2,240 cal BP during the transition from Northern Archaic to Athabaskan periods. The component is composed of three activity areas, two associated with hearth features. Tools include bifaces, modified flakes, end scrapers, and side scrapers. A wide range of stone tool debris representing the entire range of tool production and maintenance was found on site. Raw materials were brought to The Delta River Overlook site, broken down to workable fragments, and then made into tools on site. Faunal remains include bone from wapiti, ground squirrel, hare, and lynx. The diversity of lithics and fauna and the presence of many domestic tools may indicate that Component 8b was a residential base camp (Potter et al. 2018). Residential camps reflect longer periods of residence on site, a wide array of activities occurring, and a denser population of people including men, women, elders, and children.

The top two meters of the site were removed by heavy equipment in the past, which likely removed younger archaeological components representing later cultural traditions. Nonetheless, the Delta River Overlook site is unprecedented for its large number of human occupations (14) and the insight it provides into ancient human activities through 13,000 years of time. Also significant to the

Figure 36. Component 8a cache, bifaces, unifaces, and modified flakes. Photograph in Potter et al. 2008, page 240, Figure B11.

region is the faunal and botanical preservation, permitting researchers to identify ancient human use of plants and animals, as well as seasonal use of the site. Faunal remains indicate people at The Delta River Overlook site were hunting bison long after the animal had become extinct in other regions, and once the bison were extinct, the remains indicate a shift to more diverse and smaller game. Botanical remains indicate people were gathering bearberries, raspberries, and strawberries throughout the summer and fall. Additionally, the Delta River Overlook site includes the first known winter occupation in all of Beringia and evidence suggesting the earliest known use of tent structures (Potter et al. 2018).

5.5.3 The Banjo Lake Site

The Banjo Lake site (XMH-00874) is comprised of a single Middle Holocene cultural occupation containing an artifact assemblage of bifacial tools, microblades, other debris from tool manufacture, and burnt stone and bone. The site is situated on a kame and esker glacial landscape covered by a thin layer of aeolian loess overlooking Banjo Lake 200 m to the southwest (Figure 37). A single cultural component is located 10-25 cm below the ground surface. Six radiocarbon dates were taken from a hearth feature and another hearth-like deposit. The dates indicate a Middle Holocene occupation circa 5,000 to 6,000 cal BP (Esdale et al. 2015).

Figure 37. Location of archaeological site overlooking Banjo Lake.

The Banjo Lake site was identified and found eligible for the National Register of Historic Places in 2002 when 250 flakes, microblades, and broken tools made from rhyolite, basalt, chert, and obsidian were found on the surface and in buried contexts (Hedman et al. 2003). An Army range project led to excavation of the site in 2006 and 2007 (Figure 38). Excavations of a large area (234 m2) recovered 7,000 pieces of stone tools and flake debris, over 12,000 pieces of fragmented animal bone, and the hearth feature (Robertson et al. 2009a).

To reconstruct pre-contact activities at the Banjo Lake site, archaeologists conducted a paleoenvironmental reconstruction, and lithic and faunal analyses (Esdale et al. 2015). The site was occupied when the boreal forest was fully established in the area and local site vegetation was probably very similar to modern times. Lithic analysis established 24 source material types including chert, rhyolite, obsidian, basalt, andesite, quartz, quartzite, and a few sedimentary rocks. Late stage bifacial thinning flakes compose the majority of the flaked stone assemblage, indicating that tools were being manufactured on site and then taken off site for use and discard elsewhere. Additionally, microblade technology composed a significant portion of the Banjo Lake assemblage (over 11%). Tool forms include lanceolate points, projectile points, scrapers, tci-thos (cobble-spall scrapers), burins, and microblades (Figure 39) (Esdale et al. 2015).

In addition to stone tools and debris, 12,000 bone fragments were recovered from the excavation units in and around the main hearth feature at the Banjo Lake site (Esdale et al. 2015). Excavated faunal material is rare in the surrounding region, and almost all of the bone fragments are too small and degraded to be identified to species. However, it indicates people were butchering and cooking animals on site.

The Banjo Lake site contains one hearth feature and substantial charcoal staining in another area, indicating the presence of a second hearth. Artifacts surrounding the two main hearths

Figure 38. Archeologists excavate the Banjo Lake site.

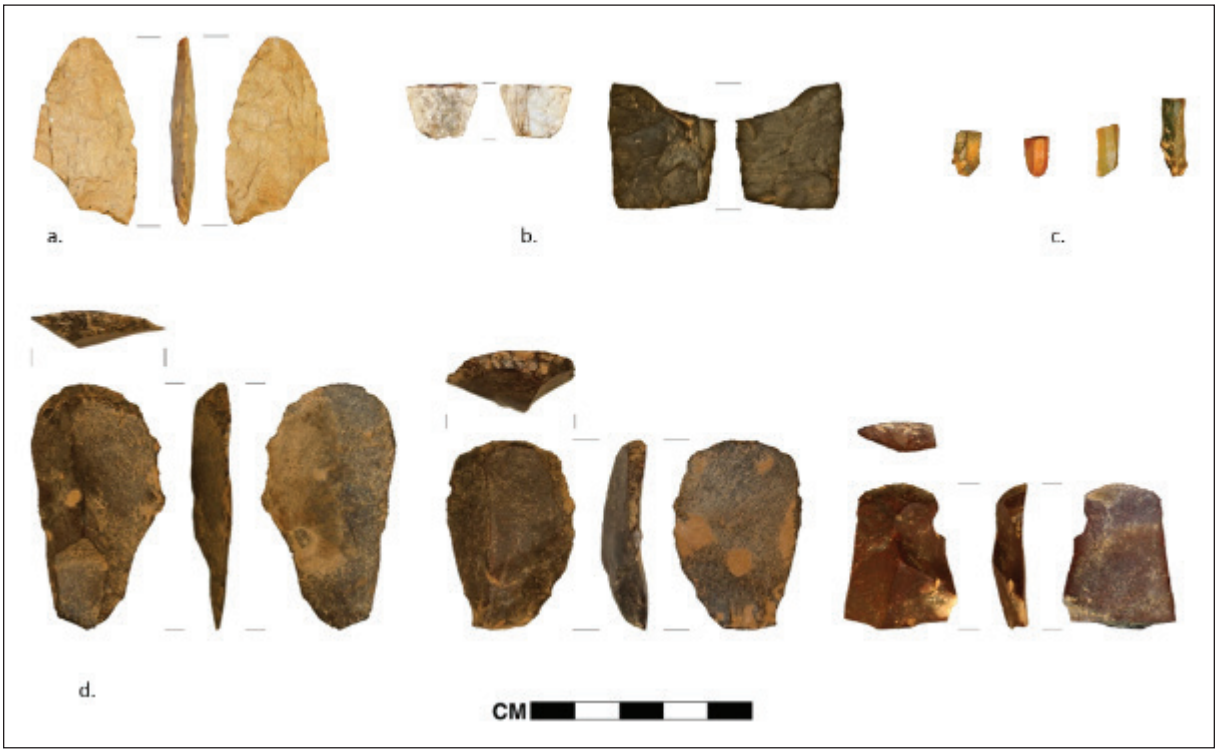

Figure 39. Artifacts from the Banjo Lake site: (a) projectile point, (b) bifacial projectile point bases, (c) microblades, (d) unifacial tools (scrapers).

provide evidence of activities including projectile point sharpening, microblade production, and food consumption (Esdale et al. 2015). The use of scrapers and burins indicate there were game processing and wood-working activities occurring. The Banjo Lake site was likely a base camp that included men, women, and children involved in hunting, gathering, meat processing, and hide-working. Although the Banjo Lake site dates within the recognized range of the Northern Archaic Tradition in central Alaska, the artifact assemblage does not have the traditional notched projectile points indicative of the time period. The tools identified at the site also demonstrate some continuity with later Holocene Athabaskan tool assemblage.

5.5.4 The Blair Lakes South Site

The Blair Lakes Archaeological District is situated in the middle of the Tanana Flats south of the Tanana River and is not connected to any modern road system. The archaeological district encompasses 38,000 acres, spans several large lakes, and includes 86 archaeological sites (Carlson et al. 2017). Of these, several sites were found during a 1979 survey along the north shore of the southern of the two Blair Lakes (Dixon 1980). This area was attractive to people from the Late Pleistocene to modern times because of the available natural resources, including abundant spruce and hardwood trees, and large and medium-bodied mammals such as moose, wolf, black bear, and brown bear. The lowland areas of the Tanana Flats are also home to a multitude of bird species, including migratory waterfowl, and the lakes are inhabited by Arctic grayling, burbot, and northern pike. Several species of salmon are also seasonally present in nearby rivers and streams. Research at the site in the last decade has noted artifacts eroding out of deposits along hundreds of meters of the northern shoreline of the lake (Figure 40, Figure 41). Excavations have identified four main cultural components dating to the Holocene.

Figure 40. North Shore Blair Lakes surface artifacts, shovel testing, and excavation.

Figure 41. Excavations at the Blair Lakes South site in 2015.

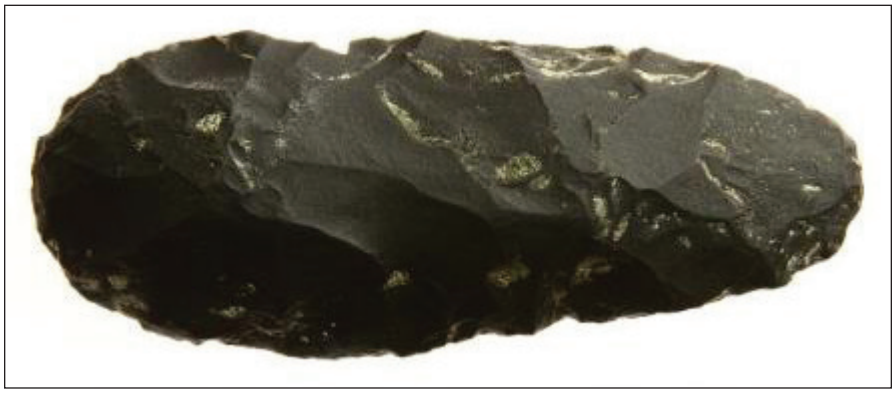

Figure 42. Chert end scraper.

The earliest cultural component (Component 1) identified during unit excavation included 218 pieces of lithic debris, primarily produced on basalt and chert stone material. Only two tools were identified, including a basalt knife and chert end scraper (Figure 42). Dispersed charcoal collected in association with the cultural materials yielded a radiocarbon age of 9,040 ± 40 BP, pushing the known occupation history of the northern shore of south Blair Lake back to the Early Holocene. An additional tool, a triangular chert projectile point, was recovered in another test trench at the site and associated with radiocarbon dates of 8,720 to 8,220 BP. The Early Holocene occupation at Blair Lakes appears to be brief, but repeated, and a site of hide working and likely fowl and small game hunting.

The second cultural component (Component 2) from the excavation yielded 64 microblades, two wedge-shaped microblade cores, and microblade core-shaping debris. Artifacts were produced from several stone materials including chert, obsidian, basalt, rhyolite, and chalcedony. Sample collected from a charcoal concentration associated with the microblade assemblage yielded radiocarbon dates of 7,840 and 7,830 cal BP. Component 2 is considered an early-Middle Holocene microblade production locale and camping spot (Lynch et al. in prep).

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OBSIDIAN

Obsidian is a type of naturally occurring volcanic glass that forms when lava cools too quickly for crystals to grow. Obsidian is hard and brittle, with a smooth uniform texture that fractures predictably and produces very sharp edges. These properties make obsidian an ideal material for manufacturing cutting and piercing tools, and it was a valuable resource for ancient peoples who quarried the material for use and trade.

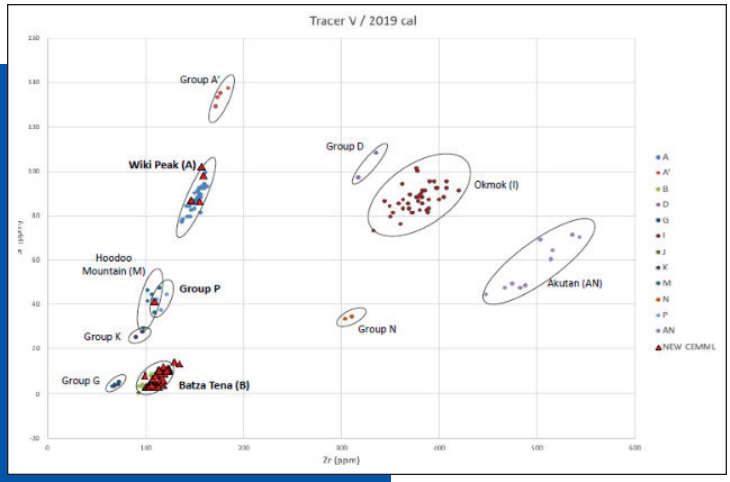

Figure 43. Plot of strontium and zirconium trace element concentrations from Alaskan obsidian sources with a sample from a site on USAG Alaska-managed lands as red triangles (Rasic 2022: Figure 1).

Obsidian is very useful for archaeologists because of its chemical signature. Every volcanic eruption has a unique **chemical composition, like a fingerprint. By using non-destructive x-ray fluorescence (XRF), archaeologists can measure the chemical fingerprint of** obsidian artifacts and match them to their sources in order to see how far the obsidian was transported and gather clues about ancient trade networks. **An XRF spectrometer sends a beam of x-rays through the obsidian sample,** exciting electrons and displacing them from their atoms. As the atoms replace **the electrons, the sample emits secondary (fluorescent) x-rays at different** wavelengths based on which elements are present. The spectrometer detects these secondary rays and produces a spectrum graph with peaks indicating elements and their amounts present in the sample (Ferguson 2012). Ten elements are commonly measured: potassium, manganese, iron, gallium, thorium, rubidium, strontium, yttrium, zirconium, and niobium (Rasic 2022). Elements can then be plotted to visualize how samples cluster based on their chemical makeup (Figure 43).

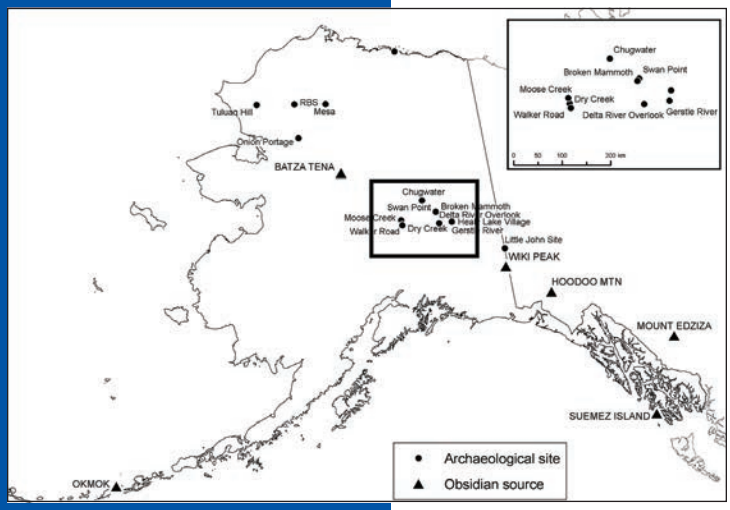

Figure 44. Eastern Beringian obsidian sources and Late Pleistocene/Early Holocene sites discussed in the text (Reuther et al. 2011: Figure 16.3).

The main difficulty with sourcing obsidian is actually locating the natural source in the environment. There are dozens of unknown obsidian sources represented in archaeological assemblages. Figure 44 shows the locations of known obsidian sources in or near Alaska. Work is currently being done to produce a database of Alaskan archaeological obsidian, which aims to contain chemical sample information on all obsidian found in an archaeological context in Alaska (Reuther et al. 2011). This database can aid future research into the sample groups that do not have **known sources and possibly aid in finding the sources themselves. Over thirty** distinctive chemical signatures have been sampled by the database and only nine have known sources.

Component 3 yielded a dense cultural occupation with large flakes and flake tools, a fragment of a chert notched bifacial point, an obsidian lanceolate bifacial point, a large rhyolite core fragment, a rhyolite side scraper, a convergent scraper, and a heavily sharpened chert knife, 240 pieces of lithic debitage, fire-cracked rock, and unidentifiable calcined bone. Dispersed charcoal collected from the lower level of the cultural occupation zone yielded a radiocarbon date of 3,280 cal BP, providing a lower-limiting age for the component. This cultural occupation was consistently dense and diverse across the northern shore of the southern Blair Lake and likely reflected a long-term, residential occupation where subsistence, butchery, and day-to-day activities were occurring. The collected cultural remains are consistent with the Northern Archaic Tradition in Interior Alaska.

The youngest cultural layer in the unit excavation, Component 4, produced an assemblage of lithic artifacts and a single fragment of fire-cracked rock, jumbled with modern fragments of plastic, glass, and rifle-shell casings. The majority of the debitage assemblage recovered in the component were flake fragments produced on chert, obsidian, rhyolite, and chalcedony. There were no reliable radiocarbon dates from Component 4; however, its placement above Component 3 situates the component from 3,000 to 100 years ago. Component 4 was also wide-spread across the northern shore of South Blair Lakes and may be composed of the surface artifacts as well as the artifacts found on the surface underwater. A radiocarbon date from Component 4 in the test trench yielded a radiocarbon date of 855 cal BP. The array of artifacts across the lakeshore suggests the Late Holocene Athabaskan occupation was extensive and could be better preserved elsewhere along the northern shore. Component 4 likely represents a conglomerate of many short-term subsistence camps with some tool production and maintenance typical of the Athabaskan emergence in this area.

The extensive evidence of human occupation along the shoreline of the lake, as well as the diversity of lithic raw materials and tools in the assemblages, clearly indicate that this was a focal point on the landscape for Holocene foragers. People were likely drawn the lakes to take advantage of seasonally abundant fish, waterfowl, and ungulates of the boreal forest during much of the last 10,000 years. From this base, the hunting-and-gathering occupants were logistically connected to the numerous extraction sites dispersed across the district (Lynch et al. in prep).

5.5.5 The Delta Creek/Niidhaayh Na' Site

The Delta Creek/Niidhaayh Na' site (XBD-00110) contains four occupations from the Late Pleistocene and Early, Middle, and Late Holocene. The site is situated on a large, steep, and west-facing bluff approximately 25 m above Delta Creek in the northern portion of DTA West. The site was originally found during a land-withdrawal survey in 1978, and the site was visited again in 2012 to for a NRHP evaluation (Bacon and Holmes 1980; Esdale et al. 2013; Holmes 1979). In 2017 and 2018, crews returned once again to evaluate the effects of mass wasting in the area after a fire and excavated eight 1x1 m units (Doering et al. 2019b, 2021a).

Excavations yielded a lower density of cultural materials from the Middle and Late Holocene components than the earliest components at the site. Charcoal from the Middle Holocene component dated to 3,800 cal BP and contained only 16 artifacts, including seven bone fragments and one diagnostic piece of debitage. The most recent component dated to 1,900 cal BP and contained 391 artifacts, including 163 well-preserved burned bone fragments, 27 diagnostic pieces of debitage, and two pieces of red ochre (Doering et al. 2019b, 2021a).

In both occupations, stone tool debris was related to all stages of bifacial tool production (Doering et al. 2019b). Rocks for tools were likely collected from the Delta River and then manufactured into

tools at the site. The fauna collected is small and burnt, suggesting it was cooked on site (Doering et al. 2019b). The cultural material collected from the Middle and Late Holocene assemblages are associated with the highly mobile, caribou-hunting people. During the Holocene, the Delta Creek/ Niidhaayh Na' site likely was a look-out and logistical hunting camp as well as a location for stone collection and tool production.

5.5.6 Other Archaeology Sites

Several other sites in DTA contain either notched projectile points or radiocarbon dates associating them with the Northern Archaic Tradition. One such site is XMH-00915, where excavations uncovered nearly 5,000 artifacts, including hundreds of stone tools, and radiocarbon dates of 5,880 and 5,750 cal BP. The site contains tools and flaking debris related to microblade, bifacial, and unifacial production including bifaces, burins, microblade cores, projectile points, utilized flakes, tci-thos, scrapers, flake cores, and hammer stones. Although it is unclear if the site represents one long-term occupation or several overlapping visits, the location was clearly an important campsite in the Middle Holocene (Robertson et al. 2013).

Recent excavations identified a Holocene era site along the western shoreline of Butch Lake (XMH-01361) containing a single radiocarbon date of 8,600 cal BP. The site is composed of unidentifiable bones, flakes, and microblades.

In addition to the radiocarbon dated archaeological sites, there are over 200 sites on training lands that have no charcoal or organic material associated with the remains of human activities. These sites are generally single occupations found on the surface or in a shallowly buried context containing mainly stone tool-making debris or isolated tools. Archaeological sites that fall within this category are commonly located on eskers and kames and along lake shores. One example of this kind of site is XMH-01298, which is situated on a ridge overlooking the Delta River in DTA. Archaeologists identified a single, broken, obsidian side-notched projectile point on the ground surface. The landform was searched for the rest of the archaeological site, but no other artifacts were found in shovel tests.

5.6 Technology and Subsistence

There is a marked change in the technology represented by tools and tool-making debris found in artifact assemblages between the Late Pleistocene and Middle Holocene periods, most apparent in the bifacial projectile point styles. Although the continuation of microblade and unifacial technology over this period and throughout the Holocene suggests a certain amount of continuity in populations, the introduction of a new projectile point style, the notched atlatl dart, has suggested to some that a population replacement occurred (e.g., Ackerman 2004; Anderson 1968). New genetic evidence is also making this theory more plausible (Willerslev and Meltzer 2021).

Regardless of who was living in Alaska over this period, or their ancestral ties, most archaeologists agree that changes in technology were brought about by changing subsistence practices in response to the displacement and extinction of large mammals as habitats changed after the glacial period. Changes in technology were likely adaptions to changing subsistence practices and high value game capture. When mammoth, bison, and elk disappeared, people focused on caribou, smaller game, birds, and fish. Movements of people would have reflected less the movement of large game animals and more the seasonal availability of different animals and plants. This highly mobile lifestyle, tied to seasonal resource availability, resulted in archaeological sites that were

occupied for only days to weeks at a time. Residential base camps or winter settlements, such as the occupation at the Delta River Overlook site, were rare. Toolkits with a diverse array of expedient and carefully crafted tools likely reflected a more diverse subsistence base.

Although there is an assumption that caribou was the high-valued prey during the Middle Holocene, evidence for this is lacking at most sites due to soil acidity and poor organic preservation (Ping et al. 2008). Sites such as the Matcherak Peninsula site (Keeney 2019) and the Delta River Overlook site (Potter et al. 2018) bolster this assumption. Archaeologists are continuously on the lookout for landscape features that have deep stratified sediments, indicating better organic preservation and significant time depth.

5.7 Conclusions

Several themes emerge in the discussion of Holocene-age sites in central Alaska, revolving around continuity and change in environmental conditions, habitat distribution, vegetation, prey-animal distribution, and subsistence technologies. Most sites in Interior Alaska provide evidence of a single moment in time that could be as brief as a week or a few days. These small sites give only a glimpse of past activities and only small insights into these themes of ancient behaviors. When taken together, patterns begin to emerge regarding the broadness of Holocene toolkits, preferred raw materials, and even favored camping spots. Even so, it is the sites with deep time depth and evidence of repeated use over time, such as the Delta River Overlook site and the Shég' Xdaltth'í' site, that provide the most information regarding subsistence decisions, raw material choices, and other human behaviors in the distant past.

CHAPTER 6 – ATHABASKAN EMERGENCE

6.1 Statement of Significance

Archaeologists hypothesize that the foundations of contemporary Dene culture emerged in Interior Alaska sometime during the Late Holocene. They see a shift in technology, settlement patterns, hunting strategies, and subsistence focus after the Northern Archaic Tradition and before contact with European settlers. The stone tool assemblage, associated organic tools, and other features are referred to as the Athabaskan Tradition. This tradition emerged across central Alaska and Yukon sometime between 2,000 and 1,000 years ago, and may be coincidental with a major volcanic eruption event and/or the initial use of bow and arrow technology in the region (Dixon 1985; Doering et al. 2020a; Hare et al. 2012; Holmes 2008; Kristensen et al. 2020; Mulliken et al. 2018; Potter 2008a; Shinkwin 1979).

Some Athabaskan Late Holocene archaeological sites have produced an exceptionally good record of organic artifacts, including those made of wood, bark, bone, and even metal in addition to stone (Alix et al. 2012; Gillespie 2018). Significantly, dated Yukon ice-patch remains indicate a rapid transition from atlatl use to the bow and arrow around 1,200 years ago (Hare et al. 2004, 2012). The use of stone dart tips and microblade insets are less common in the archaeological record of the last millennium, which is dominated by wood, antler, bone, and copper arrows and arrow tips (Figure 45, Figure 46) (Alix et al. 2012; Cooper 2011; Doering et al. 2020b). Ethnographic literature indicates that wooden and bone tips were lightweight and improved the aim and distance of the user (Alix et al. 2012).

Tools made with microblades, prevalent in earlier periods of Alaskan history, decrease in the archaeological record

Figure 45. Drawing of a man's blunter arrow shaft made from wood and feathers from the Yukon Flats (O'Brien 2011: Figure 49).

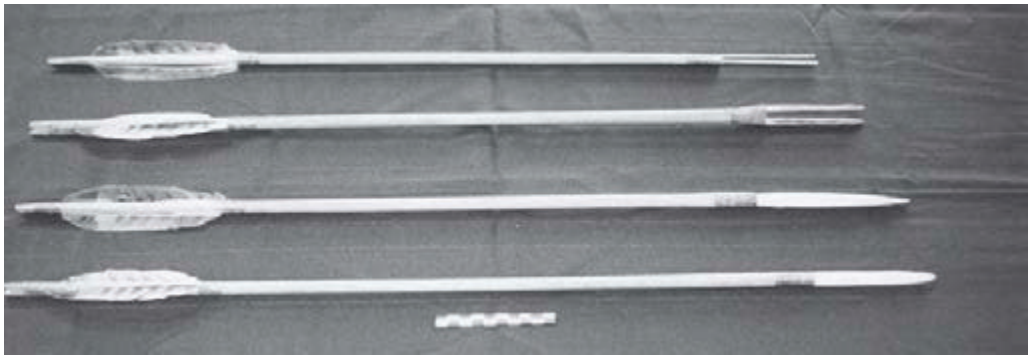

Figure 46. From the top: Yukon Flats metal two-pronged arrow, Birch Creek Region bone two-pronged arrow, Birch Creek Region fancy single-pronged arrow, and Birch Creek Region bone single-pronged water arrow (O'Brien 2011: Figure 56).

and disappear completely sometime in the last millennium. Only a handful of sites, including the Healy Lake site, the Swan Point site, the U.S. Creek site, and the Klein site, contain microblade-bearing components dating well into the Athabaskan Tradition (900-600 cal BP) (Doering et al. 2020a; Esdale 2006; Smith 2020). Similarly, lithic butchery tools such as scrapers are exchanged for bone metapodial scrapers (Figure 47, Figure 48) (O'Brien 2011).

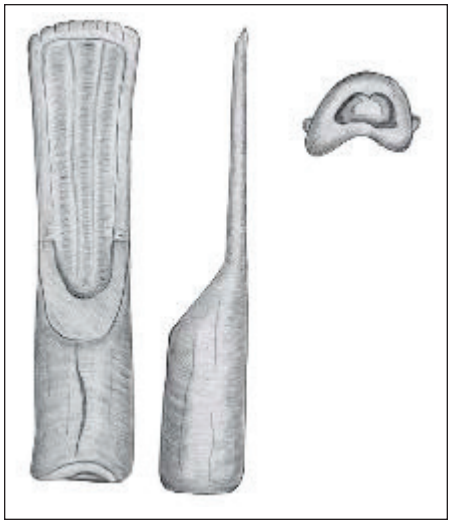

Figure 47. Drawing of the Yukon Flats-style moose leg bone skinner (O'Brien 2011: Figure 86).

Native copper was also being used for arrowheads, awls, and other tools by northern Dene people before AD 1000, but most well-dated contexts fall between AD 1000 and the arrival of Europeans (Cooper 2011). Geological sources of native copper have been reported at 46 discrete locations in south-central Alaska and southwestern Yukon (Cooper et al. 2008). Native copper nuggets range in size from a few millimeters to a few tons. Indigenous people in Alaska and Yukon used 3-4 gram nuggets obtained from secondary sources such as streams and primary sources in high elevations with steep slopes. The copper was then heated and hammered into points, knives, and decoration (Cooper 2011).

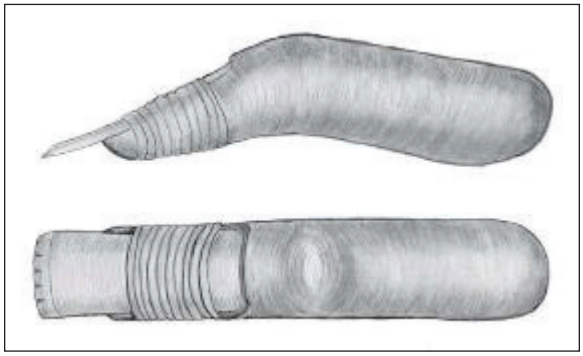

Figure 48. Drawing of the Tanana River-style bone and wood skinner (O'Brien 2011: Figure 59).

Faunal materials found in the Athabaskan Tradition sites reflect increased diet breadth, indicated by the extensive capture of fish and small game, and by increased use of lowland ecological zones with fewer caribou. Patterns of high mobility identified in Northern Archaic assemblages also shift to increased sedentism (Doering et al. 2020a; Smith 2020). The size of archaeological sites and diversity of artifact assemblages from the Late Holocene suggest people were living in one place for long periods of time as opposed to frequently moving between logistical camps. Ethnographically, Dene people moved between aggregated villages, including fish camps and caribou/sheep hunting camps, to winter camps with extended family units in traditional trapping and hunting territory (Smith 2020). Increased sedentism is also characterized by communal subsistence structures such as wooden ungulate drivelines, identified throughout the foothills of the Brooks Mountain Range, and fishing weirs and fences (Osgood 1940; Smith 2020). These features facilitated communal strategies involving mass hunting and storage of large game and fish.

Differential landscape use is reflected in the archaeological record. Athabaskan sites are more commonly identified along Interior Alaska's extensive network of riverine and lake systems than sites dating to earlier periods (Smith 2020). These watersheds are ideal for fishing, fowling, hunting, and absolutely integral for traversing the thickly wooded and boggy interior (O'Brien 2011). Winter villages and fish camps tend to be centrally located between multiple stable, seasonally available resources (Smith 2020). They are found at the juncture of larger and smaller streams and lakes; places ideal for fishing and storing food (Rainey 1939; Shinkwin et al. 1980). The first semi-

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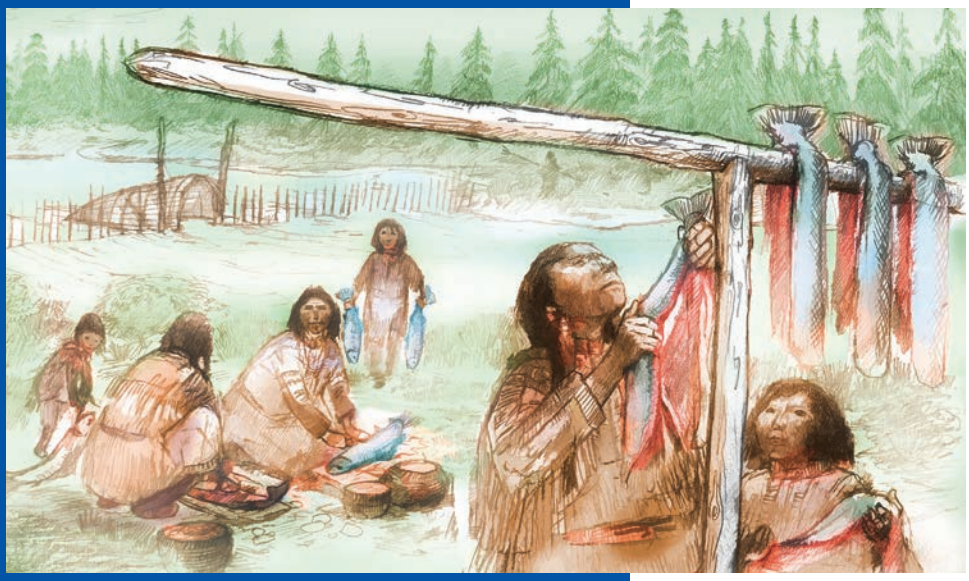
LINGUISTICS



Much like genetics, languages have 'familial' connections that can be traced through shared grammatical and vocabulary features. Some similarities can be explained away as chance, or from contact and adoption of words, like *kayak* in English being borrowed from the Inuit word *qauaq* (Comrie 2010). Determining if languages are actually related rather than simply having borrowed words is the most **difficult obstacle when drawing connections. When used in conjunction with** archaeological and genetic evidence, language can act as another independent line of evidence for the connection between distant populations.

Recently linguists have been studying connections between Siberian languages and those found on the other side of the Bering Sea, in Alaska and other regions of North America. The now endangered Yeniseian language family, found along the Siberian Yenisai River, is distinct from other Siberian languages but, with careful examination, has multiple similarities to the Na-Dene language family far to the east in Alaska (Na-Dene is the language group that includes Athabascan languages). The subarctic environment where Yeniseian is found is similar to the North American subarctic, requiring similar material culture and technology. Eventually, the area was surrounded by pastoral groups with different material and linguistic cultures, leading linguists to conclude that it was an isolated language family. The great distance and time separating Yeniseian and Na-Dene precluded comparison for a long time. However, now that comparisons are being performed, the number of parallels between the languages are higher than could be explained by chance and are what should be expected between two language groups related over a time depth of many thousands of years (Vajda 2010).

The linguistic connections go even further, extending into southern North America. The Apachean languages (languages of Navajo and Apache people) have long been recognized as members of the Dene family, branching from Canada (Ives 2010). Linguistic connections between them were being noted as early as the mid-1930s by Sapir (1936). It is possible that an environmental catastrophe pushed the ancestors of the Apachean groups south out of Canada, where they encountered a drastically different environment, which prompted them to adopt the material and ceremonial culture from groups already present in the south, but retained their own language.

subterranean house pits and infrequent ceramic materials are associated with the Athabaskan Tradition and also indicate decreased mobility (Doering et al. 2020a; Shinkwin 1979; Smith 2020).

The origins of the Na-Dene language, the language group to which Interior Athabascan languages belong, along with Eyak, Tlingit, Navajo, and Apache, originated in central Alaska at least 2,000 years ago (Dumond et al. 2010; Holton 2017; Kari and Potter 2010; Vajda 2010). However, some linguists hypothesize that it could date back to the Early Holocene (Kari and Potter 2010).

Dene groups occupied the Interior of Alaska for at least 2,000 years before a significant number of people migrated hundreds of miles south toward the Northwest Coast, the Great Plains region, and the American Southwest (Ives 1190, 2003, 2010). Because of the transmission, Athabascan language is shared between Dene in Alaska and Yukon and the Navajo and Apache in the southwestern United States (Hoijer 1956; Kari 1989).

A number of anthropologists attribute the Dene migration to a large volcanic eruption around 1,150 cal BP, which deposited ash from southeast Alaska to Greenland (Clague et al. 1995; Derry 1975: Fast 2008; Kristensen et al. 2019a, 2019b; Mullen 2012; Workman 1979). The White River Ash east event was the source of widespread paleoecological changes in the regions' ecosystems (Hughes et al. 2013; Kuhn et al. 2010; Lacourse and Gajewski 2000). At the time of the White River Ash, caribou genetic data indicate a population replacement event in central Yukon (Kuhn et al. 2010), and some archaeologists suggest decreased caribou populations led to a temporary abandonment of the region, resulting in migration as groups sought improved hunting venues (Kristensen et al. 2019a; Kristensen et al. 2019b).

Recent evidence from Athabaskan archaeological sites in the Tanana Valley indicate the event likely had low impact on populations in the region (Doering et al. 2020a). Results of this analysis indicate a gradual change during the Athabaskan period from 2,000 cal BP to the Protohistoric period circa 100 cal BP and a significant departure from the previous period, suggesting a prolonged interval of behavioral change and a broad window for the timing of the Dene migration. There were no observed changes in number of sites and no changes in upland site size before and after the deposition of the White River Ash (east lobe) circa 1,150 cal BP. The results indicate that upland resources were pursued similarly during the last 2,000 years of Dene history (Doering et al. 2020b). Additionally, results of recent excavation from the Forty Mile/Ch'eda Dek Territorial Historic site in the Yukon also indicated that the White River Ash event did not create prolonged negative environmental or cultural change, even though the site itself received over a centimeter of ash fall. Excavation displayed an almost immediate occupation of the site after the volcanic event, indicating a resilient population able to adapt to the fluctuating environmental surroundings (Smith 2020).

Similarities in artifacts from the Athabaskan Tradition assemblages and Northern Archaic assemblages draw ties between populations living in the central Alaska for thousands of years. Likewise, genetic and linguistic evidence may also indicate a links between modern Athabascans and much earlier populations (Doering et al. 2020; Moreno-Mayar et al. 2018; Smith 2020). Future research in these areas should clarify these connections and provide more robust dating regarding the antiquity of modern Dene people.

6.2 Geographic Location

Changing subsistence strategies during the Late Holocene led to differences in site locations. In addition, reduced mobility during certain times of the year resulted in some sites reflecting semi-permanent encampments while others were short-term logistical hunting camps. The semi-

permanent sites are identified on the cusps of lowlands and uplands either along lakes, rivers, or moraines. These were places people congregated in larger numbers, including multiple families for group subsistence activities. Logistical camps are generally found along the moraine and esker landscapes of USAG Alaska-managed lands and consist of small surficial lithic scatters.

During the transition to the Athabaskan period, a volcanic eruption in the Wrangell-St. Elias Mountain Range sent a cascade of ash over northeastern Alaska and northwestern Yukon (Doering et al. 2020b; Reuther et al. 2019). The first White River Ash eruption occurred circa 1,500 cal BP, followed by another eruption in 1,200 cal BP (Reuther et al. 2019). Researchers speculated that this eruption triggered a cascade of events, leading to a massive diet diversification (no longer focused on caribou) and a mass migration to the southwestern United States (Doering et al. 2020b).

6.3 Environment and Ecology

After 6,000 cal BP, environmental reconstructions indicate that the ecology of Interior Alaska was very similar to today (Edwards et al. 2000). The region contains multiple ecoregions including the Tanana-Kuskokwim Lowlands, the Yukon-Tanana Uplands and the Alaska Range, considered boreal forests (Nowacki et al. 2001). The Tanana-Kuskokwim Lowlands are a flatland of loosely aggregated soil with thin and discontinuous permafrost. The remaining patches of permafrost, combined with poor soil drainage, contribute to high surface moisture. Streams flowing across this north-sloping plain ultimately drain into one of two large river systems – the Tanana or Kuskokwim. Black spruce and white spruce forests are dominant in the region. Birch, shrubs, and sedge tussocks occur in the flatlands, while tall shrub communities of willow, birch, and alder are found in areas of better drainage. Warmer, south-facing slopes have white spruce, birch, and trembling aspen (Nowacki et al. 2001).

Wetland habitats support many birds, mammals, and fish. Large populations of migratory ducks, geese, swans, and cranes migrate to these areas annually. Forests along the river valleys attract grouse, flycatchers, warblers, owls, eagles, and ravens. Additionally, the ecoregion is prime habitat for mink, marten, muskrat, moose, river otter, squirrels, lemmings, bear, and several migrating populations of caribou. The rivers and streams contain pike, sheefish, whitefish, burbot, arctic grayling, trout, and salmon (Nowacki et al. 2001).

The Yukon-Tanana Uplands are characterized by rounded mountains and hills located between the Yukon and Tanana rivers. Elevations range from 500 meters in the valleys to more than 1,500 meters on the peaks. Small lakes occur in valleys where drainage has been blocked. Black spruce favors north-facing slopes with continuous permafrost, while white spruce, birch, and aspen dominate south-facing slopes. Low birch, shrubs, and lichen tundra are located above the treeline, and some peaks are barren. Some edible plants include mushrooms, alpine blueberry, prickly rose, and lowbush cranberries (Nowacki et al. 2001).

The deciduous-conifer forest of the Yukon-Tanana Uplands supports a variety of birds, including longspurs, jays, chickadees, flickers, and certain birds of prey. The mountainous regions are populated with Dall sheep, hoary marmots, and arctic ground squirrel. Caribou and moose move through the region, as well as predators like black and brown bear, wolverines, gray wolves, mink, marten, weasels, and lynx. Streams are important spawning areas for salmon, and include pike, whitefish, burbot, and grayling (Nowacki et al. 2001).

While the ecology was similar to that of the 20th century by 6,000 cal BP, the Middle Holocene was hotter and drier than present, with gradual cooling and increased moisture trends beginning circa

5,000 cal BP (Calkin et al. 2001; Kaufman et al. 2016). In the Late Holocene (circa 1,200 to 700 cal BP) a world-wide warming event (Medieval Warm Period) influenced the ecology of Interior Alaska. A shift in caribou mitochondrial DNA at 1,000 cal BP indicates a pulse of new lineages correlating with this event (Kuhn et al. 2010). It is hypothesized that the temperature increase put populations under stress and forced herds to migrate to more southern areas and were later replaced by a new population (Kuhn et al. 2010; Perry 1980).

Evidence of historical lichen growth on moraine deposits suggests periodic glacial advances also occurred during the Late Holocene. Increased glacial activity correlates with periods of decreased solar irradiance. Lichenometry readings from the Brooks Range and Coastal Ranges suggest significant glacial advances occurred at 1100, 1300, 1450, 1650, and 1850 AD; the final advance correlating with the Little Ice Age (Evison et al. 1996).

6.4 Regional Archaeological Evidence

During the Athabaskan Tradition, land-use patterns shifted away from short-term logistical hunting camps to larger corporate villages, moving between fish weirs, moose traps, caribou fences, and gathering places. The annual cycle for 19th century Middle Tanana groups was focused on a village centrally located between seasonally available key resource areas (Shinkwin et al. 1980). Groups sometimes maintained two villages that were located only several miles apart, possibly on opposing sides of the Tanana River. They might be occupied simultaneously or one at a time, depending on resource availability and demographic pressures (Mishler 1986). Several winter village locations have also been noted in the ethnographic literature, suggesting that villages were not necessarily geographically static. Different village locations may have been used at different times (Smith 2020).

Villages were small and sometimes exhibited several large main houses depending on the population size; some smaller communities may have only had one large main house, with smaller, more temporary, associated living shelters. In both villages and camps, residences were ideally organized on a semispherical axis to reflect the local familial connections (Pitts 1972). Basic shelters included hide or bark tents and brush shelters covered in bark that could be stretched over logs or against a standing spruce tree. Also utilized were bark lean-tos and double lean-tos. These were used during seasonal migration times, but single men and women might live in a hide tent in a village (Pitts 1972). Sometimes several small families shared a dome-shaped hide tent or joined tents together with a shared fire (Vitt 1971: 98). Larger dome-shaped, semi-subterranean, hide-covered winter houses might be built to house two families in a hunting partnership. The house type that required the most labor investment, the double-walled bark/moss house, was also made on occasion (Pitts 1972).

These villages were located ethnographically in several areas around the Middle Tanana Valley including north of Shaw Creek and along Quartz Lake. Archaeologists have also identified a winter semi-subterranean house-pit at the Swan Point site dating to circa 1,000 cal BP. Another occupation was located at the Pickup Sticks site north of the Swan Point site, dating to the same period. This site contained a house that was rapidly used and abandoned (Smith 2020).

Additional logistical hunting and gathering camps dating to the Athabaskan period have been identified along northern Quartz Lake at the Klein site (Doering et al. 2020b). Excavation uncovered two occupations. The first occupation dated to 1,080-1,160 cal BP and yielded 209 diagnostic artifacts, including a copper awl, three expedient tools, two unifacial scraper fragments, and at least 11 raw materials. The second occupation dated to 630-530 cal BP and yielded 44 diagnostic artifacts, including one microblade core fragment, one unifacial scraper, one expedient flake

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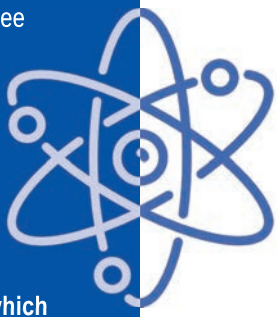
STABLE ISOTOPES

Earlier we learned how isotopes of carbon are used to radiocarbon date archaeological sites. Stable isotopes are forms of particular elements that are stable in the earth's atmosphere, but have different weights. The stable isotopes of some elements can be extracted from mammal bone, teeth, and hair, and from plant remains and cooking hearths to reconstruct ancient environments and explore paleo-diets. The most common elements for these studies are carbon and nitrogen.

Carbon is one of the most abundant elements on the world. The carbon cycle involves active exchanges of carbon dioxide between the atmosphere and both terrestrial ecosystems and the surface ocean (Peterson and Fry 1987: 300). There are three different carbon isotopes present in the atmosphere: carbon-12, carbon-13, and carbon-14 (Brown and Brown 2011). Carbon-12 and carbon-13, are the focus for carbon isotope studies because they are stable and do not decay over time like carbon-14 (Brown and Brown 2011). Though all three isotopes coexist in the world, their abundance levels are very different. Carbon-12 is the most abundant and makes up approximately 99% of all the carbon in the carbon cycle. Carbon-13 makes up approximately 1%, and carbon-14 represents one part per trillion of the carbon present. All three isotopes have **identical properties, but their different masses influence the precise ways in which** they behave during physical and chemical processes (Brown and Brown 2011).



The ratio of carbon-13 to carbon-12 can be measured in a sample of human or animal bone using a mass spectrometer and compared to an international standard (Ben-David and Flaherty 2012; Ben-David et al. 2012). Different plants that the organism eats over their lifetime take up carbon-13 and carbon-12 differently during photosynthesis. By measuring the carbon isotope ration, the scientist can tell whether a particular animal or person has been eating wild or domesticated plants during its lifetime. This information is very useful in archaeological studies regarding the origins of agriculture. The carbon isotope ratio can also be measured in layers of tooth enamel from one individual and help determine changes in the diet of that individual over time.

Nitrogen is also used for paleo-diet reconstruction. Plants, animals, and fish have different nitrogen isotope ratios depending on the amount of protein in their diets. Archaeologists can compare the ratio between nitrogen-15 and nitrogen-14 found in bone with the amount found in the atmosphere. This ratio is used to distinguish where on the food chain the specimen is located and if their diet is predominately terrestrial or marine. The nitrogen-15 values increases with the progression up the food chain. Plants have the lowest nitrogen-15 values, followed by grazing terrestrial animals, then omnivore terrestrial mammals, and then carnivores. The highest nitrogen values are found marine resources. This is useful for reconstructing paleoenvironmental conditions as well as dietary choices because archaeologists can reconstruct habitats based on the types of animals eaten.

Like any other isotope analysis, nitrogen stable isotope studies come with their own **set of complications. For example, compared to terrestrial resources, fish have an elevated nitrogen-15 values. This can make it difficult to differentiate between a highly carnivorous diet and a diet high in marine sources or fish. The stable isotopes of** multiple elements can be used to further investigate and resolve these kinds of issues.

knife, and at least six raw materials. Three copper artifacts were recovered during excavations at the upper locus of Klein site, including one awl and two pieces of scrap, and the delamination cracks on each of these are consistent with cold hammering (Doering et al. 2020b; Cooper 2007: Franklin et al. 1981).

6.5 Sites on USAG Alaska Training Lands

Archaeologists identify Athabaskan-era sites along esker and kame complexes in USAG Alaska-managed lands. The majority of sites dating to this time period reflect short-term occupations and hunting camps. Due to soil acidity, all organic materials have been severely degraded. It is likely these sites would have contained wood and antler tools and a plethora of faunal remains; however, these artifacts can no longer be seen in the archaeological record.

Two well-dated Late Holocene archaeological sites found on USAG Alaska-managed lands have had scientific excavations, although many undated (e.g., XBD-00272, which contains a copper arrow point) and several more dated, but unexamined sites with Athabaskan-age components exist (FAI-00056, FAI-00209, XMH-00838, XMH-00878, and XMH-00945). Both excavated sites contain a single cultural occupation with many lithic tools, but little faunal material. Excavators identified opaque obsidian microblades at the Clearview site, indicating microblades were used in some contexts during the transition from Northern Archaic to Athabaskan archaeological traditions. At the Caribou Knob site, archaeologists identified a hearth and conducted ground-breaking research to identify what food was being cooked in the ancient fire, including land mammals and fish (Doering et al. 2020b).

6.5.1 The Clearview Site

The Clearview archaeological site (XMH-01303) contains a single cultural component atop a small kame and esker complex in DTA East (Figure 49). The site is on the perimeter of productive upland and lowland area, offering a diverse array of resources. Views from the site include the Delta River Valley and Donnelly Dome to the south and west, the Granite Mountains to the southeast, and the Yukon-Tanana Uplands to the northeast. During four seasons of fieldwork at the Clearview site, archaeologists excavated 76 m2 of soil, resulting in the recovery of 5,138 lithic artifacts. Charcoal samples taken from cultural contexts are consistent with a Late Holocene occupation of the site circa 1,500 cal BP (Doering et al. 2019b, 2020a).

Archaeologists recovered stone artifacts just 10-20 cm below the ground surface. The stone tool assemblage contains over 4,400 pieces of tool-making debris, 55 tools, tool fragments, and cores, and 82 microblades and microblade fragments. A variety of stones were used to make tools (andesite, various chert, rhyolite, obsidian, quartz, and quartzite). Tools produced at the Clearview site include expedient cutting tools, engraving tools, projectile points, knives (Figure 50, Figure 51), microblades (Figure 52), and scrapers (Figure 53). Based on the lithic assemblage, activities at the Clearview site likely included repairing hunting tools, wood or antler working, and hide processing (Doering et al. 2019b, 2020a).

The broad range of lithic technology and raw materials present at Clearview suggest that the site may have been occupied for several weeks as a long-term residential camp. With extensive evidence for large mammal hunting, represented indirectly by large lanceolate projectile points and hide-working tools, the Clearview site is comparable to a summer or fall camp. The lithic assemblage recovered from the Clearview site provides a critical lens on central Alaska life around

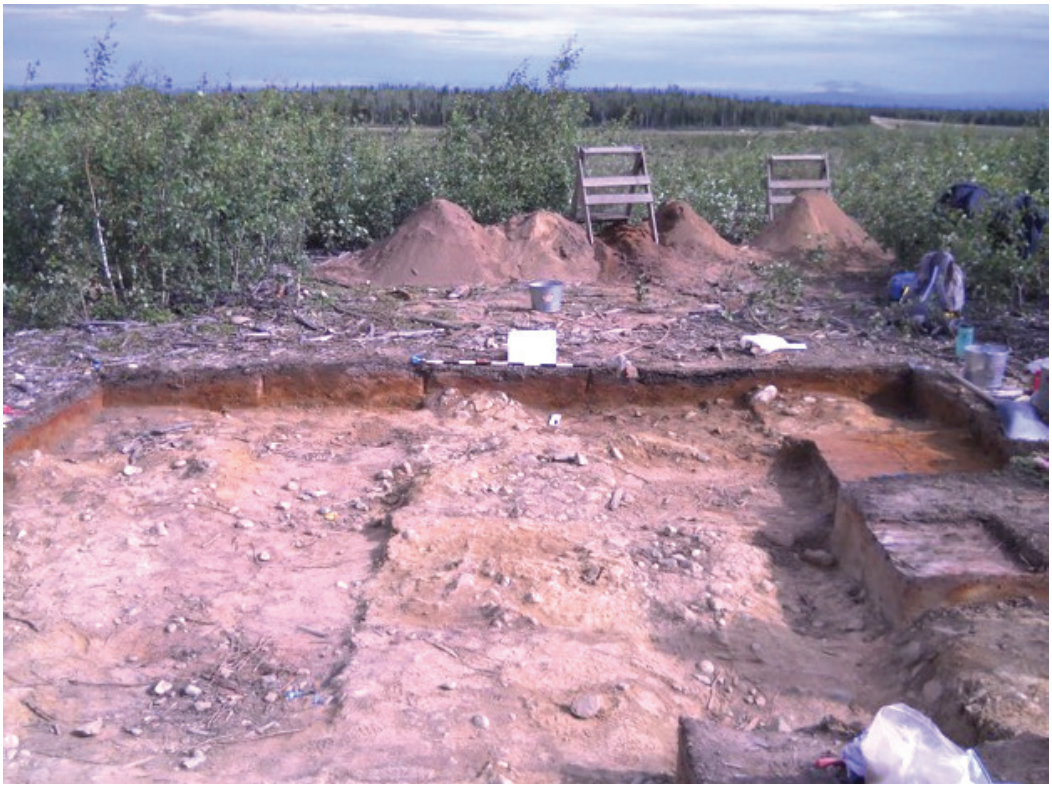


Figure 49. Overview of central excavation area at the Clearview site, facing north (Doering et al. 2019b: Figure 2).

Figure 50. Bifaces recovered from the Clearview site (Doering et al. 2020a: Figure 3).

Figure 51. Point tip recovered from the Clearview site.

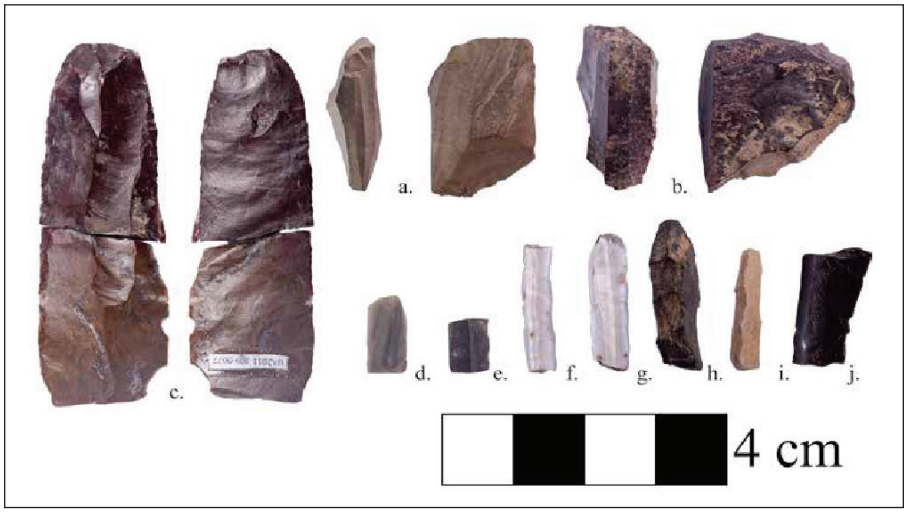


Figure 52. Microblade core fragments (a-b), microblade and microblade fragments (c-j) recovered from the Clearview site (Doering et al. 2020a: Figure 4).

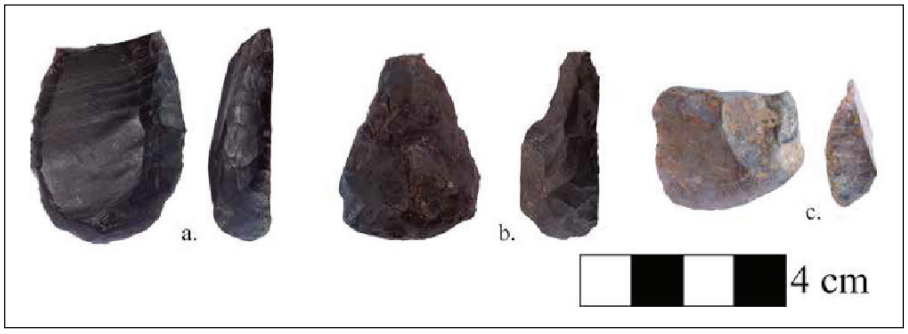


Figure 53. End scrapers recovered from the Clearview site (Doering et al. 2020a: Figure 5).

a time of significant behavioral changes between the Northern Archaic Tradition and the transition to the Athabaskan Tradition (Doering et al. 2019b, 2020a).

6.5.2 The Caribou Knob Site

The Caribou Knob site (XMH-00917) contains a single cultural component on a small kame and esker glacial landscape. Similar to other sites in the region, the Caribou Knob site is situated within aeolian loess punctuated by periods of old soil growth. Today, the site is covered with dense black spruce, poplar stands, and thick undergrowth (Figure 54). Without the dense vegetation, the site would likely offer a view of the Granite Mountains at the foot of the Alaska Range to the southeast and the Yukon-Tanana Uplands to the north. Cultural material was identified in a single layer 5-10 cm below the surface and included 2,600 bone fragments, 1,698 pieces of stone tool and tool-making debris, and a single hearth feature (Doering et al. 2021b). Soil acidity in the region generally rapidly degrades organic artifacts at archaeological sites; thus, the Caribou Knob site is one of the very few sites uniquely situated to inform researchers about activities surrounding pre-contact hearths (Doering et al. 2021b; Yesner 2001; Ping et al. 2008).

Two samples of charcoal from the hearth matrix were submitted for radiocarbon dating and yielded dates circa 2,000 to 1,400 cal BP (Doering et al. 2021b). The dates suggest a Late Holocene occupation during the transition from the Northern Archaic complex to Athabaskan assemblages. The faunal collection is too small, calcined, and fragmentary to identify species or

Figure 54. The Caribou Knob site overview.

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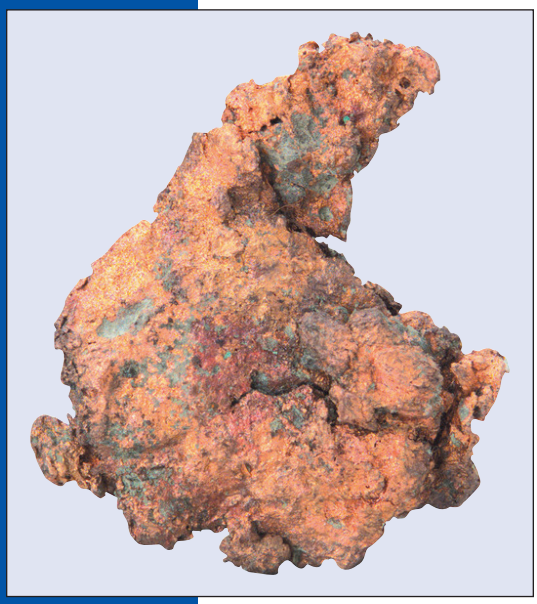
COPPER

Native copper is copper that is found naturally in the environment, uncombined with other elements. This type of copper was used prior to European contact by several indigenous people of south-central Alaska and southwestern Yukon, including several Dene groups (Ahtna, Dena'ina, Tutchone, Upper Tanana, and Tanana Dene), northern Tlingit groups (Yakutat and others), and Alutiiq people (e.g., Sugpiaq, Chugach). Native copper was being used by northern Dene before 1000 AD, but most well-dated contexts fall between 1000 AD and the arrival of Europeans in the mid-eighteenth century (Cooper 2011).



Dene people collected native copper primarily from stream gravels, sometimes with the aid of antler digging tools. Several Ahtna sources indicate copper was also collected in the mountains at the source while sheep hunting. Native copper **occurs primarily in three geologic environments: first, extrusive and intrusive mafic igneous rocks; second, the oxidized zones** of copper sulphide deposits; and third, as placer deposits in clastic sediments associated with igneous rocks and/or glacial till (Cooper et al. 2008; Rapp 2002). Several sources are known from the Wrangell-St. Elias Mountains, south-central Alaska, and British Columbia. Copper nuggets can range from a few grams to thousands of pounds.

Cold-hammering of the nuggets compresses metal grains, and heating of the copper can make the metal malleable (Cooper 2011: 260). Native copper was formed into knives, daggers, spear heads, nails, harpoons, and arrow points by cold hammering and annealing from nuggets. The natural metal was considered a prestige item which imbued status to a person in possession of such objects. The copper tools themselves carried power according to Dene legends, and different tools had their own life-cycles. **Copper has been identified at over 50 archaeological sites in Alaska, mostly** concentrated in the Copper Valley region (named for the metal).

Only one copper tool has been identified on USAG Alaska-managed lands at the XBD-00272 site. The point found was likely traded as a copper nugget or formed tool from the Copper Valley region, as no sources are known from the **Tanana Valley. Ahtna oral tradition tells a story of the first copper trade in the Tanana Valley region. A copper tool maker from the confluence of the Copper** and Chitina rivers carried 50 copper arrowheads into the region. He was so successful with his trading that he acquired slaves to help him carry back all the furs he had traded for (Cooper 2011; Gibson and Mischler 1984; Reckord 1983).

Native copper can be traced to known sources using trace element analysis. The **elements identified in the copper tools and scraps found at archaeological sites** are compared to the trace elements at source locations. The elements are unique to each native copper source and can be used to identify the source region of the archaeological artifacts (Cooper et al. 2008).

element. However, the degree of burning suggests the remains were purposefully cooked in the hearth feature.

The lithic assemblage contains one tci-tho (a flat cobble-spall scraper common in Athabaskan sites) (Figure 55), two scraper fragments, and 1,695 pieces of lithic debris, made with several types of chert, rhyolite, jasper, and chalcedony. A variety of bifacial tools were made and resharpened at the site. One microblade core was also found in the assemblage, along with the two scrapers that indicate hide processing took place on site (Doering et al. 2021b).

Cultural remains identified at the Caribou Knob site indicate that the site was a short-term tool manufacturing and maintenance location where meal preparation occurred. Radiocarbon dates situate the Caribou Knob site occupation during the Late Holocene, and the site contains an assemblage typical of the era. The research done at the Caribou Knob site illustrates the diversity of settlement types in the region during this time period. Researchers estimate that the Caribou Knob site is only about 10% excavated, and, if further explored, it is extremely likely additional faunal processing and hearth features would be identified (Doering et al. 2021).

6.5.3 The XBD-00272 Site

The XBD-00272 site was found on vertical bluff edge paralleling the Richardson Highway, just south of Delta Junction. A complete copper arrowhead was found during excavation of a shovel test pit (Figure 56). Further testing only uncovered two chert flakes, suggesting this was a single brief visit to the area. This small site is significant because cold-hammer hammering of native copper into tools and ornaments was a hallmark of pre-contact Dene activities and clearly links the site to the Athabaskan Tradition. Evidence from other archaeological sites and metallurgy experiments have shown that a copper blank or rod was hammered into shape. Then a second piece of copper,

Figure 55. Tci-Tho associated with the hearth feature (Doering et al. 2021b: Figure 7).

Figure 56. Copper arrowhead from the XBD-00272 site.

hammered thin and into a leaf shape, was wrapped around the rod in a triangular fashion, creating a pointy tip (Franklin et al. 1981; Smith and Combs 2020).

6.6 Technology and Subsistence

The Athabaskan Tradition emerged during the Late Holocene with a toolkit that closely resembled those from contact-era sites with a reduced emphasis on stone tools for projectile points. Although large cobble-spall scrapers used for hide work and stone fishing net sinkers are prevalent during this time period, stone projectile points were largely replaced with organic implements and copper. This change may have occurred concurrent with the newly acquired bow and arrow technology. Some researchers argue that this technology had been periodically incorporated into and dropped from earlier Alaskan toolkits, but evidence is far from conclusive (Dixon 2013; Maschner and Mason 2013; Smith 2020). The Yukon ice-patch artifact record provides evidence of a technological shift from the earlier atlatl darts, which had been in use since the Early Holocene, to bow and arrow technology around 1,300 cal BP (Hare et al. 2004, 2012; Smith 2020). With this change, a shift from birch use in dart shafts to spruce use in arrow shafts also abruptly occurred (Alix et al. 2012). Bow and arrow technology was used well into the Historic period until the World War II era (McKennan 1959; O'Brien 2011).

There is no specific evidence of bow and arrow technology from sites on USAG Alaska-managed lands, and organic materials are not well preserved over this time interval. However, the copper point identified at the XBD-00272 site suggests that arrow technology was likely used. Ice-patch

arrows with copper insets indicate the use of copper points in hunting activities (Hare et al. 2004, 2012), but copper was widely used as a decoration or a prestige item so it is possible that this artifact was ornamental (Cooper 2007; Smith 2020).

One notable absence in toolkits at the very end of the pre-contact period is core and blade technology. After about 1,000 years ago, this technology completely disappears from the archaeological record. Perhaps the increase in distribution of metals made it irrelevant.

Subsistence practices are very difficult to ascertain during the Athabaskan period, primarily because most faunal remains are severely degraded in the acidic soil. Ethnographic evidence suggests that people were heavily relying on moose, caribou, sheep, salmon, and freshwater fishes. Additionally, fur-bearing animals like muskrat, beaver, martin, lynx, and wolverine would have been trapped in the winter and spring (Andrews 1980; Smith 2020; Vitt 1971).

In Doering et al. 2020a, researchers used compound-specific isotope analysis to reconstruct the diet of people from the remains left in hearth soil at the Caribou Knob site. The results of analysis estimated that the majority of fats found in hearth materials were attributed to freshwater resources and that lacustrine resources were supplemented by terrestrial and marine resources, indicating that freshwater fish were of central importance in the diet of people that lived at the site (Doering et al. 2020a).

6.7 Conclusions

Researchers do not dispute that cultural remains dating to the last few thousand years found in central Alaskan sites were made by the direct ancestors of Dene people encountered at the time of European contact. Lithic and non-lithic technologies, subsistence practices, and seasonal rounds reconstructed from Late Holocene archaeological sites demonstrate significant continuity with the early 19th century. Archaeologists have long been interested in identifying the people that lived in an area at different times in the past, how they lived, and their cultural practices. When links to the past can be made by direct comparison, usually with artifacts, then ethnographic records become reliable proxies for ancient behaviors and activities.

Continuity between the Athabaskan archaeological complex and contact-era Athabascan speaking people is found in domestic tools (e.g., stone hide scrapers), hunting tools (e.g., stone knives, metal and antler arrow tips), fishing paraphernalia (e.g., hooks, net-sinkers, weirs, and nets), clothing styles, house structure, and in a variety of other areas. New features of the late pre-contact period include the adoption of bow and arrow technology, the loss of microblade technology, evidence of increased small mammal trapping, and evidence of substantial salmon exploitation. It is apparent that the enduring ties of Dene people to the land and resources, the intimate knowledge of animal behaviors and plant uses, modern Athabascan languages, and the cultural practices we know today reach back several thousand years in the Tanana Valley.

CHAPTER 7 – CONCLUSIONS

To the first military personnel in the region in the 1930s, the Tanana Valley must have looked largely uninhabited. Euro-American homesteaders occupied the fertile Chena floodplain east of Fairbanks, but the presence of indigenous populations may have been more difficult to see. The area now managed as training lands by USAG Alaska is the traditional homeland of seven bands of Tanana River Dene (Figure 57) (see Smith 2020 and Haynes and Simeone 2007). The area known to the military as TFTA was part of the traditional lands of the Nenana-Toklat and Wood River bands, who are now settled mainly in Nenana. In the past, the Chena and Salchaket bands used the eastern portion of TFTA, YTA, and the Fairbanks and North Pole areas. Descendants of these groups are now settled in major Interior cities and towns. The Delta-Goodpaster and Healy River-Joseph bands travelled all over the area now managed as DTA, and their descendants settled at Healy Lake. Outlying Army properties were once part of the traditional territories of the Tetlin-Last Tetlin and Mansfield-Ketchumstuk bands. The people from these bands settled in several towns along the northern portion of the Alaska Highway, including Dot Lake, Tanacross, Tetlin, and Tok. The footprint left by people living a migratory subsistence lifestyle was extremely light, but it is undoubtedly present.

As discussed earlier, this footprint consists mainly of shallowly buried debris from stone tool manufacture and maintenance and subsistence activities. Based on site discoveries from USAG Alaska-managed lands alone, approximately one site has been found for every 300 acres surveyed. So far, site discoveries have largely been restricted to high points on the landscape and lake shores (Figure 58). The large swaths of lowlands on the training lands look empty by comparison. It is likely that sites have been missed (or not yet looked for) in these areas, since, even though these

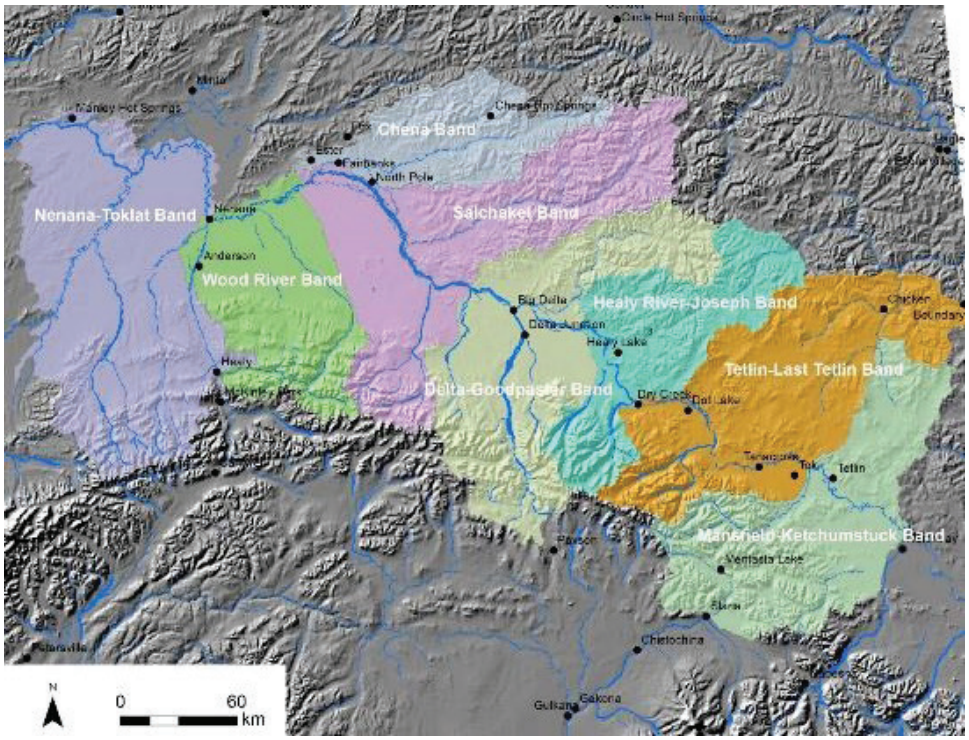


Figure 57. Approximate location of territorial ranges of Dene bands at contact (Smith 2022).

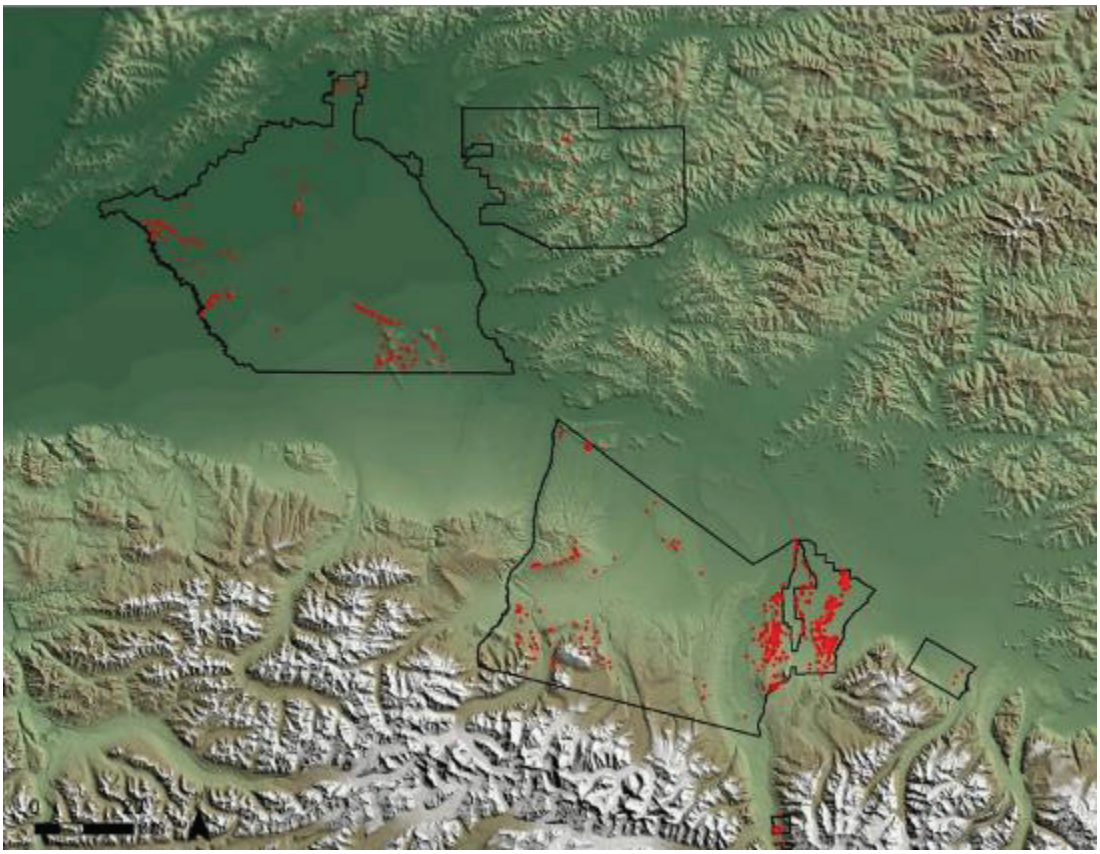


Figure 58. USAG Alaska-managed archaeological sites on a diagram of elevation in and around the Tanana Valley.

areas are hard to access during the summer archaeological field season, in the past they would have been traversed for many months of the year when frozen solid. Anyone who has spent time in Alaska can understand how different travelling is between the summer and winter months.

7.1 Pre-Contact Research Themes

Paleoecological and paleontological evidence has been used to reconstruct ancient Alaskan environments that look very different than they do today. People likely first entered Alaska following herds of large mammals across the Bering Land Bridge. Massive cordilleran glaciers covered the Brooks Range and the Alaska Range, funneling animals and people directly into the Yukon and Tanana River valleys. These areas were covered with firm ground and grasslands that provided a rich biome for bison, horses, mammoth, caribou and other animals. This vibrant ecosystem allowed ancient Beringian people to thrive in the northern latitudes. Through archaeological investigations such as the ones reported here, scientists have been able to reconstruct basic information about the people that lived here and how they survived.

Peatland formation in the Tanana Valley began at the end of the glacial period. This was caused by increased carbon accumulation due to increased summer temperatures (Jones and Yu 2010). By 8,000 years ago, the majority of peatlands had been established across subarctic Alaska. The carbon accumulation and subsequent ground insolation led to wetland muskeg development. Grassland habitat became more and more restricted to south-facing aspects. Warmer temperatures

also led to the northward movement of shrubs and the coniferous tree line. These vegetation changes led to the devastation of many large game populations. Caribou, bison, and moose continued to maintain adequate population sizes throughout the Holocene, although their ranges became more restricted. Local and regional site evidence suggests that people were able to adapt to this change by adhering to reliable seasonal rounds with a broader subsistence base including small game and fish. By the time we can reliably see the emergence of Dene populations in the Late Holocene, seasonal communal subsistence activities were well established.

Variations in Alaska's climate through time, specifically annual temperatures and precipitation, may have influenced the abundance and distribution of animal species and also the demography of ancient people. Recent studies (Doering 2021) have shown a steady population increase in Alaska since the end of the last Ice Age, with small population spikes at the end of a Late Pleistocene cooling event known as the Younger Dryas (12,000 years ago) and just before the transition to the bow and arrow (Doering 2021). Site density on Army-managed lands hints at a robust population in the Middle Tanana region over the entire Holocene period.

Although much of archaeological interpretation is restricted to explanation of meals and tool technology that can be directly reached from bone and stone remains, many researchers are attempting to look deeper into the lives of people to understand familial relationships, clothing production, trade, transportation methods, design, symbology, and learning.

For example, pre-contact trade has been studied for multiple Alaskan materials including jade, obsidian, and copper (Cooper 2012; Rasic 2016). Obsidian at sites on Army-managed lands comes from sources up to 400 km distant, a trip that would take several weeks to make by foot in Alaska. Ethnographic studies of kinship that influence trade relationships are used to speculate on how materials may have moved in and out of the Tanana Valley (Smith 2022). Glimpses at ancient symbolism and religion are rare, but can be seen in the cremation, deliberate burial, and grave goods associated with the young children at the Upward Sun River site (Potter et al. 2014). Archaeologists have even speculated about learning and how skills were passed down to children through trial and error and replication in ancient stone tool making (Gómez Coutouly et al. 2020). With future work in the Tanana Valley, we will slowly begin to know more about the lives of the people that have lived here over the last several millennia.

7.2 A Culture-History of Interior Alaska

Much like modern people divide society up into age-group generations with similar life experiences and cultural identities (e.g., millennials, baby boomers), archaeologists use cultural and environmental similarities to divide up people in the past. Unlike today, however, these groupings each encompass hundreds of generations of people. Although Alaskan archaeologists disagree over details, they have outlined three basic cultural groupings of likely ethnically related people that have been discussed in broad strokes in this document (Dixon 2001; Doering 2021; Holmes et al. 2022; Potter 2016) (Figure 59). These were: the first Alaskans (Beringian, Paleoarctic, Nenana, or Denali Traditions); the Middle Holocene inhabitants (Northern Archaic Tradition); and the Dene people (Athabaskan Tradition).

The further one goes back in time, the more arguments arise about who the people were and what kind of cultural traditions they had. Some archaeologists equate artifact types to cultural traditions and think that different groups of people were responsible for making different kinds of hunting tools. During the earliest periods, some sites contain Siberian-looking microblade cores while others contain robust bifacial lanceolate points reminiscent of lower 48 big game hunters. Some sites have

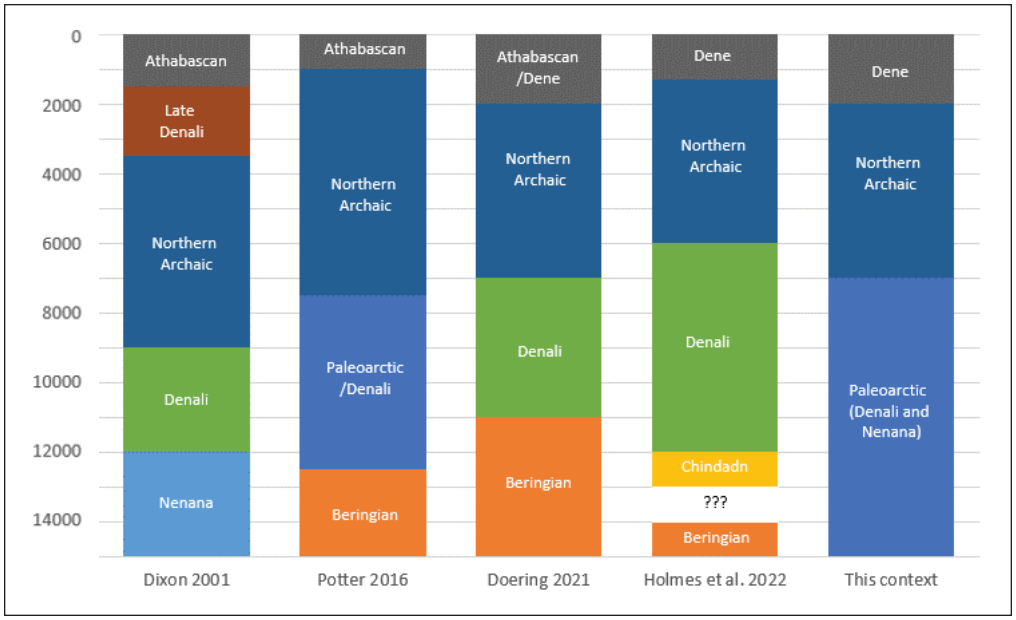


Figure 59. Cultural-historical models of Interior Alaska by different researchers.

small delicate points (Chindadn) that look like they belong to an entirely different culture or hunting implement. The ideas about stone tools are further complicated by new genetic data. Although there are only two sites with human DNA analysis, that are hundreds of kilometers and 3,000 years apart in age, the people from these sites all belong to the same genetic population, one not related to Native Americans from the contiguous United States.

Other researchers speculate that tool types equate to the types of animals hunted or site elevation instead of being characteristic of a single group of people (Wygal 2018; Doering 2021). For some types of tools, this has to be the case. For example, scraping tools are fairly ubiquitous throughout the pre-contact period in Alaska. Most were made out of stone flakes that are retouched at a perpendicular angle at the end of the tool. This blunt edge was used to scrape sinew off of hides to prepare them for clothing and blankets. It doesn't matter if a site is 14,000 or 1,400 years old, scrapers always look the same. In addition to these small flake scrapers, Late Holocene Athabascan sites often also contain large flat cobble-spall scraping tools, which were thought to have been made by ancestral Dene people. There is some speculation that different types of scrapers may have been used for different parts of the hide-processing sequence: blunt end scrapers for dehairing and tabular cobble-spall scrapers for hide softening (Reilly 2015).

Most researchers have identified an early culture of people that came into Alaska sometime between 15,000 and 14,000 years ago (Beringian Tradition). They were likely relatives of northeastern Siberians that established their homes along the Bering Land Bridge, moving slowly from one generation to the next into North America. What happened when they got into Alaska is a cause for speculation. Did they split off into different groups (the Beringians and the Nenana people) and develop different styles of hunting implement? In Interior Alaska, sites with early microblades and Chindadn points have overlapping geographic ranges and overlapping time frames. There is no way yet to know if they represent different groups of people or differences in game type or any other factor.

After about 7,000 years ago, stone-notched atlatl darts are found in most parts of Alaska. Scientists have generally coalesced around the term Northern Archaic to describe assemblages of this age.

These side-notched points were originally thought to have been brought into Alaska from the lower 48, given their similarity to atlatl darts dating to a similar time period in the south (Anderson 1968). Although there has been much speculation on the origin of these tools over the last several decades, this early hypothesis may have been correct, especially if the Ancient Beringian people (whose DNA signal disappears sometime in the Middle Holocene), were replaced by southerners related to the Native North American populations originally located south of the ice sheet.

Finally, the transition to the Athabaskan Tradition during the last one to two thousand millennium is widely accepted by archaeologists, although the mechanism is still unclear. Was it the transition to bow and arrow technology (Hare et al. 2012)? A catastrophic volcanic eruption (Kristensen et al. 2019b)? Or simply population pressures forcing specialization and longer seasonal settlements (Doering et al. 2020b)? Scientists are still collecting data to answer these fascinating questions.

7.3 Indigenous People and the Army Today

It was the Dene Tribes of the Tanana Valley that the military first met and worked alongside. Lands currently managed by the Army in Interior Alaska were within hunting and gathering ranges of multiple groups that ultimately settled into villages located near the Alaska Highway, from Northway to Fairbanks and down the Parks Highway to Nenana. USAG Alaska currently has a government-to-government relationship with six federally-recognized Tribes in the Interior. These Tribes are recognized as sovereign governments by the United States government. Army officials interact with these independent nations at the highest levels of leadership. At Fort Wainwright, the Garrison Commander meets with Tribes on a semiannual basis to discuss military training, environmental management, and other activities of interest to local communities. Lands managed by the Army are still used by tribal members for subsistence and recreation, and past and future Army activities are of shared concern. Face-to-face meetings and gatherings allow for sharing food, knowledge of the local environment, and different perspectives. These activities are vital for building and fostering strong relationships between the traditional and current stewards of the land and its resources.

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