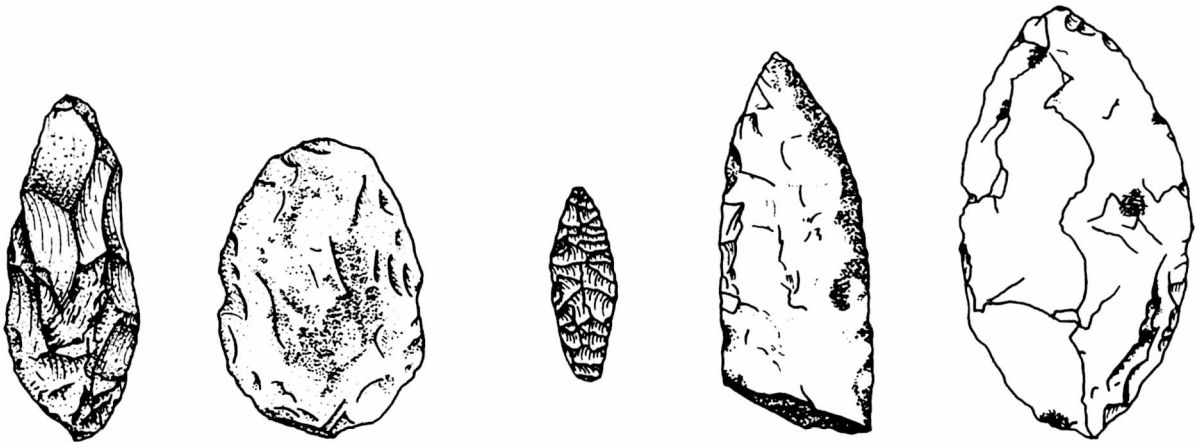


Archeological Investigations of Five Remote Tracts of Land Within Denali National Park and Preserve, Alaska: 1988, 1989

Resources Report NPS/ARRCR/CRR-95/24

by Alice J. Lynch



Alaska Field Area

Archeological Investigations
of Five Remote Tracts of Land Within
Denali National Park and Preserve, Alaska
1988, 1989

by Alice J. Lynch

Illustrations by Wyndeth Davis
based on field drawings by crew members

Edited by Thetus Herndon Smith

Department of the Interior
National Park Service
Alaska System Support Office
Division of Cultural Resources
Anchorage, Alaska

1996

TABLE OF CONTENTS

	<i>Page</i>
Summary	v
I. Background	1
Project Objectives	4
Project Overview	5
Summary of Survey Results	6
II. Environmental Setting	10
Modern Environment	10
Physiographic Setting	10
Climate	11
Vegetation	11
Fauna	12
Paleoenvironment	13
III. Cultural Environment	15
Prehistory	15
Regional Chronology	15
Archeological Research Within the Park	20
Archeological Research Adjacent to the Park	22
Ethnographic Setting	23
Upper Cook Inlet Tanaina (<u>Dena'ina</u>)	25
Western Ahtna	26
Lower Tanana	27
Upper Koyukon	28
Upper Kuskokwim (Kolchan)	28
The Historic Period	29
Exploratory Period	31
Fur Trapping	32
Mining	32
Transportation	33
Park History	33
IV. Project Research Design	34
Age and Cultural Affiliation	35
Evidence of Sites 12,000 B.P. or Older	35
Evidence of Mid-prehistoric Sites	36
Behavioral Activities (Site Type)	37

Paleoenvironmental Information	38
Evidence of Volcanic Ash (Tephra) Deposits	39
Examination of Place Name Locations	40
V. Project Methodology	40
Sample Selection	40
Aerial Survey	41
Pedestrian Survey	41
Daily Survey Procedures	41
Site Recording	41
VI. Survey Results	43
Swift Fork Unit	43
Survey Coverage and Results	43
Recorded Sites: MMK-104, MMK-105, MMK-106	50
Ruth/Tokositna Unit	56
Survey Coverage and Results	56
Coffee River Unit	59
Survey Coverage and Results	59
Dunkle Unit	59
Survey Coverage and Results	60
Recorded Sites: HEA-227, HEA-228, HEA-229, HEA-230, HEA-231, HEA-232	63
Healy/Stampede Unit	80
Survey Coverage and Results	80
Recorded Sites: HEA-255, HEA-256, HEA-257, HEA-258, HEA-259, HEA-260, HEA-261, HEA-108, HEA-263, HEA-264, HEA-265, HEA-107, HEA-262	84
VII. Discussion and Conclusions	122
Discussion	122
Prehistoric Sites	122
Historic Sites	134
Conclusions	140
Relationship Between Research Design and Data Collected	140
VIII. References Cited	146
IX. Appendix A: Archeological Site Summary Tables (Prehistoric, Historic)	161
X. Appendix B: Lithic Artifact Descriptions	166
XI. Appendix C: Paleoenvironmental Reconstruction in Interior Alaska by N. Bigelow	171

LIST OF FIGURES

	<i>Page</i>
1. Location of Denali National Park and Preserve.	2
2. Land parcels within Denali NPP proposed for land exchange with state of Alaska.	3
3. Prehistoric site locations found in and adjacent to proposed land exchange units.	8
4. Historic site locations found in and adjacent to proposed land exchange units.	9
5. Language and territory of cultural groups historically represented in Denali NPP.	24
6. Territory of the Upper Kuskokwim Kolchan (late nineteenth century) with approximate areas of six main bands.	30
7. Glacial deposits in Swift Fork area.	44
8. Survey coverage, southern Swift Fork parcel.	45
9. Survey coverage, northern Swift Fork parcel.	46
10. MMK-104 and MMK-105 site vicinity.	51
11. MMK-104 site map.	52
12. MMK-104 soil profile (test pit #6) with buried paleosol.	53
13. MMK-105 site map.	55
14. MMK-106 site map.	57
15. Survey coverage, Ruth/Tokositna unit.	58
16. Aerial survey coverage, Coffee River unit.	61
17. Survey coverage, Dunkle unit.	62
18. HEA-227 site map.	64
19. HEA-227, feature #1.	65
20. HEA-228 site map.	67
21. HEA-228 feature details, locus A, B, C.	68
22. HEA-229 site map.	73
23. HEA-230 site vicinity and site map (inset).	75
24. HEA-230 bridge abutment, superstructure and piledriver framework (detail).	76
25. HEA-231 site map.	78
26. HEA-231 plan view and cross-section of structural remains.	79
27. HEA-232 site vicinity.	81
28. HEA-232 site map.	82
29. Survey coverage, Healy/Stampede unit.	83
30. Survey coverage, Ewe Creek (south of Healy/Stampede unit).	85
31. HEA-255, HEA-257, HEA-258 and HEA-259 site vicinity.	87
32. HEA-255 site map.	88
33. HEA-256 site map.	90
34. HEA-257 site map.	92
35. HEA-258 site map.	93
36. HEA-259 site map.	95
37. HEA-260 site map.	96
38. HEA-260 archeological test pit #1, west wall profile.	99

LIST OF FIGURES (continued)

	<i>Page</i>
39. HEA-260 soil test pit #2, profile.	100
40. HEA-261 site map.	102
41. HEA-107, HEA-108 and HEA-262 site vicinity.	104
42. HEA-108 site map.	105
43. HEA-108 feature map.	106
44. HEA-263, HEA-264 and HEA-265 site vicinity.	109
45. HEA-107 site map.	110
46. HEA-262 site map.	112
47. HEA-262 feature map.	113
48. HEA-263 site map.	115
49. HEA-264 site map.	117
50. HEA-265 site map.	119
51. HEA-265 test pit soil profile.	121
52. HEA-232 wedge-shaped microcore.	125
53. Assorted bifaces recorded in study.	128
54. Stratigraphic profile at Dry Creek site HEA-005).	176

LIST OF TABLES

Table 1. Pedestrian survey coverage, Swift Fork unit.	48
Table 2. Aerial survey coverage, Swift Fork unit.	48
Table 3. Pedestrian survey coverage, Dunkle unit.	60
Table 4. Pedestrian survey coverage, Healy/Stampede unit.	84
Table 5. Recorded sites, Healy/Stampede unit.	86
Table 6. Lithic materials, HEA-264.	116
Table 7. Lithic debitage, HEA-265.	118
Table 8. Deposition of lithics (surface/subsurface) at prehistoric sites in study area.	122
Table 9. Lithic composition of Ewe Creek artifacts.	129
Table 10. Artifact number, by tool type and site, represented in study.	130
Table 11. Bifacial artifacts represented in study.	131
Table 12. Occurrence and percentage of lithic raw materials represented in study.	133
Table 13. Number of artifacts, by lithic composition, per site, represented in study.	134

SUMMARY

Between 1988 and 1989, National Park Service archeologists from the Cultural Resources Division of the Alaska Regional Office (renamed the Alaska System Support Office in 1995) conducted a series of intensive archeological surveys within Denali National Park and Preserve (Denali NPP). The surveys focused on five tracts of land (land exchange units) that the National Park Service planned to transfer to the state of Alaska. The surveys were designed to inventory and assess cultural resources within the units prior to conveyance. Twenty-two archeological and historic sites were recorded during these investigations, including nine sites found adjacent to designated land exchange units. The recorded sites constitute a valuable addition to the archeological database of the park and surrounding region.

I BACKGROUND

Denali National Park and Preserve is located in Southcentral Alaska approximately 286 km (178 miles) north of Anchorage and 136 km (85 miles) southwest of Fairbanks (Figure 1). The park encompasses 6 million acres of federal land, with boundaries that extend 196 km (122 miles) east to west and 202 km (126 miles) north to south. Denali State Park abuts the national park boundary to the south and east.

The need for a land exchange in the Denali area was agreed upon by both federal and state park managers. The exchange would align park boundaries with natural topographic features, such as watercourses and thus simplify several aspects of park management. As stated in the NPS Preliminary Exchange Agreement ADL 411991 (NPS-ARO September 1990), the exchange would:

- make boundaries more easily identifiable and locatable. In cases where land use practices are permissible on state land but not on federal park land (for example, sport hunting), the public and land managers will benefit from readily identifiable boundaries.

- create boundaries that would function as fire breaks. Boundaries based on watercourses would help prevent crossover of fires between federal and state land where fire management practices vary.

- enhance regional transportation. A winter trail would be removed from the more protected NPS land, making it more available for use by the public.

The requirement that federal agencies consider the effects of their actions on cultural resources is mandated by the National Historic Preservation Act of 1966 (NHPA). Sections 106 and 110 of the act specifically indicate that a cultural resource inventory and assessment must be conducted prior to a land exchange involving federal land.

The five proposed land exchange units that were investigated during the survey are on federal land. The parcels are widely separated and physically quite diverse (Figure 2). The units were named for prominent local geographical features and are described briefly below.

The Swift Fork Exchange unit is composed of two discontinuous parcels of land totaling 34,560 acres (54 sq mi). The southernmost parcel is a triangular, 29,440 acre (46 sq mi) area located in the extreme western sector of the park. It is bounded on the south and west by current park boundaries and on the northeast by the Swift Fork of the Kuskokwim River. The smaller tract is located approximately 30 miles north of the larger Swift Fork parcel. It is bounded to the north and west by the current park boundaries and to the southeast by a Native trail that connects the village of Telida with Lake Minchumina.

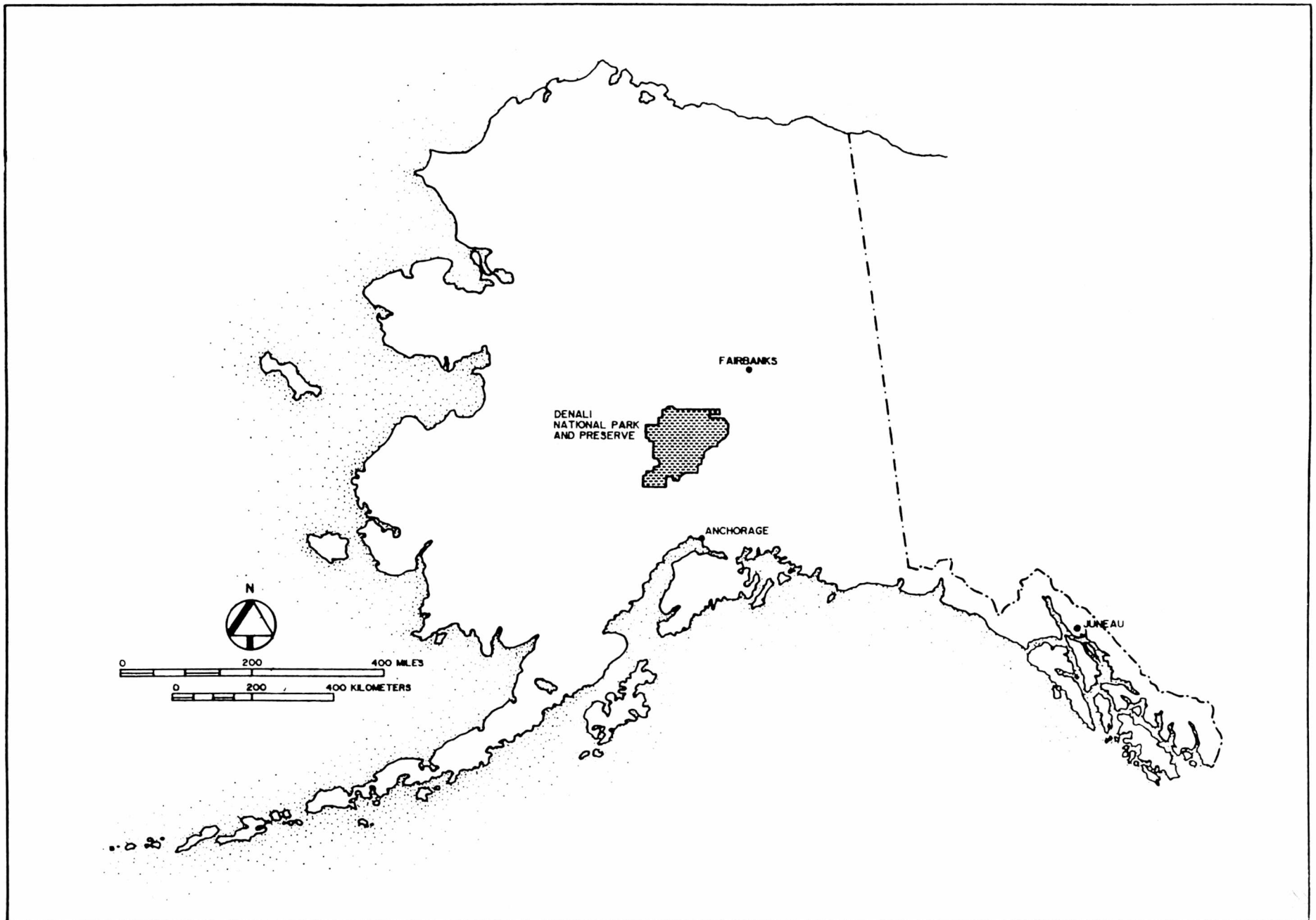


Figure 1. Location of Denali National Park and Preserve (Griffin 1990).

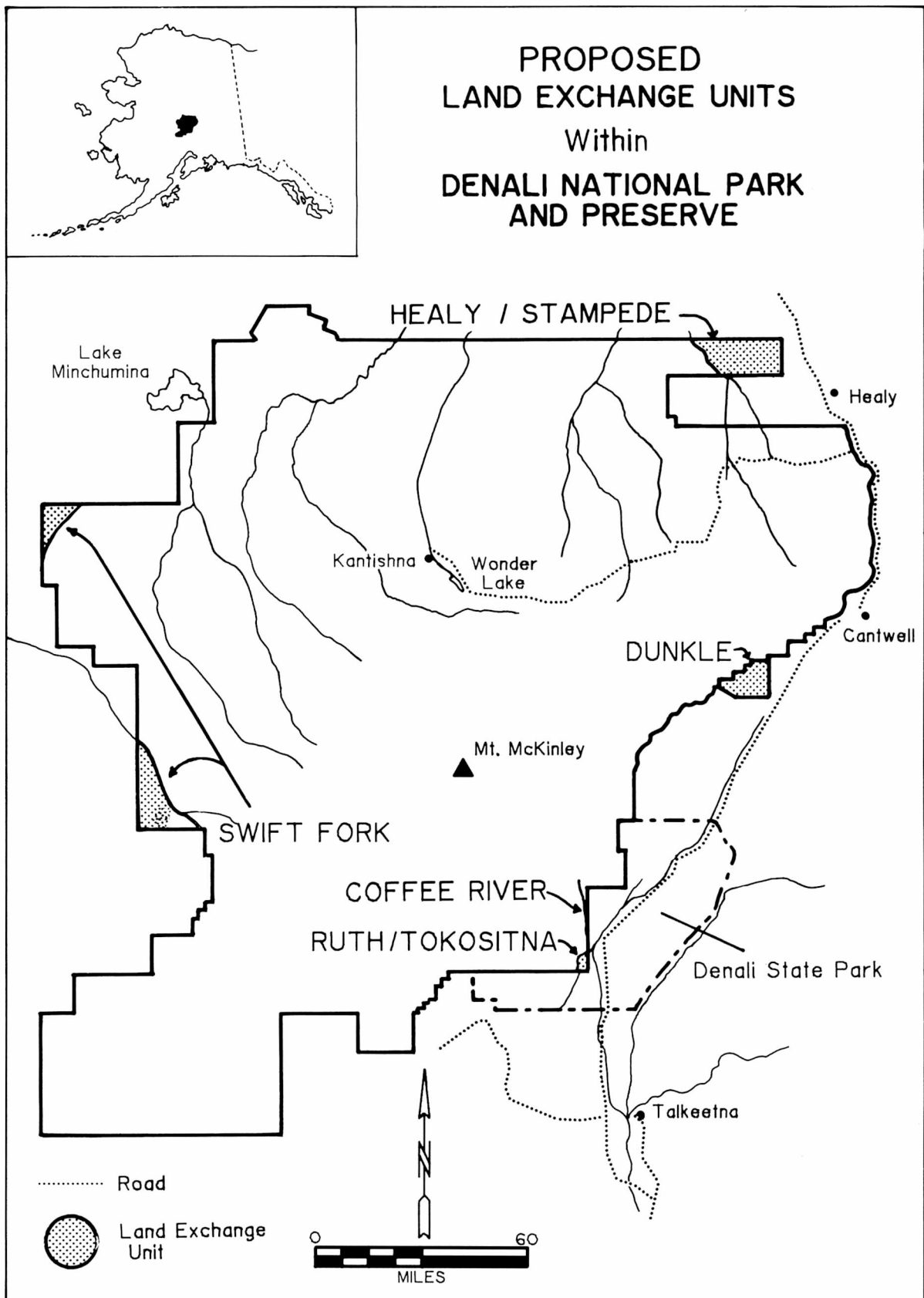


Figure 2. Land parcels within Denali NPP proposed for land exchange with state of Alaska.

The Ruth/Tokositna and Coffee River Exchange units are two small neighboring tracts of land in the southeastern part of the park. The Ruth/Tokositna unit consists of 2,560 acres (4 sq mi) of land bordered on the south and east by the current park boundary and on the north and west by the Tokositna River. The Coffee River unit, a small parcel of approximately 200 acres of land, is located about 8 miles north of the Ruth/Tokositna unit. It is bounded on the east by the current park boundary and on the north, west, and south by the Coffee River.

The Healy/Stampede Exchange unit, consisting of approximately 35,654 acres of land (56 sq mi), is situated in the extreme northeast corner of Denali NPP. The unit is bounded on the north, east, and south by the current park boundary and on the west by the Teklanika River.

The Dunkle Exchange unit, consisting of 21,677 acres (33.87 sq mi) of land, is located in the eastern sector of Denali NPP. The tract is bounded on the south and east by the current park boundary and on the northwest by Camp Creek and the existing park boundary line that skirts the southern foothills of the Alaska Range.

Project Objectives

Although compliance with the National Historic Preservation Act (NHPA) was the primary motivation for the survey, the project also gave archeologists the opportunity to explore a number of previously unsurveyed areas and address a project research design that incorporated a limited number of regional research questions. On the basis of prefield research, these questions were translated into specific research goals that formed the project research design:

Estimate the age and cultural affiliation of sites within the project area. In particular, identify and test likely locations for pre-12,000 B.P. sites in the Swift Fork area. In addition, attempt to find and identify sites from the poorly known "mid-prehistoric" period, which presently forms a 3,500 year gap between 8000 B.P. and 4500 B.P. in the archeological record of Interior Alaska.

Identify behavioral activities (site activities) at recorded sites, as indicated by physical remains.

Collect paleoenvironmental data relevant to the prehistoric sites in the project area.

Document volcanic tephra deposits, particularly those found in stratified contexts, within the park.

Search for archeological documentation of place name locations identified through oral history research.

Once the research goals were identified, field crews were able to target and sample, through intensive archeological survey, very specific areas and environments. It is important to note that the survey was not limited to the exchange units; fieldwork extended beyond the boundaries of the exchange units when prefield research, aerial reconnaissance, or field observation indicated that these areas had potential to address specific research goals. Most of these areas were immediately adjacent to exchange units but in some cases the distance was considerable, as with the Ewe Creek area located approximately 15 km (9 mi) from the Healy/Stampede unit.

It was fortuitous that some of the above-noted unsurveyed areas of the park were also considered to have high potential for archeological resources. The Swift Fork and Healy areas in particular had been identified by previous archeological investigations as potentially important. Geoarcheological investigations conducted by the North Alaska Range Project (NARP) from 1978 to 1982 identified the lower foothills on the northwest side of the Alaska Range, an area that includes a large portion of the Swift Fork unit, as a likely area for the discovery of terminal Pleistocene (pre-12,000 B.P.) sites (Ten Brink 1985).

Project Overview

The land exchange project was conducted in four phases:

- (1) a pre-field literature review,
- (2) an aerial reconnaissance of survey areas,
- (3) a pedestrian survey with subsurface testing, and
- (4) an analysis of survey results with report preparation.

Pre-field literature review included a thorough examination of reports, historical documents and journals, aerial photographs, and topographic maps pertaining to the survey areas.

Aerial reconnaissance consisted of an examination of each exchange unit during low-level helicopter overflights. This allowed field crews to identify areas with high potential of site occurrence, to distinguish areas with conditions amenable to site detection by pedestrian surveyors, and to locate large scale sites such as historic structures or trails.

Survey operations took place from remote field camps within or near each targeted exchange unit. Crews were transported to and from survey locales by helicopter, with the exception of the Swift Fork unit where survey locales were within walking distance of a temporary spike camp. Weather conditions in and around the foothills were variable, ranging from warm, sunny, breezy days to stormy days with windblown sand and rain.

Fieldwork was conducted between June and August of 1988 and 1989. All aspects of the fieldwork were conducted in accordance with the Secretary of the Interior's Guidelines for Archeology and Historic Preservation.

A strong point in the project's research design was the incorporation of interdisciplinary expertise into the field survey. In addition to three to four archeologists, field crews included a historical architect, who provided expertise recording historic structures found in the Dunkle unit (1988), and a geoarcheological specialist (1988 and 1989).

Norman Ten Brink, in the North Alaska Range Project (NARP) Report (Ten Brink 1985), identified the importance of including the expertise of a geoarcheological specialist when searching for late Pleistocene sites. As with the NARP study area, the landforms and depositional units within the land exchange areas are the products of the glacial and periglacial environment prevalent since the late Pleistocene. Successfully dating cultural assemblages from this time period would depend on field crews recognizing important temporal markers, such as episodes of soil formation. A number of the identified research goals were enhanced by the valuable sedimentological, pedological, and geomorphological data collected by the geoarchaeological specialist.

Intensive pedestrian surveys were conducted at areas and locales designated during pre-field research and aerial reconnaissance as having high site potential. Limited subsurface testing (controlled test excavation) was conducted at prehistoric sites to determine the presence of cultural materials and to evaluate their depositional context. Shovel probes were also excavated in non-site areas if the presence of unexposed cultural materials was suspected.

Discussion and analysis of sites and survey data took place after the 1989 field season when all of the field data had been gathered. This included the attempt to fit the recorded sites into existing cultural sequences.

Summary of Survey Results

Approximately 14,650 acres (23 sq mi) of park land received intensive pedestrian survey coverage during the Denali Land Exchange survey. An additional 33,500 acres (52.3 sq mi) were inspected during low level aerial reconnaissance. Survey crews recorded 22 previously unrecorded archeological sites: 13 within land exchange units and nine located outside exchange units (Figures 3 and 4). Of the 13 sites located within land exchange units, seven are prehistoric lithic sites, and six are historic sites. Eight of the sites (seven prehistoric sites and one historic site) occur within the Healy/Stampede unit. The remaining five sites are historic sites in the Dunkle unit.

Of the nine sites recorded outside exchange units, seven are prehistoric and two are historic. Three prehistoric lithic sites occur on the crests of moraines adjacent to the Swift Fork unit. Three prehistoric sites, composed of lithic scatters with high potential for subsurface remains, occur at the confluence of the Savage River and Ewe Creek, south of the Healy/Stampede unit. One prehistoric site was found on a ridge near Bull River several miles north of the Dunkle unit. The two historic sites, both associated with mining operations, are located across the Teklanika River from the Healy/Stampede unit.

A number of the identified project research goals were met. All of the prehistoric sites recorded during the study appear to have been ephemeral hunting overlooks, and manufacture or repair of stone tools took place at several of the sites. All of the historic sites in the study appear to have been directly or indirectly associated with mining or construction of roads to the mines. No pre-12,000 B.P. sites were recorded during the study, and no tephra deposits were found in association with the prehistoric sites to aid in dating the sites. These results are addressed in the Discussion and Conclusion section of this report.

In addition, considerable paleoenvironmental information was obtained from the study. These results are discussed in Appendix C of this report.

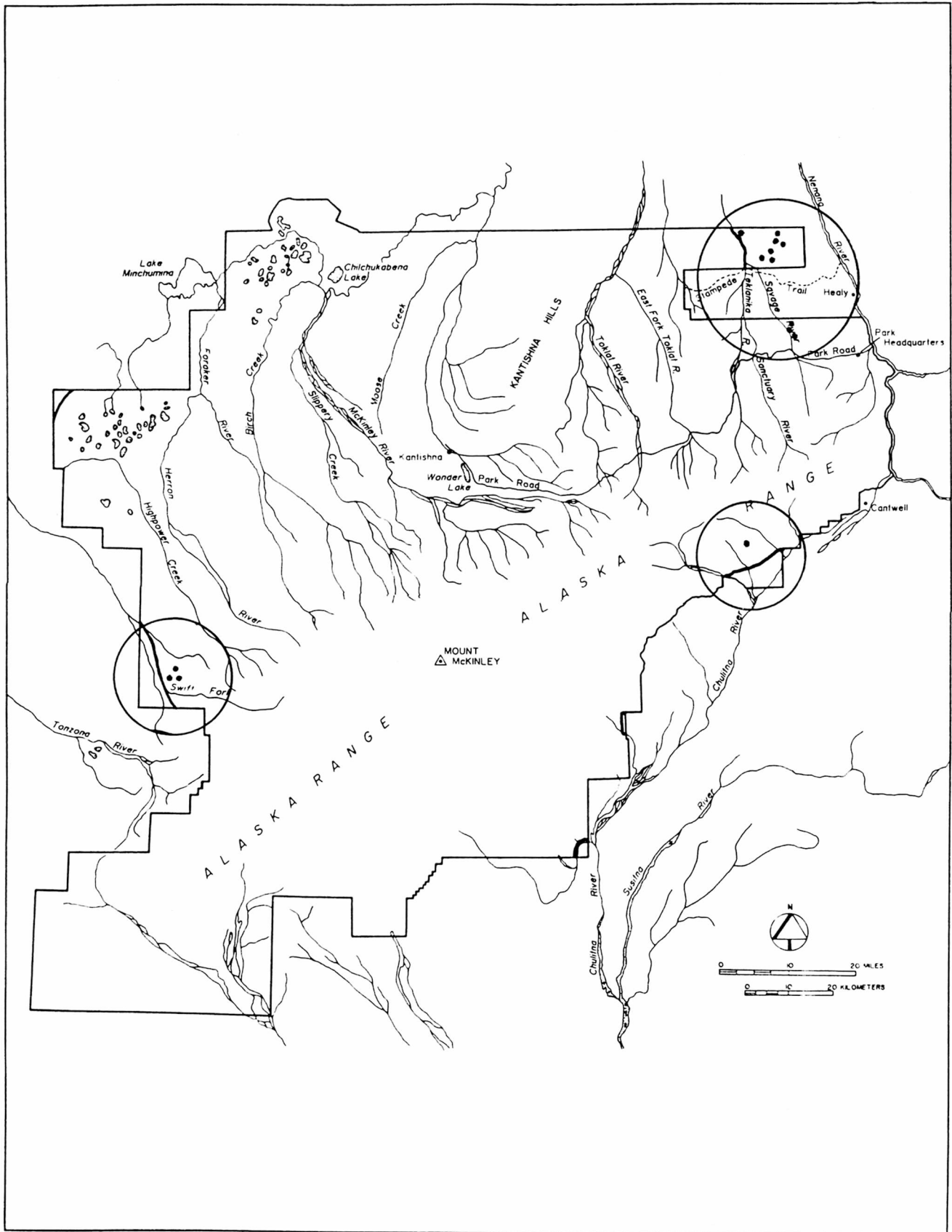


Figure 3. Prehistoric site locations found in and adjacent to proposed land exchange units (adapted from Griffin 1990).

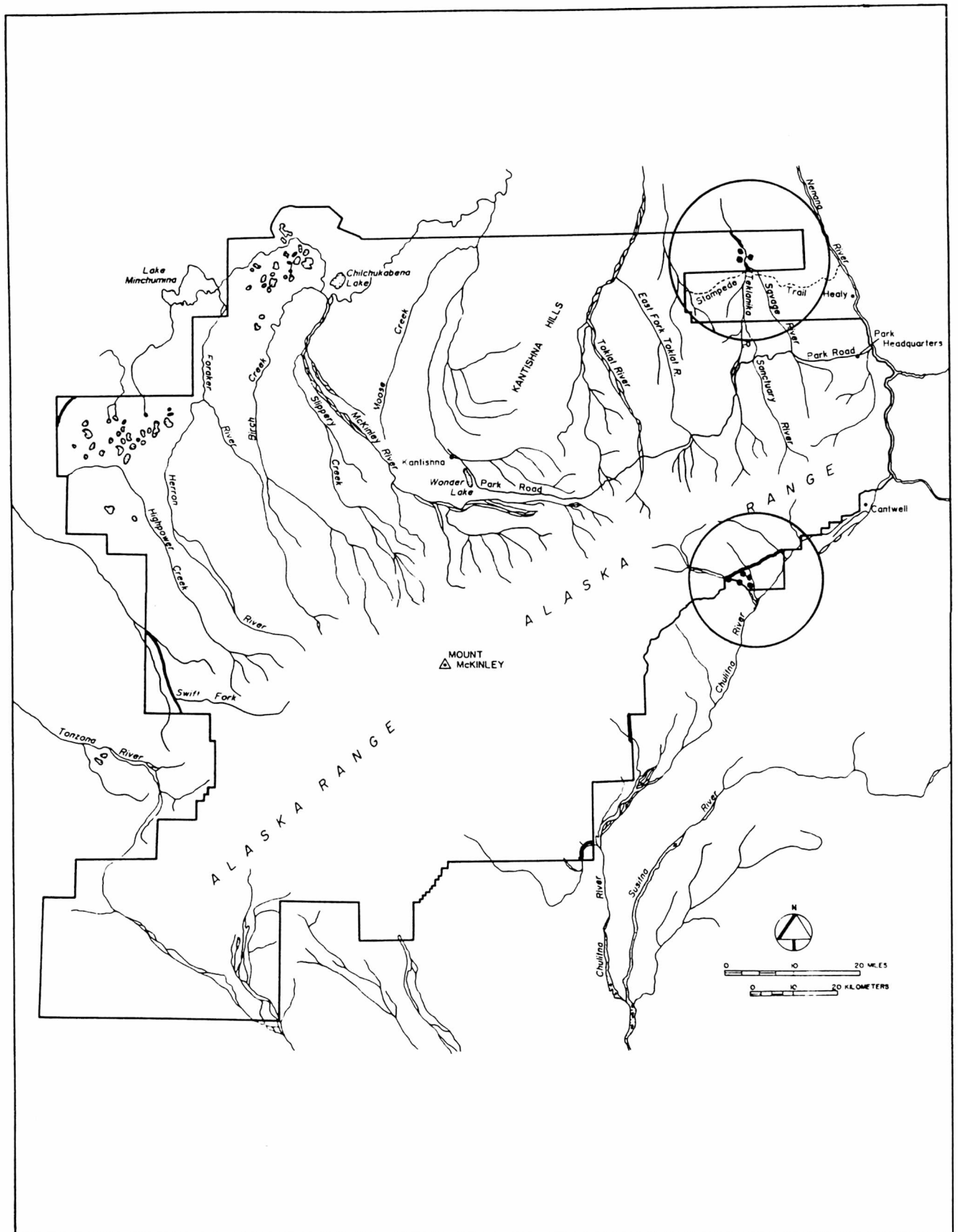


Figure 4. Historic site locations found in and adjacent to proposed land exchange units (adapted from Griffin 1990).

II ENVIRONMENTAL SETTING

The Modern Environment

Physiographic Setting. Four distinct physiographic zones have been identified within Denali NPP:

- (1) the central Alaska Range of mountains,
- (2) the Northern Foothills of the Alaska Range,
- (3) the Southern Foothills of the Alaska Range, and
- (4) the Tanana-Kuskokwim Lowland (Wahrhaftig 1965:Plate I).

Of these, the central Alaska Range, which towers over the other zones, maintains a controlling influence on the environment of the lower elevations.

The central and eastern portions of the Alaska Range consist of two or three parallel, rugged, glaciated ridges, surmounted by groups of extremely rugged, snow-capped mountains. Located within the park, Mount McKinley, North America's highest peak, rises to an elevation of 6,190 m (20,306 ft) above mean sea level. The Alaska Range forms the drainage divide between the north Pacific and the Bering Sea drainage systems. Runoff from the north side of the central Alaska Range finds its way to the Bering Sea by way of the Kuskokwim, Tanana, Nenana, and Yukon rivers; south-flowing runoff belongs to the Chulitna and Susitna river drainage basins and enters the north Pacific Ocean at Cook Inlet.

The Northern Foothills, extending north of the Alaska Range, consist of a series of flat-topped, east-trending hills 610 to 1,372 m (2,000 to 4,500 ft) high, separated by rolling lowlands. Major drainages flow essentially northward from the Alaska Range, forming rugged, V-shaped valleys where they pass through the foothills and broad, terraced valleys in the intervening lowlands (Wahrhaftig 1965:35). These streams contribute to the Tanana/Yukon river drainage system. The Northern Foothills are largely unglaciated.

The Tanana-Kuskokwim Lowland is a broad depression of low relief that borders the Alaska Range on the northwest. Glacial outwash fans, some of which display semicircular belts of moraine deposits at their upper ends, drain from the base of the Alaska Range northward onto the lowlands. Broad, terraced river valleys near the heads of the alluvial fans give way to incised channels farther downstream (Wahrhaftig 1965:29). Drainage in this area flows into the upper Kuskokwim and Tanana rivers.

The Southern Foothills, ranging in elevation from 915 to 1,220 m (3,000 to 4,000 ft), are situated between the central Alaska Range and the Cook Inlet-Susitna Lowlands. These steeply inclined hills are deeply incised by south-flowing glaciers (U.S. Department of

Interior, NPS 1988:38). Drainage is to the south and southeast through the Chulitna and Susitna rivers (Capps 1913:11).

Climate. Two major climatic zones occur within Denali NPP. A continental climatic zone, characterized by long, cold winters and short, warm summers is prevalent north of the Alaska Range (Péwé 1975:4). The south side of the mountains is characterized by a transitional zone influenced by both maritime and continental climates (U.S. Department of Interior, NPS 1988:39). The continental zone typically receives less precipitation and experiences a greater temperature range than does the transitional zone, due in part, to the Alaska Range itself, which forms a topographic barrier to the movement of maritime air masses into the region (Péwé 1975:4).

Within the park, temperature extremes range from 90° F in summer to -52° F in winter. Annual precipitation at Wonder Lake averages around 20.3 inches per year, with about half of that amount falling between June and September. Snowfall within the park ranges between 20 and 60 inches per year (U.S. Department of Interior NPS 1984:120).

South of the Alaska Range the transitional maritime-continental climatic zone exhibits slightly milder temperatures and greater precipitation than the continental zone of the interior. Moisture-laden storms abutting the southern slopes of the range drop larger amounts of snow and rain on those slopes than on the north-facing slopes. Glacier growth rates on the south slopes exceed those on the north slopes, reflecting this difference in precipitation (U.S. Department of Interior, NPS 1984:160).

Vegetation. Due to the great variation in topography, drainage, soil composition, and other interacting factors, the distribution of plant species within Denali NPP forms a patchwork of plant communities. Below the snow line five prominent vegetation associations occur within the park. Detailed descriptions of these floral habitats and their occurrences are found in Viereck and others (1986) and are summarized below:

Low Brush-Bog exhibits a mixture of mossy, herbaceous, and low shrub species, often in association with black spruce trees. Bogs tend to be located in river valleys and around permanent water bodies where periodic or frequent flooding is common. Bottomland spruce-poplar forest is often interspersed with low brush-bog in slightly elevated pockets.

Bottomland Spruce-Poplar Forest is dominated by white spruce and Alaska paper birch trees, frequently in association with balsam poplar, with an understory of willow and alder shrubs. Mosses, *Equisetum* (*horsetails*), and a variety of flowering plants are common in the groundcover. Great diversity exists in the species composition and distribution of this association. This plant community occurs in better-drained lowland areas.

Upland Spruce-Hardwood Forest is composed of an association of white and black spruce, paper birch, balsam poplar, quaking aspen, larch and willow trees with an understory of willow shrubs, resin birch, alder, Alaska rose, cinquefoil, red currant, and other berry shrubs. Mosses and lichens cover the forest floor. This plant community occupies moderate elevations up to 2,000 ft (588 m) within the park, with some outliers growing up to 3,000 ft (882 m) in protected valleys.

Dwarf Shrub and Moist Tundra occur above 2,000 ft (882 m) in elevation, where it forms a groundcover dominated by dwarf birch and willow shrubs. Blueberry, Labrador tea, alpine azalea, and crowberry are common in this association. Grasses and sedges occupy the wetter areas at this elevation.

Alpine Tundra occurs on a thin soil mantle and among rock outcrops. Species composition varies from cottongrass tussocks with some sedges and dwarf shrubs to stands where dwarf shrubs dominate. Plants found in the alpine tundra association include mountain avens, bearberry, crowberry, ground willow, alpine azalea, and lingonberry. Only lichens are found on the highest and rockiest areas just below the zone of barren rock and ice.

Fauna. A wide variety of mammal species inhabit the park. These include moose, Dall sheep, brown/grizzly bear, wolf, and caribou. Distribution and abundance of species vary dramatically with the seasons, largely due to migration, hibernation, and available food resources. As a general rule large mammals occur in greater numbers north of the Alaska Range. Smaller mammal species inhabiting the park include beaver, red fox, hoary marmot, coyote, collared pika, arctic ground squirrel, red squirrel, snowshoe hare, lynx, otter, porcupine, marten, wolverine, weasel, and several species each of mouse, lemming, and vole (U.S. Department of Interior, NPS 1988:41).

Diverse species of birds and insects appear in the park. Avian raptor species recorded in 1983 include bald eagle, northern harrier, sharp-shinned hawk, red-tailed hawk, golden eagle, American kestrel, merlin, and gyrfalcon (U.S. Department of Interior, NPS 1984:131). Other bird species include chickadee, raven, magpie, woodpecker, ptarmigan, owls, and trumpeter swans (U.S. Department of Interior, NPS 1988:42).

Several species of fish are within the park. Although the headwaters of many rivers in the park are too heavily laden with sediment to support fish populations, the lower reaches of the streams contain a variety of fish species, including king, coho, and chum salmon, arctic char, Dolly Varden, whitefish, burbot, northern pike, sheefish, and grayling (U.S. Department of Interior, NPS 1988:42).

PALEOENVIRONMENT

Extensive paleoenvironmental research details a 40,000-year vegetational history for the Denali area. This history is based primarily on Thomas Ager's analysis of pollen cores taken from lakes and peat bogs in the park on the north side of the Alaska Range and from other research in the Tanana Valley and to the east of the park (Ager 1975, 1980, 1985).

According to Ager (1980), the pollen record indicates that the foothills and lowlands north of the Alaska Range were treeless and covered by an herbaceous tundra with scattered low willow and dwarf birch shrubs during the middle Wisconsin period, 40,000 to 25,000 Before Present (B.P.). The climate at that time is thought to have been cooler and somewhat drier than today. Spruce forests probably grew at the lower elevations of the interior.

By the late Wisconsin period (25,000 to 13,500 B.P.) the climate had become arid and very cold, with light snowfall during severe winters, and cool, dry summers. The landscape was covered by a discontinuous herbaceous tundra, with xeric (dry land) habitats predominating. The vegetation was very similar from the Tanana Lowland to the foothills of the Alaska Range, suggesting a more poorly defined vegetational zonation than that which exists today. The snow line was probably 300 to 400 m lower in elevation than the modern level (Péwé and Reger 1972), about 1,200 to 1,300 m (approximately 4,000 ft) in the project area. Strong winter winds and diurnal katabatic winds sweeping off the glaciers and across the outwash plains of the Tanana-Kuskokwim Lowland would have created a gray haze of glacial dust that gradually mantled the landscape in thick loess deposits through the millennia. From 13,500 to 11,000 B.P., the climate appears to have oscillated, although it was generally warmer and more moist than during the preceding period. This warmer, wetter climate allowed the previously restricted shrub tundra to become established in the interfluvies between the glacial rivers, and eventually supersede the herbaceous tundra, which became confined to the higher altitudes and the periphery of the glacial outwash plains.

By 11,000 B.P., the summers were probably warm and dry enough to permit the rapid spread of poplar trees in the Tanana area. The predominant vegetation of this period was still the shrub tundra, with willows and poplar trees gradually encroaching along the river valleys toward the mountains.

At the beginning of the Holocene around 9,500 years ago, spruce woodland spread rapidly through the lowlands and river valleys. In many places, spruce and alder species arrived simultaneously. Between 9000 and 7500 B.P., the climate was warm and possibly moist, followed by a period of climatic oscillations with warm, dry summers and low winter snowfall that lasted until about 3500 B.P. During this time the spruce-alder association continued to spread. From about 3500 B.P. to the present, the climate has been somewhat cooler and more moist than during the preceding few millennia. During this time spruce forests and mixed forest-tundra communities had invaded all major valleys to the level of treeline.

Ager (1985) postulates that between 14,000 and 9000 B.P., bands of herbaceous tundra consisting of sedges, grasses, *Artemisia* and forbs, endured along the outwash plains of the major glacial rivers of the central Alaska Range. This association was the preferred habitat of the large grazing animals that became extinct at the end of the Pleistocene or early Holocene (Guthrie 1968; Ager 1980). The outwash sediments would have been separated from each other by shrub tundra communities, providing refuge for grazers, restricting their movement and concentrating them in small enclaves in predictable locations. This scenario has far-reaching implications for human populations dependent on the animals for survival. Consideration of these environmental changes is reflected in the research design and sampling strategy of the land exchange survey.

III CULTURAL ENVIRONMENT

Prehistory

The following is an encapsulation of the cultural history of the Alaska interior surrounding Denali NPP. For a more detailed discussion of the prehistory, research questions, and archeological interpretation of the region, see *An Overview and Assessment of Archeological Resources, Denali National Park and Preserve, Alaska* (Griffin 1990).

Regional Chronology. Human occupation of the North American continent probably began before the end of the Pleistocene, although many gaps remain in the archeological record. The prehistory of interior Alaska is particularly incomplete. The archeological record reflects the harsh preservation environment and often thin soils of the interior, in that many sites are shallow and poorly stratified. Of the deeply buried, stratified archeological sites that are known, comparatively few have been excavated (Dixon 1985:47). In spite of these limitations, archeologists have attempted to define a basic cultural sequence for the region. The refinement of the sequence continues from year to year with the discovery, excavation, and analysis of cultural materials from sites in the region. As data are analyzed, artifact assemblages and components are compared and contrasted with those of other sites in the region to determine their interrelationship. From this information a basic regional chronology is gradually being developed for interior Alaska.

The human occupation chronology for the Denali area of interior Alaska consists of three broadly defined cultural traditions, based on similarities of tool types and similar radiocarbon dates found in the archeological assemblages of representative sites. These are the Paleoarctic, the Northern Archaic, and the Athabaskan Tradition. Another early cultural manifestation, identified as the Nenana complex, may represent even earlier occupation of the area (Powers and Hoffecker 1989).

Nenana Complex (12,000 B.P. to 11,000 B.P.) The oldest firmly dated archeological assemblages in Alaska are known as the "Nenana complex," (Hamilton and Goebel 1996; Powers and Hoffecker 1989:278). The Nenana complex, which may reflect Paleoindian presence in the region at the end of the Pleistocene, represents the earliest known occupation of the northern foothills of the Alaska Range (Hamilton and Goebel 1996). The Nenana complex assemblages are represented at four sites in the vicinity of the park: Dry Creek (HEA-005), Moose Creek (FAI-206), and Walker Road (HEA-130) in the Nenana Valley (Powers and Hoffecker 1989), and Owl Ridge (FAI-091) in the neighboring Teklanika Valley (Phippen 1988). Similar cultural materials were found at all four sites in the lowest cultural component (Component I) of deeply stratified eolian deposits, which have been dated between 11,000 and 12,000 B.P. by radiocarbon or fluoroluminescence (Hamilton and Goebel 1996; Powers and Hoffecker 1989).

Technologically, the cultural materials of the Nenana complex differ from younger, overlying assemblages. Diagnostic elements of the Nenana assemblages include Chindadn points--small, teardrop-shaped projectile points--and small triangular points. The most distinctive difference between the Nenana complex and later Paleoarctic components is the absence of microblade and wedge-shaped microcores--considered to be the distinguishing elements of Paleoarctic assemblages.

Components bearing the Nenana complex assemblages are found on well-drained outer terrace margins of early Wisconsin-age glacial outwash adjacent to side valley ravines. The sparse assemblages appear to represent short-term, presumably seasonal use of the sites for hunting large game animals (Goebel and Powers 1989).

Paleoarctic Tradition (11,000 B.P. to 8000 B.P.) Distinct from the Nenana complex is the American Paleoarctic Tradition, a stone technology thought to span the period from 10,700 B.P. to 8000 B.P. The American Paleoarctic Tradition, also termed the Beringian Tradition by West (1981), was first defined by Douglas Anderson (1968). The hallmark of this tradition is microblade and wedge-shaped microcore technology, which is absent in the Nenana complex. Similar assemblages occur on both sides of the Bering Sea, although the Siberian sites, which West (1981) terms representative of the Western Beringian Tradition, are somewhat older than the Alaska Paleoarctic sites (West 1981:78-111; Powers 1973). Paleoarctic sites usually occur in unglaciated areas of the late Wisconsin age.

The Denali complex, representing the American Paleoarctic Tradition in the Denali area, is found overlying the Nenana complex component at Dry Creek, other Nenana Valley sites, Owl Ridge, and the Teklanika River sites. The assemblages have been dated by radiocarbon to a period between 10,000 and 7000 B.P., which is consistent with dates from Denali complex components in other parts of central Alaska.

Typical artifact types in Denali assemblages include prepared, wedge-shaped microcores, microblades, burins, scrapers, and a large variety of bifacially flaked knives (Dumond 1987:40; West 1967:360). However, Dry Creek Component II, dated to around 10,700 B.P. (and assigned to the Denali complex), contains discreet activity areas, some of which do not contain microblades (Powers and Hoffecker 1989:278).

The Denali complex components are found in the same topographic situation as the Nenana complex sites. However, the Denali sites appear to reflect more intensive use than the Nenana complex sites, suggesting longer periods of occupation, a larger population, or more repeated use, or all three of the above (Powers and Hoffecker 1989:284).

Some debate is ongoing as to whether Nenana complex assemblages represent a cultural group distinct from the makers of Denali complex materials or whether

technological differences result from differences in activities, seasonality, or sampling bias. These questions are discussed more fully by Powers and Hoffecker (1989).

The Chindadn complex, also considered by some to be a component of the American Paleoarctic Tradition, was first identified and defined at the Village Site at Healy Lake (Cook 1969). The typical Chindadn assemblage contains a variety of bifacial forms including the small, thin, triangular projectile point termed a "Chindadn Point", as well as microblades, microcores, and burins. Early dates of around 11,000 B.P., obtained from radiocarbon-dated bone apatite samples at Healy Lake suggested an affinity with the Nenana complex. However, the presence of microblades and microcores in the assemblages appears to be more definitive of the Paleoarctic Tradition. At present the problem of the position of Chindadn complex is still unresolved, and only additional research can define its appropriate place in the cultural sequence of interior Alaska.

The Denali complex, first defined by West (1967) at the Teklanika sites (HEA-001 and HEA-002) in Denali NPP, has also been recognized at the Campus site (FAI-001) in Fairbanks, the Donnelly Ridge site (the type locality for the Denali complex), the Dry Creek site and others. Denali occupations were originally thought to date between 11,000 and 10,000 B.P. (West 1967). More recent studies, however, hint that the Denali complex may have phased out at a considerably later date. A reanalysis of the archeological materials from the Campus site suggests that the site is more recent than previously thought (Mobley 1991). Mobley's study derived radiocarbon dates from Campus site materials dating no older than 3500 ± 140 B.P., and two other samples from the site were dated at 2860 ± 180 and 2725 ± 125 B.P. respectively (Mobley 1991:95).

These findings add weight to the proposition now held by some archeologists, of an early and a late aspect of the Denali complex, with the late manifestation spanning the time from around 4500 B.P. to as late as 1000 B.P. This conclusion is based on a number of small sites with Denali complex components found in the Susitna Basin that are associated with tephras dating between 4,500 and 1,500 years old (Dixon and others 1985:178). This argument also suggests certain affinities of the late aspect with the Northern Archaic Tradition (Dumond 1987:52; Bacon 1977:1), although West disputes this conclusion (1981:134).

Northern Archaic Tradition (6000 B.P. to 4400 B.P.) Relatively few sites of the Northern Archaic Tradition have been found in interior Alaska to date. The tradition was first identified in northwest Alaska (Anderson 1968) and later extended to the interior. Its development seems to parallel environmental trends toward climatic warming and expansion of boreal forests in the early Holocene. Large side-notched and corner-notched points and an absence, at least in some instances, of microblade technology--the traits that identify Northern Archaic sites--may be part of a technological adaptation to a changing environment; or they may reflect new ideas

introduced by different people expanding into the newly forested interior. It may be that these technological elements--lanceolate and side-notched points--were introduced by people moving northward during the Thermal Maximum between 7000 and 6000 B.P. At the same time, the microblade technology continued to endure in some parts of Alaska. Thus, there is a strong implication that a blending of the two technologies took place during this time, at least in some areas of Alaska, and that the ancestry of the Northern Archaic peoples included not one but two predecessors (Dumond 1987:54). It has also been suggested that the Northern Archaic Tradition is ancestral to the Athabaskan Tradition, although much research is needed to support this position.

Two complexes, the Palisades and the Tuktuk, are commonly ascribed to the Northern Archaic Tradition. Northern Archaic assemblages, both with and without microblades, have been reported from central Alaska and the southwestern Yukon Territory (MacNeish 1964; Workman 1978) and in the Brooks Range, where they are found in association with tent rings (Campbell 1961).

The Palisades complex, whose assemblages include side-notched points, end scrapers and large, unifacially chipped knives but no microblades, was described at Cape Krusenstern (Giddings 1967) and at Onion Portage (Anderson 1988:73-88), but has not been found near Denali.

The Tuktuk complex, whose assemblages include side-notched projectile points, bifacial knives, endscrapers, notched pebble artifacts, and microblades from broad tabular cores (Dumond 1987:51), was first described at Anaktuvuk Pass by Campbell (1962:33-42). The name Tuktuk has since been applied to other Northern Archaic, notched point-microblade assemblages, several of which are found in the Denali area of interior Alaska.

A notched point-microblade assemblage very similar to Tuktuk was revealed in Level 3 at Healy Lake Village Site, east of Denali NPP (Cook 1969:324). Similar assemblages have been described from Lake Minchumina, immediately northwest of the park (Holmes 1986:156-157), and at Butte Lake in the Alaska Range about 50 miles east of Denali (Betts 1987). A Northern Archaic component without microblades, dated at 3500 B.P., is present in Component IV at Dry Creek, where it appears to bear no relationship with the Denali complex assemblage in the underlying, 10,700 year-old Component II, (Powers and others 1983:395).

A local Northern Archaic sequence has been described by archeologist, Charles E. Holmes, at Lake Minchumina, where two major traditions were observed: an earlier Minchumina Tradition, dating from 2600 B.P. to A.D. 1000, and an unnamed tradition, dating from A.D. 1400 to early historic time, that is presumably protohistoric Athabaskan (Holmes 1986:156). Both notched points and microblades

occur in the Minchumina sequence, with notched points appearing in the middle of the three-phase sequence and microblades gradually decreasing in numbers.

Holmes has divided the Minchumina Tradition into three related phases: Blueberry (early), Cranberry (middle phase), and Raspberry (late). Another occupation, the Dogwood phase, distinct from the other phases, appears to be intrusive into the Raspberry phase. The Dogwood phase is characterized as Ipiutak--a late stage of the coastal-oriented Eskimo Norton Tradition. There is no archeological evidence at Lake Minchumina to indicate that the two groups intermingled or even occupied the area coincidentally (Holmes 1986:158).

The Susitna Hydroelectric Project Cultural Resource Program produced a local cultural sequence for the Susitna drainage south of the park, based on analysis of data retrieved during the project, which operated between 1970 and 1985 (Dixon and others 1985). This sequence is shown below:

American Paleoarctic Tradition	10,500 B.P. to 5200 B.P.
Northern Archaic Tradition	5200 B.P. to 3500 B.P.
Late Denali Complex	3500 B.P. to 1500 B.P.
Athabaskan Tradition	1500 B.P. to 100 B.P.
EuroAmerican Tradition	A.D. 1900 to Present

Athabaskan Tradition The most recent cultural groups to occupy and utilize the area around Denali were Athabaskan Indians, who ranged over the area in seasonal subsistence rounds until the early twentieth century (Schneider and others 1984). Athabaskans may represent a separate eastward migration from Asia, distinct from Paleoarctic and Northern Archaic peoples. It is uncertain, however, how far into the past the Athabaskan identity extends; no real consensus prevails as to a beginning date for the Athabaskan tradition. Estimates of *in situ* development vary from 11,500 years (Cook 1975) to about 6,000 years (Aigner 1986:130), and even more conservatively, from 1500 B.P., as defined by Dixon and others (1975) and Kari and Fall (1987). The conservative estimate of 1,500 years, based on linguistic evidence (Kari and Fall 1987:13-14), is used here as a cultural starting point of known Athabaskan presence in interior Alaska.

Athabaskan assemblages lack finely worked stone artifacts, reflecting a greater reliance on wood and bone tools. Representative artifacts include beads and buttons, boulder spall scrapers (*tchi-thos*), unilaterally barbed bone points, and bone gaming pieces. There is evidence, in the form of exotic materials such as copper and obsidian, of a growing aboriginal trade network (Cook 1975).

At present, few Athabaskan sites have been excavated in Alaska. Most of the sites that have been excavated are situated in or near the Copper River basin, some 200 mi southeast of Denali NPP. Among the best known of these sites are GUL-077 near

Gulkana (Workman 1976) and *Dakah De'nin's* village near Chitina (Shinkwin 1979), *Dixthada* near Mansfield Lake in the upper Tanana Valley (Shinkwin 1979:197-199), and two sites near Paxson Lake along the Gulkana River (Ketz 1983). In the Denali area a late prehistoric to protohistoric Athabaskan site was partially excavated in 1975 near the park entrance. Several radiocarbon dates obtained from the prehistoric component of the site, designated the Nenana River Gorge Site (HEA-062), placed occupation between the fourteenth and eighteenth centuries (Plaskett 1977:214). The various loci are thought to represent seasonal use of the site as a hunting camp.

In his Lake Minchumina sequence, Holmes (1986:158) describes a single phase--the Spruce Gum phase--which he considers to be protohistoric Athabaskan, although he hesitates to identify it as a part of the Athabaskan Tradition. The Spruce Gum assemblage displays a dramatic change in the material culture, compared to the phases of the Lake Minchumina Tradition and to the Dogwood phase, with an increased number of copper tools and ornaments and a decrease in lithic tools. Human cremation, ethnographically known to have been practiced by Athabaskans, was evident in the Spruce Gum phase (Holmes 1986:158, 159). The Athabaskan cultural pattern is more fully discussed in the ethnographic section.

Archeological Research Within the Park. Archeological research in Denali NPP began in 1960 and continued sporadically until the mid-1970s. Since that time, research has been conducted within the park and the adjacent Nenana, Susitna, and Kuskokwim drainages with increasing frequency. A number of these studies have generated regional and statewide chronological schemes and were discussed in the preceding discussion of regional chronology.

The first archeological sites documented within Denali National Park (then named Mt. McKinley National Park) were located in 1960, when members of a University of Alaska geology field camp, under the direction of Dr. Robert B. Forbes, found two sites near the Teklanika campground (Morgan 1965). At the time, very little was understood about the archeology of interior Alaska. Previous work had been limited primarily to the excavations of archeologists Nels Nelson and Froelich Rainey at the Campus site at the University of Alaska, Fairbanks (Nelson 1937; Rainey 1939, 1940), and the work of Rainey at the Dixthada site near Mansfield Lake in the upper Tanana Valley, east of the park (Rainey 1939, 1940, and 1953). The Campus site produced core and blade materials that Nelson (1937) found comparable to artifacts from Asia, suggesting cultural affiliations between the two areas. Rainey (1939, 1940, 1953) documented two occupations at Dixthada: an upper deposit attributable to an Athabaskan Indian presence, and a lower deposit with core and blade materials similar to the Campus artifacts.

With this limited background information, an excavation program was initiated during the summers of 1961 and 1962 at the two Teklanika River sites--Teklanika West (HEA-001) and Teklanika East (HEA-002)--by Frederick Hadleigh-West of the Department of Anthropology,

University of Alaska, Fairbanks (West 1965). West later made a typological comparison of the artifacts from the Teklanika sites to artifacts from the Campus site and the Donnelly Ridge site near Paxton Lakes in central Alaska (West 1967). Based on comparisons of stone tool types with assemblages from other sites, West originally suggested an age between 10,000 and 12,000 years for the Teklanika sites. More recent radiocarbon analyses conducted on samples taken during the original excavations suggest a much more recent date of 3500 to 3800 B.P. (West 1975:79). However, West supports the interpretation of greater age, based on the stratigraphic placement of the samples. The Teklanika typology was incorporated into West's definition of the Denali complex--the first proposed cultural complex recognized in interior Alaska archeology--and the Teklanika River sites became recognized as one of the type locales for the complex.

After the initial discovery of the Teklanika River sites, H. Morris Morgan of the University of Alaska undertook a reconnaissance level survey of Mt. McKinley Park during the summer of 1963 (Morgan 1965). The survey area centered along the main park road, in areas of high elevation. During the survey, Morgan located 11 previously unrecorded sites.

The following summer (1964), Adan E. Treganza of San Francisco State College resumed the survey and also made limited excavations at the Teklanika River sites (Treganza 1964). During the survey, Treganza revisited many of the sites that Morgan had documented the previous summer and recorded five additional sites.

Following the 1964 survey, Treganza reported that the park had been thoroughly inventoried, with the possible exception of the area west of the McKinley River, which at that time was completely inaccessible. His statement that "No further work is recommended for Mount McKinley National Park, as human prehistory appears not to be one of its attributes" (Treganza 1964:31), bolstered by a similar statement by Morgan (1965), halted archeological research in the park for more than a decade. Morgan qualified his statement by characterizing the Denali sites as undated, but containing some tool forms that may imply antiquity. He further stated that the sites tended to occur on high ridges between 2,500 and 3,000 ft elevation (Morgan 1965:7). However, it is worth noting that Morgan's survey followed the road corridor into the park on a course averaging 2,000 to 3,000 feet elevation, and that all of the sites recorded were located within one to two miles of the road.

Since the surveys of the early 1960s, several sites have been reexamined, including resurveys by West in 1967 and 1968, in an attempt to retrieve datable material that would tie the Teklanika sites more firmly into a regional chronology (West 1968). Currently, no reports have been published on these visits, although three dates--one obtained from a charcoal sample and two from paleosols associated with the cultural materials at the site, appear to date the site to between 3820 ± 115 B.P. and 3465 ± 120 B.P. (West 1975:79).

In 1975 and 1976, Charles Holmes and David Plaskett conducted archeological surveys in the Nenana and Teklanika valleys. Portions of these lands later became incorporated into the enlarged Denali NPP in 1980. Thirty-one sites (19 prehistoric and 12 historic) were located

during these surveys. Two of the sites, located within the Healy/Stampede unit, were reexamined in 1989.

In 1980, National Park Service archeologist, Craig Davis, recorded 25 additional sites within Denali NPP, located primarily on lands newly acquired under the Alaska National Interest Lands Conservation Act (ANILCA). Several of these sites contained artifacts reminiscent of the Denali complex materials (Davis 1981).

Since the late 1970s, archeological compliance surveys in the park have proceeded in conjunction with construction and improvement projects, largely on a case by case basis. Until recently, most of the attention centered around the park headquarters area, campgrounds, and the park road.

Beginning in 1986, NPS archeologists, historical architects, and historians have conducted an inventory and assessment of cultural resources in the mining areas within Denali NPP under the Cultural Resources Mining Inventory and Monitoring (CRMIM) Program. During this project, 64 historic and 13 prehistoric sites were recorded, for a total of 77 cultural resource sites within the claims areas. The CRMIM report is currently in preparation (Saleeby 1994). The Denali Land Exchange surveys were conducted in conjunction with the CRMIM Program in 1988 and 1989.

Archeological Research Adjacent to the Park. Several archeological projects located outside the Denali NPP boundaries but in the park vicinity have been undertaken in recent years. Of these, three are especially pertinent: the Lake Minchumina excavations, the Susitna Hydroelectric Project, and the North Alaska Range Project (NARP).

At Lake Minchumina, outside the northwest corner of the Denali NPP, archeologists have excavated three sites. The Birches site (MMK-005), located in 1962 by Edward Hosely, consisted of eight semisubterranean houses, first thought to be of late prehistoric (*circa* A.D. 1310) Athabaskan affiliation (Borden 1963:577). Later analysis of the Birches assemblage, which resembles Ipiutak artifacts from a late stage of coastal Norton Tradition, suggested an earlier date of approximately 1500 B.P. (C.E. West 1978). Between 1972 and 1978, Charles E. Holmes investigated the Lake Minchumina area and excavated two sites on the lake shore (MMK-004 and MMK-012). Analysis of this data was used to define the Minchumina cultural sequence (Holmes 1986a:155).

To the south of Denali NPP, the Susitna Hydroelectric Project Cultural Resource Program, which operated from 1979 through 1985, located nearly 250 archeological sites (Dixon and others 1985). The Susitna Project also produced a detailed description and analysis of a sequence of tephra (volcanic ash) layers in the area. These tephra deposits have proven invaluable as chronological horizon markers for the region (Dixon and others 1985).

Perhaps the most actively pursued research question for interior Alaska in recent years has been the search for the remains of the first human groups to inhabit North America. The 1973 discovery of the Dry Creek site (Holmes 1974) near Healy, northeast of the park, and its subsequent excavation, yielded radiocarbon-dated evidence of late Pleistocene occupation (Powers and Hamilton 1978). This discovery was the beginning of an extended large-scale excavation and interdisciplinary research, which included the North Alaska Range Project (NARP), conducted between 1976 and 1982, in the attempt to identify areas of high potential for sites of early human occupation in Alaska (Ten Brink 1985).

These research projects have contributed significantly to our understanding of the park's cultural past and provided a valuable cultural and environmental database for the formulation of the land exchange surveys.

Ethnographic Setting

Ethnographic information pertaining to Athabaskan groups has been derived from ethnographic, ethnohistorical, linguistic and oral sources. Formal ethnographic studies such as those of James Van Stone (1974) for the Athabaskans in general, Robert McKennan (1959; 1981) for the Tanana, Edward Hosley for the Upper Kuskokwim Kolchan, and Cornelius Osgood (1966) and James Fall (1987) for the Tanaina (Dena'ina) provide broad background information for the linguistic groups. Place name studies--a subdiscipline of ethnogeography--aid in defining the territories used by the specific Native language groups in the past (Kari and Fall 1987; Gudge-Holmes and others 1991). Finally, the collection of oral histories from Native elders has contributed significantly to the reconstruction of late nineteenth century lifeways in the vicinity of Denali NPP (Gudge-Holmes and others 1991).

The greatest body of ethnographic information specifically relating to the five Athabaskan groups that formerly ranged over the Denali area has been compiled by Dianne Gudge-Holmes (1979, 1984, 1989, 1990, 1991). The five groups are discussed in depth by Gudge-Holmes in the Denali Overview and Assessment (Griffin 1990).

Prior to EuroAmerican contact, five northern Athabaskan Indian groups--the Tanaina (Dena'ina), Ahtna, Lower Tanana, Koyukon, and Upper Kuskokwim (Kolchan)--used portions of Denali NPP seasonally as hunting grounds (Figure 5). All five groups were Athabaskan language speakers, had an economy oriented toward hunting large game, and shared similar regional settlement patterns.

In aboriginal times, the northern Athabaskans inhabited the boreal forests of Alaska where they lived by harvesting the resources of game animals, fish, birds, and plant foods seasonally as they became abundant. Although the people primarily hunted large animals, salmon also played a dominant role in their subsistence economy in those areas where it was available.

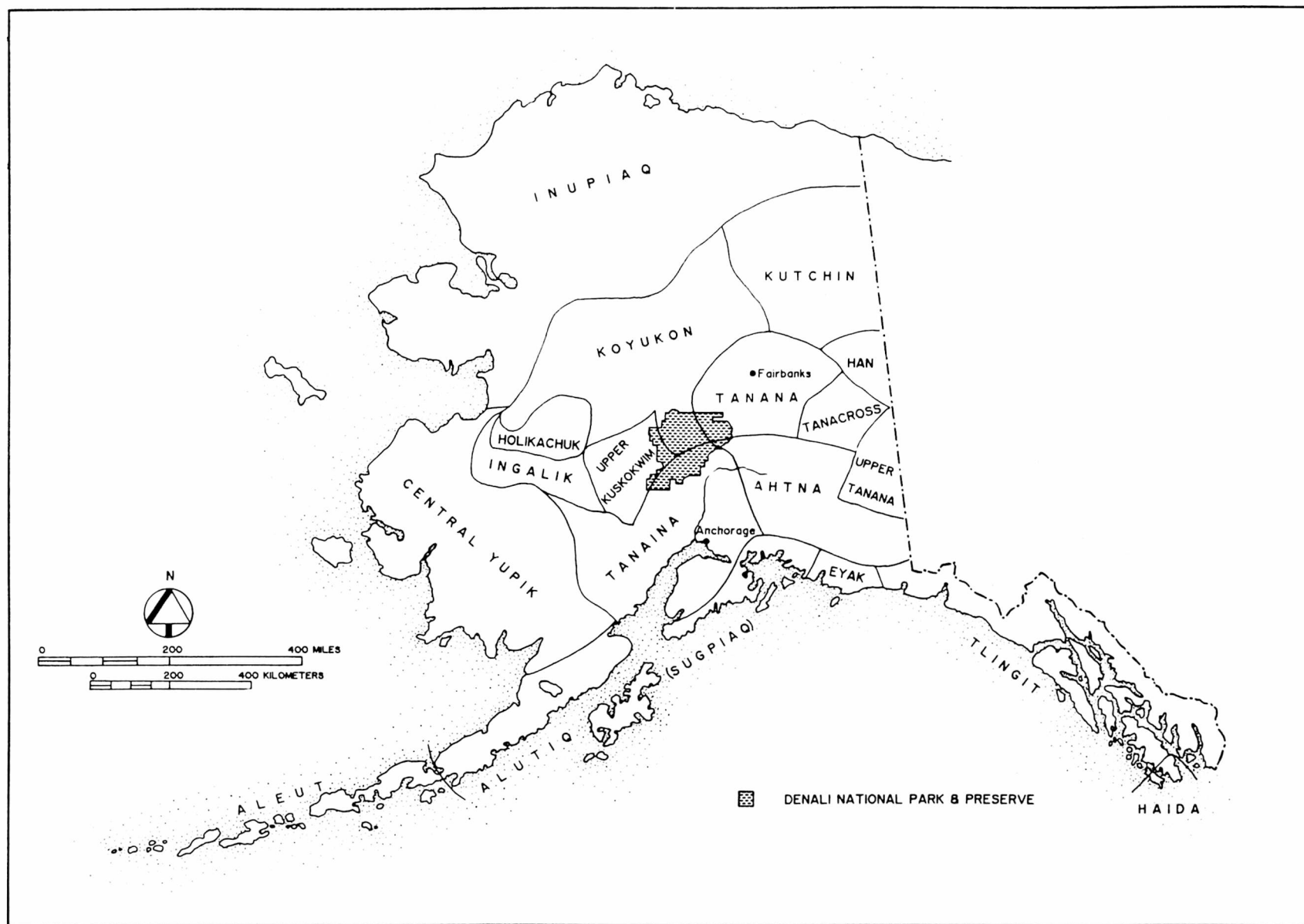


Figure 5. Language and territory of cultural groups historically represented in Denali NPP (Griffin 1990).

An extremely flexible lifestyle was necessary to exploit the resources as they became available, with continual coalescing and dispersal of people into larger or smaller units as circumstances demanded. Certain resources were abundant in some geographic areas and not in others, making it necessary for the people to travel long distances in their yearly subsistence cycle, ranging over large territories that sometimes overlapped with the use area of another group. Thus boundaries were not precise but oscillated back and forth through time.

The seasonal cycles varied from group to group and from year to year, depending upon the abundance of the local resources. Also, the cycle would modify from year to year as the numbers of animals fluctuated for one reason or another. When critical environmental changes occurred, game animals might vacate whole territories, with consequent abandonment of these areas by the people. Conversely, if a group's harvest was greater than needed, the surplus could be traded to neighboring groups whose territory did not include that particular commodity or stored up for potlatches. Thus trading networks, some of which extended to the coast, were established throughout interior Alaska.

Socially, the northern Athabaskans lived in small related groups who recognized descent through the matrilineal line. In winter the people commonly gathered in semi-permanent winter settlements composed of several semisubterranean winter houses, each of which usually held several related families. In summer, they dispersed to fish camp if they had salmon in the area and to other special activity camps during other seasons.

The Athabaskan people did not form self-defined tribal units, but rather maintained a cultural continuum of small local bands that made up both social and geographic units whose language and lifeways differed only slightly from their neighbors (McKenna 1981:562; VanStone 1974:8). Band membership and structure were fluid and transitory, with any particular band retaining the basic composition for approximately three generations (Hosley 1981:546).

Although the people did not have a tribal leader or chief who presided over the entire area, a local "headman" provided leadership by organizing hunting and trading parties and generally maintained the well-being of the group as a whole. The headman, who was usually considered a man of wealth, had great status in the community and carried a great deal of responsibility (Fall 1987:42).

Among the five groups, distinctive differences noted in language dialects, dominant food resources, group size, and scheduling of subsistence activities within the yearly round are described below.

The Upper Cook Inlet Tanaina (Dena'ina). The Upper Cook Inlet Tanaina--a subgroup of the Tanaina Indians, who call themselves Dena'ina--inhabited the northern part of Cook Inlet in southcentral Alaska. Their territory extended up the Susitna River to the

north into the Talkeetna Mountains and into the Alaska Range. The southern extent of their territory was occupied by bands whose subsistence activities were centered on the harvest of marine mammals and salmon; seasonally they traveled inland to hunt large animals and trade with neighboring groups. Rainy Pass, on the mountainous western boundary of their territory, formed an abrupt border with the Upper Kuskokwim Kolchan Athabaskans, with whom the Tanaina held an uneasy truce.

The northern territory of the Upper Cook Inlet Tanaina reached into the Alaska Range as far north as Broad Pass (Kari and Fall 1987:180). The people occupying this area were a mixed band consisting of Tanaina and Ahtna, the latter having apparently migrated into the Talkeetna River area in the early nineteenth century. The Lower Tanana Athabaskans also shared the Broad Pass area as a southern limit of their range. A well-traveled trail through Broad Pass (now the route of the Alaska Railroad), was used for trading and visiting between the Upper Cook Inlet Tanaina and the Lower Tanana Indians, who maintained good terms with each other (Kari and Fall 1987:180).

The Western Ahtna. Before EuroAmerican contact, the Ahtna region extended north and west from the lower reaches of the Copper River, with the Wrangell Mountains forming the eastern boundary and the Matanuska, Talkeetna, and Susitna drainages marking the western border. Four dialectic groups of Ahtna--Lower, Middle, Upper, and Western--occupied this geographic area.

In mid-nineteenth century, a band of Western Ahtna known as the "little timber people," moved into the upper Susitna drainage occupied by Tanaina and into Lower Tanana territory on the upper Nenana drainage. The indistinct border separating the three linguistic groups formed a common hunting zone. The Western Ahtna appear to have had a great deal of interaction with the Tanaina, whom they regarded as friends and relatives (deLaguna and McClellan 1981:641). Relations between the neighboring Western Ahtna and Lower Tanana were strained, and after a "war" between the two groups near Butte Lake in the Alaska Range in the mid-1800s, the Lower Tanana abandoned the area to the Western Ahtna (deLaguna and McClellan 1981:642). The Western Ahtna then expanded their territory into the area vacated by the Lower Tanana, to include Nenana Glacier, Jack River, Carlo Creek, Yannert Fork, Riley Creek and Healy River drainages in the park vicinity (Kari and Buck 1983:map).

The Western Ahtna were primarily large-game hunters who based their economy on the caribou herd that roamed between the Gakona River and the south flank of the Alaska Range. Generally, the winter settlements of the Western Ahtna were located close together in the middle of the caribou migration route that composed their main hunting country. For the most part, salmon were not available to the western Ahtna except for the most easterly groups, who traveled toward the Copper River or nearest tributary to fish. Sheep, beaver, muskrat, lynx, ground squirrel, waterfowl, bear, berries and other plant foods were also obtained when and where they became seasonally abundant. Small game, freshwater fish

caught in basket traps set under the ice on lakes, and porcupines were important winter staples in the Western Ahtna diet (deLaguna and McClellan 1981:645).

The Western Ahtna were conveniently located to the Tanaina trading sessions at Cook Inlet, and some of the people became middlemen in the trading network that shuttled goods (especially furs, after the establishment of the fur trade) from the interior to Cook Inlet. Ahtna trade fairs were also held in summer at Butte Lake or Susitna Lake and at Lake Louise, east of Denali (Kari and Fall 1987:190).

The Lower Tanana. The Lower Tanana Indians were part of the larger Tanana linguistic group that occupied nearly the entire stretch of the Tanana River in aboriginal times. The Lower Tanana occupied an area between the Goodpaster and Tolovana rivers and at one time may have extended to the mouth of the Tanana River. The three bands occupying the territory farthest downriver were the Wood River, the Nenana-Toklat and the Minto bands--all of which spoke the same dialect. Aboriginally, the Wood River and the Nenana-Toklat bands both occupied territory in and adjacent to Denali NPP.

Historically, the area west and north of the Toklat River was occupied by the Koyukon Indians. However, in earlier times before Koyukon infiltration into the area, the territory of the Lower Tanana probably extended up the Kantishna River to the region of the Upper Kuskokwim Kolchan, with whom they interacted socially by intermarrying and potlatching and with whom they shared a partially understandable language (Hosley 1981:618).

In aboriginal times, the southern boundary of the Lower Tanana extended up the Nenana River and over the Alaska Range to the upper Susitna River, where the Toklat-Nenana and Wood River bands used to hunt caribou and participate in trading activities. This area came into dispute in historic times, when Western Ahtna moved into the area and a "war" broke out in the mid-1800s near Butte Lake, after which the Lower Tanana moved out of the upper Nenana River area (deLaguna and McClellan 1981:642; Betts 1983; Gudgel-Holmes and others 1991:16).

The resource base of the Lower Tanana Indians--in addition to caribou, which they considered of primary importance--included salmon and freshwater fish, other large game, small animals and furbearers. The people moved seasonally between hunting and trapping areas near the base of the Alaska Range and spring/summer camps near the mouth of the Nenana River where they caught and processed salmon. Trading parties traveled as far away as Cook Inlet.

Both the Nenana-Toklat and the Wood River bands interacted with the related Minto people to the north, with whom they had regular contact, including intermarriage (Gudgel-Holmes 1990).

The Upper Koyukon. The Koyukon Athabaskans moved into the northwestern part of Denali NPP in the late nineteenth century. The Koyukon of the Kantishna area spoke the Upper Koyukon dialect that was spoken along the Yukon River from Stevens Village to the mouth of the Koyukuk River, which was the limit of their territory in aboriginal times. According to oral accounts, the Upper Koyukon expanded into the Kantishna region sometime in the late nineteenth century. At that time, a group of Koyukon moved southward from the Yukon River into the Kantishna drainage, where they pushed apart the Lower Tanana and Upper Kuskokwim Athabaskans occupying that territory (Krauss and Golla 1981:74).

The main Upper Koyukon settlements were situated at the mouths of the Cosna and Bearpaw rivers, at Birch Creek and Lake Minchumina, and along the Kantishna River.

At least two groups of Koyukon occupied the Kantishna drainage--the Minchumina-Birch Creek-Bearpaw band and the Cosna-Manley band. The people appear to have been sociable with both the Lower Tanana groups and the Upper Kuskokwim Kolchan bands. The Minchumina people interacted with the Upper Kuskokwim Kolchan to the west, with whom they shared contiguous hunting grounds. They also traveled to the neighboring Koyukon settlements for potlatches and trading. Intermarriage between the Minchumina-Bearpaw people and the Upper Kuskokwim Telida people was common, and by 1900 the groups appear to have become effectively mixed. This resulted in an interrelated and bilingual group (Gudgel-Holmes and others 1991:18).

The Upper Koyukon Indians utilized nearly all of the northwestern part of Denali NPP, which they traversed during their yearly subsistence cycle, or covered in a few years when traveling to visit or trade, or when a decline in resources in their regular hunting grounds forced them further afield. The people were primarily caribou hunters but also took advantage of large fall runs of salmon, as well as fresh water fish, Dall sheep, which they hunted in the northern foothills of the Alaska Range, small game animals, waterfowl, berries, and other vegetal varieties.

The Upper Kuskokwim (Kolchan). Aboriginally, the Upper Kuskokwim Athabaskans, who spoke a language distinct from their southern neighbors, occupied the upper Kuskokwim River drainage west of the park. In the early twentieth century their territory extended from Lake Minchumina and the western foothills of the Alaska Range to the Swift River on the southwest and from the Takotna River on the northwest to the Alaska Range on the southeast (Hosley 1981:619, map).

The Upper Kuskokwim people were composed of six main groups or bands (Figure 6). Three of the groups--the Telida, East Fork, and Nikolai bands--utilized the Denali area in their yearly rounds of subsistence. The Telida band ranged seasonally as far east as the Bearpaw River from their winter settlement at Telida Lake (Hosley 1981:619). The Telida

band traditionally socialized with the East Fork and Lower Tanana people and became friendly with the Minchumina Koyukon since historic times.

The East Fork band, which occupied the area between the Swift Fork and Tonzona rivers, ranged over the area from the North Fork Kuskokwim River to the northern foothills of the Alaska Range. The East Fork group interacted with the Telida people on the east and the Nikolai band to the west.

The resource area of the Nikolai group included the strip between the Tonzona River and the South Fork of the Kuskokwim River and extended eastward to the Alaska Range. The Nikolai band socialized with the East Fork band and other Kolchan groups downstream (Hosley 1966).

Historically, the Kolchan were surrounded by four other Athabaskan groups: the Lower Tanana to the north, the Ingalik to the southwest, the Koyukon to the northwest, and the Tanaina to the southeast (Figure 5). Aboriginally, relations were friendliest with the Lower Tanana, which included intermarriage and an exchange of words in their vocabularies. Relations with the Ingalik Athabaskans downriver were strained by disputes over hunting grounds in the Kuskokwim Mountains between their territories, resulting in frequent skirmishes between the two groups. Relations with the Tanaina were also uneasy, with occasional skirmishes taking place along their shared boundary in the Alaska Range, although the two groups carried on a trading relationship (Holsey 1981:618). Attitudes toward the Koyukon to the west are reported to have been hostile before European contact, with mutual raiding taking place (Hosley 1981:618). However, by the late nineteenth century, social contact and intermarriage between the two groups were common (Gudgel-Holmes and others 1991:13).

The seasonal subsistence cycle of the Upper Kuskokwim people centered on hunting of large game animals, with fishing also being an important resource. The summer was spent in the mountains where the people hunted caribou, Dall sheep and moose, also black and brown bears. In autumn, after the fall caribou hunt, the bands made their way back to their winter settlements by skin boats, which held their supply of meat and other resources collected for winter. Small game, including beaver, hare and porcupine, and freshwater fish, were important winter food resources.

The Historic Period

The following review of interior Alaska regional history is intended to provide a rough context for viewing the sites found during the Denali Land Exchange investigations. For a complete, in depth treatment of the historic period in and around Denali NPP, the reader is referred to the *Historical Resources Study, Denali National Park and Preserve* (Brown 1992).

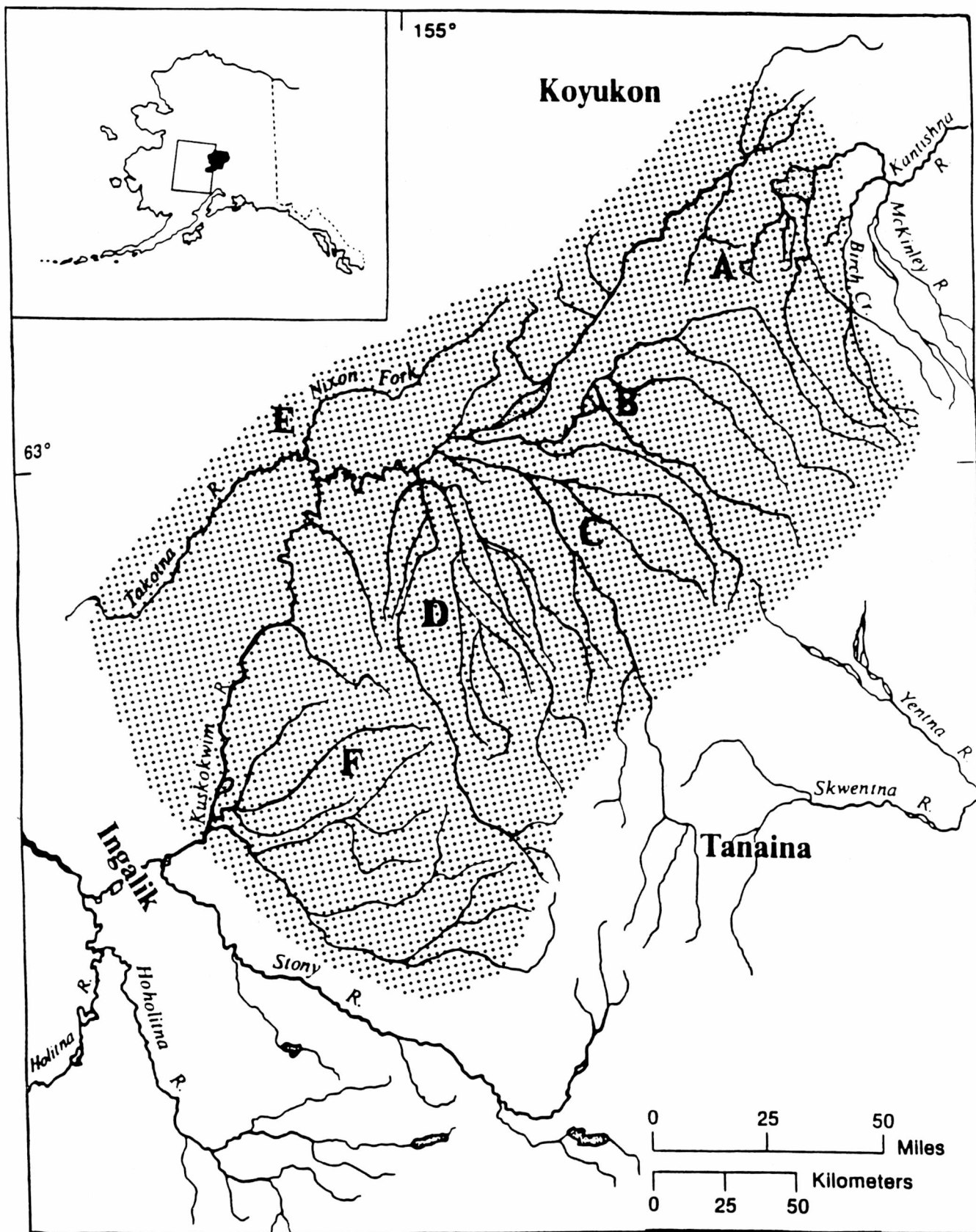


Figure 6. Territory of the Upper Kuskokwim Kolchan (late nineteenth century), with approximate areas of six main bands: A, Telida-Minchumina; B, East Fork; C, Nikolai; D, Vinasale; E, Takotna; F, Tatlawiksuk (Hosley 1981:619).

Exploratory Period. The Alaska interior, particularly the central Alaska Range area around Denali NPP, was not penetrated by Europeans and Americans until relatively recently. Russian exploration of Alaska began with Vitus Bering's visit to the Aleutians in 1741. However, the Russians confined their activities primarily to the coastal regions and to the lower reaches of the Yukon and Kuskokwim rivers and did not reach the Denali area far inland.

Earliest references to the area around Denali NPP are found in the writings of George Vancouver, Baron von Wrangell, and William Healy Dall--all of whom noted in the distance the mountain now known as Mt. McKinley. It was Dall, director of an engineering survey party for Western Union Telegraph, who proposed that the mountain group in central Alaska be called the Alaska Range (Pearson 1953:5). The naming of Mt. McKinley itself is attributed to W.A. Dickey, who later prospected in the area in 1896 (Pearson 1953:6).

By the late 1880s, a few explorers, prospectors, and traders had made their way into interior Alaska. Lt. Henry Allen's 1885 U.S. Army expedition linked the drainages of the Copper River and the Tanana River through the eastern part of the Alaska Range to the east of the park (Allen 1887).

With the 1896 discovery of gold in the Klondike, the push was on to find gold in Alaska. The U.S. Geological Survey was given the responsibility of exploring the area to provide maps and other information to prospectors, and by 1898, several government-sponsored expeditions had begun exploratory surveys into the Denali region. This included the 1898 U.S. Geological Survey expedition, headed by geologist Josiah Spurr. During the explorations the party crossed over the Alaska Range for the first recorded crossing in the Denali region and proceeded down the Kuskokwim River through the midst of Upper Kuskokwim Kolchan territory (Spurr 1900).

Also in 1898, U.S. Geological Survey geologists George Eldridge and Robert Muldrow entered the Denali area from the south by way of the Susitna River, reaching as far inland as the Nenana River. During the mapping expedition, Muldrow determined the altitude and location of Mt. McKinley (Eldridge 1900:map).

In 1899, the U.S. Army mounted an exploratory expedition under the leadership of Lt. Joseph Herron into the Kuskokwim Basin. Herron's group crossed the Alaska Range at Simpson Pass, just north of Rainy Pass, and became lost in the Kuskokwim Basin. The party was rescued by Sesui, an Upper Kuskokwim Indian from Telida (Herron 1900).

In 1902, U.S. Geological Survey geologist Alfred Hulse Brooks led an expedition into the Denali region to map and explore the area along the northwestern base of Mt. McKinley (Brooks 1903). During the expedition, the party traversed the area in the vicinity of the Swift Fork unit.

A still later phase of exploration centered on the ascent of Mount McKinley itself. Several expeditions were mounted in the early twentieth century in the attempt to reach the summit, including the Wickersham party (1903), the Cook expeditions (1903 and 1906), the Parker-Browne expeditions (between 1906 and 1912), the Alaska Sourdough expedition (1910), and the Karstens-Stuck expedition (1913). The last of these campaigns was successful in reaching the south peak of Mt. McKinley--the highest point in North America (Brown 1992).

Fur Trapping. Russian and British fur trading activity in Alaska was dominant until the United States purchase of Alaska in 1867, when Americans took over many of the vacated trading posts (Schneider and others 1984:33). A major nineteenth century trading center was located at the mouth of the Tanana River north of the park. Before 1867 Canadian fur traders had penetrated as far the mouth of the Tanana River, where they established a trading post nearby (Gudgel-Holmes, personal communication). No major fur trading outposts had been built within the boundaries of Denali NPP, although Russian-American Company outposts were located at Kolmokov on the Kuskokwim River, to the west of the park, and at Susitna Station on the Susitna River, south of the Alaska Range (Schneider and others 1984:33).

Trapping in the Denali area, particularly to the northeast of the Alaska Range, has taken place on a small-time basis since early in the twentieth century. Both Native Athabaskans and white trappers owned and operated trap lines. The trap lines, cabins and trapping gear were handed down from one trapper to another, more or less informally, on an individual basis (Schneider and others 1984:33). Although some trappers made their home base at Lake Minchumina, a few individuals chose to base their operations farther afield, in the Kantishna and Kuskokwim drainages, where they dwelt in isolated cabins situated near fresh water streams. Still apparent are the cabins and blazes marking the trap lines in the park area.

Mining. Mining activity in Denali NPP began shortly after the Wickersham party's discovery of gold in the Kantishna Hills in 1903. A small amount of prospecting took place there in 1904, and by 1905 the Kantishna rush was on. The boom was short-lived, however. By the summer of 1906--after the returns had dropped to less than one-tenth that of the previous year--most of the miners had departed the area, and only a handful of miners who had staked the best claims remained.

Gradually, as shallow placer gold deposits were exhausted, the character of mining in the Kantishna Hills changed, and hydraulic mining operations of increasing size became the large producers. Lode mines eventually replaced placer mines, and other ores--antimony, silver, and lead-copper-zinc--replaced gold in importance.

During World War II, mining in the Kantishna Hills was shut down except for the mining of antimony ore, which was declared a strategic war material. By 1941, the Stampede Mine in the Kantishna mining district was the largest antimony producer in Alaska (Bundtzen

1978:159)). The production of gold and silver, considered unessential to the war effort, was halted for the duration and did not resume until after the war (Bundtzen 1978:159). Details on the history of mining in and around Denali NPP are discussed by NPS Historian, William R. Hunt (1990:283-300), in his history of Alaska-Yukon mining.

Transportation. Travel to the Kantishna mining district during the early part of the twentieth century was best accomplished by way of the rivers, using pole or paddle boats in summer and sleds during winter. The Alaska Road Commission (ARC), established in 1905 to improve and maintain the overland trail network, was responsible for some trails in the vicinity of the park. Most of the best known trails, such as the trail from Nenana to Kantishna, were winter trails. However, several poorly documented trails were constructed within the park boundaries during the early part of the century. The present Denali park road was built by the ARC as an access route to the Kantishna Hills mining district. Construction on the road began in 1923 but progressed slowly, and the final stretch into Kantishna was not completed until the late 1930s (Griffin 1990:59).

The Alaska Railroad from Seward to Fairbanks, Alaska's most ambitious transportation project, had its beginnings in 1912, when President Taft appointed a federal commission to study the problem of building a railroad from the coast to the interior of Alaska. Actual construction began in 1915, proceeding from both ends toward the middle and including short segments that had previously been built by private concerns. The project encountered many obstacles including severe weather, topography, and a manpower shortage brought on by World War I, which delayed its completion until 1923. The Alaska Railroad, which proceeded through the Susitna Valley and the Alaska Range to Fairbanks, was soon established as the primary route to Alaska's interior. Many of the present towns located along the route of the Alaska Railroad, including Anchorage, grew from the railroad construction camps (Hulley 1970:311-312).

Park History. Denali National Park was originally founded as Mount McKinley National Park in 1917. With the completion of the Alaska Railroad in 1923, park visitation increased, resulting in the need for improved park facilities. The period between 1928 and 1937, when funding became available for construction of facilities, was a time of steady development. In the mid-1930s, the Civilian Conservation Corps (CCC)--an emergency work-relief program implemented by President Franklin Roosevelt during the Depression--embarked on a phase of intense construction in the park. The CCC was primarily responsible for building and improving the park's buildings, sewer and water systems, ditches and roads, especially in the park headquarters area (Griffin 1990:63).

Many of the 103 historic sites found and recorded within the park include the campsites and structures built by the early explorers, miners, and trappers preceding the park's inception, in addition to structures and shelter cabins built by the Alaska Road Commission or associated with early park operations.

IV PROJECT RESEARCH DESIGN

Since the 1960s, when interior Alaska came under archeological scrutiny, information gathered from interior Alaska sites has steadily increased. Nevertheless, the prehistory of central interior Alaska remains problematic and poorly understood. Within the region, which includes Denali NPP, the relative abundance of archeological data collected has led researchers to formulate several cultural traditions and complexes for interior Alaska--some of which are not mutually exclusive. These include the Denali complex, the Nenana complex, the Susitna complex, and the Minchumina Tradition, described in Chapter III. Several attempts have also been made to merge our knowledge of the prehistory of the area into comprehensive cultural chronologies, outlined in the Cultural Environment section, including the Athabaskan Tradition, the Denali Tradition, and most recently, a regional chronology proposed by Dixon (1985). Although each of these schemes has merit, many questions remain and much work is still needed before an acceptable chronology can be adopted for the central interior of Alaska.

Major research recommendations, such as the need for extensive excavations and analyses of stratified sites in the region as suggested by Holmes (1986b), Powers, Guthrie, and Hoffecker (1983), and Greiser (1985), are beyond the scope of the land exchange project. In spite of its limitations, however, the project was undertaken with the expectation that the survey could contribute considerably to the region's cultural resources database. From the outset, the underlying research objective was to devise a survey and limited testing program that, in addition to fulfilling the compliance obligations of sections 106 and 110 of NHPA, would address specific problems in interior Alaska prehistory. This involved identifying relevant research problems, reworking the problems into research goals, and targeting specific areas with potential to address those goals. This process resulted in the formation of five specific research goals:

Estimate the approximate ages and cultural affiliations of archaeological assemblages and sites in the project area. Sites/assemblages from two time periods are of particular interest: those 12,000 B.P. or older that might be found in the Swift Fork area and those sites that might be found dating from the "mid-prehistoric" period, which appears as a 3,500-year gap in the archeological record.

Identify, if possible, the behavioral activities that took place at each site, as implied by the site's physical remains.

Collect paleoenvironmental information pertinent to the prehistoric sites found in the project areas.

Look for evidence of volcanic ash (tephra) deposits in stratified context.

Look for archeological documentation of place names identified through oral history research.

Age and Cultural Affiliation

At the outset, expectations were quite high that signs of human activity spanning the entire prehistoric period would be found in the project area. Given the expected nature of the sites (surface sites with potential for mixed contexts and buried sites with limited exposure), assigning sites to specific temporal and cultural schemes was expected to be tenuous in most cases. Exceptions would most likely be historic EuroAmerican and possibly historic Athabaskan sites. It was also recognized that some sites might not fit into existing categories. Cultural materials from sites older than 12,000 years for example, would not be expected to clearly relate, via ethnographic analogy, to more recent materials of known cultural origin.

Age determinations were to be based entirely on field analysis of artifact types, constituents of assemblages, and possibly on stratigraphic association. Because of the lack of a firm cultural chronology for interior Alaska, no single chronological scheme could be adopted. Rather than create a preinvestigation bias, a review of all previously defined cultural manifestations for central Alaska was to be used as a descriptive baseline. These cultural/chronological terms are defined briefly in Chapter III and more extensively in the Denali Archeological Overview (Griffin 1990).

The category of physical remains included not only the usual lithic tool forms that might be present at a given site, but also other data. This information included (1) the distribution of cultural features and their association to each other and to artifact scatters, (2) the sizes, morphological characteristics and densities of lithic debitage, which is often present at prehistoric sites in the form of waste flakes and fragments, and (3) the topographic situation of the site in relation to the surrounding landscape--in essence, the site's overall physical constituency.

Evidence of Sites 12,000 B.P. or Older

The probability of finding sites in the project area older than 12,000 B.P. was included as a major research objective because it has been the focus of much previous paleoenvironmental and archeological research in the vicinity of the Swift Fork and Foraker rivers, and in the Nenana River Valley (Ten Brink 1985; Powers and Hoffecker 1989). In discussing the area from the Foraker River to the Swift Fork River, Ten Brink (1985:9) states:

There is little doubt, at least from a geological perspective, that this area contains the best potential of any area along the north flank of the Alaska Range for the occurrence of pre-12,000 B.P. sites in a stratified eolian

context. ...The potential for site occurrence should be particularly great along river banks in the very restricted zone where streams exit directly into the Tanana-Kuskokwim lowland from pre-Wisconsin moraine hills.

The Swift Fork unit encompasses precisely such a zone, providing a unique opportunity to target an area of high potential with a very specific research question. Admittedly the likelihood of being able to determine whether or not a site dates to pre-12,000 B.P. from a limited examination of material eroding out of a cutbank or from a surface deposit was very small. But by looking for very specific sets of information, it was expected that archeologists would be able to approximate the antiquity of a given site. For example, temporal and cultural affiliations might be deduced from: (1) diagnostic artifact types or sets, (2) association of artifacts with extinct forms of Pleistocene or early Holocene fauna, such as mammoth, horse, camel, bison, and so forth, or (3) geologic context of the site.

Also, studies at the Dry Creek site and other sites of similar age in the Nenana Valley indicate that during the late Pleistocene and early Holocene there was a significant accumulation of sand and loess, picked up from the alluvial plains by winds emanating from the glaciers of the Alaska Range. The loess had been deposited on "overlook" terraces where human occupations were located, resulting in the burial and preservation of cultural material by the loess cap (Thorson 1977; Ten Brink 1985). By understanding the geological context of buried sites, it was expected that it would be possible to estimate an approximate age, especially if the site were found in a loess matrix.

Given that the discovery and excavation of early sites in this context at Dry Creek, Nenana Gorge and Carlo Creek just east of the Healy/Stampede unit, and the Teklanika sites just south of it have revealed a stratigraphic record of human activity in the area that extends back through 11,000 years, it was felt that the possibility of finding sites of the same age or older within the project area was strong.

Evidence of Mid-Prehistoric Sites

Another time period of particular interest within the park is the mid-prehistoric period. As in the extensive Early Man research noted above, considerable information has also been collected about the late prehistoric and protohistoric periods from 4500 B.P. to EuroAmerican contact, primarily in the northwestern region of the park (Holmes 1984, 1986). In contrast, however, is a nearly 3,500-year period from around 8000 to 4500 B.P., which appears as a gap in the archeological record throughout the project area. The gap may be a reflection of a true human exodus from this part of interior Alaska during the Mid-Holocene when big game animals had presumably become extinct due to climatic and environmental changes at the end of the Pleistocene. On the other hand, it may be that a cultural hiatus only appears to have occurred in the region. In this case, the gap may simply reflect a change in subsistence base and consequent shift in settlement patterns to other locations not yet investigated. It was expected that survey coverage of areas peripheral to the

known Early Man and late prehistoric sites of the area might reveal sites with artifacts that are diagnostic for other well documented Mid-Holocene sites in Alaska.

Behavioral Activities (Site Type)

Past behavioral activities at a given site, either historic or prehistoric, are reflected in the site's cultural features and associated artifacts. The site type exemplifies these activities, which can include permanent or semi-permanent long-term occupations reflecting numerous activities, such as graves, ephemeral seasonal hunting/gathering stations, or single-use loci.

Literary sources, based on ethnographic and archeological fieldwork in Alaska and historical journals of the area, were consulted in the interpretation of a site's behavioral activities. This literature, which frequently describes specific maintenance or extractive activities commonly performed by Native and historic EuroAmerican peoples, was expected to aid in identification of particular activities reflected at a site.

Given the proximity of the exchange units to the mountains, it was expected that evidence of seasonally related resource procurement activities would be found there. These sites would contain traces of late summer or fall hunting camps when late maturation of grasses and browse would attract game animals. Ethnographic data suggest that the hunting of large game animals such as Dall sheep, bear, caribou, and moose would have been preferred activities for this environment. The known historic use of the Swift Fork area by the Tonzona subgroup of the Denali caribou herd as a calving ground (Shults and Adams 1990) further suggested that it might have been an attractive resource area during the late prehistoric period. The presence of extensive caribou lichen (*Cladina sp.*) in the modern-day environment also supports this argument.

Paleoenvironmental evidence shows an overall changing environment in the Swift Fork area during the terminal Pleistocene/early Holocene period, in which shrub tundra was replacing herbaceous tundra throughout the region. The vegetational change would have gradually restricted the habitat of the large grazing animals to the outwash basins of the glacial rivers (Ten Brink 1985; Ager 1980). Combined with late maturation of grasses in the upper elevations of the drainage basins, the concentration of animals would have been pushed into an even smaller zone near the mountains and glacial moraines along the Swift Fork River (Ten Brink 1985).

If this were the case, the concentrated pockets of grazing animals would attract hunters to the elevated glacial moraines flanking the mountains. Further, if environmental conditions permitted such an abundance of game animals in one area, there would be a high probability of finding very specific types of sites. Ten Brink (1985:32) predicted that late Pleistocene-early Holocene "overlook" sites would be located in the narrow zone of high terminal moraine crests on the up-valley boundary of the lowlands; and "kill" sites would occur on river banks at the up-valley fringe of the lowland, adjacent to the moraine hills, which would

have served as the overlooks. The survey was well suited to look for such sites in these areas.

Historic resources were also included in the research design. Several historic exploration parties had passed through the Swift Fork vicinity around the turn of the twentieth century, including Lt. James Herron's Army expedition in 1899, the USGS party led by Alfred Hulse Brooks in 1902, a mountaineering party led by Dr. Frederick Cook in 1903, and possibly others (Herron 1901; Brooks 1911; Cook 1908). Sites associated with these expeditions could be expected to be temporary (perhaps one night) encampments consisting of only the most ephemeral of physical remains.

The project area has a documented history of mining activity. A wide range of mining-related sites such as camps, cabins, prospects, mining operations, roads and other transportation facilities were expected to be found within the exchange units. The remains of trap lines, dating from trapping activities in the area during the early part of the century, were also anticipated.

Paleoenvironmental Information

Documentation of paleontological (and paleoenvironmental) information encountered during a project is a requirement of the departmentwide research guidelines of the Department of Interior. Thus the project was designed to address these imperatives. In case such materials were encountered during the survey, retrieval of paleontological or paleoenvironmental information would be restricted to field documentation in most instances, limiting the data to macro-floral and macro-faunal categories. However, in the Swift Fork area the probability of finding fossil flora and fauna in geological context was a tantalizing possibility, as stated by Ten Brink (1985:9):

...the exceptionally complete stratigraphic record preserved in this area offers an almost unparalleled wealth of frozen *in situ* Pleistocene mammalian fossils, plant macro-fossils, insects, pollen, cryogenic phenomena, etc.--in essence a complete paleoecologic record of the entire Wisconsin, and probably beyond.

Retrieval of this type of information therefore was a high priority. Obtaining an understanding of the nature of the past environments is critical for the interpretation of archaeological sites that represent human adaption to those environments. This is especially true for the late Pleistocene to early Holocene, when sweeping environmental changes were occurring. Concerning the situation in the North Alaska Range, Ten Brink (1985:25) states:

Understanding both the temporal and spatial variations in vegetational assemblages during the late Pleistocene is very important to developing any predictive model for discovery of early-man sites for two principal reasons: First, the distributions of the large grazing mammals, such as bison and

mammoth, on which early hunters apparently preyed, would have been strongly dictated by the availability of a grass-rich or herbaceous flora. Second, reconstructed variations of late Pleistocene flora provide valuable independent information about regional climatic changes that can be used, along with the glacial and other records, to reconstruct the paleoenvironments which influenced human activities and settlement patterns.

The situation would have been similar for the Pleistocene/Holocene transition, continuing on through the Holocene to the present. During this time the environmental situation near the mountains and in proximity to the glaciers would have caused fluctuations in plant and animal communities, upon which the human population depended. Much of the survey area, particularly in the Swift Fork and the land exchange units southeast of the park, would have been subject to these conditions.

Evidence of Volcanic Ash (Tephra) Deposits

The use of known volcanic ashfalls to date prehistoric sites buried beneath them has shown increasing potential for archeological research throughout Alaska. The recognition of four tephra layers in the Susitna River area, dating from 5000-1000 B.P. (Dixon and Others 1985; Dixon 1985), and subsequent identification of these deposits and ashfalls in other areas (Bowers 1978, 1990; Bowers and Thorson 1981; Riehle and Brew 1984; Riehle 1985) have contributed significantly to the dating of sites throughout the state. Attempts to locate and identify any tephra deposits in the project area, if successful, would contribute to this body of information and could possibly aid in approximating the age of sites found in the project area. Even more tantalizing was the possibility of finding an exposure with artifacts buried *in situ* in or beneath a given tephra layer. Such a discovery would provide data that could be used to approximate the age of the assemblage.

Examination of Place Name Locations

Researchers have compiled an extensive record of Native place names through oral history research focusing on the five Native Athabaskan groups that have historically ranged over the lands in the vicinity of the park (Gudgel-Holmes and others 1990). It was hoped that sites associated with some of these locales would be found during the survey, supporting the oral history research and providing rare interpretive site detail.

V PROJECT METHODOLOGY

Before the field investigations, NPS archeologists conducted a careful examination of the literature in all disciplines relating to the cultural resources of interior Alaska in general, and the park in particular. Those disciplines reviewed include the fields of archeology, ethnography, history, geology, and paleoecology of the park area and region surrounding Denali NPP.

Previously identified sites within the park were identified by consulting the comprehensive listing of known cultural resources within Alaska. These sources included the National Register of Historic Places (NRHP), the Alaska Heritage Resource Survey (AHRS), and the NPS-ARO site files for Denali NPP. In addition, the Historic American Building Survey and the Historic American Engineering Record (HABS/HAER) were consulted for information on historic structures that might be present in the survey area.

Sample Selection

The five exchange units vary dramatically in accessibility, terrain, vegetation, and site potential. Consequently, the selection of survey areas was adapted to the specific environmental conditions of each unit. Several guiding principles, some specific to individual exchange units, were followed.

The terrain and vegetation of each unit were evaluated according to USGS maps and field observations. Areas having a high potential to contain ancient sites (e.g., pre-Wisconsin and Wisconsin age moraine crests in the Swift Fork unit and lake margins, ridge crests, and alluvial terrace edges in all units) were targeted for primary intensive survey. The survey strategy focused primarily on areas of exposed (unvegetated) surface sediments, due to time constraints and physical limitations on digging, such as potential depth of possible buried cultural deposits and shallow permafrost. Areas of vertical exposure along erosional cuts, such as the Swift Fork River and Boulder Creek in the Swift Fork Exchange unit, were also targeted for examination.

Except for the Coffee River unit, which was slated for 100 percent survey because of its very small size, the survey for each of the land exchange parcels was designed to cover at least a 10 percent sample of the area.

Aerial Survey

Before the pedestrian survey, all units were examined from the air to verify prefield assumptions about terrain and vegetation and to evaluate potential survey areas. During

aerial reconnaissance, three archeologists scanned the ground from the helicopter, looking for structural remains or other traces of human activity. Areas not slated to receive intensive pedestrian coverage, such as swamps or excessively steep slopes, were covered systematically by making aerial traverses of the area at as low elevation as was safe to execute.

Pedestrian Survey

A crew of three to four archeologists and a geoarcheologist conducted the pedestrian surveys by walking roughly parallel transects spaced at no more than 30 m apart. Erosional exposures, cutbanks, blowouts, animal burrows, and other vegetational disturbances were systematically inspected for possible subsurface information.

On alluvial terraces surveys typically focused on the upper edge of the terrace riser where erosional action, as well as site visibility, was most pronounced. Shovel probes, excavated periodically to sterile gravel, bedrock or permafrost, were dug at locations with high site potential--such as well-drained areas, available water, and open views--to describe the sedimentary and pedological situation and to look for subsurface cultural materials. In open, barren areas the ground surface was closely scrutinized for surface features such as hearth outlines or isolated artifacts that might be eroding out of the ground or lying on the surface.

Daily Survey Procedures

Each crew member documented his or her daily assignment on a daily log sheet that included a description of the area surveyed on a given day, the survey procedures for the day, and the results of the day's survey. In addition to the completed survey forms, the total area covered for that day was plotted on the project's master topographic map.

Site Recording

Recorded sites were documented in a standardized manner. All features and artifacts or artifact clusters were described and measured in from an established site datum and plotted on a sketch map of the site. The location of the datum was plotted on a 1:63,360 series USGS quadrangle map and on an aerial photograph. Environmental data that could have a bearing on the site's use, including the topographic situation, vegetation, view, trails, water bodies, and so forth, were also described and mapped. Location of archeological and soil test pits within the site were also mapped in and described. Color as well as black and white photographs illustrating cultural features, artifacts and physical setting were taken at each site. Aerial photos of each site record the site in relation to its surroundings.

A 50 cm-by-50 cm test excavation was dug at each prehistoric site to sterile gravel, bedrock or permafrost, and a stratigraphic profile was drawn for each test pit. These test excavations were made to evaluate the potential presence of subsurface cultural materials and to gather geoarcheological information about the site. All excavated backdirt was either screened through ¼-inch mesh or carefully examined by hand. At sites where the artifacts appeared to lie on barren outcrops, shovel probes were made to determine whether any accumulation of soil was present. Historic sites were not archeologically tested.

Artifacts were not collected, except for those artifacts found in subsurface test excavations, which were mandatorily retrieved. All excavated artifacts were accessioned into the Park Service Inventory and returned to Denali NPP Headquarters for permanent curation after analysis in the archeology laboratory at Alaska Regional Office (renamed the Alaska System Support Office in 1995) in Anchorage. In several instances excavated sediment samples were also collected for later analysis. Site forms and other project records are on file at the National Park Service Alaska System Support Office in Anchorage.

VI SURVEY RESULTS

Archeological surveys of the five proposed land exchange units took place during the field seasons of 1988 and 1989. In 1988 the Swift Fork, Tokasitna, and Coffee River units were completed and the Dunkle unit was begun. In 1989 the Healy/Stampede and Dunkle units were completed. The information collected from each unit is listed below. In accordance with the compliance-based objective for the land exchange survey, recorded sites are grouped according to location within or adjacent to an exchange unit.

Swift Fork Land Exchange Unit

The Swift Fork unit lies in a transitional position at the upper edge of the Tanana-Kuskokwim Lowlands, at the base of the north slope of the Alaska Range (Figure 2). The landscape is composed of expansive, undated outwash terraces extending northwest from the steep valleys of the Alaska Range and overlain by a succession of moraine features and a mantle of loess (Figure 7). The moraine ridges in the study area date between 25,000 and 9,500 years ago, according to the North Alaska Range Project (NARP), which identified the major glacial landforms in the region (Waythomas and Ten Brink 1982; Ten Brink and Waythomas 1983). A loess mantle of various thickness covers most of the land surfaces in the region, reaching a maximum thickness of 5 m on the plain.

The Swift Fork of the Kuskokwim River forms the east and northeast boundary of the exchange unit's southern portion (Figure 8). The river channel is entrenched in this vicinity of the project area, exposing the Pleistocene loess and gravel deposits. The northern segment of the unit is bounded to the north and west by the existing boundaries of the park and to the southeast by the winter trail that extends from Lake Minchumina to Telida village (Figure 9). In general, the surface slopes downward to the west-northwest throughout the study area, dropping at a rate of approximately 1000 ft every 6 mi (300 m per 10 km).

Survey Coverage. Investigations in the Swift Fork unit were conducted during the 1988 field season in two 10-day work periods between 19 June and 15 July. The survey operations were conducted on foot from a remote spike camp that was moved to another location at the beginning of the second 10-day period. Both field camps were situated near fresh water kettle lakes in late Wisconsin morainal deposits with maximum pedestrian access to areas of high site potential such as morainal crests, dune fields, and cutbanks.

During the first 10-day period, investigators surveyed the ridge crests and exposures in the southern parcel. This included the late Wisconsin moraine system immediately south of the Swift Fork and the pre-Wisconsin moraine systems slightly farther to the south of the river (Figure 8, Area A). The crew examined a total of 3,200 acres on foot in this area, concentrating on a series of exposed ridge crests that provided excellent ground visibility.

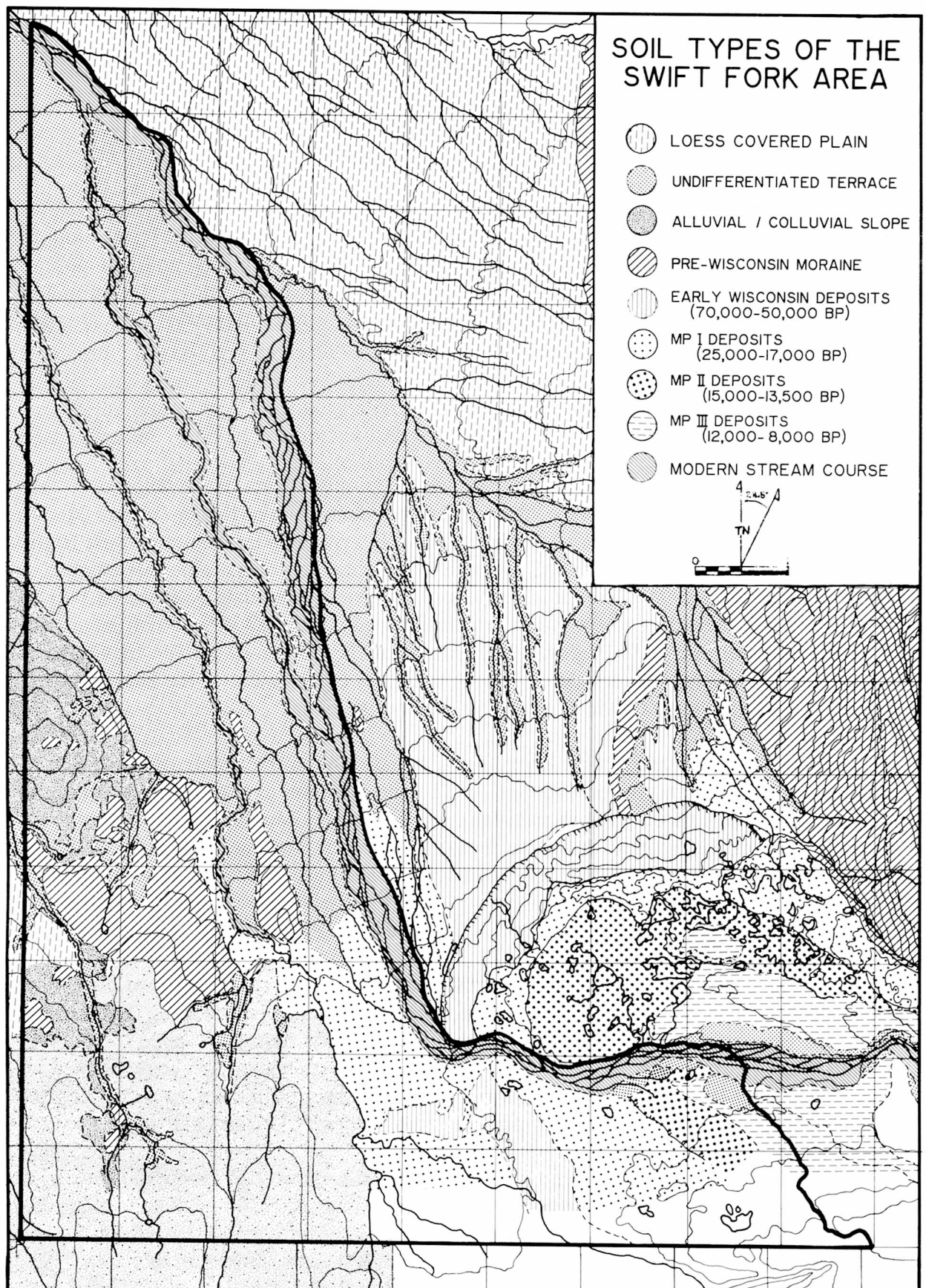


Figure 7. Glacial deposits in Swift Fork area (Ten Brink 1984).

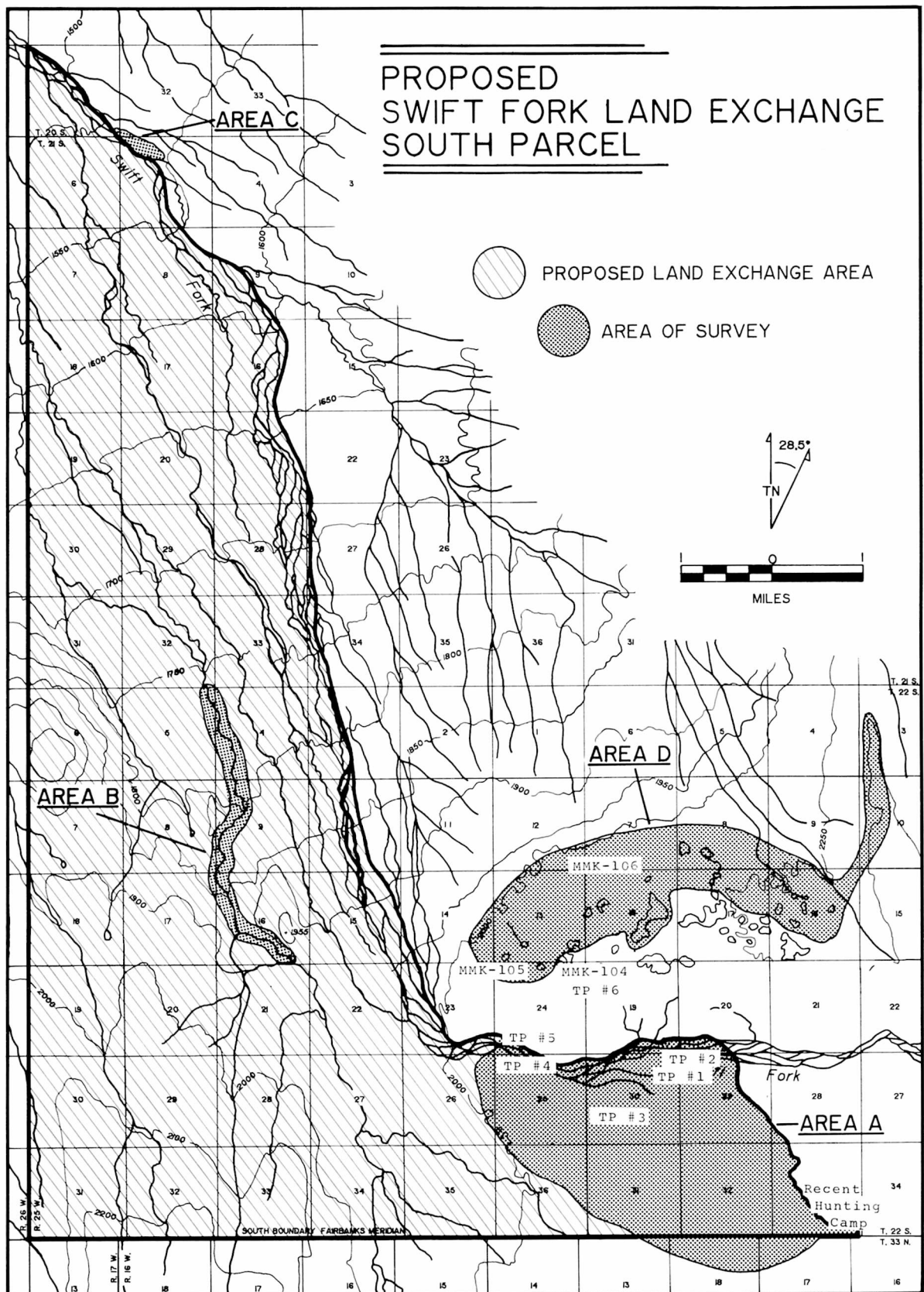


Figure 8. Survey coverage, southern Swift Fork unit.

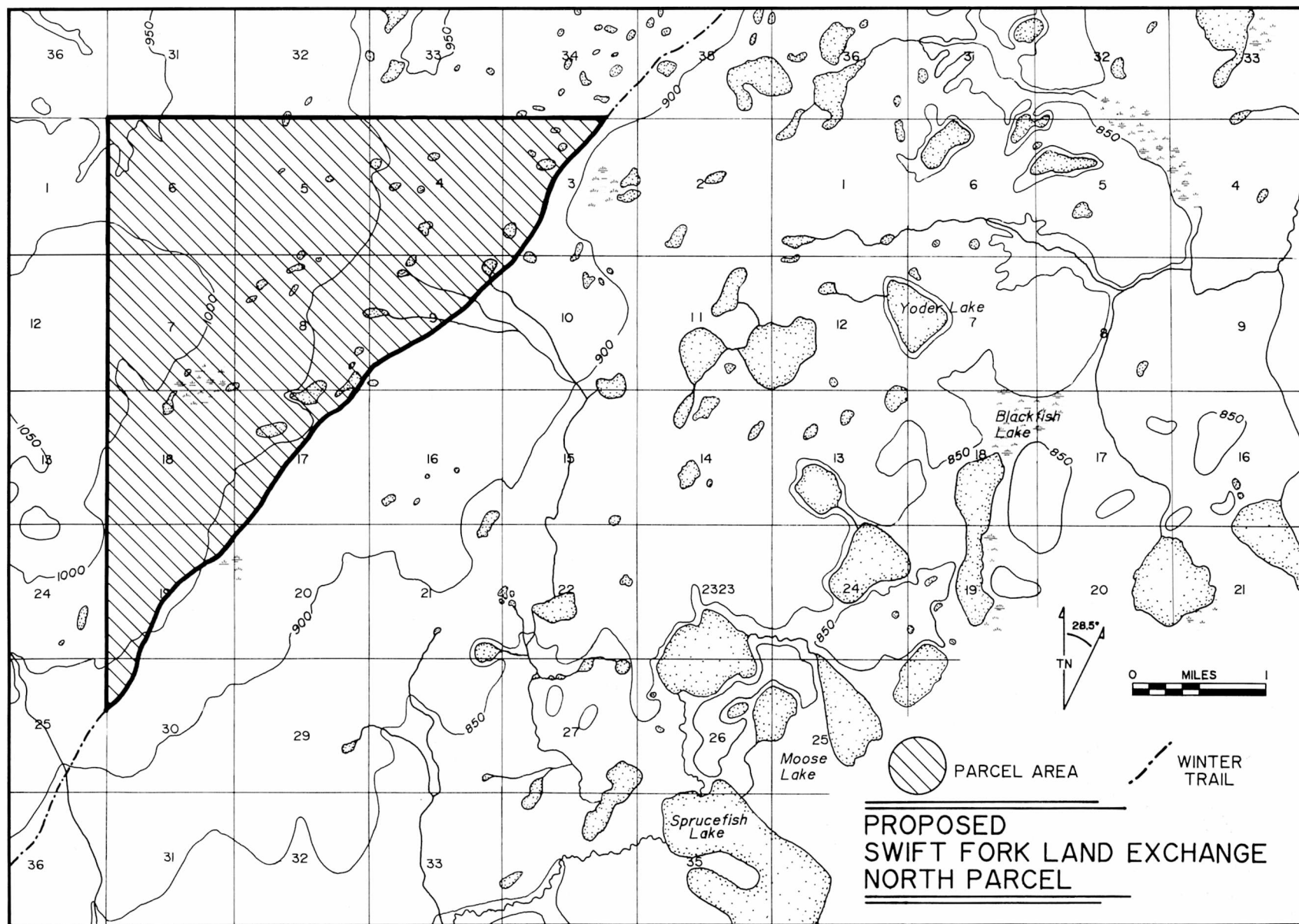


Figure 9. Survey coverage, northern Swift Fork unit.

Shovel probes on the crests revealed a very shallow sediment mantle without cultural materials, overlying dense, sterile glacial gravels.

Approximately 525 acres along Boulder Creek, in the southwestern part of the study area where the stream passes through the pre-Wisconsin moraines, were also examined by pedestrian survey (Figure 8, Area B). In this area the moraines are extremely wasted and lack topographic relief, except for one location where the stream sweeps against a moraine remnant, exposing a cutbank about 4 to 5 m high. A close examination of the cutbank revealed undifferentiated glacial gravels with very little overlying soil deposits and no loess accumulation. Shovel probes placed in the tops of both pre-Wisconsin moraines encountered permafrost immediately beneath the soil mantle. No prehistoric cultural materials nor paleontological materials were observed in the cutbank or the shovel probes dug into the moraine surface.

A large cutbank exposed along the right bank of the of the Swift Fork, at the north end of the Swift Fork unit's southern portion, was also investigated on foot (Figure 8, Area C). Close examination of the cutbank revealed a 1.4 m-thick layer of loess, capped by 60 cm of peat overlying glacial outwash gravels, but no cultural materials. The crew surveyed about 60 acres surrounding the cutbank, but found no cultural nor paleontological remains.

During the second 10-day field period, the camp was moved to the area of pronounced glacial topography, just outside the southern parcel north and east of the Swift Fork River. From this location it was possible to examine the system of sand dunes that occurs on the crests of the moraines on the north side of the river (similar dunes do not occur on the south side of the Swift Fork). Approximately 2,755 acres of pre-Wisconsin glacial topography were examined by pedestrian survey within the projected park boundaries during this time (Figure 8, Area D).

Also during the second 10-day period all portions of the survey area not covered by pedestrian survey underwent a systematic low-level aerial reconnaissance (Figures 8 and 9). This area, measuring approximately 30,825 acres (47.2 sq mi), included nearly all the land to the west of the Swift Fork River within the existing park boundaries (with the exception of the Boulder Creek survey area) and all of the northern portion of the Swift Fork unit. There were several reasons these areas were not covered on foot. Large portions of both areas lie just above the level of the floodplain and are flat and wet without suitable places to focus archeological tests. In addition, both areas are thickly mantled with vegetation that obscures the underlying surface and soil deposits. Lastly, in the western part of the unit, the terrain is sloping, tussock-covered, and underlain by shallow permafrost, with virtually no logical places for human habitation; in short, these characteristics made the probability of finding a prehistoric site almost nil.

The only cultural remains in the southern portion seen from the air were remnants of the location marker VABM (vertical angle benchmark) station Zippy, dating from 1952. In the northern portion of the exchange unit, short segments of the Telida-Minchumina winter trail

could be seen from the air. The trail was used historically for travel between the Native settlements at Minchumina and Telida. Total survey coverage in the Swift Fork area is shown in Tables 1 and 2.

Table 1. Pedestrian survey coverage, Swift Fork survey area.

<u>Location</u>	<u>Acreage</u>
Within Swift Fork unit	
Area A (South of Swift Fork)	3,210
Area B (Boulder Creek)	525
Adjacent to Swift Fork unit	
Area C (Cutbank on Swift Fork)	60
Area D (North of Swift Fork)	<u>2,755</u>
Total Pedestrian Coverage	6,550

Table 2. Aerial survey coverage, Swift Fork unit.

<u>Location</u>	<u>Acreage</u>
North parcel	5,120
South parcel	<u>25,705</u>
Total Aerial Coverage	30,825

Survey Results (Within Swift Fork unit). The Swift Fork area survey was divided into four sub-areas (A, B, C, and D) as indicated by Figure 8. Of these, A and B were located within the unit and C and D were located in adjacent areas. Although no archeological or historic sites were found within the unit boundaries, a number of modern human-use areas were noted in areas A and B.

Area A: Throughout Area A, shovel probes placed in the moraine crests above the creeks and kettle lakes were shallow, terminating in permafrost. Test pits measuring 1-m square and 60-cm deep were excavated at four locations above the floodplain. Although all appeared to have high potential as game overlook sites and had interesting natural stratigraphy, none contained cultural material. An additional test pit, excavated at Spike Camp 1, revealed the same natural stratigraphic profile but no cultural material. Recorded modern use areas in Area A are described below:

- Several dozen axe-cut stumps were found scattered in a 500-by-50-m area in spruce-cottonwood woodland near the confluence of Swift Fork River and the eastern boundary creek. The 5-to-10-cm diameter stumps had been cut about 1 m above ground level, an indication of winter firewood gathering, possibly associated with fur trapping. The stumps are relatively unweathered and appear to have been cut quite recently. No artifacts were associated with the stumps.
- A recent hunting camp was observed near the southern boundary of the survey area overlooking Boundary Creek. The camp consists of a campfire ring containing charcoal, a stone windscreen, a .30-caliber Winchester cartridge, and a cigarette butt. Nothing at the camp appeared to be older than 10 to 20 years.
- A stone cairn, four-to-five stones high, was observed on the park boundary overlooking Boundary Creek. The cairn, which still bears lichens adhering between the stacked rocks, appears to mark the 1980 boundary of the park.
- A recent hunting camp, consisting of a campfire ring with abundant charcoal and a single Marlboro cigarette butt, was found overlooking the drainage basin south of the glacial topography.
- A single, blazed tree was observed near the edge of a kettle lake near the eastern end of the southern survey area. The scar is deeply overgrown around the edges, indicating continued growth after the blaze was made. The scar appears to be somewhat older than the recent camps in the area and was tentatively dated to the 1940s or earlier. Frank Jiles (or Giles), a Kantishna prospector, is known to have operated trap lines in the Swift Fork study area between 1918 and 1933 (Schneider, Gudgel-Holmes & Dalle-Molle 1984:76).
- The remains of the VABM marker "FAST," consisting of a collapsed, milled lumber tripod; a brass cap bearing the date 1952 engraved on it; canvas scraps; and some rusted cans were found at the VABM location in Section 25, near the west end of the survey area.

Area B: Shovel probes were placed in the surface of both pre-Wisconsin moraines throughout Area B; but permafrost was encountered immediately beneath the vegetal layer, preventing penetration below the surface. Extensive evidence of a recent trap line was noted along Boulder Creek. Evidence included several dozen marten traps, a recent camp, a message tree (with recent note attached), a cache pole, a Conebear neck trap, and four cable snares still in place.

Survey Results (Adjacent to Swift Fork unit).

Area C: The cutbank in Area C contained a thick exposure of loess, but neither cultural nor paleontological materials were observed.

Area D: Area D was located outside the Swift Fork exchange unit (Figure 8). Three prehistoric sites, MMK-104, MMK-105, and MMK-106, were recorded in the area. Two of the sites, MMK-104 and MMK-105, occur in erosional areas (blowouts) in a post-Pleistocene dune system that occurs in the area (Figure 10). The third site, MMK-106, is located on glacial gravels just beyond the limits of the dune system. Sites are summarized in tabular form in Appendix A. Artifacts are described in Appendix B.

Site MMK-104 is a prehistoric site consisting of two cores, a piece of debitage, and one broken blade fragment (distal end). The artifacts were exposed in a 2-by-9-m sandy blowout, located approximately 1.6 km north of the Swift Fork River (Figures 10 and 11). The site is situated on a ridgetop of Pleistocene glacial topography (MP II (mid-Pleistocene): 15,000-13,500 B.P.), approximately 225 m northeast of Site MMK-105 (Figure 10). Two small lakes are situated nearby, on either side of the ridge. The ridge is moderately low, with limited visibility of surrounding terrain. Except for a few small balsam poplar shrubs, the site lacks vegetation. Surrounding vegetation is low shrub-scrub consisting of dwarf birch, low willow shrubs, blueberry, a few scattered spindly spruce shrubs, and a ground cover of mosses and lichens.

A paleosol, exposed beneath the vegetation at the edge of the site, lies just above the present level of the artifacts (Figure 12). Archeological test pit (Test Pit 6) was excavated at this location with negative results, although it is possible that the artifacts found at the site are eroded out of this stratigraphic context. However, the exact relationship could not be established without further excavation, which time constraints prevented.

No diagnostic artifacts were found at MMK-104. The cultural materials present suggest use as a short-term campsite, but the site may have been used more than once. Possible re-use is suggested by the basalt core (Artifact #4). A thick patina covers the surface of the core, obscuring the artifact's true jet black color, which has been exposed by several more recent flake scars. The later scars may indicate that the core was previously manufactured, deposited at the site, and then collected and reflaked at a later date. The well-worn broken end bears an even fresher break, suggesting that the artifact may have been used even later as a chopping tool--perhaps in butchering game animals.

MMK-104, 105

SITE VICINITY MAP

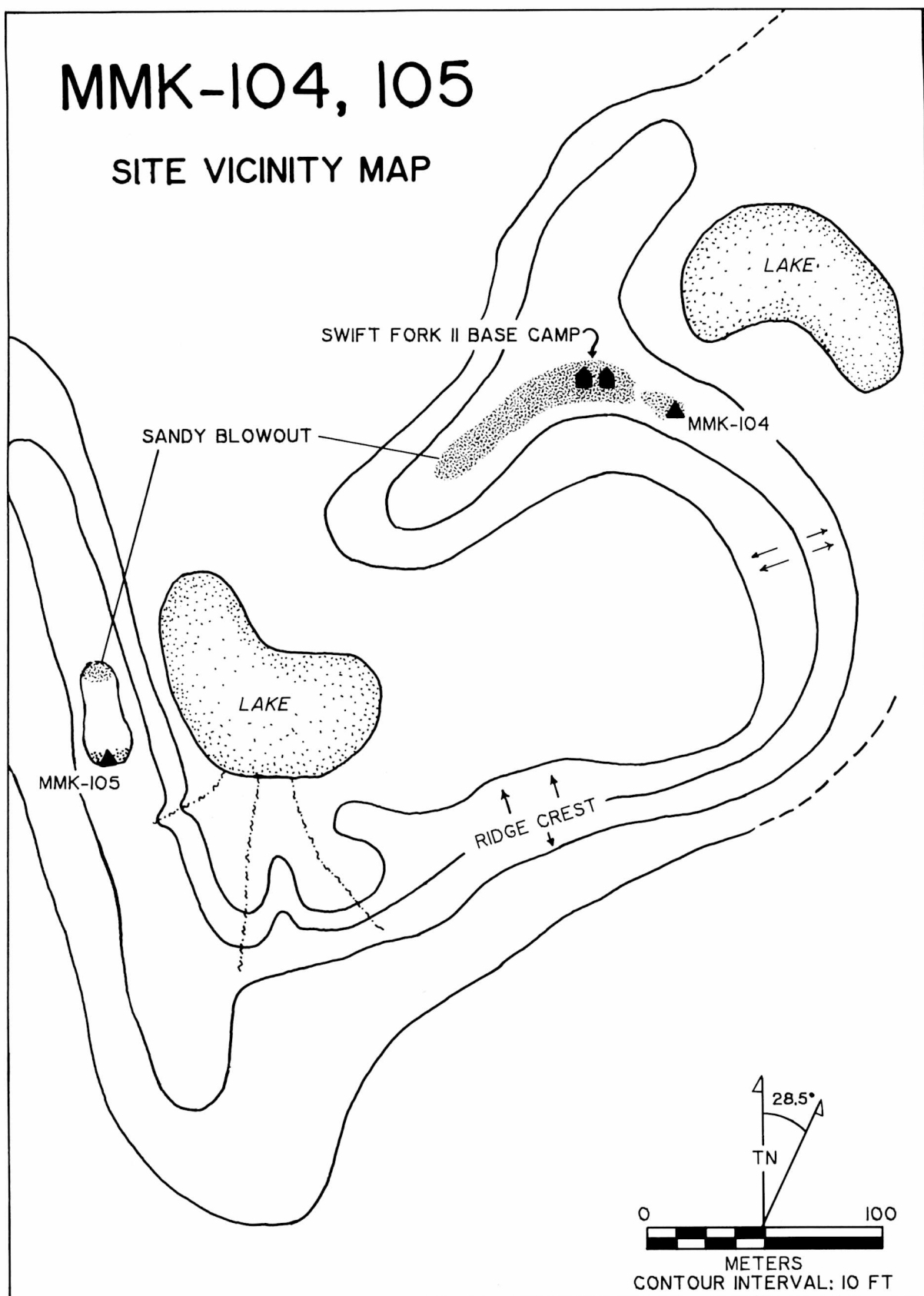


Figure 10. MMK-104 and MMK-105 site vicinity.

MMK-104

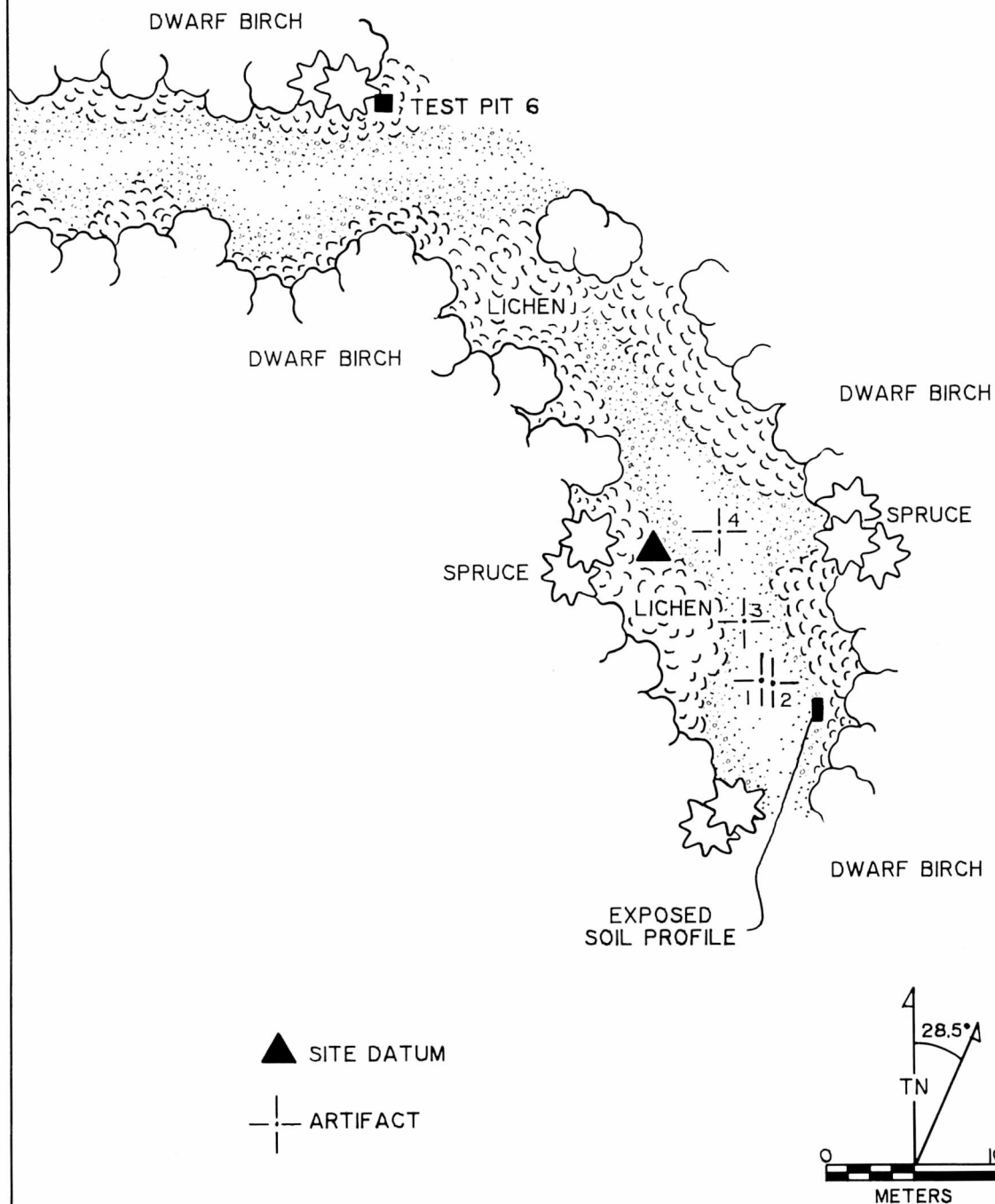
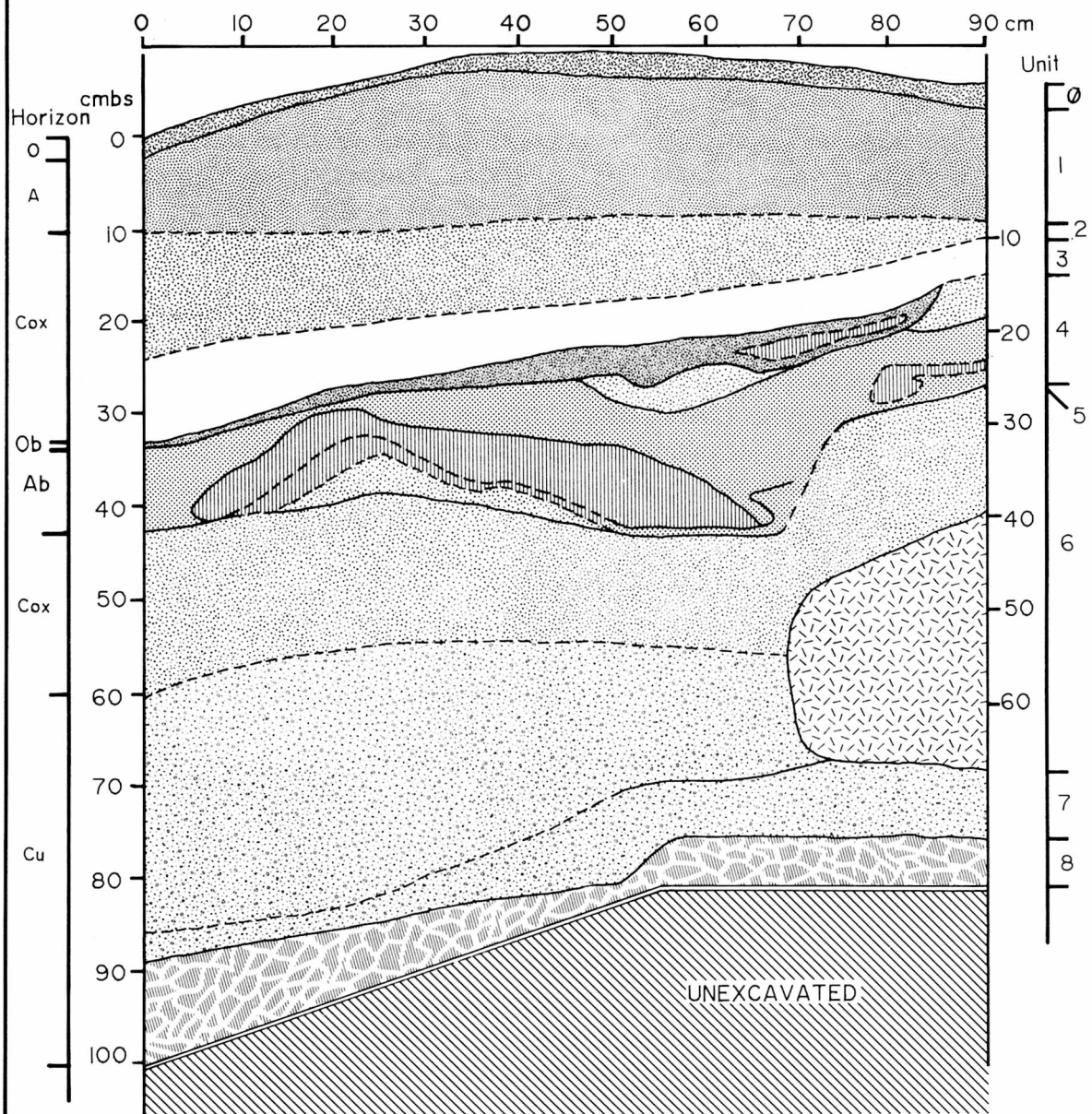


Figure 11. MMK-104 site map.

MMK-104

SWIFT FORK TEST PIT # 6 PROFILE



KEY TO UNITS:

- | | | | |
|--|----------------------------|--|--|
| | 0 - ROOT MAT | | 4 - SILT LOAM, STICKY SILT LOAM |
| | 1 - MEDIUM SAND | | 5 - LOAM |
| | 2 - COARSE SAND | | 6 - MEDIUM TO COARSE SAND |
| | 3 - LOAM, SILT LOAM | | 7 - MEDIUM SAND |
| | | | 8 - GLACIAL TILL GRAVELS |

Figure 12. MMK-104, Test Pit #6, profile with buried paleosol.

Site MMK-105 is a prehistoric site consisting of four lithic artifacts exposed in a sandy, 11-by-28-m blowout, approximately 1.5 km north of the Swift Fork River (Figure 13). The artifact assemblage (detailed in Appendix B) includes an obsidian flake used as a knife/scrapper, a crudely fashioned basalt burin, and two pieces of lithic debitage.

The site occupies the shoulder of a low ridge on the outer perimeter of the MP II glacial advance (15,000 to 13,500 B.P.). Higher ridges dominate the landscape to the east and south of the site. Site MMK-104 is located approximately 225 m to the northeast (Figure 10). A small lake to the east of the ridge is nestled approximately 8 m below the ridgetop. In general, the site does not offer an exceptional view of the surrounding topography.

The site area is devoid of vegetation. The area surrounding the site supports a small topoedaphic stand of stunted balsam poplar shrubs to the south, low spruce shrubs (Krummholz) to the west, and dwarf birch shrubs to the north. Vegetation in the vicinity of the site consists of a typical low shrub-scrub community, dominated by dwarf birch, willow, blueberry, mosses, and lichens.

A 30-cm-square shovel probe, excavated 60 cm deep into a vegetated area at the north edge of the site, revealed that the site occurs in a deep aeolian sand deposit. Except for a 14-cm-thick stratum of dark organic soil immediately beneath the vegetation layer, the probe exposed an essentially homogeneous deposit, consisting of fine-to-medium textured grey sand with patches of yellow-orange oxidation throughout.

MMK-105 may represent a short-term campsite. The site is situated on the first accessible high ground along the Swift Fork on the approach from the northwest, and could logically have served as a haul-out station for hunters traveling upstream. Although few cultural resources were observed at the site, *in situ* artifacts may be present in a buried context. Further, the obsidian artifact present at the site represents a lithic material that is not generally found in the Denali area. A trace element analysis of the obsidian could provide information about the source, which could add to the existing knowledge regarding prehistoric trade networks in interior Alaska.

Site MMK-106 is a prehistoric site consisting of a basalt thumbnail type scrapper and a basalt waste flake exposed in a sandy 1-by-8-m deflated area (Figure 14). The artifacts are further detailed in Appendix B.

The site is located on the south-facing slope of a ridgetop approximately 3 km north of the Swift Fork River (Figure 8). The ridge is situated on the

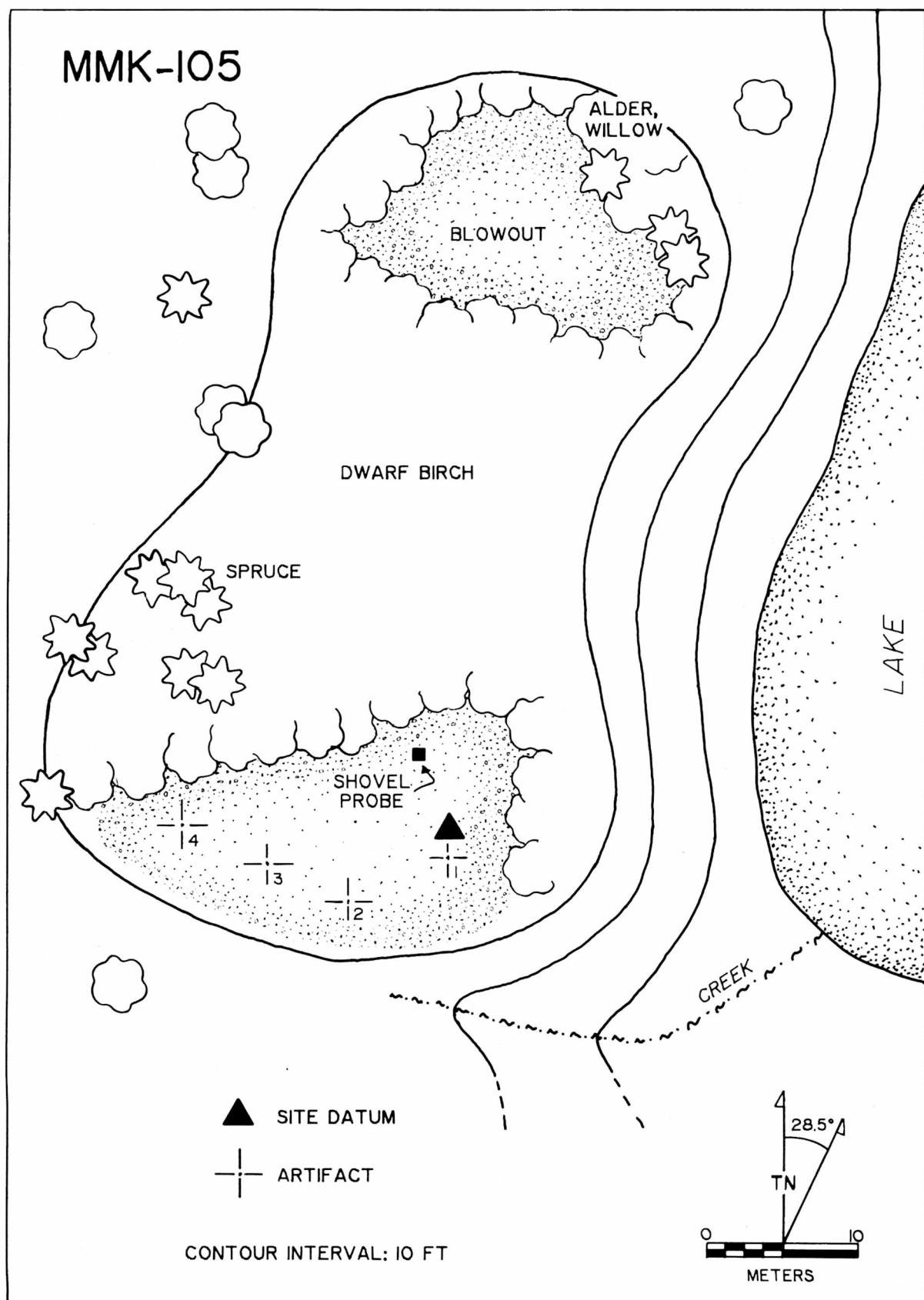


Figure 13. MMK-105 site map.

periphery of the glacial topography associated with the MP I late Pleistocene glacial advance (25,000 to 17,000 B.P.). A sand dune system, formed along the crests of the glacial ridges, extends from this part of the MP I topography into the MP II glacial deposits (15,000 to 13,500 B.P.) to the south (Figure 7). MMK-106 is situated in a blowout in the south-facing slope of a dune that lies astride one of the higher ridge crests in the area. The site commands a 360° view, with a particularly good overlook of the broad plain to the north. A wolf den is located approximately 100 m east of the site, and wolf signs consisting of wolf scat and bones lie scattered about the site.

The site is devoid of vegetation. A patch of low shrub-scrub composed of dwarf birch, moss and lichens occurs to the east of the sandy blowout, and an island of stunted, edeotropic balsam poplar and spruce shrubs is situated immediately west of the site within the deflated area. Southeast and downslope of the site the vegetation consists of dwarf birch, willow, and balsam poplar shrubs. Grasses fringe a small kettle lake some 20 m southeast of the site datum. The north slope of the ridge is covered with low shrub-scrub.

No other cultural materials were observed at MMK-106, although some portion of the site may be preserved intact beneath the small patch of vegetation along the east side of the site.

However, potential for further investigation is considered limited. MMK-106 represents a locus of limited activity, probably associated with hunting large game animals.

Ruth/Tokositna Land Exchange Unit

The Ruth/Tokositna unit is located east of Tokositna River, some two to three miles below the terminus of Ruth Glacier (Figure 15). The 2,560-acre parcel lies entirely within an area of alluvial outwash from Ruth Glacier and the Tokositna River. The area, which has been recently glaciated, is characterized by large expanses of recent alluvial deposits and standing water. A mixed forest of spruce, balsam poplar, and birch trees, interspersed with dense alder thickets and open bogs, covers the low, slightly undulating floodplain.

Survey Coverage. Survey of the Ruth/Tokositna unit was conducted on 20 August 1988. Approximately 200 acres in the unit along the terrace edge by the Tokositna River received intensive pedestrian examination. The remainder of the parcel was examined by aerial reconnaissance. During the aerial survey, three cabin groupings and a pile of sill logs of a cabin were noted in the vicinity of Pirate Lake in the center of the unit. Landing near the lake, investigators conducted an intensive pedestrian survey along an alluvial terrace of the Tokositna River.

MMK-106

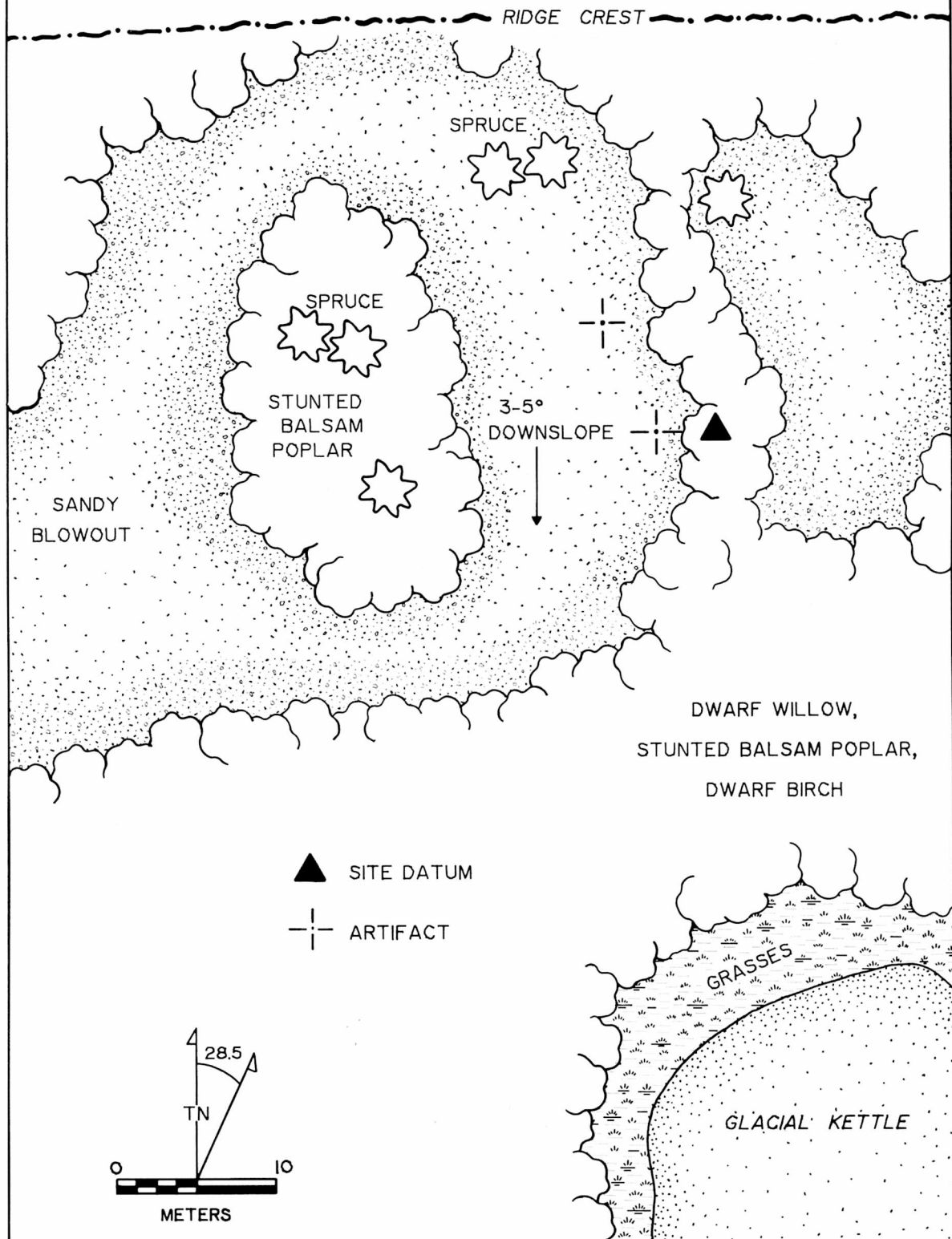


Figure 14. MMK-106 site map.

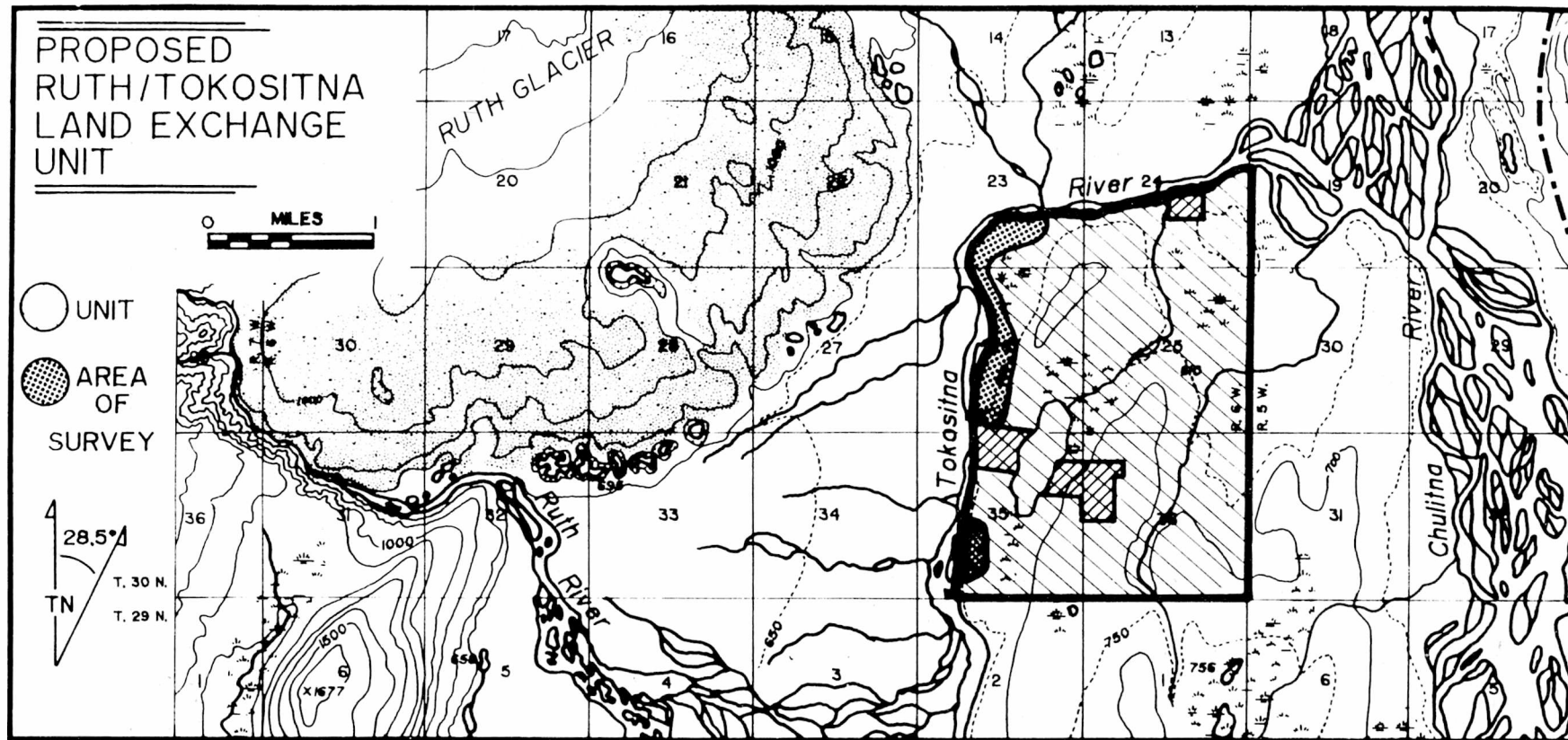


Figure 15. Survey coverage, Ruth/Tokositna unit.

Survey Results. No significant historic cultural resources were observed during investigation of the Ruth/Tokositna unit. Cultural materials observed within the unit were limited to recent cabins located to the north, east and west of Pirate Lake. John Neill, a local resident who was interviewed during the survey, indicated that all of the cabins within the exchange unit are on private property and that none was built before 1968 (Neill 1988, personal communication).

The sill logs of a cabin were also noted approximately 500 m south of the cabins. Mr. Neill indicated that the sill logs, which are located on park land south of the private inholdings, are the remains of a cabin started in 1968 and never completed (Neill 1988, personal communication).

Coffee River Land Exchange Unit

Consisting of 200 acres, the Coffee River unit was one of the smaller units and was surveyed entirely by air. The unit is located on the east side of the Coffee River along the park's southeastern edge (Figure 16). Valley walls in the vicinity of the unit slope steeply downward to a narrow, V-shaped valley floor. Beaver ponds, marshes, and dense alder-willow thickets cover the valley bottomlands in the study area. The slopes are covered with dense alder and willow thickets.

Survey Coverage. Low-level aerial reconnaissance of the entire unit was conducted on 9 August 1988 and again on 11 August 1988. Pedestrian survey of the unit was not attempted due to the extremely low potential for site occurrence in the area. Virtually all the bottomland available for survey was under beaver ponds, marshes, and dense willow and alder thickets. As there was almost no ground visibility and the area was virtually impossible to traverse, it was determined that the area could be adequately surveyed by air.

Survey Results. No cultural resources were indicated by low-level aerial reconnaissance of the Coffee River unit.

Dunkle Land Exchange Unit

The Dunkle unit, covering an area of 21,677 acres, straddles the south side of the Dunkle Hills on the east side of the park (Figure 17). The unit is bounded by the West Fork of the Chulitna River on the south and the Bull River on the east. The hills are deeply incised by several southeasterly flowing streams, including Colorado Creek, Costello Creek and Bull River, which flow out from the south side of the Alaska Range. Lower, rounded hilltops of less than 3,500-ft elevation are sparsely vegetated with alpine tundra and interspersed with rocky outcrops. Willow, dwarf birch and alder grow in the more protected areas and along the stream courses.

Survey Coverage. Archeological survey of the Dunkle unit was conducted during 1988 and 1989 (Figure 17). The 1988 survey was done in conjunction with the Cultural Resource Mining Inventory and Monitoring Program (CRMIM), incorporating the investigation of the mining claims in the exchange area with the land exchange survey between 10 and 20 August 1988. The survey of the Dunkle unit was completed the following year between 16 August and 2 September 1989.

A total of 8,401 acres in the Dunkle Hills area received pedestrian coverage during the 1988 and 1989 field seasons (Table 3). The 1988 survey covered approximately 4,977 acres (3,597 acres within the unit and 1,380 acres outside). The 1989 survey covered 3,424 acres (2,327 acres within the unit and 1,097 acres in adjacent areas).

Table 3. Pedestrian survey coverage, Dunkle unit (in acres).

<u>USGS QUAD</u>	<u>1988 SURVEY</u>		<u>1989 SURVEY</u>	
	<u>INSIDE</u>	<u>OUTSIDE</u>	<u>INSIDE</u>	<u>Outside</u>
HEALY (A-5)	0	0	1,270	181
HEALY (A-6)	322	0	699	172
HEALY (B-5)	2,615	1,380	206	538
HEALY (B-6)	<u>660</u>	<u>0</u>	<u>152</u>	<u>206</u>
Subtotal	<u>3,597</u>	<u>1,380</u>	<u>2,327</u>	<u>1,097</u>
TOTAL	<u>4,977</u>		<u>3,424</u>	
GRAND TOTAL	8,401			

Survey Results (Within the Dunkle Unit). Five historic sites (HEA-227, HEA-228, HEA-229, HEA-230 and HEA-231), were recorded within the boundaries of the Dunkle unit. All five were recorded during the 1988 field season. All of the sites are associated with lode mining operations in the Dunkle Hills, dating from the 1920s to the early 1940s. The sites are summarized in Appendix A (Table 2). The cultural materials found at each site are detailed in Appendix B.

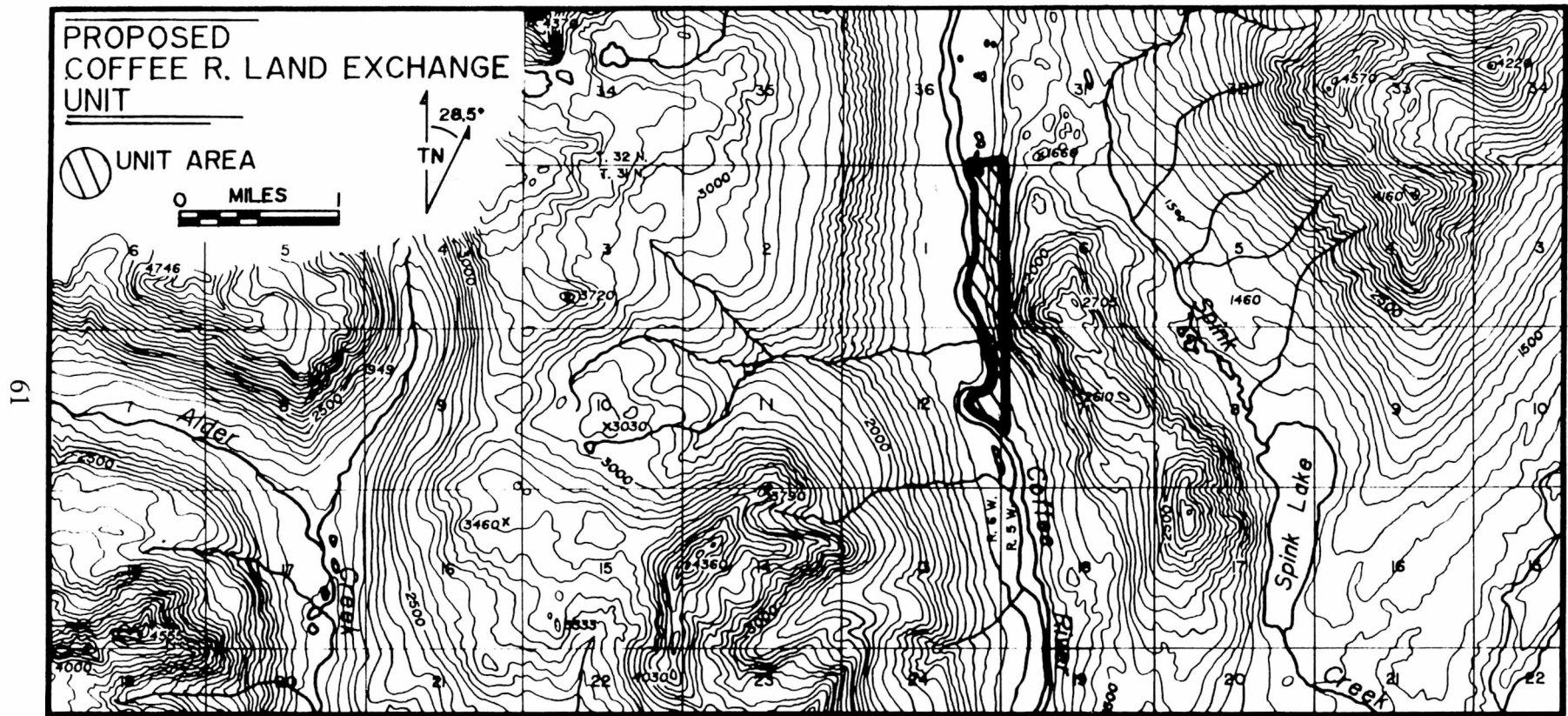


Figure 16. Aerial survey coverage, Coffee River unit.

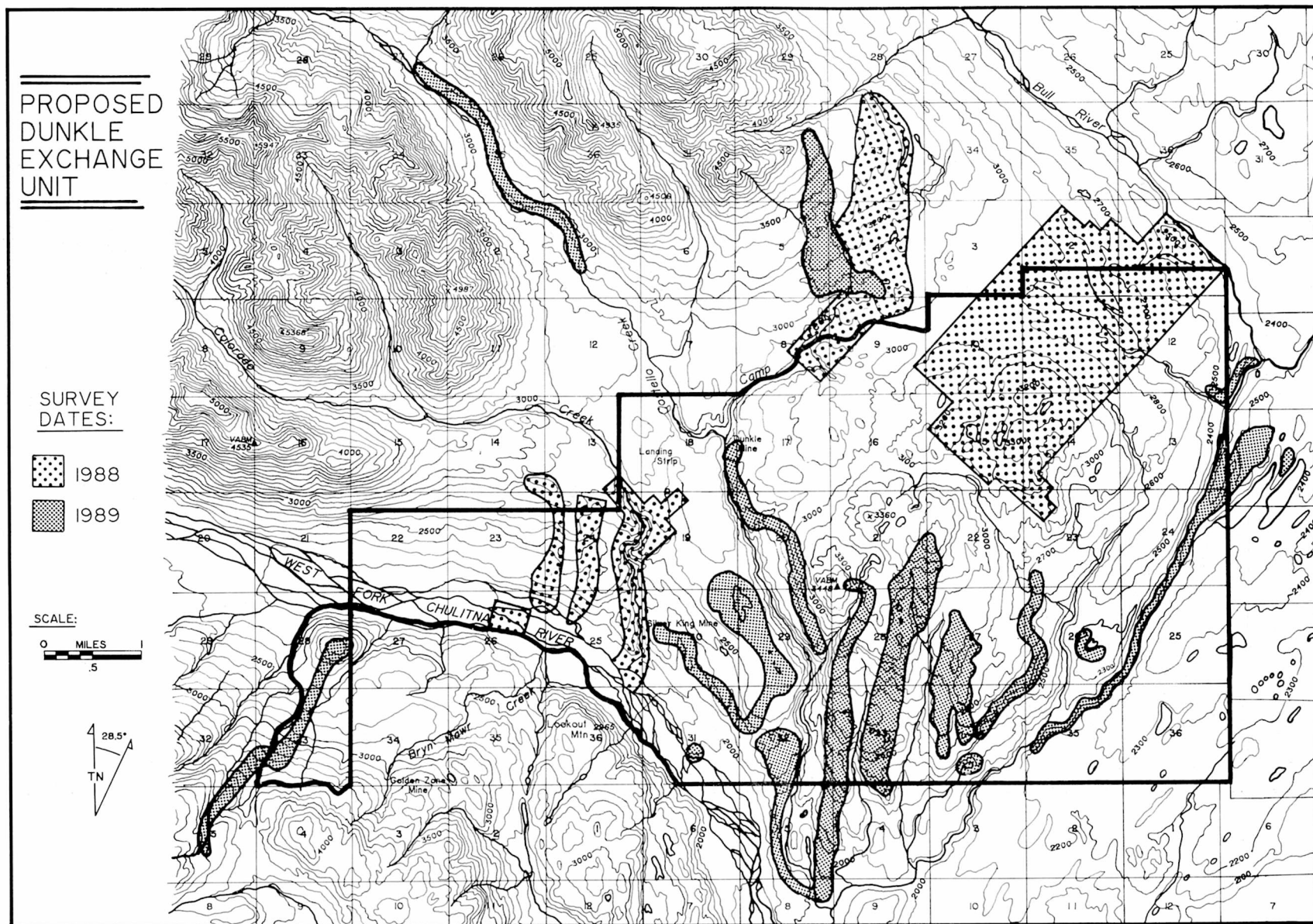


Figure 17. Survey coverage, Dunkle unit.

HEA-227 is an historic mining-related operation, composed of four cultural features--a large wooden box (Feature 1), the remnants of a log structure (Feature 2), the breached remains of a dam (Feature 3), and a road (Feature 4) that cuts through the middle of the site. The site is situated on an open gravelly area 300 m long and 100 m wide (Figure 18). The site is located on the east edge of a large pond and on the west side of an old road 3 km south of the confluence of Costello and Camp creeks in an area of low relief midway between Costello and Colorado creek drainages. The low hills surrounding the site are interspersed with lower, poorly drained areas containing small ponds, shallow pools, and minuscule drainages.

The site is largely covered with gravel, fringed by dense thickets of alder and willow. Tall grasses grow at the edge of the pond adjacent to the site. The hillsides surrounding the site support a low shrub-scrub community composed of Labrador tea, grasses, willow shrubs and wildflowers. The cultural features are described below. No artifacts were found in association with the site.

Feature 1: This feature consists of a large rectangular wooden box, 19 ft 10 inches long, 10 ft wide, and 5 ft 3 in high (6 m by 3 m by 1.5 m). (Figure 19). The box is constructed of rough-cut milled lumber, has a floor and ramp-like opening on the east end, braced with steel angle-irons and fittings. The box is in fair condition, although the floor, on which moss and grass are growing, is dilapidated and in early stages of decomposition.

Feature 2: The feature consists of the bulldozed remains of a log structure (probably a cache), strewn over an 8.2-by-.3-m area. The rotting timbers do not reveal the form of the original structure, although it appears to have been held together with spikes, ranging from 6-to-12-in long.

Feature 3: This feature consists of the remnants of an earthen dam, 8 m wide and 1.3 m high, at the outlet of the pond adjacent to HEA-227. The dam, which is breached, is located on a small creek on the west side of the road at the north end of the site.

Feature 4: An old gravel road, extending from Dunkle Mine to Colorado loading station on the Alaska Railroad, crosses the site.

HEA-228 is a complex historic habitation site and mining operation, covering an area approximately 280 m long and 80 m wide (Figure 20). The site is located on a river terrace along the left (east) bank of Colorado Creek at its confluence with West Fork Chulitna River. The terrace is 3 to 4 m above the floodplain. To the northwest, an ancient terrace face approximately 30 m high rises steeply above the site. To the southwest lies the 2-km-wide floodplain of the West Fork Chulitna with its myriad of braided channels. Colorado Creek, which flows immediately west of the site, is a fast flowing, clear stream in a single, deeply-cut channel.

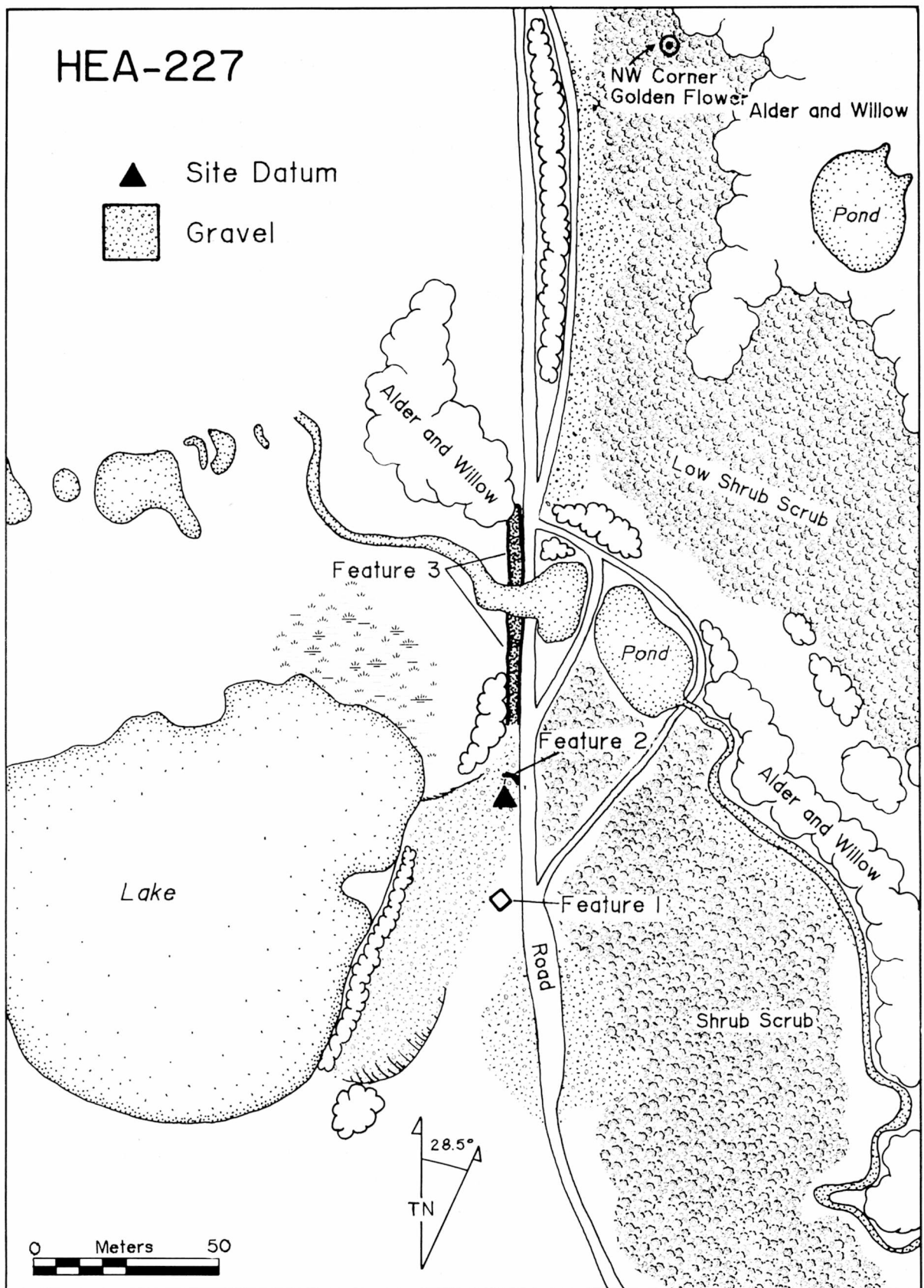


Figure 18. HEA-227 site map.

HEA-227

Feature 1 Ore Box

Side Boards 2 1/2 × 8", Posts 3 × 8" and 4 × 4"
Bottom filled with vegetation and assorted debris

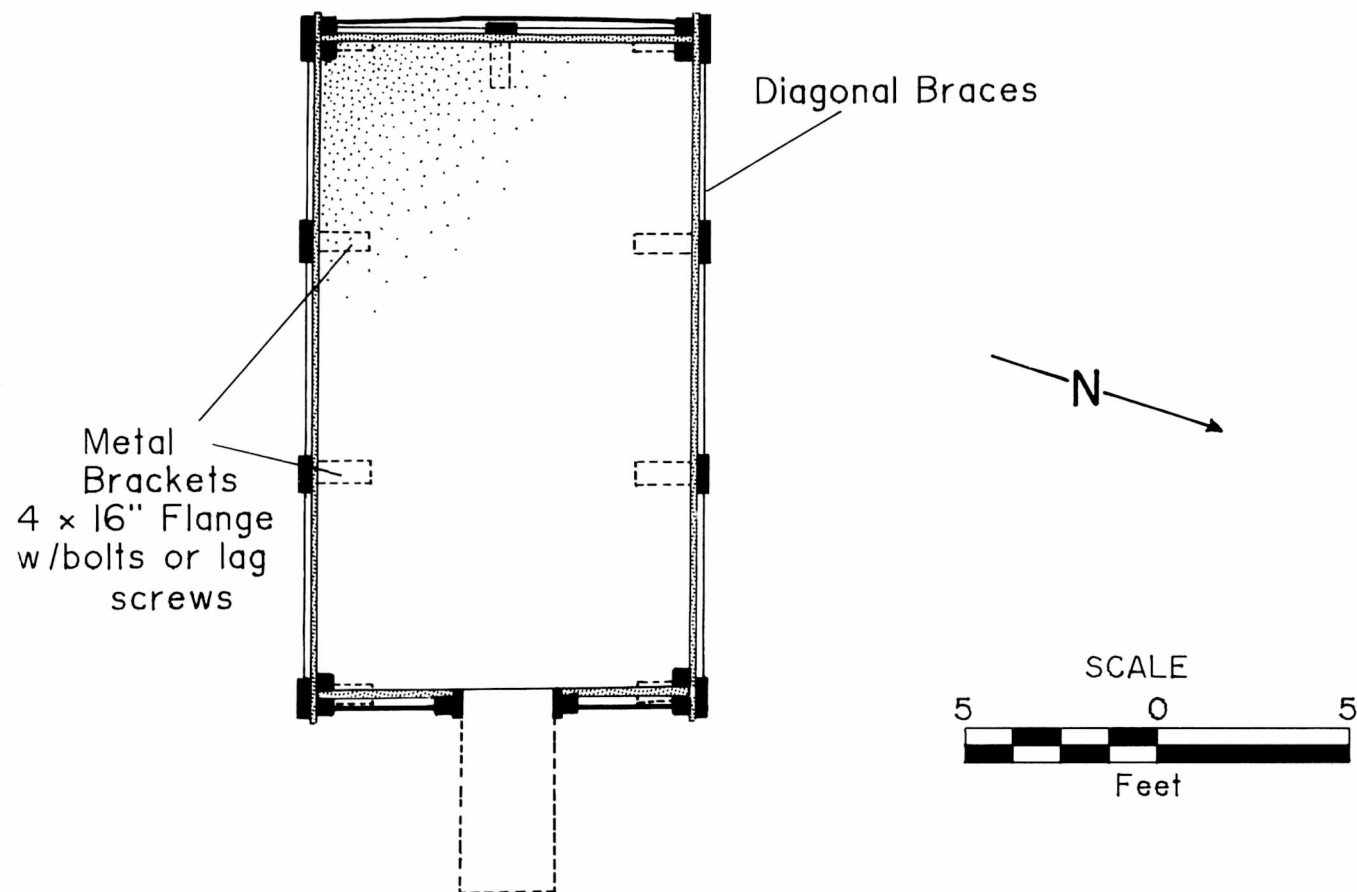


Figure 19. HEA-227, feature 1.

On-site vegetation between the cabins is generally very dense, consisting largely of alder and willow thickets. Each cabin is situated at the edge of an associated clearing of grass and fireweed, encroached upon by young black poplar trees. An old road, heavily overgrown in a thicket of mature alders and willows, leads past the cabins, crossing Colorado Creek at a wooden beam-and-log bridge (Locus D). Other identified features/loci consist of the ruins of a semi-collapsed, roofless log cabin (Locus A); a standing log cabin with intact roof, a collapsed frame outhouse, the collapsed remains of an elevated log cache, and a trash dump (Locus B); a standing log cabin with intact roof, a standing outhouse, a trash dump scattered in and around two old prospect pits, and associated mining debris (Locus C).

Four clusters of features (loci A, B, C, and D) were identified (Figure 21).

Locus A: The locus is composed of a semi-collapsed log cabin, a collapsed frame outhouse and a trash scatter in a 30-by-60-m grassy clearing.

Feature 1: This feature consists of the ruins of a partially collapsed, roofless 10-by-12 ft (3-by-3.7 m) log cabin, constructed of 8-in (20-cm) diameter logs hewn flat on the bottoms and on the interior surfaces (Figure 21, Locus A). The east end of the cabin is collapsed and disassembled. The fallen west wall, with 12 courses in place where it rests intact over the collapsed east wall, is the only complete remaining wall. Four posts that once supported the corners of the cabin are attached to the log courses by metal spikes. The north and south gables are semi-collapsed. The floorboards, constructed of rough-milled lumber, are deteriorated and covered with vegetation and fallen debris. The roof, whose remnants are scattered on the ground inside and around the cabin, is constructed of split logs laid over a ridgepole and weatherproofed with canvas and tar paper. A doorway is located in the south wall of the cabin.

A number of artifacts were noted in and around Feature 1. The cabin interior contains a handmade wooden table, a steel bed frame and springs, a flattened Hills Brothers coffee can bearing a 1922 label, and a double-sided pick head with the name, "Allin-Logan," inscribed on one end of the head. Located outside the cabin were three cast iron stoves, ranging from fair to ruinous condition, several old "Hole-in-the-top solder" type condensed milk cans, and an intact gin bottle, scattered around the perimeter of the cabin.

Feature 2: This feature consists of the ruins of a collapsed, milled lumber privy, 4-ft-7-in square and 6-ft-7-in high (when standing), 5 m northeast of the cabin .

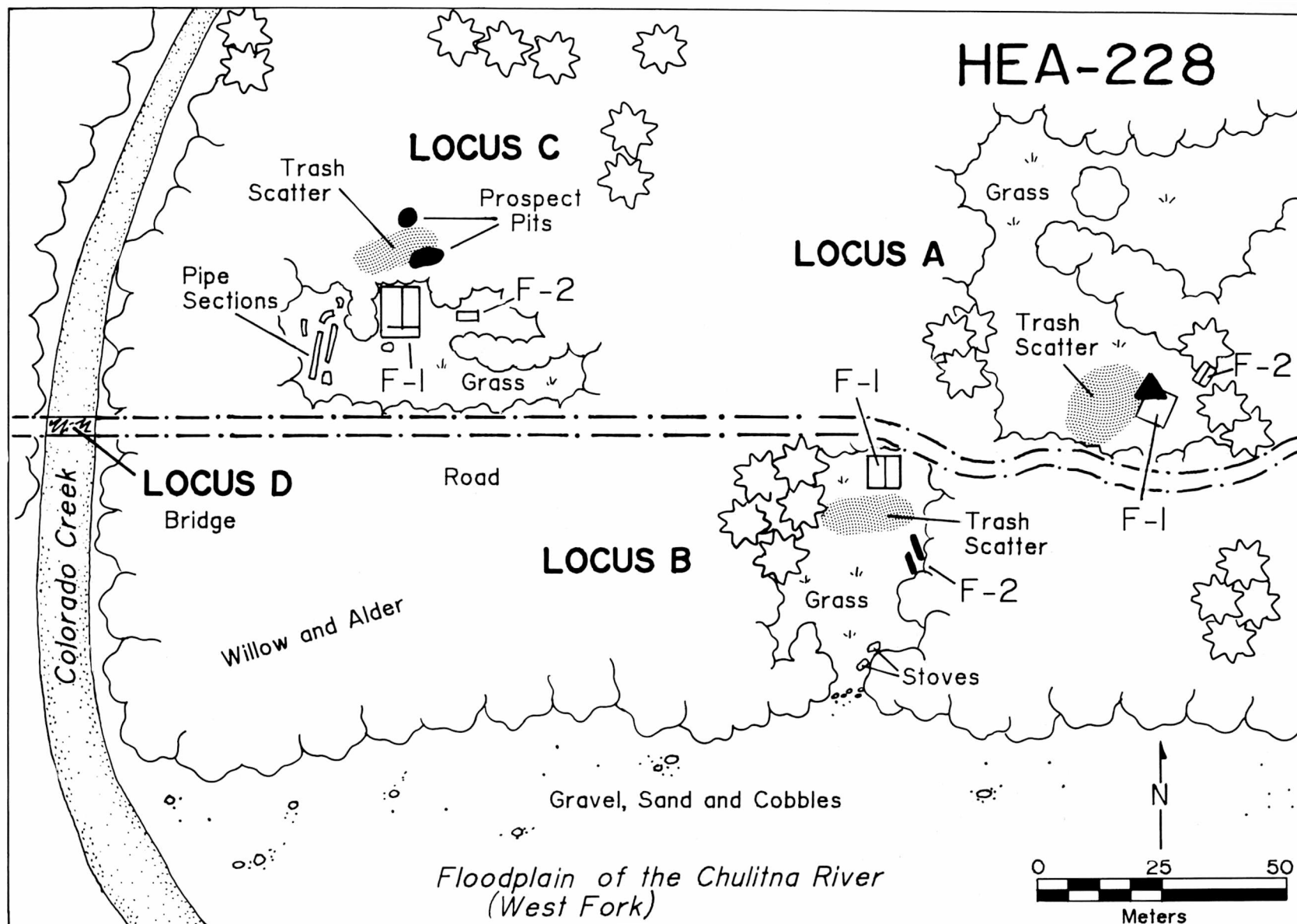
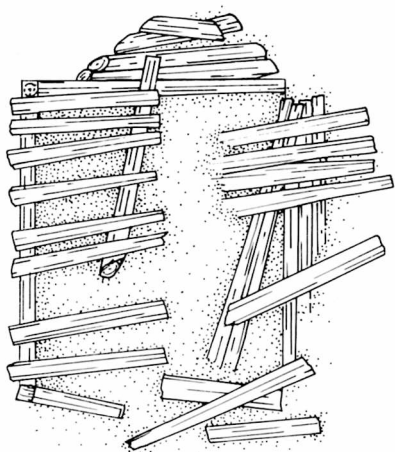


Figure 20. HEA-228 site map.

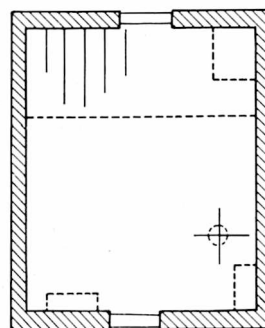
HEA-228

Locus A,B,C Detail

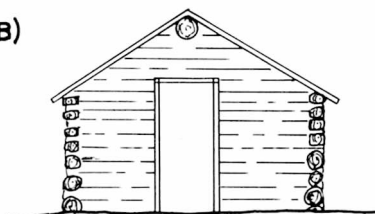


LOCUS A, CABIN RUINS (plan view)

A)

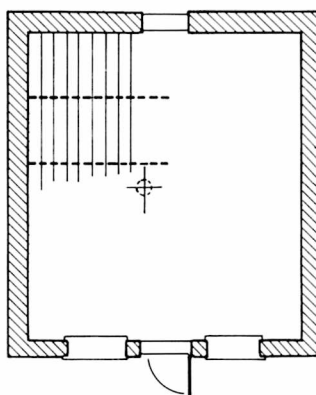


B)



LOCUS B, CABIN
(a. plan view, b. s. elevation)

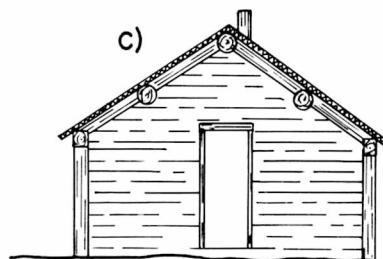
A)



B)



c)



LOCUS C, CABIN (a. plan view, b. south elevation, c. n. elevation)

Figure 21. HEA-228 feature details (Locus A, B, C).

Feature 3: This feature consists of a trash scatter spread over a 12-by-18-m area along the west side of the cabin ruins. Items observed on the surface of the scatter include a spice can copyrighted 1925 by the Commercial Importing Co., Seattle, a small china plate labelled "Shenango, New Castle, Pa. China," a tea kettle, a dappled enamelware saucepan, a Spam-type can with soldered circle and hole in tip, several gin and beer bottles, as well as nondiagnostic fragments of various culinary and coffee cans, and sherds of clear glass jars. The trash scatter is overgrown, and it is likely that more artifacts lie buried beneath the vegetation.

Locus B: Locus B is composed of a standing log cabin, the collapsed ruins of an elevated log cache and a trash dump, situated in a 20-by-50-m grassy clearing, some 30 m southwest of Locus A.

Feature 1: This feature consists of a standing cabin, in fairly good condition, 12 ft 6 in (3.8 m) long, 10 ft (3 m) wide and 8 ft (2.4 m) high at the peak (Figure 21, Locus B). The cabin is constructed of hewn logs with saddle-notched corners cut flush and nailed with spikes. The three bottom courses are unhewn. The six-course gable ends support the roof's north-south center ridgepole. The roof is constructed of round poles, covered with 1-inch milled boards, tar paper, and shingles fashioned out of flattened, 20-pound Hills Brothers coffee cans.

The doorway is located in the south wall of the cabin, and a hand-fashioned door--a wooden rectangle sheathed with flattened steel cans--lies at the west side of the opening. The cabin has a single window, with four metal "bear bars" set vertically across the opening. Within the cabin, a loft spans the north end of the structure, and wooden shelves, covered with "oiled cloth," are secured to the walls in the southeast corner and just west of the door. A third shelf, supported by a single upright post, is located in the northeast corner. The cabin floor consists of 1-by-8-in milled boards. An opening for a stovepipe is located in the roof in the southeast quarter of the cabin. Fragments of canvas partially cover the interior walls.

Artifacts, including a metal bed frame, a white enamel metal wash basin, a white enamel metal plate, two complete window frames and sections of third frame, a metal bed frame and bed springs, were observed on the cabin floor. Diagnostic items found inside the cabin include a 1 pound, 1922-32-36 "Red Can" Brand Hills Brothers coffee can, a "Klim Powdered Whole Milk" brand can, distributed by Borden Company, Limited, Toronto, Canada (label in English, Spanish, French, and German), a 12-ounce "Royal Baker's Powder" can with pry-off lid, a 16-ounce "Puretest Epsom Salts" can, made by United

Drug Company, Boston & St. Louis, distributed by Rexall stores, and an opaque white glass Mentholatum jar.

Feature 2: This feature consists of the collapsed and badly deteriorated remnants of an elevated cache. All that remains of the cache are a single 3-m-long decomposed post and a steel sleeve formed from a flattened 5-gallon Blazo can.

Feature 3: This feature consists of a 10-by-20-m trash scatter, located downhill to the south of the cabin. Items observed in the scatter include a rectangular cast-iron stove, a potato masher and assorted other miscellaneous rusted cans, plates, kitchen items, and liquor bottles. Probable diagnostic items include: a "Puretest Epsom Salts" can, a "H.J. Heinz Co" glass jar, inscribed with "426 Pat.," and screw-top lid, a 1-quart "SCHENLEY" liquor bottle, inscribed with "Federal law forbids sale or reuse of this bottle," and a 21-pound Armour meat can. Another small iron stove lies approximately 25 m southeast of the trash scatter.

Locus C: This locus is composed of a log cabin, an outhouse, a trash dump, and associated mining debris situated in a 25-by-50-m clearing about 50 m northwest of Locus B.

Feature 1: Feature 1 consists of a standing, 14-by-16-ft (4.3-by-4.9 m) log cabin, in good condition and with an intact roof (Figure 21). The logs are cut flush, squared on the ends and have saddle-notched corners. Vertical boards, nailed to the log courses to protect the notching, enclose the corners of the cabin. The cabin is 10 ft (3 m) high at the peak of the gables and 5 ft 6 in (1.7 m) high at the eaves. The cabin has two doorways, located in the gable ends. The north door is missing. Two six-pane windows with milled board frames are located on either side of the south doorway. The floor, which bears the gnaw marks of animals, is constructed of 1-by-7-in shiplapped boards. The roof's ridgepole and purlins are covered with 1-by-6-in boards and tar paper. A loft spans the inside space below the ceiling. Canvas covers the cabin's interior walls.

Artifacts inside the cabin include two manufactured wooden tables, a Coleman lantern, two coffee mugs, parts of a round stove and stovepipe, two shovels, and various fuel cans. A bench and door lean across the south doorway, and in front of the door rests a complete oval wood stove. All the artifacts are of recent manufacture and appear to have been in recent use. Artifacts noted around the cabin perimeter include a door lying on the ground in front of the north doorway, a homemade wooden chair resting outside the northeast corner of the cabin, and various recent cultural materials, including a roll of tar paper, two small metal stoves, pieces of angle iron, a "No Trespassing" sign,

a new bathtub, a battered washtub, and sections of steel pipe, scattered around all four sides of the cabin's exterior.

Feature 2: This feature is a privy, 3 ft 4 in by 5 ft by 6 ft 6 in (1 by 2.5 by 2 m), constructed of rough-cut, milled lumber stands 10 m east of the cabin. The privy is in serviceable condition.

Feature 3: This feature consists of a trash dump, scattered over a 10-by-20-m area in and between two old prospect pits about 8 m north of the cabin. Prospect pit #1 is a trench, 9.3 by 3.0 m and 1.5 m deep. Prospect pit #2 is a 4.0-m diameter pit that is 1.0 m deep. The dump contains 1940 labeled C-ration cans, powdered milk cans, steel pie plates and various pieces of non-diagnostic cultural refuse. Located 20 m west of the cabin are six sections of steel hydraulic pipe, graduating in diameter from 37 to 45 cm and from 60 to 120 cm long. The pipe appears to be directly associated with hydraulic mining operations north of the cabin (the site is located on a still-active mining claim, Colorado Placer Claim #1).

Locus D: This locus consists of a wooden bridge spanning Colorado Creek approximately 40 m southwest of Locus C.

Feature 1: This feature consists of a bridge, 39 ft (11.9 m) long and 12 ft 4 in (3.8 m) wide, composed of logs and wooden beams. The bridge spans Colorado Creek approximately 50 m upstream from its confluence with West Fork Chulitna River. Four log pilings, each 12-in in diameter, are driven into the ground to support the corners of the bridge. The piling on the northeast corner is collapsed. Lintels, measuring 12 by 12 in, rest on the tops of the pilings. The lintels support double 4-by-16-in beams that underlie the bridge's 3-by-16-in plank surface. Log cribbing forms a retaining wall on the east end of the bridge. The bridge is in fair condition.

The site dates approximately from the 1920s to the 1940s. Signs of recent placer mining prospects are evident north of the site. The three cabins found at the site suggest that it may have served as camp for mining operations in the Colorado Creek vicinity.

HEA-229 is a historic habitation site, dating from approximately the 1920s or perhaps as late as the early 1930s. The site is probably associated with mining operations in the Dunkle Hills (Figure 22). The site is composed of a partially standing cabin with collapsed roof, a collapsed cache, a trash dump, a doghouse and sled, and a freight sled.

The site is located in an irregularly shaped grassy clearing, 35 m square, on an unnamed stream that drains into the West Fork Chulitna River about 1 km south of the site. The clearing is situated on the stream terrace, about 2 m above the creek, and 15 m east of the creek bank. Vegetation on-site consists of grasses and wildflowers. A mature black poplar forest, interspersed with dense alder thickets, encroaches on the clearing.

Feature 1: This feature consists of a partially standing log cabin, 8 ft by 19 ft 10 in (2.4 by 5.8 m), with collapsed roof. The building is constructed of hewn spruce logs, double-notched at the corners. The east and west sidewalls are six to seven courses high, with vertical wooden dowels pegging the logs together. A door, constructed of milled, shiplapped boards with metal hinges, is located in the south wall. The cabin has no windows. The roof and gables are collapsed into the structure and around its perimeter. The north-south oriented ridgepole and purlins are partially covered by 3-by-12-in boards, secured to the structure with metal spikes, with approximately 1/3 to 1/2 of the roof boards still in place. The cabin floor, constructed of milled lumber, is covered with a 1-to-2-in vegetation mat. A rock retaining wall borders the west, south, and east sides of the cabin.

Six artifacts were found resting on the ground around the periphery of the cabin, including a lightweight iron stove, a grey-speckled enamelware teapot with wire-type handle, a 1-pint glass jar with "Boyd Mason" in bas-relief on its side, a deteriorated steel can inscribed on the bottom with "Pat. July 1802 [or 1902], CANCO, 731," and two white enamelware bowls.

Feature 2: The dilapidated remains of an elevated cache lie collapsed on the ground and scattered over a 2-by-5-m area, approximately 8 m southeast of the cabin. Associated artifacts include two stacks of dishes; seven white enamelware dishes; and seven grey-speckled enamelware dishes. The location of these artifacts suggests that they were stacked neatly within the cache at one time--grey speckled enamelware in one pile and white enamelware in another pile.

Feature 3: This feature consists of a 2-by-4-m trash dump, located 5 m southeast of the cabin. The scatter is heavily overgrown, with few artifacts visible on the surface, although the crunch of metal underfoot suggests that considerably more items lie buried beneath the vegetation. Those artifacts that do appear on the surface include the top from a grey-speckled enamelware teapot and several crushed rusty steel cans.

Feature 4: This feature is an extremely dilapidated log doghouse, 24 ft (7.3 m) long and 3 ft 91 cm) wide. Associated with the doghouse is a narrow sled, 5 ft 6 in long and 7 in wide (1.7 m by 18 cm). The doghouse leans against a

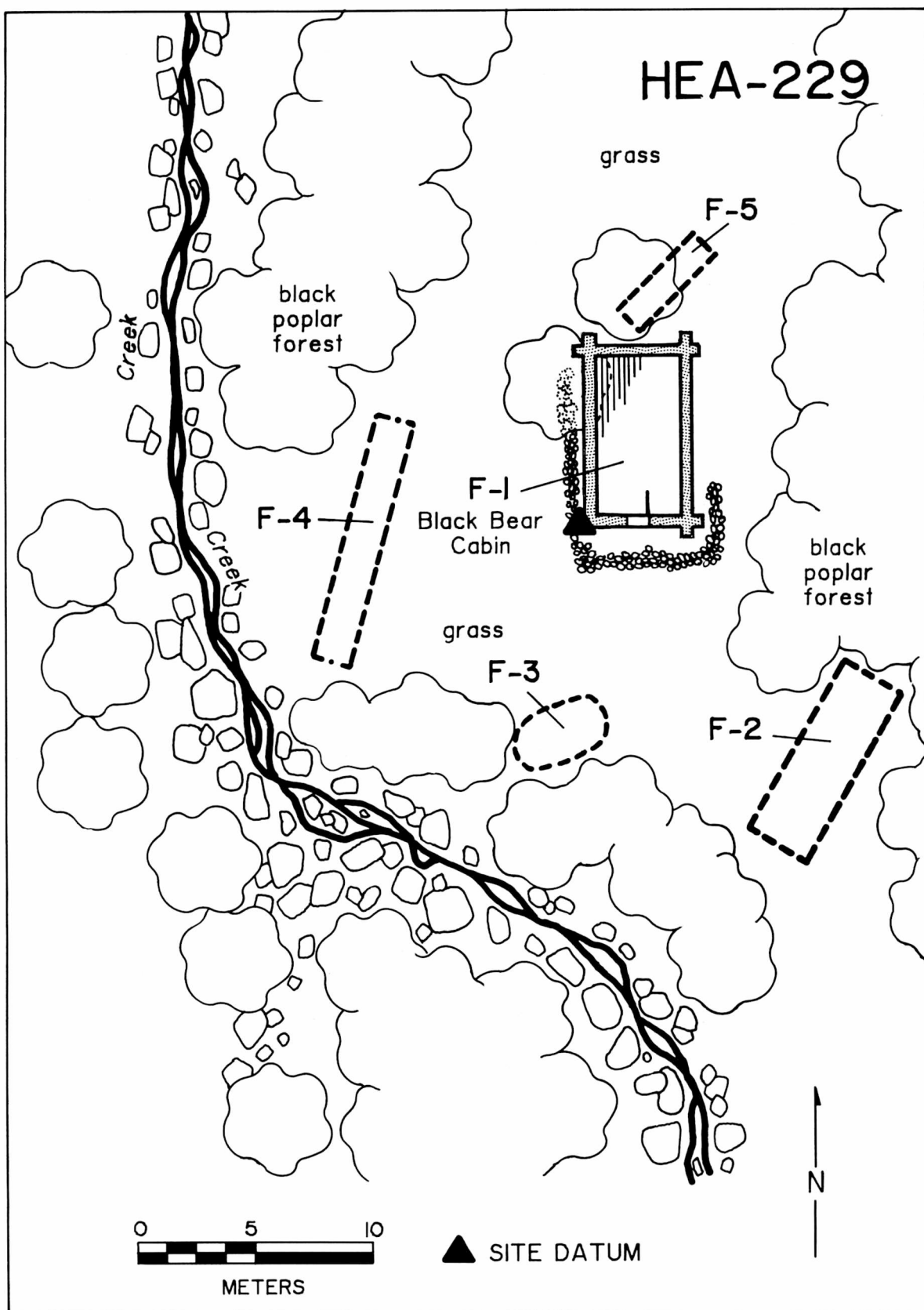


Figure 22. HEA-229 site map.

black poplar tree immediately west of the doghouse. Two steel sled runners are secured to the sled frame by nails, bolts and screws. A 5-gallon galvanized washtub and a rectangular metal box also lie adjacent to the doghouse.

Feature 5: This feature consists of a badly deteriorated freight sled, 10 ft long and 20 in wide (3 m by 51 cm). Although the wooden framework of the sled is decomposing, the metal hardware for the runners and side supports is still in fair condition. Several large, dead trees lie collapsed over the front of the sled, and it is possible that other artifacts lie buried under the vegetation in this vicinity.

HEA-230 is a historic mining-related transportation site consisting of a partially collapsed bridge and associated piledriver framework. The site is located on the West Fork Chulitna River approximately 1/2 mi (900 m) upstream from its confluence with Colorado Creek (Figure 23). The bridge formerly joined the right and left banks of the West Fork of the Chulitna, on the access road to the Golden Zone lode mine. Vegetation on both banks consists of dense willow/alder thickets.

The major feature at the site consists of the remnants of a 402-m long bridge that once spanned the West Fork Chulitna River. An associated piledriver is located immediately adjacent to the bridge's northeast abutment. Although the bridge collapsed during the Good Friday earthquake in 1964, the bridge abutment on the northeast bank and a single span remain standing in their original positions. Three other sections of the bridge lie collapsed on the gravel bar of the West Fork Chulitna floodplain (Figure 23, inset).

The bridge itself is constructed of 12-inch-diameter, diagonally braced posts and 10-by-10-in timber beams. A framework of 4-by-16-in timber joists, covered with 2-by-12-in rough-cut planks, form a raised 12-ft-wide (3.7 m) roadway that rests on the post-and-beam foundation. The super-structure of the bridge is constructed of a simple truss system (Figure 24), with each truss spanning 100 ft (30.5 m).

The truss system incorporates a metal bracket at each truss joint, which allows for prefabrication of all parts. One of the spans remains intact near the southwest bank of the West Fork where it rests collapsed on the gravel bar.

The piledriver framework, located at the northeast end of the bridge roughly 20 m north of the abutment, measures approximately 45 ft (13.7 m) long, 10 ft (3 m) wide, and 20 ft (6 m) high (Figure 24). Construction is double Warren type, composed of 12-by-12-in timbers and rough sawn, milled lumber. Pulleys, turnbuckles, and 1-inch steel cable remain in place, but no engine or other machinery is present.

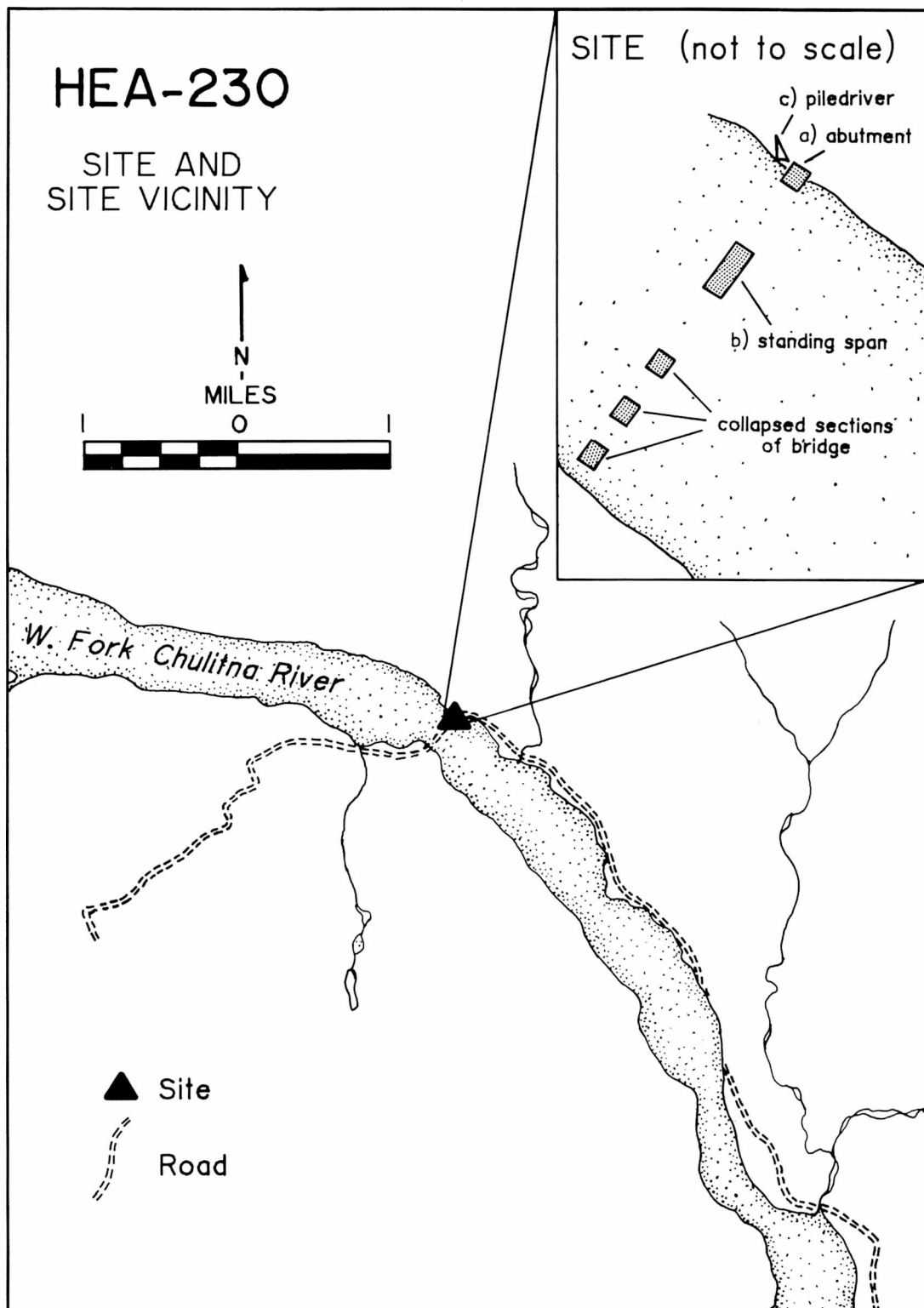
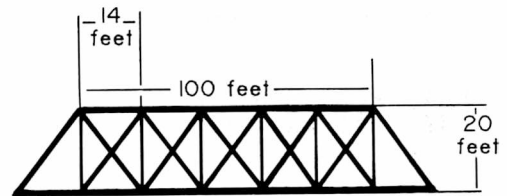


Figure 23. HEA-230 site vicinity and site map (inset).

HEA-230

BRIDGE AT WEST FORK CHULITNA RIVER

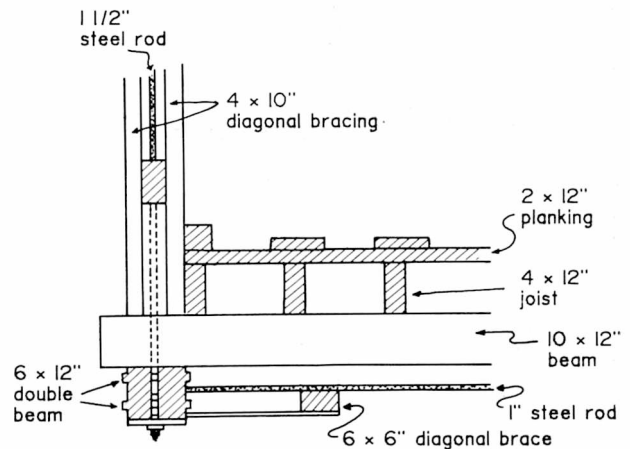
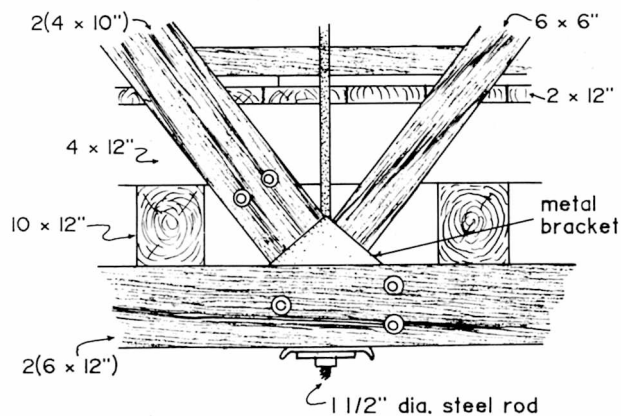
Section drawings of bridge
abutment, superstructure
and associated pile driver.



SCHEMATIC OF HOWE TRUSS SYSTEM

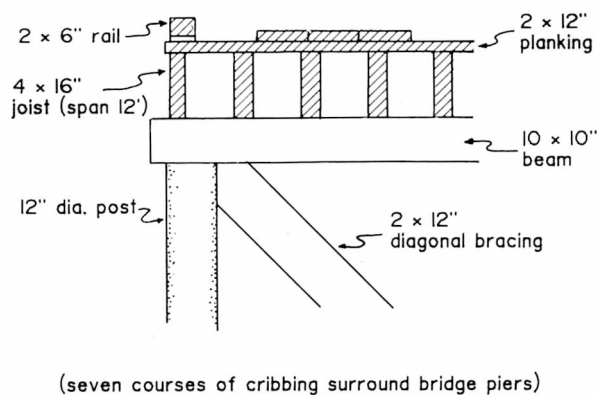
(all measurements approximate)

TRUSS CONNECTION OF SUPER-STRUCTURE



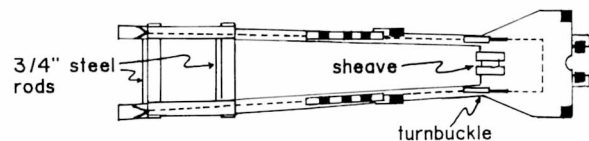
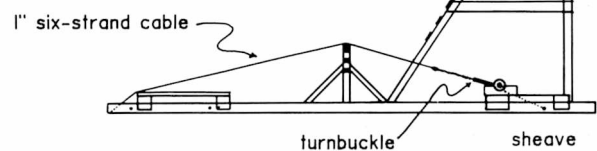
SECTION OF SPAN

SECTION OF ABUTMENT



PILE DRIVER FRAME

Longitudinal Section



Plan View

Figure 24. HEA-230 bridge abutment, superstructure, and piledriver framework (detail).

Before the earthquake of 1964, the bridge provided access to the Golden Zone mining claims, connecting that operation with the Alaska Railroad and the Dunkle coal mine.

HEA-231 is the site of a small historic mining operation on the West Fork Chulitna River in the Dunkle Hills (Figure 25). The site consists of a single historic structure probably used for processing ore or gravel.

The site is located on the gravel bar on the right (south) side of the West Fork Chulitna River, approximately 200 m upstream from the mouth of Bryn Mawr Creek.

The gravel bar on which the site is located is subject to several floods per year and is devoid of vegetation. A willow/alder thicket covers the stream bank south of the site.

HEA-231 consists of a single cultural feature: a tank-like, standing cribbed wooden structure, in relatively good condition, measuring 5 ft 3 in (1.6 m) sq and 10 ft (3 m) high. The feature is partially enclosed by a semi-collapsed flood-damaged structure (Figure 26). The tank is constructed of horizontally cribbed lumber resting on concrete footings. The tank, which at present contains several inches of silt in the bottom, is partially buried in the ground. A galvanized sheet-metal liner encases the section below ground. A horizontal axle protrudes 3 ft (90 cm) beyond the west wall of the tank. The axle--which may have served as a lubricating cup--is mounted on the shaft. The shaft is bolted to a steel cribwork located inside the tank.

The ruins that surround the tank appear to be the remnants of a structure destroyed by flooding. A high-water mark is visible 3 ft (90 cm) up on the standing south wall of the structure, and a portion of the roof lies collapsed over the interior. A 15-ft (4.6 m) section of the east wall and an 18-ft (5.5 m) section of the south wall are still intact, although collapsed. Other structural parts of the building are scattered over the gravel bar for approximately 1 km downstream from the site. In particular, large amounts of lumber, electrical wiring, roof portions, and many notched logs form a large debris scatter immediately southeast of the site.

The tank and other structural remains present at the site are almost surely associated with an old mining operation/habitation site composed of sawmill, workshop, pelton wheel, and cookhouse complex situated above the streambank 100 m south of the site. The sawmill complex was not investigated because it is located outside the park boundary.

Survey Results (Adjacent to Dunkle Unit)

One prehistoric site was recorded adjacent to the Dunkle unit in 1988. The site, HEA-232, is located approximately three mi (4.8 km) west of the unit. The site is summarized in Appendix A (Table 1). Artifacts are described in Appendix B.

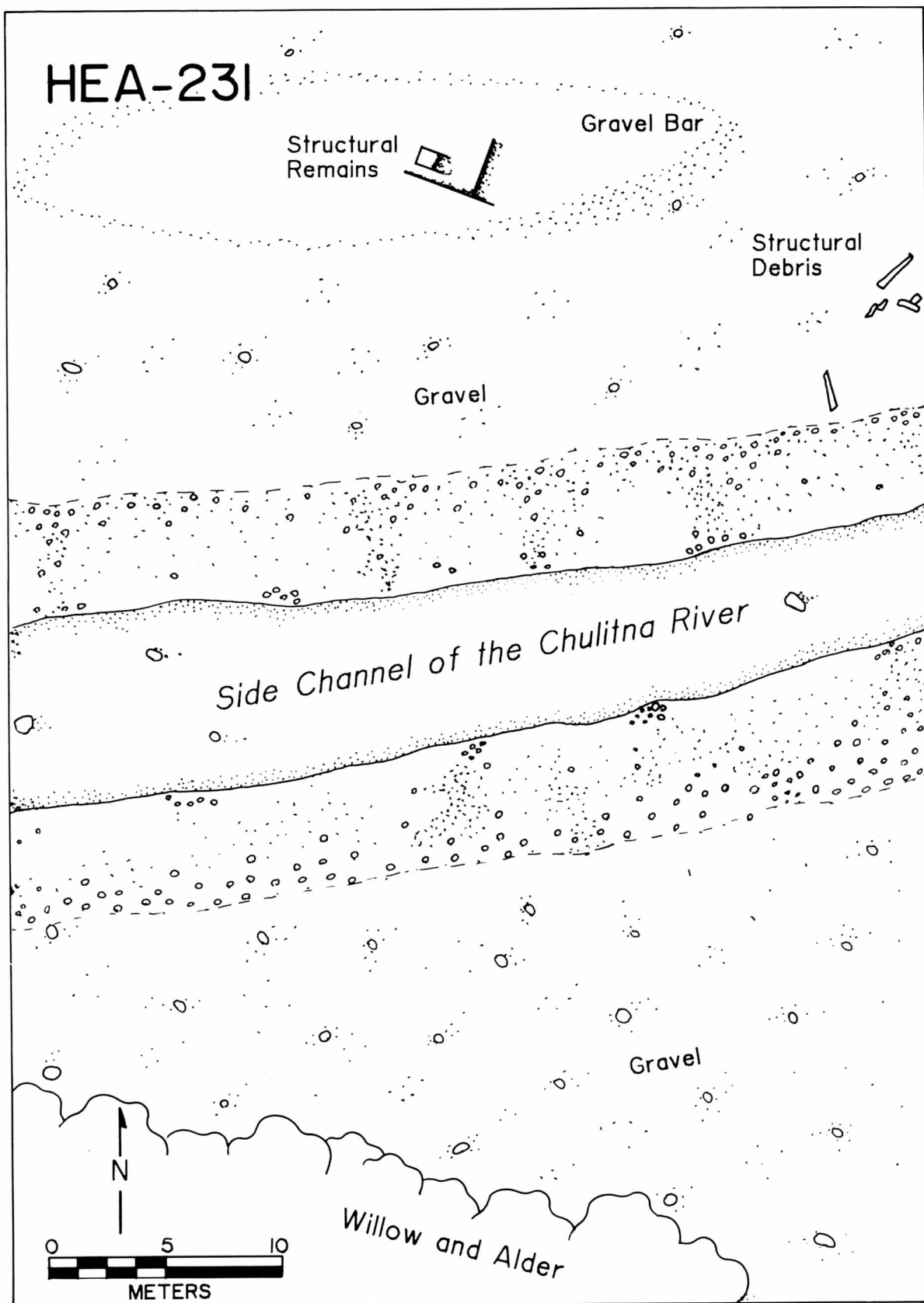
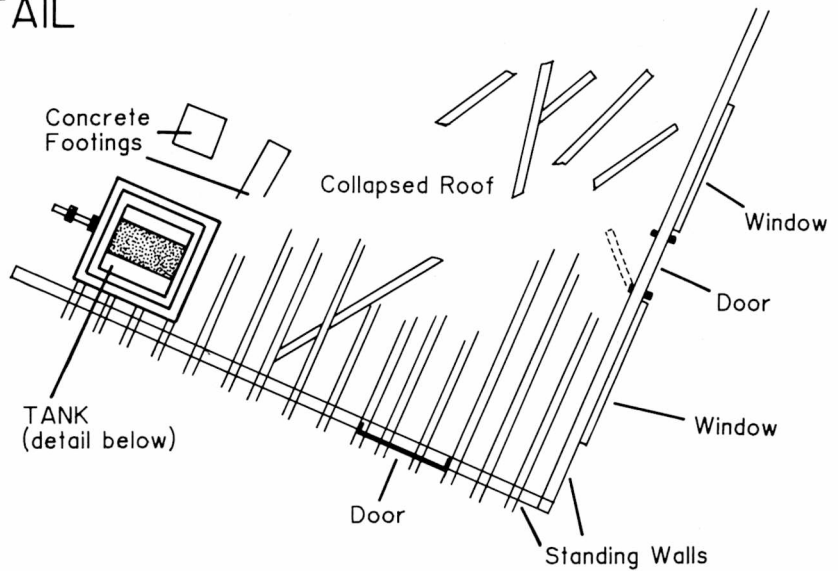
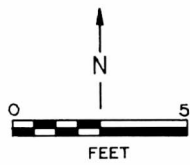


Figure 25. HEA-231 site map.

HEA-231

FEATURE DETAIL

STRUCTURAL REMAINS (Plan View)



CROSS-SECTION OF TANK (West Side)

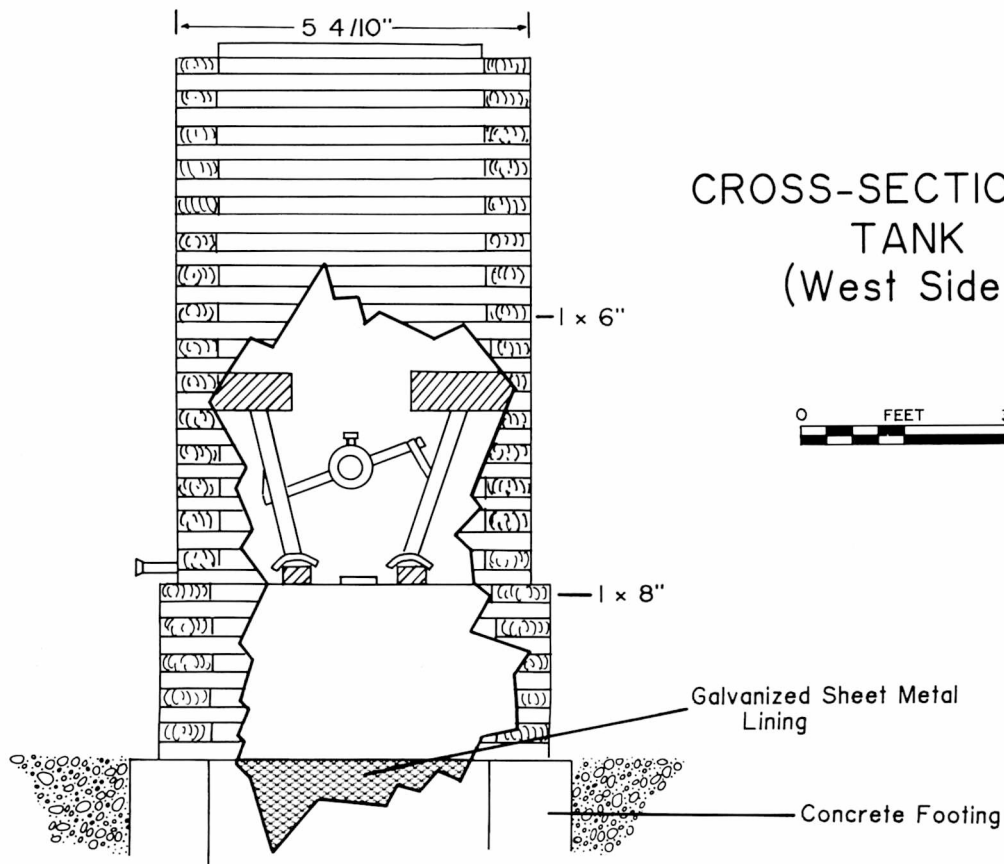


Figure 26. HEA-231 plan view and cross-section of structural remains.

HEA-232 is a prehistoric site consisting of two microblades, three flakes, and a wedge-shaped microblade core. The artifacts were scattered over a 2-by-13-m exposed area along a rocky ridgetop about 5.5 km (3.3 mi) west of the Dunkle unit (Figure 27). The artifacts formed two small clusters (Figure 28) and are detailed further in Appendix B.

The site is located on the south end of a north-south trending ridgetop overlooking a long narrow lake, about 2 km west of the headwaters of Camp Creek. To the west, the ridge drops steeply to the lake, some 30 m below the site. To the east, the ridge slopes gently downward to swampy, undulating lowlands that continue to Bull River, approximately 3 km northeast of the site.

The immediate site area is barren, rock-strewn, and virtually devoid of plant life. Vegetation in the surrounding area is very low alpine tundra composed of dwarf birch, blueberry, lowbush cranberry, crowberry, dwarf willow, clubmoss, and a sparse growth of grasses.

An archeological test pit (Test Pit #8) excavated in the vegetated area 7 m northeast of the site datum reached glacial gravels 20 cm below the root zone. Although no additional artifacts were found in the test excavation, it is possible that artifacts are present beneath the vegetation mat downslope from the site. HEA-232 appears to be a briefly occupied hunting overlook.

Healy/Stampede Land Exchange Unit

The Healy/Stampede unit, covering approximately 25,654 acres (40 sq mi), is situated in the northeastern corner of Denali NPP, immediately east of the Teklanika River and north of the Savage River and its tributary, Fish Creek (Figure 29). The unit, which extends across the northernmost of the Northern Foothills of the Alaska Range, is contained between Fish Creek and an unnamed stream commonly called "First Creek" (Plaskett 1976:6). The hills are dissected by a dendritic network of small streams flowing generally west into the Teklanika River through steep-sided, V-shaped valleys. The hilltops form undulating uplands, covered with low shrub tundra, interspersed with barren rocky ground at the highest elevations. Within the study area the Teklanika River enters the lower Teklanika Canyon, where the river flows in a meandering course around near-vertical rock outcrops. Numerous terraces and benches line the inner edges of the meanders, while the outer banks cut deeply into the canyon walls. The valley widens at the lower end of the canyon to form an expansive plain where the river enters the Tanana-Kuskokwim Lowlands. Alder and willow thickets cover the canyon floor. Upland spruce forests, interspersed with stands of birch and balsam poplar trees, grow on the canyon slopes.

Survey Coverage. Archeological survey of the Healy/Stampede unit took place between 28 June and 15 August 1989. Working out of a temporary field camp on Fish

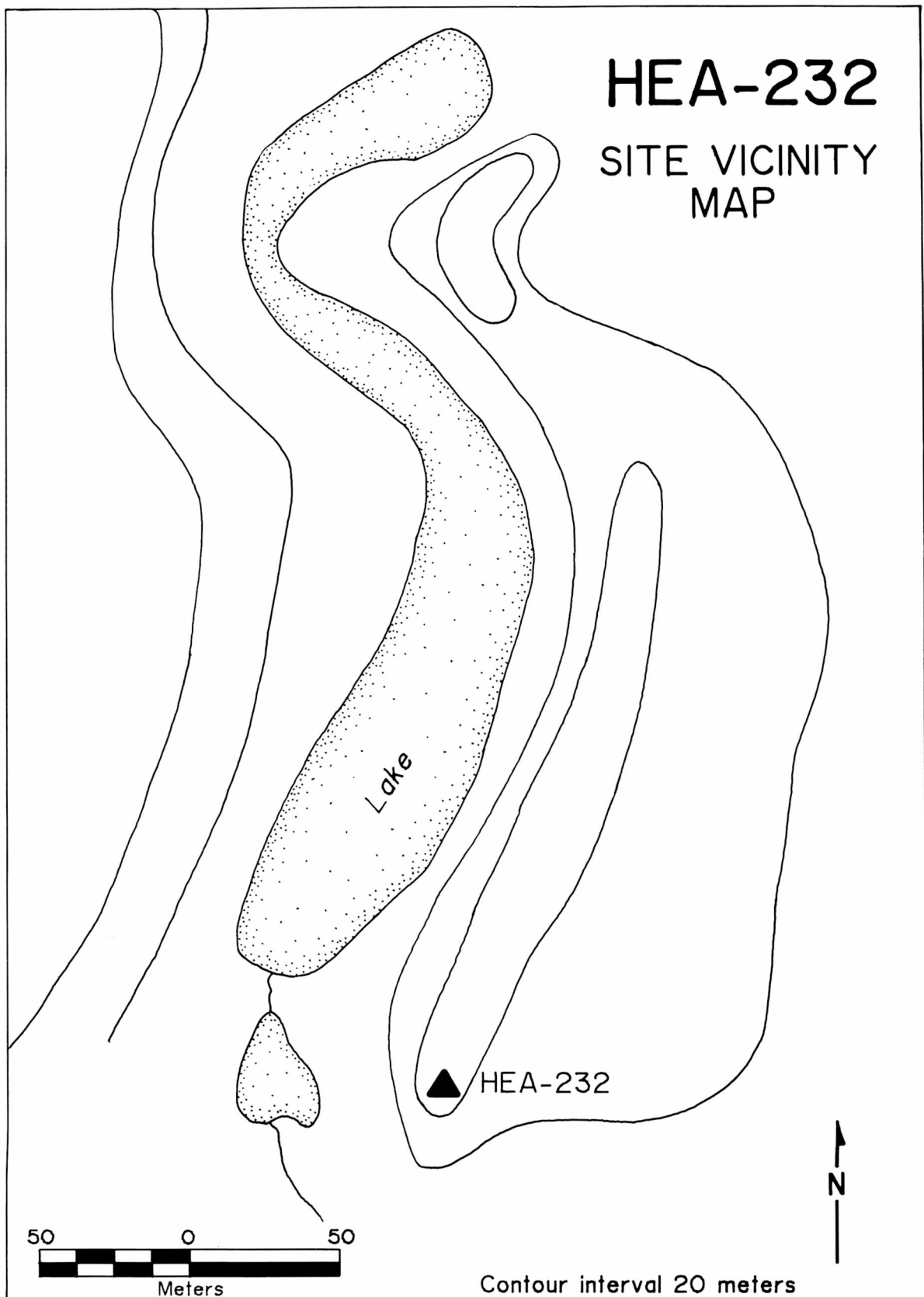


Figure 27. HEA-232 site vicinity.

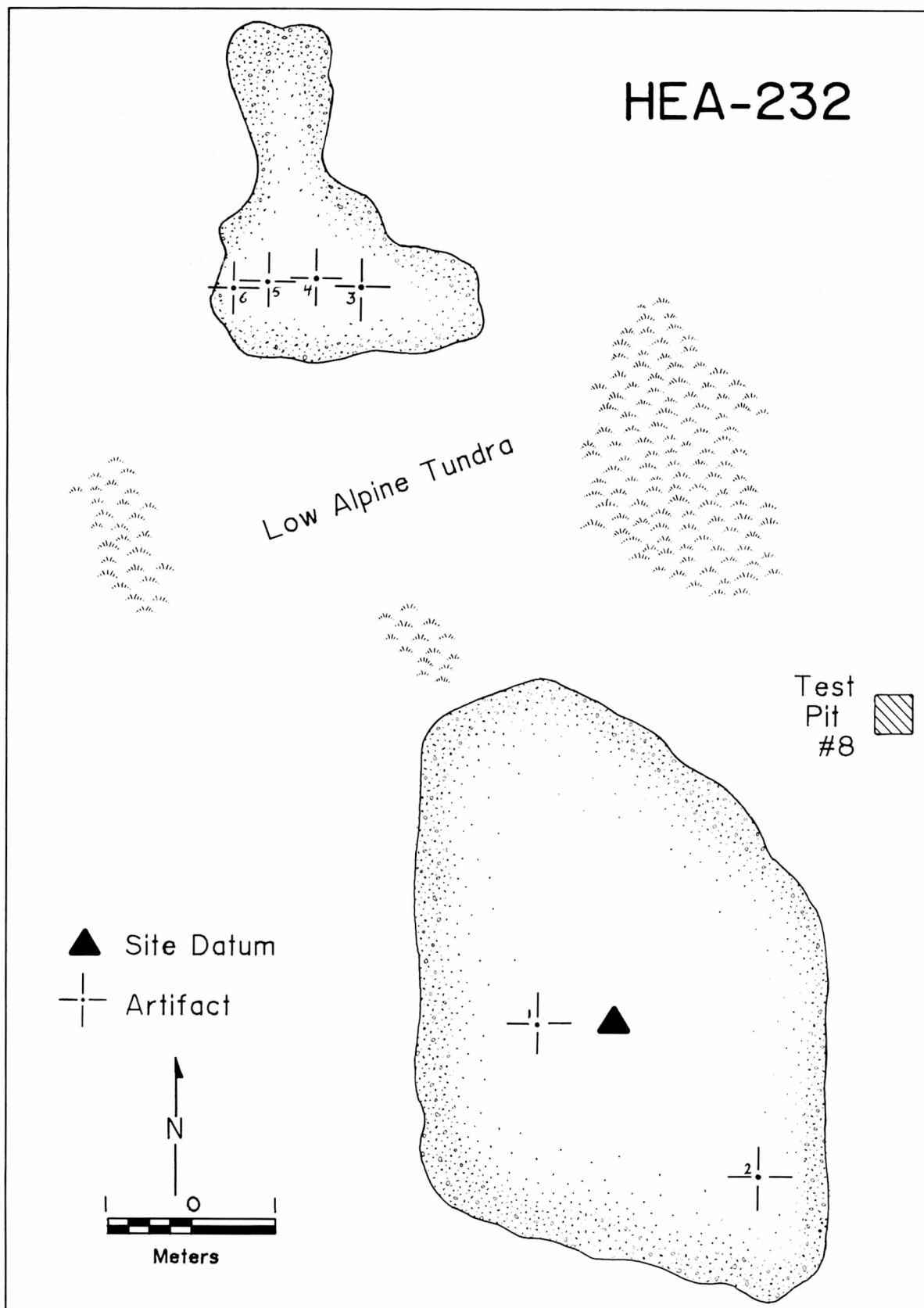


Figure 28. HEA-232 site map.

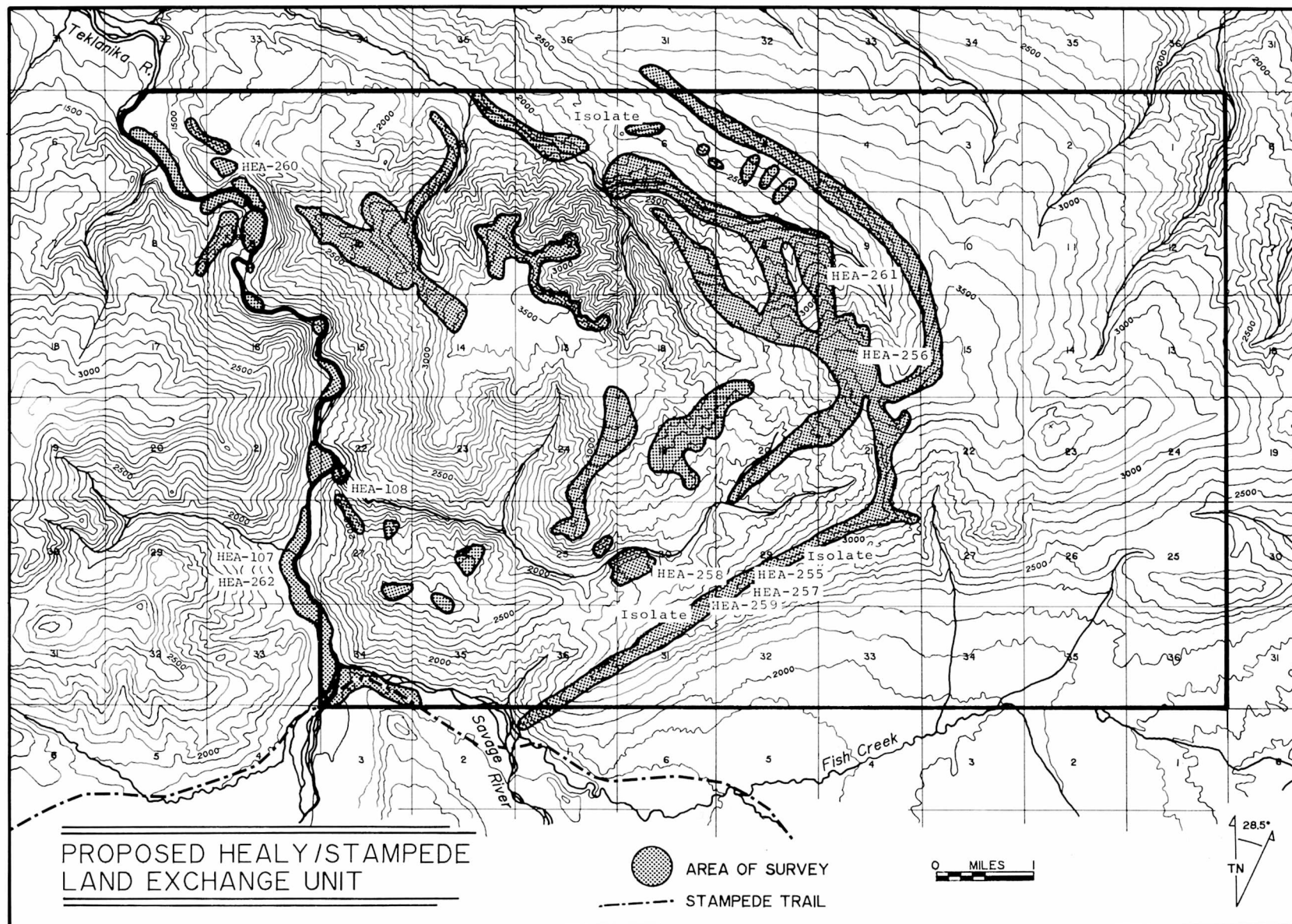


Figure 29. Survey coverage, Healy/Stampepe unit.

Creek, a four person crew commuted to daily survey areas by helicopter.

Approximately 4,429 acres (6.92 sq mi) within the Healy/Stampede unit and 300 acres adjacent to the parcel received intensive pedestrian coverage (Figure 29). In addition, approximately 66 acres in the Ewe Creek area, 16 km (9 mi) south of the unit, were covered by intensive pedestrian survey (Figure 30). The survey coverage of the Healy/Stampede unit and ancillary areas is shown in Table 4.

Table 4. Pedestrian survey coverage, Healy/Stampede unit (in acres).

<u>INSIDE</u>	<u>ADJACENT</u>	<u>EWE CREEK</u>
4,429	300	66

The majority of the survey focused on upland ridges and high ground east of the Savage and Teklanika rivers (Figure 29). This survey strategy was designed to give thorough coverage of the continuous ridge systems between the Teklanika and Nenana drainages. Based on the numerous lithic sites recorded along Owl Ridge immediately north of the park boundary (Plaskett 1977; Phippin 1988), these high, barren ridges were considered to be areas of high potential for game overlooks and dry, unvegetated transportation routes between the Teklanika and Nenana drainages. After surveying the areas described above, the terrace edges and knolls along the Teklanika Valley at the western edge of the study area were investigated. The survey included regular shovel testing to check for soil development deep enough to contain buried cultural materials.

Survey Results (Within Healy/Stampede Unit). Eight sites (seven prehistoric and one historic) were recorded within the Healy/Stampede exchange unit. These sites within the unit and those located outside and nearby the parcel are listed in Table 5.

HEA-255 is one of four small prehistoric sites situated in a row along a prominent ridge approximately 3.5 km northeast of the Teklanika/Savage River confluence (Figure 31). The site consists of 14 lithic artifacts or artifact clusters scattered on a 12-by-20-m exposed area overlooking an unnamed creek drainage. The artifacts form two discrete clusters, 10 m apart, on a flat-topped bench (Figure 32). The artifact assemblage consists of three biface fragments (Lithic Cluster #1) and two bifacially worked preforms, a side scraper and seven waste flakes (Lithic Cluster #2). Artifacts are described in Appendix B.

HEA-255 is situated on a relatively level bench jutting out from the northwest side of a northeast-southwest trending ridge. The ridge separates the Fish Creek drainage from the next unnamed drainage to the north.

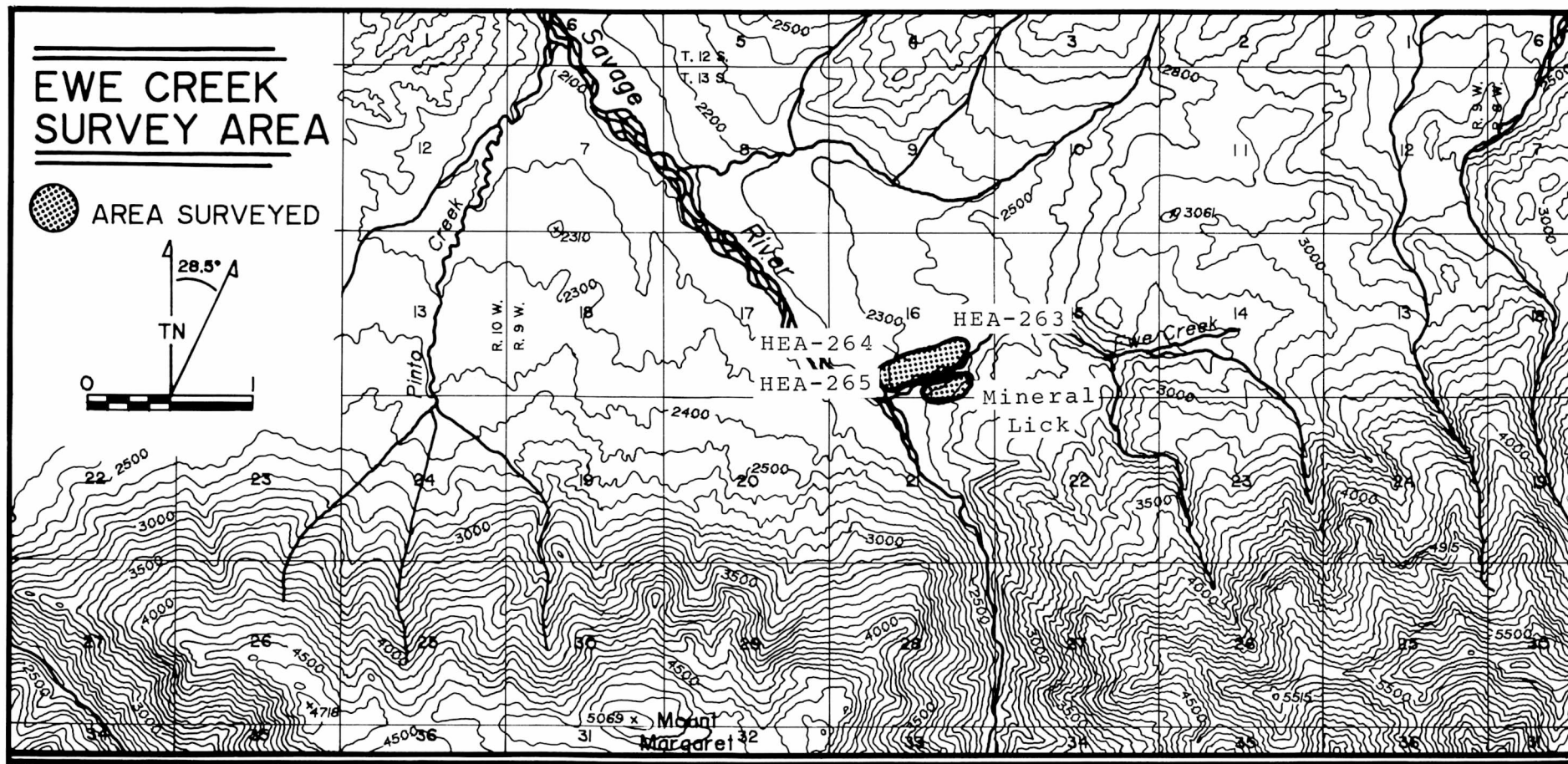


Table 5. Recorded sites, Healy/Stampede unit.

SITES WITHIN HEALY/STAMPEDE UNIT	
<u>HISTORIC</u>	<u>PREHISTORIC</u>
HEA-108	HEA-255
	HEA-256
	HEA-257
	HEA-258
	HEA-259
	HEA-260
	HEA-261
SITES ADJACENT TO HEALY/STAMPEDE UNIT	
<u>HISTORIC</u>	<u>PREHISTORIC</u>
HEA-107 +	HEA-263*
HEA-262 +	HEA-264*
	HEA-265*

+ West side of Teklanika River

* Ewe Creek area

The site is located on a well-drained exposed area of bedrock known as the Nenana gravels--a buff-to-reddish brown, poorly consolidated conglomerate of Tertiary age (Warhaftig 1970:158). A few small patches of lichens grow on the exposure. The poorly drained area around the site periphery supports a shrub tundra community of dwarf birch, grasses, mosses, and other water tolerant plants. At least some of the vegetation is underlain by ice, encountered in an archeological test pit at 40 to 50 cm below the surface.

A 50-by-100-cm archeological test pit was excavated into a silt loam (loess) deposit in a vegetated area about 6 m southeast of the second lithic cluster (Figure 32). An ice lens, encountered at 55 cm below the surface, halted the excavation before it reached sterile gravels. The excavation was negative; neither cultural materials nor a paleosol noted.

The site location and its relative abundance of bifaces, both complete and fragmentary, suggest that the site functioned as a hunting overlook where tools were prepared and repaired while looking for game. The site location provides an unimpeded view of the central Teklanika and lower Savage river valleys, the broad lowlands along Fish Creek to the south, and the steep valley of the unnamed drainage

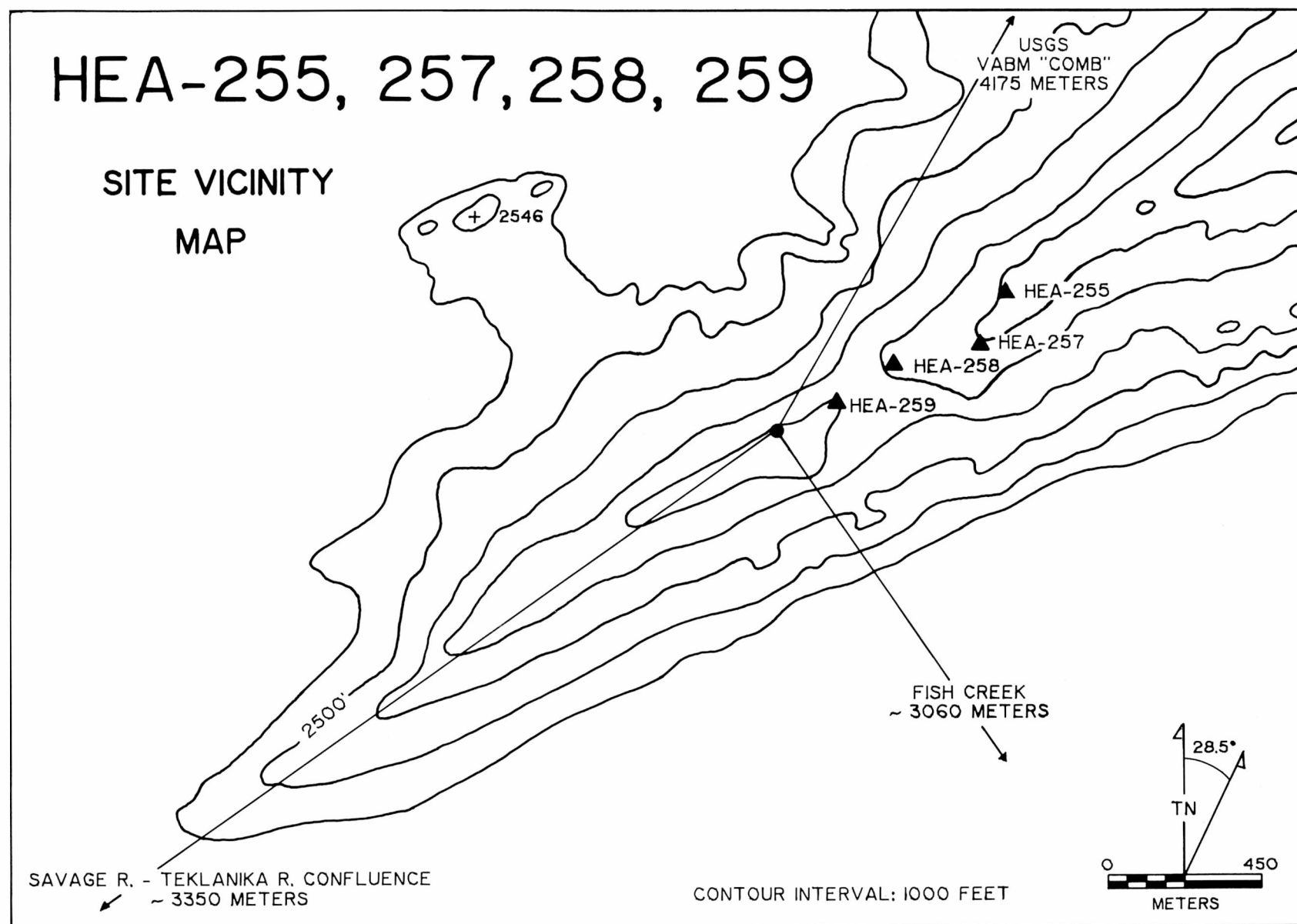


Figure 31. HEA-255, HEA-257, HEA-258, and HEA-259 site vicinity.

HEA-255

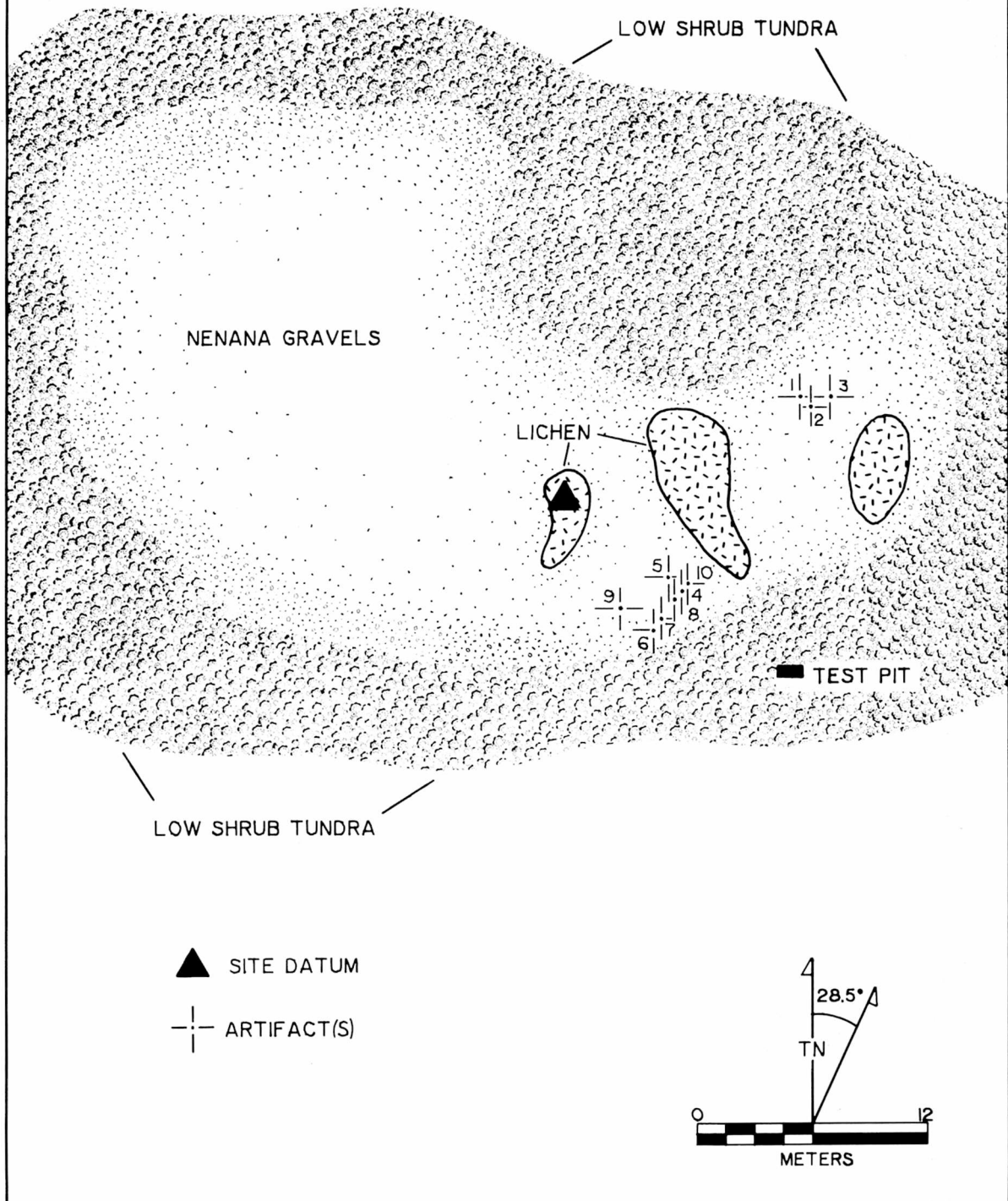


Figure 32. HEA-255 site map.

to the north. Several modern 30-caliber rifle shells and abundant caribou signs were found along the ridge in the site area, indicating that the site vicinity continues to be good for hunting.

The roughly finished, irregular outlines of the bifaces suggest that they were quickly roughed out, perhaps to be used as preforms for later completion into finished tools, or alternatively, to be used for specific tasks of short duration. The fact, however, that none of the bifaces shows signs of wear strongly suggests that they are preforms that were damaged or broken during manufacture and consequently abandoned. Repair and refitting of finished tools may also have occurred at the site.

HEA-256 is a prehistoric site consisting of a single, bifacially worked lithic artifact situated near the southwest end of a rocky knoll, approximately 115 m long and 20 to 40 m wide. The sparsely vegetated knoll protrudes some 8 to 10 m above the surrounding upland plateau (Figure 33).

The biface is ovate in shape and finely made. The artifact's distinctive shape does not resemble biface types described in well-studied assemblages of other sites in the region, suggesting that it may have been carried in from an outlying area. A detailed description of the artifact is given in Appendix B.

HEA-256 is situated on rolling upland near VABM "Comb," on the divide between Fish Creek, First Creek, an unnamed drainage to the southeast, and several unnamed creeks draining east and northeast into the Nenana River (Figure 29). The site commands excellent views of the unnamed drainage to the south and of "First Creek" and the Nenana Lowlands to the north.

The bedrock at this location is composed of poorly consolidated Nenana gravels, described above. Glacial erratic boulders are scattered on the site vicinity, both on the knoll where the site is located and on the surrounding uplands.

The dry, well-drained knolltop where the artifact rests is sparsely vegetated with heath, lichen, grasses and alpine arnica. Fireweed grows at the southeast end of the knoll, where the soil is loosened by recent ground squirrel activity. Alpine tundra, composed of sedge, lupine, mosses, and lichens, covers the surrounding area below the knoll.

HEA-256 is located on an interconnecting ridge system that was likely a major upland transportation and trade route between the Nenana and Teklanika valleys.

HEA-257 is a prehistoric site consisting of lithic artifacts scattered on a sparsely vegetated terrace on the south-facing slope of a prominent ridge (Figure 34). The artifact assemblage (detailed in Appendix B) includes three grey mottled, black chert

HEA-256

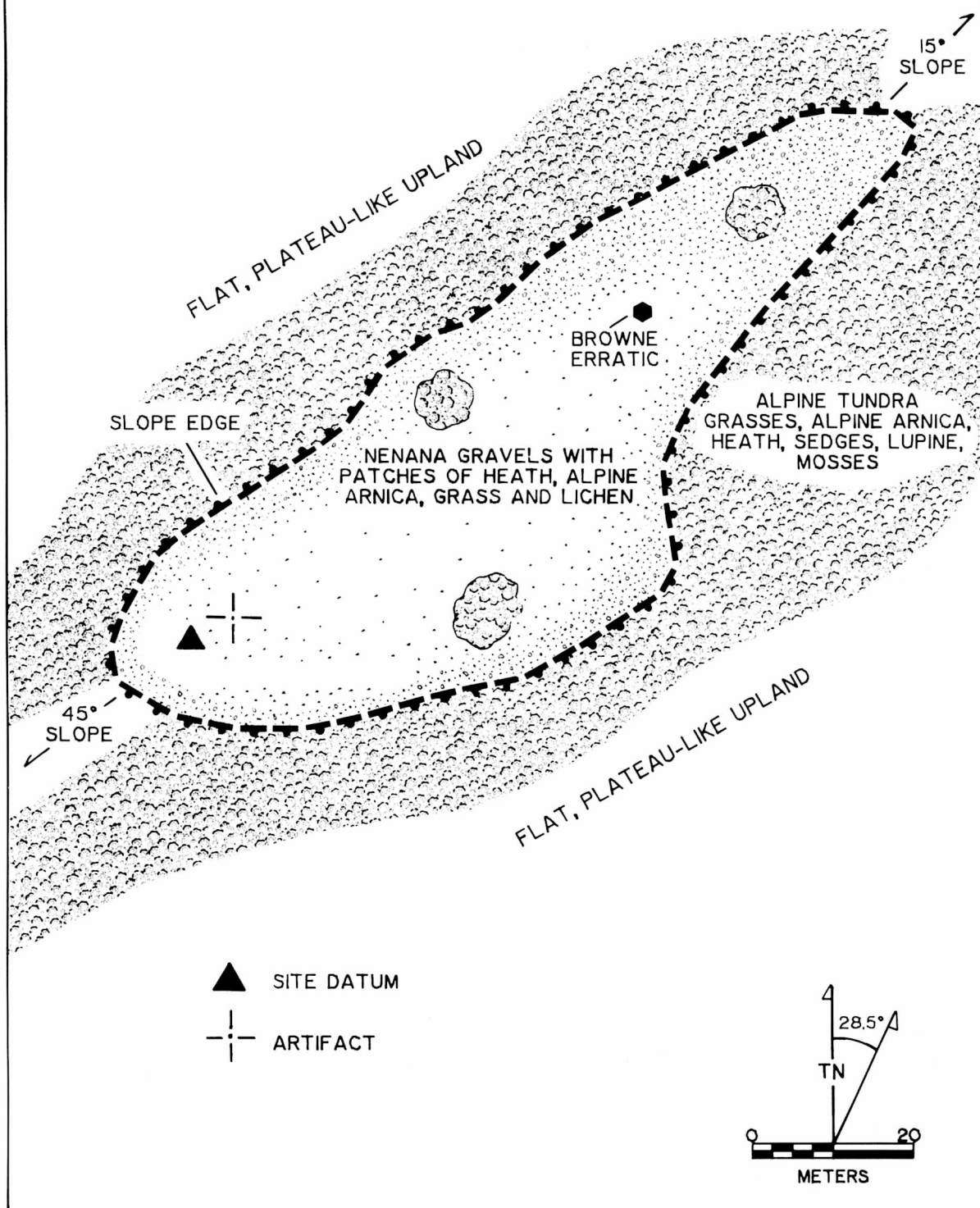


Figure 33. HEA-256 site map.

decortication flakes. The lithics are scattered on a nivation terrace or secondary ridge on the south-facing slope of a prominent ridge. Two of the flakes show wear, indicating that they were briefly used as knives or scrapers. The site is one of four small, lithic scatters located on the same ridge, all within a distance of 1 km of each other (Figure 31).

The site is located on a bench about 200 m long and 25 to 30 m wide, near the top of the northeast-southwest trending ridgeline overlooking the Fish Creek drainage to the south and an unnamed drainage to the north.

Vegetation in the site area consists of mosses, lichens and grasses, which grow sparsely on the terrace floor. Surface visibility within the exposed area is about 75 percent. The area surrounding the site supports a shrub-scrub community, dominated by dwarf birch and willow shrubs dotted by stunted-spruce Krummholz.

HEA-257 appears to be a hunting overlook. The site provides a 150-degree field of view, with excellent coverage of the Fish Creek drainage and views of the Savage and Teklanika rivers to the south and west. The presence of cortical flakes at the site implies the production of lithic preforms or "blanks" in association with hunting activities.

HEA-258 is a prehistoric site consisting of a single unifacial lithic artifact situated in an area of exposed gravels (Figure 35). The site is located on a ridge crest overlooking Fish Creek and lower Savage River to the south, and an unnamed drainage to the north.

The artifact is a rhyolite uniface that was found on the surface of a gravel exposure. Retouch and wear are evident on one lateral edge of the uniface, which is fashioned from a secondary decortication flake. The site is located on a sinuous, northeast-southwest trending ridge that terminates near the confluence of Savage River and Fish Creek. The ridge separates the Fish Creek drainage from the next valley to the north.

The immediate site area consists of a dry alpine plant community composed of thinly spaced arnica, dryas, lichen, moss and grasses. The sediment mantle at the exposure margins around the site is less than 10 cm thick. The surrounding area supports a low shrub-scrub community composed of dwarf birch, willow shrubs and a few small-spruce Krummholz, in addition to bearberry, blueberry, and lowbush cranberry. The site is situated at the upper edge of the spruce zone.

The gravel exposure containing the artifact was intensively surveyed, as were all nearby exposures in the vicinity, but no other cultural materials were found in association with the site. HEA-258 is one of four small lithic scatters located on the same ridge (Figure 31). All of the sites lack temporally diagnostic artifacts and appear to be hunting overlooks.

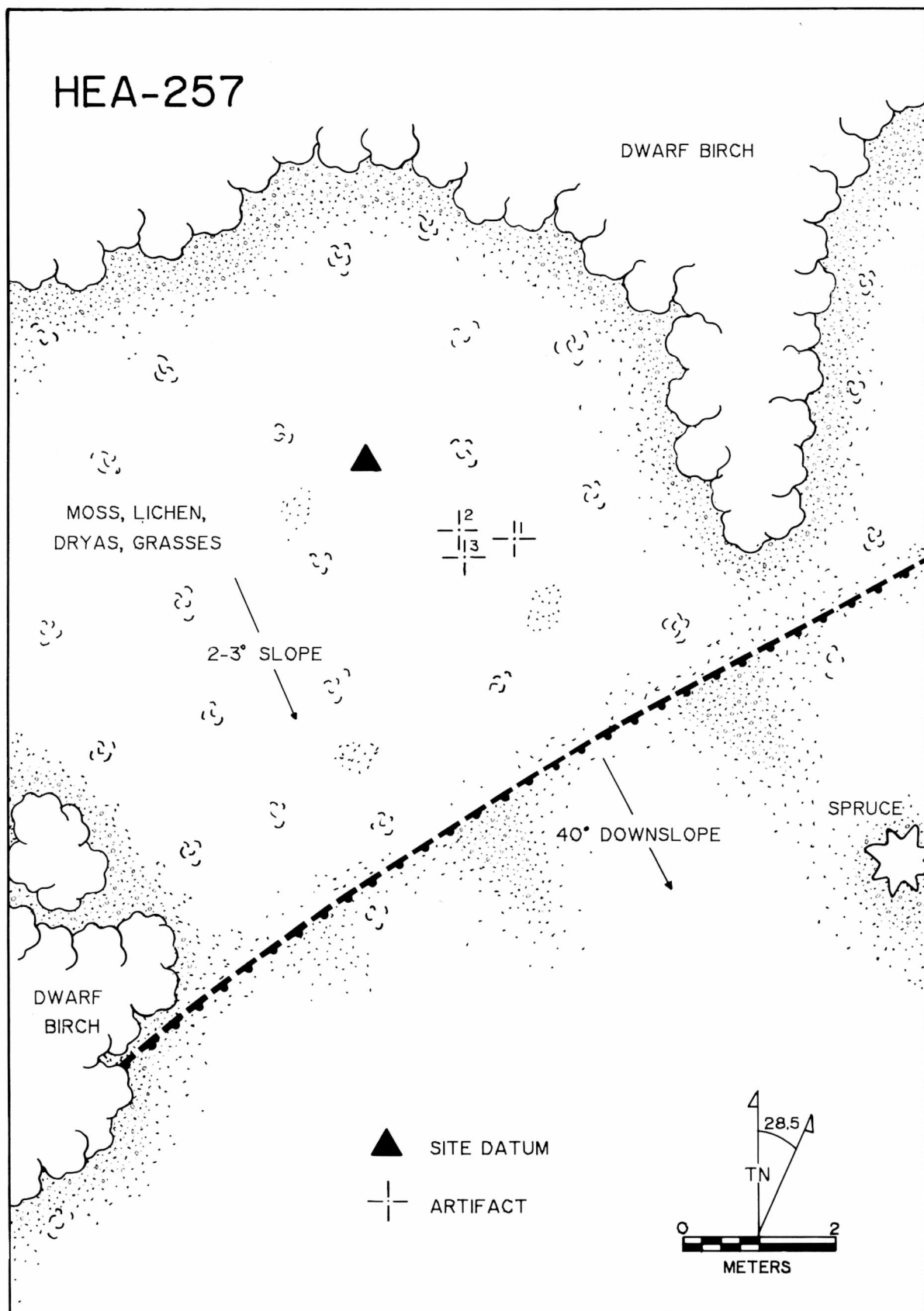


Figure 34. HEA-257 site map.

HEA-258

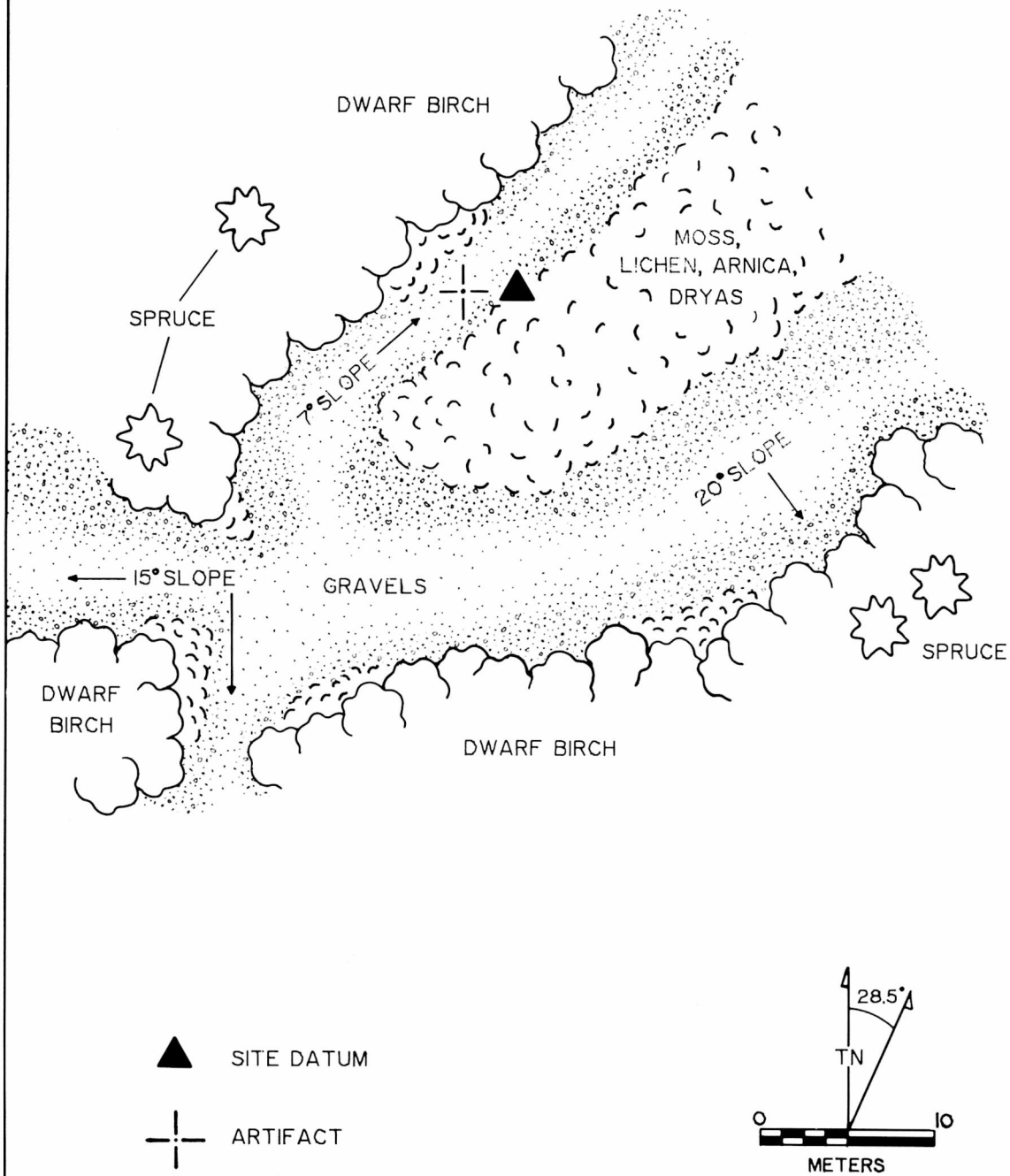


Figure 35. HEA-258 site map.

HEA-259 is a prehistoric site consisting of nine lithic artifacts of varied composition, scattered on an exposed gravel area (Figure 36). The artifact assemblage consists of a uniface (retouched on one lateral edge), a broken biface (distal end), and seven waste flakes.

The site area, measuring 62 by 10 m occupies a sinuous ridge that separates the Fish Creek drainage from the next valley to the north and terminates near the confluence of Savage River and Fish Creek, some 3.5 km (2.1 mi) southwest of the site. The site is situated in a deflated area on the west side of a saddle of the ridge. The artifacts are clustered near the northeast end of the deflated area about half way up the west side of the saddle.

A dryas alpine tundra community consisting of mosses, lichens, small grasses, and dryas (the dominant herbaceous plant), sparsely covers the immediate site area. On-site surface visibility varies between 65 and 85 percent. Vegetation surrounding the site is composed of shrub-scrub, consisting of dwarf birch, alder, blueberry, mosses, grasses, and a scattering of stunted-spruce Krummholz.

Intensive examination of the gravel exposure surrounding the artifacts and of other nearby exposures did not reveal additional cultural materials. Dense gravels on or near the surface precluded subsurface testing along the ridge.

HEA-259 is one of four small lithic sites located on the ridge (Figure 31). All of the sites lack temporally diagnostic artifacts and appear to be hunting overlooks.

HEA-260 is a prehistoric site consisting of 38 lithic artifacts clustered along a broad, sandy terrace on the east side of the Teklanika River, near the northern park boundary (Figure 29). The terrace is situated on the inside of an incised meander of the river, at the north end of lower Teklanika Canyon. The site, which contains both surface and subsurface components, is situated on an eolian sand-covered remnant bedrock outcrop that juts out of the terrace (Figure 37).

The quartz-schist outcrop (50 m long, 20 m wide, and 5 m high) juts up out of the terrace and overlooks the Teklanika River floodplain. The outcrop acts as a sediment trap for silt and sand carried by winds from the southwest. Although most of the outcrop's rock face is exposed on the south and west sides, the layer of eolian sand gradually increases in depth northward, completely covering the bedrock at the north end of the outcrop (Figure 37, inset of site area).

HEA-259

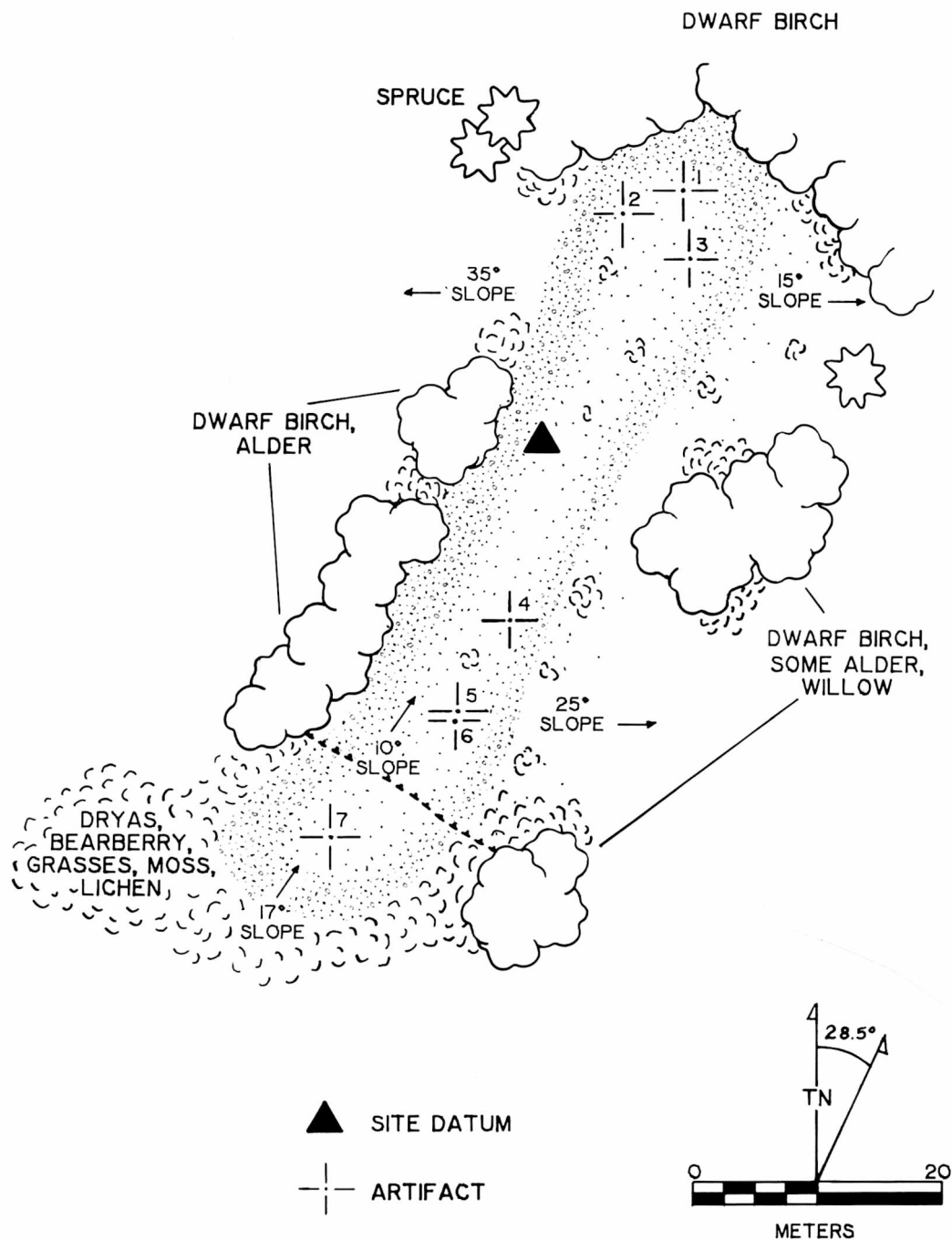


Figure 36. HEA-259 site map.

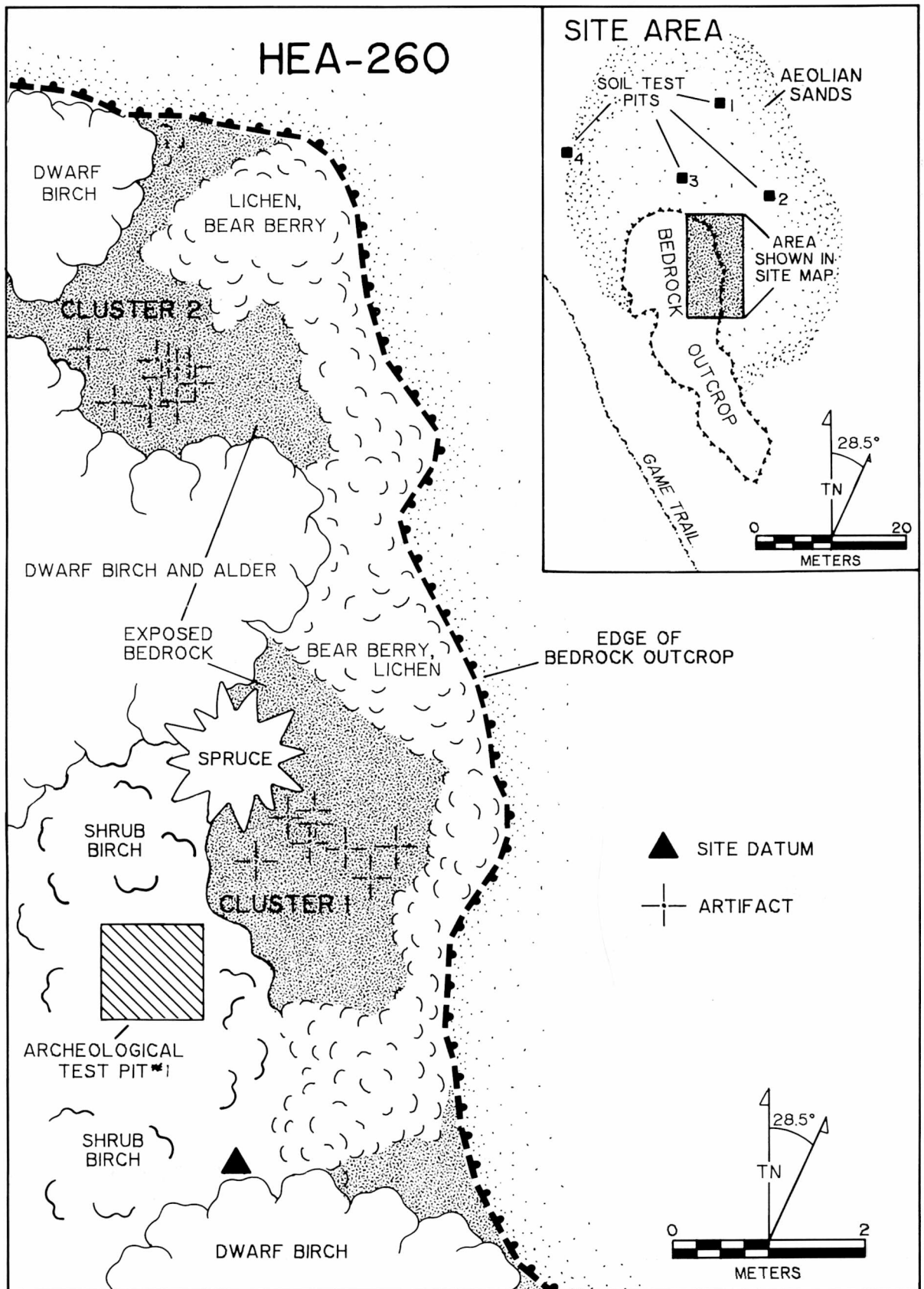


Figure 37. HEA-260 site map.

As noted, a total of 38 artifacts was found at the site. Nineteen surface artifacts, in two discrete clusters, were found in deflated sandy blowouts on the bedrock remnant. Cluster #1 consisted of a basalt manuport and seven unaltered waste flakes in a deflated area at the east edge of the outcrop. Cluster #2 consisted of a retouched basalt spall, a utilized basalt flake, and nine unaltered waste flakes in a sandy blowout approximately 4 m north-northwest of Cluster #1.

In addition, an archeological test excavation (Archeological Test Pit #1), yielded 19 subsurface artifacts at depths between 31 and 54 cm below ground surface. Artifacts recovered from the test pit include two basalt spalls, a polished chert pebble (or burnisher), three lithic debitage fragments, a rhyolite blade fragment, a cobble core, and twelve unaltered lithic waste flakes.

The artifacts found on the surface at the site are situated in two barren deflated areas, each approximately 3 m in diameter. Vegetation growing on the area surrounding the site consists of low shrub tundra dominated by dwarf birch, willow shrubs, blueberry, grasses, and mosses. Aspen and alder thickets grow on the sand-covered part of the outcrop west of the site.

The archeological test excavation, 1 m square and 84 cm deep, was excavated 50 cm west of Cluster #1 (Figure 38). Below the vegetation, a single modern soil unit composed of loam and fine sand is discernible. The C horizon begins at about 9 cm and extends to the bottom of the excavation, 84 cm below the ground surface (cmbs). A paleosol development was not observed in the archeological test excavation.

The artifact-bearing levels of Archeological Test Pit #1 are disturbed by bioturbation, resulting from five distinct rodent burrows in the west wall profile below 40 cmbs. The artifacts are considered to be in secondary depositional context, due to the rodent burrowing. All of the excavated artifacts were collected.

In addition to the archeological test pit, 4 soil test pits were excavated into the sand dune north of the bedrock outcrop (Figure 37, inset). These tests were made to define a suspected paleosol, to determine dune depth, and to probe for possible buried cultural materials.

Soil Test Pit-1: (55 by 80 cm) (Figure 38). Excavated to a maximum depth of 100 cmbs into the fan-shaped sand dune north of the site. Modern soil horizons are clearly visible, the slightly reddened C horizon grading out at 25 cmbs. Below the upper 25 cm of loam and fine sand the east wall profile shows a massive unit of coarse-to-medium sand. Rodent burrows were found throughout the excavation. The dune base was not reached, and no cultural materials were encountered in this test pit.

Soil Test Pit-2 (Figure 39): Excavated on the east flank of the fan-shaped dune, where an existing low erosional scarp was cleaned off and extended to a depth of 140 cmbs. A paleosol was encountered below the A, B, and C horizons of the modern soil, at approximately 40 cmbs. No cultural materials were encountered in the test pit.

Soil Test Pit-3: (85 by 140 cm) Excavated into the fan-shaped dune near the rock edge in an effort to find artifacts washed off the rock outcrop. The test pit was excavated to a depth of 160 cmbs, where an ice lens halted further digging. Loess deposits mixed with fine sand occur near the surface, below which the sediments are uniformly medium-coarse sand. A paleosol shows up within the B horizon of the modern soil at a depth of 13 cmbs. This is probably the same paleosol noted at 40 cmbs in Soil Test Pit #2. The difference in depth may result from differential sand deposition rates. No materials were noted in the test pit.

Soil Test Pit-4: (50 by 50 cm) Excavated off the west edge of the fan-shaped dune. Excavation was terminated at 93 cmbs due to groundwater. Beneath a thin layer of modern soil development, medium-coarse sands extended to the bottom of the excavation. No cultural materials were encountered in this test pit.

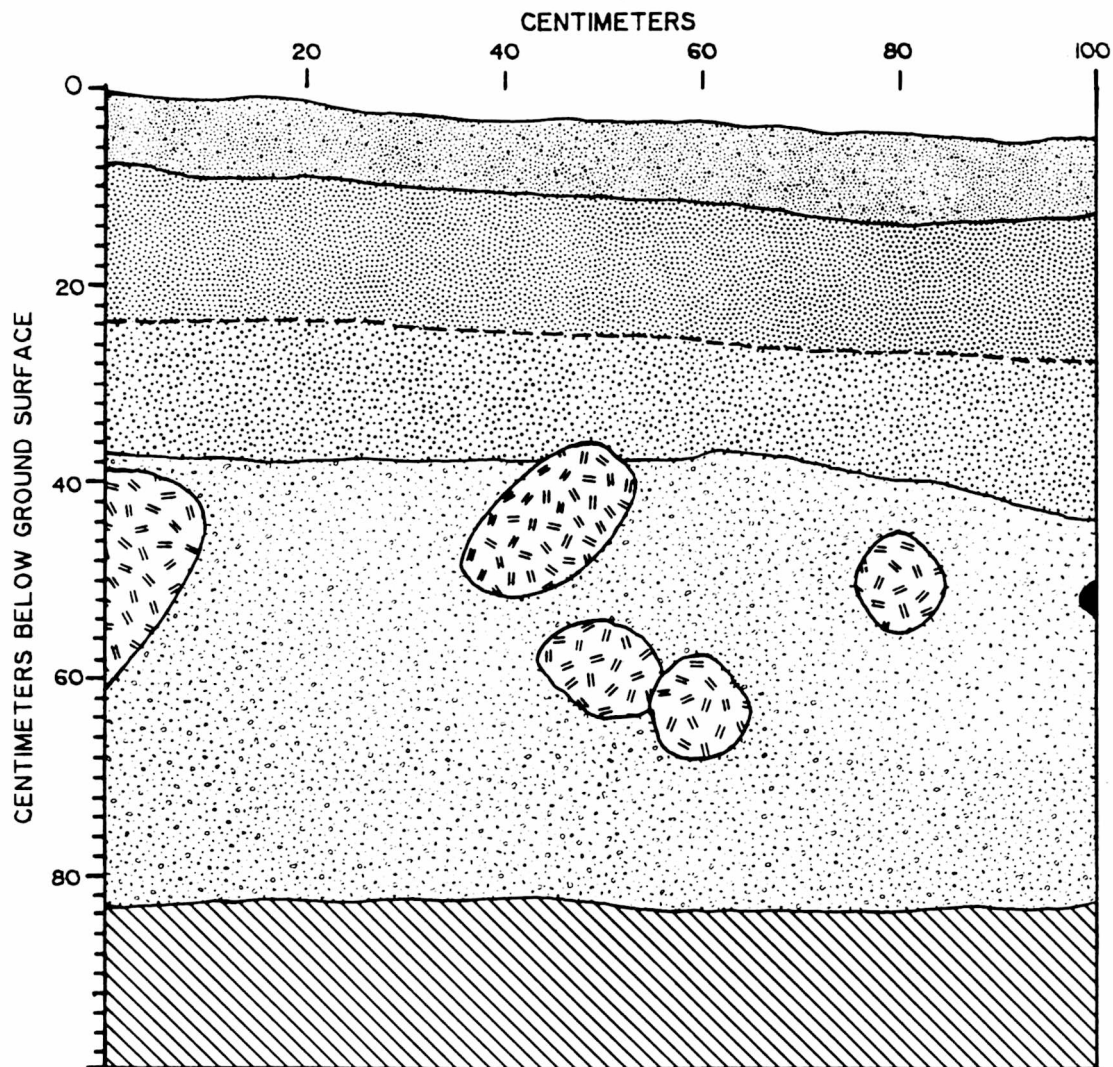
It is likely that additional artifacts lie buried beneath the eolian sand deposits that cover the rock outcrop and the alluvial terrace below the site. In addition, the paleosol encountered in Soil Test pits 3 and 4 indicates the presence of undisturbed stratigraphy that could aid in dating the site. HEA-260 appears to be a hunting overlook where at least a limited number of lithic tools were manufactured.

HEA-261 is a prehistoric site consisting of a single bifacial stone projectile point found in a deflated area of a north-facing slope. The slope overlooks "First Creek" near the northern boundary of the park (Figures 29 and 40).

The site area is deeply incised by runoff channels that divide the slope into three major north-trending ridges (HEA-261 is situated on the central ridge of this system). The projectile point was found on an unvegetated gravel-paved deflation basin. Vegetation surrounding the deflated area consists of shrub tundra composed of willow shrubs, dwarf birch, bearberry, mountain avens, Labrador tea, mosses, forbs, and lichens.

No additional cultural materials were found on the other exposures in the vicinity of the site, although all such deflated areas were intensively scrutinized. Subsurface testing was not conducted, due to the lack of the sedimentary accumulation on the exposures.

HEA-260 ARCHEOLOGICAL TEST PIT #1, WEST WALL



-  Root Mat (0.5-6 cm) Av. 4cm thick. Dark brown (10YR 3/3 moist)
-  Cox Horizon (4-42 cm) Av. 35cm thick. Divided into upper and lower segments based on root content (40-50% upper, 20% lower). Lower contact is clear. Yellowish brown, 10YR 5/4 dry (upper), 10YR 4/4 moist (lower).
-  Cu Horizon (38.5 cm to bedrock) Av. 42cm thick. Most artifacts were recovered from this stratum. Upper contact is clear, lower is abrupt. Yellowish brown 10YR 5/4 moist) many active and filled rodent burrows.
-  Bedrock (below 82 cm)
-  Rodent Burrow
-  Artifact

Figure 38. HEA-260 archeological test pit #1, west wall profile.

HEA-260

SOIL TEST PIT # 2, PROFILE

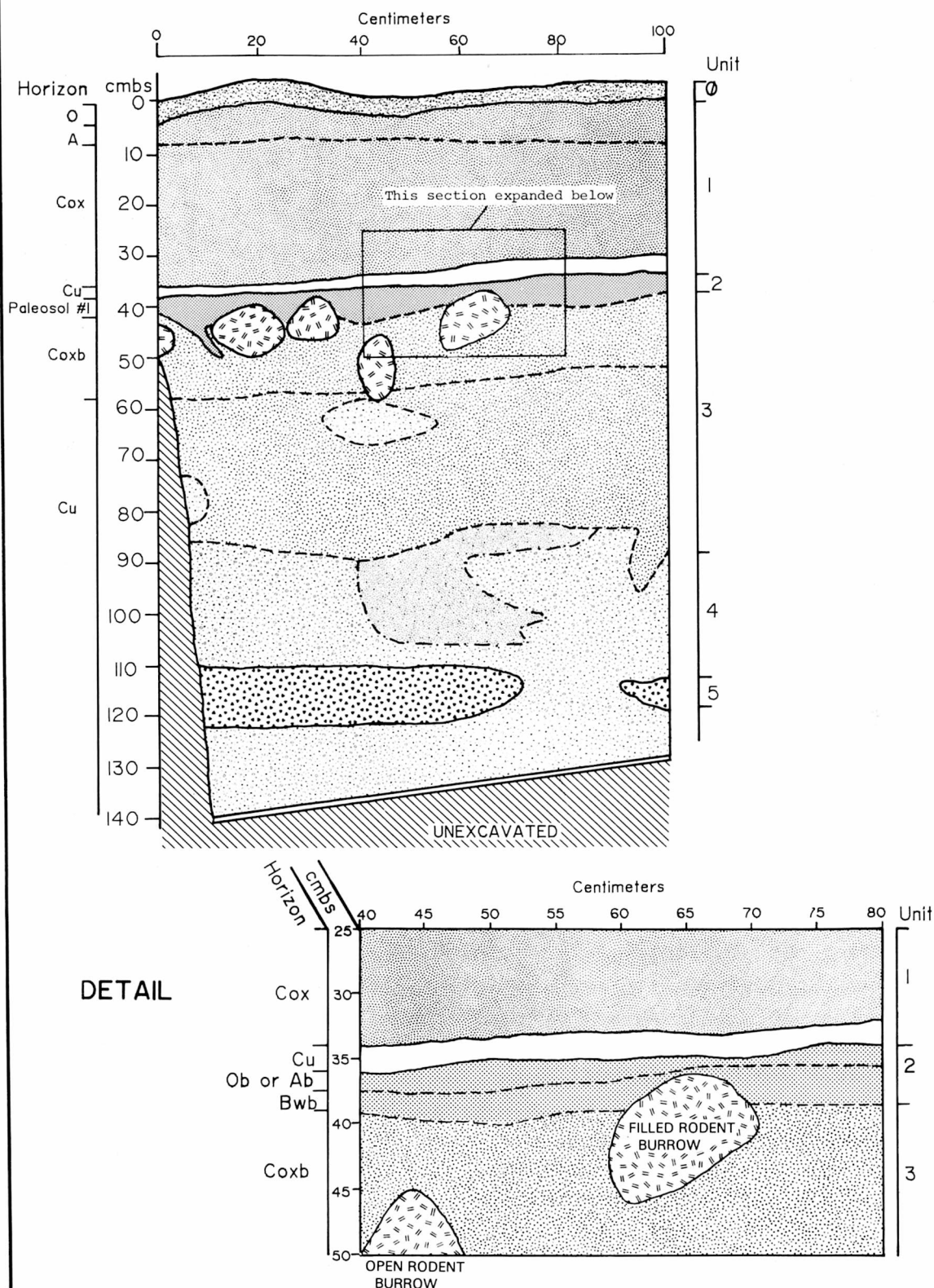
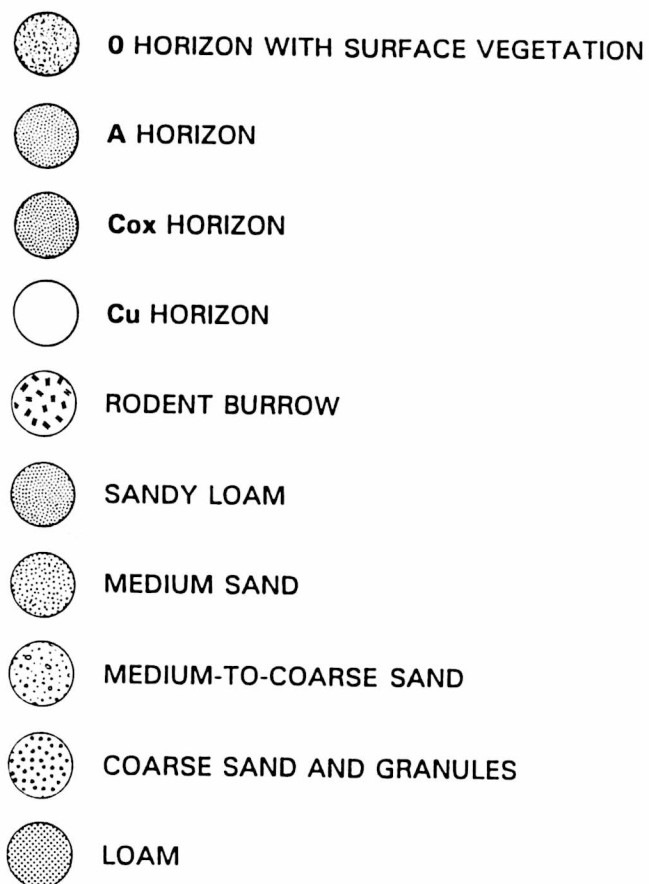


Figure 39. HEA-260 soil test pit #2 profile.

HEA-260 SOIL TEST PIT # 2



Legend, Figure 39.

HEA-261

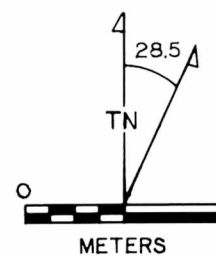
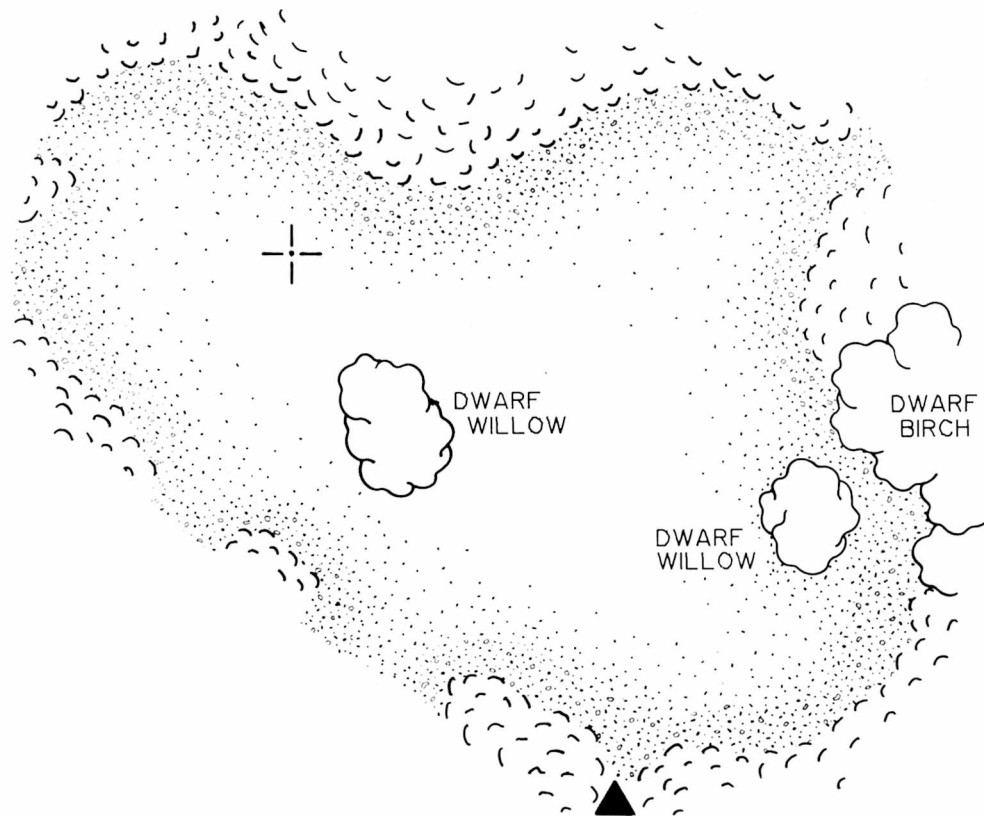


Figure 40. HEA-261 site map.

In addition to the prehistoric sites described above, three lithic isolates, each composed of one or two unaltered waste flakes, were noted on the ridge in line with the other prehistoric lithic sites recorded within the Healy/Stampede unit (Figure 29). Because the flakes showed no sign of use or alteration, they were not recorded as sites. However, their location was recorded as traces of human activity in the area. The presence of these materials along the crest of a ridge known to have recorded lithic sites adds credence to the hypothesis that the ridge system east of the Teklanika River served as an upland transportation route linking the Teklanika and Nenana valleys.

HEA-108 is an historic habitation site consisting of a partially standing, roofless log cabin and associated pole scatter. The site is situated at the back of a 2-m high terrace, near the confluence of the Teklanika River and the first tributary stream north of Savage River that enters the Teklanika from the east (Figures 41 and 42).

The site occupies a bench that is 2 m high, 76 m long and 61 m wide. A meander of an unnamed creek borders the site area to the north, east, and south. A second bench, rising 1.6 m behind the cabin and sloping steeply downward to the Teklanika River (37 m west of the site), forms the west boundary. A third bench, approximately 10 m high, rises south of the second bench, and terminates abruptly at a steep cutbank of the creek.

The site area/bench is thickly vegetated with mature white spruce and poplar forest with an understory of alder. Soapberry, low bush cranberry, *Equisetum* and moss cover the forest floor. Grasses grow on the other nearby benches.

The site was first recorded and entered on the Alaska Historic Resources Survey (AHRS) Register as HEA-108 by David Plaskett in 1975, during an archeological survey of the Teklanika River. In his report Plaskett noted that the site consisted of a 5-by-5-m cabin with a stove and some cans (Plaskett 1976). In 1989, NPS archeologists resurveyed the site for the land exchange project. Two main features were identified. Feature 1 is a partially standing, roofless log cabin measuring 15 ft 3 in (4.65 m) by 13 ft 7 in (4.14 m) (Figure 43). Nine courses of spruce logs remain on the cabin's north and south walls, and 10 courses remain on the east and west walls. The wall logs are saddle-notched at the corners and are hewn flat on the interior surfaces of all four walls and on both interior and exterior surfaces at the front (east) side of the cabin. Sod chinking is visible between the courses throughout the cabin. The doorway is located in the east wall; a single window penetrates the north wall. Two shelves, constructed of milled boards, are attached at the northeast corner of the cabin's interior. A hand-fashioned sleeping bench extends along the west interior wall.

The roof and both gables lie collapsed on the ground outside and within the cabin foundations. Roof poles are scattered about the site area, with concentrations outside

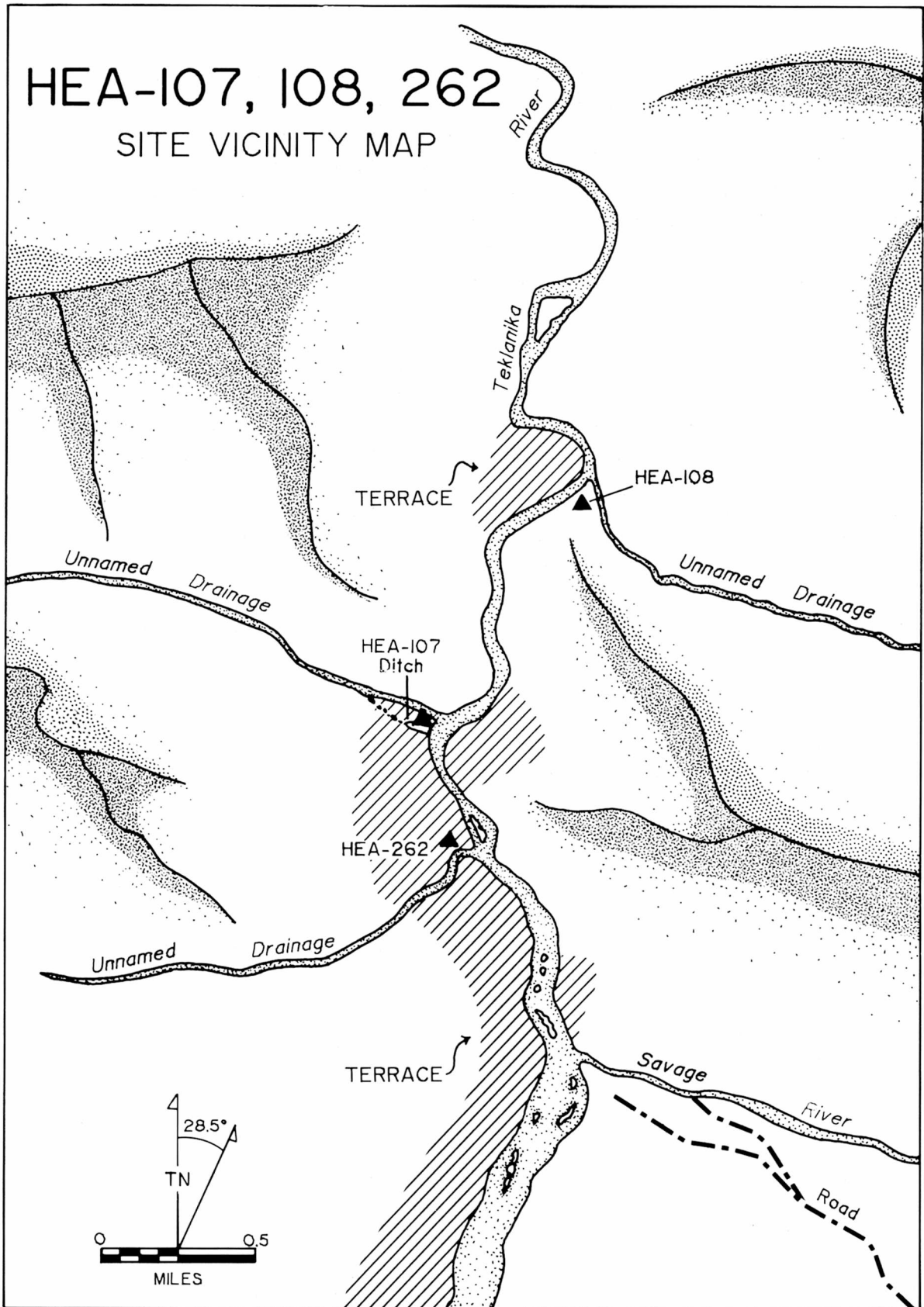


Figure 41. HEA-107, HEA-108, and HEA-262 site vicinity.

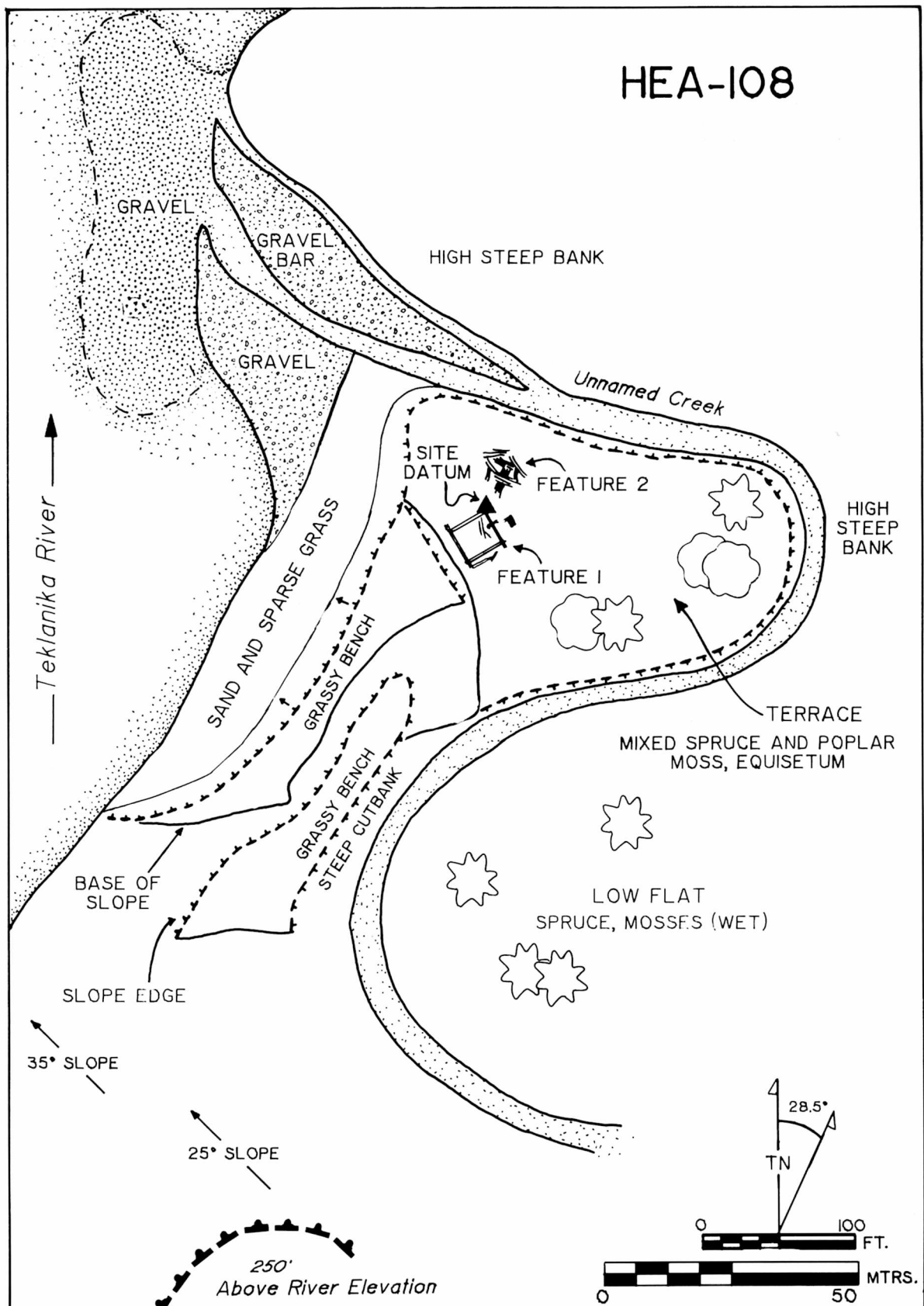


Figure 42. HEA-108 site map.

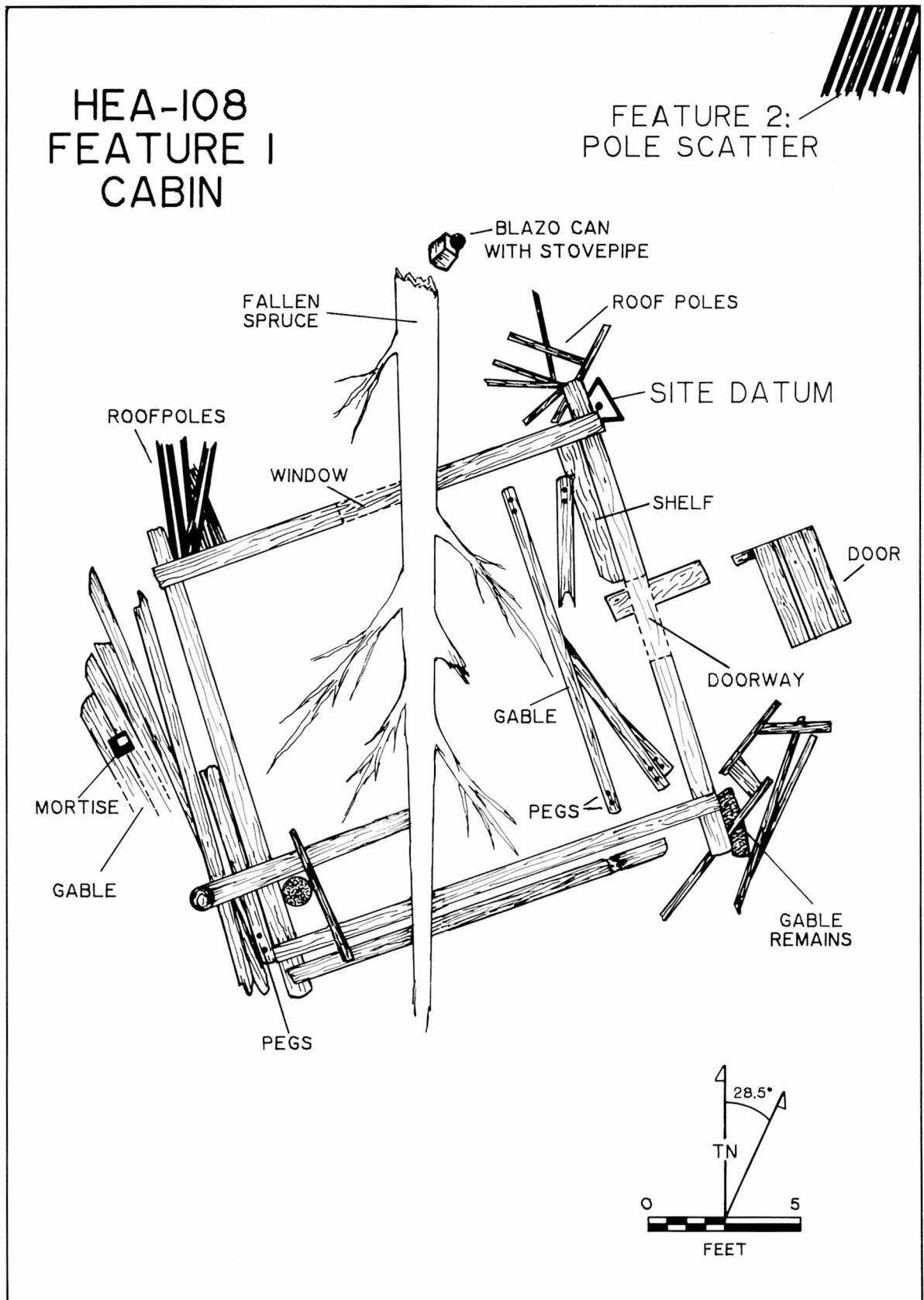


Figure 43. HEA-108 feature map.

the northeast and northwest corners of the cabin. A fallen spruce tree, with a diameter of 13 in, appears to be responsible for the collapse of the roof and gables and lies suspended on the upper log courses of the cabin.

Feature 2 is a cluster of notched poles, scattered on an 8-m diameter area approximately 12 m northeast of the cabin. The poles may have been part of the roof construction.

Associated artifacts that include partially buried sections of a portable "Yukon stove," fashioned from a Blazo can and a section of stove pipe inserted into the top, lie outside the northeast exterior corner of the cabin and inside the northeast interior of the cabin beneath a portion of the collapsed front gable.

HEA-108 may be the habitation site associated with two historic mining sites recorded in this section of the Teklanika Valley: HEA-107 and HEA-262 (Figure 41). Both sites are located adjacent to the Healy/Stampede unit and are described in the following section.

Survey Results (Adjacent or Nearby Healy/Stampede Unit). Approximately 300 acres of land adjacent to the Healy/Stampede unit and 66 acres on Ewe Creek, 15 km (9 mi) south of the parcel were examined in 1989. Table 4 shows the survey coverage outside the unit, in addition to the coverage within the land exchange parcel.

Five sites (three prehistoric and two historic) were recorded outside the Healy/Stampede exchange unit. The two historic sites (HEA-107 and HEA-262--both small mining prospects) are located immediately adjacent to the unit on the west side of the Teklanika River (Figure 41). Both sites were surveyed because of their proximity to the survey area and the high probability that the sites are associated with the historic habitation at site HEA-108 within the study area.

Also included as part of the Healy/Stampede survey was the Ewe Creek area, approximately 15 km (9 mi) south of the unit (Figure 30). Although somewhat far removed from the exchange unit area, it was decided to include the area because it contained a "mineral lick," known to be well frequented by large game animals (John Dalle-Molle, personal communication to Dianne Gudgel-Holmes, 1985). Thus, given the high probability for finding sites with hunting-related behavioral associations near the mineral lick, with possible ethnographic associations (objectives that relate to specific research goals identified in the project research design), it was advantageous to include the area in the survey sample.

Preliminary aerial reconnaissance of the valley showed many game trails converging onto a white section of valley floor in lower Ewe Creek. Pedestrian survey coverage included the terrace edges and floodplain on both banks of Ewe Creek within several hundred meters of

the white deposit. Three prehistoric sites (HEA-263, HEA-264, and HEA-265) were recorded in this area (Figure 44).

The sites adjacent to the Healy/Stampede unit and the nearby Ewe Creek sites are described below.

Adjacent Sites

HEA-107 is an historic mining operation (Figure 45), consisting of a water diversion ditch (Feature 1) and associated sluicebox/flume remains (Feature 2). The site, first recorded in 1975 (Plaskett 1976), is situated on a broad bench on the left (west) side of the Teklanika River, approximately 1.8 km north-northwest of the Teklanika/Savage River confluence (Figure 41). A small unnamed creek, from which the ditch diverges, flows across the bench and enters the Teklanika River approximately 150 m northeast of the ditch outlet.

Vegetation consists of an open stand of small-to-medium-sized spruce trees, with scattered birch and willow shrubs, a few poplar trees, blueberry, Labrador tea, cotton grass, crowberry, low bush cranberry, and tundra rose, with occasional grasses, mosses, and lichen. The ditch is defined on both sides by willows, visible from the air as a distinct line of vegetation.

Feature 1: This feature consists of a water diversion ditch, approximately 300 m long. The ditch is about 75 cm wide and 20 cm deep near the upstream junction with its source creek. The ditch gradually deepens and widens to its maximum at the outlet, where it becomes a well defined V-shaped excavation, 5 to 6 m wide at the top, 1.5 m wide at water level and about 5 m deep. The ditch drops about 100 ft in elevation from its upland intersection with the source stream to its outlet into the Teklanika River. Except for one badly deteriorated milled board, no cultural materials were found at or near the headwaters of the ditch. Two axe-cut stumps are located near the outlet, on either side of the ditch.

Feature 2: This feature is composed of the badly weathered remains of three sluicebox sections that rest on the ground about 30 m north of the ditch and 73 m west of the Teklanika River. The bottom of each section is braced at both ends and in the middle with milled lumber that has been reinforced with hand-fashioned, saw-cut side braces. A single riffle section, constructed of poles, milled board braces, and wire nails, remains intact. At the west end of the sluicebox scatter rests a dilapidated, brace-like structure, which may have supported one of the sluicebox/flume sections. No additional artifacts were found at the site.

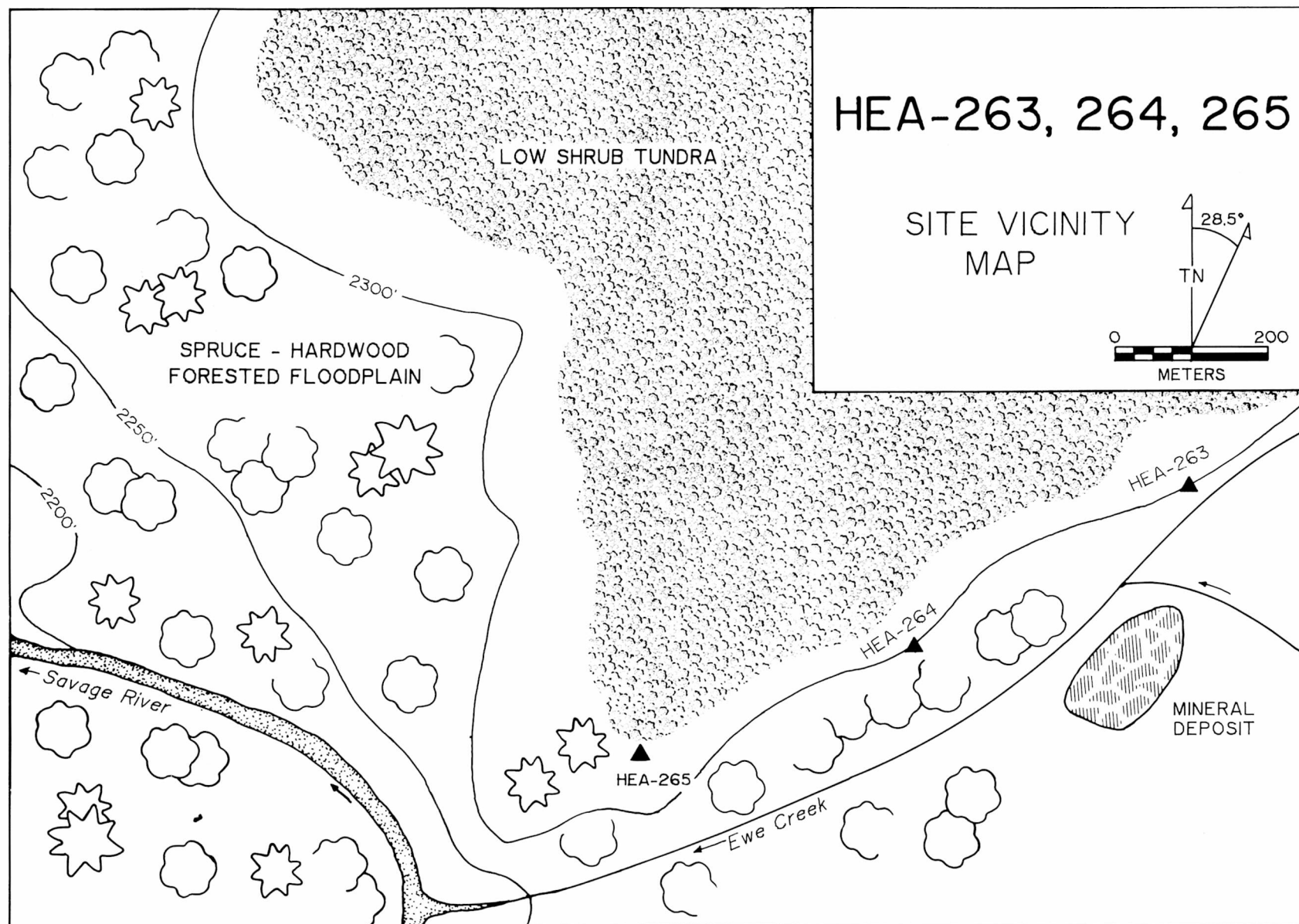


Figure 44. HEA-263, HEA-264, and HEA-265 site vicinity.

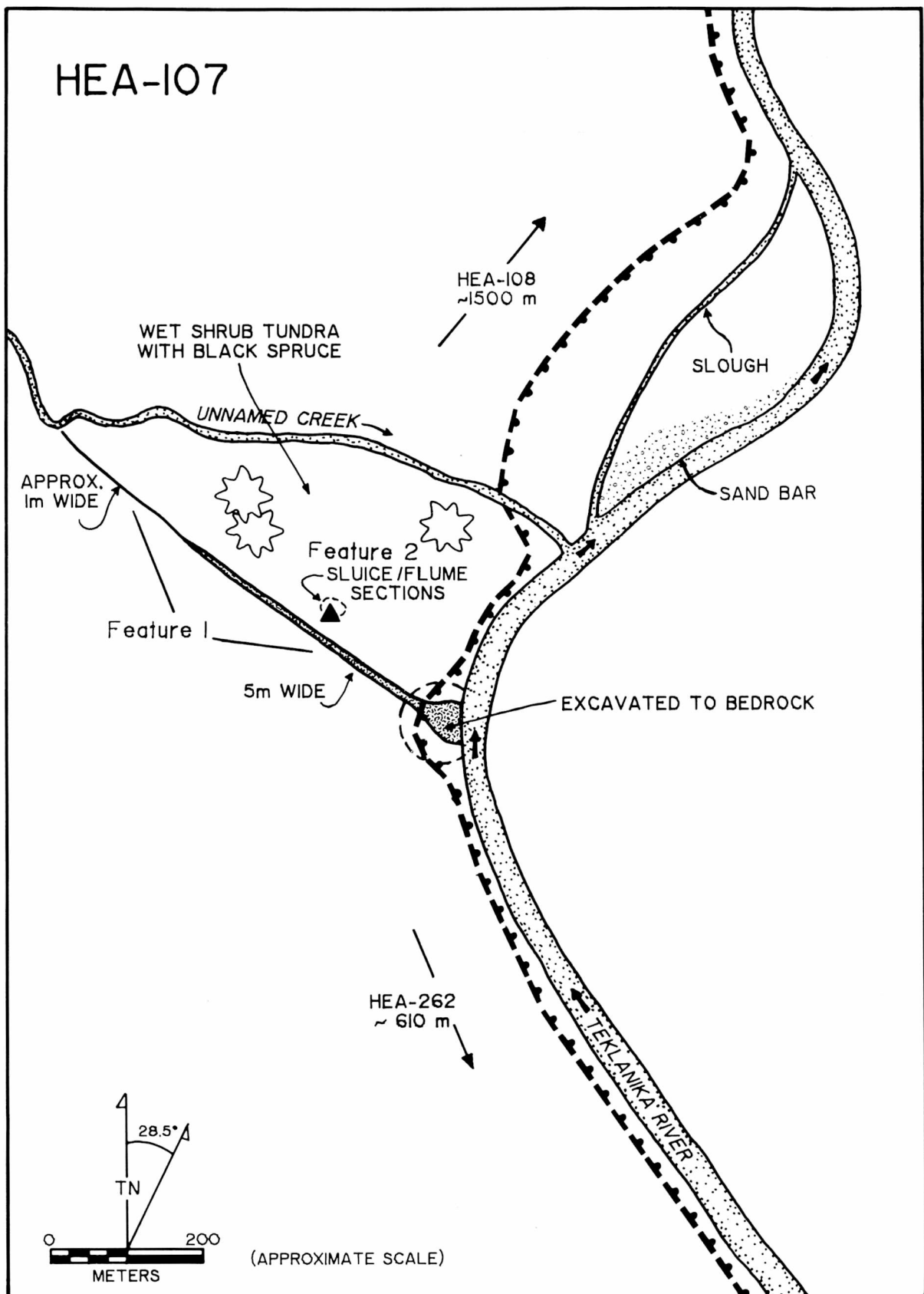


Figure 45. HEA-107 site map.

HEA-262 is the site of a small historic placer mining operation (Figures 46 and 47). The site consists of the incomplete remains of several sluice boxes and riffles (Feature 1) and a probable placer mining prospect and tailings pile (Feature 2).

The site occupies a broad terrace on the left (west) side of the Teklanika River approximately 1.3 km northwest of the Teklanika/Savage River confluence (Figure 41). The terrace is situated approximately 15 m above the Teklanika floodplain. A minor stream drainage bordering the site to the south enters the Teklanika River at the site.

Vegetation in the immediate site area consists of dwarf birch, grasses, Labrador tea, willow, and occasional alder bushes and spruce trees, which increase in density near the river shore.

Feature 1. This feature consists of the dilapidated and incomplete remnants of a set of sluiceboxes and riffles. The remains are scattered on the ground in the bushes at the edge of an unnamed creek, just above its confluence with the Teklanika River (Figure 46). The sluice boxes are constructed of milled lumber, held together with wire nails and side-braced at both ends and the middle with hand-fashioned wooden pegs. The riffles are fashioned of poles with 4 poles to a section to accept a milled-board brace. The poles are attached to the braces with wire nails.

Feature 2: This feature consists of what appears to be an excavated channel, 3.9 m deep and 1.5 m wide, in the streambed immediately east of the sluice box debris. A thickly vegetated mound of creek cobbles discernible beneath the vegetation mat adjacent to the sluice box scatter and the ditch is tentatively identified as a tailings pile associated with the ditch.

The deep course of the channel, the nearly vertical exposed rock banks, and the unusually straight course of the channel immediately adjacent to the old tailings pile and the sluicebox remains all suggest that the flanking banks and creek bottom are alterations of the creek by a prospect or other small-time mining operation. Additional artifacts associated with the features include a crushed, galvanized wash tub at the north end of the sluice box scatter and a rusted butter or lard can, hidden in the bushes at the south end of the sluice box remains.

Two other historic sites (HEA-107, the remnants of another placer mining operation, and HEA-108, the remains of a cabin) are also present in this section of the Teklanika Valley (Figure 41). In addition, a claim marker marked Edward P. Kerns, January 1926, was found attached to an upright 4-by-4-inch post approximately 400 m south of HEA-262. The date on the claim marker, coupled with the nature of the litter found at these sites, strongly suggests a date of use in the 1920s and further implies that the sites may be related.

HEA-262

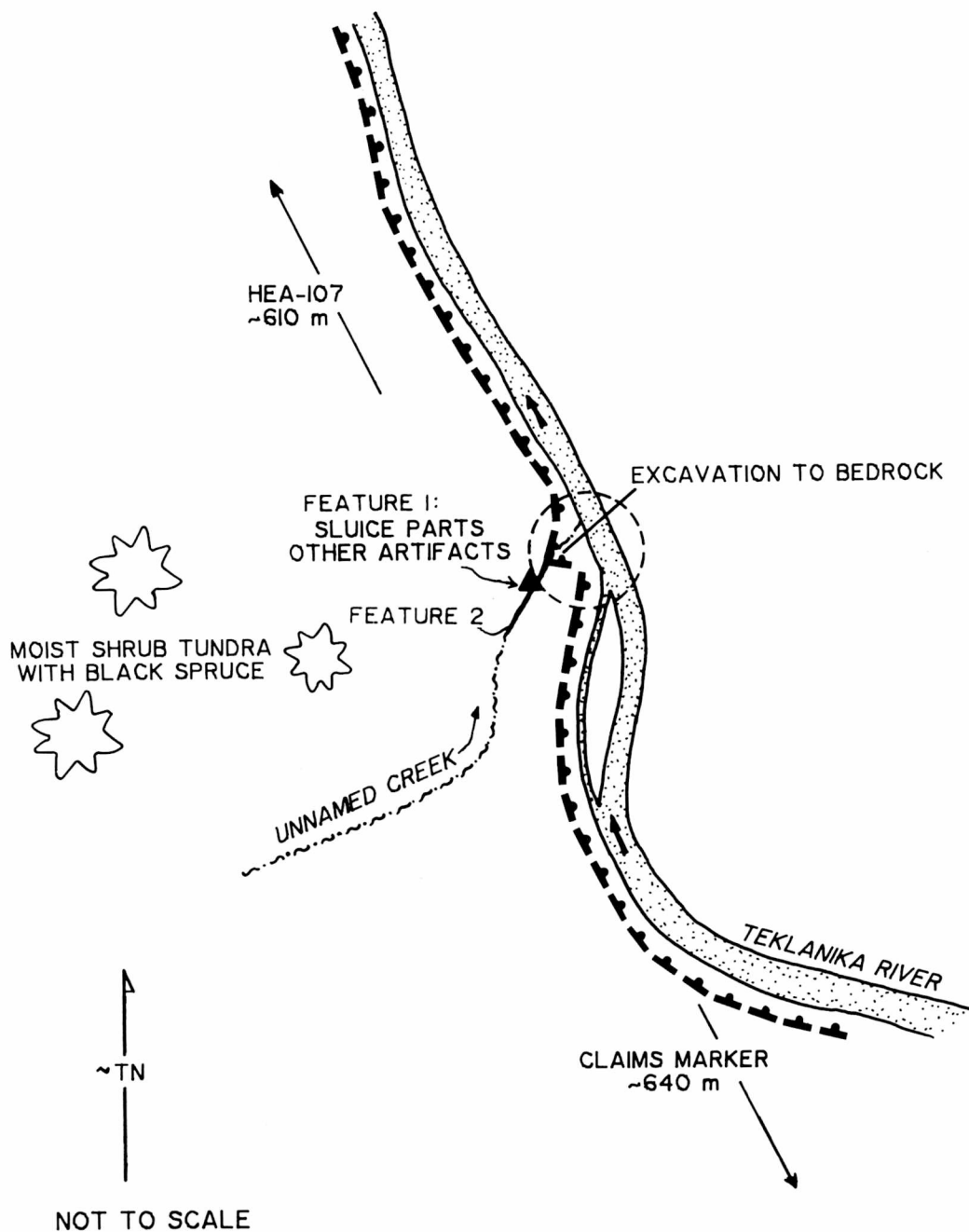


Figure 46. HEA-262 site map.

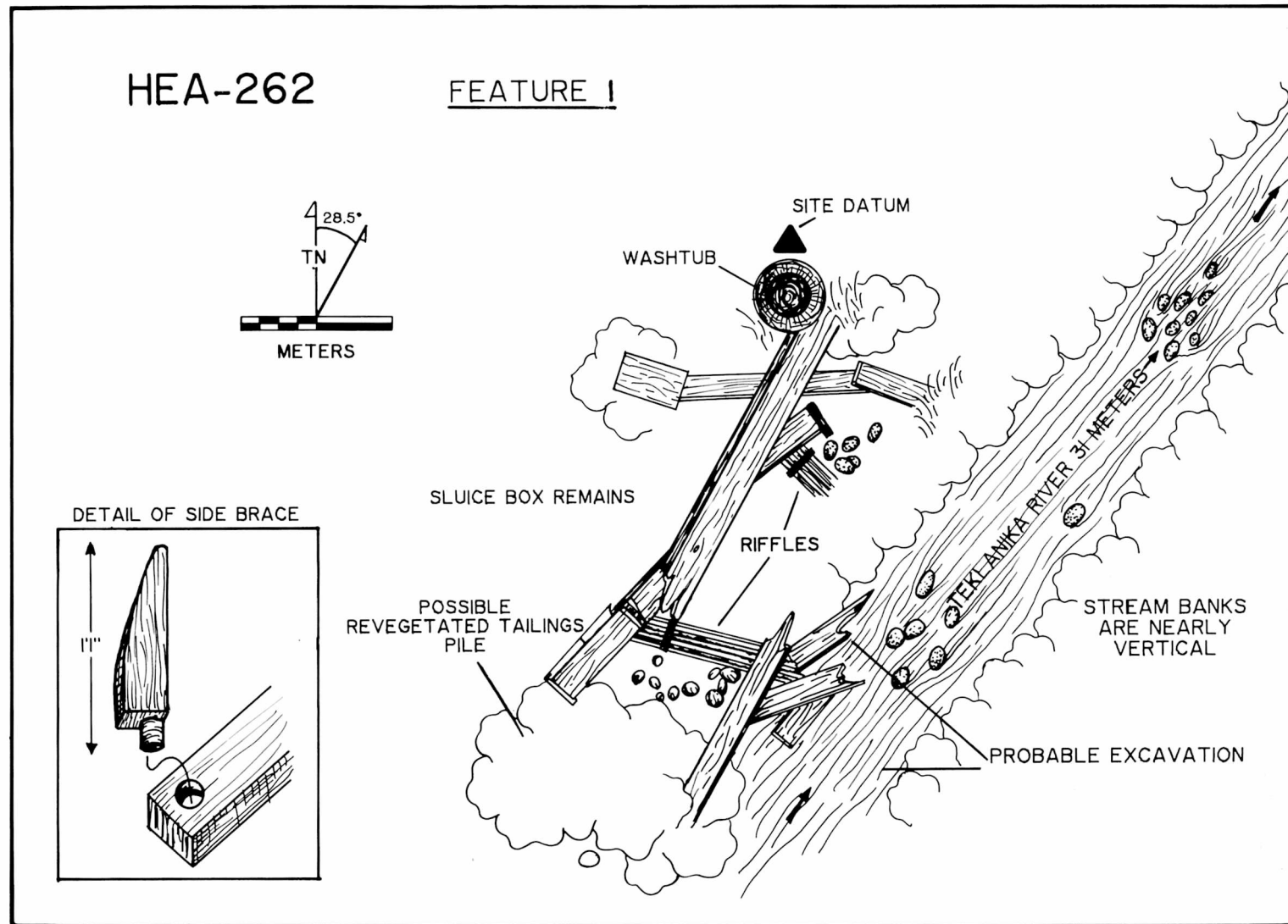


Figure 47. HEA-262 feature map.

Ewe Creek Prehistoric Sites

HEA-263 is a prehistoric site situated on top of a south-facing terrace on the north side of Ewe Creek (Figure 48). The site consists of a lithic flake showing possible use wear and a dark grey chert core (detailed in Appendix B). The artifacts were found 30 m apart on the exposed surface of the terrace edge.

The site is situated on the edge of a broad alluvial terrace overlooking Ewe Creek. Sands deposited by strong winds that funnel through the Savage River Gorge form a sediment trap just behind (north) of the terrace edge. The terrace is presently eroding, leaving numerous deflated areas along the edge.

A large white mineral deposit is located across Ewe Creek, about 160 m south of the site. In the distance to the south, the land slopes upward to the mountains around Mt. Healy.

The site occurs in a deflated area (30 m by 3 m) at the upper edge of the south-facing alluvial terrace overlooking Ewe Creek. The site area, which has about 85% surface visibility, is sparsely vegetated with grasses, mosses and lichens. Vegetation surrounding the site consists of dwarf birch and alder shrubs with occasional clusters of black spruce. Ground visibility off-site is completely obscured.

Intensive survey of the terrace edge and nearby exposed surfaces did not turn up any additional cultural materials. The site was not archeologically tested because the cliff edge sands at this location are extremely shallow.

HEA-264 is a prehistoric site composed of 37 lithic artifacts scattered on an 18-by-40-m area on the exposed upper edge of a south-facing terrace (Figure 49). The site is located approximately 200 m west of the white mineral deposit on Ewe Creek. Two other lithic sites (HEA-263 and HEA-265) are located within 300 m of HEA-264 (Figure 47). The site's artifact assemblage consists of a brown chert endscraper, a grey chert biface tip, and 35 lithic waste flakes or flake fragments (unmeasured). Artifacts are described in Appendix B. Represented lithic materials are summarized below, in Table 6.

HEA-263

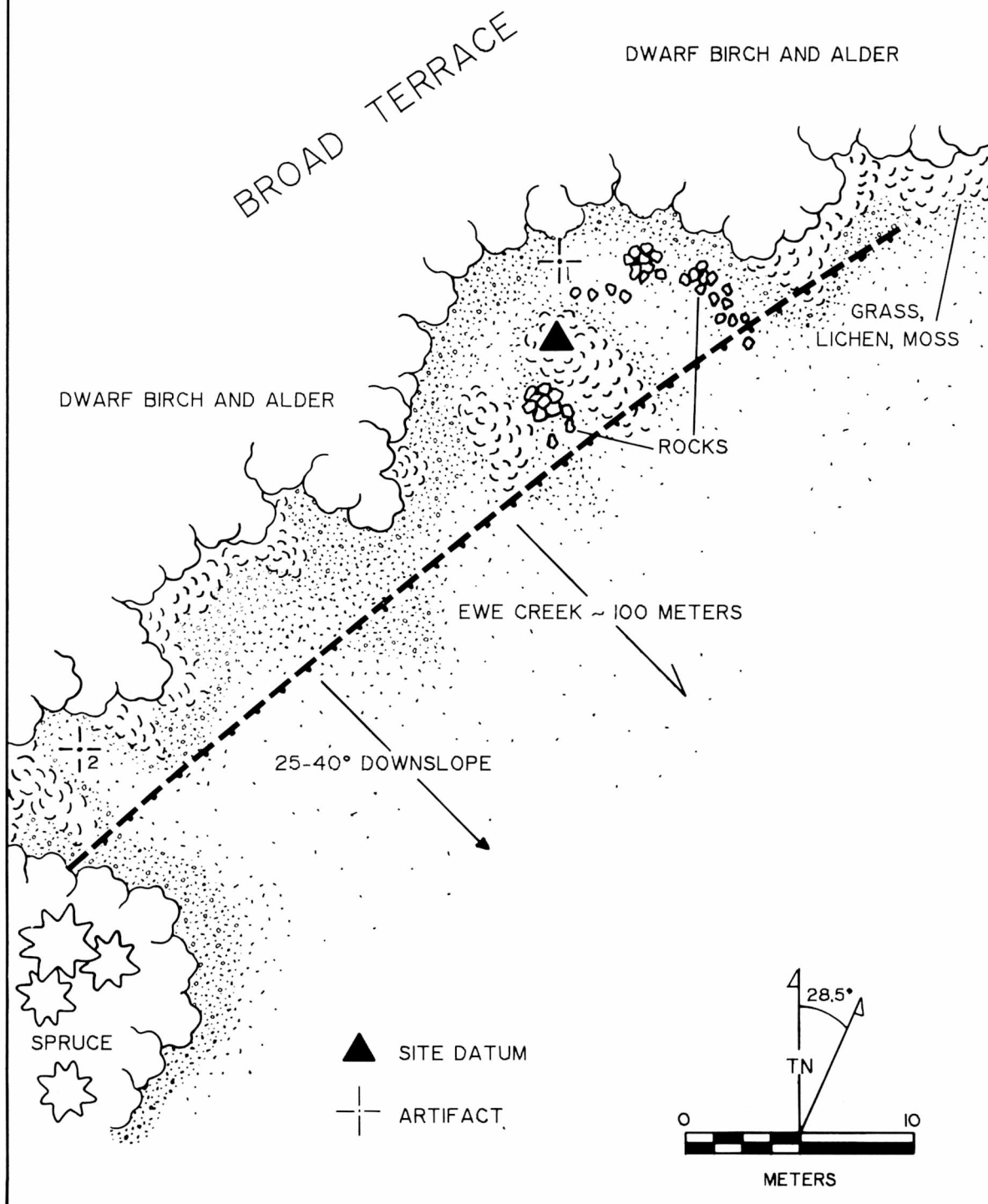


Figure 48. HEA-263 site map.

Table 6. Summary of lithic materials, HEA-264.

	<u>CHERT</u>	<u>CLCDY</u>	<u>RYLT</u>	<u>BSALT</u>	<u>OZITE</u>
Prim. Dec. Flake	0	0	0	0	0
Sec. Dec. Flake					
< 20 mm	0	0	0	0	0
> 20 mm	2	0	1	0	0
Tertiary Flake					
< 20 mm	7	1	3	1	0
> 20 mm	11	0	3	4	2
Other	<u>2</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL	22	1	7	5	2

The site is situated on the exposed and eroding edge of a broad shrub-covered terrace overlooking Ewe Creek. A white mineral deposit lies to the east of the site (across the creek), exposed in the creek's left (south) bank. From the creek bank the land slopes upward toward the mountains around Mt. Healy.

On-site vegetation is sparse, consisting of grasses, lichens, and mosses, with about 85 percent ground visibility. The area surrounding the site supports a shrub-scrub community consisting of dwarf birch and alder shrubs with occasional clusters of black spruce trees.

The artifacts occur in two clusters at the site. The larger cluster (Artifact Cluster #1) is scattered on a 12-by-20-m deflated area near the terrace edge. Artifact Cluster #2 is scattered on a 14-by-20-m exposed area, located near the edge of a modern eolian cutbank approximately 35 m north of the terrace face. Because it appeared that the artifacts may have eroded out of the sand dune at this location, the cutbank was cleaned and designated as Test Pit #1, and a stratigraphic profile was made.

Test Pit 1: The test pit was excavated into the south-facing cutbank of sandy deposits capping the alluvial terrace. A single paleosol was recognized in this profile. The paleosol may correlate with paleosol #2 in the test pit described at HEA-265. The paleosol contains traces of charcoal, but the amount is insufficient for dating. No artifacts were found in the excavation.

Although no subsurface artifacts were found at HEA-264, the site has high potential for containing buried cultural materials. The lithics exposed in Artifact Cluster #2 strongly suggest that the artifacts eroded out of the sand deposits along the north side of the site. These eolian deposits near the terrace edge appear to be undergoing

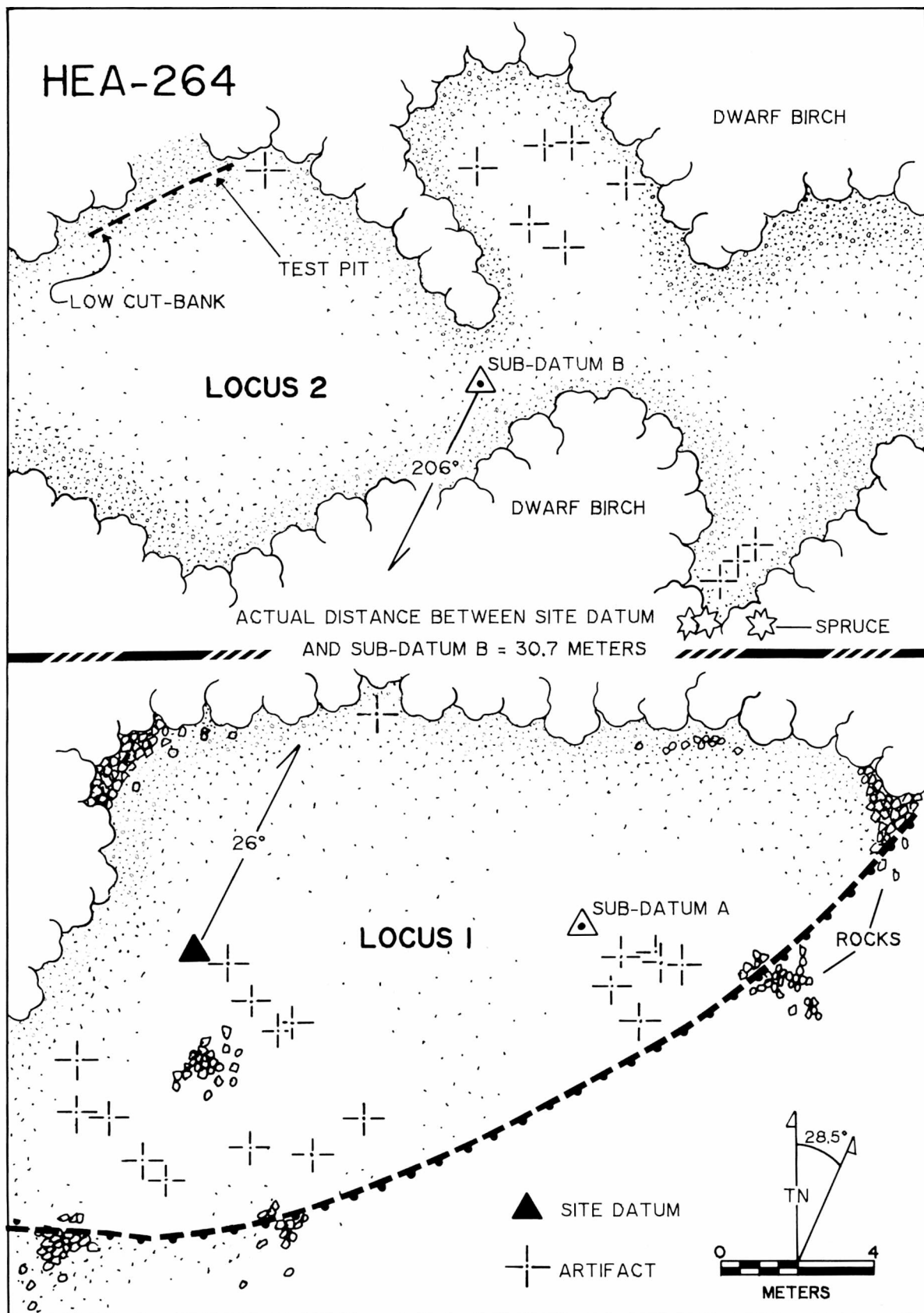


Figure 49. HEA-264 site map.

erosion, as shown by the modern cutbank, whose retreat to the north may expose still more buried cultural materials.

HEA-265 is a prehistoric site consisting of 45 lithic artifacts, scattered on a continuous sandy exposure, 3 to 4 m wide, and stretching for 80 m along the upper terrace edge overlooking Ewe Creek and Savage River (Figure 50). The artifact assemblage consists of the basal fragment of a biface, the distal end of a lanceolate biface projectile point, 40 lithic waste flakes and flake fragments, and three pieces of flake shatter. The two tool specimens are described in Appendix B. The remainder of the cultural materials in the assemblage consists of debitage, summarized in Table 7.

Table 7. Lithic debitage summary, HEA-265.

	<u>GREY CHERT</u>		<u>TAN CHERT</u>	
	<u>< 20 mm</u>	<u>> 20 mm</u>	<u>< 20 mm</u>	<u>> 20mm</u>
Prim. Dec. Flake	0	0	0	0
Sec. Dec. Flake	1	5	0	0
Tertiary Flake	12	16	2	4
Shatter	<u>0</u>	<u>1</u>	<u>0</u>	<u>2</u>
TOTAL	13	22	2	6

HEA-265 is situated on the exposed upper edge of a south-facing alluvial terrace overlooking Ewe Creek, approximately 1 km east of its confluence with Savage River. The site area is about 30 by 10 m, with a ground visibility of about 60 percent. On-site vegetation consists of a sparse growth of grasses, moss and lichen with an occasional dwarf birch shrub. The area surrounding the site supports a low shrub-scrub community including dwarf birch, blueberry, low-bush cranberry and occasional thickets of head-high spruce. Ground visibility to the north of the site is less than 5 percent. All unvegetated areas along the terrace edge were intensively surveyed, but no additional cultural materials attributable to HEA-265 were found.

About 550 m east of the site, a crumbly, white mineral outcrop protrudes along the left (south) side of Ewe Creek. Numerous animal trails converge on this area from the hills and ridges to the south.

Although only two lithic tool specimens were found at the site, the composition of the artifact assemblage at HEA-265 is remarkably homogeneous. With the exception of the rhyolite biface point (Artifact #24), all of the artifacts are composed of black or

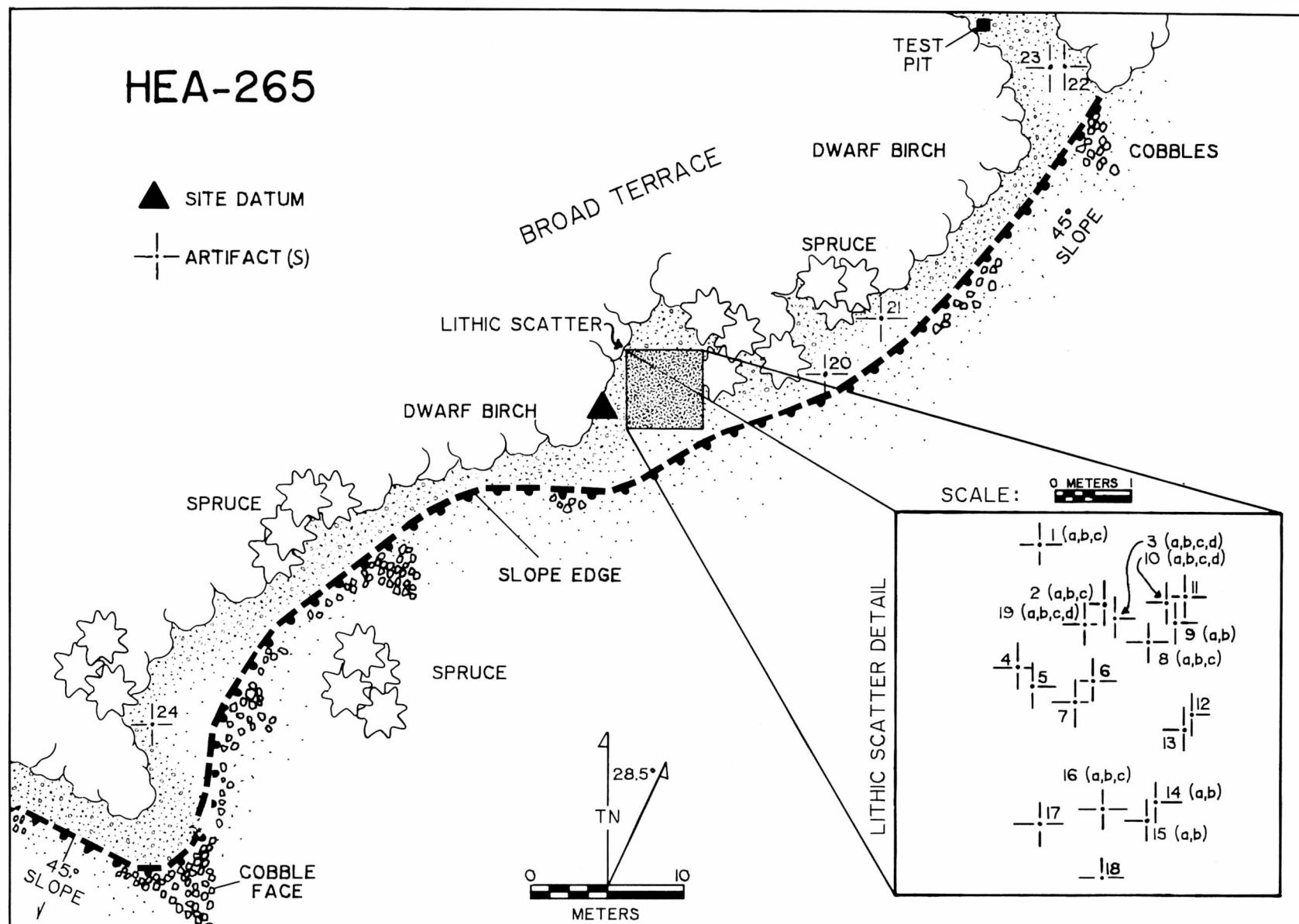


Figure 50. HEA-265 site map.

grey chert. This color distinction may merely reflect the range of color variation of the material within a single source.

The general lack of cortex on the artifacts at HEA-265 further suggests that the lithic source is not located in the immediate site vicinity. Initial trimming to produce preforms appears to have been done elsewhere, with a later reduction stage of the manufacture reflected at this site.

One test pit was excavated at HEA-265. The excavation consisted of a cleaned-off section, 80 cm wide and 80 cm deep, of an erosional bank at the northeast end of the site (Figure 51). The bank was chosen for archeological testing because of the depth of the sand deposits at that location and the close proximity of the surface artifacts to the profile. The sediments consist of loess deposits capped by approximately 35 cm of fine-to-medium-grained cliffhead sands. Two distinct paleosols are present in the profile--the first at 25 cmbs and the second at about 35 cmbs. No cultural materials were found in association with either paleosol in this profile. The test excavation terminated at dense glacial gravel.

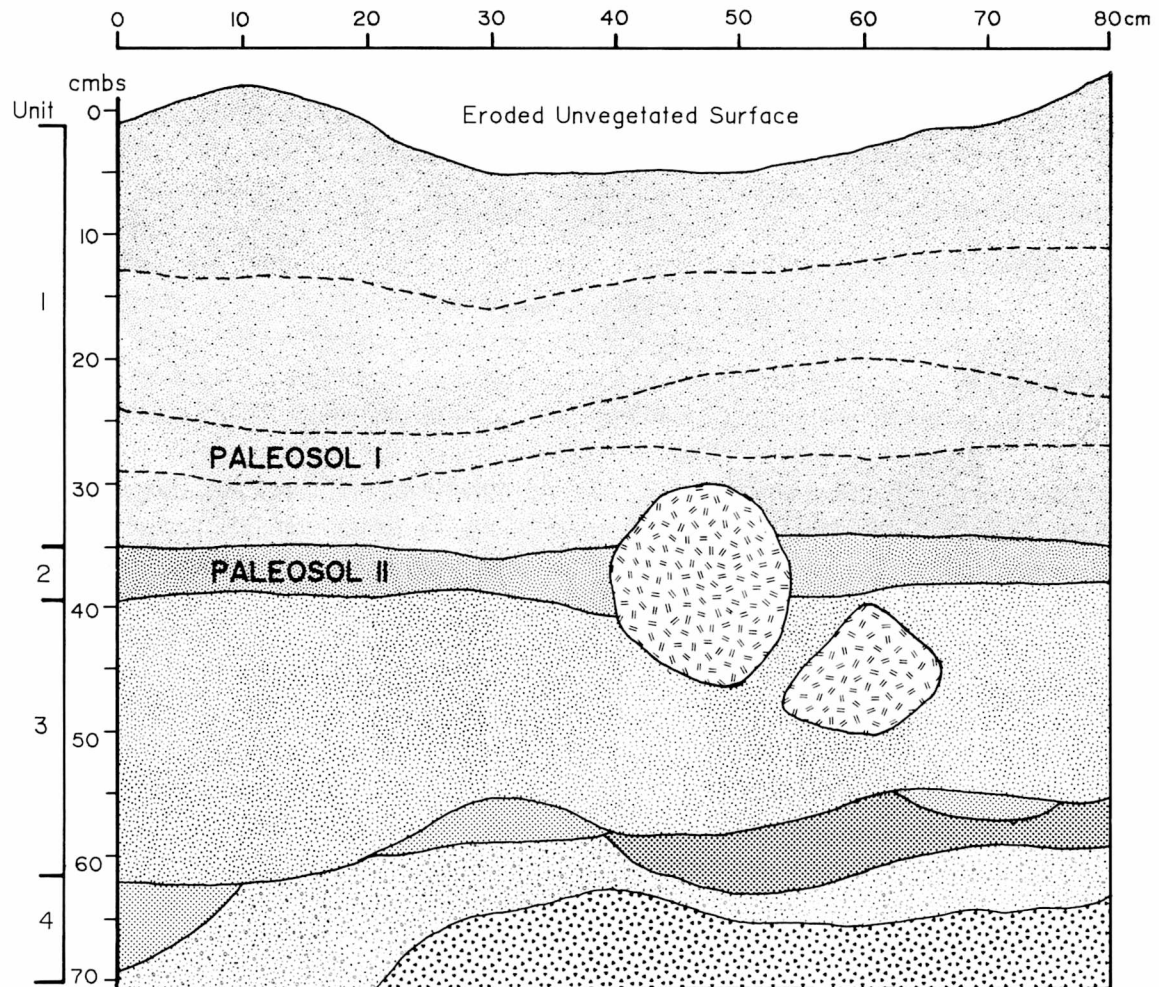
No other artifacts were observed on the surface at HEA-265, although it is highly probable that the site does contain additional subsurface cultural materials. Sand deposits with a potential to contain cultural materials cover an area up to 200 square m in the site vicinity.

Many artifacts were noted on the sandy slopes below erosional banks at the site, strongly suggesting that more artifacts lie buried in the sand. A return trip to the site a week after the test excavation revealed that three additional artifacts had eroded out into a shallow blowout 10 m north of the current southern edge of the erosional scarp. The discovery supports the premise that additional artifacts are buried in that area.

Two other lithic sites (HEA-263 and HEA-264) are located on the same terrace as the site, within 800 m east of HEA-265 (Figure 47). All three sites appear to have been hunting overlooks to exploit game animals that were drawn to the mineral outcrop for nutrients.

HEA-265

TEST PIT PROFILE



LEGEND:

- | | |
|--|--|
|  SAND |  LOAM WITH WASHED SILT FRAGS. |
|  SANDY LOAM |  SANDY LOAM WITH GRANULES |
|  LOAM |  ALLUVIAL GRAVELS |
|  SILT LOAM |  RODENT BURROW |

Figure 51. HEA-265 test pit profile.

VII DISCUSSION AND CONCLUSIONS

Discussion

The Denali land exchange survey expanded archeological survey coverage into areas of the park not previously investigated, including remote sections of the west, southeast, and northeast boundaries of the park. The survey recorded a total of 14 prehistoric and eight historic sites. Further discussion of the survey results is presented below.

Prehistoric Sites

All of the 14 prehistoric sites found during the land exchange survey appear to be hunting-related sites that were occupied for short duration. This interpretation is based on the known cultural/ethnographic pattern, site location, and observed cultural material.

All of the sites are small, contain relatively sparse cultural material, and occupy good vantage points for spotting game animals. Fishing was not a documented activity at any of the sites--not surprising given that none of the sites is located in the immediate vicinity of a stream or large body of water.

The total artifact assemblage of the 14 sites is comprised of lithic artifacts: stone tools, tool fragments, and debitage.

As illustrated in Table 8, the recorded sites are predominantly surface deposits, with only one site (HEA-260) containing known subsurface cultural material. Three sites (HEA-256, HEA-258 and HEA-261) are isolated finds, each consisting of a single lithic tool.

Table 8: Deposition of lithics (surface/subsurface)
at study area sites.

Isolated Single Lithic Tool (Surface Find)	3
Surface Lithic Scatter	10
Surface & Subsurface Lithic Deposits	<u>1</u>
TOTAL	14

No readily datable site contexts (charcoal, paleosols) were discovered during the survey. Nevertheless, an attempt was made to approximate the age and cultural identification of each site by comparing the cultural materials found at the sites with similar assemblages from dated sites in the area. Only one artifact that can be considered diagnostic for a particular cultural phase and time period was found during the survey. The specimen--a small projectile point closely resembling late prehistoric lithic material from Lake Minchumina--was discovered at HEA-261 in the Healy/Stampede area.

Prehistoric sites were found in three areas during the land exchange survey: the Swift Fork River on the west boundary, the Dunkle Hills on the southeast boundary, and the Healy/Stampede area along the northeast boundary of the park (Figure 3).

Swift Fork Area. The three sites in the Swift Fork area are small and sparsely scattered. The artifacts recorded at all three sites are exposed on the surface of sandy blowouts where they are out of archeological context.

The sites are located on the north flanks of the Alaska Range in a decidedly periglacial area that may have supported small groups of large land mammals during Holocene times. The number of game animals in the area was probably never large, as reflected by the impoverishment and ephemeral character of the sites, as well as the small number of sites found in the general area.

All three sites appear to represent occupations of short duration, although they may represent a series of occupations. This possible reuse is implied at MMK-104 by the presence of a basalt core that appears to have been utilized at two widely spaced intervals. The original flaked surface of the artifact bears a thick brown patina, obscuring the core's true black color. Several unstained flake scars expose the original surface, indicating later alteration and reuse. Specific reutilization of the tool would suggest that small parties may have used the site(s) for short periods of time on hunting forays into the northern foothills of the Alaska Range.

No bifaces were found at the Swift Fork sites, although their absence does not preclude the possibility that the people who occupied the sites did use bifaces and other forms of hunting paraphernalia not in evidence there at the present time.

All 10 artifacts found at the Swift Fork sites are composed of igneous extrusive materials: basalt, andesite, and obsidian. Cobbles of both basalt and andesite are found in large numbers in the Swift Fork streambed, where they have been transported by glacial action and water from source areas in the Alaska Range. Most likely the stream cobbles provided the raw materials for the basalt and andesite artifacts found at the sites.

The obsidian artifact found at MMK-105 was almost certainly hand carried into the Swift Fork area from a considerable distance. The closest known obsidian source from Swift Fork is located within the park on the upper Teklanika River near Cathedral Mountains (Gilbert,

Ferrell, and Turner 1976:Plate 1), some 150 km northeast of the site, but well within the probable subsistence range of hunters in the area. The lithic material could also have been traded in from the prominent obsidian source at *Batza tina* ("obsidian trail") in the Indian Mountain vicinity of the Koyukuk River, some 350 km north of Swift Fork, or from the Wrangell Mountains, 600 km southeast of the Swift Fork area (Workman 1978). It is also possible that the specimen was carried in by Koyukon hunters from the *Batza tina* area during an early Koyukon incursion into the area.

None of the artifacts recorded at the Swift Fork sites is diagnostic for a particular time period. In addition, the sites lack stratigraphic context or organics from which a radiocarbon date could be obtained. Without diagnostic artifacts or other data that could date the sites, it is impossible to speculate on periods of occupation.

Dunkle Hills. A single prehistoric site, HEA-232, was found in the Dunkle Hills vicinity during the land exchange survey. It is the sole prehistoric site recorded to date along the southeastern boundary of Denali NPP (Griffin 1990:84).

The site appears to be an ephemeral hunting lookout, containing only six artifacts. However, the site is of special interest because it is the only site found in the land exchange survey that contains microblades and a microcore (Figure 52).

Attempting to date the site, in the absence of associated charcoal for radiocarbon analysis, is challenging. The microblades and wedge-shaped microcore are typical of the classic Denali complex materials (West 1967). West (1967:378) suggests that this area south and east of the Alaska Range was glaciated at the time of occupation at Teklanika, Dry Creek and other early Denali complex sites to the north of the range. However, a radiocarbon date obtained from a basal peat layer overlying the top of glacial till on Broad Pass, 10 miles east of the site, indicates that the Broad Pass area was deglaciated prior to 9300 B.P. (R. Reger 1992, personal communication).

It is also possible that the immediate site area was part of a glacial refugium at one or more times during the Holocene in uplands where Post-Pleistocene climatic conditions were favorable for glaciation until recently (Nelson and Reed 1978). HEA-232 is situated in a vicinity about 3,300 ft above sea level and a mere eight miles south of an existing lobe of the Cantwell Glacier. The area bears signs of Holocene glacial advances, interspersed with nonglaciated areas. Ager (1975:85-86) discusses the occurrence of such geographic refugia in the periglacial regions along the hilly flanks of the Alaska Range during the Holocene. Such an ecological environment could probably have supported a store of large game animals such as bison for hunters ranging over deglaciated areas in search of food.

Working with this hypothesis, Holmes and Bacon (1982) have attempted to link the hunting of bison in central Alaska to the basic Denali-complex tool kit--including microblades. Their argument is strengthened by recently derived radiocarbon dates of classic Denali-complex wedge-shaped microcores essentially identical to the early manifestations of Denali-complex

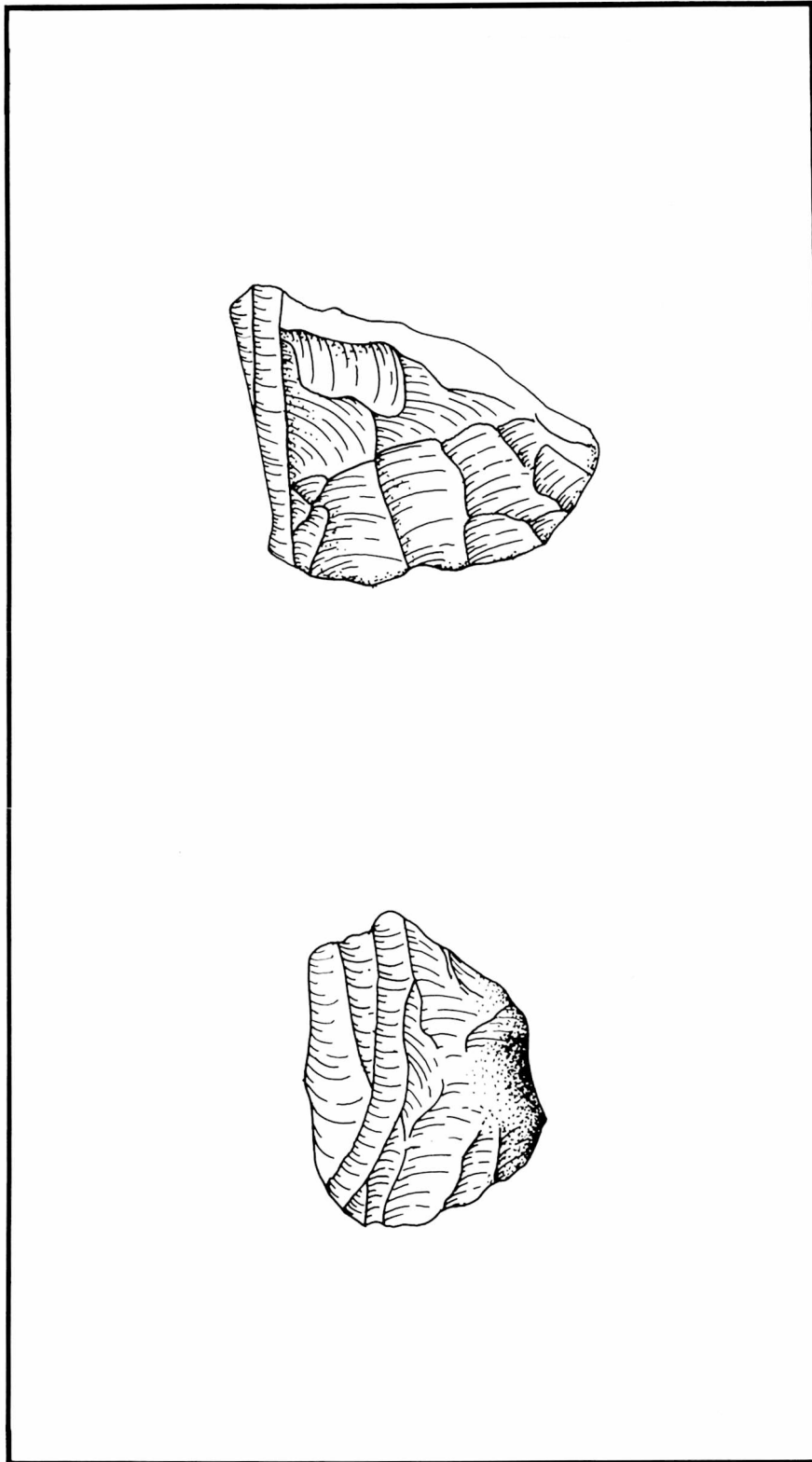


Figure 52. HEA-232 wedge-shaped microcore.

materials originally described by West (1967) but much younger in age. In their argument Holmes and Bacon propose a "technological conservatism" model, suggesting that the basic technology, with a reliance on microblades, continued in these geographic pockets throughout the Holocene until bison disappeared from the region (Holmes 1986:157).

This suggests that HEA-232 may be of similar age as the late manifestations of Denali complex type wedge-shaped microcores identified from the Campus site assemblage, radiocarbon-dated at 3500 ± 180 and 2725 ± 140 B.P. (Mobley 1991:95), and the Lake Minchumina site, MMK-004, dated at 2280 ± 170 and 2365 ± 140 B.P. (Holmes 1986:123). However, if the site area did become deglaciated some 9,000 years ago in conjunction with the general glacial retreat on Broad Pass, eight miles to the east, then it is possible that HEA-232 is of similar age as the Paleoarctic sites on the north side of the Alaska Range and may even represent the remnants of a hunting foray from a Paleoarctic site on the north side of the mountains.

On the other hand, if the site area remained glaciated until relatively late, around 3,000 to 4,000 years ago, then the site could possibly be related to the Lake Minchumina occupation around 2,300 years ago. Until the glacial deposits of the Dunkle Hills are recorded and analyzed, it is impossible to determine if the site's artifacts are products of the early or the late manifestation of the Denali complex.

Healy/Stampede Area. Seven prehistoric sites were found in the Healy/Stampede unit during the land exchange survey. In addition, three cultural isolates, consisting of single waste flakes showing no signs of use-wear and not recorded as sites, were located in the unit during the survey (Figure 29).

With the exception of HEA-260, all of the prehistoric sites and all three cultural isolates recorded within the Healy/Stampede unit are situated on a prominent ridge system that extends across the study area, connecting the Nenana and Teklanika river drainages (Figure 29). All of the sites benefit from excellent views in at least two directions. The sites' very small artifact assemblage suggests that they were hunting sites or overlooks that were briefly occupied as hunters traveled in the Kantishna Hills from one location to another. The presence of debitage at HEA-255 and HEA-259 implies that at least some preparation or repair of stone tools took place at the sites.

HEA-260 is situated adjacent to the Teklanika River, apart from the other cultural sites and isolates along the ridge system. Only HEA-260 has a known subsurface cultural component, although it has been disturbed by bioturbation. Thirty-five of the 38 artifacts recorded at the site consist of lithic debitage, implying that HEA-260 functioned primarily as a manufacturing site. The relatively large size of the individual specimens in the site's lithic debitage (16 specimens greater than 30 mm long, or nearly half of the total assemblage) would suggest that at least some of the tool manufacture that took place at the site represents the very early stages of preparation. It may be that the site's occupants prepared lithic

preforms, rather than completed tools, from nearby basalt and rhyolite sources. These preforms could then be finished somewhere on down the trail as needed.

HEA-260 may have been occupied for somewhat longer than the other ephemeral sites situated along the ridge system within the Healy/Stampede unit. Three tool forms were identified in the two activity areas of the site: a polished "burnishing stone," a blade fragment and a sharpened cobble spall that may have functioned as a cleaver or scraper. Although no hearth area was found to indicate that it also functioned as a camp site, the "burnishing stone" present at the site would imply that other activities did take place at HEA-260 in addition to flintknapping--perhaps the softening of skins in the tanning process.

Only one diagnostic artifact that could be used to estimate the age of a site with any degree of confidence was found during the land exchange survey. The artifact, a small projectile point found at HEA-261 (Figure 53c), is almost identical in size and shape to a specimen that Charles E. Holmes recently found in stratigraphic context at MMK-007 at Lake Minchumina, some 120 km west of the site. Two radiocarbon dates derived from the Minchumina site, MMK-007, average out at 1100 B.P. (Holmes 1992, personal communication). From this information we can extrapolate that the projectile point found at HEA-261 also dates from the late prehistoric time period around 1100 B.P. Furthermore, it is highly probable that the point is associated with the same people occupying Lake Minchumina at that time.

The Ewe Creek Sites. In addition to the seven prehistoric sites recorded within the Healy/Stampede unit during the survey, three sites were also recorded within the park 15 km south of the unit. The sites are located on the north side of Ewe Creek, across from a mineral deposit frequented by large game animals, drawn there by minerals necessary to their diet (J. Dalle-Molle 1985, personal communication).

Of a total of 84 artifacts found in the Ewe Creek area, only five are tool forms: three bifaces, one uniface (an end scraper), and one flake tool (a broken blade). The remainder of the cultural material at the sites is composed of debitage (79 unmodified waste flakes).

Cryptocrystalline silicate is by far the most common lithic raw material in the Ewe Creek assemblage, with 69 specimens composed of black or grey chert. Rhyolite accounts for only eight specimens, including a white rhyolite lanceolate biface found at HEA-265 (Figure 53d). Table 9 shows the number and distribution of artifacts at the three Ewe Creek sites by lithic raw material.

The great preponderance of chert in the lithic inventory at Ewe Creek suggests that the source of supply is either very close by or that the people occupying the sites carried it in with them to work with while watching for game animals. The nearest known source of chert in the area is in the Tertiary latite deposits on the south slopes of Sugarloaf Mountain (Warhaftig 1970:map), immediately northeast of the park entrance, about 30 km east of the sites. Chert deposits are also reported to occur on Polychrome Mountain and portions of

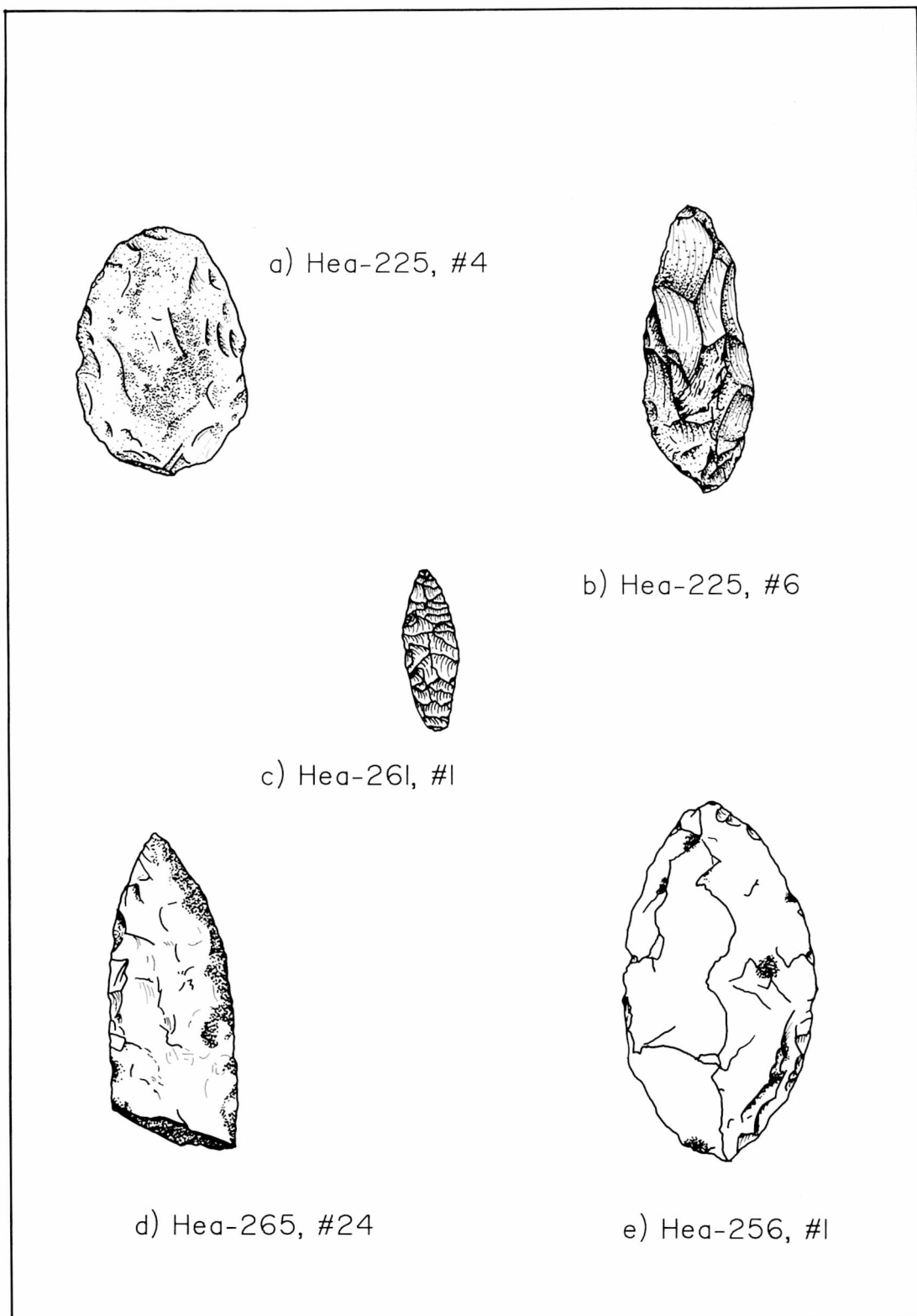


Figure 53. Assorted bifaces found in study area.

Table 9: Lithic composition of Ewe Creek artifacts.

<u>SITE</u>	<u>CHERT</u>	<u>RHYOLITE</u>	<u>BASALT</u>	<u>QUARTZ</u>
HEA-263	2	0	0	0
HEA-264	23	7	5	2
HEA-265	<u>44</u>	<u>1</u>	<u>0</u>	<u>0</u>
TOTAL	69	8	5	2

Igloo and Cathedral mountains and on the ridge between the Polychrome area and the Middle Fork of the Toklat River (Gilbert, Ferrell and Turner 1976:Plate 1).

Lithics

The 14 prehistoric sites recorded during the survey yielded a total of 166 lithic artifacts. A more detailed description of these items is presented in Appendix B. Thirty-seven of the recorded artifacts have been identified as tools or implements used in tool production.

Within the project artifact assemblage, five lithic industries (based on method of manufacture) have been identified and are described below. The five tool types represented consist of microblades, bifaces, core/flake tools, unifacially worked tools, and burins. Table 10 gives a breakdown of the artifacts by tool type found at each site.

Because of the continuous nature of the reduction process in lithic manufacture, waste flakes and fragments were placed into a separate category, and no attempt was made to determine which manufacturing process produced them. No ground-stone artifacts were encountered during the survey, and with the exception of two abraded but otherwise culturally unmodified stones and one unaltered manuport, all of the cultural materials found in the survey are chipped stone.

Microblade Industry. Microblades are small, thin blades with prepared proximal ends and a width of less than 10 mm (1.0 cm). Their sides are roughly parallel.

Artifacts associated with microblade manufacture were found at a single site during the land exchange survey. HEA-232, located inside the park immediately north of the Dunkle land exchange unit, yielded two microblades and one wedge-shaped microblade core (Figure 52). The core fits the classic description of the "Campus" core, one of the diagnostic artifacts of the Denali complex. Both microblades found at the site fall into the width category of Holmes' (1986:137) level 4/5 microblades from MMK-004 at Lake Minchumina. With a mean width of 0.55 cm, the artifact width is almost identical with Holmes' mean width of 0.557 cm. Both microblades and the microcore are composed of black chert.

Table 10. Artifact number, by tool type and site, represented in study.

SITE NO.	FLAKED LITHICS						BLADE and CORE		OTHER
	BIFACE	UNIFACE	BURIN	CORE	FLAKE TOOL	WASTE FLAKE	MICROCORE	MICROBLADE	UNMODIFIED LITHICS
MMK-104				2	1	1			
MMK-105			1		1	2			
MMK-106		1				1			
HEA-232						3	1 (wedge-shaped)	2	
HEA-255	5					7			1 (utilized spall)
HEA-256	1								
HEA-257					2	1			
HEA-258		1							
HEA-259	1	1			2	5			
HEA-260		2		1	2	31			2 (1 burnisher; 1 manuport)
HEA-261	1								
HEA-263				1	1				
HEA-264	1	1				35			
HEA-265	2					43			
TOTAL	11	6	1	4	9	129	1	2	3

Biface Industry. Bifaces are implements that have been flaked on both faces in their production. Bifaces probably functioned as knives, projectile points, or in unfinished form, remained as preforms or "blanks." These functional terms are based on archeological interpretation, and although not completely reliable, are used in this report for descriptive purposes.

Eleven bifaces or portions of bifaces were found in the Healy/Stampede unit. All of these are composed of tan, black or grey chert. Five of the bifaces are complete or nearly complete (Figure 53). Projectile points were identified by their relatively small size, symmetrical shape, pointed ends, and thin cross-section (Figure 53c). Bifacial knives were distinguished from projectile points by their large size, broad medial width, and narrowed ends (Figures 53a and 53d). Preforms were identified on the basis of gross flaking, step fractures, and lack of retouching or use-wear (Figures 53b and 53e). Three bifacial fragments lacked sufficient diagnostic attributes to make a further determination about the original tool. Table 11 shows the completeness of bifaces found during the survey.

Table 11. Bifacial artifacts represented in study.

	<u>COMPLETE*</u>	<u>PARTIAL+</u>	<u>FRAGMENT</u>
Projectile Points	1	1 (distal)	1 (basal)
Bifaces/Knives	2		2
Preforms	1		
Biface Fragments	3		

* Complete=unbroken or nearly whole.
+ Partial=half or less.

Core/Flake Industry. The Core/Flake industry is represented in the study by four cores--modified cobbles from which flakes had been systematically removed--and nine flake tools showing use-wear and/or deliberate retouching on one or more edges. Lithic raw materials used in the manufacture of the artifacts include basalt, grey/black chert, and rhyolite. Signs of wear on the flake tools suggest that they functioned as knives or scrapers.

Core/flake tools are represented in the assemblages from both the Healy/Stampede unit and the sites adjacent to the Swift Fork unit.

Uniface Industry. Unifacial artifacts identified in the assemblage include those lithics that are flaked on the dorsal side only, leaving the ventral side essentially unmodified. Six unifaces were recorded during the survey, including two unifacially retouched basalt spalls, three "side scrapers" unifacially worked on a lateral edge, and two "endscrapers" unifacially

worked on the distal end and lateral edges. The artifacts are composed of basalt, rhyolite, and chert.

Unifacially worked specimens were found in the Healy/Stampede unit and at MMK-106, adjacent to the Swift Fork unit.

Burin Industry. Burins are flakes that display one or more burin facets formed by the removal of a burin spall from the edge of the flake. The wear pattern on the faceted edges suggests that burins could have been used for scraping, planing, or possibly whittling.

A single burin was the sole representative of this technology found during the survey. The artifact was discovered at MMK-105 adjacent to the Swift Fork unit. The burin is composed of basalt.

Miscellaneous, Unmodified Stones. Three unmodified stone objects thought to be associated with cultural activity were found within sites recorded in the Healy/Stampede unit. Each was associated with artifacts, but other than suspected use-wear, showed no sign of purposeful alteration.

A manuport was found in association with seven other lithic artifacts in Artifact Cluster #1 at HEA-260 (Surface Artifact #1). The manuport, an unmodified chunk of angular basalt, was found in a context that suggested it had not been deposited by natural forces, thus indicating that it was intentionally carried to the site.

A highly polished elongate chert pebble was included in the assemblage of 19 artifacts in the archeological test pit at HEA-260 (Archeological Test Pit Artifact #5). The high polish on all sides of the specimen suggests that it had been used as a burnisher. The specimen is otherwise unmodified.

A fragment of fine-grained basalt, exhibiting use-wear on one lateral edge, was found in association with nine other artifacts at HEA-255 (Artifact #9). The item is otherwise unmodified, with no sign of chipping or retouch on the object. Extensive use wear on one side suggests that the artifact may have functioned as a side scraper.

Lithic Raw Materials. Lithic raw materials represented at the sites include basalt, andesite, chert/chalcedony, obsidian, rhyolite, and quartz (chert and chalcedony, both of which are color variations of cryptocrystalline quartz, are lumped under the chert category in this report). Table 12 shows the occurrence of the different lithic raw materials within the total project artifact assemblage, by the number and percentage of artifacts in each category.

Chert represents 57.8% of the lithic artifacts recorded, totalling 96 specimens. It is clearly the most prevalent raw material in the land exchange project artifact assemblage. Of this number, 69 artifacts composed of chert/chalcedony were found at the three small sites--HEA-263, HEA-264 and HEA-265--overlooking Ewe Creek, south of the Healy/Stampede unit.

Table 12. Occurrence and percentage of lithic raw materials in study.

RAW MATERIAL	<u>BASALT</u>	<u>ANDESITE</u>	<u>CHERT</u>	<u>OBS.</u>	<u>RHY.</u>	<u>QTZ.</u>
Number	36	1	96	2	28	3
% of Total	21.8	.06	57.8	1.2	16.9	1.8

The remaining 27 artifacts in this category were sparsely scattered on sites within the Healy/Stampede unit and at HEA-232 in the Dunkle Hills.

The relatively large amount of debitage found at HEA-264 and HEA-265 in particular, implies that some reduction of chert/chalcedony tools took place there. Furthermore, the high density of sites with chert artifacts in the Healy/Stampede area would suggest that these source materials occur somewhere in the vicinity. A likely source would be a Tertiary latite deposit which outcrops in several places at the south base of Sugarloaf Mountain about 6 km northeast of the park entrance (Wahrhaftig 1970:Figure 1).

Basalt was the next most common lithic raw material in the project assemblage, including 36 specimens (21.8% of the total). Basalt is readily available in the Swift Fork and the Healy/Stampede locales and appears in the assemblages of both places.

The occurrence of rhyolite was limited to five sites (HEA-258, HEA-259, HEA-260, HEA-264, and HEA-265) in the Healy/Stampede area. These 28 artifacts represented 16.9% of the total project assemblage. The greatest number of rhyolite artifacts (15) were clustered at HEA-260, near the northern boundary of the park. Large outcrops of this raw material--a pale pink rhyolite of Tertiary age--occur on the west and south slopes of Sugarloaf Mountain, northeast of the park entrance (Wahrhaftig 1970:Figure 1). The same pink rhyolite lithic material also occurs in the archeological assemblages at the Dry Creek and Panquingue Creek sites immediately east of the Healy/Stampede unit (Fifield, personal communication 1989). Rhyolite is also reported to be present in the Teklanika Formation, near Polychrome Mountain within the park, along with bands of obsidian and silicic deposits (Gilbert, Ferrell, and Turner 1976:Plate 1).

Crystalline quartz, obsidian, and andesite are sparsely represented lithic raw materials in the land exchange survey. Three quartz specimens--one fragment at HEA-260 and two small waste flakes at HEA-264--make up this category, which comprises 1.8% of the total. Obsidian is even more meagerly represented, with the occurrence of one flake at MMK-105 in the Swift Fork area and a single flake at HEA-232 in the Dunkle Hills (1.2% of the total). Obsidian does occur within the park in the upper Teklanika sequence (unit F), which has a 2 meter-thick black and white bed containing obsidian at its base (Gilbert, Ferrell, and Turner 1976:Plate 1). A single andesite core, found at MMK-104, comprises 0.06% of the lithic assemblage recorded for the land exchange survey. The specimen most likely was fashioned from a stream cobble carried down from pyroclastic deposits in the Alaska Range. Pyroclastic rocks are reported on Polychrome Mountain and portions of Igloo and Cathedral Mountains in the center of the park (Gilbert, Ferrell and Turner 1976). Table 13 shows the number of artifacts in each lithic category represented at the sites recorded during the land exchange survey.

Table 13. Number of artifacts, by lithic composition, per site, represented in study.

BASALT	n	CHERT	n	RHYOLITE	n	Andesite	n	Obsidian	n	Quartz	n
MMK-104	3	HEA-232	5	HEA-258	1	MMK-104	1	MMK-105	1	HEA-260	1
MMK-105	3	HEA-255	12	HEA-259	4			HEA-232	1	HEA-264	2
MMK-106	2	HEA-256	1	HEA-260	15						
HEA-255	1	HEA-257	3	HEA-264	7						
HEA-259	2	HEA-259	3	HEA-265	1						
HEA-260	20	HEA-260	2								
HEA-264	5	HEA-261	1								
		HEA-263	2								
		HEA-264	23								
		HEA-265	44								
Total	36		96		28		1		2		3

n = number of artifacts in given category present at site

Historic Sites

Eight historic sites were found during the land exchange survey. Five of the sites are located within the Dunkle unit (Figure 17), while three historic sites are situated within or adjacent to the Healy/Stampede unit (Figure 29). No historic sites were found within the Swift Fork, Ruth/Tokositna, and Coffee River units, although the Purkeypile lode mine and airstrip, constructed in the 1940s, is visible some two miles south of the Swift Fork survey area on the south side of Boulder Creek. Development of this mine, operated by I. W. Purkeypile under the name of Grandview Exploration Company, continued until 1983 (Buzzell 1988:7). The airstrip and buildings at the mine are now used as a commercial hunting camp west of Denali NPP (Buzzell 1988:8).

The following review, written by National Park Service Mining Historian Logan Hovis, discusses the mining history and recorded mining sites in the Dunkle and Healy/Stampede land exchange areas.

Dunkle Hills Unit. The first reported discovery of placer gold in the vicinity of the West Fork of the Chulitna River was in 1907, when John Coffee staked claims near the head of Bryn Mawr Creek, a tributary on the south side of the West Fork. The Golden Zone lode claim in the same area as the placer claims was initially staked in 1909. Other claims in the area, including the Northern Light lode on Costello Creek north of the West Fork, were located in 1911 and 1912. As of 1917, the only mineral production in the area was restricted to a small amount of placer gold. The lode deposits consisted of complex gold, copper, and antimony ores that were not amenable to recovery by simple milling methods (Capps 1919:208-221).

Initially, the remoteness of the region and the attendant lack of cheap, reliable transportation hampered development of mining in the area. Gradually, access and transportation into the area from Talkeetna, Susitna, or Knik (the nearest sources of supply) were established--first

by dog sleds in the winter and launch, poling boats, and pack trains during the summer. Between 1915 and 1917, construction of the Alaska Railroad northward from Anchorage made the area more accessible. By 1917, a pack trail from Talkeetna connected the West Fork Chulitna area with the railway and the new supply center of Anchorage (Capps 1919:211).

By 1917, a dozen or more claim groups had been located on or near the West Fork of the Chulitna, where most of the significant claims, including the Golden Zone, were located south of the river. At that time, little work was underway at any of them, with the exception of the Golden Zone, where relatively extensive underground work, consisting of more than 200 feet of tunneling, exposed a complex gold-bearing ore (Capps 1919:225-230).

Claims on the north side of the West Fork of the Chulitna (within the boundaries of the land exchange area) were located along Colorado and Costello creeks. The Northern Light group, also known as the Eagle claim, was staked near the mouth of Camp Creek just south of the Dunkle mine area. Across Costello Creek was the site of the Lucrata or Lucrative group. The Silver King group on the east bank of Colorado Creek was staked approximately 1.5 miles upstream from the mouth. The Liberty claims lay between the two streams in the general vicinity of the present landing strip southwest of the former Dunkle mine.

The three claims of the Northern Light group were first staked by A. O. Wells, Frank Wells, and Joe Focket in 1911. By 1917, the partners had driven a 64-foot adit into a quartz vein containing copper, zinc, and antimony minerals, as well as gold and silver. At the same time, the only work evident on the five claims of the Lucrative group was a 15-foot tunnel dug into a bluff. Also, the Silver King group, consisting of two claims--the Silver King and Silver King Extension--had lapsed and been relocated by 1917; and all that had been excavated on these claims were shallow trenches that did not expose the ore body. Consequently, the nature of the deposit was a matter of speculation at the time (Capps 1919:223-225).

Although the published record makes no mention of cabins or tents at any of these locations, it is reasonable to assume that some camp facilities were present on most if not all of the claims.

By 1930, only two groups of claims were still valid, and only one prospector was doing assessment work in the Chulitna Basin. The most recent work on the Riverside group had exposed additional copper ores and small quantities of gold and silver without demonstrating the presence of a large ore body. Assessment work continued at the Golden Zone, where the extent of the underground work was essentially the same as in 1917 (Capps 1933:297-300).

In 1931, an increased level of activity was reported for the area, and several lapsed claims in the vicinity of the Golden Zone were restaked in the expectation of finding sufficient gold ores to make a mine. In August of that year, work began to extend the tunnel on the Golden Zone an additional 125 feet (Ross 1933:315-327). A sketch plan of the area showing one

tent and one cache as the only structures standing at the time, implies that the crew was probably not large (Ross 1933:Plate 27).

During this time, mining activity north of the West Fork continued on previously known claims. Most, if not all, of these claims were controlled by Henry Stevens, who was also developing the coal deposits (the future Dunkle mine) just above the confluence of Camp and Costello creeks. Stevens restaked the Silver King as the Stibnite on the basis of samples taken in 1926; but despite the abundance of sulfides, the irregularity and sparseness of the mineralization at the claim were not encouraging. Stevens also held the Liberty claim group, whose prospect consisted of a pit and a shallow trench. Along Costello Creek, the Lucrative claim was restaked and renamed the Lucrata, then subsequently abandoned as unprofitable. No additional underground work was conducted on the Eagle prospect--the old Northern Light group (Ross 1933:327-332). Given the close association of the operations, it is possible that all work in the area was conducted from one centrally located camp, perhaps in the vicinity of the coal prospect.

In spite of the optimistic USGS reports regarding the area's mineral potential and the establishment of the Alaska Railroad connection to the outside, the only property in the area with demonstrated commercial potential in the mid-30s was the Golden Zone, of which W. E. Dunkle gained full control in 1937. Efforts to place the mine into production after Dunkle's acquisition included the construction of a camp, mill, hydroelectric power plant and saw-mill, and road construction. The camp and sawmill, located on the south bank of the West Fork Chulitna, were completed in 1938 (Dunkle 1938:1).

Road construction from Colorado Station on the Alaska Railroad to the Golden Zone mine, along with the attendant construction of the bridges across the East Fork, Bull River, and West Fork Chulitna, was undertaken in 1937-1938 by the Alaska Road Commission (Dunkle 1938:1).

A road also connects the Dunkle coal mine with Colorado Station on the Alaska Railroad, 11 miles from the mine, and with the Golden Zone mine south of the West Fork Chulitna. From a point approximately one-half mile below the mouth of Colorado Creek, the road to the railway covers the same route used to access the Golden Zone mine. The Dunkle access was probably constructed at the same time that road access was established to the Golden Zone, to enable transport of coal from the Dunkle mine to the Golden Zone.

Between 1939 and 1941 the small production of the Dunkle coal mine was reserved solely for the power plant at the Golden Zone (Hawley and Clark 1974:33).

A flotation mill was also installed at the Golden Zone prior to the beginning of production in 1941. The mine produced 869 tons of concentrates during 1941 and 1942. The Golden Zone closed operations in 1942, due to wartime restrictions on non-strategic metals, and did not reopen after the war (Hawley and Clark 1974:33-34).

The same year the Golden Zone closed, W. E. Dunkle obtained the coal leases from Henry Stevens and operated the coal mine until the autumn of 1943 (Wahrhaftig 1944:1; Rutledge 1948:2-4). The Dunkle coal mine road was still under the maintenance of the Alaska Road Commission in 1942 (Dunkle 1942:1).

Recorded Historic Sites. There are five recorded historic sites in the Dunkle Hills area: HEA-227 through HEA-231. All of the sites may be considered mining-related to some degree.

HEA-227: The site consists of a large rectangular wooden box, the remains of a probable cache, and a breached dam. No specific historic information has been unearthed that definitely links these items with the Dunkle coal mine or the closer Liberty or Silver King lode prospects. However, the physical evidence strongly implies this connection. The gravel road constructed *circa* 1938 and connecting the old Dunkle mine site with the Alaska Railroad at Colorado cuts through the site area. The box may be the remains of a truck or sled bed used to haul coal from the mine to the railway. The box is sturdily built, suggesting that it was subjected to considerable strain. The precise identification or age of the "cache" is indeterminate. The probable cache could be associated with early work on the Silver King (*circa* 1912-1930), 300 m southwest of the site, or Liberty claims (*circa* 1926), located approximately 300 m northeast of the site.

HEA-228: No record has been found pertaining to historic mining activity associated with the vicinity of this site at the mouth of Colorado Creek. The literature does mention that early placer mining occurred across the West Fork from the site on Bryn Mawr Creek between 1907 and 1917. Also, several lode prospects are situated up Colorado Creek approximately 1.5 miles upstream from the site (the location of the Silver King Mine on USGS Quadrangle 1:63,360 series, Healy (A-6) is incorrect; the mine is actually located one mile due north of the indicated location). The current placer claims on Colorado Creek, including Colorado No. 1 where the site is located, were not staked until 1971. Early prospectors in the area were "men of small means" who trapped in the winter and prospected in the summer and may well have selected this site for their base camp as early as 1907. Frank Wells, A. O. Wells, and Joe Focket were active on Camp Creek between 1911 and 1917. The Lucrative group on Costello Creek and the Silver King on Colorado Creek were active in 1917, as was the Riverside group on the south bank of the West Fork Chulitna River. Early prospecting at the Golden Zone (1912) may have been conducted by people based on the river. HEA-228 is centrally located to these areas, as well as being situated along the main access route up the West Fork. A. O. Wells was still in the country and associated with the Golden Zone and Riverside claims in 1931. Between 1931 and 1937, Henry Stevens became the principal claim holder in the area with the Golden Zone, the coal mine, and the Silver King all held in his name. By appearance and condition, the cabins predate 1940, and some or all of the cabins may even date from the teens or twenties when small-scale prospectors operated in the area. Long-term

occupation or reuse of older cabins in the 1930s is possible, although little exploration is reported in the area during the 1930s except at the Golden Zone and the Dunkle coal mine. The possibility that one or more of the cabins was built or used during road construction by the Alaska Road Commission in the late 1930s is also a strong consideration. The bridge across Colorado Creek can be dated with some certainty. It was probably built in 1937-1938 when the Alaska Road Commission upgraded the pack trail up the West Fork to a road to serve the Golden Zone mine.

HEA-229: The Black Bear site consists of a collapsed cabin and cache, a dog house, and two sleds. There is no record in the literature of historic placer activity of any significance in the site vicinity. While some placer prospecting occurred in the West Fork drainage as early as 1907, only the claims on Bryn Mawr Creek were ever reported as producers. Lode prospecting may have occurred, but again, no historic activity was reported in the immediate vicinity. The current Black Bear placer claims were staked on Lode Creek in the 1970s. The cabin is too large to be used solely as a trapline shelter. Furthermore, it is too close to the cabins at the mouth of Colorado Creek (approximately one mile away) to serve that purpose. The physical condition, the methods of construction, and the runners on the sleds are typical of the 1920s and 1930s. The number and type of artifacts suggest repeated and extended periods of occupation (in terms of months).

HEA-230: The site contains a bridge across the Chulitna River and an associated piledriver. The bridge was constructed in 1937-1938 as part of the roadwork undertaken by the Alaska Road Commission to support mining operations at the Golden Zone mine, which produced gold concentrates in 1941-1942. The road and bridge were part of the construction operations associated with placing the Golden Zone into production. The roadwork began in 1937 under the direction of W. E. Dunkle. The pile driver framework appears to have been built in a style commonly used for bridge construction. Two additional bridges were constructed on the Golden Zone road in 1937-1938, one across the East Fork and one over Bull River, and it seems reasonable that the frame would be stripped of machinery and abandoned after construction of the last bridge with pile foundations on the road.

HEA-231: Sufficient information about the site is not available to make any definitive assumptions about its purpose. The structure at HEA-231 was probably erected in 1937 at the same time that the sawmill, hydroelectric plant and other lower camp buildings associated with the Golden Zone mine were constructed.

Healy/Stampede Unit. A review of the historic literature reveals little about historic mining activity on the Teklanika River on the western boundary of the Healy/Stampede unit. The absence of any published reports on the area by the U.S. Geological Survey, the U.S. Bureau of Mines, or the Alaska Territorial Governor's Papers implies that the area was a very marginal producer, if it produced any placer gold at all.

However, the physical evidence at the sites recorded in the survey shows that some placer mining--apparently limited to prospecting--did take place in the area in the past. The traces of mining activity, the absence of recent artifacts, and dense revegetation of the site areas suggest that mining occurred there before 1940. The low level of mining disturbance recorded at the sites further suggests that the efforts were minimal.

Recorded Sites. Three historic sites were recorded within or immediately adjacent to the Healy/Stampede unit (Figure 29). HEA-108 is located on the east side of the Teklanika River within the western periphery of the unit. Two sites (HEA-107 and HEA-262) are located along the west bank of the Teklanika, immediately adjacent to the exchange parcel.

HEA-108: The site consists of a single log cabin. The partially collapsed cabin was listed on the Denali cabin inventory in 1984. No artifacts associated with the site are specific to mining, nor do the recorded artifacts and cultural features indicate any other functional use for the cabin besides habitation. However, the cabin is located within 2 km of two historic prospects, HEA-107 and HEA-262, suggesting that it may have been used as a base camp for the prospects.

HEA-107: This historic mining operation site contains the remains of a ditch and remnants of sluice or flume sections. The limited number of boxes (three) and the presence of one partial set of riffles suggest that the ditch was dug to prospect the bench it cuts. Excavations and the natural action of the water can account for the widening and deepening of the ditch toward its lower end. The boxes may have been moved along the ditch, probably upstream from the mouth and set up at places where the prospector hoped to find gold. It is also possible that the operation was simply moved up the ditchline in sequence as far as the point where the boxes were abandoned. The limited scale of disturbance suggests that these efforts were unproductive.

HEA-262: The second small mining operation consists of the remains of sluice boxes, complete with riffles, a ditch or drainage channel, and a tailings pile. Once again, this is quite likely a prospecting site. The sluice boxes appear to have been set up alongside the channel of the stream where gold was expected to be found, and the gravels shoveled into the boxes by hand. The ditch indicated on the site map is probably the area opened up by this method. The stream would have been diverted into the sluice to wash the gravels, using hand shovels to deepen the stream to bedrock if possible. Thus the operation probably took advantage of the natural drainage to test the gravels of the bench. The wash tub located near the collapsed sluice could have served several functions, including a receptacle to pan the concentrates collected in the sluice. The marked post 640 m downstream from the site (approximately 2,000 ft or a little more than one claim length) provides the only clue to the operator and the period of activity.

The relationship of the three sites discussed above is tenuous at best. The identification of the cabin at HEA-108 with mining is based solely on its physical proximity to the two areas of known mining activity. However, given the marginal nature of the area, multiple uses for the cabin--including placer prospecting, hunting and trapping, or all three activities--are probable.

HEA-108 is situated 1.5 km from HEA-107 and nearly 2 km from HEA-262. No cabins or other evidence of a camp is reported for either mining operation site, suggesting a short period of occupation and poor returns. Still, assuming that HEA-108 was a central base for prospecting along this section of the Teklanika and that the prospects did not warrant a closer camp, it is possible to associate the cabin indirectly with the mining sites.

Conclusions

Fourteen prehistoric and eight historic sites were recorded during the 1988/1989 land exchange survey in Denali NPP. Although the number of cultural resources discovered is relatively small, the information gleaned from the survey adds considerably to our understanding of the history and prehistory of the area.

Relationship between Research Design and Data Collected

Prehistoric Sites. Five goals were formulated before beginning the land exchange survey project. Each of these goals is readdressed below. All five goals specifically address the documentation of prehistoric sites in the study.

Estimate the age and cultural affiliation of sites within the project area. In particular, identify and test likely locations for pre-12,000 B.P. sites in the Swift Fork area, and identify sites from the poorly-known "mid-prehistoric" period (a 3,500-year gap in the archeological record of interior Alaska from *circa* 8000 B.P. to *circa* 4500 B.P.).

No diagnostic artifacts nor radio-carbon datable organic materials were found at the three Swift Fork sites. Furthermore, no cultural material was found in stratigraphic context with datable paleosols or tephra deposits. Although this negative evidence does not preclude the possibility that there are sites as old or older than 12,000 B.P. in the Swift Fork area, it is impossible to speculate that these three sites date from this time.

Only one site recorded during the project--HEA-232 in the Dunkle Hills area--might possibly date from the mid-Holocene period, presently missing from the archeological record in the Alaska interior. The microblade/microcore site at HEA-232 in the Dunkle Hills is the sole prehistoric site found south of the Alaska Range during the survey and the only

representative of the microblade industry in the study. The wedge-shaped microcore displays the characteristics of the classic Denali complex "Campus" core. Lacking archeological provenience, however, we have no way at present of estimating the age of the site. Forthcoming geological studies of the Dunkle Hills may unravel the glacial history of the area. Such studies could reveal whether the site vicinity was unglaciated around 9,000 years ago or whether it remained glaciated until some 3000 to 4000 B.P. This information could thus supply the means to determine whether the site belongs to the early manifestation of the Denali complex some 9,000 years ago, or to its late manifestation, occurring as late as some 2,300 years ago.

At least one of the Healy sites (HEA-261) is associated with the people based at Lake Minchumina, and there is a high probability that other sites in the study area are also related to the Lake Minchumina occupations (Holmes 1986a; C. E. West 1978). The single projectile point found at HEA-261 is identical to the Minchumina projectile point from MMK-007 (Holmes 1991:personal communication), strongly implying a relationship between the two sites--perhaps with HEA-261 functioning as an outlying hunting camp from the Lake Minchumina base settlement. This diagnostic artifact also reliably dates HEA-261 at 1100 B.P. This is the only date obtained for any of the prehistoric sites in the study.

The Swift Fork sites may also be associated with the Lake Minchumina occupations or possibly with people from the Kuskokwim Basin to the west or the Koyukuk River to the north. Again, because no diagnostic artifacts nor radiocarbon-datable organic materials were found at the Swift Fork sites, it is impossible at present to determine the origin or period of occupation of the people who occupied the sites.

Identify behavioral activities at recorded sites, as indicated by physical remains.

All of the 14 prehistoric sites recorded in the study area appear to be ephemeral hunting sites where small parties camped or simply stopped for a brief period of time. No settlement of long duration was found within the survey boundaries, suggesting that the home bases for the hunting parties using the sites were probably located outside of the study area. This possibility is quite likely, inasmuch as the sites--particularly those located in the Swift Fork area and the single site in the Dunkle Hills--are situated in marginally habitable, periglacial terrain, unfavorable for a base camp.

The three sites in the Swift Fork area appear to be ephemeral hunting sites for hunting parties approaching the northern foothills of the Alaska Range from downstream. All three sites appear to have been of short duration, although they may have been occupied periodically.

In the Healy/Stampede area, all except one site appear to be on or adjacent to a well-established route between the Nenana Valley and the Kantishna Lowlands. Only HEA-260, which has a subsurface component, appears to have the potential for occupation of longer

than a very short time. Although both the surface of the site and the test excavation lacked indication of fire hearth activity, it is possible that a hearth lies buried in the untested subsurface component.

The three Ewe Creek sites south of the Healy/Stampede unit all appear to be hunting related, most likely associated with the mineral lick that is visible from the terrace on which all three sites rest. The proximity of the sites to the mineral lick, which big game animals still frequent for nutritional needs, suggests that the sites were probably occupied intermittently as hunting overlooks for a long time.

Collect paleoenvironmental data relevant to the prehistoric sites in the project area.

This goal was partially met. Although no cultural material was found in stratigraphic context at the 14 prehistoric sites in the project area, a considerable amount of relevant paleoenvironmental information, summarized below, was obtained. An in-depth discussion of the paleoenvironment of the study area, by geoarcheologist, Nancy Bigelow, is presented in Appendix C.

Significant eolian deposition of sand has occurred in both the Swift Fork and Healy/Stampede areas. Although no radiocarbon dates are available for these locales, they probably correlate with deposits in eastern Alaska, documented as late Pleistocene and early Holocene.

Loess was also noted in nearly every subsurface test pit in the study area. Although no datable materials were obtained at the sites, radio-carbon dates from the nearby Nenana Valley indicate that the loess deposits in that vicinity are Holocene in age. Stratigraphic relationships in the Swift Fork and Healy/Stampede areas suggest that the loess deposits in these locales are also Holocene.

Paleosols associated with the eolian deposits described above, were documented in both the Swift Fork and Healy/Stampede survey areas.

Based on her analysis of the data from the Swift Fork and Healy/Stampede surveys, the following paleoenvironmental reconstruction of the project area is suggested by geoarcheologist, Nancy Bigelow.

1. Late Wisconsinian drift was deposited in the Swift Fork study area. At the same time, alluvial gravel was deposited at Ewe Creek in the Healy/Stampede area.
2. Eolian sand was deposited or reworked on the Swift Fork moraines and on the scoured schistose bedrock in the Teklanika Valley (in the Healy/Stampede area). The wide distribution of sand sheets and sand dunes in interior Alaska, coupled with the

dominance of xeric flora in pollen cores suggests that this period (the terminal Pleistocene) was very cold and dry.

3. Loess was deposited either directly on gravel/bedrock or on the eolian sand in both study areas. All the loess in the Nenana Valley is Holocene; the same probably holds true for the Teklanika and Swift Fork study areas. The change from sand deposition to silt deposition reflects either a reduction in windiness or a reduction in the amount of sediment available for transport. Both factors were probably in effect. Once the glaciers had retreated to their current positions, the glacier-fed streams carried less sediment past the study areas; thus less material was available for transport. Furthermore, the retreat of the glaciers would also have resulted in less windiness because down-valley katabatic winds at the study areas would have been significantly weakened.

4. Episodic soil formation occurred, reflecting either stabilization of the sand or loess deposits or in the case of the sand deposits, the migration of blowouts. If the correlation of Paleosol 2 at Ewe Creek with Paleosol 3 at Dry Creek is correct, then a regionwide event of soil formation occurred between 8600 and 6000 B.P., probably affecting most of interior Alaska.

This period of soil formation for the area corresponds to the paucity of prehistoric sites dating from 8000 to 4500 B.P. in the area. This may explain the apparent hiatus during the mid-prehistoric period when dust bowl conditions would have provided a most inhospitable environment for game animals and hunters alike.

Look for volcanic ash (tephra) deposits in stratified context.

Because they can be geologically identified and reliably dated, tephra deposits are excellent horizon markers when found in association with undisturbed buried artifacts. Unfortunately, no tephra deposits were observed in the survey study area.

Look for archeological documentation of place names identified through oral history research.

No cultural remains were found at ethnographically documented locations in the study area, although several general vicinities in the Swift Fork locale have Native place names (Gudgel-Holmes and others 1991; Schneider and others 1984; Hosley 1966). Conversely, it is highly likely that the three sites recorded on Ewe Creek in the Healy/Stampede locality, did have a traditional name. The sites overlook a prominent mineral formation heavily used by large

game animals for nutritional needs. It is highly probable that the formation did have a traditional name. Furthermore, it is likely that the name has either fallen out of the cultural memory of the people who traditionally used the area, or that ethnographic researchers have simply not yet collected the information. Additional research into the oral history of the people who once traveled through this area in their traditional subsistence rounds may reveal one or more Native place names for this mineral formation.

Historic Sites. Of the eight historic sites recorded during the land exchange survey, all appear to have been directly or indirectly associated with mining. The five sites located in the Dunkle Hills and the three sites in the Healy/Stampede area are marginal to historic mining in the park vicinity, and little or no information about them appears in the historic record.

In the case of the Dunkle Hills south of the Alaska Range, the chief economic mineral reserves were confined to the area south of the West Fork of the Chulitna River. However, a few small operators did eke out a living on the north side of the river from the 1910s until World War II, where they mined in the summer and trapped in the winter. The cabins at the mouth of Colorado Creek (HEA-228) and on the unnamed creek 1.0 km to the west (HEA-229) may have been occupied by such local operators. Although the sites are not directly linked by historic accounts with mining activities on these tributary streams of the West Fork Chulitna, their proximity to the access road between Colorado Station on the Alaska Railroad and the Golden Zone and Dunkle mines strongly suggests that they were at least minimally associated with mining before 1942.

At HEA-228 in particular, two prospect trenches immediately north of the cabin at Locus C give archeological evidence that small-scale placer mining did take place there in the past. An estimate on the date of such early activity can be gleaned from the partially collapsed and overgrown Prospect Trench #1. The trench contains a trash deposit that includes a Sandborn coffee can, manufactured prior to the company's merger as Chase & Sandborn. The coffee can dates from sometime before 1929 when Mr. Chase & Mr. Sandborn's coffee companies merged with Nabisco under the Chase & Sandborn label. Prior to that time this brand of coffee sold under both the "Chase" and the "Sandborn" labels--particularly in Canada (Kathy Longendyck, personal communication). The pit also contains 1940s style C-ration cans, suggesting that the prospect was later used as a garbage dump, possibly by Alaska Road Commission during construction of the bridge (Locus 4) just before World War II.

The unidentified structure in the river bottom on the south side of West Fork Chulitna River (HEA-231) appears to be an auxiliary unit of the hydroelectric plant and sawmill some 50 m up the bank from the site. The plant and sawmill were constructed as a support installation for Golden Zone mine, and as such the structure at HEA-231 can also be linked indirectly to mining.

In addition to mining, three of the five historic sites located in the Dunkle Hills are also directly associated with the Alaska Road Commission (ARC), who constructed access roads and bridges connecting the Golden Zone, Dunkle, and other small mining operations with the Alaska Railroad at Colorado station during 1937/1938 (Dunkle 1938:1). These sites include the "ore" box at HEA-227, the small log bridge at HEA-228, Locus 4, and the bridge remains and piledriver platform at HEA-230. Furthermore, it is highly probable that the cabins at HEA-128 were also used as base camp for the ARC crew during construction of the road and its connecting bridges.

In regard to historic mining activity in the Healy/Stampede vicinity, there is little in the historic literature to indicate the level or type of past mining on the Teklanika River beyond the recorded physical evidence of the sites found there. However, the presence of a ditch, sluice remnants, and other hand equipment at the sites shows that some limited placer mining occurred there *circa* 1925-1940. The low level of mining activity, the limited equipment used at the sites, the absence of recent trash, and dense revegetation of the site areas further suggest that the mining took place there sometime before 1940. The minor disturbance recorded at the sites suggests that the efforts were minimal.

It appears that placer mining efforts in the Healy/Stampede area were confined to prospecting, including the two prospects found at HEA-107 and HEA-262. No other mining prospects were found in the area during the survey, suggesting poor returns at both sites.

The identification of the cabin at HEA-108 with mining in the Healy/Stampede vicinity is based solely on its physical proximity to the two areas of known mining activity--HEA-107 and HEA-262. The single cabin at HEA-108 is situated 1.5 km from HEA-107 and 2.0 km from HEA-262. No other cabins nor evidence of a camp were found at either mining operation site. Assuming that HEA-108 was a central base for prospecting along this section of the Teklanika River, it is possible to associate the cabin indirectly with the mining sites. Furthermore, given the marginal nature of the area, it is probable that the site was used for multiple activities--including placer prospecting, hunting, and trapping.

In conclusion, the archeological survey on which this report is based was initiated as a result of a potential land exchange in the area of Denali NPP between the National Park Service and the state of Alaska. The survey was performed in compliance with Section 106 and Section 110 of the National Historic Preservation Act of 1966. These mandates specifically require that a cultural resource inventory and appropriate consultations be conducted prior to a land exchange involving federal land. This report constitutes the inventory component in compliance with relevant historic preservation legislation and regulations.

In the interim since the survey was made, the decision to implement the proposed land exchange was suspended. Until such time as the proposed land transfer is reactivated, further planning for the transfer, including determination of eligibility to the National Register of Historic Places, is on hold.

VIII REFERENCES CITED

Allen, Henry T.

- 1887 *Report of an Expedition to the Copper, Tanana and Koyukuk Rivers, in the Territory of Alaska, in the Year 1885.* U.S. Government Printing Office, Washington, D.C.

Ager, Thomas A.

- 1975 *Late Quaternary Environmental History of the Tanana Valley, Alaska.* Institute of Polar Studies Report No. 54, Ohio State University, Columbus.
- 1980 An Outline of the Quaternary History of Vegetation in the North Alaska Range. In *North Alaska Range Project Report on Geoarchaeological Studies, Part 9*, edited by N.W. Ten Brink. Report to the National Geographic Society and the National Park Service. Department of Geology, Grand Valley State College, Allendale, Michigan.
- 1983 Holocene Vegetational History of Alaska. In *Late Quaternary Environments of the United States*, Vol. 2, *The Holocene*, edited by H.E. Wright, pp. 128-141. University of Minnesota Press, Minneapolis.
- 1985 Quaternary History of Vegetation in the North Alaska Range--a Preliminary Outline. In *North Alaska Range Project Final Report on 1978-1982 Geoarchaeological Studies, Part 9*, edited by N.W. Ten Brink. Report to the National Geographic Society and the National Park Service. Department of Geology, Grand Valley State College, Allendale, Michigan.

Ager, Thomas A., and L. Brubaker

- 1985 Quaternary Palynology and Vegetational History of Alaska. In *Pollen Records of Late-Quaternary North American Sediments*, edited by V. Bryant and F. Holoway, pp. 353-384. American Association of Stratigraphic Palynologists Foundation, Dallas.

Aigner, Jean S.

- 1986 Footprints on the Land, the Origins of Interior Alaska's People. In *Interior Alaska, a Journey Through Time*, edited by J.S. Aigner, R.D. Guthrie, M.L. Guthrie, R.K. Nelson, W.S. Schneider, and R.M. Thorson. Alaska Geographic Society, Anchorage.

Anderson, Douglas D.

- 1968 A Stone Age Campsite at the Gateway to America. *Scientific American* 218(6):23-33.

- 1988 *Onion Portage: The Archaeology of a Stratified Site from the Kobuk River, Northwest Alaska*. Anthropological Papers of the University of Alaska 22(1-2). University of Alaska Press, Fairbanks.
- Bacon, Glenn H.
 1977 The Prehistory of Alaska: A Speculative Alternative. In *Problems in the Prehistory of the North American Subarctic: The Athapaskan Question*, edited by James W. Helmer, S. Van Dyke, and F.J. Kense, pp.1-13. University of Calgary Archaeological Association, Calgary.
- Bacon, Glenn, and Charles E. Holmes
 1980 *Archaeological Survey and Inventory of Cultural Resources at Fort Greeley, Alaska, 1979*. Final Report prepared by Alaskarctic for Alaska District, Corps of Engineers, Contract DACA 85-78-0045. Federal Antiquities Permit No. 79-AK-008.
- Betts, Robert C.
 1987 *Archaeological Investigations at Butte Lake, Alaska: An Inquiry into Alaskan Notched Point-Microblade Assemblages*. Report to the University of Alaska Museum Geist Fund, Fairbanks.
- Bigelow, Nancy H.
 1991 Analysis of Late Quaternary Soils and Sediments in the Nenana Valley, Central Alaska. Unpublished MA Thesis, on file at Rasmussen Library, University of Alaska, Fairbanks.
- Bigelow, Nancy H., J. Beget and W. Roger Powers
 1990 Latest Pleistocene Increase in Wind Intensity Recorded in Eolian Sediments from Central Alaska. *Quaternary Research* 34:160-168.
- Borden, Charles E.
 1963 Current Research. *American Antiquity* 28:577.
- Bowers, Peter M.
 1979 *The Cantwell Ash Bed, a Holocene Tephra in the Central Alaska Range*. Short Notes on Alaskan Geology, (19-24). Alaska Division of Geological and Geophysical Surveys Report No. 61, Fairbanks.
- Bowers, Peter M., and Robert M. Thorson
 1981 A Geo-archaeological Perspective on Tephrochronology in Central Alaska: A Summary of Existing Data. Paper prepared for the eighth annual meeting of the Alaska Anthropological Association, Anchorage, March 20-21.

Brooks, Alfred H.

- 1903 An Exploration to Mount McKinley, America's Highest Mountain. *Smithsonian Report for 1903*, pp. 407-425. U.S. Government Printing Office, Washington, D.C.
- 1911 *The Mount McKinley Region, Alaska*. U.S. Geological Survey Professional Paper No. 70. U.S. Government Printing Office, Washington, D.C.

Brown, William E.

- 1992 *Historical Resources Study, Denali National Park and Preserve*. U.S. Department of the Interior, National Park Service, Alaska Regional Office, Anchorage.

Bundtzen, Thomas K.

- 1978 A History of Mining in the Kantishna Hills. *The Alaska Journal* 8(2):151-160.

Buzzell, Rolfe

- 1988 Historical Overview: Swift Fork Proposed Land Exchange. Unpublished Report, National Park Service, Alaska Regional Office, Cultural Resources Division, Anchorage.

Campbell, John M.

- 1961 The Tuktuk Complex of Anaktuvuk Pass, Central Brooks Range. *Anthropological Papers of the University of Alaska* 14(1). Fairbanks.

Capps, Stephen R.

- 1913 The Yentna District, Alaska. *U.S. Geological Survey Bulletin* 534. U.S. Government Printing Office, Washington, D.C.
- 1919 Mineral Resources of the Upper Chulitna Region. *U.S. Geological Survey Bulletin* 692. U.S. Government Printing Office, Washington, D.C.
- 1933 The Yentna District, Alaska. *U.S. Geological Survey Bulletin* 836-D. U.S. Government Printing Office, Washington, D.C.

Carter, L.D.

- 1983 Fossil Sand Wedges on the Alaskan Arctic Coastal Plain and Their Paleoenvironmental Significance. In *Proceedings, Permafrost 4th International Conference*, pp. 109-114. National Academy Press, Washington, D.C.

Carter, L.D., and J.P. Galloway

- 1984 Lacustrine and Eolian Deposits of Wisconsin Age at Riverside Bluff in the Upper Tanana River Valley, Alaska. U.S. Geological Survey Circular 868.

- Carter, R.W.G., P.A. Hesp and K.F. Nordstrom
 1990 Erosional Landforms in Coastal Dunes. In *Coastal Dunes: Form and Process*, edited by K.F. Nordstrom, N.P. Psuty and W.G. Carter, pp. 217-250. John Wiley & Sons, Ltd., Chichester.
- Collins, F.R.
 1985 *Map Showing a Vegetated Dune Field in Central Alaska*. USGS Miscellaneous Field Studies Map MF-1708.
- Cook, Frederick A.
 1908 *To the Top of the Continent*. Doubleday, New York.
- Cook, John P.
 1969 *The Early Prehistory of Healy Lake, Alaska*. Ph.D. dissertation, University of Wisconsin. University Microfilms, Ann Arbor, Michigan.
- Csejtey, B., Jr.; M.W. Mullen and G.D. Stricker
 1992 *Geology and Geochronology of the Healy Quadrangle, South-Central Alaska*. U.S. Geological Survey Miscellaneous Investigations Map I-1961.
- Dalle-Molle, John
 1985 Resource Specialist, Denali NPP, Alaska. Personal communication to Diane Gudgel-Holmes.
- Davis, Craig
 1981 1980 Archeological Reconnaissance of Mt. McKinley National Park--'Yes, Virginia, It's Worth Another Look.' Paper presented at the 8th annual meeting of the Alaska Anthropological Association, Anchorage, March 20-21.
- deLaguna, Frederica, and Catherine McClellan
 1981 Ahtna. In *The Handbook of North American Indians, Vol. 6, Subarctic*, edited by June Helm, pp. 641-663. Smithsonian Institution, Washington, D.C.
- Denton, G. H., and W. Karlen
 1973 Holocene Climatic Variations--Their Pattern and Possible Cause. *Quaternary Research*, vol.3:155-165.
- Dixon, E. James
 1985 Cultural Chronology of Central Interior Alaska. *Arctic Anthropology* 22(1):47-66.

- Dixon, E. James, George Smith, Becky Saleeby, Charles Utermohle, and Maureen King
1985 *Draft Report: Susitna Hydroelectric Project Cultural Resources Investigations, 1979-1985*. University of Alaska, Fairbanks.
- Dumond, Don E.
1987 *The Eskimos and Aleuts*. Revised edition. Thames and Hudson, Ltd., London.
- Dunkle, William E.
1938 *The Golden Zone Mine*. U.S. Bureau of Mines records [microfilm], roll 13, item 46.

1942 Letter to E. L. Bartlett, 12 April 1942. Alaska Territorial Governor's Papers [microfilm] roll 314], University of Alaska Anchorage Archives.
- Eldridge, George
1900 A Reconnaissance in the Susitna Basin and Adjacent Territory in 1898. In *Explorations in Alaska in 1898, 20th Annual Report of the U.S. Geological Survey*, Part 7:1-29. U.S. Government Printing Office, Washington, D.C.
- Fall, James
1987 The Upper Cook Inlet Tanaina, Patterns of Leadership among an Alaskan Athabaskan People, 1741-1918. *Anthropological Papers of the University of Alaska* 21(1-2):1:80.
- Fernald, A.T.
1965 Recent History of the Upper Tanana River Lowland, Alaska. U.S. Geological Survey Professional Paper 525C, pp. 124-127.
- Fifield, Terry
1989 Archeologist, National Park Service. Personal communication to A.J. Lynch, September 1989.
- Gilbert, W.G., V.M. Ferrell, and S.L. Turner
1976 *The Teklanika Formation--A New Paleocene Volcanic Formation in the Central Alaska Range*. Geologic Report 47, Division of Geological and Geophysical Surveys, College, Alaska.
- Goebel, Ted, and W. Roger Powers
1989 A Possible Paleoindian Dwelling in the Nenana Valley, Alaska; Spatial Analysis at the Walker Road Site. Paper presented at the 16th Annual Alaska Anthropological Association Meeting, March 9 and 10, 1989, Anchorage.

Greiser, Sally T.

- 1985 Summary and Future Research Considerations. In *Phase I Report: Background Research and Predictive Model for Cultural Resources Located Along the Susitna Hydroelectric Project's Linear Features*, Volume I, with contributions from Alaska Heritage Research Group, Inc. Under contract to Harza-Ebasco Susitna Joint Venture, for the Alaska Power Authority. Edited by T. Weber Greiser. Final Report Document No. 2865. Alaska Power Authority, Anchorage.

Griffin, Kristen

- 1990 *An Overview and Assessment of Archeological Resources, Denali National Park and Preserve, Alaska*. Research/Resources Management Report AR-16, Department of Interior, National Park Service, Alaska Regional Office, Anchorage.

Gudgel-Holmes, Dianne

- 1979 *Ethnohistory of Four Interior Alaskan Water Bodies*. State of Alaska Department of Natural Resources, Division of Research and Development, Anchorage.

- 1990 Language, Territory and Seasonal Round of the Athabaskans of Denali National Park and Preserve, Alaska. Appendix C, in *An Overview and Assessment of Archeological Resources, Denali National Park and Preserve, Alaska* by Kristen Griffin. Research/Resources Management Report AR-16, U.S. Department of the Interior National Park Service, Alaska Regional Office, Anchorage.

Gudgel-Holmes, Dianne, and Charles E. Holmes

- 1989 *Predictive Model of Aboriginal Site Types and Locations for a Catchment Basin Along the Denali Park Road Within Denali Park and Preserve*. Report prepared for the U.S. Department of the Interior, National Park Service, Alaska Regional Office, Anchorage.

Gudgel-Holmes, Dianne, Abbie Joseph, Eliza Jones, and James Kari

- 1991 *Native Place Names of the Kantishna Drainage, Alaska: Kantishna Oral History Project*, Contract no. PX 97000-8-1067, compiled and edited by D. Gudgel-Holmes. U.S. Department of the Interior, National Park Service, Alaska Regional Office, Anchorage.

Guthrie, R. Dale

- 1968 Paleocology of the Large Mammal Community in Interior Alaska during the Late Pleistocene. *American Midland Naturalist* 79(2):346-363.

- Hamilton, Thomas D.
 1982 A Late Pleistocene Glacial Chronology of the Southern Brooks Range: Stratigraphic Record and Regional Significance. *Geological Society of America Bulletin* 93:700-716.
- Hamilton, Thomas D. and Ted Goebel
 1996 Late Pleistocene Peopling of Alaska. In *Ice Age Peoples of North America*. Edited by Robson Bonnicksen and Karen Turnmire. Oregon State University Press, Corvallis.
- Hawley, Charles C.
 1974 *Geology and Mineral Deposits of the Upper Chulitna District, Alaska*. U.S. Geological Survey Professional Paper 758-B. U.S. Government Printing Office, Washington, D.C.
- Herron, James
 1901 *Explorations in Alaska, 1899. An All-American Overland Route from Cook Inlet, Pacific Ocean, to the Yukon*. U.S. Adjutant General's Office, Military Information Division, Publication No. 31. U.S. Government Printing Office, Washington, D.C.
- Hoffecker, John F.
 1984 The Moose Creek Site: An Early Man Occupation in Central Alaska. In *North Alaska Range Project Final Report on 1978-1982 Geoarchaeological Studies, Part 3*. Edited by N.W. Ten Brink. Report to the National Geographic Society and the Department of the Interior, National Park Service. Department of Geology, Grand Valley State College, Allendale, Michigan.
- Holmes, Charles E.
 1974 Archaeological Investigations in Central Alaska During 1973. Paper presented at the 39th annual meeting of the Society for American Archaeology, Washington, D.C.
- 1975 Northern Athabaskan Environmental Systems in Diachronic Perspective. In *Western Canadian Journal of Anthropology*, Vol. 5(3 & 4):92-124.
- 1986a *Lake Minchumina Prehistory: An Archeological Analysis*. In *Aurora No. 2*, Alaska Anthropological Association Monograph Series. Anchorage.
- 1986b Problems of Mid-to-Late-Holocene Archaeology in Interior Alaska. Paper presented at the 1986 Alaska Anthropological Association Meeting, March 7-8, Fairbanks.

- Holmes Charles E., and Glenn Bacon
 1982 Holocene Bison in Central Alaska: A Possible Explanation for Technological Conservatism. Paper presented at the 9th Annual Meeting of the Alaska Anthropological Association, April 2-3, Fairbanks.
- Hopkins, David M. (editor)
 1967 *The Bering Land Bridge*. Stanford University, Palo Alto.
- Hosley, Edward H.
 1961 The McGrath Ingalik. *Anthropological Papers of the University of Alaska* 9(2):93-133.
 1966 *Factionalism and Acculturation in an Alaskan Athapaskan Community*. Ph.D. Dissertation, University of California, Los Angeles. University Microfilms, Ann Arbor, Michigan.
 1981a Intercultural Relations and Cultural Change in the Alaska Plateau. In *Handbook of North American Indians, Vol. 6, Subarctic*, edited by June Helm, pp. 546-555. Smithsonian Institution, Washington, D.C.
 1981b Kolchan. In *Handbook of North American Indians, Vol. 6, Subarctic*, edited by June Helm, pp. 618-622. Smithsonian Institution, Washington, D.C.
- Hulley, C. C.
 1970 *Alaska: Past and Present* 3rd ed. Metropolitan Press, Portland, Oregon.
- Hunt, William R.
 1990 *Golden Places; The History of Alaska-Yukon Mining, with Particular Reference to Alaska's National Parks*. U.S. Department of the Interior, National Park Service, Alaska Regional Office, Anchorage.
- Jenny, J.
 1980 *The Soil Resource*. Springer-Verlag, New York.
- Jungerius, P.D., A.J.T. Verheggen, and A.J. Wiggers
 1981 The Development of Blowouts in 'De Blink,' a Coastal Dune Area near Noordwijkerhout, the Netherlands. *Earth Surface Processes and Landforms* 6:375-396.
- Karlstrom, Thor N. V.
 1965 Upper Cook Inlet Area and Matanuska River Valley. In *Guidebook for Field Conference F, Central and Southcentral Alaska*. International Association for Quaternary Research, 7th Congress, USA, by T.L. Péwé, O.J. Ferrians, D.R. Nichols, and T. Karlstrom.

- Kari, James
1977 Linguistic Diffusion Between Tanaina and Ahtna. *International Journal of American Linguistics* 43(4):274-288.
- Kari, James, and M. Buck (editors)
1983 *Ahtna Place Names Lists*, preliminary edition. Copper River Native Association and the Alaska Native Language Center, University of Alaska, Fairbanks.
- Kari, James, and James Fall (editors)
1987 *Shem Pete's Alaska. The Territory of the Upper Cook Inlet Dena'ina*. University of Alaska, Fairbanks, and the Alaska Department of Fish and Game, Division of Subsistence.
- Ketz, James A.
1983 *Paxson Lake: Two Nineteenth Century Ahtna Sites in the Copper River Basin, Alaska*. Occasional Paper No. 33, Anthropology and Historic Preservation, Cooperative Park Studies Unit, University of Alaska, Fairbanks.
- Krauss, Michael E., and V. Golla
1981 Northern Athapaskan Languages. In *Handbook of North American Indians, Volume 6, Subarctic*, edited by June Helm, pp. 67-87. Smithsonian Institution, Washington, D.C.
- Longendyck, Kathy
1992 RJR Nabisco Holding Corporation Historian. Personal communication to A.J. Lynch, 15 December 1992.
- MacNeish, R. S.
1964 The Peopling of the New World as Seen from Northwest America. *Proceedings of the 35th International Congress of Americanists, 1962*. Mexico City.
- McKenna, Robert A.
1959 The Upper Tanana Indians. *Yale University Publications in Anthropology* 55. New Haven.
- 1981 Tanana. In *Handbook of North American Indians, Volume 6, Subarctic*, edited by June Helm, pp. 562-576. Smithsonian Institution, Washington, D.C.
- McKenna, Robert A., and John P. Cook
1970 The Athapaskan Connection; a View from Healy Lake in the Yukon-Tanana Upland. Paper presented at the 10th Annual meeting of the Northeastern Anthropological Association, May 1970. Ottawa.

- Mobley, Charles M.
1991 *The Campus Site: A Prehistoric Camp at Fairbanks, Alaska*. University of Alaska Press, Fairbanks.
- Morgan, H. Morris
1965 *An Archaeological Survey of Mount McKinley National Park*. U.S. Department of Interior, National Park Service Contract 14-10-0434-951.
- Neill, John
1988 Long time resident of Pirate Lake, Alaska. Personal communication to Wayne Howell, August 1988.
- Nelson, Nels C.
1937 Notes on Cultural Relations Between Asia and America. *American Antiquity* 2(4):267-272.
- Nelson, S. W. and B. L. Reed
1978 Surficial Deposits, Talkeetna Quadrangle, Alaska. *Miscellaneous Field Studies*, Map MF-870-J. U.S. Geological Survey, Reston, Va.
- Osgood, Cornelius
1966 *The Ethnography of the Tanaina* (reprinted). Yale University Publications in Anthropology, No. 16. Originally published 1937, Human Relations Area Files, New Haven.
- Péwé, Troy L.
1975 *Quaternary Geology of Alaska*. Geological Survey Professional Paper 835. U.S. Government Printing Office, Washington, D.C.
- Phippin, Peter G.
1988 Archaeology of Owl Ridge: A Pleistocene-Holocene Boundary Age Site in Central Alaska. Unpublished MA Thesis, on file at Rasmussen Library, University of Alaska, Fairbanks.
- Pierson, Grant
1953 *A History of Mount McKinley National Park, Alaska*. U.S. Department of the Interior, National Park Service.
- Plaskett, David C.
1976 *Nenana and Teklanika Rivers of Central Alaska--A Cultural Resource Survey*. State of Alaska Department of Natural Resources Division of Parks, contract no. 02-76-00035-00, and University of Alaska Museum Geist Fund, Fairbanks, Alaska.

- 1977 The Nenana River Gorge Site, a Late Prehistoric Athapaskan Campsite in Central Alaska. Master's Thesis, University of Alaska Fairbanks.
- Powers, W. Roger
- 1973 Paleolithic Man in Northeast Asia. *Arctic Anthropology* 10(2):1-106.
- Powers, W. Roger, R. Dale Guthrie, and John F. Hoffecker
- 1983 *Dry Creek: Archaeology and Paleoecology of a Late Pleistocene Alaskan Hunting Camp*. U.S. Department of the Interior, National Park Service, Alaska Regional Office, Anchorage.
- Powers, W. Roger, and Thomas D. Hamilton
- 1978 Dry Creek: A Late Pleistocene Human Occupation in Central Alaska. In *Early Man in America from a Circum-Pacific Perspective*, edited by A. L. Bryan. Occasional Papers, No. 1, of the Department of Anthropology, University of Alberta, Edmonton.
- Powers, W. Roger, and John F. Hoffecker
- 1975 Dating the Denali Complex. *Arctic Anthropology* 12(1):76-81. University of Wisconsin, Madison.
- 1989 Late Pleistocene Settlement in the Nenana Valley, Central Alaska. *American Antiquity* 54:263-287.
- Rainey, Froelich G.
- 1939 Archaeology in Central Alaska. *Anthropological Papers of the American Museum of Natural History* 36(4):351-405.
- 1940 Archaeological Investigations in Central Alaska. *American Antiquity* 5(4):299-308.
- 1953 The Significance of Recent Archaeological Discoveries in Inland Alaska. In *Asia and North America: Trans-Pacific Contacts*, edited by Marion W. Smith. Society for American Archaeology Memoir 9, pp.43-46.
- Reger, Richard
- 1992 Geologist, Division of Geological and Geophysical Surveys, Department of Natural Resources, State of Alaska. Personal communication to A.J. Lynch, January 1992.
- Riehle, James R.
- 1985 A Reconnaissance of the Major Holocene Tephra Deposits in the Upper Cook Inlet Region, Alaska. *Journal of Volcanology and Geothermal Research* 26:37-74.

- Riehle, James R., Peter M. Bowers, and Thomas A. Ager
 1989 The Hayes Tephra Deposits, an Upper Holocene Marker Horizon in South-central Alaska. In *Quaternary Research*, pp. 276-290.
- Riehle, James R. and David A. Brew
 1984 Explosive latest Pleistocene(?) and Holocene Activity of the Mount Edgecumbe Volcanic Field, Alaska. In *The United States Geological Survey in Alaska: Accomplishments during 1982* (K.M. Reed and Susan Bartsch-Winkler, editors), pp.111-115. *U.S. Geological Survey Circular 939*.
- Ross, C. P.
 1933 *Mineral Deposits Near the West Fork of the Chulitna River, Alaska*. *U.S. Geological Survey Bulletin 849-E*. U.S. Government Printing Office, Washington, D.C.
- Rutledge, F. A.
 1948 Investigation of the W. E. Dunkle Coal Mine, Costello Creek, Chulitna District, Alaska. *U.S. Bureau of Mines Report of Investigations 4360*.
- Saleeby, Becky
 1994 The Cultural Resources Mining Inventory and Monitoring Program (CRMIM): Results of Fieldwork, 1986-1993. Ms. on file, Cultural Resources Division, Alaska Regional Office, National Park Service, Anchorage, Alaska.
- Schneider, William, Dianne Gudgel-Holmes, and John Dalle-Molle
 1984 *Land Use in the North Additions of Denali National Park and Preserve: An Historical Perspective*. National Park Service Research/Resources Report, AR-9, U.S. Department of Interior, National Park Service, Alaska Region, Anchorage.
- Schoenberg, Kenneth M.
 1985 *The Archaeology of Kurupa Lake*. Research/Resources Management Report AR-10, U.S. Department of the Interior, National Park Service, Anchorage.
- Soil Survey Staff
 1975 *Soil Taxonomy*. Soil Conservation Service, U.S.D.A. Agriculture Handbook 436.
- 1990 *Keys to Soil Taxonomy*, 4th ed. SMSS Technical Monograph No. 6. Blacksburg, Virginia.

Shinkwin, Anne D.

- 1979 *Dakah De'nin's Village: A Contribution to Northern Athapaskan Prehistory*. National Museum of Man, Mercury Series. Archaeological Survey of Canada, Paper No. 91. National Museums of Canada, Ottawa.

Shults, Brad and Layne G. Adams

- 1990 *Status and Distribution of the Tonzona Caribou Herd; 1989 Progress Report*. Natural Resources Report AR-90/01. U.S. Department of Interior, National Park Service, Alaska Regional Office, Anchorage.

Spurr, Josiah

- 1900 A Reconnaissance in Southwestern Alaska in 1898. In *20th Annual Report of the U.S. Geological Survey for the Years 1898-1899*. U.S. Government Printing Office, Washington, D.C.

Ten Brink, Norman W.

- 1985 Editor, *North Alaska Range Project Final Report on 1978-1982 Geoarcheological Studies*. Report to the National Geographic Society and the National Park Service. Department of Geology, Grand Valley State College, Allendale, Michigan.

Ten Brink, Norman W., and C.F. Waythomas

- 1983 Late Wisconsin Glacial Chronology of the North-Central Alaska Range: A Regional Synthesis and its Implication for Early Human Settlements. In *North Alaska Range Early Man Project*, pp. 15-32. National Geographic Society Research Reports, vol. 19, edited by W. Swanson. National Geographic Society, Washington, D.C.

Thorson, Robert M.

- 1977 Reconnaissance Surficial Geology of the Savage-Teklanika River Region, with Particular Emphasis on Prehistoric Archeologic Potential. Unpublished manuscript.

Thorson, Robert M., and Thomas D. Hamilton

- 1977 Geology of the Dry Creek Site: A Stratified Early Man Site in Interior Alaska. *Quaternary Research* 7:149-176.

Treganza, Adan E.

- 1964 *An Archaeological Survey of Mount McKinley National Park*. University of Alaska and U.S. Department of the Interior, National Park Service, Contract No. 14-10-0434-1547.

U.S. Department of the Interior, National Park Service

- 1984 *Denali Park and Preserve: Final Environmental Impact Statement, Kantishna Hills/Dunkle Mine Study Report*. December 1984. Denver Service Center.
- 1988 *Final Environmental Impact Statement, Wilderness Recommendation, Denali National Park and Preserve, Alaska*. PS D-114A. Denver Service Center.
- 1990 *Environmental Assessment, Denali National Park and Preserve: Proposed Coffee River/Tokositna River Land Exchange*. Alaska Regional Office. September 1990. Anchorage.

VanStone, James W.

- 1974 *Athapaskan Adaptations: Hunters and Fishermen of the Subarctic Forests*. Aldine Publishing Company, Chicago.

Viereck, L. A., C. T. Dyrness, and A. R. Batten

- 1986 *The 1986 Revision of the Alaska Vegetation Classification*. U.S. Department of Agriculture, National Forest Service, Institute of Northern Forestry, Fairbanks.

Wahrhaftig, Clyde

- 1944 *Coal Deposits of the Costello Creek Basin, Alaska*. U.S. Geologic Survey Open File Report 8.
- 1965 *Physiographic Divisions of Alaska*. U.S. Geological Survey Professional Paper No.482, Government Printing Office, Washington, D. C.
- 1970 Geologic Quadrangle Maps of the United States Geologic Map of the Healy (D-4) Quadrangle, Alaska. U.S. Geological Survey, Washington, D.C.

Waythomas, C.F., and D.S. Kaufmann

- 1991 Letter to the Editor. *Quaternary Research* 36:329-333.

Waythomas, C.F., and Norman W. Ten Brink

- 1982 Glacial Geology of the Swift Fork, Herron, and Foraker River Valleys. In *North Alaska Range Project Final Report on 1978-1982 Geo-archeological Studies*. Submitted to the National Geographic Society and the National Park Service.
- 1984 Glacial Geology of the Swift Fork, Herron, and Foraker River Valleys, Western McKinley (Denali) Park, Alaska. In *North Alaska Range Project Final Report on 1978-1982 Geo-archeological Studies* (Part 11), edited by Norman W. Ten Brink.

West, C. Eugene

- 1978 *Archaeology of the Birches Site, Lake Minchumina, Alaska*. Master's thesis, University of Alaska Fairbanks.

West, Frederick Hadleigh

- 1965 *Excavations at Two Sites on the Teklanika River, Mount McKinley National Park, Alaska*. Report to the National Park Service, on file at Alaska Regional Office, Anchorage, and University of Alaska Fairbanks.
- 1967 The Donnelly Ridge Site and the Definition of an Early Core and Blade Complex in Central Alaska. *American Antiquity* 32(3):360-382.
- 1968 *Report of Archaeological Investigation in Mount McKinley National Park, 1967-1968*. Report submitted to the Superintendent, Mt. McKinley National Park. Laboratory of Anthropology, Alaska Methodist University, Anchorage, Alaska.
- 1975 Dating the Denali Complex. *Arctic Anthropology* 12(1):76-81. University of Wisconsin, Madison.
- 1981 *The Archaeology of Beringia*. Columbia University Press. New York.

Workman, William B.

- 1976 Archaeological Investigations at GUL-077: A Prehistoric Site Near Gulkana, Alaska. Manuscript on file, Alaska Pacific University, Anchorage.
- 1978 *Prehistory of the Aishihik-Kluane Area, Southwest Yukon Territory*. National Museum of Man, Mercury Series. Archaeological Survey of Canada, Paper No. 74. National Museums of Canada, Ottawa.

Zagoskin, L. A.

- 1967 Lieutenant Zagoskin's Travels in Russian America, 1842-1844. Henry N. Michael, editor. In *Anthropology of the North: Translations from Russian Sources* 7. Published for the Arctic Institute of North America by Toronto Press, Toronto.

APPENDIX A **ARCHEOLOGICAL SITE SUMMARY TABLES**

SUMMARY OF RECORDED PREHISTORIC SITES

SITES ADJACENT TO SWIFT FORK UNIT

SITE NUMBER; MAP QUAD	OTHER DESIGNATIONS	SITE TYPE	CULTURAL MATERIAL, FEATURES
MMK-104 Mt. McKinley (A-5)	DENA-88-010	Surface lithic deposit	1 andesite core, 1 basalt waste flake, 1 basalt blade, 1 basalt core/chopper
MMK-105 Mt. McKinley (A-5)	DENA-88-011	Surface lithic deposit	1 utilized obsidian flake, 1 unifacially worked burin, and 2 basalt waste flakes
MMK-106 Mt. McKinley (A-5)	DENA-88-012	Surface lithic deposit	1 basalt unifacial end scraper, 1 basalt waste flake

SITES ADJACENT TO DUNKLE UNIT

SITE NUMBER; MAP QUAD	OTHER DESIGNATIONS	SITE TYPE	CULTURAL MATERIAL, FEATURES
HEA-232 Healy (B-5)	DENA-88-021	Surface lithic deposit	1 wedge-shaped microcore, 2 microblades and 3 waste flakes. Located on the west side of a ridge overlooking a long, narrow lake.

SITES IN HEALY/STAMPEDE UNIT

SITE NUMBER; MAP QUAD	OTHER DESIGNATIONS	SITE TYPE	CULTURAL MATERIAL/FEATURES
HEA-255 Healy (D-5)	DENA-89-004	Surface lithic deposit	2 bifaces, 3 biface fragments, 1 unworked scraper and 7 waste flakes in 2 loci
HEA-256 Healy (D-5)	DENA-89-005	Surface lithic deposit (isolate)	1 oval biface
HEA-257 Healy (D-5)	DENA-89-007	Surface lithic deposit	2 utilized flakes and 1 waste flake (all chert)
HEA-258 Healy (D-5)	DENA-89-008	Surface lithic deposit (isolate)	1 rhyolite uniface
HEA-259 Healy (D-5)	DENA-89-009	Surface lithic deposit	1 biface (distal tip), 1 uniface, 7 waste flakes
HEA-260 Healy (D-5)	DENA-89-010	Surface and subsurface lithic deposit	3 spalls, 1 core, 1 blade fragment, 1 manuport, 1 polished chert pebble, 1 utilized flake and 28 waste flakes in 2 surface clusters and 1 test pit
HEA-261 Healy (D-5)	DENA-89-013	Surface lithic deposit (isolate)	1 projectile point (biface)

SITES ADJACENT TO HEALY/STAMPEDE UNIT

SITE NUMBER; MAP QUAD	OTHER DESIGNATIONS	SITE TYPE	CULTURAL MATERIAL, FEATURES
HEA-263 Healy (D-5)	DENA-89-015	Surface lithic deposit	1 unifacially worked medial blade fragment and 1 core
HEA-264 Healy (D-5)	DENA-89-016	Surface lithic deposit	1 biface tip, 1 unifacially worked endscraper and 35 lithic waste flakes; nothing recovered from subsurface eolian deposits
HEA-265 Healy (D-5)	DENA-89-017	Surface lithic deposit	1 biface stem, 1 lanceolate biface (distal end), 43 lithic waste flakes and fragments; nothing recovered from subsurface eolian deposits

SUMMARY OF RECORDED HISTORIC SITES

SITES IN DUNKLE UNIT

SITE NUMBER; MAP QUAD	OTHER DESIGNATIONS	SITE TYPE	CULTURAL MATERIAL, FEATURES
HEA-227 Healy (B-6)	DENA-88-016	Lode Mining Operation; Road (Transportation)	1 large ore box, 1 earthen dam and cache remains, dating to 1930s and early 1940s
HEA-228 Healy (A-6)	DENA-88-017	Lode Mining Camp and Placer Operation; Bridge (Transportation)	3 log cabins with associated trash dumps, 2 outhouses, 1 collapsed log cache, 1 bridge and overgrown roadway dating to the 1920s and 1930s
HEA-229 Healy (A-6)	DENA-88-018	Lode Mining Camp	1 collapsed log cabin, 1 elevated cache and 2 sleds dating to the 1920s
HEA-230 Healy (A-6)	DENA-88-019	Transportation Site: Bridge	Partially collapsed bridge and 1 piledriver, both dating to the 1930s
HEA-231	DENA-88-020	Part of Lode Mining Operation; Milling (?)	1 wooden crib-like structure and associated structural debris

164

SITES IN HEALY/STAMPEDE UNIT

SITE NUMBER; MAP QUAD	OTHER DESIGNATIONS	SITE TYPE	CULTURAL MATERIAL/ FEATURES
HEA-108 Healy (D-5)	DENA-89-011	Cabin	1 cabin, associated cans and 1 Yukon stove

SITES ADJACENT TO HEALY/STAMPEDE UNIT

SITE NUMBER; MAP QUAD	OTHER DESIGNATION	SITE TYPE	CULTURAL MATERIAL, FEATURES
HEA-107 Healy (D-5)	DENA-89-012	Small Scale Placer Mining Operation	1 water diversion ditch and associated sluice/flume remains
HEA-262 Healy (D-5)	DENA-89-014	Small Placer Mining Prospect	Sluice box remains, associated artifacts and tailings pile

APPENDIX B

LITHIC ARTIFACT DESCRIPTIONS

Site: MMK-104

Artifact #1: an andesite core, 120 mm x 92 mm x 42 mm, with a few small flakes removed.

Artifact #2: an angular piece of basalt debitage, 20 mm x 20 mm x 20 mm.

Artifact #3: the distal portion of a fine-grained basalt blade, 25 mm x 25 mm x 14 mm.

Artifact #4: a crude basalt core (possibly a broken core/chopper), 90 mm x 60 mm x 32 mm.

Site: MMK-105

Artifact #1: a large secondary basalt flake, 96 mm x 37 mm x 12 mm, with a lipped platform.

Artifact #2: a triangular tertiary flake of basalt, 22 mm x 23 mm x 5 mm, with three distinct unifacial edges--two on the ventral side and one on the dorsal side. Heavy use-wear was noted on the unifacially worked point. Intense use-wear appears on the concave edge. This tool may have functioned as a crude burin.

Artifact #3: an obsidian tertiary flake, 30 mm x 39 mm x 10 mm, that exhibits use-wear on the ventral side along a concave lateral edge and on both the dorsal and ventral sides along the distal end. The nature of the use-wear and the edge morphology suggest that the flake had two different uses: (1) for scraping some hard material on the obtuse distal edge, and (2) for cutting or scraping a softer material on the sharper, concave lateral edge.

Artifact #4: a piece of angular basalt, 28 mm x 14 mm x 9 mm.

Site: MMK-106

Artifact #1: a unifacial endscraper of basalt, 31 mm x 25 mm x 6 mm. The scraper exhibits heavy use-wear on the dorsal side and retouching along the distal end and lateral edges.

Artifact #2: an unretouched basalt primary flake, 30 mm x 40 mm. The waste flake shows scars of previous flakes removed from its dorsal side.

Site: HEA-232

Artifact #1: a wedge-shaped microblade core, 48 mm x 30 mm x 12 mm, bifacially flaked on one edge. The core, composed of coarse black chert, shows scars from the removal of 3 microblades. The bifacially flaked edge shows some signs of wear, suggesting a broken tool reworked into a core.

Artifact #2: a tertiary flake, 48 mm x 30 mm x 11 mm, with a pronounced bulb of percussion and crushed striking platform. The artifact is composed of the same coarse black chert as Artifact #1.

Artifact #3: a microblade, 21.5 mm x 5 mm x 1 mm, composed of dark grey chert.

Artifact #4: a small translucent white chert/chalcedony flake, 15 mm x 7 mm x 2 mm, with a visible bulb of percussion.

Artifact #5: a tertiary flake of obsidian, 20 mm x 20 mm x 4 mm. The flake has a pronounced bulb of percussion and a lipped platform.

Artifact #6: a broken microblade, 13 mm x 6 mm x 1 mm, composed of the same dark grey chert as Artifact #3.

Site: HEA-255

Artifact #1: the basal fragment of a grey chert biface, 34 mm x 31 mm x 10 mm. The artifact has a prepared platform.

Artifact #2: a small grey chert biface fragment, 22 mm x 21 mm x 4 mm. The artifact, which also has a prepared platform, is diamond-shaped, with fractures on 2 sides.

Artifact #3: a small black chert biface fragment, 20 mm x 19 mm x 7 mm. The fragment lacks a prepared platform.

Artifact #4: an oval-shaped chert biface, 59 mm x 39 mm x 12 mm, weathered to a light tan color on its exterior. Step-fractures occur near the edge of the biface, and a shallow notch is present on one side.

Artifacts #5: a tight cluster of 4 pieces of light tan chert debitage, differing in lithic composition from Artifact #4.

Artifact #6: a black chert biface, 69 mm x 26 mm x 10 mm. The artifact, which displays severe step fracturing, shows no evidence use-wear and presumably was abandoned before completion.

Artifact #7: a black chert interior waste flake, 28 mm long.

Artifact #8: a black chert interior flake, 87 mm long.

Artifact #9: a fine-grained basalt side scraper, 69 mm x 43 mm x 17 mm. The artifact appears to have been an unmodified rock fragment used as a scraper, as no platform or retouch is evident on the specimen, although extensive use-wear is apparent on one side.

Artifacts #10: a small black chert waste flake, 31 mm x 19 mm x 4 mm.

Site: HEA-256

Artifact #1: an ovate, tan chert biface, 86 mm x 46 mm x 9 mm. Large, expanding flake scars cover the entire surface of the artifact. The biface edges are almost straight when viewed from the side, and the specimen is very thin relative to the length and width. A quarter of the edge shows stacked step fractures. The weathered surface of the artifact is the same color as the surrounding surface gravels.

Site: HEA-257

Artifact #1: a secondary decortication flake fragment of black chert, 35 mm x 30 mm x 8 mm. The cortex varies from tan to grey. Use-wear is apparent on 2 edges of the flake.

Artifact #2: a complete secondary decortication flake of black chert, 34 mm x 21 mm x 9 mm, showing prominent use-wear and probable retouch on 2 different edges.

Artifact #3: an angular black chert fragment, 40 mm x 26 mm x 12 mm, with cortex on one face.

Site: HEA-258

Artifact #1: a rhyolite uniface, 60 mm x 51 mm x 19 mm. The uniface is formed on a secondary decortication flake bearing a portion of the cortex, which is red. Retouch and wear are evident on one lateral edge of the specimen.

Site: HEA-259

Artifact #1: a complete, unaltered tertiary flake of grey chert, 25 mm x 19 mm x 4 mm.

Artifact #2: a grey chert uniface, 47 mm x 31 mm x 9 mm. Unifacial retouch is evident on one lateral edge.

Artifact #3: a rhyolite tertiary flake, 35 mm x 25 mm x 11 mm. Possible use-wear is visible on one edge of the artifact.

Artifact #4: a broken biface, 44 mm x 34 mm x 10 mm, composed of a coarse-grained grey basalt. The specimen appears to be the distal tip of a larger bifacial tool.

Artifact #5: a rhyolite tertiary flake, 45 mm x 21 mm x 5 mm.

Artifact #6: a complete rhyolite tertiary flake, 28 mm x 13 mm x 2 mm.

Artifact #7: a complete, secondary decortication flake, 52 mm x 38 mm x 11 mm, of the same coarse-grained grey basalt as Artifact #4. The specimen shows possible use-wear.

Artifact #8: a complete rhyolite tertiary flake, 34 mm x 10 mm x 3 mm.

Artifact #9: a complete tertiary flake, 36 mm x 18 mm x 9 mm, of dark grey chert.

Site: HEA-260

Surface Cluster #1 (8 lithic artifacts):

Artifact #1: an unmodified chunk of angular basalt, 25 mm x 20 mm x 10 mm, with no cortex. The specimen was recorded as a manuport because the lithic material is out of natural context and could not have been carried in by natural forces.

Artifact #2: a complete basalt tertiary flake, 45 mm x 30 mm x 10 mm.

Artifact #3: a tertiary flake of basalt, 30 mm x 25 mm x 5 mm. The platform and bulb of percussion are missing.

Artifact #4: a rhyolite tertiary flake, 20 mm x 15 mm x 2 mm. The platform and bulb of percussion are missing.

Artifact #5: a rhyolite secondary decortication flake, 35 mm x 15 mm x 8 mm, with reddish-brown cortex. The bulb and platform of percussion are absent.

Artifact #6: a rhyolite tertiary flake, 20 mm x 15 mm x 2 mm, without bulb or platform of percussion.

Artifact #7: a rhyolite tertiary flake, 12 mm x 10 mm x 2 mm. The proximal end of the flake is missing. The specimen appears to be a thinning flake.

Artifact #8: a tertiary basalt flake, 25 mm x 23 mm x 7 mm. The platform and part of the bulb of percussion are missing.

Surface Cluster #2 (11 lithic artifacts):

Artifact #9: a basalt tertiary flake, 30 mm x 28 mm x 10 mm, with possible retouch on one edge. Both platform and bulb of percussion are missing.

Artifact #10: a tertiary flake of basalt, 20 mm x 20 mm x 10 mm, without platform or bulb of percussion.

Artifact #11: a basalt tertiary flake, 30 mm x 25 mm x 10 mm, with part of a bulb of percussion but no platform.

Artifact #12: a fine-grained basalt tertiary flake, 15 mm x 13 mm x 3 mm, with part of a bulb of percussion but no platform.

Artifact #13: a fine-grained basalt or rhyolite spall, 75 mm x 65 mm x 20 mm, with coarse, unpatterned unifacial retouch on one edge. No cortex, platform, or bulb of percussion is present.

Artifact #14: a tertiary flake of coarse-grained basalt, 20 mm x 16 mm x 5 mm, with a partial bulb of percussion but no platform.

Artifact #15: a secondary decortication flake of rhyolite, 15 mm x 15 mm x 5 mm, with a partial bulb of percussion but no platform.

Artifact #16: a complete rhyolite tertiary flake, 10 mm x 10 mm x 3 mm.

Artifact #17: a complete tertiary flake of basalt, 40 mm x 30 mm x 5 mm.

Artifact #18: a rhyolite tertiary flake, 25 mm x 7 mm x 5 mm, without bulb or platform.

Artifact #19: a basalt tertiary flake, 30 mm x 10 mm x 7 mm, without platform or bulb of percussion.

Archeological Test Pit (19 artifacts):

Artifact #1: a unifacially retouched basalt spall, 160 mm x 76 mm x 39 mm, split off from a water-worn cobble. The spall retains the cortex on about 75% of the dorsal face. The specimen bears 3 large flake scars, each 20 mm long, on one end of the dorsal face. A series of uniform flake scars are evident along one entire edge toward the ventral face, forming a very straight edge.

Artifact #2: a tertiary flake, 62 mm x 45 mm x 15 mm, of rhyolite with platform and bulb of percussion. The raw material is the same as Artifact #6.

Artifact #3: a tertiary flake fragment of basalt, 21 mm x 12 mm x 2 mm, without platform or bulb of percussion.

Artifact #4: a quartz tertiary flake fragment, 9 mm x 5 mm x 1 mm.

Artifact #5: a polished, elongate pebble, 61 mm x 24 mm x 23 mm, of black chert. The specimen may have been used as a burnisher.

Artifact #6: a complete secondary decortication flake, 14 mm x 13 mm x 3 mm, of rhyolite. The weathered cortex is altered to a distinctive reddish-buff.

Artifact #7: a basalt tertiary flake, 11 mm x 11 mm x 1 mm.

Artifact #8: a blade fragment, 36 mm x 24 mm x 5 mm, produced from a tertiary flake of the same rhyolite raw material as Artifact #6. A single dorsal, longitudinal ridge spans the length of the specimen, terminating in a hinge fracture.

Artifact #9: a tertiary flake, 40 mm x 33 mm x 3 mm, of the same rhyolite raw material as Artifact #6.

Artifact #10: an angular fragment, 16 mm x 9 mm x 3 mm, of the same rhyolite raw material as Artifact #6.

Artifact #11: a basalt tertiary flake fragment, 10 mm x 5 mm x 1 mm.

Artifact #12: a tertiary flake, 6 mm x 4 mm x 1 mm, of the same rhyolite raw material as Artifact #6.

Artifact #13: a basalt tertiary flake, 21 mm x 15 mm x 3 mm.

Artifact #14: a black chert secondary decortication flake, 19 mm x 8 mm x 4 mm, with alluvial cortex.

Artifact #15: a tertiary flake, 9 mm x 8 mm x 2 mm, of the same rhyolite raw material as Artifact #6.

Artifact #16: a primary decortication flake, 63 mm x 7 mm x 4 mm, of basalt.

Artifact #17: a basalt tertiary flake, 28 mm x 17 mm x 3 mm.

Artifact #18: a rhyolite core, 140 mm x 113 mm and 48 mm thick, which shows flake scars on both ends of a water worn cobble. Alluvial cortex remains on 70% of the specimen.

Artifact #19: a basalt spall, 114 mm x 90 mm and 45 mm thick, which retains cortex on 50% of one face.

Site: HEA-261

Artifact #1: a bifacial chert projectile point, 38 mm x 12 mm x 1 mm. Both faces of the artifact are completely flaked in a random, unparallel pattern suggestive of fine percussion flaking. The specimen is bipoined, and the tips of both ends are broken.

Site: HEA-263

Artifact #1: a medial macroblade fragment, 24 mm x 24 mm x 4 mm, from tertiary flake of dark grey chert. The right edge of the specimen is nicked and nibbled, suggesting use-wear.

Artifact #2: a dark grey chert core, 64 mm x 32 mm x 20 mm. One end of the core retains cortex. Two surfaces of the specimen exhibit longitudinal flake scars. One surface shows transverse flaking.

Site: HEA-264

Artifact #5: a unifacial endscraper, 17 mm x 11 mm x 7 mm, formed on a tertiary flake of brown chert.

Artifact #25: a dark grey, chert biface tip, 27 mm x 24 mm x 5 mm.

Site: HEA-265

Artifact #21: a biface basal fragment, 21 mm x 18 mm x 8 mm, composed of dark grey chert.

Artifact #24: the distal end of a nearly complete white rhyolite lanceolate biface, 77 mm x 29 mm x 10 mm. The specimen is reminiscent of bifaces found in Denali complex assemblages elsewhere in the region.

APPENDIX C

PALEOENVIRONMENTAL RECONSTRUCTION IN INTERIOR ALASKA

by Nancy Bigelow

This appendix accompanies the Denali NPP Land Exchange Survey Report. It provides a description and analysis of the paleoenvironment that prevailed during late Pleistocene and Holocene times in the proposed land exchange locales.

Introduction

This appendix discusses, in terms of past climates, the stratigraphic record of several archeological sites within the land exchange area. In this context, the features of most interest are sediment texture and the morphology and stratigraphy of the paleosols found in the test excavations. Before describing the stratigraphy at these sites, it is first necessary to discuss the paleoclimatic record for central Alaska as we understand it. The record is based primarily upon the glacial history and pollen stratigraphy from several localities in the region.

Glacial History of the Central Alaska Range

This report focuses on the time period just preceding and after the appearance of humans in central Alaska. The oldest archeological sites found thus far are located in the Nenana and Teklanika valleys and range in age between about 11,000 and 11,800 B.P.

The region discussed here is the central and western Alaska Range in the immediate vicinity of Denali NPP. For this reason, the nomenclature of Ten Brink and Waythomas (1983), who described the glacial history of the area, is used. The late Wisconsinan ice advances that emerged from several of the north-flowing river valleys have long since retreated, although several short, sharp mini-advances occurred in late upper Pleistocene and early Holocene.

The McKinley Park glaciation covers the several episodes of ice advance between about 20,000 and 10,000 years ago. Four stades, or periods of movement, of the glaciation have been documented. The McKinley Park I stade is dated between about 25,000 and 17,000 B.P. Evidence for this ice advance has been seen in most valleys draining the north side of the Alaska Range (Ten Brink and Waythomas 1985; Hamilton 1982; Péwé 1975). At that

time, the ice was at its greatest extent and other proxy climatic indicators (i.e., pollen and sand dune formation) suggest the climate was very cold and arid.

The McKinley Park II stade is dated between about 15,000 and 13,500 B.P. This advance is less extensive than the preceding stade, although it has apparently been recognized in most of the north-draining valleys (Ten Brink and Waythomas 1985).

McKinley Park III stade is a short but sharp climatic reversal, possibly dated between 12,800 and 11,800 B.P. Unfortunately there are no radiocarbon dates in direct association with McKinley Park III (glacial) till; thus the published radiocarbon dates could be distant limiting ages. This advance is recognized in the McKinley and Nenana river valleys but is not well demonstrated in other river valleys in the area (Ten Brink and Waythomas 1985).

The final stade, McKinley Park IV, is a very brief advance seen only in the upper reaches of several rivers, not far from the modern ice front. The beginning of the advance is not well dated, although the end is fairly well constrained by peat formed on McKinley Park IV till around 9,500 B.P. (Ten Brink and Waythomas 1985).

Pollen Stratigraphy

To date, only one pollen core from the central Alaska Range has been analyzed and published. The core was extracted from Eightmile Lake on the interfluvium between the Nenana and Teklanika valleys (Ager 1983). This core is exceptional because it extends well into the end of the last glaciation. At that time (about 14,000 B.P.), the vegetation was dominated by sedges (*Cyperaceae*), grasses (*Gramineae*), and willows (*Salix*). *Artemisia* (sage) also made a brief appearance then. By about 13,000 B.P., birch (*Betula*) appeared dramatically in the core and increased from about 10% to nearly 70% of the pollen count. At the same time, sedges, grasses, and willows all decreased to about 1/2 of their former values. *Artemisia*, which never had a very high count, also decreased, but not until after the *Betula* peak was obtained. After about 11,000 B.P., *Populus* appeared for a very short time. Willows and grasses also briefly increased, although they were not entirely synchronized with the *Populus* peak. Immediately after the *Populus* peak, spruce (*Picea*) and alder (*Alnus*) appeared together in the record at about 7400 B.P. From that time until today, spruce, birch, and alder are the major constituents of the pollen core. Grasses and sedges are still present, although in small amounts. *Populus*, *Salix*, and *Artemisia* each constitutes less than 2% of the pollen count. The only addition to the pollen is a small but constant increase in the heaths (*Ericaceae*) after about 5000 B.P.

The changes in the vegetation described above reflects some of the larger-scale climatic changes noted in the glacial record. The oldest part of the core where sedges, grasses, and willows dominate (herb zone), is dated to the end of the last glaciation. The vegetation reflected in this and other cores in Alaska indicates that the climate was predominantly cold and arid, although the high amount of sedges indicates that water was at least locally

available. The absence of tree pollen is a strong indication of reduced summer temperatures and a short growing season.

The onset of the birch rise marks the beginning of the *Betula* zone when the increase of birch and reduction of the grasses and sedges indicates ameliorating climates. Birch appeared earliest in the unglaciated parts of the state and spread rapidly to the formerly glaciated areas (Ager and Brubaker 1985).

About 11,000 B.P., a very brief spike in *Populus* pollen appears in most pollen cores throughout Alaska and the northern Yukon. Most researchers agree that this pollen, probably cottonwood (*P. balsamifera*), is responding to the transient increase in summer solar insolation associated with changes of the earth's orbit around the sun. After the peak in summer solar insolation passed, *Populus* becomes rare or absent in pollen cores.

By about 6000 or 7000 B.P., the modern plant assemblage is present on the landscape. This indicates to most palynologists that little has changed climatically since that time.

Paleosols as Paleoclimatic Indicators

A paleosol is a surface soil that was buried and preserved in the sediment. The paleosol, when it was the active soil on the ground surface, reflects several factors that affect its morphology. These factors include parent material, topography, climate, length of soil forming interval, flora, and fauna (Jenny 1980:201-206). For the purposes of this report, fauna plays a very minor role and will not be discussed further. Parent material strongly affects pedogenesis, primarily because the ability of sediments to drain water is a critical factor for soil formation and results in distinctive soil morphologies. Topography is a related factor because changes of topography affect not only soil moisture, but also soil temperature.

Climate and the length of the soil-forming interval are independent factors. Increasing warmth and moisture promote pedogenic activity. The reverse is also true. The reason is that soils are formed mostly by chemical weathering, which is most effective in warm, moist environments. Length of the soil-forming interval is also important because soils in different climates require different amounts of time to form the various soil horizons.

All of the soil-forming factors listed above affect the morphology of the soil, which is then preserved as a paleosol after burial. The problem, however, is separating the different factors that form the soil in the first place. For example, in the soils of the forested regions of the north, elluvial (leach) zones are frequently encountered. Occasionally these elluvial zones are preserved in buried soils. The development of elluvial zones requires the translocation of organometallic complexes. This could be due either to a long soil-forming interval (several thousand years) or to exceptionally favorable climatic conditions with abundant warmth and precipitation.

Horizon nomenclature. All soils are composed of weathering horizons; changes in these horizons are due to the variations in the above factors. Soil horizon nomenclature in this appendix follows the nomenclature of the U.S.D.A. Soil Survey Staff (Soil Survey Staff 1975; 1990). However, only those horizons relevant to this study are discussed below.

The O horizon is the surficial organic matter (i.e., the rootmat). The Oi horizon contains more than 40% rubbed fiber by volume; the Oe horizon has 17% to 40% rubbed fiber; and the Oa horizon is the most decomposed, with less than 17% rubber fiber.

The A horizon is a zone of humified organic matter mixed with the mineral soil. This horizon is dominantly mineral, whereas the O horizon is dominantly organic.

The E horizon underlies the O or A horizon. It is the zone of leaching (elluvial horizon), where organics, sesquioxide complexes, and clays are removed and precipitated down the section. This horizon is lighter in color than the surrounding horizons.

The B horizon underlies O, A, or E horizons and is often the zone of alteration and/or accumulation (alluvial horizon). In areas with active pedogenesis, this horizon can be significantly different from the unweathered parent material. The Bs horizon has illuvial accumulations of amorphous organometallic complexes from the overlying E horizon. The Bt horizon has accumulations of illuvial clay. The Bw horizon is redder or browner than the underlying C horizon, although there is no evidence of translocation of clay or organometallic complexes.

The C horizon is unweathered parent material. Horizons separated by a virgule (i.e., B/C), have recognizable properties of both horizons. When a horizon is transitional between two master horizons (i.e., BC), two capital letters are used. In both cases, the first letter indicates the dominant feature of the horizon. The term, *Cox*, which indicates weakly oxidized parent material, is used frequently in this report. This term is used by Birkeland (1984) and is not part of the U.S.D.A. nomenclature.

Arabic numerals prefix the horizon name when there is a significant change in the particle-size or mineralogy of the sediments. Arabic numerals follow the horizon name when either laboratory or field analysis indicated a need for a vertical subdivision within a single weathering horizon.

Lower-case letters are added to the horizon name to indicate subordinate features of the horizon. The letter "g" indicates gleying. Gleying occurs when the sediments are saturated and anaerobic conditions develop. In these circumstances, the iron present in the soil is reduced, and the sediments turn a gray or greenish-gray color. Oxidation mottling is often associated with gleyed horizons. This often occurs around rootlets because they provide oxygen to the sediment. Mottling usually reflects a changing water table with alternating periods of anaerobic and aerobic conditions (Rieger 1983:162-167). The letter "b" indicates a buried soil. The "b" is usually placed last, after all the other features have been noted.

Paleosol stratigraphy in the Nenana Valley. Extensive archeological research has been undertaken in the Nenana Valley in recent years (Powers and Hoffecker 1989). Most of the archeological sites there are located on promontories overlooking tributaries of the Nenana River. At these localities, the cultural remains were found within a loess mantle that caps the early Wisconsinan outwash gravel. Of these sites, only the Dry Creek site, which has the most detailed eolian stratigraphy, is discussed below. It must be noted, however, that one other archeological site, Owl Ridge (Phippen 1988), located on a tributary of the Teklanika River, south of the Teklanika Gorge, has an eolian stratigraphy very similar to Dry Creek. This site is not discussed below because some compression of the stratigraphy has occurred, and the suite of radiocarbon dates from the site is internally inconsistent.

The Dry Creek site is located near Healy, just outside the northeast corner of Denali NPP (Figure 2), on a south-facing bluff above Dry Creek. Loess deposits of late Pleistocene and Holocene age mantle the site. Cultural remains from the Nenana Complex and Denali Complex were recovered near the bottom of the 2-m-thick deposit, and Northern Archaic cultural materials were found near the top. Beginning at the bottom of the Dry Creek stratigraphic profile (Figure 54), the loess consists of 30 to 40 cm of unweathered loess (Loess 1 and 2), lying unconformably on outwash gravel. The loess, especially the bottom 20 cm, is gleyed with minor oxidation mottling. Capping this loess is Sand 1, a very thin (1 cm) and discontinuous, but quite sandy unit (90 percent sand). Three loess units containing three paleosol horizons overlie Sand 1. The lowest paleosol (Paleosol 1) consists of up to five discontinuous and thin organic stringers, less than 0.5 cm thick, each separated by unweathered loess. The entire paleosol is nearly 15 cm thick. Paleosol 2 overlies Paleosol 1. This paleosol is continuous and consists of 1 to 3 continuous organic stringers. The stringers are slightly thicker (1.0 cm) than Paleosol 1, and where they merge, they form a horizon about 5.0 cm thick. A 20-cm band of weakly weathered loess separates Paleosol 2 from Paleosol 3. Paleosol 3 is in reality a pedocomplex with as many as 8 different organic stringers. The lowest stringer tends to be the thickest (3.0 cm), while the upper stringers are slightly thinner (1.0 cm). Gleying, while present in the lower paleosols, is particularly evident in Paleosol 3. This paleosol has also been deformed by tectonic processes, as indicated by small faults. Cryogenic processes are evident in slumping and flowage seen in the deposit. A weakly weathered, sandy loess caps this paleosol. Finally, two paired paleosols (Paleosols 4a and 4b) overlie the sandy loess. These paleosols, which are separated by a sandy loess and capped by another sandy loess, are significantly different from the underlying paleosols in that they are oxidized and at the bluff edge show no evidence of gleying.

Radiocarbon dates from the Dry Creek site are not always internally consistent (Figure 54). For example, there is a single date from Loess 2 ($11,120 \pm 85$ B.P.) from Nenana Complex hearth charcoal. This is consistent from other archeological sites in the Nenana Valley (Powers and Hoffecker 1989). A single date was also obtained from Paleosol 1 ($10,690 \pm 250$ B.P.). Unfortunately, due to the limits of conventional dating, a bulk sample was used; thus the date obtained provides only a broad estimation of the age of the paleosol and of the Denali Complex. A suite of four dates was processed from Paleosol 2, and here, too, there

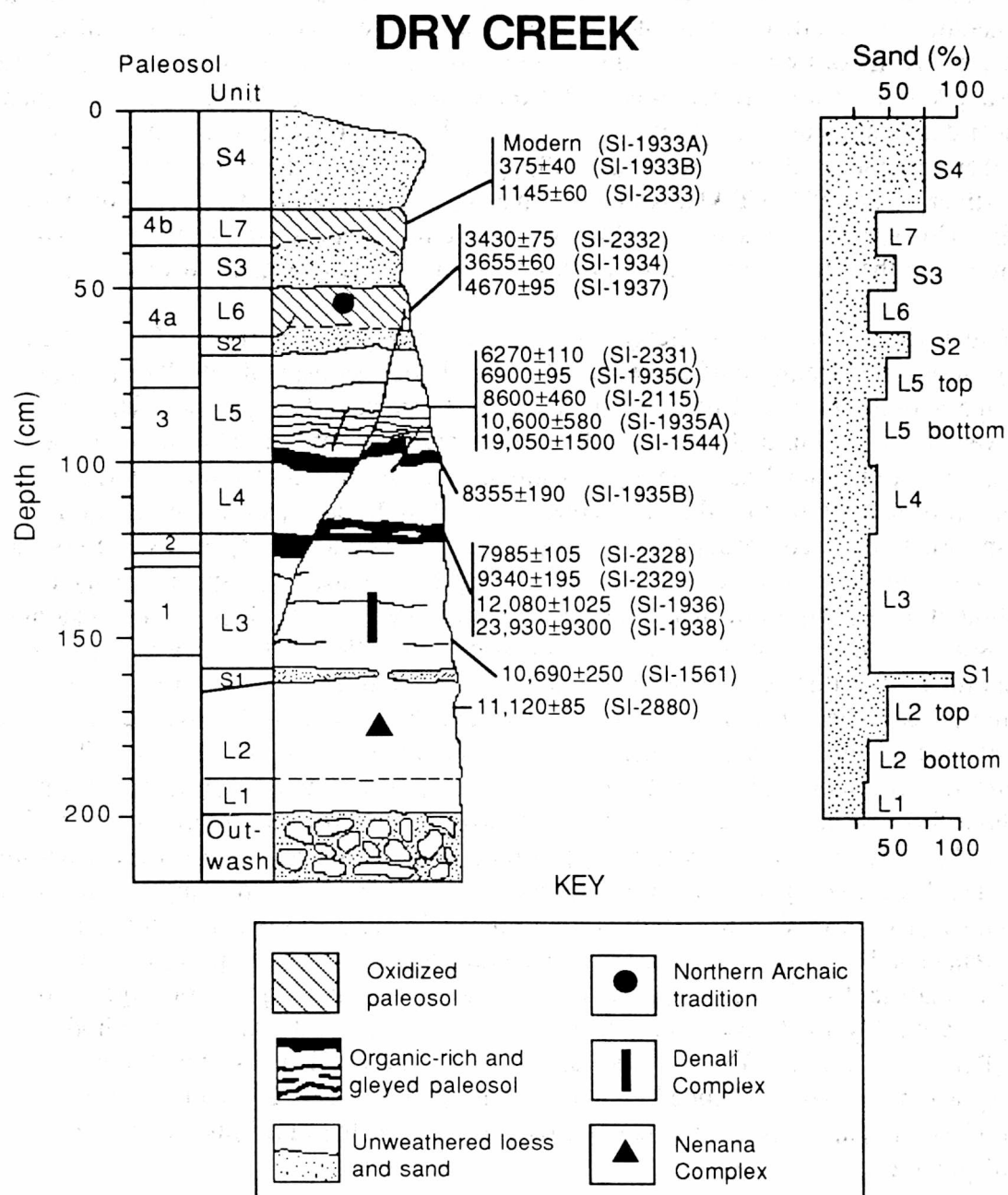


Figure 54. Stratigraphic profile at Dry Creek site (HEA-005).

is a large range of variation. The oldest dates suffer from problems of small sample size and the possibility of contamination by inert carbon (Thorson and Hamilton 1977). The same problem appears to apply to Paleosol 3. If the oldest dates with the largest standard deviations can be ignored, then Paleosol 2 is dated between about 9300 and 8000 B.P., and Paleosol 3 is dated between 8600 and 6300 B.P. Paleosol 4a has a suite of three dates ranging between 3400 and 4700 B.P., and Paleosol 4b has a suite of three dates ranging between 1100 B.P. and the present.

The changing morphology of the paleosols provides some evidence of past climates (Thorson and Hamilton 1977; Bigelow 1991). The lowest three paleosols are organic bands with some evidence of gleying. The thinness of some of the organic bands suggests short periods of stabilization before renewed loess deposition. This indicates that the surface was stable for shorter periods of time during Paleosol 1 times than during Paleosol 3 times. In addition, the gleying indicates periodic saturation where oxygen was depleted from the soil. In sum, Paleosols 1, 2, and 3 indicate relatively short periods of surface stability interrupted by renewed loess accumulation. The increased gleying in Paleosol 3 indicates water was ponded near or at the surface. The deformation of Paleosol 3 suggests some flowage, possibly when the sediments were saturated. Paleosols 4a and 4b, with their oxidation and near absence of gleying, suggest improved drainage and longer periods of surface stability.

The changes in particle size may also reflect climatic change (Bigelow, Biget and Powers 1990; Bigelow 1991). The sandy units (Sands 1, 2, 3, and 4) may reflect increased windiness. However, changes in sediment source (Waythomas and Kaufman 1991) may account for some of the variability in texture; thus additional research is needed before local topographic controls can be separated from regional climatic controls. If sediment texture can be used as a proxy climatic record, then Sand 1 may correlate with the Younger Dryas cold event, 11,000 to 10,000 B.P (Bigelow, Biget, and Powers 1990), Sands 2 or 3 with Neoglacial cooling 5000 to 3000 B.P., and Sands 4 with the Little Ice Age, 600-100 years B.P. (Bigelow 1991).

Study Areas

In two summers (1988 and 1989), reconnaissance-level archeological survey was conducted along portions of the Swift Fork and Teklanika rivers (Figure 2). Three archeological sites were found in the vicinity of the Swift Fork, and several sites were located on the Teklanika River and its tributaries.

Swift Fork Study Area. The archeological survey in this area was conducted only on the McKinley Park I and II moraines where the Swift Fork cross-cuts them (Figures 7 and 8). These moraines date from the Late Wisconsinian (25,000 to 17,000 B.P. and 15,000 to 13,500 B.P. respectively), and are unmodified compared with the Early Wisconsinian drift. Both sets of moraines have well-developed moraine ridges and numerous kettle ponds (Ten

Brink and Waythomas 1985). At this locality, the McKinley Park II moraines were identified only on aerial photographs; and the moraine boundaries are at this point, speculative (Waythomas and Ten Brink 1982).

The vegetation on the moraines is dominated by shrub birch and a few scattered spruce trees less than 3 m tall. Larger trees are present in protected areas below the moraine crests. In one locality, a balsam poplar clone of about 20 trees was found in a protected valley. Willow shrubs are also present along the shores of the kettle ponds. A few beaver were present in some of the ponds; they used the small (around 3 cm in diameter) willows for their lodges and dams in lieu of larger plants.

On the south side of the Swift Fork, subsurface test pits were excavated at three different locations.

The first location is on a promontory of the McKinley Park I moraine above the Swift Fork. Shrub birch is the dominant vegetation of the promontory, with scattered spruce, willow, and alder shrubs on the protected side away from the mountains. The high knoll was chosen because of its elevated location above the surrounding terrain with good visibility in all directions, making it a likely place for an archeological site. After a brief surface survey, two excavations were dug into the surface (Figure 8: test pits 1 and 2). No artifacts were encountered in either test pit. The subsurface tests revealed a 25-to-30-cm-thick silt cap mantling fine eolian sand. The sand is horizontally bedded with 1-cm-thick laminae of coarse sand. A lag of medium sand and granules caps the fine sand. This deposit is clearly a relict sand dune that probably forms the entire knoll.

The second location is also situated on McKinley Park I moraine. At this site (Figure 8: test pit 3), nearly 20 cm of loess caps the gravel. About 10 cm of mixed granules and silt separate the loess from the gravel. A buried soil consisting of an Ab horizon is preserved about 15 cm below the surface. The modern soil includes a weakly developed elluvial horizon. the surface vegetation consists of shrub birch, lichen, labrador tea, and mosses.

Finally, a brief reconnaissance was conducted near the boundary between the McKinley Park I moraine and the outwash deposits (Figure 8: test pits 4 and 5). Ice was encountered between 20 and 30 cm below the surface. A thick, mossy root mat and an A horizon extend to the surface of the ice.

A single test pit was excavated at archeological site MMK-104 on the north side of Swift Fork, on the McKinley Park II moraine (Figure 8: test pit 6). On this side of the river, much of the McKinley Park II moraine is mantled with eolian sand, and blowouts are common. The test pit is located near the edge of a blowout (Figures 11 and 12). Medium and coarse sand extend 20 to 30 cm below the surface, below which lies a 10-cm-thick silty deposit. A paleosol is preserved within this silt. Coarse and medium sand extend an additional 40 cm below the surface. The paleosol is relatively complex with buried O, A, and B horizons. The paleosol is formed on silt that at one time covered the eolian sand.

The modern soil is formed on sand and consists of O and A horizons. No B horizon was encountered.

An additional stratigraphic profile was drawn at an exposure cut by the Swift Fork several km downstream from the study area (Figure 8: area C). At this locality, nearly 3 m of loess mantles alluvial gravel. No well-defined paleosols were noted at this exposure, although a 15-cm-thick band of blocky, oxidized loess is present about 80 cm above the gravel. Such blocky structure is often the result of pedogenic activity and may represent a paleosol, but no buried O horizon was associated with it.

Teklanika Study Area (Healy-Stampede Unit). Research in the Teklanika drainage was conducted in the summer of 1989. Subsurface testing and stratigraphic analysis were conducted at several locations along the Teklanika River and on a tributary of the Savage River.

A series of subsurface shovel probes were conducted along the Teklanika Gorge from Sec. 5, R10W, T11S, Fairbanks Meridian to Sec. 15, R10W, T11S, Fairbanks Meridian (Figure 29). In this area, the Teklanika River has cut a narrow gorge through schistose bedrock, possibly the Totatlanika Schist (Csejtey and others 1992). In the lower end of the gorge, the bedrock walls widen so that the river flows in a deeply incised channel cut some 35 to 45 m into the gently sloping and terraced bedrock surface. The terrace surface is vegetated with 2-to-3-m-tall spruce, shrub birch, mosses, and equisetum (horsetail) on the poorly drained locations, and stunted aspen, balsam poplar, and alder on the better-drained locations. The archeological survey was concentrated on the terrace surface on both sides of the Teklanika River. All the subsurface probes revealed a mantle of eolian or fine-grained colluvial sediments of silt or fine sand covering schistose bedrock. Areas with silty sediments tended to be poorly drained with evidence of gleying, while those that were sandy tended to be better drained with oxidized horizons. None of these shovel probes uncovered any paleosols.

A group of soil test pits were excavated in the immediate vicinity of HEA-260 (Figures 29 and 37). This site is in the Teklanika Gorge on an eroded bedrock knob on the east side of the river. The four test pits were excavated into the sediments around the bedrock knob. A small sand dune, the crest of which is about 2 to 3 m above the surrounding area, is present about 30 m northeast of the site. Soil Test Pit 1 was excavated into the crest of the dune. About 15 cm of loam caps a medium-to-coarse sand that forms the core of the dune. No paleosols were encountered.

The second test pit was excavated closer to the bedrock knob near the edge of a blowout formed on the northern side of the sand dune (Figure 39: soil test pit 2). The top 35 cm of soil consists of sandy loam, below which lie medium and coarse sands. A paleosol was discovered about 40 cm below the surface. The paleosol is about 5 cm thick and consists of buried O (or A) and Bw horizons formed on loam or silt loam. Five abandoned rodent burrows 5 to 8 cm in diameter were also noted in this test pit. The tops of four of the

burrows lie within the paleosol, while the fifth is only slightly below it. Below the paleosol to the limit of excavation (about 140 cm below the surface), the sediments consist of massive medium to coarse sand, with occasional granules.

The third test pit was excavated approximately 16 m north-northwest of the archeological site (Figure 37: test pit 3). This test pit location was chosen because it is in the lee of the bedrock knob, sheltered from current summertime winds that blow through the Teklanika Gorge out of the south. Protection by the outcrop may have provided a comfortable spot for prehistoric hunters. The test pit was located near the crest of a vegetated sand dune. The top 15 cm of the test pit consists of the modern soil composed of silt loam and a paleosol slightly below it. The top of the paleosol is situated only 12 to 15 cm below the surface and has been affected by the modern soil. The modern soil consists of O, A, and Bw horizons. The Bw horizon has been superimposed on the buried A horizon of the paleosol. The paleosol consists of buried A, E, and Bw horizons. Medium sand underlies the paleosol and extends to the limit of the excavation, about 150 cm below the surface, where ice was encountered. No artifacts were encountered in or around Test Pit 3, although the area was thoroughly scrutinized.

At the archeological site itself, the sediment stratigraphy is uncomplicated (Figure 38: archeological test pit). As noted above, HEA-260 is situated on top of an eroded bedrock knob about 4 m above the surrounding terrain. The surface of the bedrock is vegetated with small aspen less than 1 m tall, shrub birch, labrador tea, and various berry bushes. About 80 cm of eolian loam with fine sand mantles the bedrock. No paleosols were encountered in the archeological test pit. The modern soil is poorly developed with only an O and slightly oxidized C horizons. Artifacts were encountered below the modern soil in the unweathered sediments.

Stratigraphic descriptions were also conducted in the vicinity of HEA-264 and HEA-265 (Figures 30 and 47). These archeological sites are located on Ewe Creek, a tributary of Savage River. Ewe Creek is situated south of the Teklanika Gorge near the location where the Savage River exits the Alaska Range. The sites lie on the south-facing side of Ewe Creek, on an alluvial gravel terrace, probably deposited during the Mt. McKinley II glaciation (Wahrhaftig 1970; Ten Brink and Waythomas 1983). Numerous artifacts were encountered that had been eroded out of the eolian sediments mantling the gravel. Unfortunately, no artifacts were found *in situ* within the eolian sediments.

At HEA-265, the eolian sediments were described at an erosional face approximately 10 m from the edge of the terrace (Figure 51). At this location, the surface of the sediments is slightly eroded, and the modern rootmat is missing. The top 35 cm of the eolian sediments is a massive cliffhead sand composed of medium- to-fine sand with granules. A paleosol complex, about 20 cm thick and consisting of three organically enriched horizons, is near the bottom of the cliffhead sand. The complex is referred to here as Paleosol 1, although this may oversimplify the situation, as two paleosols may be collapsed on top of each other. A thin, 5-cm-thick sandy loam and an additional paleosol (Paleosol 2) lie immediately

beneath the cliffhead sand. This paleosol consists of a buried O horizon with abundant charcoal. The bottom 20 to 30 cm of exposure is dominated by unweathered (Cu) to weakly weathered (Cox) loam and sandy loam with occasional lenses of silt loam.

A brief sediment description was also conducted at HEA-264, approximately 350 m down the terrace (northeast) from HEA-265. At this locality, the massive cliffhead sand is about 16 cm thick and unweathered. Unlike the situation at HEA-265, no paleosol was encountered in the bottom of the cliffhead sand at HEA-264. Below this unit, a thin, 2-cm-thick grayish paleosol with charcoal fragments was encountered. This paleosol probably correlates with Paleosol 2 at HEA-265. Weakly weathered loam extends below this paleosol to the limit of excavation, about 60 cm below the surface.

Discussion and Conclusions

The stratigraphic descriptions from the Teklanika and Swift Fork study areas provide some useful insights into past climates in interior Alaska.

Eolian deposition. Both of the study areas have significant eolian deposition. In the Swift Fork area, eolian sediments were deposited on the McKinley I and II moraines. Extensive sandsheets and dunes from the late Wisconsin are well known elsewhere in Alaska (Carter 1983; Collins 1985; Carter and Galloway 1984; Fernald 1965). Without radiocarbon dates, it is impossible to state for sure when the sand sheets and dunes were stabilized in the Swift Fork area. However, documentation on sand deposits in the eastern part of Alaska indicate that some of the deposits were stabilized as late as the early Holocene (Fernald 1965). A sand sheet is also probably present in the Teklanika Gorge, in the vicinity of HEA-260. Again, without radiocarbon dates it is difficult to date the deposit precisely, but it probably correlates with the late Wisconsinan and early Holocene sandy deposits noted above.

Another eolian deposit that is common to both the Swift Fork and Teklanika study areas is loess. Loess was noted in nearly every subsurface test pit, where it either lies directly on the bedrock, or it lies on a sandy deposit (a sand sheet or dune) that mantles the bedrock. Radiocarbon dates from the Nenana Valley indicate that the loess there is Holocene in age. Stratigraphic relationships in the Swift Fork and Teklanika study areas suggest that the loess deposits in these locations are also Holocene in age.

Paleosol formation. Paleosols were documented in both the Swift Fork and Teklanika study areas. In the Swift Fork area, one paleosol was associated with a sandy deposit (in Test Pit 6), and the other was associated with loess (in Test Pit 3). In the Teklanika area, one paleosol was documented with the sandy deposit surrounding HEA-260; and at Ewe Creek (HEA-264, HEA-265), one or two paleosols were documented in the loess deposits there. With respect to the sandy deposits (sand sheets or sand dunes), it is always tempting to interpret the paleosols as evidence of stabilization, indicating some sort of

regional climatic signal. The difficulty, however, is that only one test pit was excavated at each blowout, so the paleosols may merely indicate movement of the blowout boundaries.

Blowouts occur where vegetation growing on a sandy substrate has been disturbed (Carter, Hesp, and Nordstrom 1990). Blowout developments appear to follow a recognizable sequence, where they begin as relatively small features, expand to a maximum size, and then are slowly revegetated (Jungerius, Verhaggen, and Wiggers 1981). The buried soils encountered at the edges of active blowouts may record a period of surface stability before the development of the blowout, or they may record a time when the blowout was smaller.

Interestingly, however, the paleosols found within the blowouts described above are formed on sediments significantly finer than the surrounding sandy sediments. This may indicate reduced eolian deposition, possibly the result of reduced windiness, although changes in source area cannot be ruled out.

The loess stratigraphy at the Ewe Creek archeological sites is of particular interest. The location of these sites (on the south-facing bank of a tributary to a trunk river) is very similar to the location of the archeological sites in the Nenana Valley. While the Nenana Valley sites are nearly always located on early Wisconsinan outwash terraces, the Ewe Creek sites are located on a late Wisconsinan alluvial deposit. The stratigraphy at HEA-265 has some similarities with the Dry Creek stratigraphy. Both locales are capped by a cliffhead sand, and both have organic-rich paleosols. HEA-265, however, does not have the oxidized paleosols seen at Dry Creek. In the absence of radiocarbon dates, it is difficult to correlate the Ewe Creek paleosols with Dry Creek. However, it is quite probable that Paleosol 2 at Ewe Creek correlates with Paleosol 3 at Dry Creek for the following reasons:

1. Given that the eolian deposits at Ewe Creek are only about 80 cm thick (as compared with nearly 200 cm at Dry Creek), the correspondingly thinner, 35 to 40 cm depth of Paleosol 2 at Ewe Creek agrees well with the 100 cm depth of Paleosol 3 at Dry Creek.
2. Paleosol 3 at Dry Creek is well developed and continuous. This paleosol has been recognized in other archeological sites in the Nenana Valley (Walker Road) and Teklanika Valley (Owl Ridge). Therefore, the likelihood of its preservation at the nearby Ewe Creek sites is quite high.
3. Paleosol 2 at Ewe Creek, with its increased organics and abrupt contacts makes it morphologically similar to Paleosol 3 at Dry Creek.

It must be noted, however, that this correlation is purely speculative, and only a reliable suite of radiocarbon dates will permit an accurate reconstruction.

Paleoenvironmental reconstruction. Based on the survey conducted in the Swift Fork and Teklanika study areas, the following reconstruction is suggested.

1. Late Wisconsinian drift was deposited in the Swift Fork study area. At the same time, alluvial gravel was deposited at Ewe Creek.
2. Eolian sand was deposited or reworked on the Swift Fork moraines and on the scoured schistose bedrock in the Teklanika Valley. The wide distribution of sand sheets and sand dunes in interior Alaska, coupled with the dominance of xeric flora in pollen cores suggests that this period (the terminal Pleistocene) was very cold and dry.
3. Loess was deposited either directly on gravel/bedrock or on the eolian sand in both study areas. All the loess in the Nenana Valley is Holocene in age; the same probably holds true for the Teklanika and Swift Fork study areas. The change from sand deposition to silt deposition reflects either a reduction in windiness or a reduction in the amount of sediment available for transport. Both factors were probably in effect. Once the glaciers had retreated to their current positions, the glacier-fed streams carried less sediment past the study areas; thus less material was available for transport. Furthermore, the retreat of the glaciers would also have resulted in less windiness because down-valley katabatic winds at the study areas would have been significantly weakened.
4. Episodic soil formation occurred, reflecting either stabilization of the sand or loess deposits or, in the case of the sand deposits, the migration of blowouts. If the correlation of Paleosol 2 at Ewe Creek with Paleosol 3 at Dry Creek is correct, then a regionwide event of soil formation occurred between 8600 and 6000 B.P., probably affecting most of interior Alaska.



As the nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural and cultural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to assure that their development is in the best interests of all. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration. The National Park Service, Alaska System Support Office provided publication services. NPS document: NPS/ARRCR/CRR-95/24.

JULY 1996
