

An Overview of Alaskan's Prehistoric Cultures



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I. Introduction

Alaska is a vast state covering many distinct geographic regions, and has a complicated history of environmental changes that have occurred since the waning stages of the last ice age. As a result, the prehistory of the state is more varied and complex than in almost any other part of the United States. Reconstructing this prehistory is a challenge because the majority of Alaska remains a remote wilderness accessible only by boat or bush plane. As a result, archaeologists working in the state have tended to concentrate on a few of the most accessible areas and on a narrow range of research problems that evoke the greatest interest – and funding – at a national level. For these reasons, archaeological coverage is spotty across the state and it is often necessary to project results from the better known areas into what are in reality blank spaces in time and on the map. These gaps in coverage often limit our ability to fully predict what types of prehistoric cultural resources may exist in a specific area and where they may be found. For management purposes the discussion that follows should be read keeping these limitations in mind.

Archaeological and genetic evidence from Northeast Asia and the Western Hemisphere shows that Alaskan prehistory must have begun with waves of human migration out of the Old World that started at least 14,500 years ago. Since the arrival of these earliest migrants dramatic changes have occurred in both the State's physical and biotic environments. In response the prehistoric residents of Alaska adapted through innovations in technology, social systems, and subsistence strategies. One of the most critical dividing lines is between prehistoric cultures adapted to the ice age conditions encountered during the late Pleistocene era, and their successors for whom conditions encountered during the subsequent Holocene era were far more similar to the present day. A second fundamental division is between the prehistory of interior and inland regions without access to marine resources, and coastal zones where maritime resources supplied the majority of food and materials.

This overview adopts a basic approach that describes the broadest outlines of Alaska's prehistoric culture history as seen against the backdrop of these environmental changes and geographic divides. Results of the many more advanced analyses of prehistoric behavior are omitted for the sake of simplicity, as are the details of the many scholarly debates important in the archaeological literature.

II. Beginnings

The earliest prehistoric Alaskans arrived during the late Pleistocene, a time when the climate was much colder and drier than today. Prior to about 12,000 years ago, the geography of North America was dominated by continental-scale ice sheets that covered almost all of Canada and much of Alaska. These glaciers formed an impassible barrier that isolated Alaska from the remainder of North America and inundated the southern coastal zone with ice. The northern coasts were unglaciated but ice-bound year round by an expansion of the permanent polar ice cap. Because so much of the Earth's water supply was tied up in glacial ice at this time, world sea level fell by about 425 feet. This caused the shallow bed of the Bering Sea to become dry land, forming a 1,400 mile wide connection between the ice free parts of Alaska and Northeast Asia. The land mass created by these changes is referred to as Beringia in the scientific literature. Beringian biotic environments were as radically different from today as the geography. Forests were eliminated by the cold climate



Figure 1: Archaeological reconnaissance by helicopter in the Talkeetna Mountains, South-central Alaska. Alaska's vast distances and lack of roads present unique challenges for archaeologists. OHA photograph by Dr. Richard VanderHoek.



Figure 2: Archaeologists testing an alpine prehistoric site in the Clearwater Mountains, South-central Alaska. Archaeological research in Alaska often takes place in remote and physically challenging environments. Photograph courtesy of Dr. John Blong.

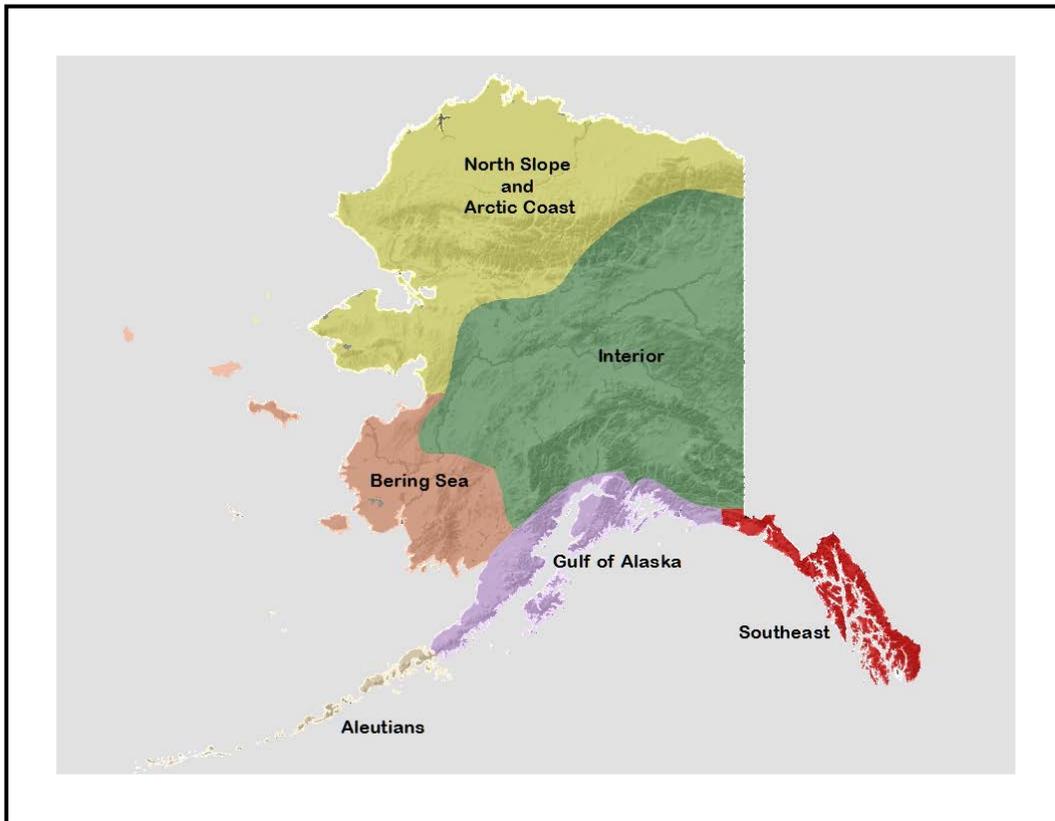


Figure 3: Geographic divisions during Alaska’s prehistory. OHA illustration by T.E. Gillispie and Caitlan Dowling.

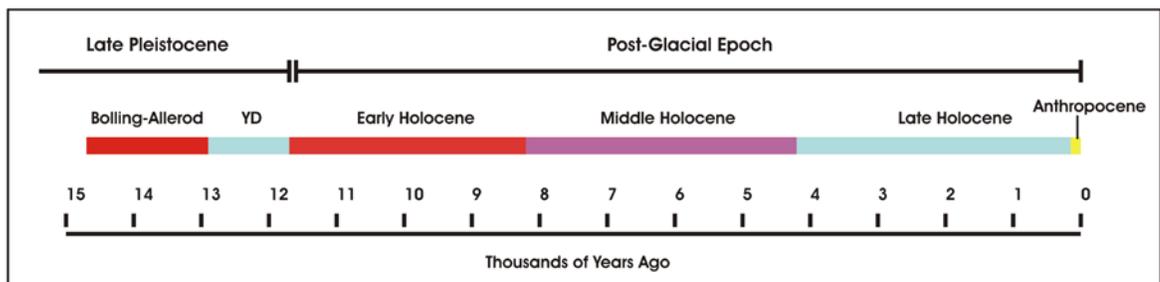


Figure 4: Geologic time periods (chronozones) during Alaskan prehistory. OHA illustration by T.E. Gillispie.

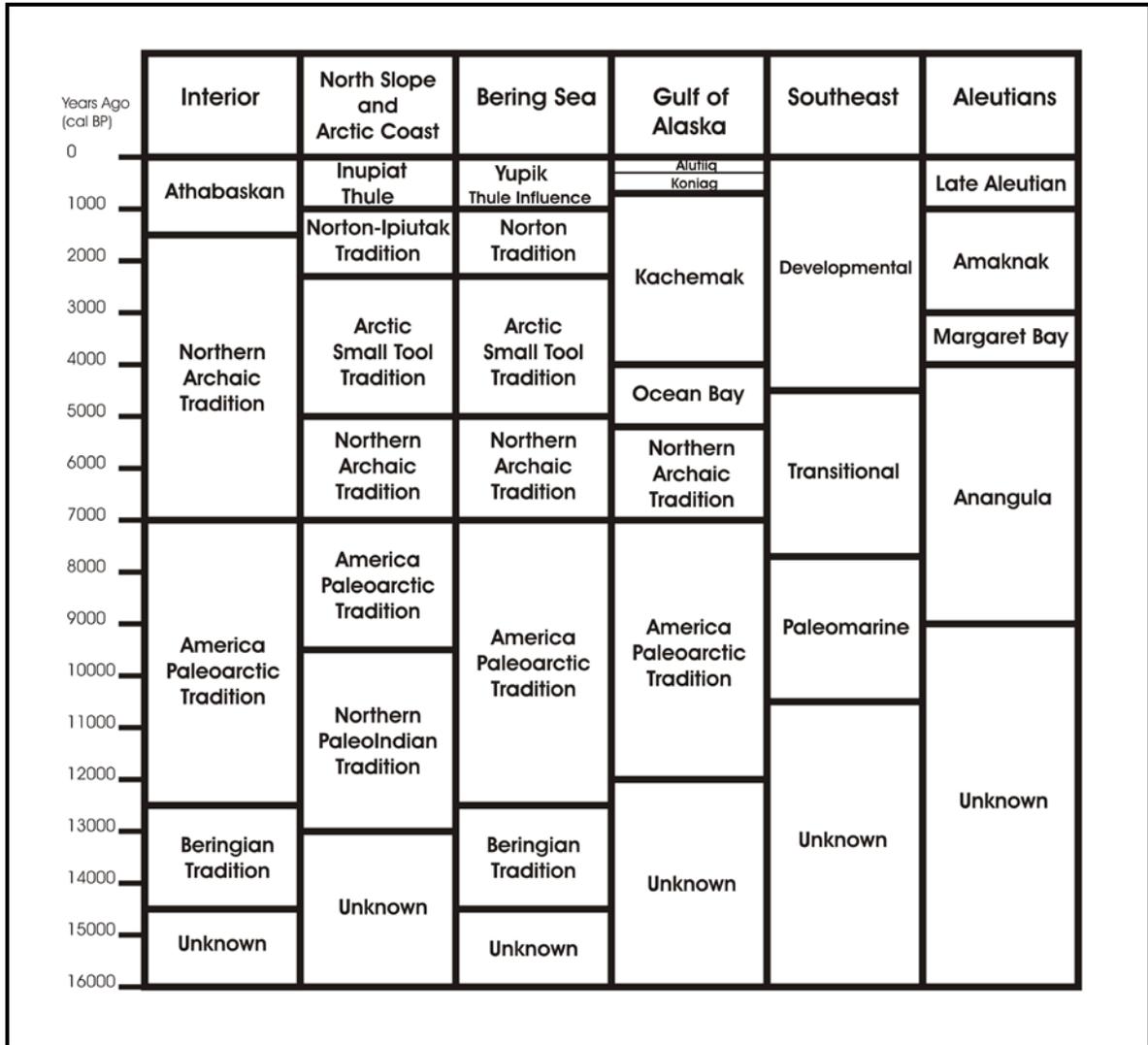


Figure 5: Major cultural traditions in Alaska from the Late Pleistocene to Euro-American contact. The earliest intervals, labelled Unknown, are periods when human occupation is expected based on genetic research and the ages of early archaeological sites in the Americas south of Alaska. However, Alaskan prehistoric cultures of this age have yet to be found. The age scale on the left is in thousands of years ago. OHA illustration by T.E. Gillispie.

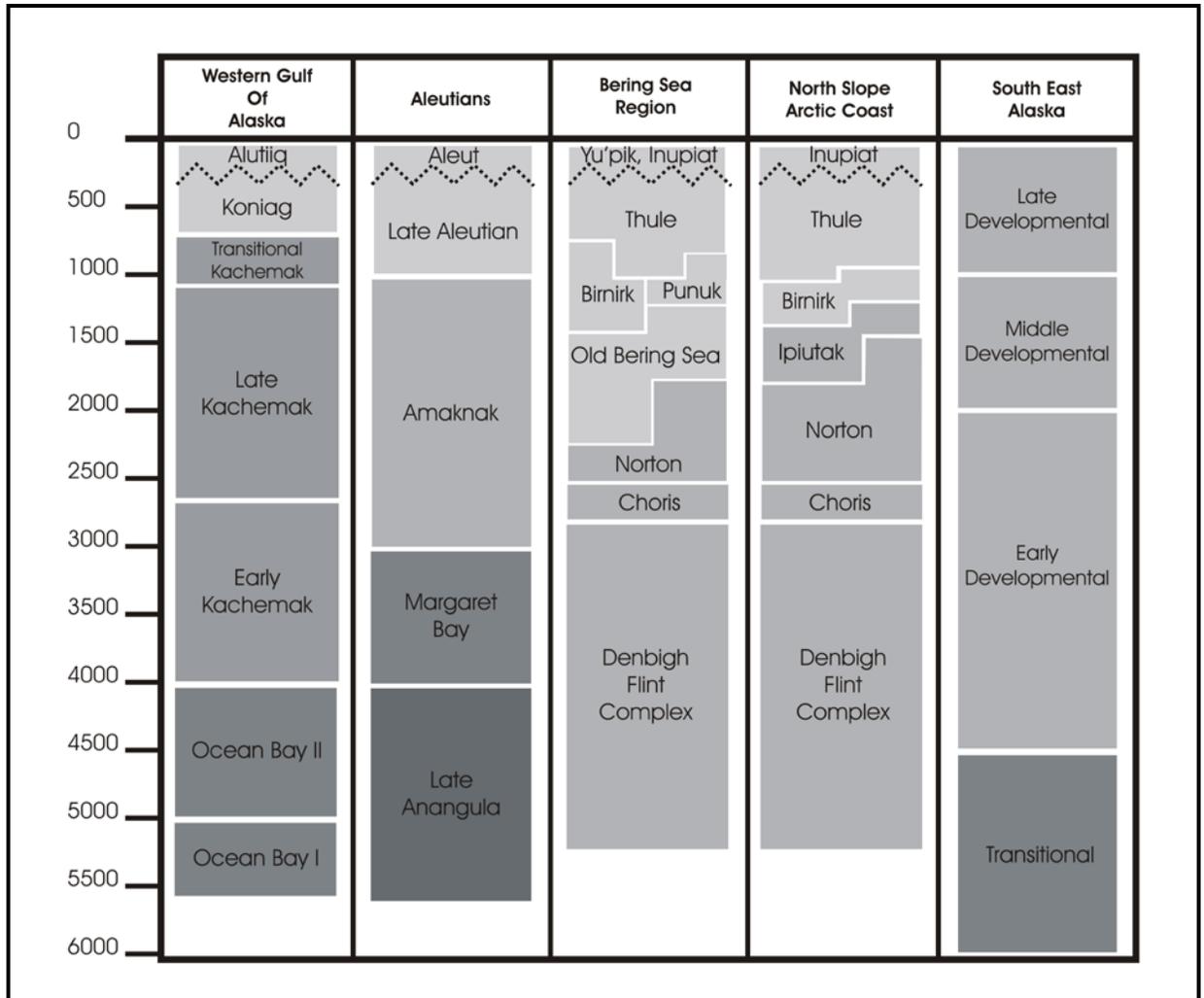


Figure 6: Maritime region cultural phases in Alaska up to Euro-American contact. The age scale on the left is in thousands of years ago. Adapted from Friesen and Mason 2016, Figure 1.1.

and the northern tundra zone expanded to cover almost the entire landscape. In much of Beringia the tundra was relatively dry and took on some of the characteristics of modern steppe environments like Mongolia. This steppe-tundra supported many species of large mammals which are now extinct, including mammoths, cave lions, primitive horses, and giant bison.

The oldest confirmed prehistoric sites in Alaska belong to the Eastern Beringian Tradition, dating from about 14,000 to 12,000 years ago. They were occupied while Beringia was still isolated from the rest of North America and connected to Eurasia. The earliest sites in this tradition contain stone tools that closely resemble technology found in many Upper Paleolithic sites in Northeast Asia, and may represent some of the first migrants from the Old World into North America. Most of these earliest Beringian sites have been found in the Tanana River basin of Interior Alaska and date to a time of late glacial climatic warming called the Allerød interval. In tandem with the ameliorating climate, shrub tundra and possibly a few trees began to appear across much of Beringia during the Allerød. The addition of wood to the resource base may have been critical to the early migrants as a source of fuel and materials for tools and shelters.

Many of these early sites contain evidence of a distinctive hunting technology, probably designed around lightly built spears that were propelled using a device called an atlatl or throwing board by archaeologists. The atlatl functioned as an extension of the hunter's arm, imparting greater velocity and range to the projectile. The spear tip was a composite implement built from a combination of osseous materials – ivory, horn or bone – and flaked stone. Highly controlled flaking was used to carefully prepare minute, rectangular slivers of glass-like stone called microblades. These were inset into narrow, pointed osseous rods that formed the body of the spear tip. This system created a strong slender projectile point with sharp cutting edges. The earliest Alaskan example of this technology comes from Cultural Zone 4 at the Swan Point site, found at the top of a low knoll in the Tanana River basin. CZ4 is also the earliest reliably dated site in Alaska, and records a human occupation that occurred at least 13,800 years ago. The buried living surface at Swan Point produced evidence of campfires made using large mammal bones and fat for fuel; and use of mammoth ivory and wapiti (American elk) antler for tool making. The ivory was apparently scavenged from the remains of dead –and perhaps recently extinct – mammoths. Flaked stone was used for a variety of tool types that required a scraping or cutting edge. There is no evidence that mammoths were eaten, and bone fragments found at Swan Point suggest a narrow range of prey. These included steppe bison, horse, an unidentified canid and large waterfowl. The CZ4 campsite was organized into specialized work areas surrounding the campfires, as were most other Eastern Beringian sites. Slightly younger Allerød age sites, dating to between 13,800 to 13,000 years ago, contain small flaked stone spear points with distinctive triangular and tear-drop shapes, either alone or along side microblade technology. Campfires were made using wood, often gathered from willow shrubs. The younger sites include bluff edge overlooks like Dry Creek in the foothills of the Alaska Range, and lake shore sites like the Village near the Tanana River. The spread of food sources used was wider and included bison, wapiti, caribou, Dall sheep, moose, ptarmigan, hare, marmots and arctic ground squirrel. Finds of canids, otter and bear may suggest use of high quality furs for clothing or bedding. Eastern Beringian campsites generally cover only a few hundred square feet, indicating use by small hunting parties or possibly extended families. The inhabitants typically relied on local geologic sources to supply tool stone, and except for spear points, employed simple tools that were easily made and quickly discarded for most tasks. These “expedient tool-kits” may indicate that provisioning was a group activity carried out by people who moved frequently from campsite to campsite across a

territory in which the seasonal availability of resources was already well understood. Volcanic glass used for high-quality tool making has been found at some Eastern Beringian sites. The most common varieties come from sources as much as 300 miles away from the camp sites in which it was found, indicating either periodic travel across great distances or the development of trade networks very early in Alaskan prehistory. Genetic studies suggest that the founding human population in Beringia was quite small, numbering only a few thousand people.

III. Inland - Interior Traditions

During the Allerød interval glaciers and polar ice were in retreat as world temperatures rose in response to cyclic changes in the Earth's orbital parameters. However, the Allerød was followed by a relatively brief interval of cooler and drier climate in the Northern called the Younger Dryas, which lasted from about 12,900 until about 11,700 years ago. By Younger Dryas times, shrub tundra, composed largely of dwarf birch and willow, had spread across most of Alaska. Also at about this time human population may have declined from a peak reached during the late migration period, and a cultural transition took place in central Alaska during which the Eastern Beringian Tradition was succeeded by the American Paleoarctic Tradition. The American Paleoarctic people continued to use most of the basic stone tool technologies from the earlier tradition, but with many small technical differences in manufacturing, artifact styles and the percentages of tool types found at particular sites. There is evidence that they placed greater emphasis on transporting tools made of higher quality stone from site to site rather than depending on lower quality local materials. Hunting technology continued to be based on the atlatl and throwing spear system, with both osseous and flaked stone spear tips being used. Taking all sites from this period into account, the array of animals used for food remains is similar. The geographic distribution of sites with and without microblade technology indicates that the osseous point weapon system may have been used preferentially on large game animals, like bison, in lowland settings and probably during the fall – winter – and spring seasons. A possible reason for this is that the glass-like tool stones used in spear points become much more brittle and breakable at sub-zero temperatures.

In the Brooks Range, Arctic foothills and the Noatak River valley of Northwest Alaska the succession of Younger Dryas prehistoric cultures followed a very different trajectory than in the central interior. In this region, the Northern Paleoindian Tradition appeared with flaked stone technology nearly identical to tool and projectile point types common to Paleoindian cultures in the lower 48 states and Canada. The most characteristic artifacts are expertly flaked stone projectile points virtually identical to southern Paleoindian types, including the Sluiceway and Mesa styles. A somewhat later style is distinctive because the body of the point was thinned by removing one or more long narrow flakes from the base, resulting in a "fluted" appearance reminiscent of the late Paleoindian Folsom type found throughout the lower 48 states.

Only a few Northern Paleoindian sites have been thoroughly researched and it is not certain whether this culture represents a northward migration of Paleoindians or wholesale adoption of their technology by an undescribed, pre-existing population. Little in the way of preserved food remains has been found in these sites, so that only indirect inferences can be made about Northern Paleoindian resource and land use. Despite this, some archaeologists speculate that the Paleoindian resource base was founded on hunting caribou and bison in herd situations, and that the seasonal availability of these migratory species dictated a fixed annual cycle for Northern Paleoindian land use. This cycle is believed to have required spring and fall hunts for migrating caribou in the Brooks

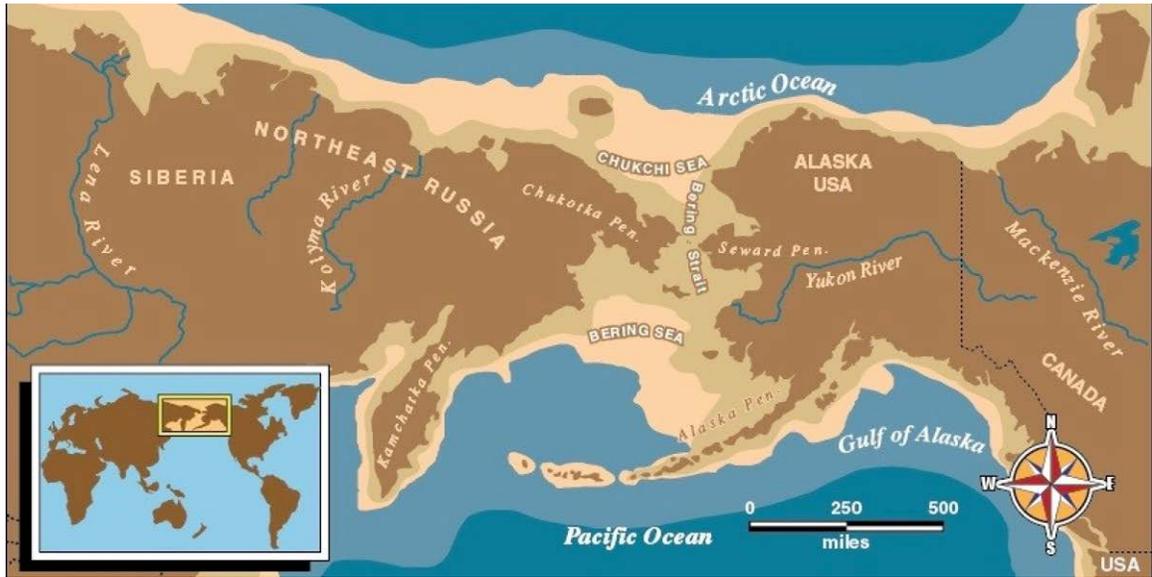


Figure 7: Beringian during the Late Pleistocene. Illustration used by permission of the National Park Service.

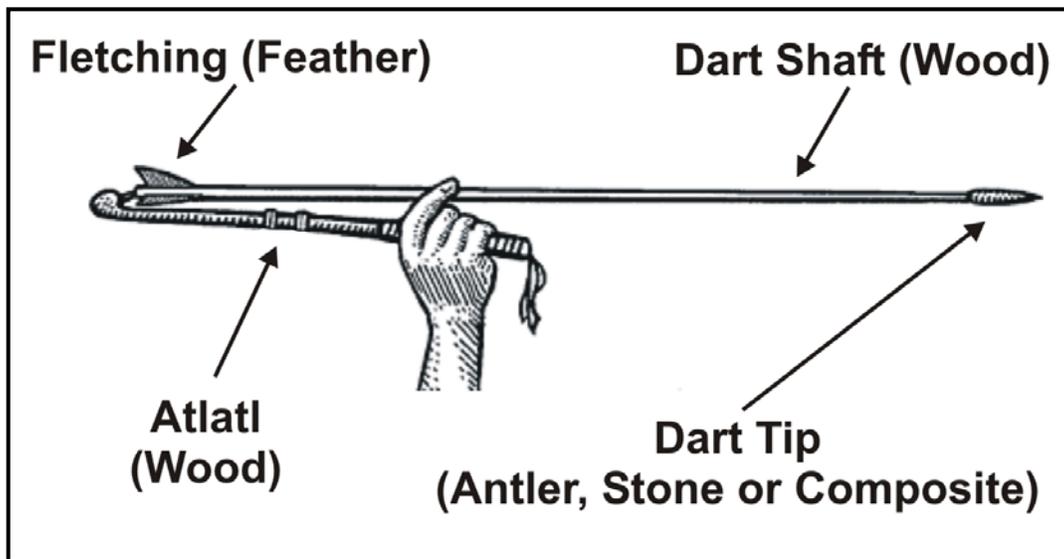


Figure 8: Parts of the atlatl and dart hunting technology. Illustration in the public domain..

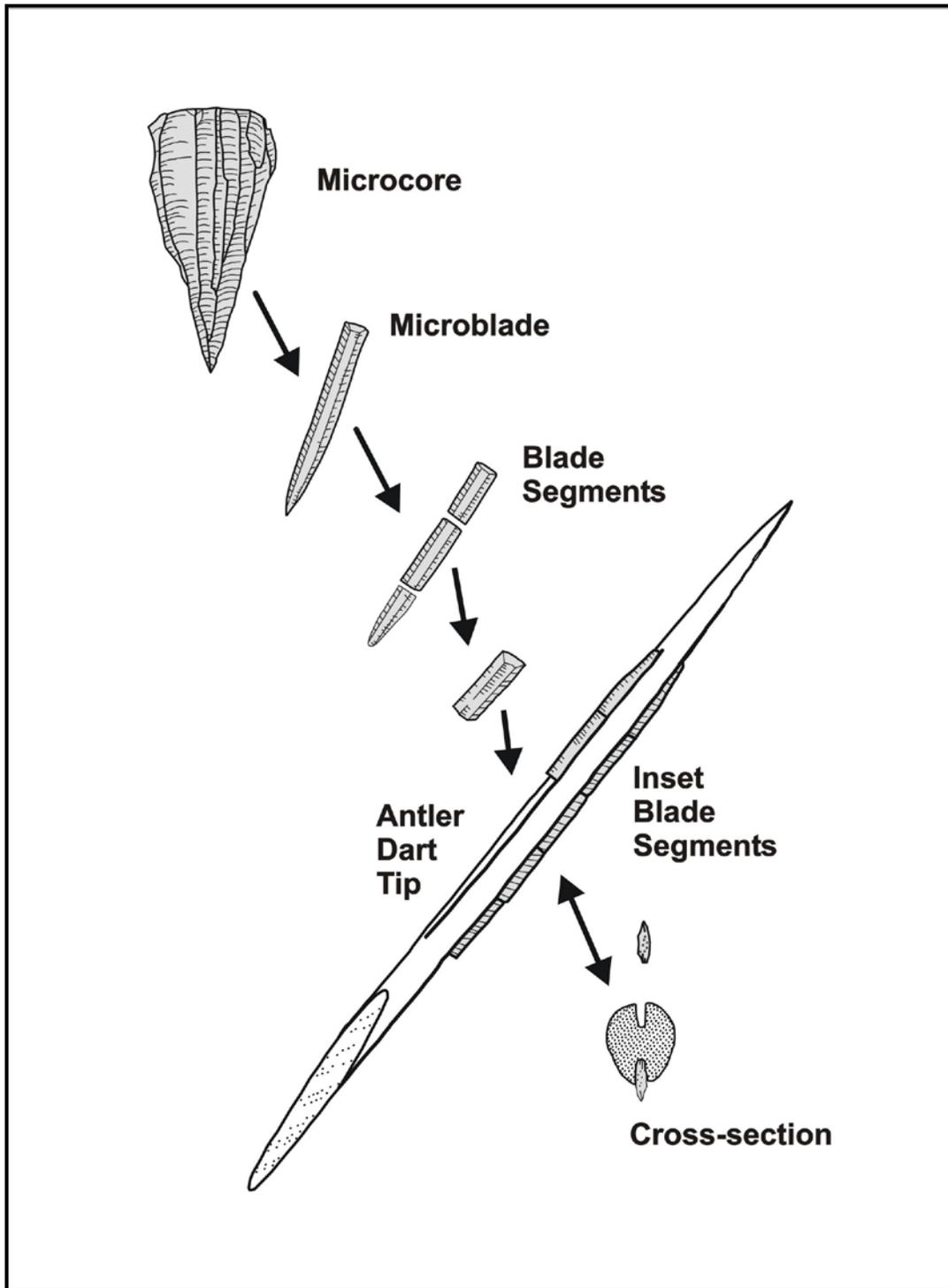


Figure 9: Assembly of an osseous dart point with microblade cutting edges. OHA illustration by T.E. Gillispie.

Range and summer hunts for dispersed bison herds in the Arctic Foothills. The harsh northern winters are believed to have been spent in lowland areas like the Noatak valley, where wood for heating shelters was more abundant and larger winter villages were maintained. Food for winter was largely provided by meat harvested in the adjacent uplands during the fall, stored, and later transported to the winter settlements. Migrating caribou were thought to have been intercepted and diverted to kill zones by large, tightly organized social groups who employed drive lines and favorable chokepoints in hilly terrain. Bison hunting may have been done by smaller, more widely dispersed groups who stalked their prey from the concealment provided by shrub tundra vegetation and micro-terrain features.

Early Holocene

The end of the Younger Dryas also marks the end of late ice age environments in Alaska. The following Early Holocene interval witnessed the full retreat of Pleistocene ice and swiftly rising sea levels that drowned the Bering Sea land bridge. Temperatures in the central and northern interior climbed and precipitation increased. The first interior forests, composed mainly of poplar or aspens, appeared at lower elevations during this time. In central Alaska the evidence points to cultural continuity during the Early Holocene, with the American Paleoarctic Tradition remaining in place until between seven to eight thousand years ago. The most basic outlines of subsistence and settlement patterns also continued for a time, but with an important addition. The first physical evidence of salmon consumption by prehistoric Alaskans, or indeed anywhere in North America, emerges at 11,500 years ago. This in the form of fish bone and bio-chemical signatures in cooking fires at the Upward Sun River Site, located in the Tanana River basin. Upward Sun River is also exceptional as the first prehistoric site in the state to produce evidence for ritual burial practices. In the 11,500 year horizon archaeologists found three child burials, all within the floor of the same pit house. Two of the children were infants, buried together in a flexed position. They were accompanied by grave goods that included hunting implements in the form of four antler rods with incised decorative patterns and two carefully made stone projectile points. These were found lying together and covered with a red mineral pigment. The third burial is of a young child found cremated directly above the infants. Genetic material recovered from the buried infants showed a close relationship to the Beringian founding population for Native Americas in both North and South America, and a clear connection to a parent population somewhere in Eurasia.

In many parts of the Northern Hemisphere a climate event lasting a few thousand years happened during the Early Holocene in which there occurred the warmest average annual temperatures experienced since the last ice age and the present industrial era. Some evidence exists that this Holocene Thermal Maximum (HTM) event may have happened in Alaska and had important effects on the environment and human adaptations. Concurrent with this warm period in central Alaska, lowland vegetation changed from relatively dry, open, broadleaf forests to the closed canopy, needle-leaf boreal forest familiar to us today. White spruce trees appeared as the dominant tree species at about 10,000 years ago and the transformation was completed with the arrival of black spruce at about 9,000 years ago and alders at approximately 8,000 years ago. Peatlands spread during the same interval. Lake levels and other indicators suggest a gain in precipitation by at least 9,000 years ago and a significant increase by 8,000 years ago. These environmental changes seem to have had a dramatic effect on American Paleoarctic populations in central Alaska, which were reduced – at least temporarily – at a time centered on about 10,500 years ago based on the number of dated sites found

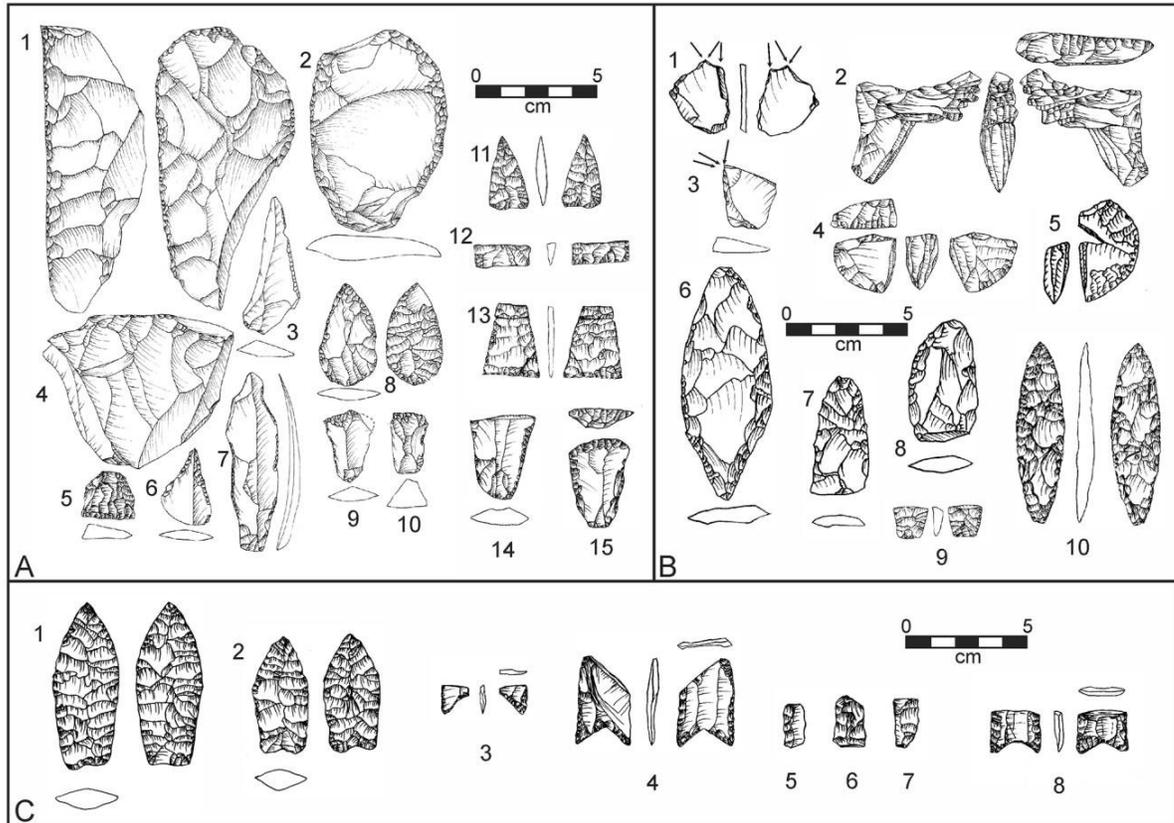


Figure 10: Representative artifacts from the Beringian, Northern Paleoindian and American Paleoarctic Traditions. A, Nenana Complex artifacts from Walker Road: 1 (planoconvex cobble tool), 2 (unifacial side scraper), 3, 7 (utilized bladelikey flakes), 4 (subprismatic blade core), 5 (bipolar flake core), 6 (bifacial drill), 8 (teardrop-shaped bifacial point), 9–10 (unifacial end scrapers; modified from Goebel and Buvit 2011); Dry Creek: 11–12 (triangular-shaped bifacial points), 14 (retouched blade), 15 (end scraper on blade; redrawn from Hoffecker, Powers, and Bigelow 1996); Owl Ridge: 13 (triangular-shaped bifacial point). B, Denali Complex artifacts from Donnelly Ridge: 1 (burin), 5 (wedge-shaped microblade core), 6–8 (bifaces; modified from Goebel and Buvit 2011); Dry Creek: 2 (wedge-shaped microblade core refit with a ski spall and core tablets), 3 (burin), 4 (wedge-shaped microblade core), 9 (bifacial lanceolate point base; redrawn from Hoffecker, Powers, and Bigelow 1996); Owl Ridge: 10 (bifacial lanceolate point). C, Northern Paleo-Indian projectile points from Mesa: 1–2 (lanceolate bifacial points; modified from Goebel and Buvit 2011); Serpentine Hot Springs: 3–4 (fluted bifacial point base), 5–7 (flute (channel) flakes); Raven Bluff: 8 (fluted bifacial point base). Illustration from Graf and Buvit 2017, Figure 6, used by permission of the authors and the University of Chicago Press.

by archaeologists. In some areas, like the Tangle Lakes Archaeological District in the east-central Alaska Range, this depopulation seems to have been nearly complete, lasting from about 10,000 to 5000 years ago. The chief cause may have been a slow reduction in the numbers of the bison and wapiti, the large game animals targeted by American Paleoarctic hunters. Both species are best adapted to open habitats having abundant grazing and dry ground, exactly the environmental characteristics which began to change during the HTM. The change in the physical structure of the lowland environment may also have been a cause due to the reduction in lines of sight in closed forests which would have made spotting game animals over long distances much more difficult, possibly forcing prehistoric hunters to innovate and adapt new hunting strategies. Near the end of the Early Holocene, human population numbers in central Alaska seem to have rebounded, reaching a new peak at about 9,500 years ago, and possibly indicating that American Paleoarctic peoples had adjusted to the demands of the lowland forest environment.

In the inland regions of northern Alaska the HTM may have arrived somewhat earlier, between 11,500 to 9,000 years ago, again accompanied by slightly higher precipitation. Broadleaf poplar or aspen forests seemed to have advanced northward at lower elevations. Following about 10,000 years ago however, these forests waned and were largely replaced by shrub tundra. At roughly the same time both average annual temperatures and precipitation fell. These environmental changes were apparently detrimental to Northern Paleoindians, whose material culture disappeared between eight to ten thousand years ago, to be replaced by bearers of the American Paleoarctic Tradition. The exact reasons for this replacement are not yet known, and discovering them awaits the results of future research.

Middle Holocene

In the Northern Hemisphere, the Early Holocene interval is regarded as ending in a sharp climatic cooling event lasting only one or two centuries and dating to about 8,200 years ago. In interior and inland Alaska, the Middle Holocene interval was evidently a prolonged period of climatic conditions that were “average” for the post-glacial era, and which remained stable until about 4,500 years ago. Temperatures and moisture seem to have varied by only small amounts over time and from place to place, and even the 8,200 cold snap is not well represented. However, some evidence exists that the period between about 7,000 to 5,000 years ago experienced a small but consistent rise in average temperatures, possibly concentrated during the summer season.

During the Middle Holocene, the American Paleoarctic Tradition was replaced by the Northern Archaic Tradition throughout its former range in Alaska, except along the southern coasts where maritime regional traditions developed. This transition occurred between six and eight thousand years ago, seemingly coincident with a sharp drop in human population that reached a low point at about 7,500 years ago. This low point was followed by a swift climb in numbers of Northern Archaic sites and presumably human populations that continued to the end of the Middle Holocene. During this time, caribou bone began to appear in sites in higher percentages relative to bison, which were probably declining in abundance. Although often identified with interior boreal forest environments, a large proportion Northern Archaic sites are in upland and northern tundra settings. This has suggested to archaeologists that intercepting migrating caribou herds were an important part of the annual Northern Archaic subsistence strategy. It can be speculated that the long, stable climate

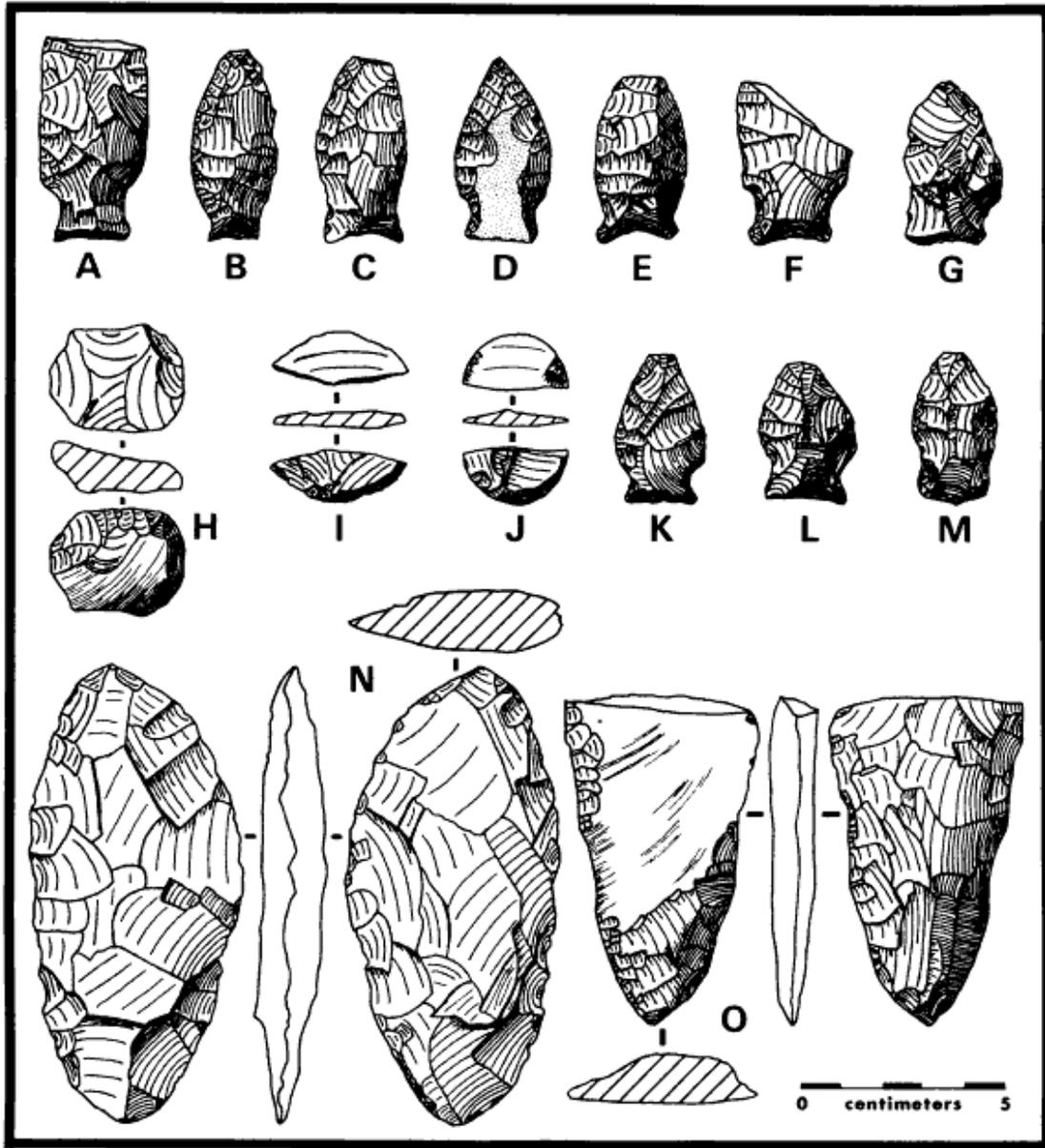


Figure 11: Northern Archaic flaked biface types from the Landmark Gap Site (XMH-035). Notched and stemmed projectile points, A-G, K-M. Unifacial end scrapers, H-J. Semi-lunate biface blanks, N-O. Specimen O has been broken and discarded during manufacture. Landmark Gap Trail Site (XMH-289). Illustration from Mobley 1982, Figure 12. Used by permission of the author and the University of Wisconsin Press.

interval had a favorable effects for caribou, resulting in high populations and highly predictable migration routes.

Northern Archaic stone tool technology was distinctive in that use of microblades in weapon tips was deemphasized in favor of spear points made of fine-grained stone. These tended to have a few standardized outlines, thin cross-sections, and faces shaped by removal of small flakes across the entire surface. Continued use of stone scraping and engraving tools for hard materials indicates that bone and antler remained important to the tool-kit. Technological hallmarks included spear points with notches or fish-tail shaped stems at their bases, presumably to aid in hafting the points to the spear shaft. Some elongated Northern Archaic stone point types (lanceolates) were distinctive from earlier, similar forms in that the haft area often contracted, and had a wider “blade” ahead of the haft. Frequent resharpening of the blade element resulted in a stubby nose, giving the point a distinctive pentagonal outline, with elongated hafts and a straight base. Another characteristic tool was a large flaked stone artifact which was thinned and had a “semi-lunate” or irregular outline. These may have functioned as large knives. An alternate use may have been as an easily transported core or preform from which a variety of tools, including spear points, could be manufactured as needed.

In some locations, including the Landmark Gap valley in the Alaska Range, Archaic sites are found near tool stone quarries and a stereotypical manufacturing sequence in which quarried blocks were progressively flaked into the large semi-lunate form and then onward to the final notched and lanceolate spear points. One of the Landmark Gap sites contains masses of discarded stone chips numbering in the tens thousands produced by this manufacturing sequence. This is demonstrated by a close association with large numbers of tools that failed to be properly shaped, were rejected and then discarded by their maker. Similar Northern Archaic sites near tool stone quarries are Fog Creek in the Talkeetna Mountains and the David Site located on the Yukon River near Eagle. All three are in areas known to be on or near modern caribou migration routes. Other distinctive Northern Archaic tools are small stubby end scarpers thought to be used to process animal hides and notched cobbles that may have functioned fishing net weights. Although microblades continued to be made in smaller numbers, the stone cores from which they were flaked included new tabular and conical shapes. Obsidian from distant sources remained in common use, which shows that an elaborate trade network continued to exist across much of Alaska. Northern Archaic technology can be traced to obvious sources in Northwest Canada, especially the Shield Archaic, and ultimately to earlier Archaic traditions that spanned most of North America during the later stages of the Early Holocene.

Because large numbers of hide scraping tools are often associated with notched points in Northern Archaic tool-kits, archaeologists have speculated that the upland hunting groups included both women and men. This inference depends on early historical records and Native social narratives that indicate hide processing and sewing clothing were generally female activities. Similarly, harvests of migrating caribou are known from Native oral histories to have depended on larger social groups that included children, women and men. These larger groups drove migrating herds into lakes, rivers or brush corrals where they could be easily dispatched. The herd behaviors of migrating caribou cause them to be easily diverted along drive lines formed by wooden drift fences, piled stones or turfs set at regular intervals, or simply lines of people who chivvied the animals in the desired direction. Full utilization of this “drive and intercept” tactic required careful prior planning and coordination of timing during the hunt. If used by Northern Archaic peoples, it would suggest that social organization may have spanned several related bands that coalesced during the caribou migrations, but traveled and gathered food in smaller groups at other times in the annual subsistence cycle. The proximity of

stone quarries and large volume stone tool manufacturing sites to caribou migration routes argues for an integrated Northern Archaic logistics strategy. This strategy may have combined provisioning for tool stone, hides and meat in bulk, possibly for subsequent transport to more distant areas for use at other times of the year. Notched point sites known to be associated with caribou drive lines have been found include Agiak Lake in northern Alaska

Late Holocene

In Alaska the end of the Middle Holocene is defined based on cooling temperatures and at least three episodes during which alpine glaciers in the region advanced to their maximum Holocene extents. These episodes dated to 4,500 – 4,000, 3,300 – 2,900, and 2,200 – 2,000 years ago. Although the broad distributions of inland and interior boreal forests and of shrub tundra remain constant, these events appear to mark the end of the relative climate stability that characterized preceding Middle Holocene, and mirror a general trend toward cooler climates at higher latitudes in the Northern Hemisphere called the Neoglacial. Around 4,500 years ago, the geographic range of the Northern Archaic Tradition contracted to the boreal forest zone, giving way to the earliest Eskimo cultures in the maritime zones along the Bering Sea coast and Arctic Alaska. This geographic contraction may coincide with a contraction in Northern Archaic population numbers. The general pattern for human population in central Alaska during this period seems to be moderate drop centered on about 4,500 years ago, followed by a steady rise up to at least 1,000 years ago. An alternate analysis concentrating on dated Northern Archaic sites shows them continuing until at least 2,500 years ago, but to have experienced a five-fold decrease in numbers, beginning almost simultaneously with the first episode of alpine glacier expansion. Given the strong connection theorized between the Northern Archaic and the harvest of migrating caribou, it may be possible that the less stable and generally cooler Neoglacial climate was in some way detrimental to caribou populations or the predictability of their migration patterns.

Athabaskan Tradition

Environmental conditions during latest Holocene times in the interior and northern inland regions were similar to the present: the climate was somewhat cooler than the Holocene average; spruce-dominated boreal forests covered the lowlands; and upland areas supported shrub or alpine tundra. Like today, peatlands and permafrost were wide-spread. Oxbow and thaw lakes were and are common in lowland river valleys. Many uplands areas above modern tree-line retained landforms inherited from the late glacial era, including large moraines and proglacial lakes.

Beginning at about 1,700 years ago and continuing until historic times, the late prehistoric Athabaskan Tradition marked a sharp technological break with the preceding Northern Archaic. Athabaskan archaeological sites are abundant, and excavations have produced an exceptionally good record of organic artifacts, including those made of wood, bark and bone. During the last two decades permanent mountain ice patches, melting due to modern climate change, have provided evidence one of the important Athabaskan technological innovations. Dated artifacts found in ice patches in central Alaska and Yukon Territory show that a rapid transition took place from the older atlatl and throwing spear system to the bow and arrow near the beginning of the Athabaskan Tradition. Projectile point styles also changed. Along with the transition from spears to arrows, stone points like the diminutive Kavik style became smaller and tended to have stemmed rather than notched hafts. Bone points, especially barbed forms, appear and over time became more abundant

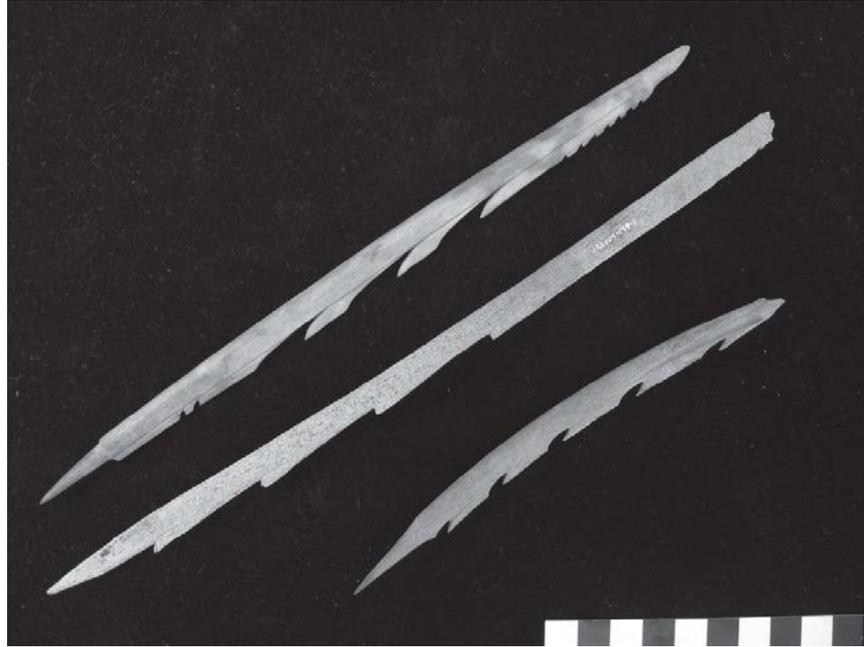


Figure 12: Late prehistoric Athabascan barbed bone projectile points recovered from melting ice patches in the TLAD-SUA. OHA photograph by Richard VanderHoek.

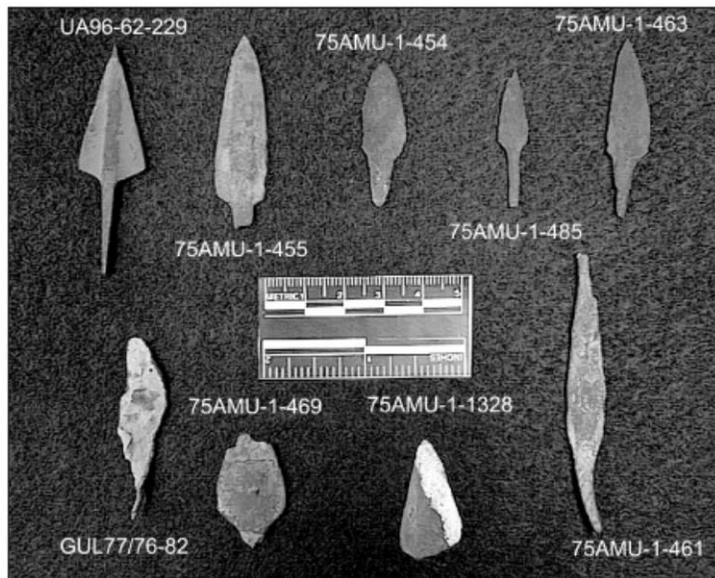


Figure 13: Late Prehistoric Athabascan copper projectile points from Ringling Site, Gulkana, Alaska. OHA photograph reproduced from Hansen 1999: figure 23.

than flaked stone types. Other common organic artifact types include sewn basketry and cache pit liners made of birch bark, bone or antler awls, bone hide scraping tools, bone knives and drinking tubes. Cold hammered copper also appeared in the record, originating from deposits in the Wrangle Mountains. Copper was put to a variety of uses, including knives, projectile points, bracelets, personal adornment and as a mark of high social status. Flaked stone technology was little used by historic Athabaskans, possibly due to their rapid adoption of metal implements supplied by European and American traders in the 19th century. However in prehistoric sites flaked stone is well represented by scraping and graving tools for shaping antler and bone, small wedges, several types of hide scrapers, and expedient flake tools. More robust tools made by pecking or grinding coarse-grained igneous or metamorphic rock also make their appearance in Athabaskan sites, including pestles for grinding mineral pigments and grooved adzes or picks.

Prehistoric Athabaskan subsistence and settlement patterns are also well-represented in the archaeological record. In lowland river valleys, large winter villages are found at locations where migrating salmon could be captured in large numbers, including sites like Da'ka Denin's village and Ringling in the Copper River basin. These sites typically contained several large house pits and many subsurface food storage caches. The houses were solidly built out of poles and bark, and were arranged along elevated river terraces. Short term villages are also known to have developed at some locations on interior lakes and rivers where freshwater fish were seasonally abundant. Examples include Dixthada at Mansfield Lake in the Tanana River valley. Intercept hunting for migrating caribou is also documented as an important activity and was sometimes associated with extensive drive fences. Mass caribou hunts resulted in the temporary formation of larger social groups at sites like Paxson Lake near the headwaters of the Gulkana River, and Old John Lake on the East Fork of the Chandalar River. Along with caribou, moose becomes increasingly important as prey. Data from a large sample of sites in central Alaska found that moose bone was recovered from 75% of Athabaskan period sites. Other large game species important during Athabaskan times included Dall sheep, and bear. Among small game animals, hare, beaver and canids occurred in greater numbers. Fish of all kinds were found in 38% of the sites. Biochemical analysis of three Athabaskan-era human skeletons discovered at McGrath, on the Kuskokwim River, has confirmed the importance of salmon in prehistoric Athabaskan diets. Many smaller sites dating to the Athabaskan period are found scattered throughout the boreal forest zone and adjacent uplands. These are often recognized by masses of fire cracked rock interpreted as evidence for stone boiling and of finely divided, burned bone. The latter are thought to represent crushing and boiling large mammal bones to recover edible grease. Isolated cache pits and small scatters of flaked stone are also common.

IV. Maritime Traditions Beringian Coastal Migration

Many archaeologists studying the first peopling of the New World regard Alaska's Pacific coast as a plausible route for this migration. The reasons for this hypothesis are the existence of a few archeological sites south of the glacial ice sheets dating as old as 15,000 years ago, geologic studies indicating a late opening of the ice free migration corridor through Canada, and the absence of sites older than 14,000 years in the Beringian interior. This route is hypothesized to have crossed an arc extending from Northeast Asia east along the Aleutian Islands and the Gulf of Alaska, and then southward through Southeast Alaska.

Other archaeologists have raised objections to this theory. Late ice age glaciers covered almost all of this southern coast line until about 14,000 years ago. Early coastal migrants would have been forced to “island hop”, following a chain of rare ice-free refuges between long stretches of ice-bound coast, similar to the modern coast of Greenland. Evidence for these “refugia” has been found, notably at cave sites on Prince of Wales Island that produced ringed-seal bones dating back to the height of the last glaciation, and brown bears as old as 14,300 years ago. The coastal route would have presented severe environmental challenges. Migrating humans would have been forced to develop the skills needed to cross wide stretches of cold ocean water by boat and to harvest sea mammals for food. Both technologies are complex and there is little evidence for their early development. A further objection is that no archaeological sites of the required antiquity have been found anywhere along the coastal route. Coastal theory supporters account for this by citing the great rise in sea level following the end of the ice age, which they believe to have submerged or eroded the Pacific route sites. Whether or not the coastal migration occurred remains a fiercely debated topic among archaeologists. If a prehistoric site of this age were found anywhere along Alaska’s southern coastline it would be one of the most important discoveries in the history of New World archaeology.

Southeast Alaska

Southeast Alaska extends along the state’s eastern Pacific Coast, beginning at the Copper River Delta. From there it runs southeast for almost 350 miles along narrow glacier forelands, open to the severe weather and pounding sea conditions of the Gulf of Alaska. At Cross Sound begins the more sheltered coastline of the Alexander Archipelago, a 300 mile long chain of about 1,100 islands, the largest of which include Prince of Wales Island, Chichagof Island, Admiralty Island, Baranof Island and Revillagigedo Island. These mountainous islands rise steeply from the ocean and are separated by many deep water channels and fjords. The rugged terrain found throughout Southeast is the result of intense glaciation during the last ice age. The modern climate is maritime, with cool summers, mildly cold winters and high precipitation throughout the year. Heavy storms occur frequently in winter. Vegetation since the last ice age has passed through two major changes. By 12,000 years ago, alder shrub tundra covered the newly deglaciated landscape, giving way to cool temperate rain forests about 11,000 years ago in the Alexander Archipelago and about 8,000 years ago on the open gulf coast. Modern terrestrial mammals include black and brown bears, Sitka deer and wolves. Four species of salmon and the oil rich eulachan are the most important anadromous fish for human consumption. Pelagic and ocean bottom fish, several species of sea mammal, and abundant intertidal shellfish round out the important ocean resources.

There are major difficulties to be faced while composing a coherent narrative for Southeast Alaska prehistory. First, the majority of data about the area is scattered in short, government-sponsored cultural resource reports written to address specific land management needs. These reports typically lack the scale and detailed analysis required of more formal academic research. A second problem is that archaeological deposits in sites that have been the subject of full scale excavations are typically complex rather than neatly layered. This often makes separating out uniform time periods for analysis problematic. A third factor has been the complicated history of local sea level changes since the end of the last ice age. These have been caused by depression and rebound of coastlines in response to glacial ice loading and melting. When added to the general rise in sea level since the ice age, these changes can submerge sites of a given age, raise them above the modern shoreline, or have done both at different times. As of 2004, at least three alternative outlines for prehistory in the region had been published in the research literature and two of the three use data from the British Columbia coast to

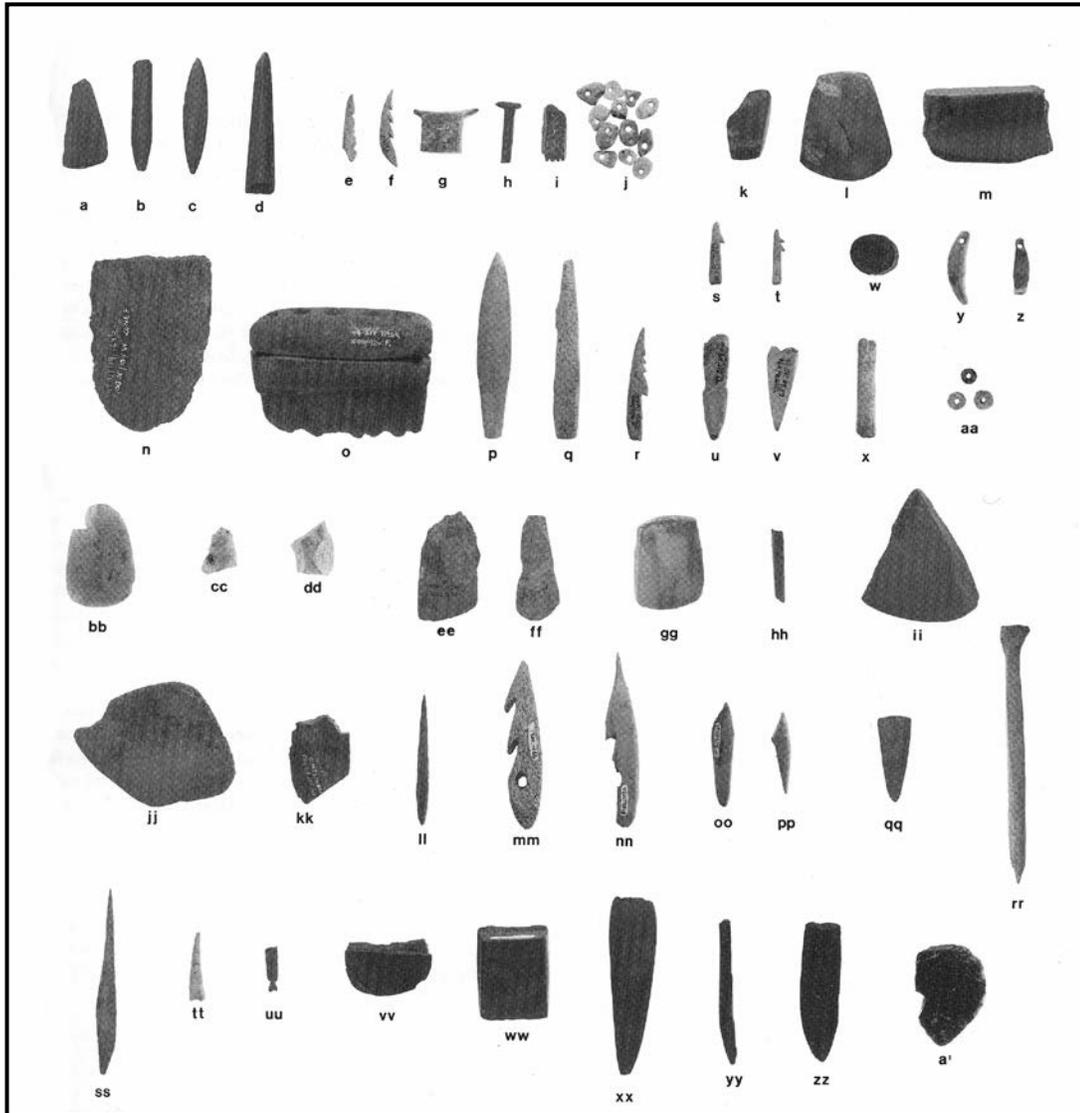


Figure 14. Artifacts of the Developmental Northwest Coast Stage. Early Phase: a-d ground slate points; e-f unilaterally barbed bone point fragments; g-h, stone labrets; i, stone bead; j, small perforated pebble beads; k, stone adze; l small stone planning adze; m, whetstone; n, chipped slate blank; o, ribbed stone. Middle Phase: p, lanceolate bone point; q, unilaterally single-barbed bone point; r, unilaterally multiple barbed point; s-t, small unilaterally single and double-barbed bone points; u-v, valves for composite harpoon; w, labret; x, bird bone tube; y-z, drilled seal teeth; aa perforated shell beads; bb, incised stone; cc-dd, multifaceted burins; ee-ff, small stone adzes; gg, small stone planning adze; hh, nephrite chisel; ii-jj, single edge ground stone knives; kk, ground shell knife. Late Phase: ll, bone point; mm, unilaterally barbed harpoon point with line hole; nn, unilaterally barbed bone harpoon point; oo-pp, bone points; qq, composite harpoon valve; rr, bird bone awl; ss, bone awl; tt, mammoth tooth chisel; uu, carved bone; vv, elliptical pulley-shaped labret; ww, small stone planning adze; xx, ground slate chisel; yy, ground single edge knife; zz, ground slate point base; a, obsidian scraper. Length of a, 5.75 cm, rest same scale.

Illustration from Davis 1990: figure 3, page 20, Handbook of North American Indians, Prehistory of Southeastern Alaska, Wayne Suttles, editor.

create full narratives. One widely accepted chronology divides the post-glacial prehistory into three traditions, roughly corresponding to the major divisions of the Holocene. From oldest to most recent, they are the Paleomarine Tradition, the Transitional Stage, and the Developmental Northwest Coast Stage.

Early Holocene

At present the archaeological record in Southeast Alaska extends back in time no further than the Early Holocene, although Canadian archaeologists propose that a few sites dating to the late glacial era exist along the coast of British Columbia. Paleomarine Tradition sites have reliable dates that range from about 10,500 to 7,700 years ago. Flaked stone tools found in these sites are reminiscent of the contemporary American Paleoarctic Tradition, and parallels are also found in the North Coast Microblade Tradition of British Columbia. Microblades and microblade cores attest to the use of composite throwing spear technology, as do flaked stone burins and gravers used to shape bone and antler. Other distinctive artifact types include rare leaf-shaped flaked stone spear points, large blade cores, abraders, and barbed bone points. Simple flake, cobble and pebble tools are present at many Paleomarine Tradition sites. Strong evidence exists showing that people living in Southeast relied heavily on ocean resources during Paleomarine times. This evidence includes excavations at the Chuck Lake site on Heceta Island demonstrating use of shellfish, marine fishes, and sea mammal hunting. This site produced microblade technology and dated to about 8,800 years ago. Indirect evidence for a marine focus comes from typical Paleomarine site locations, which are almost all within a short distance of tidewater. Most remarkable among the Paleomarine archaeological sites is Shuká Kaa Cave located on Prince of Wales Island. This site rests 500 feet above modern sea level and produced one of the oldest human skeletons ever found in the New World, dated to 10,400 years ago. Biochemical analysis of these remains point to a diet heavily dependent on ocean food resources. Genetic analysis places this individual close to the founding lineage for all New World humans and indicates a shared ancestry with modern Native Americans on the Northwest coast. Other important Paleomarine Tradition sites include Ground Hog Bay on Kupreanof Island and Hidden Falls on Baranof Island. During the Paleomarine period both global sea levels and the local rebound of land from depression by glacial ice loading were happening at a rapid rate, resulting in fluctuating shorelines. New research by U.S. Forest Service scientists makes it possible to accurately reconstruct elevated Early Holocene shorelines in the Alexander Archipelago and use this information to predict Paleomarine site locations.

Middle Holocene

Transitional Stage sites dating from about 7500 to 5000 years ago include Lake Eva, Point Couverdon, and Irish Creek. Excavations at the Hidden Falls and Ground Hog Bay sites have also contributed to our knowledge of this tradition. During this period, the position of local shorelines stabilized and the development of diverse forest environments was underway. Some evidence exists that the climate may have been drier than present from 7,000 to 3,700 years ago. During this time stone tool technology began a gradual shift away from flaked to ground stone technology. Transitional Stage tool types include scrapers, choppers, bifacial point or knife fragments, flakes tools, microblades, bi-directional microblade cores and larger blade cores. The presence of microblade technology suggests that composite projectile points remained in use. Organic remains of food animals are rare during this period due to acidic forest soils; but the distribution of Transition Stage sites close to shorelines indicates a marine orientation.

Late Holocene

Neoglacial climate change during the Late Holocene resulted in a cooler, wetter climate in Southeast Alaska, with increased storminess and heavier winter snowfalls. Coastlines were fully stabilized by about 2,500 years ago. During this period, Developmental Northwest Coast Stage societies in the region experienced a cultural and economic florescence which ultimately led to the complex Eyak, Tlingit and Haida societies encountered by European and Americans in the 18th and 19th centuries. These developments resulted in greater dependence on intertidal resources, larger populations, permanent winter villages, tribal and clan societies holding territories which they defended, and elaborate plank houses, art and ritual. One prominent synthesis has divided the Developmental Stage into Early (5,200 – 2,600 years ago), Middle (2,600 – 1000 years ago) and Late (1000 – *circa* 250 years ago) phases, but other researchers have offered different schemes emphasizing continuity and gradual change. Representative sites for the Early phase include: Hidden Falls (Baranof Island), Coffman Cove (Prince of Wales Island), Rosie's Rock shelter (Heceta island), Ground Hog Bay (Chilkat Peninsula) and Traders Island. The Middle phase is represented by Sarkar Entrance (Prince of Wales Island), Young Bay (Admiralty Island), Green Creek, and Component II at Hidden Falls, among others. Late phase sites include Starrigavan (Baranof Island), Russian Cove, Bear Shell Midden (Chichagof Island), Old Town (Knight Island) and Component I at Ground Hog Bay.

After about 5,200 years ago, evidence for larger and more permanent settlements appears, including large shell middens associated with masses of fire-cracked rock, wooden post molds indicating plank house construction, beach-gravel pavements and rock bounded hearths. Further evidence is provided by the appearance of wooden fish weirs targeting salmon for mass harvest at about 3,200 years ago, and a three-fold increase in the number of dated archaeological sites between 6,500 and 1,000 years ago. A variety of seasonal subsistence camps remained in use and fortifications implying warfare appeared. Petroglyphs bearing clan crests and delineating territorial boundaries are part of the late Developmental record. Human burials from the late developmental phase are common finds.

Bones and shell excavated from the midden sites gives us a detailed picture of Developmental Stage diets. Mammals targeted included Sitka deer, bears, harbor seals, sea otters. Whale, either scavenged or hunted, appears in late Developmental sites. Bird remains are uncommon, but include rare bald eagle bones. Domestic dog bones are also found, but it is not certain if they were used as food. Fish remains show use of four species of anadromous salmon and more than 14 species of marine fishes, including halibut, cod and rockfish. At least 21 species of shellfish were eaten, with blue mussel, butter clams and Pacific littleneck clams making up the majority at some sites.

Technologically the shift from the Transitional to the Developmental Stage is marked by much greater reliance on ground stone implements, including large and elaborate tools like grooves adzes and mauls. Other ground tool forms are stone points, wedges, gravers, abraders, and bowls. Nephrite, a tough form of jade, was used for some for some heavy tools like mauls. Bone was used for barbed harpoon points and drinking tubes, shell for knives and beaver incisors for wood working. Decorative items like incised stones and a wide variety of ornamental items are also found. These include pendants and beads made of shell, mammal teeth, amber and jet. Ground labrets were used to fill lower lip piercings. Simple flaked stone technology and even microblades are retained at some of the earliest Developmental sites, but subsequently disappear from the archaeological record. Rare

flexible organic artifacts like bark mats and baskets have been found in middle and late Developmental phase sites. Copper makes its first appearance in late Developmental sites, used for items like knife blades, arrowheads, bracelets and beads, small adze blades, scrapers, knives, drills, and awls. Flaked stone technology using obsidian makes a small revival during the late Developmental phase. Awls made from drift iron of European origin appear at the very end of the Developmental Tradition.

Late Holocene Maritime Traditions: Arctic and Bering Sea

The Arctic and Bering Sea are maritime culture regions that share a Late Holocene prehistory, unified by events leading to the development of Alaskan Inupiat and Yupik cultures. Geographically, this culture area includes the Arctic and Bering Sea coastal plains, north from Bristol Bay to Point Barrow, and then eastward to Demarcation Point. It incorporates those adjacent inland regions influenced by Arctic and Bering Sea weather patterns and in the main supporting herb and shrub tundra vegetation, and where only small areas of boreal forest vegetation exist at the peripheries and in some river valleys. These inland areas are the Brooks Range, Nulato Hills, Yukon-Kuskokwim Delta, Ahklan Mountains and Bristol Bay Lowlands. Also included are the inhabited islands of the Bering Sea, which are Nunivak Island, Saint Lawrence Island, King Island and Little Diomedea. Climate in the Bering Sea region features low summer and winter temperatures, wet summers and moderate snowfall. Winters are long and severe around Bering Straits with moderate snowfall. Bering Straits' summers are short and relatively wet. Winds are strong and persistent in all seasons. Further north climate reflects true arctic conditions, having very low temperatures both summer and winter, very low annual precipitation and strong, persistent winds throughout the year. Clouds and fog are usual along the coastline in summer. North of the Arctic Circle long weeks of 24 hour daylight occur in mid-summer and perpetual darkness in mid-winter. Sea ice is everywhere a major feature of the winter environment. Permafrost is an important part of the landscape which becomes continuous at higher latitudes.

Archaeologists and geneticists generally agree that Late Holocene prehistoric populations in the Arctic and Bering Sea regions originated as one or more migrations from Siberia, which carried with them the basic elements of Siberian Neolithic culture. Dates proposed for the earliest of these migrations range from 7,000 to 4,500 years ago, with 5,200 years being a useful average. Prehistoric cultures in the region are usually divided into two broad traditions. The earliest is the Paleoeskimo Tradition. This tradition apparently originated from the initial Eskimo migration event and continued until roughly 2,300 years ago in the Bering Sea region and as late as 1,100 in the Eastern Arctic. The younger tradition has been referred to by several terms, including Northern Maritime and Neoeskimo. It originated during the florescence of the Old Bering Sea culture beginning at about 2,300 years ago and culminated in the explosive expansion of the Thule culture beginning about 1,100 years ago, which led directly to the Yupik and Inupiat cultures of the 18th and 19th centuries.

The archaeology of the American Arctic and Bering Sea has been intensively studied for over a century, but there remains a major gap in geographic coverage centered on the Yukon-Kuskokwim Delta. This area is over 50,000 square miles in extent and is the heartland for Central Yupik language and culture. Although several hundred prehistoric sites are known to exist in the Delta, relatively little archaeological research has been done and the only formal prehistory to appear in an academic journal was published two decades ago.

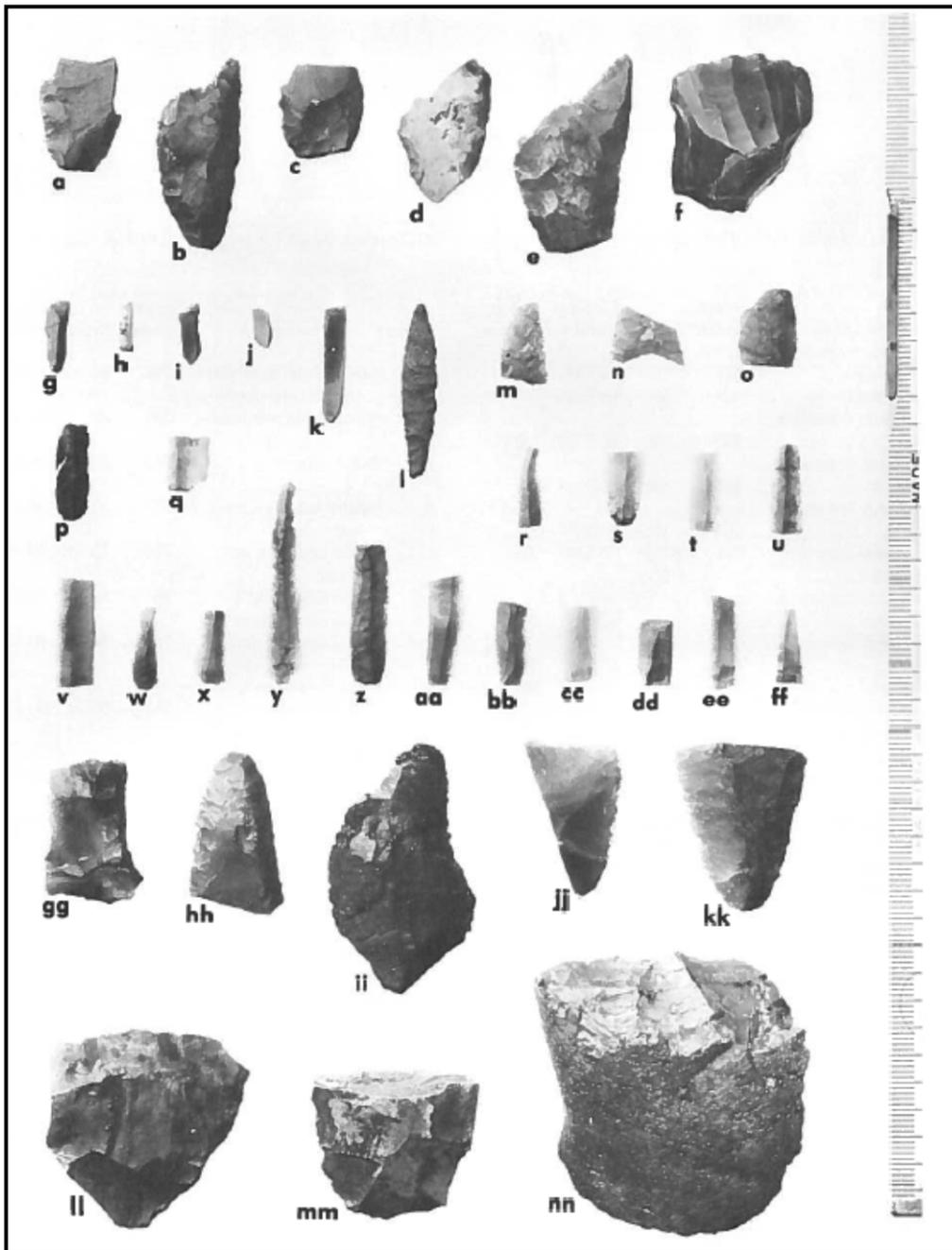
Paleoeskimo: Denbigh, Choris, Norton and Ipiutak

Initial Paleoeskimo migration was accomplished by a population carrying with it a cultural phase called the Denbigh Flint Complex in Alaska north of the Yukon- Kuskokwim Delta. This migration event either displaced or replaced the Northern Archaic population in the tundra hinterlands of the Bering Sea and Arctic coasts, and marks the advent of cultural patterns that would continue for the next 3,000 years. It extended into the Canadian High Arctic, Greenland, Southwest Alaska, and the Alaska Peninsula and even the coastal zone of South Central Alaska. In these more distant areas allied phases have received different names, but the underlying material culture and dating remain so similar that there is little doubt that the same migration event is responsible for their appearance. Most important in Alaska is a Denbigh cognate culture called the Brooks River Gravel phase by its discoverer. The initiation of the migration event coincided with the beginning of the Late Holocene Neoglacial climate interval, with its alternating intervals of cool-wet and warmer-drier climate conditions. One-to-one relationships between climatic intervals and cultural changes are an on-going topic for research. Paleoeskimo adaptations established during Denbigh times included reliance on coastal resources for part of the year¹, a highly developed and specialized flaked stone and osseous tool kit, high annual mobility to access seasonal resource concentrations and hunting technology including harpoons and the bow and arrow.

Dating the Denbigh period, and all prehistoric sites where sea mammals were harvested using the radiocarbon method, is complicated because incorporation of the radioactive carbon-14 atom into ocean environments can lag its production in the atmosphere by several hundred years. Correcting dates affected by this lag or by mixing of cultural levels in shallow archaeological sites involves a great deal of informed guesswork. As a result, different scholars have proposed different dates for the exact beginning and end of Denbigh and other coastal cultures reliant on sea mammals. A long-count for Denbigh, based on most of the available dates, runs from circa 5,500 to 2,300 years ago. A short-count that eliminates many “problem” dates is narrower, with a range of about 4,500 to 3,500 years ago. Points of origin identified in Siberia are the Syalakh and Bel’kachi cultures of the Aldan and Lena River basins which date to between 7,100 and 6,000 years ago.

As stated, Denbigh sites are found in both inland and coastal settings. Along with preserved bone from food animals this indicates an economy based on seasonal movement between the two environmental zones. At coastal sites there is direct evidence for Denbigh people harvesting smaller seals, bearded seals and small cetaceans, possibly beluga whales. Analysis of the seal bone indicates that the sealing camps were used in the spring and early summer. Late summer was devoted to harvesting salmon and freshwater fish on major rivers, while fall was a time of large-scale caribou harvests in inland areas. Camps used at all seasons are small and were used for short intervals, suggesting small social groups that moved frequently. Most are represented by scatters of flaked stone debris and broken tools, and one or more hearths. Housing at all but a few sites seems to have

¹ Possibly facilitated by final stabilization of post-glacial sea levels regression during the Middle Holocene.



Object	Description
a	Burin fragment, chert
b	Burin, chert
c	Burin fragment, chert
d	Burin, translucent chert
e	Burin, translucent chert
f	Microblade core, chert
g	Burin spall artifact, chert
h	Burin spall artifact fragment, chert ..
i	Burin spall artifact chert
j	Burin spall artifact fragment, silicified slate ...
k	Burin spall, chert ...
l	Side-blade inset, red jasper
m	Side-blade inset fragment, chert ...
n	Harpoon end-blade inset base fragment, chert ...
o	Side-blade inset fragment, chert ...
p	Microblade fragment, black chert
q	Microblade fragment, chert ...
r	Microblade, chert ...
s	Microblade, chert ...
t	Microblade, chert ...
u	Microblade, chert ...
v	Microblade, chert ...
w	Microblade, chert ...
x	Microblade, chert ...
y	Microblade, chert ...
z	Microblade, chert ...
aa	Microblade, chert ...
bb	Microblade, chert ...
cc	Microblade, chert ...
dd	Microblade, chert ...
ee	Microblade, chert ...
ff	Microblade, chert ...
gg	Flakeknife fragment, red jasper
hh	Flakeknife fragment, chert
ii	Drill (?), black chert
jj	Flakeknife fragment, chert
kk	Flakeknife base fragment, chert ...
ll	Adz blade fragment, silicified slate ...
mm	Knife or lance blade (?), silicified slate
nn	Core or adz blade (?), chert

Figure 15. Burins, side blades microblade and other artifacts from the Denbigh Flint beaches 102-104, Cape Krusenstern, Northwest Alaska.

Illustration from *Beach Ridge Archaeology of Cape Krusenstern* (1985) used by permission of Dr. Douglas Anderson and the National Park Service.

been portable skin tents measuring ten to twelve feet long. Many small sites are located on high ground from which game animals could be spotted. At a few interior lake and river settings with landforms known to concentrate migrating caribou there are much larger Denbigh sites with greater numbers of artifacts, probably indicating larger temporary social groupings and repeated use over time. At a very few sites the outlines of semi-subterranean winter houses have been found. These included the important innovation of entrance tunnels with a deeper “cold-trap” just below a short vertical climb into the main room.

Flaked stone Denbigh tools are exceptional in being tiny and intricately flaked, displaying manufacturing skill and artistic expression of the highest order. Characteristic tool forms include small end and side blades used in composite weapon tips, elaborate “mitten-shaped” burins, microblade technology based on a variety manufacturing sequences, knives and several forms of end and side scrapers. The small points (end blades), either leaf-shaped or with indented bases, displayed an elaborate and difficult to achieve surface flaking pattern. This consists of narrow flake removals arranged in a continuous, parallel, echelon across each face, with the flaked removals all performed at a constant, oblique angle. Equally elaborate crescent shaped “side blades” were made as insets for the lateral margins of weapon tips to provide a cutting edge. Known technology based on organic materials included the armatures for composite weapon tips, other throwing spear parts including antler points, fishing barbs and gorges, awls, wedges, a needle, a needle case and sewn birch bark. A few composite artifacts made up of microblades and burins with wooden handles have also been recovered, and were probably used to shape hard osseous materials. High quality tool stone was used to achieve these results, and there is evidence that the resulting ultralight tool kits were conserved and transported from camp to camp throughout the year. This portability would have been a major advantage for groups moving rapidly and widely across the landscape. Obsidian was also used, indicating trade or long-distance travel.

Two separate cultures followed the Denbigh Flint Complex in northern Alaska, both with their defining sites positioned on the Chukchi Sea coast, just north of Bering Straits. One of these, the Choris culture, is a phase in the Paleoeskimo Tradition intermediate between Denbigh and the later and more wide-spread Norton culture. The second is the enigmatic Old Whaling culture known from a single coastal village site and having no obvious predecessors or descendants in the American arctic.

Choris derives its name from the first site of this phase to be discovered, located at a complex of ancient beach ridges on the Choris Peninsula, south of the modern community of Kotzebue. Here three shallow, oval, house depressions were found with post molds inside the depressions and highly decayed structural wood at the margins of the floors. One house contained a diffuse hearth and one was found to contain a ground stone seal oil lamp used for cooking, heating and lighting. Scattered artifacts and bone helped to trace the house floors, which were between 25 to 30 feet in length. Three much smaller circular pits accompany each house and may have functioned as food storage caches. The Choris Peninsula site house style is unique in the North American arctic, with the possible exception of one house found inland at the Onion Portage site on the Kobuk River. A recent inventory based on government records has identified 56 other possible Choris sites spread across northern Alaska and Yukon Territory. However, only few of these sites have been studied in detail. The majority are undated and thus difficult to differentiate from other Paleoeskimo phases with certainty. Radiocarbon dating of samples unaffected by sea mammal oil, and from unmixed

archaeological deposits at several sites believed to represent the Choris phase, indicate an age range of about 2,900 to 2,200 years ago.

Artifacts found at the Choris Peninsula and other Choris sites show clear continuity with the earlier Denbigh culture. This is especially true of the flaked stone technology, whose key artifact types, like weapon tips, differ in only a few stylistic elements, notably the introduction of stemmed haft elements with rounded shoulders. However, some more distinctive differences are known. For example, microblade technology was deemphasized and nearly absent, as was production of the mitten burin. Simpler burins and graving tools were used, as were flaked drill bits. More importantly, the first pottery found in northern Alaska appears suddenly in Choris sites without a regional precursor. Like other Paleoeskimo innovations, the source for this new technology is believed to be Siberian Neolithic cultures to the west of the Bering Straits. Other support for continued contact between Paleoeskimo and Siberian cultures of this era comes in the form of geochemically distinct obsidian from Siberia found in some Choris sites. Another innovation was the introduction of slate tools, including large slab knives with chipped edges and more refined ground stone ulus.

Choris Peninsula organic artifacts include bilaterally barbed harpoon points made of antler – sometimes found with the end blade attached, an antler spoon, bird bone needles, an antler punch, an antler adze, a walrus bone ice pick, scapula scrapers, bird bone drinking tubes, an antler knife handle, a carved bone peg thought to be part of a throwing board and carved walrus ivory pieces interpreted as parts of bow drills and archery equipment. Items of personal adornment were found, including an ivory pendant, ivory labret and an amber bead. A remarkable item discovered in one of the Choris Peninsula houses is a small human figurine that shows both the facial features and the details of a parka hood. A second ivory figure was found carved with two faces that somewhat resembles the heads of seals.

Reliable information about Choris subsistence comes almost entirely from the Choris Peninsula site. There the bulk of bone interpreted as food scrap is either caribou (48%) or seal (46%), mostly small seals but with a few large bearded seal bones also recorded. Other species included small numbers of beluga and other whale bone, waterfowl, rodent, and fur bearing animals including bear, wolf, fox, lynx and beaver. An isolated area at the south end of the Choris Peninsula has been reported to be a seal rookery, and an expanse of tundra suitable for caribou habitat is located on a low plateau east of the beach ridge complex. Beluga may have been hunted, implying use of watercraft. Although bone from larger whales has been found at Choris sites, but there is no evidence for large whale hunting technology. At the present time large whale bone is easily obtained from naturally deceased whale carcasses beached on the shoreline of the Peninsula, and this may have also been true for the Choris people. Caches of finished Choris weapon tips found at Cape Krusenstern are evidence for season changes of residence among resource sites that were used repeatedly.

The Old Whaling culture is known from a single village site found on Beach 53 of the vast Cape Krusenstern beach ridge complex, located 30 miles northwest of Kotzebue and the mouth of the Noatak River. The site consists of two clusters of buried houses dated to between 3,100 to 2,800 years ago. Old Whaling tools and houses are unique in the Arctic and the culture stands outside the main line of Paleoeskimo development. The Old Whaling village is arranged in two house clusters, each containing five houses. One cluster is composed of substantial, semi-subterranean winter dwellings. These had walls and frames built of upright wooden timbers, supported by a central frame built of heavy posts. The floors were of also of wood and the remains of wooden sleeping platforms

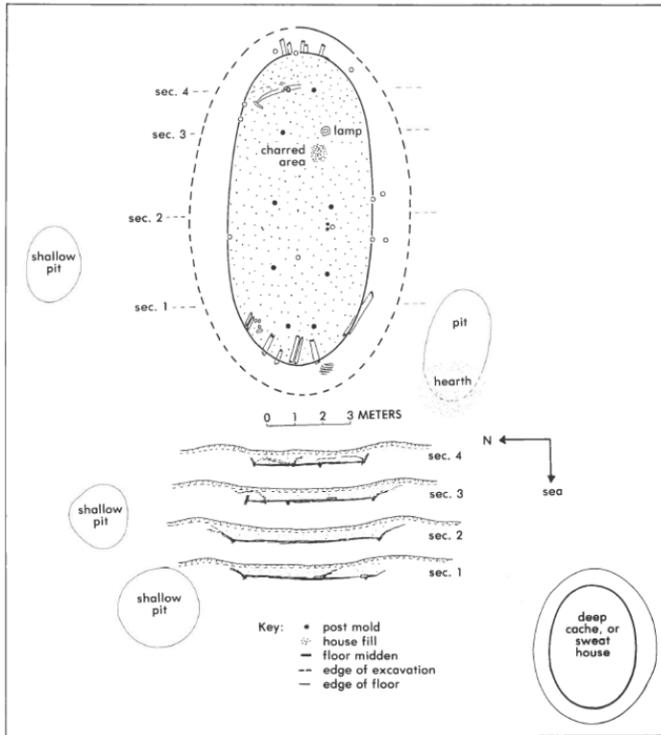
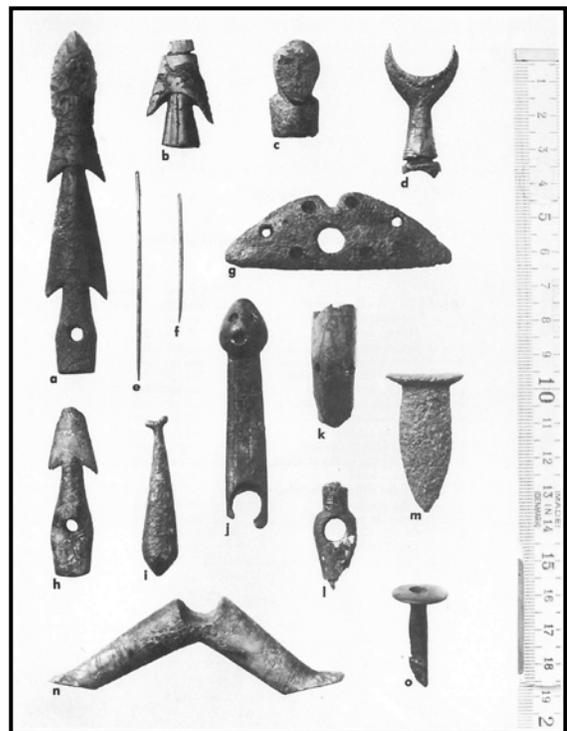


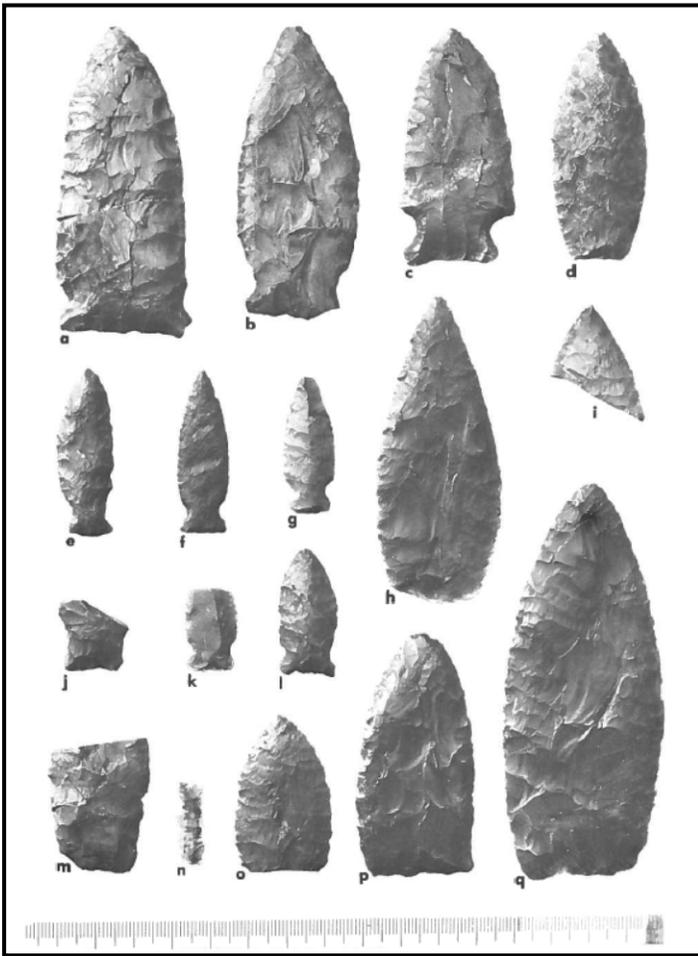
Figure 16. Cross sections and plan view of Choris House 1, Choris Peninsula, Northwest Alaska.

Figure 17. Artifacts from the Choris Houses, Choris Peninsula, Northwest Alaska.

Object	Description	House
a	Harpoon dart head, antler, with chalcodony point	2
b	Harpoon dart head fragment, ivory	1
c	Figurine fragment, ivory	3
d	Bow guard (?), ivory	3
e	Needle, bone	2
f	Needle, bone	2
g	Plate for swivel (?), ivory	3
h	Harpoon dart head, ivory	2
i	Pendant, ivory	3
j	Ornamented object, ivory	3
k	Shaft fragment, ivory	1
l	Object, ivory	3
m	Labret, ivory	2
n	Object, ivory	3
o	Socket piece, antler	2



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Object	Description
a	Large, side-notched point, chert
b	Large, side-notched point, silicified slate
c	Large, side-notched point, translucent chert
d	Large, straight-based point, chert
e	Small, side-notched point, chert
f	Small, side-notched point, chert
g	Small, side-notched point, translucent chert
h	Narrow, elongate biface, possibly a lance head, chalcedony
i	Large biface point fragment, translucent chert
j	Small, stemmed point fragment, chert
k	Small, side-notched point fragment, chalcedony
l	Small, side-notched point, chert
m	Large, straight-based point fragment with burin blows, chert
n	Ridged flake; chalcedony
o	Large, straight-based point, chert
p	Broad biface blade, chert
q	Narrow, elongate biface, possibly a lance head, chalcedony

Figure 18. Flaked stone weapon tips and other bifacial tools from Old Whaling House 22, Cape Krusenstern, Northwest Alaska.

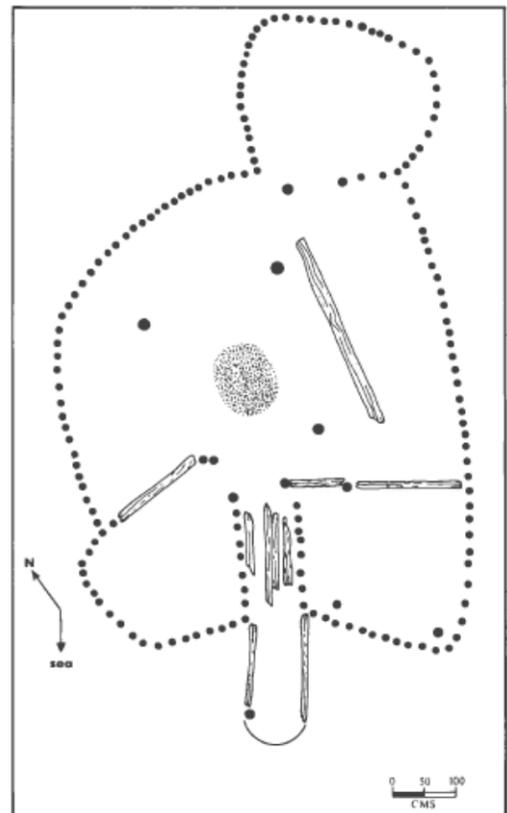


Figure 19: Plan view of Old Whaling House 20, Cape Krusenstern, Northwest Alaska.

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were found along the walls of the main rooms. Other details of the winter houses include central hearths composed of ash, charcoal, and bone and gravel cemented by hardened sea mammal oil. Unusual characteristics were the presence of multiple smaller chambers branching off from the tunnel or main room of the house seemingly at random, a short rather than long entrance tunnel and the irregular, rounded shapes of the rooms. These characteristics are in contrast with other houses in the Eskimo continuum, which may have multiple rooms but are generally rectangular in outline and have long tunnels. Dimensions of the central chamber in the winter houses averaged 18 by 20 feet, and of the attached rooms 8 by 10 feet. The summer houses were equally unusual, being shallow pit structures with an oval outline, vertical posts set both inside and at the margins, and interior hearths containing charcoal, ash and bone built up on the surface of the floor. Dimensions of the largest summer house were 18 by 22 feet.

Even more surprising than the houses is the assemblage of stone tools. It contained many very large stone weapon tips much more similar in outline and flaking style to Northern Archaic notched and lanceolate points than to any microlithic Paleoeskimo types. Most other flaked tools were also large, and include such things as end scrapers with notched hafts, ulus, flake knives and side scrapers. Ground or pecked stone implements are represented by two seal oil lamps and a few simple slate tools. Pottery and microblade technology are absent. The organic artifacts were poorly preserved and composed mainly of unclassifiable items of chipped walrus ivory or worked antler. Identified items included an ivory harpoon point, a wooden bowl, needles and an arrow shaft.

During the initial study of the site, the large size of the spear points led to the speculation that hunting for large whales may have been an important subsistence activity for its residents. However, subsequent analysis of the bones of prey animals found at the site reveals that 98% consisted of small seals, plus a very few caribou, waterfowl and canid remains. Only a single piece of whale bone was found. In light of this the Old Whaling culture seems to have been misnamed, but still remains one of the mysteries of Arctic archaeology.

Across much of Alaska the Norton culture is the culmination of the Paleoeskimo Tradition. It is found in the tundra and maritime environmental zones from the Alaska Peninsula, north along the Bering Sea coast including Nunavik Island and then east along the Chuckchi and Beaufort Sea coasts. Norton culture is oldest in Northwest Alaska, where it appears to be derived from the Choris culture based on commonalities in artifact types. Here Norton culture is first seen between 2,500 to 2,200 years ago and ends at roughly 1,400 years ago. Further south in the Bering Sea and Alaska Peninsula regions Norton begins and ends slightly later, having an age range of 2,400 to 1000 years ago. Norton subsistence and settlement patterns are based on three main resources. Along the coasts sea mammal hunting, with emphasis on small seals, was the most important activity, with walrus hunting being an important addition in Northwest Alaska. At river mouths, and at favorable locations up-river, Norton people fished for anadromous salmon using weighted nets. Further inland away from major rivers the main resource seems to have been migrating caribou. In the southern portion of Norton phase territory semi-permanent village sites developed at favored coastal and riverine locations. These ranged in size from a few winter houses to hundreds, built and occupied over a period of several centuries. Houses built at these villages were substantial pit structures having a rectangular outline, a short sloping tunnel and an internal hearth. Winter house sizes averaged about 12 to 13 feet per side. Inland caribou hunting sites are mainly small seasonal camps. The



Figure 20. Norton culture organic objects from Kugzuk Island pond Site 1.

Object	Description
a	Fish spear side prong, wood and bone, baleen lashing
b	Fish spear side prong barb (?), bone
c	Decorated rod fragment, ivory
d	Sealing harpoon head, antler and chert
e	Decorated object, ivory
f	Spatulate object, antler
g	Pointed object, wood
h	Arrowhead fragment, antler
i	Pick (?), ivory
j	Gauged drill, bone
k	Wedge, wood
l	Slotted fragment, antler
m	Cylindrical object, antler
n	Unidentified fragment, ivory
o	Spoon-like object, mammoth ivory
p	Stepped carving, ivory
q	Notched cylinder, wood
r	Button (?), wood

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development of larger sites located at resource hot spots indicates development of larger social groups, possibly with simultaneous development greater complexity in social organization. One potential indicator for this is the appearance of large, oval structures interpreted as men's or community gathering houses and workshops (kashims) segregated from the small family winter houses. Some cemetery and midden sites located in northern Alaska could be affiliated with Norton culture and might therefore provide evidence for more sedentary residence patterns at resource rich locations.

Norton phase material culture retains many characteristics inherited from Denbigh and Choris. Use of microlithic flaked stone technology continues, although sometimes with less elaborate flaking styles. Microlithic flaked end blades, other weapon tips and side blades remain hallmarks. Many projectile points have stemmed hafts. Other characteristic flaked tools include hafted drill bits, round bifacially worked scrapers, and a variety of simple knives and scrapers made on large flakes. Technology based on ground and flaked slate for items like knives, ulus and graters increased as a proportion of the tool-kits. Some finely ground harpoon points are known. Artifacts made of organic materials included equipment for sea mammal hunting such as small, composite seal harpoon heads with end and side blades. Some large harpoons have been found thought to indicate whale hunting. Barbed harpoon heads continued to be used, but a shift began towards more effective toggling forms. Many new classes of arrow heads made of ivory, bone and antler were utilized. Other organic tools included such things as pronged fish spearheads, knife handles, ivory paddles used to decorate pottery and rare carved human figurines. Simple decorative engraving on osseous tools became more common, particularly on harpoon heads. From its beginnings during Choris times ceramic technology improved and its use became more common. Both linear and check stamped decoration continued. Labrets used to fill lip piercings were in common use.

The Bering Straits Cultural Florescence and Neoeskimo Origins

Following Norton in Northwest Alaska came one of the most rapid and remarkable cultural metamorphoses in all of North American prehistory. Between about 2,200 to 800 years ago prehistoric societies on both sides of the Bering Straits achieved a tremendous elaboration of material culture. This change was expressed as distinctive styles in art, ritual items, structures, burial practices and in highly refined technologies for hunting, transportation and domestic life. Simultaneously, there arose coastal societies of far greater scope and complexity than any previously known in the region. These societies developed large permanent villages; social ranking and hierarchies, and the incorporation of many smaller residence groups across wide geographic territories into polities bound together by shared origins, economic ties and ideology. These developments were accompanied by unmistakable evidence for warfare, expansion of trade and transmission of abstract ideas across societal boundaries.

The drivers for these changes were many and the coalescence of environmental, demographic, social and cultural forces transcends simple narratives of prehistory based on the linear succession hunter-gatherer traditions over time. As a result many specifics are the subject of lively scholarly debate. However, at the most basic level stand Late Holocene Neoglacial climate cycles that periodically increased access to marine mammal harvests, consequent food and raw materials surpluses, the explosive growth of a genetically distinct Neoeskimo population originating in northeastern Siberia, and its subsequent migration into Northwest Alaska across Bering Straits. The result of this migration

was a nearly complete replacement of the earlier, genetically Paleoeskimo population of northern maritime Alaska, although some degree of intermarriage is thought to have occurred.

Speaking broadly, the sequence of cultural phases during the Bering Sea Cultural Florescence, their affiliations and approximate dates are: Ipiutak (Paleoeskimo, 1800 – 1400 years ago), Old Bering Sea (Neoeskimo 1,800 – 1,600 years ago), Punuk (Neoeskimo 1,200 – 400 years ago), and Birnirk (Neoeskimo 1400 – 800 years ago). As is evident from this list, Old Bering Sea – Ipiutak and Punuk – Birnirk were largely contemporaneous societies. In the early stage, there appears to have been significant cultural interchange between Old Bering Sea and Ipiutak, expressed as commonalities in art and ritual practice between societies with largely fixed territories. In the later stages, geographic and temporal overlap between Punuk and Birnirk suggest a porous or shifting boundary along the Arctic coast. Out of the final stages of the Bering Sea Cultural Florescence there emerged the late prehistoric Thule culture, which became the immediate ancestor to the historic and contemporary Inupiat and Yupik cultures of Alaska.

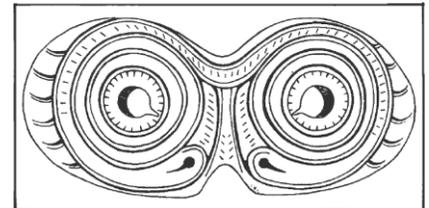
Several problems exist which limit our ability to reach a final consensus about the exact course of events during the Bering Sea Cultural Florescence. Greatly improved preservation of organic artifacts and animal bone at these Late Holocene sites has resulted in a mass of collections from dozens of sites that has outstripped the capacity of archaeologists to fund and complete analyses. A related problem is that many of the largest excavations at some of the most critical sites occurred early in the 20th century when field methods were less refined, and collections often excluded most of the animal and fish bone representing proportional changes prehistoric subsistence. Dating problems down to the level of a few centuries also occur. This is due in part to vertical mixing of older and younger cultures at some sites. Also problematic are marine carbon-14 reservoir effects that skew the dating of sea mammal and salmon bone several hundred years earlier than their actual age. This bias also applies to human tissues from people whose food came from these sources. Corrections can be made, but are not always precise. The dating problems are exacerbated by occasional artifact finds bearing art styles outside their usual geographic and time ranges. The pace of change during the Neoeskimo migration era was quick and included cultural exchange across societal boundaries, or rapid and uneven changes in these boundaries. As a result the uncertainties in the dating framework have blurred the prehistoric record, and resulted in numerous attempts at revisions that are indefinite or not universally accepted.

Ipiutak

Most archaeologists regard the Ipiutak culture as the culmination of the Paleoeskimo Tradition in Northern Alaska. It was first defined in the late 1940s based on excavations of a massive village and cemetery site at Point Hope. However its geographic range in smaller sites is now known to extend south to Kotzebue Sound, the Seward Peninsula and Norton Sound. Ipiutak also extends eastward and inland into the Brooks Range, and the Noatak and Kobuk River drainages. Ipiutak material culture is distinct from the preceding Norton culture in several ways. Some village sites are large, containing hundreds of houses and burials, organized into separate precincts and evenly spaced across wide areas. Winter and summer house forms occur, and the houses are of variable size suggesting differences in wealth and status. Driftwood is a major structural material, and some much larger structures exist, suggesting communal use for ritual and social gatherings. Some burials contain elaborate works of high art made of walrus ivory thought to have ritual and religious meaning and to signify social ranking. Some children's burials are especially elaborate, and there are



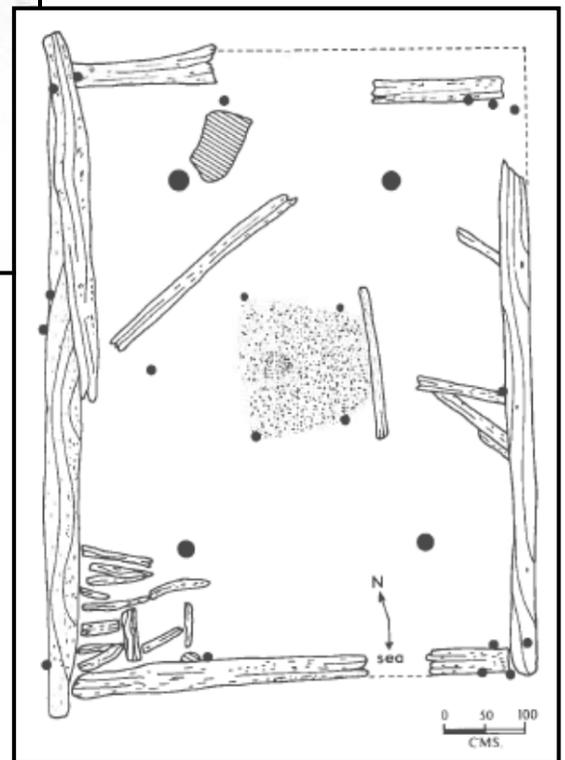
Object	Description
a	Adz blade, sharp bevel, silicified slate
b	Adz blade, sharp bevel, silicified slate
c	Adz socket, antler
d	Adz blade, sharp bevel, silicified slate
e	Adz blade, flat bevel, silicified slate
f	Adz blade, sharp bevel, silicified slate, and socket, antler
g	Adz blade, sharp bevel, silicified slate, and socket, antler
h	Adz blade, sharp bevel, silicified slate, and socket, antler



i. Decorated snow goggles or mask from Ipiutak House 30 at Cape Krusenstern.

Figure 21a. Artifacts from Ipiutak House 30 at Cape Krusenstern, Northwest Alaska.

Figure 21b. Floor plan of Ipiutak House 17 at Cape Krusenstern, Northwest Alaska. Shown are drift wood structural members.



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numerous instances of human skeletons that show evidence of violent injury and death, indicating warfare. Certain items found in Norton sites are absent, including pottery and ground stone oil lamps. Bow and arrow technology is well represented and include barbed arrow points believed to have been made specifically for use in warfare. Birch bark containers were used. Organic, utilitarian artifacts of bone, antler, and especially ivory were often decorated and the shapes of harpoon heads included both stylistic and functional elements. The most elaborate carving was reserved for ritual items, including spectacular burial masks. Art motifs included complex linear designs, circles, dots, rays and dashes. Some recurring decorative motifs found on abstract and non-functional items are believed to represent cosmological symbols associated with shamanism. The subsistence economy included seal, walrus and caribou hunting, and possibly beluga harvest in areas to the south. The extent of fishing is not certain, but may have been important at interior lakes. Small pieces of iron traded from distant Asian sources are found and were used to make engraving tools. Ipiutak disappears from Northern Alaska between 1,400 to 1,000 years ago, and is replaced by Neoeskimo cultures.

Old Bering Sea

Contemporary with Ipiutak, Old Bering Sea culture was first described in the 1930s based on large excavations at village and midden sites on Little Diomed and Saint Lawrence Island. Subsequently, the earliest stages were described from coastal sites on the Eastern Chukotka Peninsula. Isolated finds of Old Bering Sea artifacts have been made at Point Barrow and Golovin. The village sites include separate house and cemetery districts. No inland sites are known. Winter houses have elaborate stone slab flooring and employ both whale bone and drift wood as part of the structure. Evidence for larger structures is limited. Old Bering Sea art is the most elaborately developed of the entire Bering Sea florescence and includes the circle, dot, rayed and complex line motifs. Old Bering Sea art is generally regarded as the root for the development of subsequent Ipiutak, Punuk and Birnirk styles. Harpoon heads were made in several culturally specific styles that changed over time, and sculptural art included refined and sometimes abstract human and animal representations. Old Bering Sea harpoon styles and decorative motifs strongly influenced Ipiutak art, demonstrating cultural interchange. Utilitarian items were often highly decorated. Small Asian iron implements found in Old Bering Sea sites indicate that it was the source for iron found in Ipiutak sites, confirming that trade relations existed. Flaking styles of stone implements tended to be relatively simple. Ceramics, bowls, cooking containers and lamps were used. Burials from the Old Bering Sea sites at East Cape on the Chukotka Peninsula contained large numbers of artifacts, including hunting, household and ritual equipment, and are often framed by complicated whale bone and wood structures. Differences in burial contents, including decorated ivory, suggest social ranking. Subsistence was based on sea and walrus hunting, with some whaling indicated. Caribou hunting was not emphasized; making trade with the Ipiutak people to the east for caribou hides likely. Old Bering Sea society may be closely identified with the initial pulse of Neoeskimo migration.

Punuk

Punuk was the immediate Neoeskimo successor to Old Bering Sea culture and was first described based on excavations on Saint Lawrence Island made during the 1930s. Subsequently, it has been discovered across a wider area centered on both sides of the Bering Straits, including eastern Chukotka and the Seward Peninsula. Minor sites or isolated finds are known from a larger area, including Norton Sound, the Kobuk valley, Kotzebue Sound and the Northwest Alaska coast. This

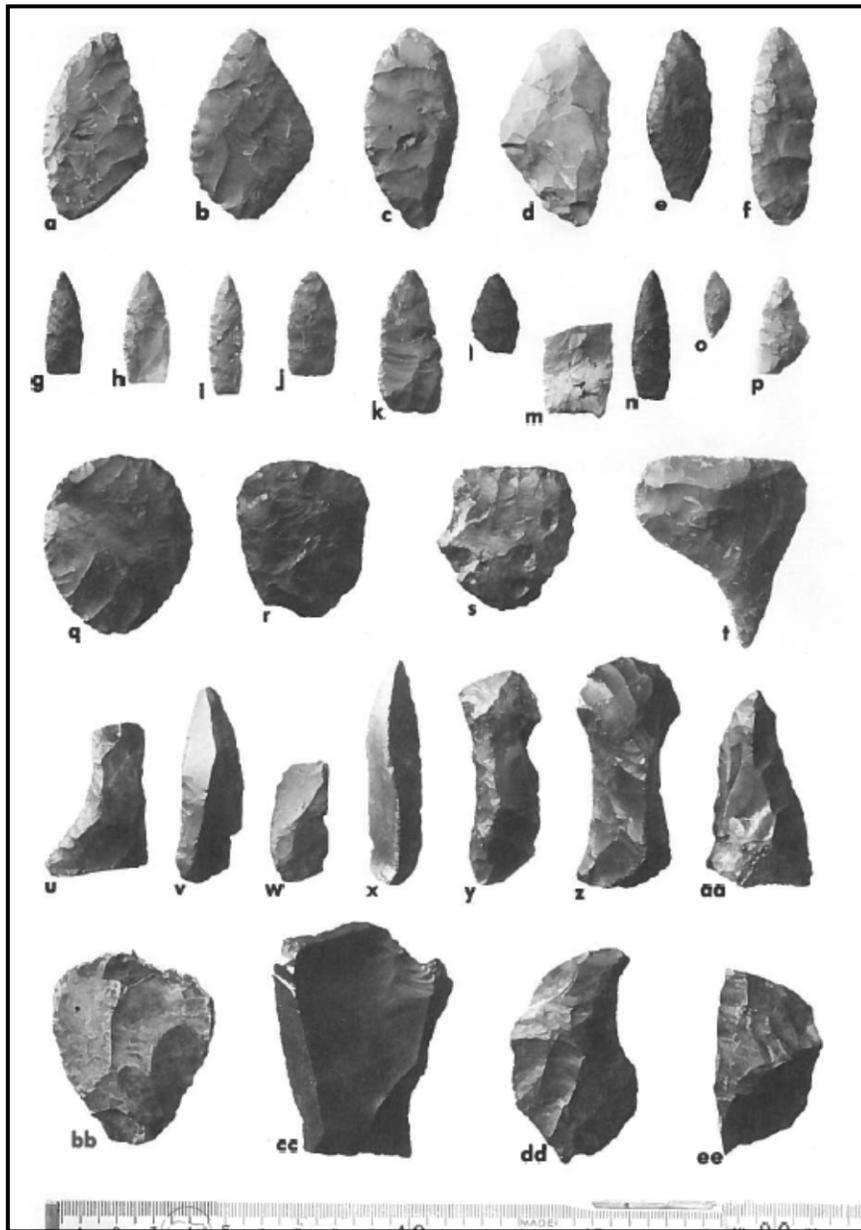
wider geographic range is consistent with an expanding and migrating Neoeskimo population in contact with neighboring societies. In Chukotka, there is continuity in the use of village sites, although fewer Punuk era graves are reported. Grave goods are fewer and less elaborate than in Old Bering Sea and Ipiutak sites. House styles show continuity with Old Bering Sea, but larger structures are also found indicating specialized communal uses. Characteristic artifacts include most functional types found in Old Bering Sea, but with numerous stylistic changes. Decorative art somewhat simpler than the preceding period and figural art is scarce or lacking. Lines, dots and circles are the common motifs. Slate was used for end blades and scrapers. Bola weights and blunt arrow points used in waterfowl hunting, drum handles and carved wrist guards used in archery are common forms. More advanced bow designs and the use of slat armor suggest warfare. Maritime subsistence continued to be based on sealing and walrus hunting, but with the undoubted addition of whaling. Successful capture of large whales implies a high degree of social organization and technological development around economic pursuits. The importance of caribou hunting is uncertain. Fish resources were of importance in Norton Sound and on the Kobuk River.

Birnirk

Roughly contemporary with Punuk, Birnirk culture was first defined in 1930 based on a site near Point Barrow, and its cultural center is focused on the Chuckchi Sea coast. However, subsequent discoveries show that Birnirk or at least Birnirk style artifacts have a much wider distribution, from Cape Baranov near the Kolyma River in Siberia east as far as the central Canadian Arctic. This wide geographic range suggests contact and shifting borders with adjacent Punuk societies. In the American side of Bering Straits Birnirk sites are most abundant in the vicinity of Point Barrow, with smaller sites overlapping the range of Punuk culture around Point Hope and Cape Krusenstern. Isolated Birnirk artifacts have been found as far south as Wales at the tip of the Seward Peninsula. No Birnirk sites have been found in non-coastal areas. Winter village houses were generally small and there were few larger community structures. Burials inside structures were common, including a spectacular multiple internment at the Kugusuguruk site on the Chuckchi Sea coast that contained a large inventory of grave goods. Status indicators such as differences in the amounts and quality of grave goods are less than in Old Bering Sea and Ipiutak sites. Decorative art was simpler than Old Bering Sea, Ipiutak and Punuk, with abstract designs restricted to linear motifs. Figural art was lacking. Utilitarian implements included an array stylistically distinctive of harpoon styles, well-flaked stone, ceramics and lamps. The subsistence base was maritime oriented and included harvest of seals, walrus and whales. Caribou hunting occurred in northern Alaska but the extent of fishing is not certain.

Western Thule and the Origins of Inupiat Culture

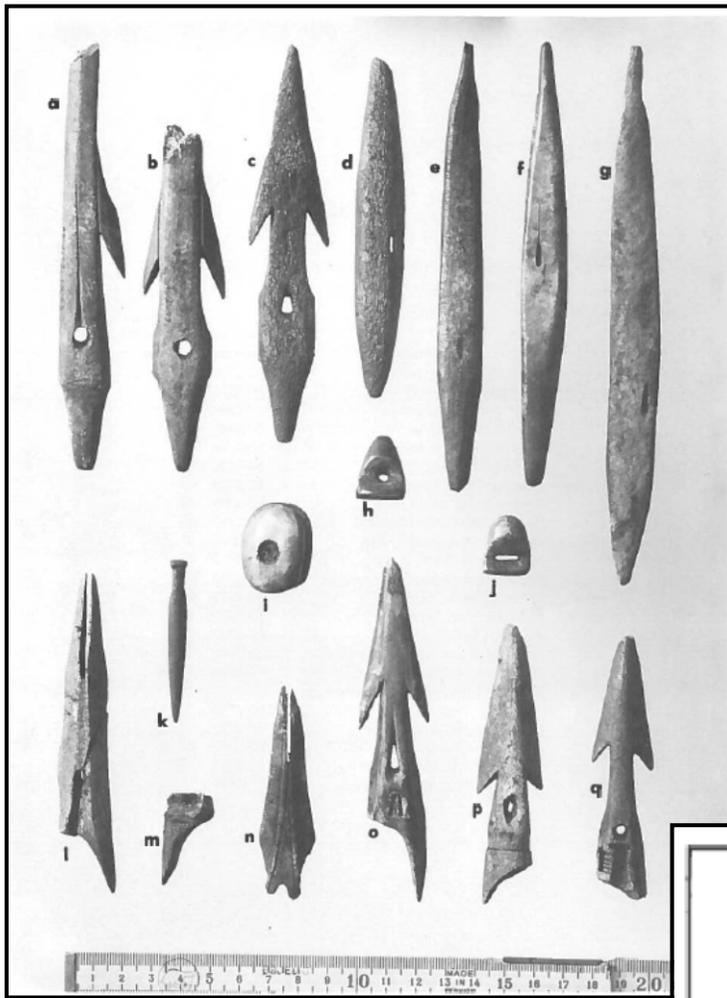
Thule culture was first defined based on archaeological explorations in the Canadian Arctic during the 1920s, and is now firmly dated to between 1000 and 300 years ago. Many points of origin were once proposed for Thule, ranging from the eastern Aleutians to Point Barrow. Now however, genetic studies make it clear that the Thule peoples, and their descendants the modern Inupiat, are of Neoeskimo origin. Archaeological study demonstrates development of early Thule out of the Birnirk culture and society along the Chuckchi Sea coast, especially near Point Barrow. Punuk influences have also been suggested and debated. In Alaska, Western Thule geographic distribution included the Bering Straits, with some evidence of a southern extent that ultimately reached south to the Alaska Peninsula. Western Thule people also expanded into non-coastal areas including the Brooks Range



Object	Description
a	Large side blade, chert
b	Large side blade, chert
c	Large side blade, chert
d	Large side blade blank (?), chert
e	Large side blade, red jasper
f	Large side blade, chert
g	Arrowhead end-blade inset, basalt
h	Arrowhead end-blade inset, chert
i	Arrowhead end-blade inset, chert
j	Arrowhead end-blade inset, chert
k	Arrowhead end-blade inset, chert
l	Harpoon side-blade inset (?), black chert
m	End-blade inset base, chert
n	End-blade inset, basalt
o	Side-blade inset, chert
p	Side-blade inset fragment, chert
q	Discoidal scraper, chert
r	Discoidal scraper, black chert
s	Discoidal scraper, chert
t	Drill, chert
u	Flakeknife, chert
v	Drill or graver, chert
w	Graver, chert
x	Graver, chert
y	Flakeknife, chert
z	Flakeknife, chert
aa	Drill, chert
bb	Side scraper, silicified slate
cc	Side scraper, black chert
dd	Side scraper, black chert
ee	Artifact blank or core, black chert

Figure 22. Stone knife blades, scrapers and other flaked stone objects from Birnirk-period house 32, Cape Krusenstern, Northwest Alaska.

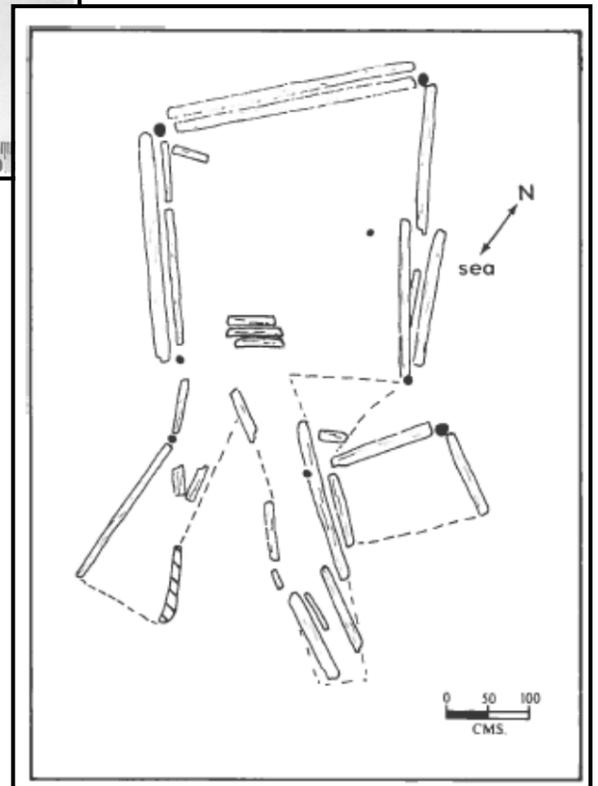
Illustration from *Beach Ridge Archaeology of Cape Krusenstern* (1985) used by permission of Dr. Douglas Anderson and the National Park Service.



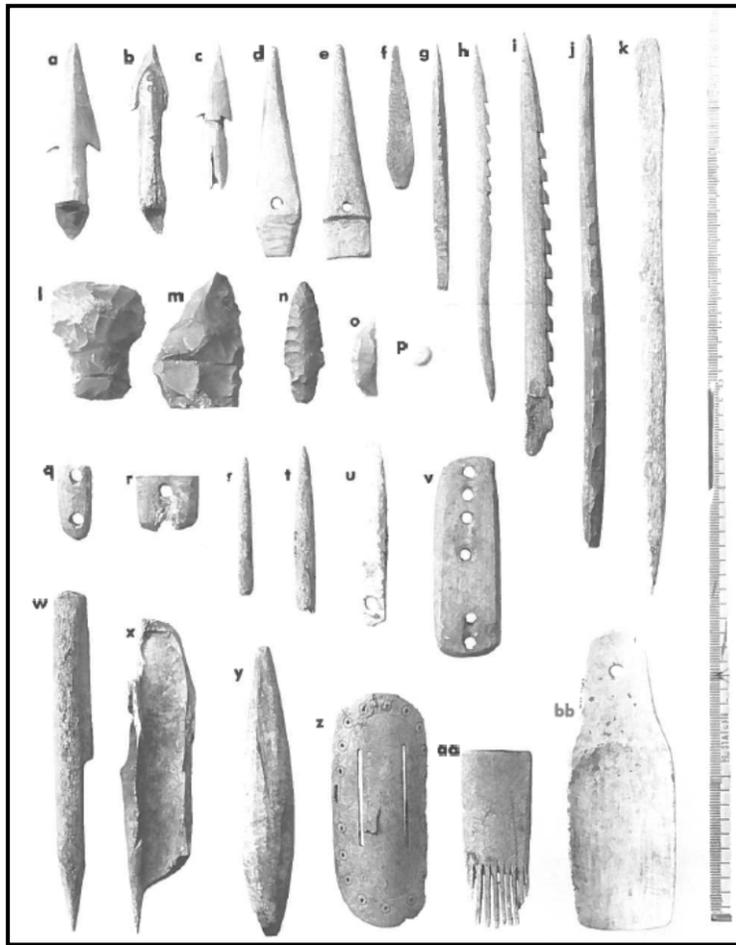
Object	Description
a	Sealing dart head fragment, antler
b	Sealing dart head fragment, antler
c	Sealing dart head, antler
d	Harpoon foreshaft fragment, antler
e	Harpoon foreshaft, unfinished, antler
f	Harpoon foreshaft, antler
g	Harpoon foreshaft, antler
h	Harpoon finger rest, ivory
i	Inflation nozzle, ivory
j	Harpoon finger rest, ivory
k	Wound pin, ivory
l	Harpoon head, antler
m	Harpoon head fragment, antler
n	Harpoon head fragment, antler
o	Harpoon head, ivory
p	Harpoon head, antler
q	Harpoon head, antler

Figure 23a. Osseous Artifacts from Western Thule House 25 at Cape Krusenstern, Northwest Alaska.

Figure 23b. Floor plan of Thule House 25 at Cape Krusenstern, Northwest Alaska. Shown are drift wood structural members.



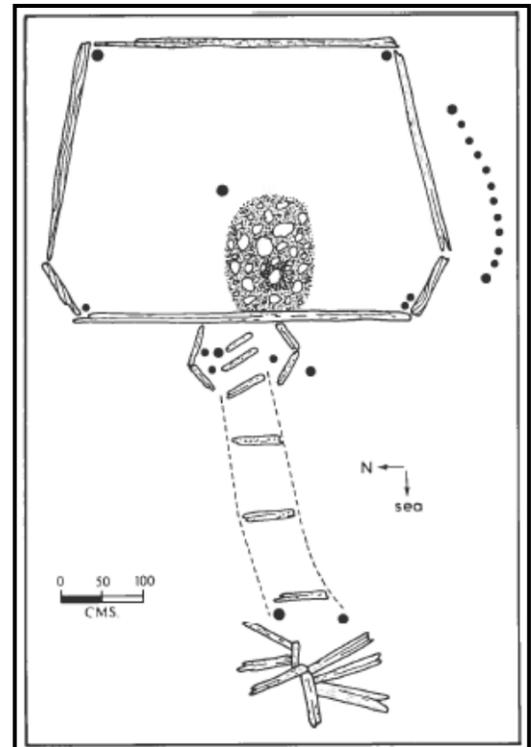
Illustrations from *Beach Ridge Archaeology of Cape Krusenstern* (1985) used by permission of Dr. Douglas Anderson and the National Park Service.



Object	Description
a	Harpoon head, ivory.....
b	Harpoon head, antler.....
c	Harpoon head fragment, ivory.....
d	Harpoon foreshaft, antler....
e	Harpoon foreshaft, antler....
f	Harpoon foreshaft(?), antler..
g	Fish arrow point, antler.....
h	Leister prong, antler.....
i	Leister prong fragment, antler.....
j	Leister prong fragment, antler.....
k	Pointed object, antler.....
l	End scraper, chert.....
m	Knife blade blank, chert.....
n	Arrow point, red chert.....
o	Knife blade, chert.....
p	Glass bead.....
q	Cleat fragment, antler.....
r	Cleat fragment, antler.....
s	Fishhook barb, antler.....
t	Fishhook barb, antler.....
u	Object, ivory.....
v	Cleat, antler.....
w	Arrowhead blank, antler.....
x	Awl, bone.....
y	Fishhook shank, ivory.....
z	Wrist guard, antler.....
aa	Comb, antler.....
bb	Spoon or fat scraper, horn...

Figure 24a. Artifacts from Kotzebue (Inupiat) House 31 at Cape Krusenstern, Northwest Alaska.

Figure 24b. Floor plan of Kotzebue (Inupiat) House 31 at Cape Krusenstern, Northwest Alaska. Shown are drift wood structural members.



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and along the major river systems. Development of Thule culture, whaling in particular, has often been connected to climate cycles during the latest Holocene, including the so-called Medieval Warm Period (1,100 – 700 years ago) and Little Ice age (700 – 150 years ago). Researchers have offered several alternative scenarios, but none has achieved universal acceptance. Beginning at about 800 years ago, a break-away Thule population began an eastward migration that carried Neoeskimo genetics and culture throughout the Canadian Arctic and onward into Greenland. After about 300 years ago, Western Thule culture and society grades into the Historic Inupiat, an era which brought ever increasing contact with Asian, European and American technology and social patterns.

Western Thule coastal societies were characterized by permanent village sites. Social organization was complex, and organized trade for a variety of materials was a regular occurrence. Winter houses were strongly built semi-subterranean structures with driftwood or whale bone frames, rectangular outlines, sod insulation, and a sunken entrance tunnels that acted as a cold trap. The winter houses were often multi-roomed, with a separate kitchen area and sleeping benches in a large central chamber. Cooking and heating were accomplished using sea mammal oil lamps, or in some cases small driftwood fires. Evidence for larger structures is rare, but one large community structure (qargiich) has been excavated near Point Barrow. Large cemetery districts are found at village sites near Point Hope and in the Point Barrow region, and possibly on Saint Lawrence Island. Cultural practices followed for individual burials of the dead appear to have been nearly uniform. Differential distribution of high value items occurs in preserved houses, indicating ranking in social status. Small sites with winter houses are also found in scattered coastal locations distant for the major villages. Western Thule people also expanded into non-coastal areas including the Brooks Range and along major river systems throughout northern Alaska. Summer houses were apparently skin tents based on a few excavated examples and comparison to historic practices.

Summer travel and sea mammal hunting was aided by use of large open skin boats called umiaks, and dog sleds came into general use for winter travel. An array of highly efficient hunting technologies allowed the Thule people to harvest almost all of the potential food resources, including sea mammals, land mammals, birds and fish. Many communities successfully hunted walrus and bowhead whales, endeavors that required social cooperation in large task groups, elaborate technological systems and effective seasonal logistics planning. At village sites without reliable access to bowhead whales, fishing and sealing provided a greater proportion the subsistence harvest, and drives for the small beluga whale occurred at some communities around Kotzebue Sound. Use of dog teams led to intensified salmon harvests in some areas. Caribou were a vital resource for meat and hides used for clothing and bedding. Migratory birds contributed to the harvest. Brooks Range settlements away from major rivers relied on caribou and lake fish.

Characteristic artifacts were manufactured of ground stone, bone, and antler, wood, sea mammal hides and other less durable organic materials, often combined into complex forms. Ceramics and a wide range of harpoon points were used; many with individual ownership marks. There were several distinctive forms of antler and bone arrow points. Technology required for hunting seals on sea ice in winter was elaborate and highly developed functionally. Decorative designs were simple compared to previous Neoeskimo styles and generally linear. Abstract human figurines interpreted as dolls were common. Generally speaking, Thule toolkits were derived from earlier Birnirk and Punuk technology with refinements of preexisting items. An extensive trade network extending deep into Northeast Asia supplied small quantities of bronze, iron and glass beads. Steatite vessels were obtained from the central or eastern Canadian Arctic. Vigorous trade networks were also maintained within the

Thule cultural zone which tended to even out the availability of inland materials and sea mammal products not available locally. Slate armor reappears in quantity at about 600 years ago, suggesting an increase in social tensions and individual conflicts, if not warfare. Harpoon head styles changed overtime in a semi-regular fashion and often supply relative ages for sites.

Aleutian Islands

The more than two hundred Aleutian Islands form an arc over 1000 miles across the North Pacific Ocean between the Alaska Peninsula and Kamchatka. The islands are formed by a chain of steep volcanos, both active and inactive, exposed along the crest of a submarine ridge which divides the deep ocean waters of the Pacific from the shallow Bering Sea. The Aleutians have a maritime climate, with cool temperatures year-round, wet foggy summers, and snowy winters. Oceanic storms producing very high winds are a prominent aspect of the climate. Sea ice and permafrost are absent. Vegetation at higher elevations is composed of dwarf scrub communities consisting mainly of willows and crowberry. Mixed communities of grasses and herbaceous plants occupy both wet and dry substrates in lowland settings. Low scrub communities are found in bogs that feature thick peat accumulations. The island geography controls the distribution of prehistoric settlements and imposed limits to the size of individual occupation sites. Suitable locations must have topography providing protection from wind and waves, beach access for boat landings, fresh water, low slope angles, and sediment depths sufficient for semi-subterranean house construction. Only about 5 – 10 percent of the island coastlines provide these conditions, the rest being too steeply sloping or rising as vertical cliffs. Some evidence for prehistoric use of the mountainous island interiors exists, but is minor compared to coastal occupation. From a human perspective the subsistence resource base is almost entirely marine and coastal. Oceanic resources include abundant pelagic fish, sea birds and nesting waterfowl. Sea mammals inhabit the islands in large numbers and many species are found in archaeological sites. These include harbor seals, ringed seals, northern fur seals, large and small whales, porpoises, sea otters and sea lions. At some locations tides and storms have cut strand flats as post-glacial sea levels stabilized. These provide productive habitat for many species of edible invertebrates, including chitons, clams, sea urchins, mussels and scallops. Frequent volcanic eruptions resulting in heavy ash falls are an important aspect of the Aleutian environment, and many prehistoric sites preserve volcanic ash layers interleaved with archaeological remains.

Mid-20th century studies of Aleut physical anthropology postulated that the island chain had been occupied in two separate waves: an early Paleoaleut population that was replaced approximately 1,000 years ago by a migration of physically different people termed Neoeleuts. Genetic studies performed in the last 15 years have reached somewhat different conclusions. A study of modern Aleut DNA samples show their closest genetic relationship is to the aboriginal population of Chukotka of Northeast Asia, in particular the Chuckchi and Siberian Eskimo peoples. A separate study comparing modern Aleut DNA with ancient samples recovered at archaeological sites from the Alaska Peninsula and Prince William Sound shows that there may have been several prehistoric migrations from the Alaska mainland, with considerable prior mixing among different source populations. Some studies have even indicated genetic overlap with Interior Athapascans. Overall the genetic situation appears complicated, with more research needed to clarify Aleut origins and relationships.

Based on records kept by the State Office of History and Archaeology, at least 1,025 prehistoric archaeological sites are known to exist on the Aleutian Islands. The vast majority have been found

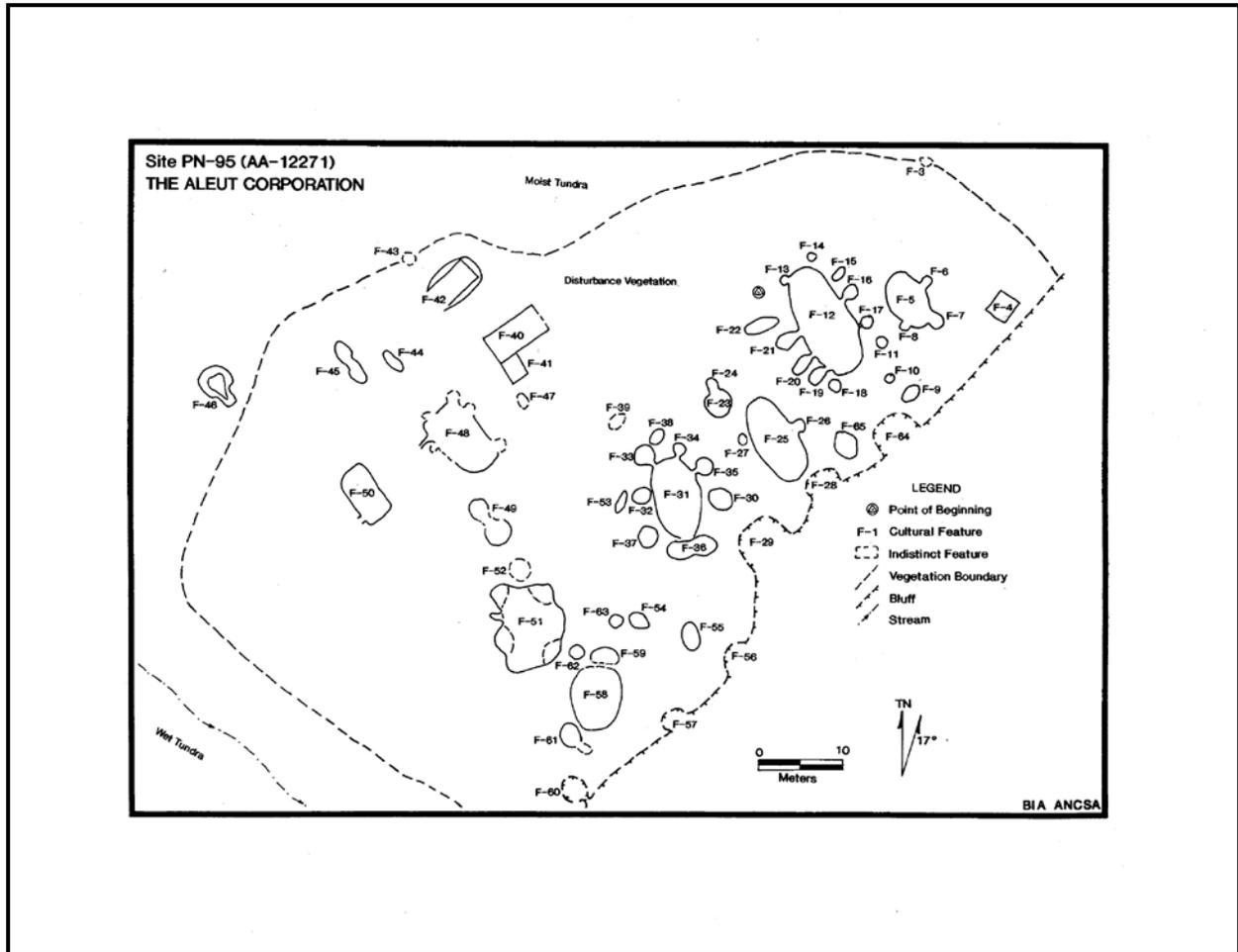


Figure 25. Archaeological map of an Aleut village site, Kinzarof Lagoon West at Cold Bay, Alaska. The village includes both historic and prehistoric house remains. The multi-room houses date to the early Russian contact period. Illustration courtesy of the United States Bureau of Indian Affairs, ANCSA 14h1 Office, Anchorage, Alaska.

during exploratory surveys sponsored by the United States government, which began in the late 19th century and continue to the present day. Far fewer sites have been the subject of formal archaeological excavations reported in the scientific literature. Enough information is available from sites in the eastern Aleutians to construct an outline of prehistory in the region, and to frame more advanced questions about environmental adaptations and social interactions. Excavation data from the central and western Aleutians is sparse, and is insufficient as yet to fully sketch even the outlines of a prehistory for the farther reaches of the island chain.

Broadly speaking prehistory in the eastern Aleutian Islands can be divided into two periods. Between roughly 9,000 – 3,000 years ago the earliest maritime residents expanded at least 950 miles westward from the Alaska Peninsula, reaching as far as the Rat Islands in the center of the Aleutian chain. However, the largest islands in the Aleutian chain, including Unimak, Unalaska, and Umnak, are located in the east, are nearest to the Alaska Peninsula and were the focus for the earliest known human settlements. For the most part these early archaeological sites record short term occupations without substantial structures or deep accumulations of discarded food remains and artifacts (middens). These early cultural phases are usually assigned to an Anangula Tradition. After 3,000 years ago far more substantial sites appear, some with multi-room houses, large and diverse artifact inventories, and deep midden accumulations. These late cultural phases can be grouped within an Aleutian Tradition. Early researchers in the region debated the question of continuity of human occupation at considerable length, with field research suggesting that there may have been gaps lasting up to several thousand years. However, since the 1990s, new excavations have succeeded in closing these gaps, producing a continuous record.

Surveys sponsored by various government agencies have been on-going in the central and western for decades, but there have been few formal excavations, and many are not yet fully reported. The available data suggests a complicated prehistory with many aspects of housing styles, technology and subsistence specific to individual islands or island groups. Radiocarbon dated sites indicated a prolonged period of westward migration. The time of first occupation in the central Aleutians at Adak is about 6,500 years ago, in the Rat Islands about 5,500 years ago and in the Near Islands by 3,000 years ago. The westernmost Commander Island group may have remained unoccupied by humans until historic times.

Early Anangula

The Early Anangula phase is the first culture known from eastern Aleutian prehistoric sites, and dates to between 9,000 – 7,000 years ago. No bone or other organic materials are preserved at these earliest Aleutian sites, limiting full reconstruction of the technology and environmental adaptations. Evidence of structures is limited to small depressions having floors stained with charcoal and red ochre accompanied by post holes, suggesting the use of temporary shelters. Artifacts recovered from Early Anangula sites are limited to flaked stone tools and the waste debris from their manufacture, plus a few ground stone forms. The flaked stone technology is based on microblades, large blades, and burins. Finished tool forms are all made by flaking along a single face and include retouched blades and end scrapers. Unusually, bifacially flaked tools, such as knives or weapon tips are absent. Ground stone tools consist of abraders for wooden shafts, pigment grinders and stone oil lamps. Although organic remains are lacking, the coastal location of the Early Anangula sites makes it clear that the subsistence orientation was in part maritime. The presence of abundant microblades and

burins used to shape hard osseous materials suggest use of technically sophisticated composite weapon tips for hunting, similar to those used by inland cultures like the Denali Complex. The ephemeral nature of the sites, absence of middens or permanent houses argues for a highly mobile residence pattern and subsistence strategy. Early Anangula flaked stone technology is highly distinctive and as yet no obvious precursor has been found among the older sites of inland and interior Alaska.

Late Anangula

The Late Anangula phase, dating from 7,000 – 4,000 years ago, retains all of the technology from the earlier phase, but adds to it stone tools shaped by flaking on both faces, including leaf-shaped and stemmed weapon tips. The youngest Late Anangula phase levels at the Margaret Bay site in Unalaska Bay include a large shell midden that has preserved an array of bone and ivory including parts for throwing boards, bird bone needles, and barbed harpoon points. Shallow semi-subterranean houses also appear during Late Anangula times. The tool types, organic materials and site locations all indicate a maritime adapted culture.

Margaret Bay

During the Margaret Bay phase, dated between 4,000 to 3,000 years ago, eastern Aleutian sites begin to produce a wider array artifact types. These include occasional finds of ground slate points and ground jet items for personal adornment like beads and labrets, indicating possible contacts with Alaska Peninsula and Kodiak Island cultures. Over time, the large blade technology diminishes in importance and new forms of finely flaked stone technology appear that strongly resemble the Arctic Small Tool technology employed by contemporary Paleoeskimo cultures further north. Houses became larger and more substantially built, having walls lined with stone, and averaging about 23 feet in diameter. The appearance of more elaborate houses may be an indication of semi-permanent residence patterns. Net sinkers also appear, suggesting greater reliance on fish as a food source. Late in the Margaret Bay phase and much wider array of artifacts appears, including knives and weapon tips with stemmed and notched hafts, polished stone adze blades and chisels, the first toggling harpoon points, anthropogenic carvings and whale bone masks. Houses begin to have multiple rooms. The addition of these new manufactures marks the beginnings of the transition from the Anangula to the Aleutian Tradition.

Animal bone recovered as food scrap from Margaret Bay phase sites on Unalaska made provide evidence that climatic cooling during the Late Holocene Neoglacial interval brought with it temporary changes in the physical environment and sea mammal resources. Northern species, some with sea ice become important, including polar bears, walrus, bearded seal and ringed seals. Where they occur the stone lined houses seem to date to the Neoglacial, and include sophisticated heating systems comprised of stone lined hearths, chimneys and air intake shafts and stone channels creating heated floors.

Amaknak

The Amaknak phase represents the full development of the Aleutian tradition, in which the variety and complexity of technology greatly increased, and artifact styles changed. Characteristic Anangula technologies including blades, burins and stone lamps disappeared. New elements included reliance on toggling harpoons, many new forms of knives and scrapers, many styles of elaborate barbed

harpoon points, decorated hunting equipment and other art forms. Other typical artifacts include boulder spall scrapers. Huge earthworks were constructed on hill sides above village sites, possibly for food storage or burials. The stone-lined houses become larger, more nearly rectangular, and more complex than in the preceding period. Large midden mounds become common.

Late Aleutian

The Late Aleutian phase begins circa 1,000 years ago, and continues until Russian colonization of the region in historic times. Village sites are often found on top of the massive middens which accumulated during Amaknak times. Characteristic of Late Aleutian is the predominance of ground slate tools, especially ulu blades. Large collections of bone tools have been made at some sites. Houses and other settlement patterns changed dramatically. Semi-subterranean longhouses appear, a type known from historic record, with some measuring over 130 in length. Evidence for raiding and warfare also make their appearance, including defensive works on fortified sea stacks and refuge rocks.

Gulf of Alaska

Geographically, the central and western Gulf of Alaska begins at the Copper River Delta and extends westward to Prince William Sound, the Kenai Peninsula, Cook Inlet, and the eastern shores of the Alaska Peninsula. It also includes the islands of the Kodiak Archipelago, and numerous smaller islands. Although terrestrial environments within the region are varied, features of the near shore and marine environment relevant for human use are similar throughout. A wide continental shelf, numerous major rivers emptying into the northern Pacific and frequent powerful storms combine to make the Gulf one of the most productive marine ecosystems on earth. Sea mammals, shellfish, migrating salmon, ocean fin-fish, migratory waterfowl and resident sea birds are all available for human use. This abundance has consistently channeled prehistoric economies toward marine resources that are similar or identical throughout the region. As a result, the Gulf is broadly unified in its succession of prehistoric cultures, and major stages of adaptation and social change. Terrestrial food resources are limited in comparison. Sitka deer, black and brown bear, moose and caribou all occur, but their distributions in lands surrounding the Gulf are uneven, with some islands having relatively impoverished faunas.

Climate throughout the Gulf is maritime-influenced: cool and wet, with moderate variation in seasonal temperatures and precipitation. Extended periods of overcast clouds and fog are common, as are storms. Heavy snows are common in the mountainous uplands. Temperate coastal rainforests cover a long arc across the inland areas of eastern Gulf, including the Kodiak Archipelago. Coastlands bordering Cook Inlet support mixed forests of black, white and Sitka spruce, aspen, and cottonwood.

On the Alaska Peninsula and the west side of Kodiak Island the dominant vegetation consists of shrub-lands, grassy meadows or wet tundra. Topography in the region is most commonly coastal mountains sculpted by glaciers during the last ice age. Relict glacial lakes and ponds abound, and coastlines are typically imbricated with many bays, fjords and river deltas. Small tidewater and mountain glaciers are an important landscape feature in many parts of the Gulf. Level areas are often covered by bogs or marshes. Upper Cook Inlet has an exceptional daily tidal variation, which exposes wide, hazardous mud flats.

Ocean Bay Tradition

Most land areas surrounding the Gulf were deglaciated between about 14,000 to 13,000 years ago, although possibly as late as 10,000 years ago on portions of Kodiak islands. Despite this, the earliest prehistoric tradition is much younger, dating to the Early and Middle Holocene between 8,600 to 4,000 years ago. This is the Ocean Bay Tradition, best described from sites in the Kodiak Archipelago. Well-documented regional co-traditions include the Takli Alder and Birch sequence on the Alaska Peninsula and the Brooks River Strand phase on the Naknek River. Local equivalents, for which much of the data remains unpublished, include the Old Islander phase (Chirikof Island), Pedro Bay (Lake Iliamna) and the Sylva site (Kachemak Bay). Less certain evidence for an Ocean Bay presence is known from sites in upper Cook Inlet and Prince William Sound. The distribution of these sites from throughout the Gulf, including the Kodiak Archipelago, demonstrates mastery of ocean-going boat technology.

Early Ocean Bay sites represent small, mobile groups living adjacent to tidewater at sheltered coves or the mouths of salmon streams. Ill-defined semi-subterranean houses with red ocher (pigment) covered floors are found, rectangular in shape, at least 12 feet in extent and associated with large post holes. Rectangular hearths occur with stone slab linings. Flaked stone technology in Ocean Bay I sites includes bifacially worked tools, a microblade industry and production of larger blades. A cobble stone industry produced heavy spall scrapers, choppers, mauls, grooved cobbles and ocher grinders. Stone lamps were used, implying procurement of sea mammal or fish oil. Organic tools include bone points slotted for microblade inserts and an array of barbed harpoon heads, spear prongs, fishhook barbs and prongs, wedges and small eyed needles. Bone implements were shaped by sawing, scraping, grinding and polishing. Blades and microblades at some early sites resemble types from the Anangula site in the near Aleutians, suggesting a descendant relationship. Midden accumulations in early Ocean Bay sites are generally small and poorly preserved.

During later Ocean Bay phases, settlement patterns on Kodiak Island and the Alaska Peninsula included sites found inland on large lakes. Later phase house types were varied and added pentagonal, oval and circular forms. A late (Strand) phase house excavated on the Alaska Peninsula at Naknek was quite small, only 6.5 by 10 feet in size. Flaked stone technology included weapon tips ranging in size from large to very small, scrapers and adzes. During the later Ocean Bay phases worked slate entered the technical repertoire. In some areas its use gradually increased until at some sites worked slate completely replaced flaked stone. Slate weapon tips included small forms similar to flaked points in shape and longer “bayonets”. The slate projectile points were often marked with line patterns and had notches or small barbs along their edges. Whetstones used to work slate became common. Barbed bone harpoon heads were in evidence but the number of styles was reduced. Other characteristic late Ocean Bay artifacts include stone lamps, awls and needles. A few ornaments have been recovered, including tooth pendants and labrets from the Takli Birch phase.

Speaking of the Ocean Bay Tradition as a whole; site locations, recovered bone and the types of hunting and fishing implements found demonstrate an over-whelming reliance on the harvest of maritime resources for food. Sea mammals taken include several species of porpoises, sea lions, seals, and sea otters. Where accessible near tidewater terrestrial mammals including marmots, bear, caribou, and moose were captured, but in smaller numbers than sea mammals. Salmon were a

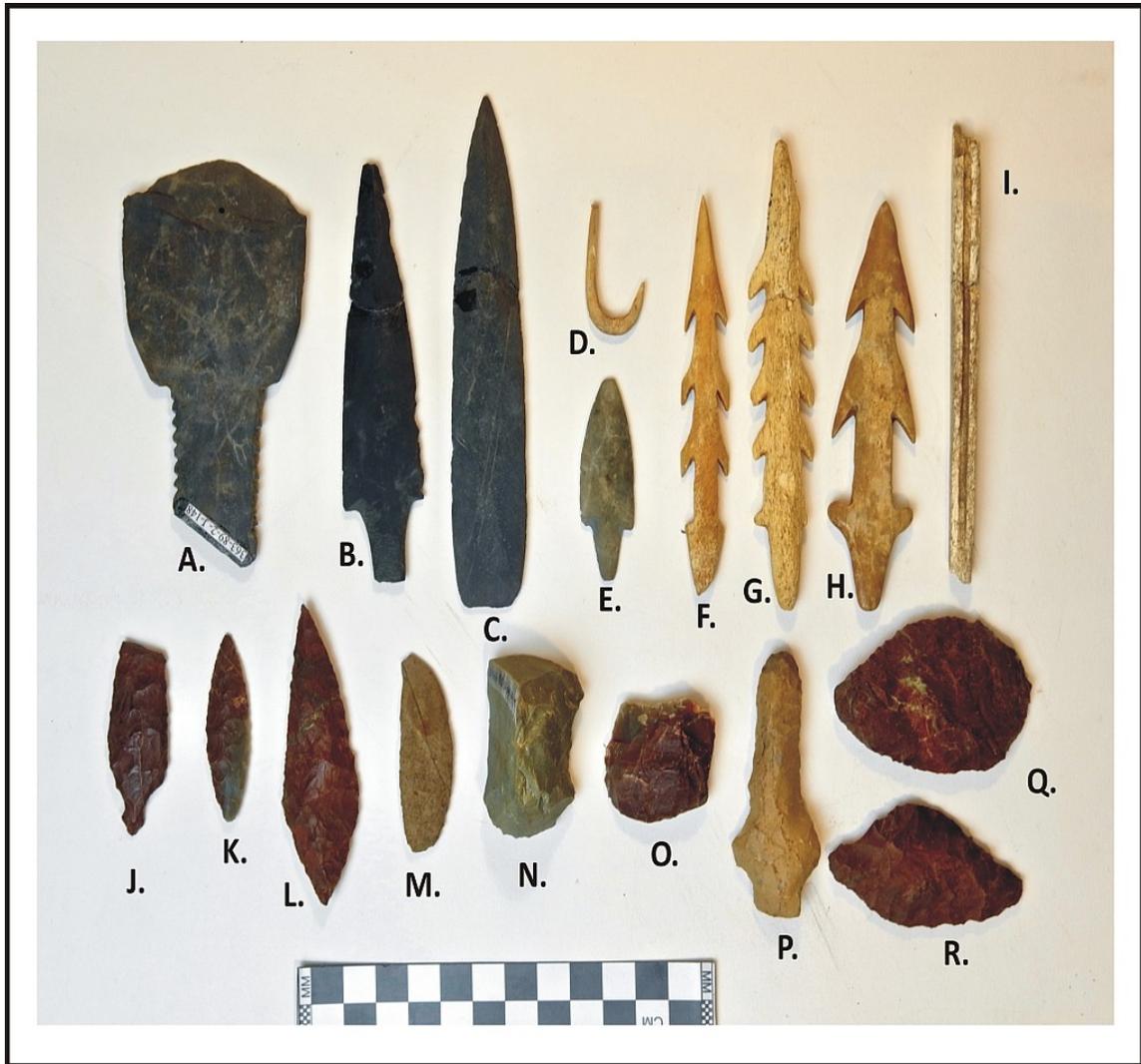


Figure 26. Ocean Bay Artifacts from the Rice Ridge site. A, ground slate flensing knife B – E, ground slate projectile points; D, bone fishhook; F-H, barbed bone harpoon points; I, Slotted lance (for microblade inserts); J-L, flaked stone projectile points; M, Ground burin; N, Microblade core; O, Piece Esquillee (bone wedge); P, flaked stone drill bit, Q-R, Chipped stone sideblades. Illustration courtesy of the Rice Family and the Alutiiq Museum, Kodiak, Alaska.

mainstay at the mouths and lower courses of streams, and ocean fin-fish like cod and halibut were also harvested. Whale bone has been found at a few sites but the status of whale as prey is uncertain. Birds were also hunted, including geese, cormorants, albatrosses, murre and auklets. Shell fish in the diet included clams and blue mussels. The spring and fall peaks in the timing of salmon runs probably determined the seasons at which some sites were occupied. An absence of implements like notched pebbles for net weights suggests that salmon were harvested using traps or weirs.

Kachemak

Following circa 4,000 years ago the Ocean Bay was succeeded by the Kachemak Tradition, best known from sites the Kodiak Archipelago, but also found in Cook Inlet, the Kenai Peninsula, Prince William Sound and in a variant form on the Pacific Side of the Alaska Peninsula. Local sub-traditions have been assigned numerous phase names, including Riverine Kachemak on the Kenai Peninsula and Palugvik in Prince William Sound. Kachemak influence is also seen in the Takli Birch and Cottonwood phases on the Alaska Peninsula.

Early archaeological studies on Kodiak found sharp distinctions between the material culture of the Kachemak and the Ocean Bay Traditions, and a substantial time gap between the end of Ocean Bay and the beginnings of the younger tradition. Explanations for this gap included environmental degradation due to volcanic eruptions or a region-wide redistribution of populations due to changing subsistence adaptations forced by the advent of a colder, wetter climate during the Late Holocene Neoglacial era.

Subsequent surveys and excavations have filled in this gap and found many Early Kachemak Tradition occupations, often resting on top of earlier Ocean Bay sites, with artifacts showing technical and stylistic characteristics bridging the two cultures. The Early Kachemak Tradition now seems to have developed seamlessly from its Ocean Bay predecessor without a time gap. An important characteristic of the transition was a shift toward greater reliance on fish resources, especially salmon and cod, and a proportional reduction in dependence on sea mammals. Evidence for mass fish harvests, processing, and storage indicates a shift from an economic strategy that depended on procuring food season by season to one that emphasized producing surpluses for long-term storage and consumption. This trend remained important and intensified throughout the Kachemak Tradition.

Numerous aspects of Early Kachemak material culture reflect the change economic strategy. Middens in this period are blacked with charcoal from many fires; contain many pits and implements related to mass fish harvests. The latter include fish net sinkers and slate ulus. Tool kits at sites away from salmon streams suggest specialization for sea mammal hunting and catching marine fishes. These implements include such things as slate weapon tips, abraders for smoothing spear shafts, and plummet used as fishing line weights. The abraders and plummet were large, heavy implements made from cobbles, as was a type of large scraper. Early Kachemak houses became more regular and substantial than the typically amorphous Ocean Bay shelters, suggesting longer periods of use during each year. Typical houses were oval, single-room, semi-subterranean structures roofed with sod, containing stone lined hearths and entrances off-set from the house's centerline. Other circular pits in several configurations have been interpreted as specialized fish processing or storage structures. Taken together, the increase in the number of sites, development of large middens, intensification of



Figure 27. Kachemak Artifacts from the Uyak site . A, Leister sideprong; B-C, barbed bone harpoon points; D, Self-bladed toggling harpoon point; E, bone arrow point; F, Decorated ivory pin; G, carved bone fish lure; H, bone fish hook barb; I-J, flaked stone projectile points; K, Canel coal labret; L, ground slate ulu; M-N ground slate projectile points; O, Notched shingle netsinker; P, ground stone knife. Illustration courtesy of the City of Larsen Bay and the Alutiiq Museum, Kodiak, Alaska.

food harvest and storage, construction of more substantial housing all suggest an increase in population and decrease in seasonal movements during the Early Kachemak phase.

At about 2,700 years ago Kachemak Tradition sites greatly increase in numbers and size, appearing in hundreds of coastal and inland locations. Village sites are found in protected coastal locations, inland on major salmon rivers and along the shorelines of Kodiak's large lakes. Many contain large, deep middens surrounding clusters of up to 30 houses. These Late Kachemak phase settlements contained a variety of other structures, including exterior hearths and pits used for food processing and storage. Late Kachemak houses appear to have been well-designed to retain heat; being relatively small, having narrow sunken entrance tunnels and central hearths lined with slate slabs. The hearths were often surrounded by smaller cooking features such as clay-lined pits. There is evidence for sleeping benches along the inner walls, and small alcoves are sometimes present. Increases in the numbers of notched pebbles used as net sinkers point to further intensification of fish harvests during Late Kachemak times.

Items typical of Kachemak tradition material culture include use of toggling harpoon heads for sea mammal hunting, continuing increase in the proportions of ground slate versus flaked stone tools, and continued use of stone adze bits. Kachemak sites also have produced many types of bone implements, including: weapon tips, fish hook and fish lure parts, wedges, awls, needles and socket pieces for adze blades. By Late Kachemak times long-distance trade in luxury materials used for personal adornment gained importance. These included jet, amber, walrus ivory, marble, and copper. Other trade items had more practical uses for tool making, such as caribou antler and beaver incisors. About 1,000 years ago simple pottery vessels came into use at some, but not all Kachemak sites.

Although intensive fish harvests became a major economic focus, preserved remains of food scrap from middens shown that Kachemak subsistence was also broad-based and adaptable to differences in local resource availability. Sea mammals harvested on Kodiak included the harbor seal, northern sea lion, fur seals, sea otter, harbor porpoise, and both large and small whales. Terrestrial mammals found include red fox, brown bear, beaver and domestic dogs. Data from mainland sites adds several other land mammals to the list, including mountain sheep, moose, hare, marmot and muskrats. Kachemak Tradition hunters harvested well over forty species of birds, including waterfowl, sea, and shore birds. Bones of hawks, eagles and ravens have also been found. Ocean fin-fish targeted at various sites were Pacific cod, Pollock, tomcod, flounder, halibut, sculpins, Irish lord and sole. At coastal localities with broad tide flats, shellfish are typically abundant in middens. The most common species are the blue mussel, clams, cockles, sea urchins and periwinkles.

Although it may be assumed that increases in population and development of semi-permanent village sites led to complex forms of social organization and mechanisms for regulating access to resource rich locations, there is little direct evidence for this in Kachemak Tradition sites. Some evidence regarding ritual and ceremony is available however. Stone lamps decorated with carved figures of humans, seals and whales have been found at several sites. In some instances the lamps have been deliberately placed upside down or broken, suggesting ceremonial actions. Some are quite large, weighing almost 90 pounds. By Late Kachemak times simpler representational art became common in contexts suggesting ritual use. Numbers of incised slate figures occur in these sites, possibly the result of a ritual in which faceless human carvings were made and then discarded. However, the most prominent evidence for ritual comes from a range of burial and mortuary practices, indicating differential treatment of the dead. The common mode of deliberate burial was in pits with the body

placed in a tightly flexed position. Multiple burials in a single pit may indicate use of “family crypts”. More difficult to interpret is the occurrence of mass burials containing parts of as many as 20 individuals, with incomplete skeletons, bodies placed without apparent order, some bones showing evidence of modification after death and an association with barbed weapon tips. Also common in Late Kachemak village sites are human skeletal remains showing no signs of deliberate burial. These are found scattered in middens and are frequently burned, broken and bear cut marks; all suggesting that the body was dismembered, defleshed, and exposed to fire prior to disposal.

Transitional Kachemak and Koniag

Starting at about 950 years ago, Late Kachemak phase settlement patterns, house configurations and village sizes, and artifact types began to change rapidly. By about 650 years ago these changes resulted in a prehistoric culture essentially identical to the Alutiiq and Sugpiaq speaking Alaska native cultures encountered by the first Russian explorers in the 18th century. Changes in house construction and other built features are among the most noticeable. Transitional Kachemak houses change from mostly single pit features into much larger and more elaborate structures having several small rooms radiating from a large central dwelling and social area. The smaller rooms seem to have served several functions, including sleeping chambers, sweat baths, and areas devoted to food processing and storage. Movement of food storage into single family dwellings may signal social changes from communal to family based resource harvest and ownership. On Kodiak Island and elsewhere, subsistence at Transitional Kachemak village sites became even more focused on mass salmon harvests, and there are massive villages of 40 or more houses found on the upper courses of major salmon streams and at large lake outlets. Some evidence exists that competition for this resource resulted in social competition and conflict. On Kodiak the first defense sites located on rocky islets appear, and many villages are associated with shoreline rock art that may assert exclusive rights to the most productive marine hunting and fishing locales. There is little evidence however for different levels of wealth and status within villages. Artifacts excavated from Transitional Kachemak sites are mostly utilitarian and echo types found in the preceding Late Kachemak phase, with little use of materials obtained non-locally and few new tool types. Several traits seem to have been acquired slowly over a period of centuries. These include such things as: thick, gravel tempered pottery, triangular slate weapon tip with faceted bases, grooved splitting adzes, sweat baths, and deepened house entrance tunnels serving as cold traps. Although these changes occur at about the same time as the Medieval Warm Period in the Northern Hemisphere (1,100 – 700 years ago), some current archaeological research has instead draw attention to the general trend toward Late Holocene Neoglacial cool as at least one driving force for Transitional Kachemak and subsequent Koniag population growth and adaptations.

Koniag Tradition culture appears to develop out of Transitional Kachemak, beginning at about 650 years ago. During this time the social landscape in the Gulf region again changes, with the size, number and variety of sites greatly increasing. These changes suggest a growing population and a subsistence strategy that encouraged more forays from the semi-permanent villages at resource rich locations to smaller, seasonal settlements providing access to short-term, seasonal sources of fish and game. Food scrap in middens and associated with houses at larger villages provides evidence for even greater salmon harvests. New technologies for capturing salmon also appear, including weirs and fish traps and salmon harpoons. House structures at the central villages vary in size and number of rooms over time, but are larger and more substantial than houses found at the small, dispersed sites. By about 450 years ago, houses in the semi-permanent villages once again increase in size and



Figure 28. Koniag Artifacts from the Karluk One site. A, ground slate ulu; B, ground slate knife; C-F, ground slate projectile points; H, Incised pebble; I, reconstructed bone fishhook; J, Toggling fish harpoon; K, Bone arrow point; L, wood labret; M, Grooved splitting adze; N, Ground greenstone adze. Illustration courtesy of Koniag Inc. and the Alutiiq Museum, Kodiak, Alaska.

have more satellite rooms. Domestic arrangements and some artifact types parallel this trend: multiple hearths and pits inside the dwellings along with greater storage space indicate that the emphasis on food processing and storage at the family level again increased. Large pottery vessels also appear and may have served to store large quantities of rendered sea mammal oil. At the same time adze blades for woodworking increase in size, reflecting the need to shape larger numbers of wooden supports and wall components for houses. Also during this later period the number of very large and medium size villages increase once again in both tidewater and inland salmon-river settings. Use of some sites located on outer coastlines may indicate pursuit of large whales, a common practice among the historic Alutiiq. The general trend for mass resource harvests and storage of large food surpluses brought with it evidence that differences in wealth and social status had developed. Koniag villages tend to be laid-out in rows, and some houses were larger in size with more and larger rooms and food storage areas. These larger houses tend to be grouped together, suggesting development of elite neighborhoods within the larger villages. Settlements with the distinctive Koniag house types appear on the northern Alaska Peninsula at this time, suggesting a westward movement by some Koniag peoples in response to growing population pressure. One site located on Kodiak Island contains an exceptionally well preserved series of organic artifacts that provide evidence for Koniag ceremonial practices. Among the items excavated were mask, drum and rattle parts, dolls, gaming pieces, and feasting bowls – all objects documented as having ritual functions among the Alutiiq and Sugpiaq descendants of the prehistoric Koniag. Other artifact categories, including most utilitarian items, are similar to Kachemak types, with relatively minor variations in style.

Cook Inlet

The Holocene archaeology of Cook Inlet exhibits several differences from the general prehistory of the Gulf of Alaska due in part to its proximity to the larger mainland interior environmental zone, and a resemblance to boreal forest instead of temperate rain forest environments. In lower Cook Inlet a flaked stone technology resembling the Arctic Small Tool Tradition appears at some sites for a few centuries between four and five thousand years ago, following brief period of late Ocean Bay occupation. In the upper Inlet at least one site has been found with notched projectile points typical of the Northern Archaic Tradition and believed to date to the interval between 6,000 and 5,000 years ago. After about 3000 years ago, Kachemak Bay tradition peoples occupied the inlet for roughly 1,500 years, with cultural and technological trends resembling this tradition elsewhere in the western Gulf of Alaska. Between about 1,500 to 1,000 years ago a few sites representing a Norton-like material culture have been found, apparently living in the Inlet in tandem with the Kachemak population.

Following end of the Kachemak occupation a new late prehistoric culture appears, leading directly to the Dena'ina and Kenaitze Athapascan people found living on the shores of the Inlet and the surrounding interior by the first European explorers in the 18th and 19th centuries. These late Athabaskan occupants adopted many aspects of the marine oriented technology and subsistence developed by the earlier Kachemak peoples in order to adapt to life in a coastal environment with abundant salmon runs on large rivers. On the Kenai Peninsula late prehistoric houses tend to occur in smaller groups and are sometimes placed on high bluffs overlooking the river or tributary streams. They also occur at lakes well away from the river. Some complex houses with entry tunnels and multiple rooms have been found. The house pits tend to be shallow and the central hearth is unlined. Small middens with abundant fire-cracked rock, charcoal and burned bone may be found adjacent to

the houses. Shallow rectangular pits with alternating layers of fire-cracked rock, charcoal and bone fragments are thought to represent smoke houses. Shallow cache pits are also common, generally seen on the surface as ovals or semi-circular shapes. Larger village sites occur at some favored salmon fishing localities on the Kenai River, with site concentrations near the Kenai Lake and the Russian River, the outlet to Skilak Lake and the lowermost reaches of the river near its mouth on the Inlet. In addition to salmon, Kenaitze subsistence included a major element of terrestrial fauna, including small mammals such as hare, marmot, porcupine, beaver, and Arctic ground squirrel. Large terrestrial mammals taken included both black and brown bears, moose and caribou. Marine mammals are known from some coastal sites, including small whales. Discarded artifacts in Kenaitze sites are rare compared to earlier periods, but demonstrate adoption of ground slate technology for projectile point and ulus; use of coarse ground stone for wood working tools like grooved adzes and chisels. Organic artifacts are uncommon but include barbed antler dart points, slotted toggling harpoon heads, and barbed antler arrow points. Copper artifacts have been found at some sites. Art objects found include decorated beads made from stone, bone and amber. Burial sites are known largely from the early historic period. Some are cremations, a typical Athapascan practice, while flexed burials of uncremated in shallow graves have also been found.

V. Summary

As shown in this overview, archaeological research demonstrates that the sequence of prehistoric cultures, their adaptations, and resulting historic property types are not uniform across the State of Alaska. Instead, Alaska's prehistoric past is divided and defined by geographic regions, great changes in natural environments during the last fourteen centuries, and multiple human migrations out of Northwest Asia. In order to be effective historic preservation planning related to our State's prehistory must take into account these circumstances, whether at a State-wide, regional or local scale. The summary information provided here is intended only as a stepping stone for organizations and individuals actively formulating preservation plans. A much greater body of academic research and cultural resource management documentation exists, much of it recording details of our prehistoric past at the level of individual boroughs and communities, and sites. Planning bodies can gain access to much of this information through consultation with the Alaska State Office of History and Archaeology (OHA) and use of OHA's comprehensive online literature and site database, the Alaska Heritage Resources Survey. Another key resource is the University of Alaska system, particularly the Anthropology departments of the University of Alaska Anchorage and University of Alaska Fairbanks; as well as the Archaeology Department at the UA Museum of the North. Finally, every agency managing federal land and large federal construction projects in Alaska maintains an experience cultural resource staff. These include the National Park Service, the US Forest Service, the US Bureau of Land Management, the Army Corps of Engineers, US Fish and Wildlife Service, the US Bureau of Indian Affairs and the Federal Highway Administration. Individual and academic researchers specializing in specific areas and time periods are often eager to share their expertise, and many can be identified through author entries of the attached bibliography and the publications referenced in these sources.

Bibliography

General References

- Ames, Kenneth M. and Herbert D. G. Maschner
1999 *Peoples of the Northwest Coast: Their Archaeology and Prehistory*. Thames and Hudson Ltd, London and New York.
- Anderson, Douglas D.
1988 Onion Portage: the archaeology of a stratified site from the Kobuk River, Northwest Alaska. *Anthropological Papers of the University of Alaska* 22:1–163.
- Bever, Michael R.
2001 An Overview of Alaskan Late Pleistocene Archaeology: Historical Themes and Current Perspectives. *Journal of World Prehistory* 15(2):125-191.
- Damas, David (editor)
1984 Arctic, edited by David Damas. *Handbook of North American Indians*, Volume 5, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.
- Dumond, Don E.
1977 *The Eskimos and Aleuts*. Thames and Hudson, New York.
- Fitzhugh, Ben
2016 The Origins and Development of Arctic Maritime Adaptations in the Subarctic and Arctic Pacific. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 253-278. Oxford University Press, New York.
- Friesen, T. Max and Owen K. Mason (editors)
2016a *The Oxford Handbook of The Oxford Handbook of the Prehistoric Arctic*. Oxford University Press, New York.
- Goebel, Ted and Ian Buvit (editors)
2011 *From the Yenisei to the Yukon: Interpreting Lithic Assemblage Variability in Late Pleistocene/Early Holocene Beringia*. Texas A&M University Press, College Station.
- Helm, June
1981 Subarctic, edited by June Helm. *Handbook of North American Indians*, Volume 6, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.
- Mason, Owen K., and T. Max Friesen
2018 *Out of the Cold: Archaeology on the Arctic Rim of North America*. SAA Press, Washington. D.C.

Nowacki, Gregory J., Page Spencer, Michael Fleming, and others
2001 *Ecoregions of Alaska and Neighboring Territories*. U.S. Geological Survey Open-File Report 02-297, U.S. Geological Survey, Washington, D.C.

West, Fredrick .H. (editor)
1996a *American Beginnings: The Prehistory and Paleoecology of Beringia*. University of Chicago Press.

Beginnings: Pleistocene Alaska and Human Migration into the New World

Erlandson J.M. and T.J. Braje
2015 Stemmed Points, the Coastal Migration Theory, and the Peopling of the Americas. In *Mobility and Ancient Society in Asia and the Americas*, edited by M. Frachetti and R. Spengler III, pp 49-58. Springer International Publishing, Basel and New York.

Goebel, Ted and Ian Buvit
2011 Introducing the Archaeological Record of Beringia. In *From the Yenisei to the Yukon: Interpreting Lithic Assemblage Variability in Late Pleistocene/Early Holocene Beringia*, edited by Ted E. Goebel and Ian Buvit, pp.1-32. Center for the Study of the First Americans, Texas A&M University Press, College Station.

Hoffecker, John F. and Scott A. Elias
2007 *Human Ecology of Beringia*. Columbia University Press, New York.

Hoffecker, John F., Scott A. Elias, Dennis O'Rourke, G. Richard Scott and Nancy H. Bigelow
2016 Beringia and the Global Dispersal of Modern Humans. *Evolutionary Anthropology* 25:64-78.

Kunz, Michael I., Michael Bever, and Constance Adkins
2003 *The Mesa Site: Paleo Indians above the Arctic Circle*. BLM-Alaska Open File Report 86. Alaska State Office, Bureau of Land Management, U.S. Department of the Interior, Anchorage.

Potter, Ben A., Charles Holmes and David R. Yesner
2013 Technology and Economy Among the Earliest Foragers in Interior Eastern Beringia. In *Paleoamerican Odyssey*, edited by Kelly E. Graf, Caroline V. Ketron, and Michael R. Waters, pp 81-103. Center for the Study of the First Americans, Texas A&M University Press, College Station.

Potter Ben A., Joshua D. Reuther, Vance T. Holliday, Charles E. Holmes and others
2017 Early colonization of Beringia and Northern North America: Chronology, routes, and adaptive strategies. *Quaternary International* 444(B):36-55

Waters, Michael R., and Thomas Wier Stafford, Jr.
2013 The First Americans: A Review of the Evidence for the Late-Pleistocene Peopling of the Americas. In *Paleoamerican Odyssey*, edited by Kelly E. Graf, Caroline V. Ketron, and Michael R. Waters, pp.541–560. Center for the Study of the First Americans, Texas A&M University Press, College Station.

Holocene Inland and Interior Traditions

Dixon, E. James

1985 Cultural Chronology of Central Interior Alaska. *Arctic Anthropology* 22(1): 47-66.

Esdale, Julie A.

2008 A current synthesis of the Northern Archaic. *Arctic Anthropology* 45(2):3–38.

Hare, G., S. Greer, R. Gotthardt, R. Farnell, V. Bowyer, C. Schweger, and D. Strand

2004 Ethnographic and Archaeological Investigations of Alpine Ice Patches in Southwest Yukon, Canada. *Arctic* 57(3):260-272.

Holmes, Charles E.

2008 The Taiga Period: Holocene Archaeology of the Northern Boreal Forest, Alaska. *Alaska Journal of Anthropology* 6(1-2):69-81.

Holmes, Charles E.

2011 The Beringian and Transitional Periods in Alaska: Technology of the East Beringian Tradition as Viewed from Swan Point. In *From the Yenisei to the Yukon: Interpreting Lithic Assemblage Variability in Late Pleistocene/Early Holocene Beringia*, edited by Ted E. Goebel and Ian Buvit, pp. 179-191. Center for the Study of the First Americans, Texas A&M University Press, College Station.

Potter, Ben A.

2008 Radiocarbon Chronology of Central Alaska: Technological Continuity and Economic Change. *Radiocarbon* 50:181-204.

2016 Holocene Prehistory of the Northwestern Subarctic. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 537-562. Oxford University Press, Oxford and New York.

Shinkwin, Anne D.

1979 Dakah De'nin's Village and the Dixthada site: a Contribution to Northern Athabaskan prehistory. *National Museum of Man Mercury Series, Archaeological Survey of Canada Paper No. 91*. National Museums of Canada, Ottawa.

Workman, W.B.

1977 Ahtna archaeology: a Preliminary Statement. In: Helmer, J., Van Dyke, S., and Kense, F.J., eds. *Prehistory of the North American Subarctic: the Athapaskan Question*. Calgary: University of Calgary, Chacmool.

Wygall, Brian T. and Ted Goebel
2012 Early Prehistoric Archaeology of the Middle Susitna Valley, Alaska. *Arctic Anthropology* 49(1):45-67.

Maritime Traditions- Southeast Alaska

Carlson, R.J. and J.F. Baichtal
2015 A Predictive Model for Locating Early Holocene Archaeological Sites Based on Raised Shell-Bearing Strata in Southeast Alaska, USA. *Geoarchaeology: An International Journal* 30:120-138.

Davis, Stanley D.
1990 Prehistory of Southeastern Alaska. In *Northwest Coast*, edited by Wayne Suttles, Volume 7, Handbook of North American Indians, William C. Sturtevant, general editor, pp. 197-202. Smithsonian Institution, Washington, D.C.

de Laguna, Frederica, Francis A. Riddell, Donald F. McGeein,
Kenneth S. Lane, and J. Arthur Freed
1964 *Archaeology of the Yakutat Bay Area, Alaska*. Smithsonian Institution Bureau of American Ethnology Bulletin 192. U.S. Government Printing Office, Washington, D.C.

Helm, June
1981 Subarctic, edited by June Helm. *Handbook of North American Indians*, Volume 6, William C. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

Moss, Madonna L.
2004 The Status of Archaeology and Archaeological Practice in Southeast Alaska in Relation to the Larger Northwest Coast. *Arctic Anthropology* 41(2):177-196.

Maritime Traditions: Arctic and Bering Sea

Christian M. Darwent and John Darwent
2016 The enigmatic Choris and Old Whaling Cultures of the Western Arctic. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 371-394. Oxford University Press, Oxford and New York.

Dumond, Don E.
2016 Norton Hunters and Fisherfolk. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 395-476. Oxford University Press, Oxford and New York.

Friesen, T. Max and Owen K. Mason
2016 Introduction: Archaeology of the North American Arctic. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 1-26. Oxford University Press, Oxford and New York.

Jensen, Anne M.

2016 Archaeology of the Late Western Thule/Inupiat in North Alaska (A.D. 1300-1750). In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 513-536. Oxford University Press, Oxford and New York.

Mason, Owen K.

2016a The Old Bering Sea Florescence about Bering Strait. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 417-442. Oxford University Press, Oxford and New York.

2016b From the Norton Culture to the Ipiutak Cult in Northwest Alaska. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 443-468. Oxford University Press, Oxford and New York.

2016c Thule Origins in the Old Bering Sea Culture: The Interrelationship of Punuk and Birnirk Cultures. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 489-512. Oxford University Press, Oxford and New York.

Tremayne, Andrew H. and Jeffery T. Rasic

2016 The Denbigh Flint Complex in Northern Alaska. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 349-370. Oxford University Press, Oxford and New York.

Maritime Traditions- Aleutian Islands

Corbett, Debra and Michael Yarborough

2016 The Aleutian Tradition: The Last 4,000 Years. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 607-630. Oxford University Press, Oxford and New York.

Davis, Richard, Rick Knecht and Jason Rogers

2016 First Maritime Cultures of the Aleutians. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 303-322. Oxford University Press, Oxford and New York.

Maschner, Herbert D. G.

2016 Archaeology of the Eastern Aleut Region. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 323-348. Oxford University Press, Oxford and New York.

Maritime Traditions- Gulf of Alaska

Clark, Donald

2001a Kodiak. In *Encyclopedia of Prehistory, Volume 2: Arctic and Subarctic*, edited by Peter N. Peregrine and Melvin Ember, 71-86. Springer International Publishing, Basel and New York.

2001b Ocean Bay. In *Encyclopedia of Prehistory, Volume 2: Arctic and Subarctic*, edited by Peter N. Peregrine and Melvin Ember, 152-164. Springer International Publishing, Basel and New York.

Steffian, Amy, Patrick Saltonstall and Linda Finn Yarborough
2016 Maritime Economies of the Central Gulf of Alaska after 4000 B.P. In *The Oxford Handbook of the Prehistoric Arctic*, edited by T. Max Friesen and Owen K. Mason, pp. 303-322. Oxford University Press, Oxford and New York.

Maritime Traditions- Southcentral Alaska

Reger, Douglas R.
1998 Archaeology of the Northern Kenai Peninsula and Upper Cook Inlet. *Arctic Anthropology* 35(1):160-171.

2013 Dena'ina Archaeology. In *Dena'inaq' Huch'ulyeshi: The Dena'ina Way of Living*, edited by S. Jones, J. A. Fall and A. Leggett, pp. 63-71. University of Alaska Press, Fairbanks.

Reger, Douglas R. and Brian T. Wygal
2016 Prehistory of the Greater Upper Cook Inlet Region. In *Shem Pete's Alaska: The Territory of the Upper Cook Inlet Dena'ina*, edited by J. Kari and J. A. Fall, pp. 15-16. Revised second ed. University of Alaska Press.

Workman, William B.
1998 Archaeology of the Southern Kenai Peninsula. *Arctic Anthropology* 35(1):146-159.

Workman, William B. and Karen Wood Workman
2010 The End of the Kachemak Tradition on the Kenai Peninsula, Southcentral Alaska. *Arctic Anthropology* 47(2):90-96.

Paleoenvironments

Anderson, P. M., Edwards, M. E., and L. B. Brubaker
2004 Results of Paleoclimate Implications of 35 Years of Paleoecological Research in Alaska. In *The Quaternary Period in the United States*, Edited by A. R. Gillespie, S. C. Porter and B. F. Atwater, pp. 427-440. Elsevier, Amsterdam.

Barclay, David J., Gregory C. Wiles, and Parker E. Calkin
2009 Holocene Glacier Fluctuations in Alaska. *Quaternary Science Reviews* 28(21):2034-2048.

Briner, Jason P., and Darrell S. Kaufman
2008 Late Pleistocene Mountain Glaciation in Alaska: Key Chronologies. *Journal of Quaternary Science* 23(6-7):659-670.

Briner, J.P., J.P Tulegenko, D.S. Kaufman, N.E. Young, J.F. Baichtal, and A. Lesnek
2017 The Last Deglaciation of Alaska. *Geographical Research Letters* 43(2):429-488.

Kaufman, Darrell S., Yarrow L. Axford , Andrew C.G. Henderson and others
2016 Holocene climate changes in eastern Beringia (NW North America): A systematic review of multi-proxy evidence. *Quaternary Science Reviews*, 147: 312-339

Lambeck, Kurt, H el ene Rouby, Anthony Purcell, Yiyang Sun, and Malcolm Sambridge
2014 Sea level and global ice volumes from the Last Glacial Maximum to the Holocene. *Proceedings of the National Academy of Science* 111(43):15296–15303.

Reuther, Josh D. and Ben A. Potter
2017 Geoarchaeology of Beringia. In *Encyclopedia of Geoarchaeology*, edited by A. Gilbert, R. Mandel and V. Holliday, pp 65-74. Encyclopedia of Earth Sciences Series, Springer International Publishing, Basel and New York.

Human Genetics and Migration into the New World Through Alaska

Raff, Jennifer A., and Deborah A. Bolnick
2014 Genetic roots of the first Americans: The whole-genome sequence of a human associated with the earliest widespread culture in North America confirms the Asian ancestry of the Clovis people and their relatedness to present-day Native Americans. *Nature* (506):162-163.

Raghavan, Maanasa, Michael DeGiorgio, Anders Albrechtsen, Ida Moltke, and others
2014 The genetic prehistory of the New World Arctic. *Science* 345(6200):1255832-1 - 1255832-1