TWO NORTHERN ARCHAIC TENT RING SETTLEMENTS AT AGIAK LAKE, CENTRAL BROOKS RANGE, ALASKA

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ABSTRACT

Agiak Lake in the central Brooks Range exhibits both a high density and a wide array of archaeological features, including lithic scatters, campsites, lookouts, hunting blinds, and caribou drivelines composed of hundreds of *inuksuit* (stone cairns). Of particular interest are two tent ring complexes at either end of the lake and their possible association with two caribou driveline complexes. These archaeological features are examined using a distributional approach to archaeology that emphasizes spatial relationships and high-resolution GPS mapping of individual archaeological features and de-emphasizes the delineation of "sites." Analyses of the distribution of lithic artifacts and their primary association with the tent rings suggest a Northern Archaic tradition occupation of both tent ring sites. Charcoal found in hearths within the tent rings produced radiocarbon dates ranging from 3690 cal. years BC to 2940 cal. years BC. The spatial association of the drivelines and tent rings on the landscape surrounding Agiak Lake may indicate an association between the Northern Archaic tent rings and the caribou drivelines.

Keywords: Mid-Holocene, caribou driveline hunting, archaeology

INTRODUCTION

Throughout the central Brooks Range, prehistoric people have left extensive evidence of their presence on the landscape. These traces indicate a vast array of activities, broadly distributed across the landscape and variable by season. Agiak Lake in the central Brooks Range exhibits both a high density and a wide array of archaeological features, including lithic scatters, campsites, lookouts, hunting blinds, and caribou drivelines composed of hundreds of *inuksuit* (stone cairns). Of particular interest are two tent ring complexes at opposite ends of the lake and their possible association with the caribou drivelines. This configuration of archaeological features reveals some rarely glimpsed behaviors in the Brooks Range such as communal caribou hunting, specialized hunting technologies, comprehension of caribou behavior, and seasonal land-use.

In order to better understand the archaeological features at Agiak Lake, we employed a "distributional" approach to emphasize the importance of individual archaeological features and artifacts and recognize the importance of landscape and topography to the distribution of these features (Dunnell and Dancey 1983). This approach avoids imposing arbitrary site boundaries on distributions of features and artifacts and allows the examination of spatial patterns in the archaeological record. This in turn produces

more informed inferences as to the possible interrelatedness of features across the landscape and the relationship of these features to the landscape. When viewed graphically, a distributional approach can show patterns among archaeological features that are obscured by their aggregation into single sites. Highly accurate global positioning system (GPS) receivers and geographical information system (GIS) software has made this approach economically feasible and more powerful in helping archaeologists with field data collection and analysis.

Stone tent rings and caribou drivelines are fairly common elements of central Brooks Range archaeology. Stone tent rings are circles of stones likely used to secure the edges of domed caribou-skin-covered tents (Binford 1978; Burch 2006; Campbell 1962; Corbin 1976; Gubser 1965; Hall 1976). Drivelines were used to aid in caribou hunting by guiding caribou in desired directions, often ending at bodies of water where hunters in kayaks could easily dispatch the swimming animals. Ethnographic and archaeological examples of this method of hunting exist for much of the Arctic (Balikci 1970; Binford 1991; Birkett-Smith 1929; Brink 2005; Burch 1998, 2006; Gronnow et al. 1983; Gubser 1965; Mathiassen 1927; Rasmussen 1930; Spearman 1986; Steffanson 1921; Stewart et al. 2000). Past researchers have reported dozens of sites and hundreds of tent rings and *inuksuit* scattered throughout the Brooks Range, especially along rivers and near mountain lakes (Alexander 1969; Binford 1991; Campbell 1962; Davis et al. 1981; Hall 1976; Kunz 1986; Tremayne 2006). However, describing and interpreting these sites has not been a central focus of most archaeological work, and there are few absolute dates associated with them. It has conventionally been assumed that most tent rings and drivelines in the central Brooks Range are the result of historic or protohistoric occupations of the inland-dwelling Nunamiut Eskimos or northern bands of Athabascan Indians (Amsden 1977; Campbell 1976; Corbin 1976; Davis et al. 1981; Gubser 1965; Kunz 1986); however, these assumptions are typically not based upon radiocarbon dating or artifact typology. While north Alaskan proto-historic and historic peoples certainly constructed tent rings, the limited chronological data on tent ring structures prompted us to investigate two tent ring clusters at Agiak Lake with the hope of clarifying the age of these particular settlements. The impressive number of tent rings at Agiak Lake increased our interest in the locale and further directed the focus of our research. Also, the possibility that these features may have been associated with the massive caribou driveline systems at Agiak Lake generated an even higher degree of interest. Although the archaeological record at Agiak Lake includes a wide variety of sites and features, this paper will focus on the tent ring complexes and drivelines near the lake.

Agiak Lake lies just south of the continental divide, nearly 56 km east-southeast of Anaktuvuk Pass (Fig. 1). It is one of several large lakes in the Chandler Lake valley, a wide mountain pass that serves as a natural corridor between the North Slope tundra and the forested valleys and hills south of the Brooks Range. At 950 m above sea level the vegetation is a mixture of alpine tundra, dryas, and notably sparse willow growth concentrated along several small, winding creeks. Ethnographic accounts of people living in the central Brooks Range place a high level of importance on willow for establishing campsites, especially in winter (Binford 1978; Campbell 1962; Gubser 1965; Spearman 1979). The current sparse willow cover at Agiak Lake may account for the lack of more historic and modern sites in the area. The soil is thin and rocky, especially at the bases of the three rugged mountains that rise above the lake.

Agiak Lake was chosen for this project based on the abundance and variety of known archaeological features in the area. The lake was originally inspected by Alexander (1969) during the late 1960s as part of his dissertation research on the archaeology of the central Brooks Range. However, it was not until the mid-1980s that a systematic investigation of the area was undertaken by the National Park Service (NPS) as part of an initial cultural resources survey following the establishment of Gates of the Arctic National Park and Preserve (Kunz 1986). Along with documenting a substantial number of sites throughout the park, the 1985 field crew located more than 40 sites within 3 km of Agiak Lake. The unpublished 1986 report remains the most complete account of archaeological resources at Agiak Lake. During the subsequent 20 years, NPS archaeologists have periodically visited the lake to conduct additional surveys, investigate the condition of known archaeological sites, and update archaeological databases (Saleeby 1996; MacIntosh 2001).

RESEARCH GOALS

Previous research at Agiak Lake raised several questions concerning its archaeological record. In the vicinity of the lake the 1985 NPS field crew reported four discrete tent ring clusters—three in close proximity northeast of the lake

and the other located just southeast of the lake. According to the 1986 report, the three northern sites—XCL-089, XCL-090, and XCL-091—consisted of six, one, and five tent rings respectively for a total of 12 features, while the southern site, XCL-118, included nine tent rings.

During a 2001 NPS site visit, archaeologists revisited the northern tent ring sites and discovered an additional three tent rings within the cluster designated as XCL-089, thereby raising the number of tent rings at that site to nine and bringing the total number of tent rings in the northern cluster to 15. MacIntosh (2001) noted some difficulty in locating the stone structures due to the surrounding terrain—a boulder field created by ancient rock-fall from a nearby mountain. Despite the difficulty in locating additional tent rings, their discovery made Agiak Lake the setting for some of the most substantial tent ring clusters in northern Alaska. McIntosh (2001) also mentioned the possibility that more tent rings may be found in the area and that the three sites may eventually be merged together as one large complex. Therefore, some of the primary concerns of the 2005 research were to discover new tent rings, to determine if the individual rings may have been simultaneously occupied, and to establish whether the tent ring complexes may be associated with one another.

The 1985 field crew also documented large quantities of lithic materials within and around the tent ring structures, including dozens of finished tools and hundreds of waste flakes. The tent rings were initially assumed to be much younger than the lithics, which were reasonably assumed to be prehistoric (Kunz 1986). Although the lithic assemblages at both the northern sites and the southern complex appeared similar, a side-notched projectile point

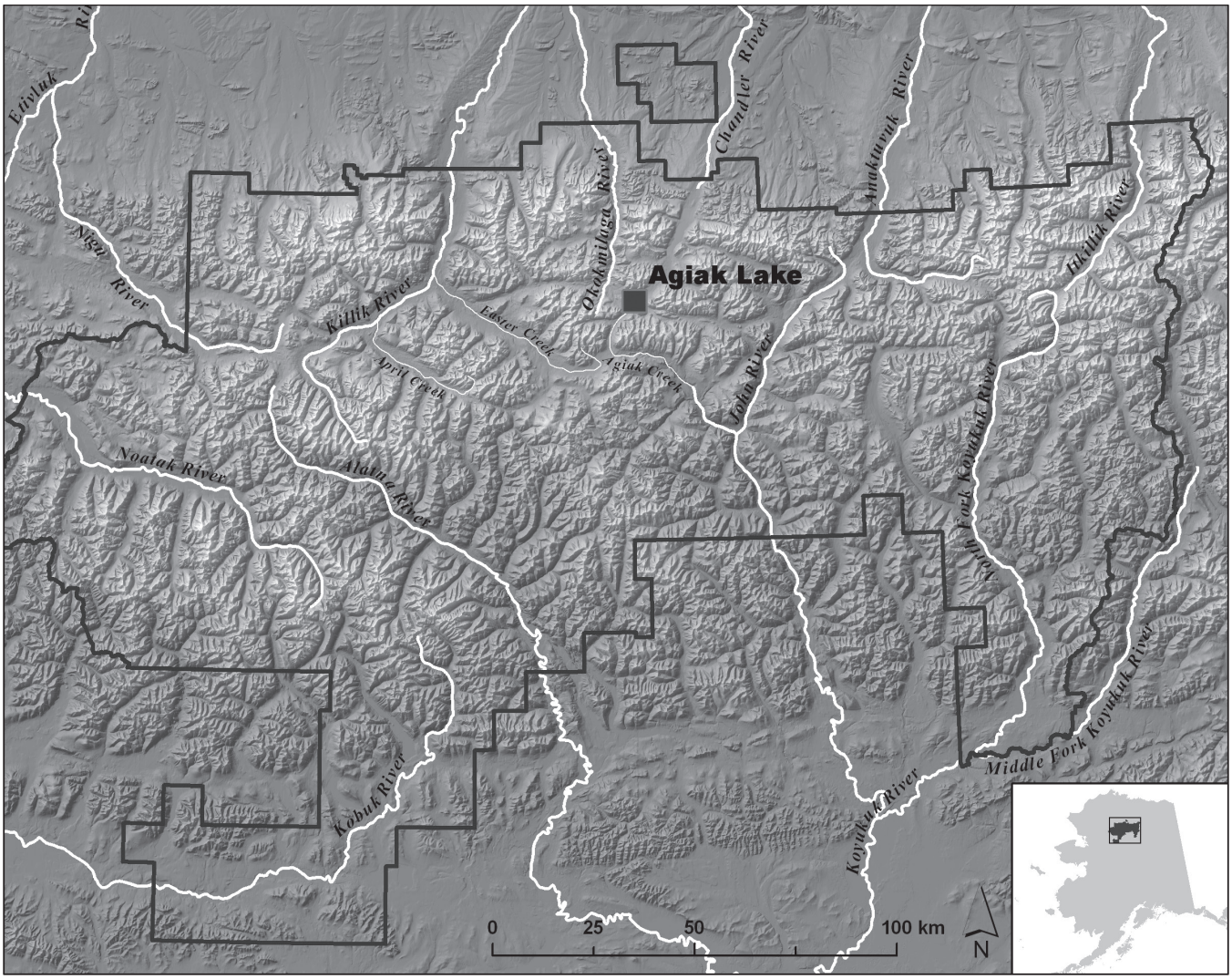

Figure 1. Location of Agiak Lake and Gates of the Arctic National Park and Preserve in the central Brooks Range, Alaska.

discovered at the southern site suggested a more ancient lithic assemblage. Side-notched projectile points are often attributed to the Northern Archaic tradition (Anderson 1968), which dates to between 4500 to 6500 years BP in northern Alaska (Anderson 1988; Campbell 1962; Lobdell 1986, 1995). Based on this information, Kunz (1986) proposed that more recent historic or protohistoric tent rings were superimposed on much older lithic assemblages and the spatial associations were coincidental. We set out to test this assumption and discover whether or not the tent rings and lithic materials were indeed contemporaneous by attempting to acquire datable material from test excavations within the tent rings and examining associations between the ancient lithics and the structures.

In addition to the information reported on the tent ring sites, two substantial caribou drivelines were described by previous investigators (Kunz 1986; Saleeby 1996; MacIntosh 2001). The drivelines are located in a smaller east-west-trending valley separating the two tent ring complexes east of Agiak Lake (Fig. 2). The details of these drivelines were variously recorded, but little effort was given to dating or associating them with other sites located around Agiak Lake, other than possible associations to nearby hunting blinds. We wanted to address the possibility that the large sites at Agiak Lake—the tent ring sites and the caribou driveline complexes—were built and used by the same people. Although it is typically assumed that driveline hunting in Alaska is a relatively recent phenomenon, Ackerman

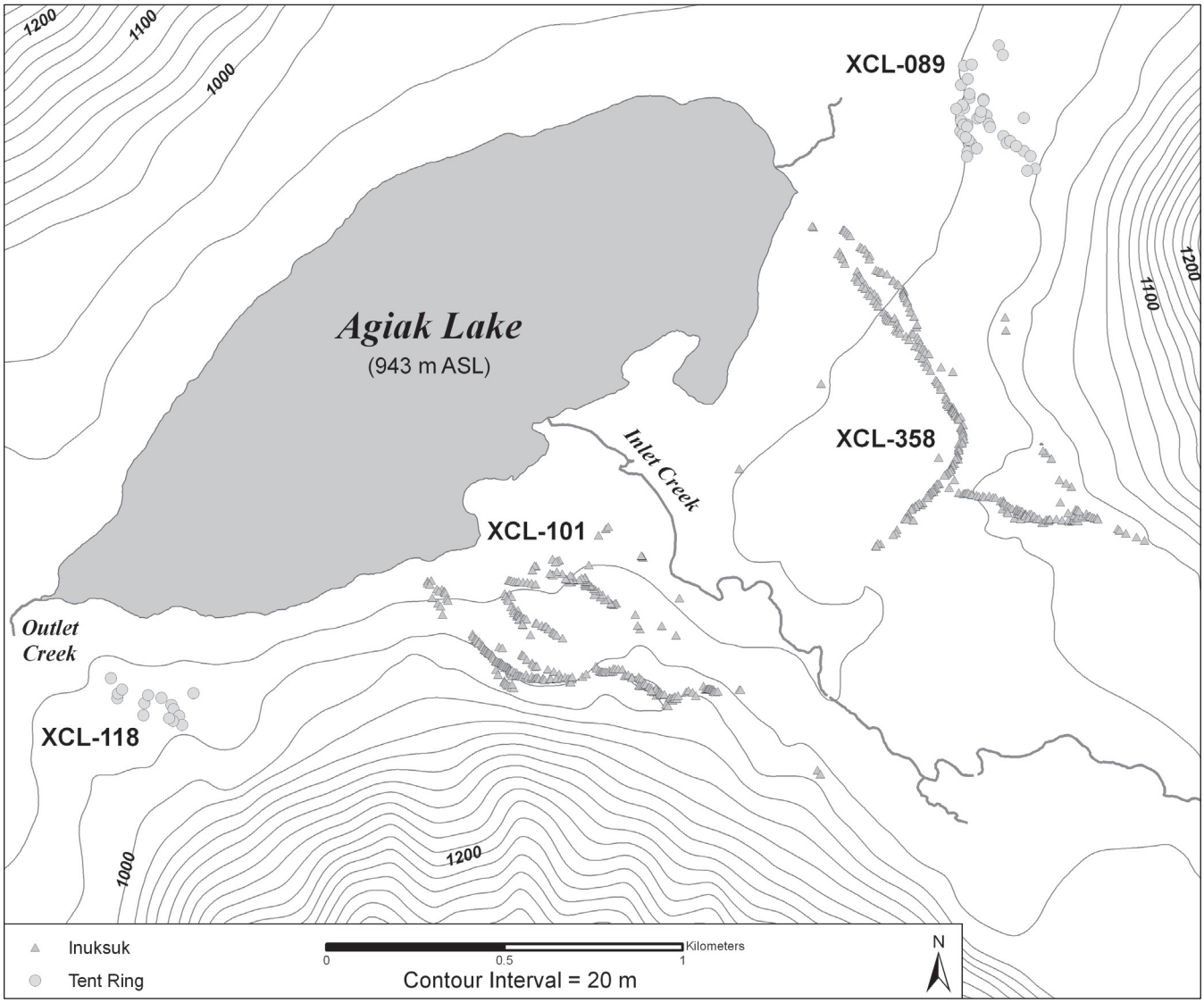

Figure 2. Tent ring and driveline complexes as mapped in 2005 at Agiak Lake.

(2004) has proposed that perhaps this technique may be as old as the Northern Archaic tradition.

METHODS

With access to prior archaeological field maps, the sites at Agiak Lake proved easy to relocate. Once the known tent rings were established, transects were walked at roughly 5 m intervals over the entire surrounding terrain. The survey identified many more tent rings than previously described, although it required careful examination to distinguish the tent rings in the boulder-field terrain. Also, the tent rings were often poorly preserved, obscured by vegetation and lichen cover, and/or occasionally deformed by frost cracks. The effects of cryoturbation are minimal, and none of the tent rings appear to be the result of frost action, such as cryogenic sorting. Although many additional tent rings were discovered during the initial pedestrian survey, we continued to find new tent rings right up until the last day of fieldwork. For this reason, it is conceivable that concealed tent rings remain to be discovered during future site visits.

Each tent ring was sketched at a large scale using a 4 x 4 m grid system, focusing on the rocks visually identified as part of the tent ring wall and on other important features such as nonportable boulders, frost cracks, and prominent vegetation. We recorded attributes of each tent ring, such as diameter, shape, rock number, presence or absence of hearths or entryways, and orientation (Tremayne 2006). The physical location of each tent ring was mapped using a Trimble GeoXT GPS receiver. This GPS unit generated better than 1 m accuracy, which allowed for each tent ring sketch to be georeferenced into a GIS map. This technique can be visualized as establishing small chunks of floating 4 x 4 m grid around each tent ring that were then tied together using their geographic coordinates with < 1 m accuracy. This routine was fast and economical and provided adequate precision to address questions about feature distribution and site structure by modeling the distributions of archaeological features. The Trimble GeoXT also has the ability to record feature attributes, further enhancing the GIS maps and our ability to query the data to answer research questions.

We excavated 1.0 m^2 test units in nine of the tent rings to obtain materials for radiocarbon dating and to sample subsurface artifacts for detailed lab analysis. Tent rings containing sediments and those associated with artifacts were given preference for testing. Surface vegetation was typically sparse, composed of grasses, sedges, lichen, and moss. Underlying sediments were shallow and consisted of poorly sorted gravelly or sandy silt averaging 15 cm in depth and terminating in frost-shattered regolith. Each unit was excavated several centimeters into the regolith, which was devoid of cultural materials. Because of the shallow nature of the soil and the absence of identifiable stratigraphy, the test units were excavated as a single stratigraphic unit. All excavated material was screened through ¼-inch mesh.

Surface artifacts and artifacts beneath tent ring rocks were described. The ground surface outside the tent rings, but still within the complex area, was also examined in order to locate artifacts deposited outside the tent rings. All surface artifacts were analyzed in the field and returned to their original locations, while subsurface artifacts were provenienced and collected. We took a technological approach to lithic debitage analysis, with an emphasis on placing the flakes into a manufacturing continuum (Flenniken 1981). Upon returning from the field, we analyzed the material recovered from test units. The results of these analyses allowed comparison of the tent rings based upon assemblage characteristics and provided information on occupation activities.

SITE OVERVIEWS

TENT RING COMPLEXES

The tent ring sites both north and south of Agiak Lake share many similarities. Tent rings at both complexes are composed of a high number of stones, typically greater than 50. The tent rings are circular or oval with similar diameters and a roughly continuous ring of stones (Fig. 3). Ring stones at both sites are heavily weathered, covered with lichen, and where they lie on vegetation, are deeply embedded within the vegetation mat (Fig. 4). Lithic artifacts occur within or beneath nearly all tent ring walls. Surface inspection of areas outside tent rings revealed very few lithic artifacts. The array of lithic artifacts in the assemblages, both formal artifacts and debitage, is quite similar at both complexes, as is the variety of raw materials used.

The geographic settings of the two tent ring complexes are broadly similar. They lie at opposite ends of the lake, separated by 2.5 km (Fig. 2). Both are located near the eastern side of the roughly north-south trending Agiak valley, proximal to the east-west trending inlet creek valley. Both

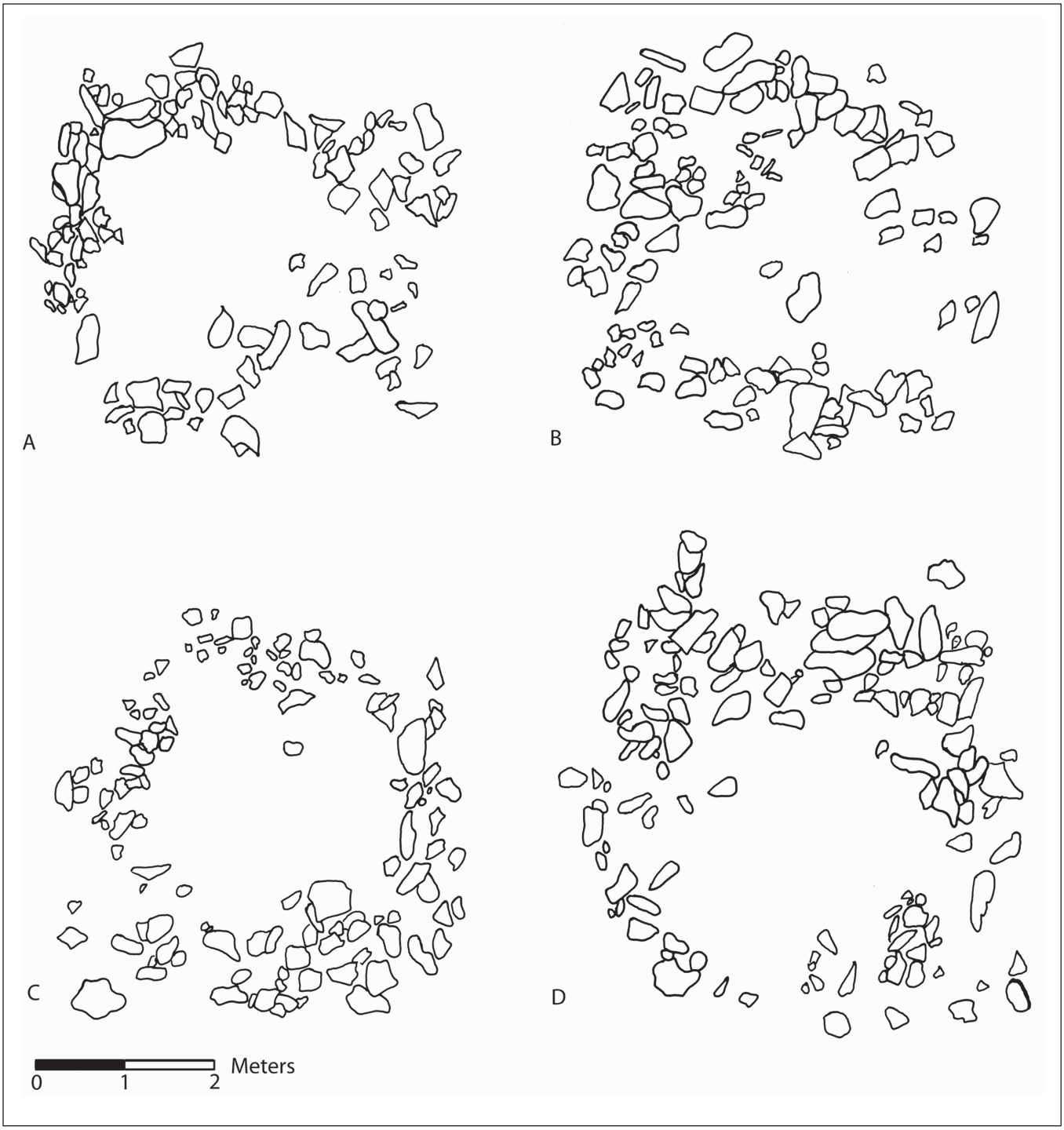

Figure 3. Plan maps of representative tent ring features: A: Site XCL-089, Feature X; B: Site XCL-089, Feature V; C: Site XCL-089, Feature L; and D: Site XCL-118, Feature I.

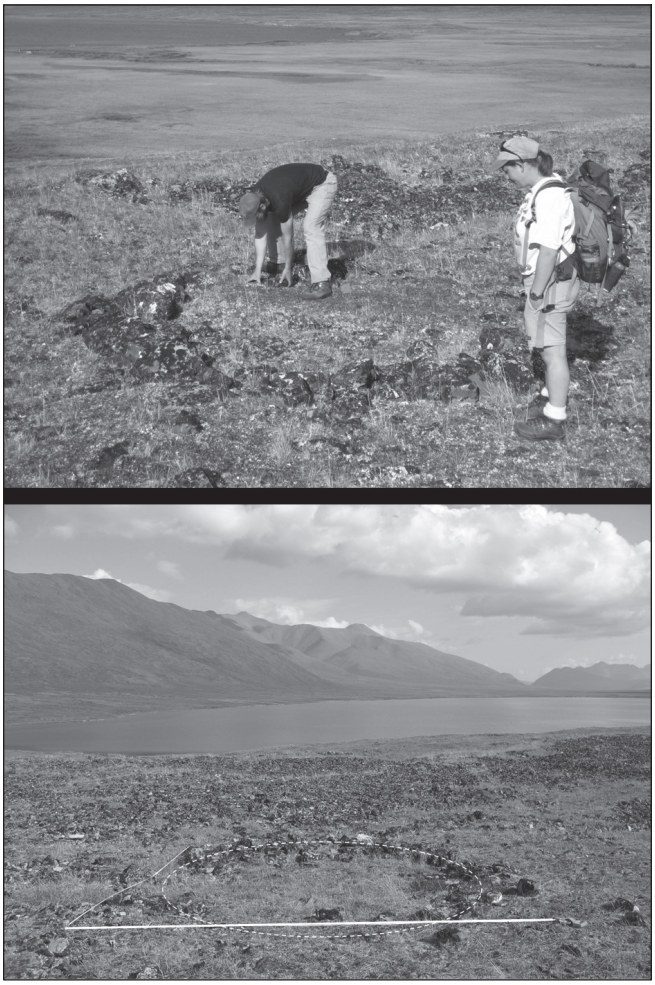

Figure 4. Tent rings from both the southern (bottom; white tape measure at 4 m) and northern (top) complexes.

sites are positioned near the base of boulder-strewn mountains on somewhat level plateaus above the surrounding terrain—the remnants of ancient glacial deposits and landslides. The southern complex rests on rougher, less vegetated terrain than the northern site, which has some vegetated swales. Both sites are at similar elevations above the present lake surface.

At the north end of the lake, 26 additional tent rings were discovered in the vicinity of the three previously listed tent ring sites. These new tent rings have filled in the intervening areas between XCL-089, XCL-090, and XCL-091; thus, the northern complex, now composed of 40 identified tent rings, has been redefined as one large tent ring complex, XCL-089 (Fig. 5). The complex sits 485 m from the present lakeshore and 24 m above the lake's surface. A small inlet stream flows into Agiak Lake near the site to the west-southwest. The view from the site encompasses the entire lake and valley to the south, as well as much of the terrain to the west and north. The view to the east is restricted by a 1540-m mountain. The tent rings are spread over a seven-hectare area, with many of the rings concentrated near the terrace edge that rises somewhat abruptly from the low-lying marshy grasslands just north of the lake. Vegetation in the area consists mainly of grasses, mosses, and lichens concentrated in shallow swales and within the tent ring circles. The nearest willow patch of any size is 400 m away to the south, but it is uncertain how similar this pattern is to prehistoric vegetation distribution. Although no formal spatial analyses have been conducted on the layout of the tent rings, many of the rings are regularly spaced along the small rises or within gentle swales on the terrace (Fig. 5). In several locations, groups of three to six rings are regularly spaced roughly 10 to 12 m apart, following linear topographic features.

The southern site is comprised of fewer tent rings than the northern site, with 15 identified rings located 200 m south of the lakeshore (Fig. 6). The lake's outlet creek, Agiak Creek, exits the lake just over 300 m to the northwest. The banks of this creek support the largest and densest willow patches in the region, with some trees approaching 3 to 4 m in height. The southern complex boasts views of the entire lake and much of the valley to the north, as well as terrain to the west and some of the Agiak Creek valley to the south. Views to the east and southeast are restricted by a 1,530-m mountain—the talus slope covering the mountain's foothills rises steeply less than 100 m from the complex. The complex covers an area roughly two hectares in size. Similar to the northern complex, the rings are located along the tops of small undulations in the boulder-strewn terrain as well as within the swales between ridges. Vegetation is sparse, with only small concentrations of grasses and mosses growing between boulders and within tent rings. A few dwarf birch shrubs are interspersed within the rocky outcrops. Regular spacing of tent rings at the southern complex is less apparent than at the northern complex; however, some spatial patterns are still recognizable. These clusters of three to four tent rings, positioned along the small ridgetops and slight plateaus, have a somewhat regular spacing of between 12 and 20 m (Fig. 6).

DRIVELINE COMPLEXES

Two prominent caribou drivelines stretch over the terrain east of Agiak Lake, impressive for their length and the close spacing of individual *inuksuit*. Many of the cairns are wonderfully preserved, standing precariously on end

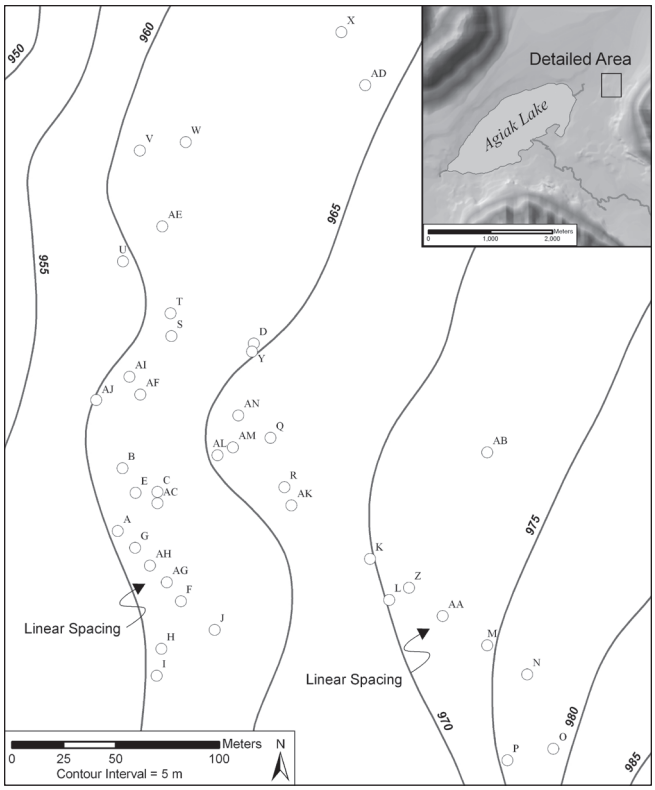

Figure 5. Detail of northern tent ring complex with examples of patterned spacing.

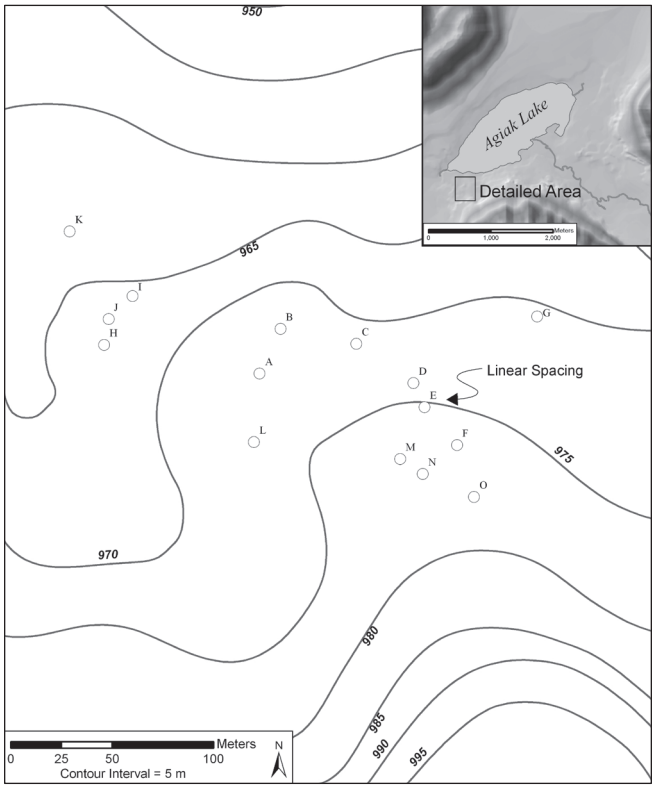

Figure 6. Detail of southern tent ring complex with examples of patterned spacing.

or carefully stacked many stones tall (Fig. 7). These lines run roughly east-west along the bases of two separate mountains and terminate near the lakeshore. The *inuksuit* in both lines follow subtle topographic features within the valley, most often located on micro-ridges or along the rocky slopes of natural rises. In this manner, the *inuksuit* enhance the natural topography, standing out against and breaking the horizon. Willow branches and sod clumps were likely used to augment the effectiveness of the stone cairns in directing caribou movement.

The northern caribou driveline (XCL-358) contains 298 *inuksuit* and extends in a roughly northwest-southeast direction. The base of the line nearest the lake travels over a low-lying, grassy plain and then increases in elevation as it extends away from the lake along the south-facing slope of the mountain northeast of the northern end of Agiak Lake. The base of the line nearest the lake is approximately 85 m away from the water's edge. The driveline takes on a Y-shape with two segments diverging roughly halfway along its total length. The segments appear to represent two unique construction events, probably the result of reuse and maintenance. The combined length of these seg-

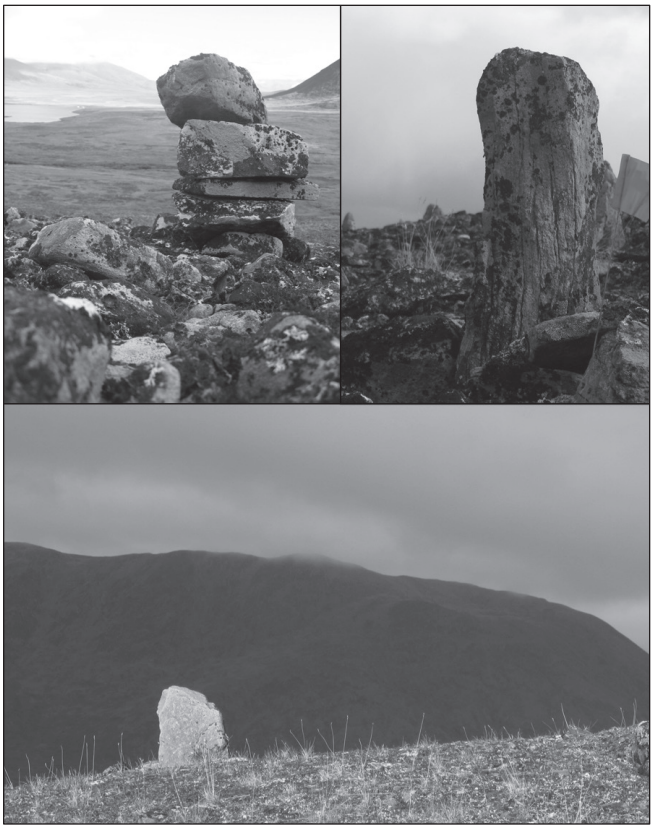

Figure 7. Examples of **inuksuit** *from Agiak Lake drivelines. Top left: stacked construction. Top right and bottom: monolithic construction.*

ments is 2,247 m. The distance between the two extremities of the line (the two furthest *inuksuit*) is 1,280 m. Pieces of willow were found associated with ten of the *inuksuit*; thus, it is likely that willow branches were used in order to make the cairns appear larger and therefore more effective at breaking up the horizon and redirecting caribou. The several pieces of well-preserved (but undated) willow also indicate that the drivelines were most recently used in historic or late-prehistoric times; however, this does not preclude the possibility of older episodes of use.

The southern caribou driveline (XCL-101) is located at the base of the mountain that defines the southern boundary of the valley east of Agiak Lake and consists of 306 identified *inuksuit*. Most of this line cannot be seen from the north due to the proximity of the mountain. The southern driveline is much more convoluted than the northern one, with many diverging and disconnected segments. As with the northern driveline, these multiple segments probably indicate more than one episode of use and maintenance. The total length of the segments is roughly 1,500 m. Other scattered *inuksuit* in this general area were considered components of the complex but could not be definitively associated with any of the defined segments. The *inuksuit* in the southern complex are contained within an area of 46 ha.

RESULTS

ABSOLUTE DATING

The primary reason for subsurface testing at Agiak Lake was to obtain material suitable for radiocarbon dating. Fortunately, many of the rings produced organic material including bone, calcined bone, and charcoal samples. The tested tent rings all showed some evidence of internal, unlined hearths. Four of the seven rings tested at the northern complex and one of the two rings tested at the southern complex produced charcoal suited for radiocarbon dating. In addition, the hearths yielded burned soil, potlidded flakes, calcined bone, and tight concentrations of charcoal—all important elements of hearth features. Due to the small scale of the tests, the extents and shapes of the hearths were not established.

Radiocarbon dates were obtained on five charcoal samples collected in 2005. Samples from the two complexes produced a fairly tight cluster of dates (Table 1). Calibrated at the 1-sigma (68% probability) level, the dates range between 3690 cal. yrs BC and 2940 cal. yrs BC (INTCAL04; Reimer et al. 2004). Although the older dates come from the northern complex, the one date at the southern complex matches exactly one of the dates obtained at the northern complex.

LITHIC ANALYSIS

As mentioned above, each of the tent ring complexes, and most of the individual tent rings, contained a large quantity of lithic material. The goal of the lithic analysis was threefold: to determine activities involving the manufacture and repair of stone tools, to document similarities or differences between the two tent ring complexes, and to determine into which archaeological tradition the assemblages best fit. For the purposes of this paper, the comparison of the two tent ring complexes is of primary concern. As with the site

Table 1. Radiocarbon dates obtained from hearths within tent rings. Calibrated with INTCAL04 (Reimer et al. 2004).

Lab No.	Catalog No.	Provenience	Material	Conventional (^{14}C yrs BP) Radiocarbon Age (1-sigma)	Calibrated (cal. yrs BC) Age (1-Sigma)
Beta-210714	GAAR14659A	XCL-118; Tent Ring J	Wood charcoal, *Salix* sp.	4430 ± 40	3310–2940
Beta-210707	GAAR14564A	XCL-089; Tent Ring H	Wood charcoal, *Salix* sp.	4430 ± 40	3310–2940
Beta-210710	GAAR14580A	XCL-089; Tent Ring AM	Wood charcoal, *Populus* sp./ *Salix* sp.	4580 ± 40	3490–3130
Beta-210708	GAAR14621A	XCL-089; Tent Ring M	Wood charcoal, *Salix* sp.	4760 ± 40	3640–3520
Beta-210709	GAAR14633A	XCL-089; Tent Ring AL	Wood charcoal, *Salix* sp.	4850 ± 40	3690–3540

descriptions, the lithic analyses focused on the similarities between the two complexes. Intrasite variability is very low and not an integral part of comparing the two complexes; therefore, it is not discussed in this report.

The assemblages from the two complexes include 137 tools or tool fragments (Table 2) and 6,759 pieces of debitage. Of the nearly 7,000 pieces of debitage, a total of 1,268 pieces possessed enough attributes to make them diagnostic of reduction stage and/or technology (Flenniken 1981; Table 3). At both complexes, unifacial scrapers and notched points are prominent and typologically important artifact types. These tools are considered diagnostic of the Northern Archaic tradition in northern Alaska, as are the bifacial knives found at the northern tent ring complex (Anderson 1988; Lobdell 1986, 1995; Fig. 8). Other tools within both tent ring clusters, such as notched pebbles (Fig. 9), also appear in Anderson's (1988) description of Northern Archaic artifacts at the Onion Portage site. The notched pebbles at Agiak Lake show signs of battering, indicative of their use as percussors, perhaps during the extraction of bone marrow. The scrapers, bifacial knives, and notched pebbles together indicate that hide working, game processing, and marrow extraction were primary activities. The side-notched projectile points are represented only by broken bases and two nearly complete points. The projectile points and bases suggest rehafting of weapons within the tent rings, while the bifacial blanks and preforms indicate initial tool production.

The lithic debitage data show that similar technological activities—mainly later-stage bifacial reduction, including percussion and pressure shaping, and unifacial and bifacial retouch and/or resharpening—were taking place at both tent ring complexes on opposite sides of the lake (Table 3). Resharpening flakes imply the onsite use of scrapers rather than transport to and discard at the site. Debitage analysis also shows a paucity of primary and secondary decortication flakes (2.7% of the debitage), which indicates that most tools entering the site were in later stages of production—very little initial material testing, shaping, and reduction occurred on site.

Lithic raw material at both tent ring complexes consisted mainly of black (82.2%) and gray chert (12.9%), with lesser quantities of other materials, including obsidian (2.3%), tan siliceous mudstone (1.3%), quartzite (0.3%), quartz crystal (0.3%), and one unifacial tool made of basalt. Much of this material was apparently obtained from sources distant from Agiak Lake—the obsidian, for example, has been chemically matched to the Batza Tena source 250 km away (Speakman 2006). The presence of exotic raw materials indicates a familiarity with the Brooks Range and surrounding regions. However, a poor-quality tabular black chert appears to be of local origin because several pieces of this raw, unworked material were observed near the lake.

DISCUSSION

The absolute age of the tent rings at Agiak Lake has been established and confirmed by five radiocarbon dates. These particular tent ring structures date to a time period in northern Alaska usually assigned to the Northern Archaic tradition. Diagnostic lithic artifacts, including side-notched projectile points and notched pebbles, further support the classification of these settlements within the Northern Archaic tradition.

Table 2. Surface and subsurface artifacts from the northern (XCL-089) and southern (XCL-118) tent ring complexes.

Tools/Formed Artifacts	XCL-089 (40 tent rings)		XCL-118 (15 tent rings)	
	Count	Percent	Count	Percent
Unpatterened Flake Core	3	2.9	0	0.0
Modified Flake Tool	17	16.2	0	0.0
Biface Blank	32	30.5	6	18.8
Biface Preform	3	2.9	3	9.4
Notched Projectile Point	8	7.6	3	9.4
Bifacial Knife	4	3.8	0	0.0
Uniface/Scraper	37	35.2	19	59.4
Notched Pebble	1	1.0	1	3.1
Total	105	100.0	32	100.0

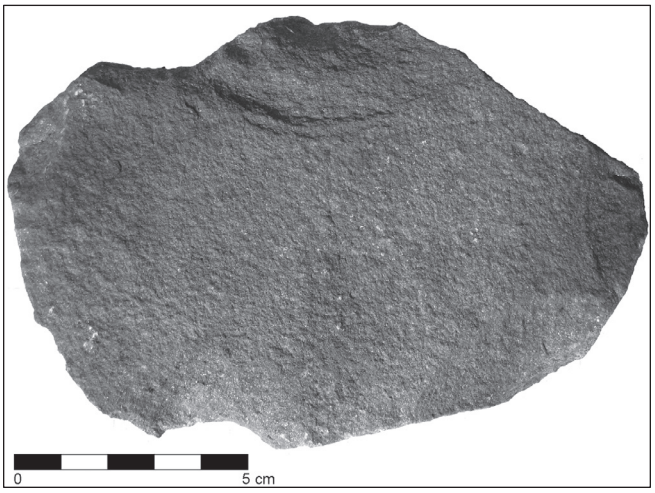

Figure 9. Notched pebble from tent ring D, site XCL-089.

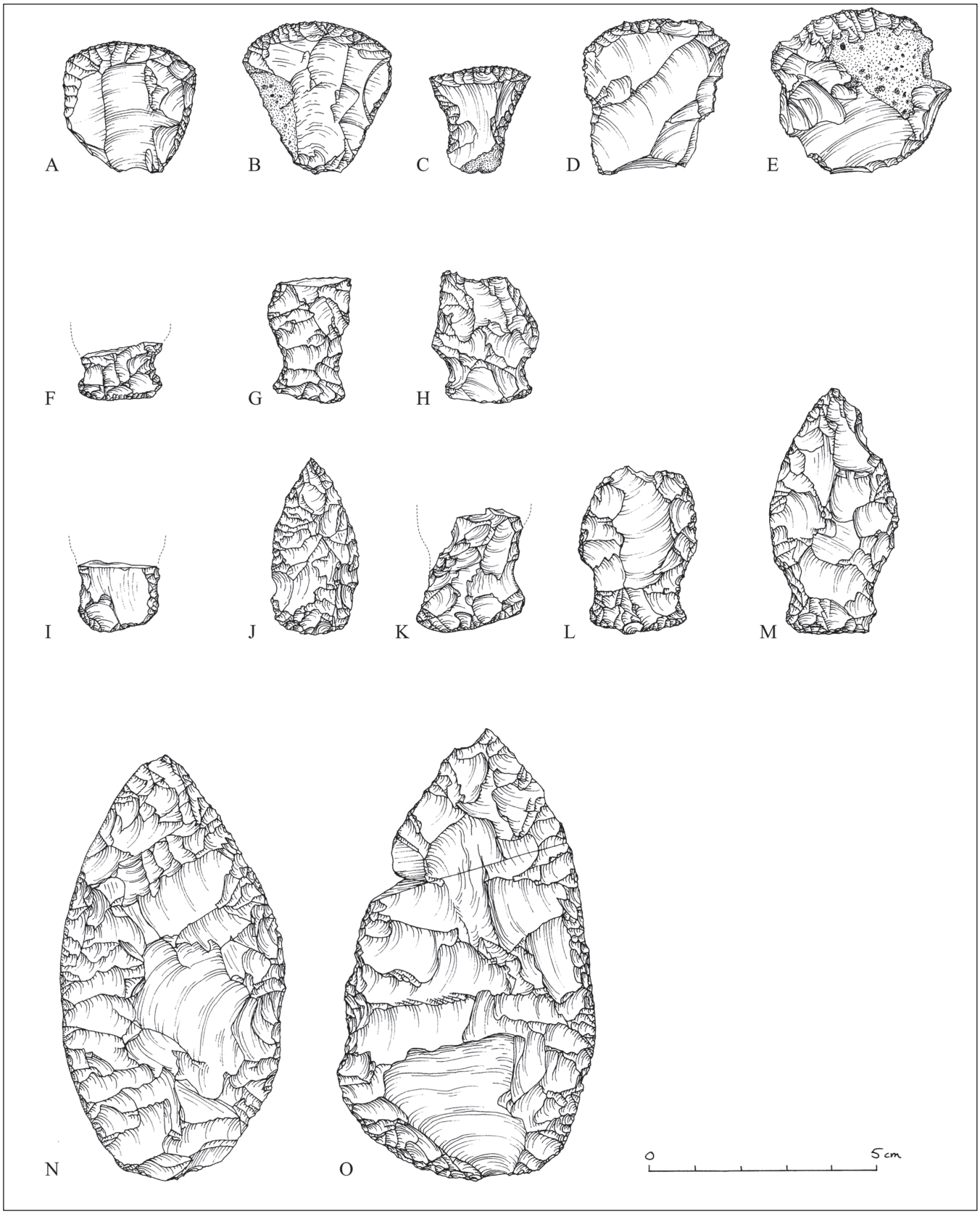

Figure 8. Drawings of formed artifacts from both tent ring complexes: scrapers [A (089D), B (089AJ), C (089H), D (089M), E (089AM)], notched projectile points [F (089X), G (089H), H (089H), I (118J), J (118H), K (118H), L (089X), M (089AL)], and bifacial knives [N (089X) and O (089AM)].

Table 3. Surface and subsurface debitage from the northern (XCL-089) and southern (XCL-118) tent ring complexes.

Stage of Reduction and Technology	Flake Types	XCL-089 (40 tent rings)		XCL-118 (15 tent rings)	
		Count	Percent	Count	Percent
Early Stage Core Shaping	Primary Decortication	8	0.8	0	0.0
	Secondary Decortication	33	3.2	8	2.6
	Interior Multi-Faceted	149	14.7	20	6.5
	Interior Single-Faceted	46	4.5	10	3.3
Bifacial Shaping	Edge Preparation	39	3.8	16	5.2
	Bifacial Percussion	184	18.1	36	11.7
	Bifacial Pressure	401	39.5	181	59.0
	Notching Flake	1	0.1	0	0.0
Unifacial Shaping	Unifacial Pressure	155	15.3	36	11.7
Total		1,016	100.0	307	100.0

Corresponding dates from the two campsites imply the rough contemporaneity of the two tent ring clusters and suggest that both areas were used within decades of each other. While radiocarbon dating does not allow for a more precise determination of occupation age, there are other indicators of contemporaneous use. Prehistoric hunters would have made decisions about the geographic placement of these settlement areas in relation to the surrounding landscape and topography, proximity to the lake, vegetation resources, caribou migration routes, weather conditions, and other related factors. The complexes have been placed similarly in relation to the surrounding landscape, almost like mirror images across the lake. This similarity is one indicator of possible shared cultural behavior, which further supports roughly contemporaneous occupation. Similar weathering and lichen cover on tent ring stones indicate approximately equal lengths of time since construction and the possibility for seasonal occupations at either end of the lake by the same group of people.

A closer look at the placement of tent rings within each complex may address the question of contemporaneous occupation of individual tent rings. Many of the tent rings sit atop small ridges or within the grassy bottoms of gentle swales. It is difficult to say why swales and ridges were chosen, but the patterned spacing may indicate contemporaneous occupation of the rings (Park 1997; Whitelaw 1991). The contiguous spacing of the tent rings may indicate a social need for physical distance from neighbors occupying nearby tents (Binford 1983; McCartney 1977; Whalen 1981). Regularly spaced clustering of households has also been interpreted as an indicator of close social relationships, such as kinship ties or political alliances (Gargett and Hayden 1991; Stark and Young 1981; Yellen 1977). The very regular spacing of tent rings seems less likely to be attributable to successive occupations by single families constructing new tent rings year after year—why would one family construct tent rings year after year with such regular spacing? Although it is very unlikely that *all* the tent rings at both complexes were occupied at once, it seems likely that some or many of the tent rings were in use at the same time.

The association of lithics with tent rings is strong. Of the 55 total tent rings, 53 contained lithic artifacts, and the artifacts are almost always entirely within the perimeter of the structures. Only two lithic scatters unassociated with tent rings were documented on the landforms containing the tent ring complexes, and almost no lithic material was found outside the tent ring walls. It seems highly unlikely that such a large number of tent rings would be subsequently placed precisely atop nearly every observed ancient lithic scatter. It makes far more sense to assume an association between the two forms of archaeological data. The correspondence of the hearth features located centrally in several of the tested tent rings, the Northern Archaic-age dates from samples in the hearths, and lithics indicating heat-fractured tools and flakes associated with both the hearths and the Northern Archaic tradition all strongly support the association of tent rings, radiocarbon dates, and lithic artifacts.

A final discussion concerns the tent ring complexes and their possible association with two of the most prominent sites at Agiak Lake—the monumental caribou drivelines. A presumption can be made that the drivelines are protohistoric or historic in age due to good preservation of many of the cairns, the association of preserved willow within some cairns, and the historically documented use

of this hunting strategy in similar Brooks Range settings (Binford 1991; Burch 2006; Spearman 1986). In fact, the last documented communal kayak-caribou hunt occurred just 16 km north of Agiak Lake at Little Chandler Lake in 1944 (Spearman 1986). Preserved willow fragments, likely used to enhance the *inuksuit* during a caribou drive and found near and under many of the cairns indicate that the lines, or portions of the lines, were indeed used in more recent times. However, the argument can also be made for a more ancient construction and use of the drivelines, with later populations using and augmenting this ready-made hunting facility (Brink 2005).

The state of preservation of individual *inuksuit* varies and suggests multiple episodes of construction and use. While some *inuksuit* are well preserved (standing) and unvegetated, others, especially in the southern line, are poorly preserved (toppled) and exhibit very heavy lichen cover. Admittedly a rough, relative measure, the degree of lichen growth on many *inuksuit* is nonetheless equivalent to that found on stones from tent rings now dated to over 3000 cal. years BC. Our attempts to derive more precise ages using lichenometry were not successful since the environmental conditions among individual *inuksuit* were highly variable. While many of the *inuksuit* have very little lichen cover and were therefore probably constructed and used in more recent times, the dilapidated *inuksuit* may be part of a more ancient drive system.

Furthermore, the proximity of both tent ring complexes to the northern and southern drivelines give circumstantial support to their possible association. The symmetry produced by the physical locations of the tent ring complexes and the drivelines in relation to one another may indicate functional positioning of settlements and drivelines at both ends of the lake, perhaps in relation to predictable seasonal shifts in caribou migration. Both tent ring complexes are situated in the same relative position and within 700 m of the drivelines. The tent ring settlements would have been out of sight to caribou moving along the lines, yet close to the termination of the lines and the expected kill areas on the lakeshore. This would have facilitated processing, preservation, storage, and use of caribou meat, hides, etc.—activities that would at least partially have taken place within the residential camp. The many endscrapers found in the tent ring settlements suggest that hide-working was an important activity. The large bifacial knives would have functioned well as meat slicing and butchering tools, as seen associated with other large scale kill-butchery sites (Jodry 1998; Morrison 1997). Surprisingly, there is no evidence at Agiak of storage facilities, such as stone caches, as seen in similar historic contexts (Binford 1978, 1980; Murray 1999). If large amounts of game were procured on the shores of Agiak Lake, it may be that stone caches were not a part Northern Archaic technology. Perhaps perishable materials, such as drying racks (Binford 1978), were a more common method of preserving meat if the hunt took place in spring; meat obtained in fall hunts could be frozen without leaving any archaeological trace. Another possibility is that the sites were short-term occupations and no storage facilities were necessary.

There is no reason to suspect that northern caribou hunters would *not* participate in communal caribou hunts. This is an ancient technique used for thousands of years in the Old World (Davis and Reeves 1990) and a technique almost certainly within the capabilities of Northern Archaic hunters in the central Brooks Range. Ackerman (2004), for example, has argued for a similar connection between a Northern Archaic assemblage and a caribou driveline near a lake in southwestern Alaska. It has even been suggested that before the introduction of firearms, moderately sized populations in the New World would have been required to hunt communally, especially in seasonally variable, high-latitude environments such as northern Alaska (Blehr 1990). Communal hunting was not necessarily employed because it was cost-effective in terms of labor but rather because it was a more reliable (less risky) means of ensuring a successful hunt (Hayden 1981; Hofman 1994). The possibility of many people at Agiak Lake for at least part of the year suggests the necessity, and human resources necessary, for communal driveline hunting (Driver 1990; Riches 1982). However, it should be noted that the activation of caribou drivelines in ethnographic times did not require a large number of people—as few as twenty is sufficient (Balikci 1970; Binford 1991, Spearman 1986). It should also be kept in mind that reasons for human aggregation other than communal hunting, such as religious gatherings, rites of passage ceremonies, information sharing, mate finding, etc., would have been important concerns (Binford 1991; Conkey 1980; Hofman 1994).

Another argument for the association of the tent rings and the drivelines involves changing lake levels. Both tent ring complexes are at similar elevations above the current lake level. After mapping the terrain and looking closely at the topography around Agiak Lake, we observed that the lake level may have been higher than at present. The

land immediately surrounding the lake is relatively low and wet. Around most of the lake at a distance of 5 to 500 m from the present shoreline exists a steep bank that rises roughly 5 to 20 m from the low-lying terrain surrounding the lake, possibly representing a paleoshoreline. In addition, the southern outlet creek flows through a very narrow, steep-walled valley that rises some 5 to 10 m above the lake level. If this narrow outlet was once partially filled in, it would have dammed the lake, causing higher lake levels. Clague et al. (2006) documented a similar lake level shift at Kluane Lake, in the southern Yukon Territory, due to glacial activity and snowfall. This is one possible explanation of Agiak Lake's hypothetical level change. Loon Lake, several kilometers south of Agiak Lake, experienced a catastrophic drainage event in the 1990s when heavy rainfall caused the basin to overflow and resulted in rapid down-cutting of its outlet creek and a shoreline shift of an estimated 100 m. At Agiak Lake, the lake level would only have to be several meters higher to place the northern tent rings very near the water's edge. The southern tent rings would have been closer to the lake, but not right on its shore. The cairns nearest the water, although they are separated by two kilometers, both sit 8 m above the current lake level. The same several-meter rise in lake level would place the cairns that are closest to the water's edge—currently 50 to 80 m from the lakeshore—directly adjacent to the hypothetical shoreline, thus making the driveline more effective. Although this hypothesis remains untested, ethnographic and archaeological records in the Brooks Range demonstrate the common theme of living close to water and the important resources in and near lakes and rivers. The lake-level history of Agiak Lake should be investigated to better establish links between the paleoenvironmental setting and human occupational events.

CONCLUSIONS

The tent rings and driveline complexes at Agiak Lake are among some of the most intriguing settlement and hunting complexes in northern Alaska. The age of the tent rings and the diagnostic lithic assemblage place the occupants of these structures within the Northern Archaic tradition. In Alaska very few tent rings from this time period have been recognized and documented, and none of these sites match the size of the Agiak Lake complexes. The impressive expanse of tent rings may suggest seasonal gatherings of people, perhaps to activate the caribou drivelines in a communal hunt. Regardless of whether communal hunts necessarily occurred in conjunction with occupation of the tent camps, the shores of Agiak Lake were witness to large numbers of people, either simultaneously or through the centuries, who wielded a typical Northern Archaic toolkit and relied on their knowledge of the surrounding environment to subsist in the central Brooks Range.

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