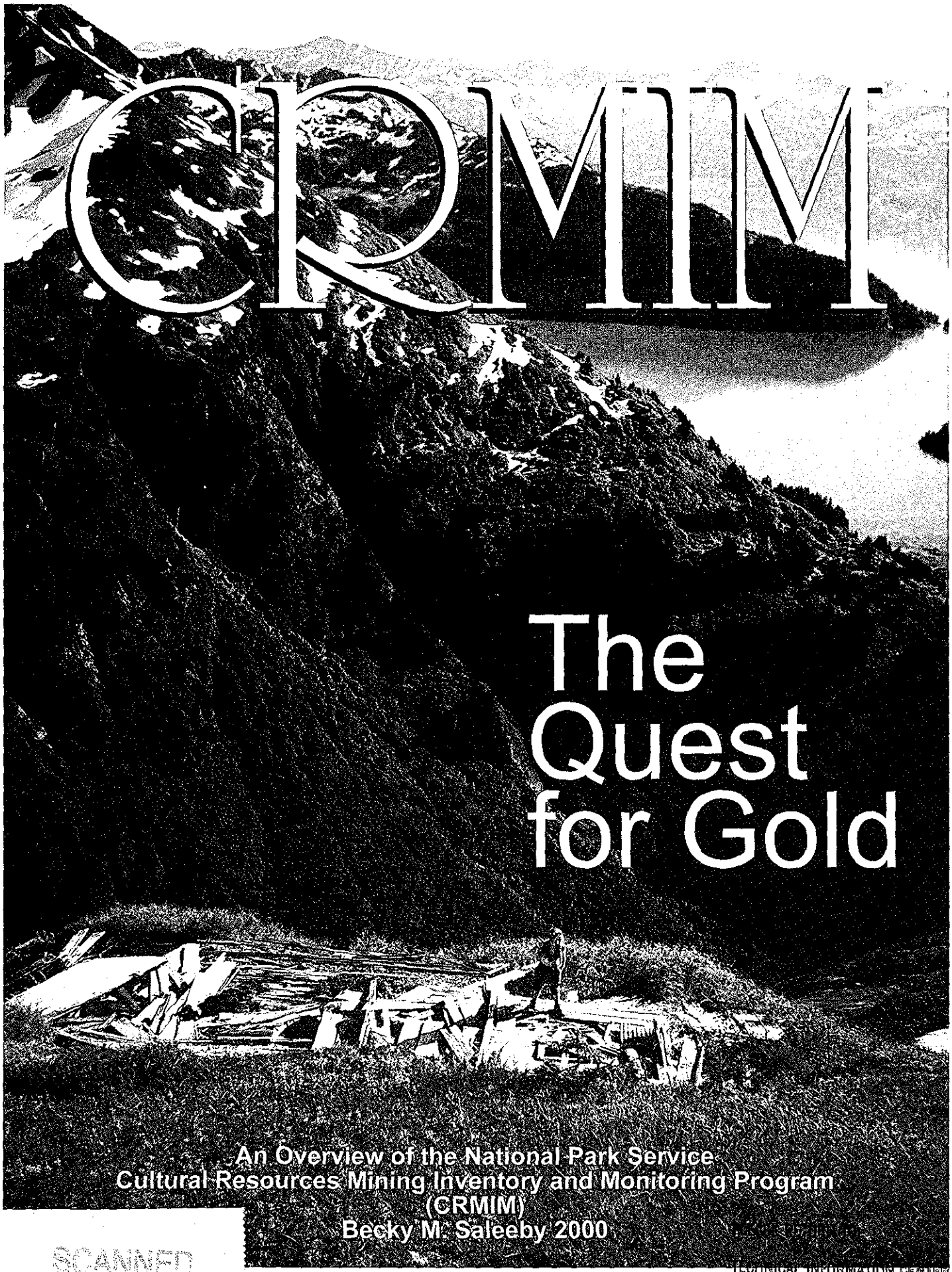
953/D-129



CRMIM

The Quest for Gold

An Overview of the National Park Service Cultural Resources Mining Inventory and Monitoring Program (CRMIM)

Becky M. Saleeby 2000

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Front cover: Bunkhouse ruins at the Nukalaska Mine, SEL-235, in Nuka Bay, Kenai Fjords National Park and Preserve, Alaska. *(Photograph and cover design by Frank Broderick)*

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IN REPLY REFER TO:
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Dear Colleague:

We are pleased to enclose a copy of *The Quest for Gold: An Overview of the National Park Service Cultural Resources Mining Inventory and Monitoring Program* by Becky Saleeby. This publication reports on the archeological results of ten years of cultural resource inventory conducted within nine of Alaska's national parks and preserves. The inventory and subsequent monitoring was conducted as part of Section 106 decision-making related to the National Park Service's assessment, review, and permitting of active mining claims located within park borders. Throughout the decade-long project, the National Park Service remained committed to the very highest standards of field survey and carried out the work within the rigorous framework of an overall, comprehensive program of investigation. Over its duration, the inventory program drew upon the talents of forty different archeologists, historians, historical architects, and volunteers.

The Quest for Gold is a work of historical archeology, not history. Mining history in the parks has been addressed separately in such publications as William R. Hunt's *Golden Places: The History of Alaska-Yukon Mining*(1990) and in several park-specific Historic Resource Studies. In *The Quest for Gold,* the author looks at mining from the vantage point of an archeologist and anthropologist. She describes and gives meaning to the patterns revealed in the distribution of sites and artifacts by comparing and contrasting the findings between each of the major mining districts. Becky Saleeby is also the first scholar to give serious attention to the important role played by Alaska Natives in the early mining industry. For the author, creating this book has been a labor of love and we believe her devotion is clearly evident in the quality of her writing and thinking.

The Quest for Gold was intended to be a work of scholarship and reference, rather than a popular work accessible to all. For those seeking more popular summaries of mining in Alaska's parks, we would urge them to turn to *Gold in Alaska: A Century of Mining History in Alaska's National Parks* (1997) and *Alaska Goldrush National Historic Landmarks: The Stampede North* (1998), both National Park Service publications.

No book is the product of a single person and that is certainly true here as well. The many useful maps were designed and drafted by Judy Kesler and the tedious, but critical, job of technical editor was ably accomplished by Thetus Smith. Also deserving of mention here are Gene Griffin, Leslie Starr Hart, Ken Schoenberg, and Bob Spude; all of whom played important roles in the design and execution of the field inventory that eventually led to the writing of *The Quest for Gold.*

If you have any questions about this book or require additional information, please contact Becky Saleeby, Archeologist, Alaska Support Office, National Park Service, at (907) 257-2443 or via e:Mail (becky_saleeby@nps.gov).

Sincerely,

Ted Birkedal
Team Manager, Cultural Resources Team

Enclosure

953/D-129

THE QUEST FOR GOLD

AN OVERVIEW OF THE NATIONAL PARK SERVICE CULTURAL RESOURCES MINING INVENTORY AND MONITORING PROGRAM (CRMIM)

By
Becky M. Saleeby

National Park Service - Alaska Region
Research/Resource Management Report ARRCR/CRR-2000/37

U.S. Department of the Interior
National Park Service
2525 Gambell Street
Anchorage, Alaska 99503

2000

ACKNOWLEDGMENTS

This report is the result of 10 years of Cultural Resources Mining Inventory and Monitoring (CRMIM) fieldwork carried out by 40 people - archeologists, historians, architects, and even some volunteers. The hours they spent hiking, surveying, measuring, and describing is but a fraction of the time that many of them spent back in the lab, writing the site reports and drafting site and feature maps that constitute the basic data for this overview. I would like to acknowledge them and thank them for all their efforts. The following people served on the CRMIM crews: the late Bernard (Ben) Bensen, Nancy Bigelow, Richard Bland, Frank Broderick, Rolfe Buzzell, Doug Carr, John Christopher, Richard Chesmore, Margie Connolly, Jim Creech, Mike Elder, Carey Feierabend, Jim Firor, Cassie Flynn, Gene Griffin, Leonard Hansen, Fred Harden, Roger Harritt, Logan Hovis, Wayne Howell, Bill Johnson, Ann Kain, A.J. Lynch, M. B. Lynch, Martha McCollough, Karen Miller, Martha Olympic, Mike Ostrogorsky, Tim Sczawinski, Kaerin Stephens, Karen Sturnick, Theresa Thibault, Ann Thornton, Sue Thorson, Beth Turcy, Dale Vinson, Rudy Walser, Keith Williams, and Anne Worthington. Ben Bensen, a CRMIM crewmember and a friend, died in a tragic mountaineering accident the winter after his work on the project. His fine abilities as an archeologist and a cartographer are missed.

Several of the people mentioned above deserve special recognition for the extra time and talent that they devoted to their jobs. A. J. Lynch served as a CRMIM crew leader and the reigning expert on Denali National Park and Preserve archeology from 1986 until her retirement in 1994. Her incredible memory for site details and love for her work inspired all of us around her. Logan Hovis, who also began working on the CRMIM program in 1986, now serves as an NPS mining historian. Logan's knowledge of the technical intricacies of mining equipment and procedures is unsurpassed. I am grateful that he has been so generous with this knowledge. I would like to thank him for all the detailed explanations he has given to my questions, all the historic documents he has loaned me over the years, and for his thoughtful comments on an earlier version of this overview.

Longevity awards should also be given to Jim Creech and Frank Broderick for their many years of work on the project. Examples of their superb feature maps can be seen in the placer and lode mining chapters of the report. Frank also produced the cover and all the fine illustrations found throughout the report. Thank you, Frank, for serving as the general "artistic director" of this project! Also to be specially recognized are mining historians Rolfe Buzzell, Ann Kain, and again Logan Hovis. Without their well-researched drainage and site histories, this report could not have been written.

It was necessary to create several different computer databases to organize and sort the wealth of information recorded on the CRMIM site forms. I was helped in the time-consuming and tedious task of data entry by John Christopher, Cassie Flynn, Megan Partlow, and Theresa Thibault. James LaCas helped with the bibliography. Roger Harritt greatly assisted me in the preparation of the chapter on prehistoric sites. Laura Shelton of Resource Data Inc. made the first draft of all the Arc-View maps, while Judy Kesler spent many hours at work and at home in fine-tuning them into the high quality product that appears in this overview. Assistance in gathering the historic photographs published in the report was given by Diane Brenner, Wayne Howell, John Branson, Ann Kain, Logan

Hovis, and Cyd Martin. Greg Dixon assisted greatly in the time-consuming task of indexing. Thank you all very much.

Thanks also to Team Manager for Cultural Resources, Ted Birkedal, and to Gary Somers, formerly the Senior Archeologist, for their years of patience and support in this long-term writing project. I would like to acknowledge Ken Schoenberg, the original archeological supervisor for the CRMIM program, and Gene Griffin, who headed up the CRMIM field operations until 1992. My final thanks go to Thetus Smith, who went over each page of this report with her sharp editorial eye and her hot-pink pen.

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Page 339. The Sheriff Mine (XMC-106) in the Bremner area of WRST: Tram station with attached shed and powerhouse (top); exterior (middle) and interior (left) views of the bunkhouse, known as the Cliff House at XMC-106.

Page 343. Homemade wheelbarrow found at XMC-111 at the headwaters of Golconda Creek in the Bremner area of WRST.

Page 353. Skipway and ore bin at the Rambler Mine (NAB-072).

Page 363. Nukalaska mill equipment (SEL-177), including ball mill, classifier, and flotation unit, on Shelter Cover in Beauty Bay, KEFJ.

Page 367. Wooden track and mine car dating to the early period of mining at SEL-212 on Ferrum Creek in KEFJ. An old ore crusher lies just below the mine car.

Page 381. Cabin at abandoned town of Diamond (MMK-001) on the Bearpaw River in DENA. A.J. Lynch records this structure, which probably served as a roadhouse and later as the Diamond post office.

Page 384. The Fannie Quigley house (MMK-020) near Moose and Friday creeks in DENA. Karen Sturnick records this structure, which was occupied by Fannie in her final years.

Page 387. Fish camp on Moose Creek (MMK-011) in DENA. The view into the main room is on the left, and the exterior room is on the right.

Page 393. A T-shaped log cabin, supposedly used as a bordello, and a shed at the abandoned town of Bonanza City (NAB-009) near Bonanza and Chathenda creeks in WRST.

Page 393. The interior of cabin at NAB-045, the Wilson Creek sawmill, shows a saw blade, stove, and crates.

Page 395. Hauling freight on the McCarthy Creek Road. The road led from the town of McCarthy up to the Green Butte and Mother Lode Copper Mines. *(Wrangell-St. Elias National Park and Preserve Research Library)*

Page 396. Tent frame and artifacts at XMC-102, adjacent to the McCarthy Road. This transportation site dates to 1925 or earlier.

Page 398. Tools and maintenance equipment inside the shed at XMC-110 on the McCarthy-May Creek Road. The maintenance shed was used by the Alaska Road Commission in the 1920s and 1930s.

Page 405. Ben Creek airstrip (CHR-100): Dennis Layman stands on an International bulldozer used to pull a large sledge (go-devil) with mining equipment up the Coal Creek valley in the spring during the 1940s and 1950s (above left); this wannigan served as a shelter on the go-devil when brining supplies up to the airstrip on the ridge (above right).

Page 422. Lanceolate point found at MMK-110 on Wonder Lake in DENA.

Section I
The Program

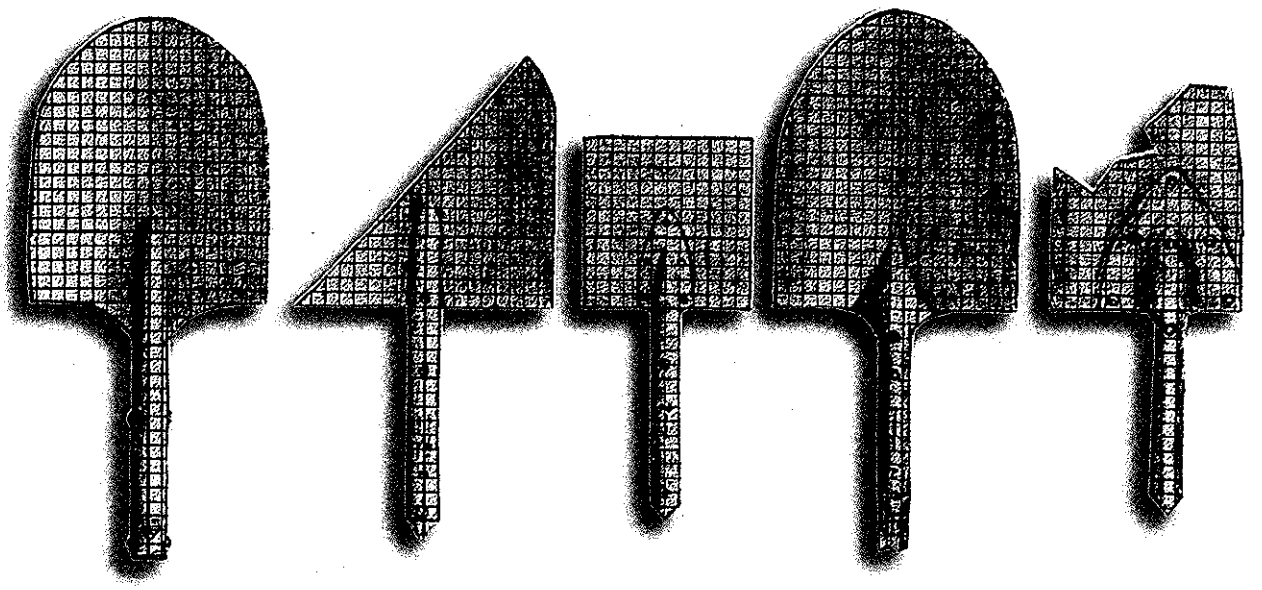


Illustration by Tim Sczawinski

CHAPTER 1

CULTURAL RESOURCES MINING INVENTORY AND MONITORING PROGRAM: BACKGROUND, ORGANIZATION, AND RESULTS

The quest for gold first attracted prospectors and would-be miners to Alaska in the late 1870s. By the winter of 1897-98 discoveries in the Klondike set off a series of dramatic rushes to the gold fields of the Yukon and Alaska territories. The initial rushes brought tens of thousands of people to the north. In Alaska, the non-Native population increased from around 4,000 in 1890 to well over 30,000 in 1900 (Mendenhall and Schrader 1903: 9). Rush followed upon rush as prospectors and mining parties spread across the North. Others followed at the first hint of riches: Nome in 1900, Fairbanks in 1902, Kantishna in 1905, Koyukuk in 1910, and Chisana in 1913, to name a few. Some of the stampeders stayed in a new district long enough to test the ground and leave. Others put in their sluices, built cabins and settled into their mines until they made their stake, went broke or rushed off to the next discovery. A few with greater financial resources began to put mining on a business footing and installed hydraulic plants and dredges. At the same time, hard rock mining for gold and other metals, especially copper, enticed miners and investors alike. In the century since the Klondike rush first captured the imagination of the world, the stampeders and the generations of miners that followed have left the imprint of their lives on the land. Abandoned mines, camps, and lonely cabins, frequently near or overlooking more recent workings, bear witness to the past and tell the story to those who will listen.

Since 1986, when the Cultural Resources Mining Inventory and Monitoring (CRMIM) Program was established, more than 44,000 acres of land in nine National Park Service (NPS) units in Alaska have been surveyed to find and document these mines and camps. During a decade of CRMIM fieldwork, survey crews succeeded in recording 345 sites, located on valid and abandoned mining claims and property adjacent to them, in the following parks and preserves: Denali National Park and Preserve, Wrangell-St. Elias National Park and Preserve, Yukon-Charley Rivers National Preserve, Gates of the Arctic National Park and Preserve, Kenai Fjords National Park, Bering Land Bridge National Preserve, Katmai National Park and Preserve, Lake Clark National Park and Preserve, and Glacier Bay National Park and Preserve (figure 1). For simplicity, the National Park Service (NPS) units will hereafter only be referred to by their acronyms, as they appear in table 1.

This report is a compendium and overview of the rich data that was gathered during 10 years of CRMIM survey. The main objective here is to distill the information contained in voluminous survey and site reports into one accessible report. By its very nature, the overview will not provide all the information that some readers would like to see, or all the information available about any one site. The NPS hopes, however, that the report will be useful in providing baseline data for park managers and as a springboard to guide further research, particularly on the historic mining sites.

Table 1
National Park Service (NPS) Acronyms

Park Unit	Acronym
Denali National Park and Preserve	DENA
Wrangell-St. Elias National Park and Preserve	WRST
Yukon-Charley Rivers National Preserve	YUCH
Gates of the Arctic National Park and Preserve	GAAR
Bering Land Bridge National Preserve	BELA
Kenai Fjords National Park	KEFJ
Katmai National Park and Preserve	KATM
Lake Clark National Park and Preserve	LACL
Glacier Bay National Park and Preserve	GLBA
Alaska Support Office	AKSO
Alaska Regional Office	ARO

Overview of Mining Laws

When prospectors flocked to Alaska during the gold rush days of the early 1900s, the law permitted them to stake placer and lode claims on public lands where they made mineral discoveries. Over the years, a complex history of claim ownership has evolved. Claims have been abandoned, relocated, sold, traded, divided, or held, and new claims have been surveyed and staked. Approximately 5,000 mineral claims came under the jurisdiction of the National Park Service in 1980 with the passage of the Alaska National Interest Lands Conservation Act (ANILCA) (NPS 1989:1). The act authorized the addition of 10 new park units to the three parks and two national historical parks already in the state. This overview of mining laws provides a frame of reference for understanding why the CRMIM program was initiated and how it operated to identify and protect sites within the park boundaries. A list of the acronyms used here and in subsequent discussions is in table 2 below.

The most important piece of legislation regarding mining is known simply as the General Mining Act of July 26, 1872 (30 USC 21 et seq.) and referred to as the General Mining Law or the Mining Law of 1872. Despite the fact that it is more than a century old and has been revised and updated by amendments, the basic precepts have remained the same. This law gives prospectors the right to explore for valuable minerals on public lands and stake claim to the land where a discovery is made. The following discussion of mining laws is limited to statutes that pertain to minerals considered to be locatable, such as gold, silver, and copper, and not to those that apply to leasable minerals, such as coal and oil, or salable minerals, such as sand and gravel.

The General Mining Law distinguishes between lode and placer claims and specifies the size for each. A lode claim covers about 20 acres and cannot exceed 1,500 feet by 600 feet along the length and width of a vein. Individual placer claims also cover 20 acres, while association claims at one time could be as large as 160 acres. In Alaska, the territorial legislature finally repealed the 160-acre placer regulation in 1939 and restricted all claims to a maximum of 40 acres (Hunt 1990: 170-171). Another category included under

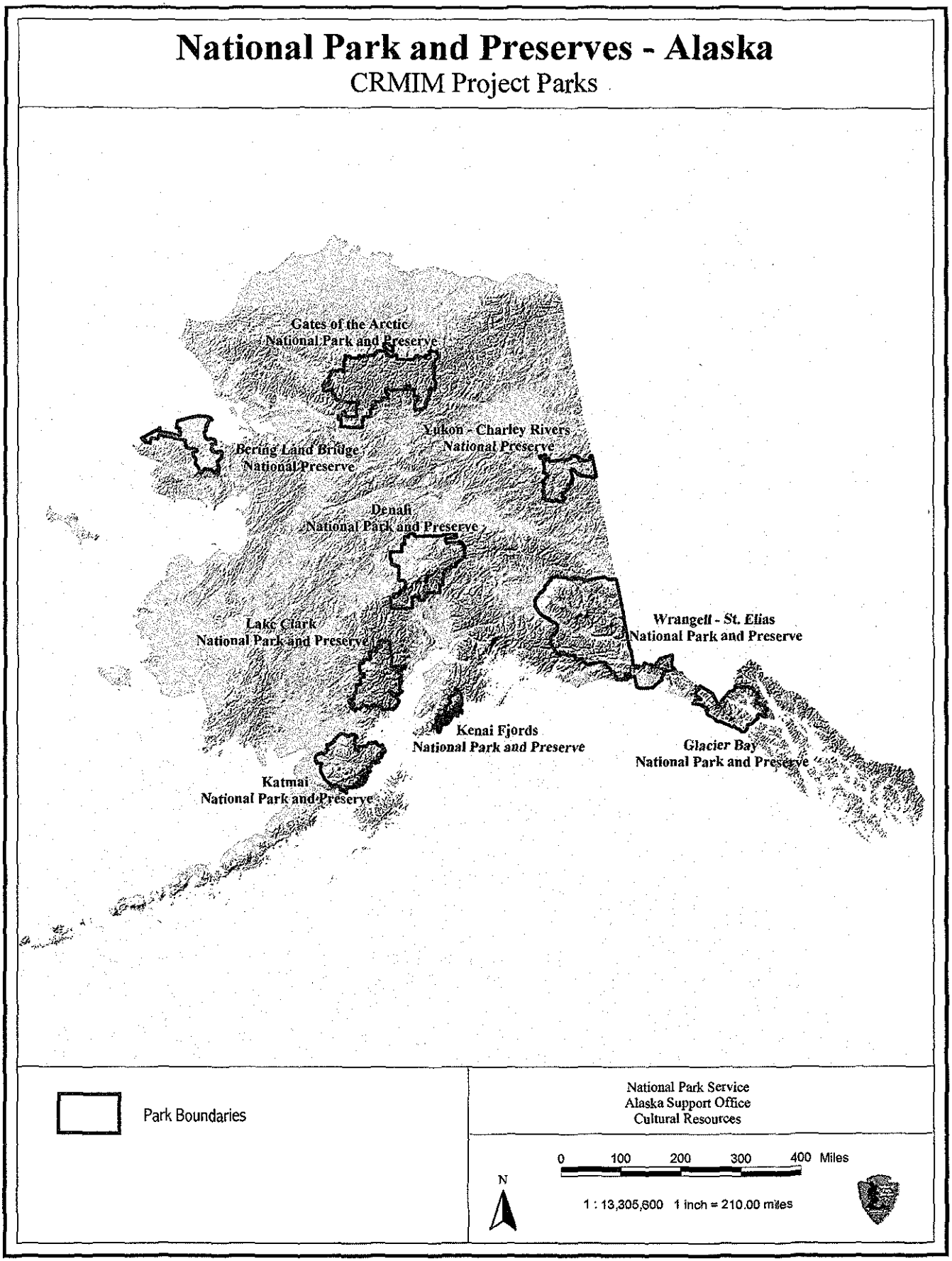

National Park and Preserves - Alaska
CRMIM Project Parks
Gates of the Arctic
National Park and Preserve
Bering Land Bridge
National Preserve
Yukon - Charley Rivers
National Preserve
Denali
National Park and Preserve
Lake Clark
National Park and Preserve
Wrangell - St. Elias
National Park and Preserve
Kenai Fjords
National Park and Preserve
Glacier Bay
National Park and Preserve
Katmai
National Park and Preserve
Park Boundaries
National Park Service
Alaska Support Office
Cultural Resources
0 100 200 300 400 Miles
N
1 : 13,305,600 1 inch = 210.00 miles

Figure 1.

Table 2
Legislative and Administrative Acronyms

AHRS	Alaska Heritage Resources Survey
AML	Abandoned Mineral Lands
AMRAP	Alaska Mineral Resource Assessment Program
ANILCA	Alaska National Interest Lands Conservation Act
BLM	Bureau of Land Management
CFR	Code of Federal Regulations
CRMIM	Cultural Resources Mining Inventory and Monitoring
DOE	Determination of Eligibility
EIS	Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
FR	Federal Register
MOA	Memorandum of Agreement
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NPS	National Park Service
SHPO	State Historic Preservation Office
USC	United States Code

the Mining Law of 1872 is the millsite, which may be non-adjacent to the lode claim, but may not exceed 5 acres (Douglas 1941: 24-01).

The law, as amended, gives claimants the right to locate as many claims as they wish as long as there is an actual physical discovery of a valuable mineral on each claim (BLM 1989:9; McCoy 1989:3). This was not always the case. Before 1923, a prospector was allowed only one claim by right of location on each creek or vein (Leshy 1987: 171-173). During the gold rush era in the early part of the century, some prospectors who held the power of attorney for other individuals circumvented the one-claim-per-creek clause by staking claims in the others' names. Thus, they could tie up a whole creek valley from further prospecting for many months or even years (Purington 1905:255). By 1912, the law was changed so that those who wished to consolidate ground had to acquire it by purchase and not by power of attorney (Hovis: 1996, personal communication).

The Mining Law of 1872 also established the process for retaining the claim and for bringing the claim to patent. On all unpatented claims, that is claims on which the land ownership rights are still held by the United States government, at least $100 worth of labor, called assessment work, must be performed each year to keep the claim active. This annual labor is not required after a claim is patented and the actual title to the minerals, and in most cases the surface and its resources, passes from the United States to the claimant (McCoy 1989:3).

The method of applying for a patent under the General Mining Law is similar for both lode and placer claims. The owner must first have the claim surveyed if it is a lode claim or a placer claim not located by legal subdivision on previously surveyed land. Placer claims located by legal subdivision do not require another survey. The plat of survey is then forwarded to various government offices and is posted in a conspicuous place on the claim itself. One copy of the plat, along with a patent application, goes to the appro-

priate land office. The registrar of the land office must then publish a notice in the newspaper that this application has been made, and the waiting period of 60 days begins. The claimant must also sign an affidavit stating that at least $500 worth of labor or improvements has been carried out on the claim. After the waiting period, if no adverse claim has been filed, the miner is entitled to the patent upon payment of a fee of $5 an acre for a lode claim and $2.50 an acre for a placer claim (Douglas 1941: 24-08, 24-14). These fees remained the same until 1989 when the patent application fee was raised to $250, with an additional $50 per claim.

Before 1884, no one could obtain title to a mineral claim in Alaska. Mining claims were held only by squatter's title and common consent (Brooks 1973: 300). The authority of the General Mining Law was extended to Alaska in 1885 by order of the secretary of the interior (Purington 1905: 257). As amendments were made to the Mining Law, they too were extended to Alaska by various acts of Congress and published in the U.S. Statutes-at-Large. Two statutes with significance for Alaska were the Act of March 3, 1891 (26 Stat. 1104), which authorized the president to appoint a mine inspector for each territory, and the Act of May 16, 1910 (36 Stat. 369) that established the Bureau of Mines with responsibilities for health, safety, and conservation issues (Maley 1983).

Whereas the Mining Law of 1872 opened the door to would-be miners, the legal system gradually began to impose tighter restrictions on mining, stopping short of closing the door altogether. Even before the government began establishing regulations, several early federal court cases dealt with the right of the United States to protect public lands from trespass and waste on mining claims (Maley 1983: 417). Legal restrictions were later imposed by the Surface Resource Act of July 23, 1955 (69 Stat. 367), which allowed federal agencies to manage surface resources on unpatented claims, with some exceptions. Although historic structures are included in the surface resources encompassed by this law, the chain of title must also be taken into consideration. For example, if the claimant built the structures and has not abandoned the claim, his rights to their use are absolute. If however, the structures were on the claim when it came under his control, the miner has a right to use them if their use is related to mining, but does not have the right to destroy them (Turner and Armentrout 1986: 8; Hovis 1996: personal communication).

Further restrictions came about with the passage of the Federal Land Policy and Management Act of 1976 (FLPMA). This act directs the secretary of the interior to take any action required to prevent "unnecessary or undue degradation of the land" (90 Stat. 2743). Although this act does not withdraw public lands from mineral entry, it does, by virtue of its implementing regulations found at title 43 Code of Federal Regulations (CFR) Subpart 3809, force miners to comply with a federal approval process if the mining exploration or activity exceeds five acres. This approval process requires that mine operators comply with environmental protection requirements for natural and cultural resources. Also, under section 314 of the act, the proper agency for recording a mining claim was shifted from the county recorder's office to the appropriate state office of the Bureau of Land Management (BLM) (Maley 1983: 158).

Despite the tightening of restrictions to mining, mineral prospecting and claim staking is still allowed on unreserved, unappropriated lands administered by the BLM and by the National Forest Service, i.e., those lands that have not been withdrawn or segregated from mineral location and entry (Maley 1983: 56). Valid claims that were located on BLM or Forest Service lands before the land was withdrawn may still be ac-

tively mined. The same holds true for valid claims on National Park Service lands, as discussed below. No matter when a claim was recorded, operating a mine in Alaska requires permits by as many as 13 state and federal agencies, and thus the state uses the Annual Placer Mining Application to assist miners in this lengthy permitting process (BLM 1989:11).

When the National Park Service was created with the passage of the Organic Act of August 25, 1916 (16 USC 1 et seq.), it became apparent that the American people had changed their values with respect to nature. "The old colonial and pioneering emphasis on rapid exploitation of seemingly inexhaustible resources was at last giving way..." (NPS 1985b: 11). In fact, in the following years when Congress and the president created new national park units, they closed, with few exceptions, those parks to mineral entry under the mining laws (McCoy 1989:3). One of the exceptions was Mt. McKinley National Park (now encompassed in DENA), originally established in 1917.

Almost sixty years later, Mt. McKinley National Park was closed to mineral entry by the Mining in the Parks Act of 1976 (16 USC 1901). The five other, non-Alaska park units that were still open to mineral entry and location were also closed by this act. Congress determined that if mineral entry continued, it would conflict with the purposes for which the parks had been established many years earlier. These purposes were to "conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment unimpaired for the enjoyment of future generations" (16 USC 1 et seq.). The new parks created by ANILCA (16 USC 410) in 1980 were also withdrawn from mineral location, entry, and patent under the U.S. mining law, according to Section 206 of the Act (16 USC 410hh-5). These withdrawals were subject to valid existing rights, and thus mining operations continued in the parks.

The Mining in the Parks Act of 1976 also authorized the secretary of the interior to regulate the patented and unpatented mining claims in all parks. The regulations that apply to this act are in Title 36 of the Code of Federal Regulations (CFR) Part 9A and essentially permit miners to exercise their valid existing mineral rights while minimizing damage to the environment and other resources, including cultural resources. Miners' activities are monitored through a plan of operations submitted to the National Park Service by the mine operator for all exploration and development on patented and unpatented claims within the park boundaries. The plan contains such information as maps, mode of transport and equipment to be used, a mining reclamation plan, an environmental report, and other information that will help the Park Service assess the nature and extent of potential disturbances before approving the plan (36 CFR 9A).

Before the NPS regional director approves a plan of operations, he must consider whether any properties included on, or eligible for inclusion, on the National Register of Historic Places (discussed below) may be affected by the proposed mining activity. The regulations specify that "adequate information, such as that resulting from field surveys (are necessary) in order to properly determine the presence and significance of cultural resources in the area to be affected by mining operations" (36 CFR 9.10 (e)). Determining the presence of cultural resources is the first step in what is known as the "section 106 process." The "section 106 process" refers to that specific section of the National Historic Preservation Act (NHPA) of 1966 that safeguards significant prehistoric and historic sites from destruction. The NHPA plays a central role in the organization and implementation of the CRMIM program, as described below.

Organization of the Cultural Resources Mining Inventory and Monitoring Program

In 1985, the Northern Alaska Environmental Center, the Alaska Chapter of the Sierra Club, and the Denali Citizens Council filed an injunction in the U.S. District Court for the District of Alaska to halt mining on unpatented claims in three of the national parks in Alaska - DENA, WRST, and YUCH (Civil Case J85-009). On July 22, 1985, the court granted the injunction and ordered the National Park Service to comply with the National Environmental Policy Act (NEPA) and NPS regulations for mining (i.e., 36 CFR 9A) before approving any mining plans of operation. This law requires that the federal government assess the environmental impact of federally sponsored projects on public lands. In addition, the court ordered the NPS to prepare environmental impact statements (EIS), as mandated by NEPA, on the cumulative impacts of mining operations in these parks.

As a result of the court decision, the National Park Service implemented an Alaska Regional Mineral Management Division (now administered by NPS Physical Resources) under which mining plans of operation could be approved. The cultural resources part of the program was to be administered by the Cultural Resources Division of the Alaska Region of the National Park Service. Hence, the Cultural Resources Mining Inventory and Monitoring program came into being. The initial goal of the CRMIM program was to inventory and evaluate the historic properties on all administratively valid claims in the three parks where the injunction was enforced.

The inventory and evaluation process is mandated by the National Historic Preservation Act. The cornerstone of the NHPA and the legal basis for many federally sponsored archeological programs, including the CRMIM program, is found in section 106 of the act, which states:

> The head of any Federal Agency having direct or indirect jurisdiction over a proposed Federal or federally assisted undertaking in any State and the head of any Federal department or independent agency having authority to license any undertaking shall prior to the approval of the expenditure of any Federal funds on the undertaking or prior to the issuance of any license, as the case may be, take into account the effect of the undertaking on any district, site, building structure, or object that is included in the National Register. The head of any such Federal agency shall afford the Advisory Council on Historic Preservation established under title II of this Act a reasonable opportunity to comment with regard to such undertaking [16 USC 470, sec. 106].

In addition, the act authorizes the secretary of the interior "to expand and maintain a national register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, hereinafter referred to as the National Register..." (16 USC 470, Section 101(a)(1)). The National Register of Historic Places is administered by the NPS and serves as the official list of the country's cultural resources that are worthy of preservation.

The amendments made to the NHPA in 1980 (94 Stat. 2997; Public Law 96-515) expanded the historic preservation role of the federal government and required, under section 110 of the act, that each federal agency establish a program to locate, inventory, and nominate to the secretary of the interior all historic properties under its control that appear to qualify for inclusion on the national register (16 USC 470, Sec. 110(a)(2).

In considering the large number of claims to be surveyed and inventoried for cultural resources, the NPS chose to fulfill its Section 106 responsibilities through a Pro-

grammatic Agreement with the State Historic Preservation Office (SHPO) for Alaska and the Advisory Council on Historic Preservation. A programmatic agreement can take the place of a memorandum of agreement (MOA) for complex projects, such as the CRMIM program, that would otherwise require numerous individual requests or comments from the SHPO and Advisory Council (36 CFR 800.13; Outerbridge 1990: 176-16).

The programmatic agreement for the CRMIM program establishes stipulations to "avoid or satisfactorily mitigate any reasonably foreseeable adverse effects" to cultural resources on mining claims in the national parks and preserves in Alaska (NPS 1988a). Primary among the 12 stipulations are the first three that require inventory and evaluation of historical properties on patented and unpatented mining claims (stipulations I and II) and a review of all mining plans of operation (stipulation III). Stipulation II states that "until the Determination of Eligibility (DOE) evaluation program is completed, NPS will treat all historic properties as potentially eligible for inclusion on the National Register for purposes of assessing the effects of approval of Mining Plans of Operation" (NPS 1988a: 2).

Stipulation III considers the "106 process" in the review of the mining plans of operation. The stipulations state that no mining plans of operations will be approved until inventory and evaluation of historic sites are complete. It also states that the plan may be approved in the following situations: if no sites are identified during the inventory; if sites are found but determined ineligible for the national register; if sites are found but it is determined that there will be no effect to them; or if sites are found, but it is determined that there will be no adverse effect to them. If, however, it is determined that there will be unavoidable direct or visual impacts to eligible sites, the NPS will consult with the Alaska SHPO to develop a mitigation plan for the property that will be implemented before the commencements of mining (USDI, NPS 1988: 3). A stipulation of the programmatic agreement also covers the monitoring of mining operations that may potentially impact historic properties.

The duties of the CRMIM program were expanded to include a number of other mining-related activities, as well as survey coverage of six other parks. In addition to the inventory program and review of mining plans of operation, these duties include: mineral validity examinations, access requests, reclamation plans, monitoring of mining activities where cultural resources are located, and preparation of cultural resource sections for all mining-related environmental assessments. Besides the three injunction parks (DENA, WRST, and YUCH), the other parks units that were included for CRMIM survey were GAAR, BELA, KATM, KEFJ, LACL, and GLBA. Since 1989 when the initial inventory phase of the CRMIM program was completed, other programs have been integrated into the ongoing fieldwork of CRMIM personnel. One such program was the Alaska Region Abandoned Mineral Lands program (AML) initiated by the former Minerals Management Division (now Physical Resources) of the NPS. The objective of the program is to eliminate the health and safety hazards associated with abandoned mines and to protect the natural and cultural resources found at these mine sites. The abandoned mining sites, which include surface and underground features associated with the mining of gold, silver, antimony, and coal, may contain explosives or hazardous wastes, such as mercury, petroleum products, and chlorinated hydrocarbons, or unsafe mine openings. The AML program involves a thorough inventory of the abandoned mine sites on all National Parks Service

lands in Alaska, plus a follow-up of remedial activities, such as warning signs, physical barriers, or elimination of hazards (NPS 1989:1).

Other programs that required CRMIM input were the Alaska Region's Mineral Claim Acquisition Program and the Alaska Mineral Resource Assessment Program (AMRAP). The acquisition program was developed in response to final environmental impact statements pertaining to the cumulative effects of mining, in which the proposed NPS action for resource management and protection was to acquire all patented and valid unpatented mining claims in the parks (NPS n.d.). The acquisition program was initiated in DENA. The second program, AMRAP, was designed to collect data and assess the mineral potential of all public lands; and thus the CRMIM program's responsibility was to monitor the field activities of AMRAP surveyors to protect all cultural resources (NPS 1991b).

Research Design

The research design for the CRMIM project has consisted of four separate, but integrated, components. These components pertain to the field inventory, the mining site typology, ongoing historic and archeological research, and ultimately to national register evaluation for all of the sites. Over the years as the focus of the CRMIM program has changed, the emphasis on various components has also shifted. For example, during the first two years, the emphasis was on field inventory of valid claims in the "injunction parks." The emphasis later shifted to include other park units as well as abandoned mining lands. As the inventory of sites grew, an increased emphasis was placed on developing a site typology for all of the mining sites. Historic and archeological research and evaluation of site significance have continued to be important components of the research design from the outset.

Field Inventory Procedures. The survey universe for the CRMIM program was developed in coordination with the NPS Regional Minerals Management Division, now administered under NPS Physical Resources. By using their database of known, administratively active mining claims situated in National Park units in Alaska, the CRMIM program manager was able to determine the location of the survey units and the logistics schedule for much of the initial fieldwork. In general, the survey units were accessed with a helicopter from a base camp, which might be moved as the field season progressed. Coordination with Minerals Management continued as the CRMIM program expanded and other mining lands and other types of mining activities were incorporated into the program. The standard procedures for all CRMIM fieldwork is detailed in the Programmatic Agreement Regarding Mining Operations in Alaska National Parks (National Park Service 1988a).

The inventory procedures began with a pre-field literature review, which incorporated pertinent historical literature, such as U.S. Geological Survey reports, ethnographic sources, Alaska Heritage Resources Survey (AHRS) files, previous archeological studies conducted in or adjacent to the areas under investigation, and other reference material on the geology, paleoenvironment, or biological resources of the area. In addition to producing a literature review for each survey drainage or locale, the project historian assembled a resource library on mining history and technology, which was available to all project personnel. Ideally, each survey crew was composed of a crew chief, usually a professional

archeologist with at least a master's degree, and two or three crew members who were trained in archeology, history, or historical architecture.

The primary survey unit of investigation was a 20-acre mining claim (placer or lode), a group of claims that might extend for several kilometers, or a park-designated access route to these claims. For the sake of field accuracy, these survey units were often mapped on Mylar overlays on aerial photographs. Most placer claims are contiguous and normally follow natural stream drainages, while lode claims tend to be located on steep ridges or hillsides above the stream channels. The entire survey unit, with certain exceptions, was covered by survey transects, the spacing of which varied depending on previous ground disturbance, surface visibility, and vegetation. Areas deemed to be unsafe, such as adits, slopes greater than 30 degrees, and standing water were excluded from survey coverage. To ensure that no historic property would be affected by the possible secondary effects of mining, such as erosion before reclamation, survey coverage was extended well beyond the claim boundaries. The extended coverage, normally adjacent to the claims, was carried out only in areas with a high probability of site occurrence, such as high overlooks and terraces adjacent to lakes and streams. In some cases, subsurface probes were placed in areas thought to have a high site potential. These procedures have been defined as "intensive survey" in the *Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines* as they appear in the Federal Register (48 FR 44716, September 29, 1983).

Field crews recorded their daily activities in field notebooks, on Survey Summary Forms, on Cultural Resource Site Forms, and on master survey coverage and site location maps maintained in NPS Regional Office (now the Alaska Support Office). Black and white photographs and color slides were also taken of all survey units and of all sites. Each Cultural Resource Site Form contained not only a detailed site description, but also a quad map pin-pointing the site location, a site map, and sometimes individual feature maps. Each Cultural Resource Site Form, along with its accompanying documentation, was forwarded to the State Office of History and Archaeology for permanent inclusion in the Alaska Heritage Resources Survey (AHRS) files. Another type of form used in surveying abandoned mining lands was the Notice of Discovery of Abandoned Explosives. This form was used to alert the park to potential hazards, which were then mitigated by NPS explosives disposal specialists or contractors under NPS supervision.

Despite this standardized set of field procedures, latitude was also given to individual crews in terms of defining and describing the cultural resources they encountered. For example, field crews often identified cultural isolates - usually small cluster of artifacts or a single piece of abandoned equipment - on their Survey Summary Forms. The distinction of what constituted an isolate, as opposed to a site, was considered to be a "field call," or an interpretation that was best made while in the field by the crew itself. Another situation that depended on the judgment of the individual crew members was the identification of whether or not an artifact, an isolate, or a site was in fact historic, meaning that it was at least 50 years old. There is a certain gray zone at the historic/recent chronological boundary that makes some field interpretations of site age difficult for even the most experienced archeologists or historians. In some cases, sites that did not initially seem to meet the 50-year criterion were revisited and recorded during survey in later years when the site's 50-year age status had been met.

Typology of Historic Mining Sites. Another gray zone during the first year or two of fieldwork related to the descriptive labeling of mining sites. A mining site is defined as "any site or associated works constructed for the extraction of minerals or constructed to support the extraction, beneficiation, and refining of minerals" (Noble and Spude 1992: 3). This close identity of a mining site with the point of production excludes other mining-related sites, such as sawmills or access routes, from the mining site category. These other, possibly mining-related sites, are classified here simply as historic sites. To standardize field identifications, establish general categories for site components, and identify the type or function of individual sites, CRMIM historian, Logan Hovis, developed a typology that pertains specifically to mining sites found in Alaska. The following discussion is based on his typology (Hovis 1992c).

There are two major groupings of mining sites - placer and lode - and within each grouping, the site can be further categorized as either **a camp, an operation, or a camp and operation (camp/operation)**. The essential feature of any camp is a dwelling, habitation, or domestic feature of some sort, regardless of its type of construction or condition. An operation is a mining site that does not include domestic features, while a camp/operation contains both domestic features and features pertaining to mineral extraction. Each site can be further detailed and described along two primary lines: 1) in terms of the component parts of the site, that is the buildings, features, and artifacts that make up the sites; and 2) in terms of the mining method(s) or other functional activity(s) associated with the site. The typology is intended as a descriptive and analytical tool. (Hovis 1992c: 3).

The components of a site fall within three categories: buildings; features/ structures/ systems; and objects/artifacts (table 3). Buildings can be related to either domestic use (tent frames, cabins, bunkhouses, privies, root cellars, and so on) or to other general uses, usually pertaining to mine operation and maintenance (assay offices, compressor shed, workshops, and so on). The next category is composed of non-portable features or structures that are often part of one integrated system. A good example would be the interrelated system of features that pertain to water diversion and supply and include dams, ditches, flumes, penstocks (pipelines), head gates, turnouts, regulators, and head boxes. The third category is object/artifact and is distinct from the preceding category in terms of relative permanence of place. Mining tools and equipment are classified as features/structures when they are part of a coherent, intact system; otherwise, they are classified as objects/artifacts. Examples of all these components are discussed at length in the following chapter on mining technology and the chapters describing the placer- and lode-mining sites.

Mining sites, both placer and lode, can be further described by the mining method or process employed at the site. This determination is made on the basis not only of the buildings, features, and artifacts remaining at the site (as discussed above), but also on historic research pertaining to that specific site. Hovis (1992c) has identified 12 methods associated with placer mining (figure 2) and 12 processes associated with lode mining (figure 3). The placer mining methods (extractive techniques) are defined as prospecting and exploration; open-cut manual with hand shoveling, shoveling-in, ground-sluicing, and booming sub-types; drift mining; hydraulic mining; bulldozer mining; bulldozer-hydraulic

Table 3
Component Parts of a Mining Site (after Hovis 1992c)

I. General Site Type (eg., Placer Mining Site)
  A. Specific Site Type (eg., Placer Mining Camp)
    1. Buildings
      a) Domestic Buildings
      b) Other Buildings
    2. Features/Structures/Systems
      a) Landscape Modifications
      b) Circulation (Transportation and Communication)
      c) Water Diversion and Supply
      d) Mineral Processing
      e) Power Production and Supply
      f) Other
    3) Objects/Artifacts
      a) Mining and Processing Tools and Equipment
      b) Other Tools and Equipment
      c) Domestic and Personal Items
      d) Other

mining; open-cut mechanized with scrapers and power shovels/draglines as sub-types; dredging; multiple methods; no associated method; other; and unknown. A detailed discussion of each of these methods, except for the last three, is presented in chapter 2. The category of "no associated method" is applied to placer mining camps where there is no evidence to link the site with a specific mining operation; "unknown" is used in cases where evidence exists but no determination can be made.

While the placer mining methods are each considered to be an extractive technique, extraction is actually only one of several processes that can be part of a mining operation. The term "lode mining process" refers to any of several procedures - prospecting and exploration, extraction, transportation, and milling or concentrating that might have taken place at a site. A more detailed listing of these processes and sub-processes is found in figure 3. The three that are not shown on the table are "no associated method," "other," and "unknown."

The same general typology designed for the mining sites is also useful in describing the non-mining historic sites identified during CRMIM fieldwork. The designations of camp, operation, or camp/operation are the same in the non-mining historic site typology, but a classification of site functions replaces the placer methods or lode processes stage of the descriptive hierarchy. For the non-mining historic sites, the following site functions have been identified: transportation, communication, hunting, trapping, logging, sawmilling, townsite, and other (Hovis 1992c). The prehistoric sites have simply been classified by setting as (1) sites on elevated terrain, and (2) sites adjacent to streams and lakes.

Historic and Archeological Research. Historic research has been an integral part of the CRMIM program in all phases of the project, including the field surveys and inventories. Much of the historic research generated by the program has taken the form of broad-

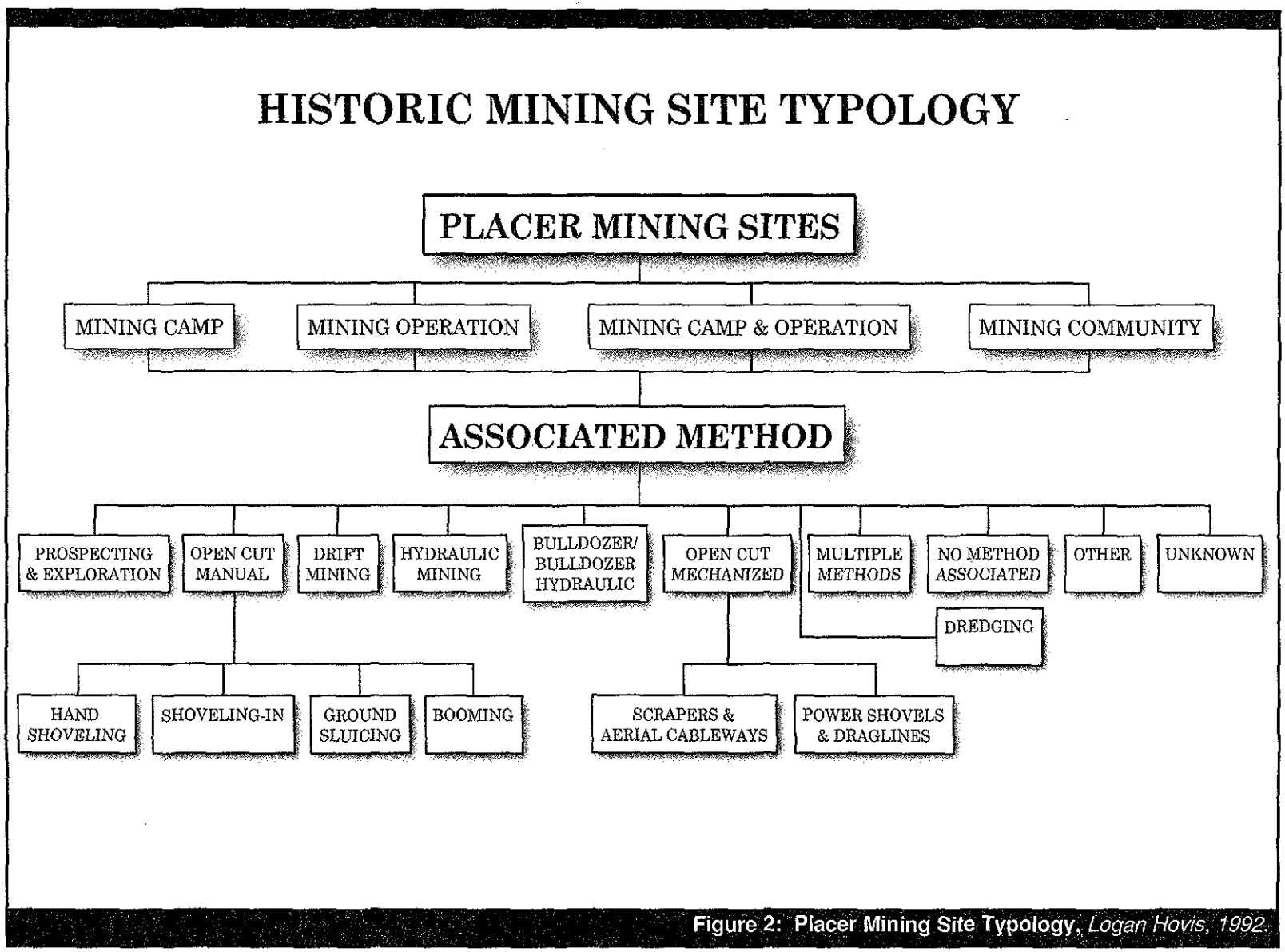


Figure 2: Placer Mining Site Typology, *Logan Hovis, 1992.*

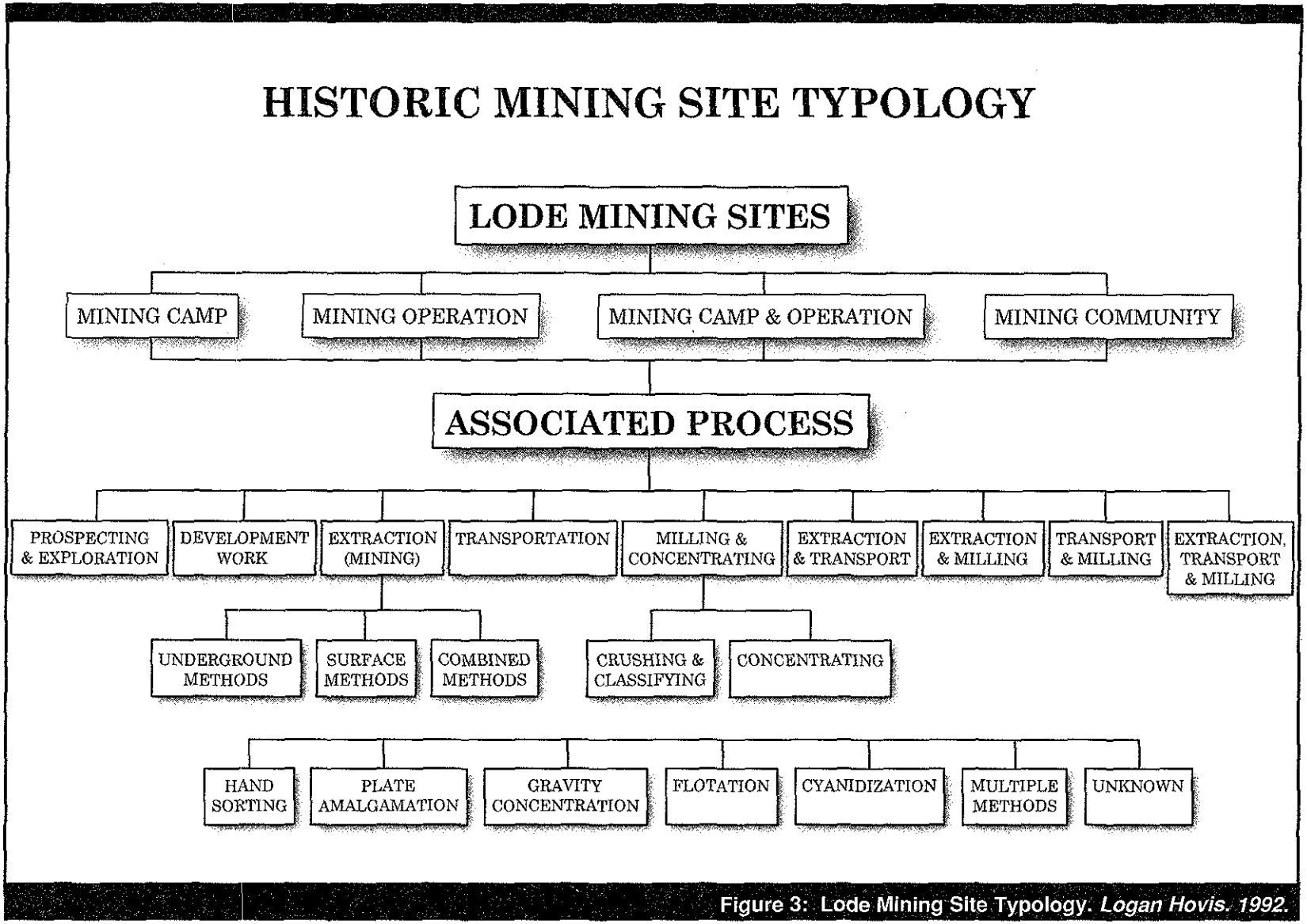


Figure 3: Lode Mining Site Typology. ***Logan Hovis. 1992.***

scale overviews (Hunt 1990; Buzzell 1988a, 1989), drainages histories (Buzzell 1988b, 1988c, 1988d, 1988e; Hovis 1990d, 1990d), and background research for determinations of eligibility (national register DOEs) (Kain 1994a, 1994b). Although this overview is based primarily on site records produced by the CRMIM field crews, it relies heavily on the historic background documentation provided by NPS historians. As parallel, yet related sets of information, the archeological and documentary records complement each other, sometimes serving to confirm, supplement, or even contradict what the other has to offer (Deetz 1977: 8-12; Adams and Brauner 1991: 2). Historical archeologists, however, have many different perspectives, some leaning more toward the scientific end of the spectrum and others more toward the humanistic. There has been an attempt in this overview to strike a balance between the two.

This overview was written with the following objectives in mind:

1) to describe the broad geographic and typological mix of sites identified during CRMIM survey;
2) to place the mining sites in their appropriate chronological contexts;
3) to provide a systematic analysis of the features that compose placer and lode mining camps; and
4) to broadly discuss the artifacts, singling out unique, handmade, or innovative artifacts at these camps for their value in reflecting the personal characteristics of their makers or users.

The first two objectives are pertinent for park managers, who are interested in establishing baseline data on the cultural resources under their jurisdiction. The second two apply to historic archeologists who are looking for comparative or interpretative material or a springboard for further research.

The organization of the extensive body of CRMIM data was facilitated by creating several dBASE III PLUS databases for all the sites. The CRMIM staff created a master database that lists each of the 345 sites by AHRS number; location (claim, drainage, and map coordinates); site type (lode or placer, camp or operation, and so forth); and other variables. Other databases were created for each major group of sites: mining camps; mining operations; mining camps/operations; other historic sites; and prehistoric sites. With respect to the mining sites, the databases have also provided the details necessary to group the sites by mining district and to look analytically at the patterns, i.e., the size and structure of the features and the nature of the artifacts that compose placer and lode mining camps.

Some very general research questions addressed in this analysis are the following:

1) Is there a direct relationship between the size of the structures found at placer or lode mining camps and the type of technology used by its inhabitants?
2) Is there evidence of women and possibly children at the camps, or does the stereotype of the predominantly male mining camps hold true?
3) Does the archeological evidence allow us to differentiate between the camps of the long-term "subsistence miners" as opposed to the transient "get-rich-quick" types?
4) Do the artifact assemblages truly reflect the nature of site occupation, or are they more a product of post-occupation scavenging and re-use by other miners or vandals?

National Register Evaluation. The final component in the CRMIM research design is evaluation of the significance of each site according to national register criteria, as discussed earlier in this chapter. The evaluation of all historic sites is an on-going process by NPS historians; the prehistoric sites are to be evaluated by NPS archeologists. The standard document that addresses national register significance is designated as a determination of eligibility (DOE). If a site is deemed eligible for the national register, it is accorded full protection under federal law (see discussion of the 106 process above). The next step in the procedure is the actual nomination process for a site or group of sites to be included on the National Register of Historic Places. Although evaluations for site significance are outside the scope of this report, a list of the CRMIM sites that have previously been deemed eligible for, or are currently listed on the National Register of Historic Places is in chapter 16.

Results of Fieldwork

This section presents the cumulative results of 10 years of survey and site inventory in the nine park units. The intention here is to present a quantitative summary and comparison of survey and site totals by park unit and by year. Refer to chapters in the following section, section II, for more specific park-by-park information on survey locales and general site locations by drainage, and to the "sites" chapters in section III for detailed site descriptions.

The extent of intensive pedestrian CRMIM coverage, in terms of total number of acres inspected in each park unit, is shown in table 4. As indicated in the table, survey crews covered a total of 44,348 acres of land in all the parks. Since the basic unit of survey was a typical 20-acre mining claim, the total figure is the equivalent of 2,217 claims. This figure is an extremely conservative estimate of the actual survey coverage because the acreage of adjacent areas that were also inspected was usually not tabulated on the survey summary forms prepared in the field and thus not tabulated here in the results.

The year-by-year figures for total acreage presented in table 4 illustrate that the bulk of field investigations occurred in the first three years (1986-1988) of the program's existence. Surveying claims considered "administratively valid" continued through 1989. From 1990 to 1993, the focus of CRMIM fieldwork shifted to abandoned mining claims; and by 1994 the fieldwork consisted almost entirely of monitoring activities. In terms of park units, the majority of survey coverage, 82%, occurred in DENA and WRST. The other "injunction" park unit, YUCH, contributed another 12% to the total survey acreage. Until 1992, the CRMIM surveys in WRST, as in all the other park units, were administered by the Alaska Regional Office (now the Alaska Support Office) in Anchorage. Beginning in 1993, most aspects of the CRMIM program in WRST were taken over by the WRST cultural resources staff. The mining-related fieldwork accomplished by WRST personnel was included in compiling the survey data only for 1993, but not for subsequent years, in this table.

In addition to the survey of mining claims, field crews intensively surveyed park-designated access routes to some of the claim groups. The amount of coverage for these routes and various other linear survey locales is presented in table 5. The field crews inspected a total of 174.5 miles (281 km) during these investigations. Again, the majority of linear surveys, 85%, occurred in DENA and WRST, with YUCH contributing another

Table 4

CRMIM Area Survey Results (in Acres) by Year and Park Unit

Year	DENA	WRST	YUCH	GAAR	KEFJ	BELA	KATM	LACL	GLBA	Total
1986	2,000	4,440	4,735	-	-	-	-	-	-	**11,175**
1987	4,580	12,427	-	-	-	-	-	-	-	**17,007**
1988	7,770	1,400	-	1,490	-	-	-	-	-	**10,660**
1989	820	218	-	-	245	340	119	119	-	**1,861**
1990	-	-	-	-	-	-	-	-	-	-
1991	298	603	-	-	25	206	-	-	-	**1,132**
1992	276	280	386	-	-	-	-	-	-	**942**
1993	103	1,054	61	284	-	-	-	-	40	**1,542**
1994	-	-	9	-	-	-	-	-	-	**9**
1995	-	-	-	-	-	-	-	20	-	**20**
Total	**15,847**	**20,422**	**5,191**	**1,774**	**270**	**546**	**119**	**139**	**40**	**44,348**

TABLE 5

CRMIM Linear Survey Results (in Miles) by Year and Park Unit

Year	DENA	WRST	YUCH	GAAR	KEFJ	BELA	KATM	LACL	GLBA	Total
1986	44.1	67.7	15.5	-	-	-	-	-	-	**127.3**
1987	-	-	-	-	-	-	-	-	-	-
1988	-	-	-	-	-	-	-	-	-	-
1989	-	14.3	-	-	-	-	-	-	-	**14.3**
1990	6.2	15.5	-	-	3.1	-	-	-	-	**24.8**
1991	-	-	-	-	-	-	-	-	-	-
1992	-	-	-	-	-	-	-	-	-	-
1993	-	-	-	-	-	-	-	-	-	-
1994	-	-		5.0	-	-	-	-	-	**5.0**
1995	-	-	-	-	-	-	-	3.1	-	**3.1**
Total	**50.3**	**97.5**	**15.5**	**5.0**	**3.1**	-	-	**3.1**	-	**174.5**

9% to the total distance. Most (73%) of the survey coverage of access routes occurred in 1986, the first year of fieldwork.

CRMIM crews recorded 345 sites between the years 1986 and 1995 (table 6). Sites recorded in DENA, WRST, and YUCH account for 87% of the total site inventory. Another 10% were recorded in GAAR and KEFJ. BELA, KATM, LACL, and GLBA together contribute only 3% to the total site count. Although information about claim name and status of each of these sites is available in our master CRMIM database, we have not included this specific data in the overview. The ownership rights for many claims are still pending validity determinations, and their legal status is still in a state of flux (Diane Wohlwend 1999: personal communication).

Table 6 also presents a breakdown of the total site inventory into site types: placer mining, lode mining, historic, prehistoric, and other sites. One paleontological site is included in the "other" category. For the entire site sample, placer mining sites account for 51% of the total; lode mining sites contribute 25%; historic sites account for 14%; prehistoric sites contribute 10%; and other sites account for less than 1%. As might be expected, considering the nature of the survey universe, the majority of the sites (76% of the total) are directly associated with extractive mining. Several in the historic category (see chapter 14) are also mining-related.

A very high site density in the survey area is another expectation of the results of non-random surveys in locales having a very high potential for discovery of historic sites. This expectation has been borne out for all the parks units, but is particularly evident in the data from GAAR. Using the figures from table 4 on survey acreage and from table 6 on the total number of sites recorded per park unit, one can easily compute that in GAAR the ratio of recorded sites to survey acres is 23/1,774, equal to a site density of 1 site/77 acres. In comparison, we can consider the site density statistics for GAAR as a whole. It has been estimated that 15% of the entire 8,472,517 acres within the boundaries of GAAR has been covered by cultural resources surveys, and a total of 943 sites have been recorded (Schoenberg 1995: 129, 131). Given these statistics, the ratio of sites to survey acres is 1 site/1,348 acres for all the fieldwork undertaken in GAAR. This enormous difference in site/acreage ratios provides a good example of just how high site densities proved to be for CRMIM surveys.

Table 6

Number of Sites by Park Unit and Site Type

Park	Placer	Lode	Historic	Prehistoric	Other	Total
DENA	35	19	17	22	1	94
WRST	69	54	21	3	0	147
YUCH	49	0	7	3	0	59
GAAR	17	0	4	2	0	23
BELA	6	0	0	0	0	6
KEFJ	0	10	0	0	0	10
KATM	0	0	0	3	0	3
LACL	1	0	0	1	0	2
GLBA	0	1	0	0	0	1
TOTAL	**177**	**84**	**49**	**34**	**1**	**345**

In addition to the sites enumerated in the preceding tables, CRMIM crews documented hundreds of historic isolates, primarily pertaining to mining. These isolates range from small can scatters to dam remnants, ditches, sluice box segments, and a host of other features and artifacts. The presence and location of isolates have been documented in each survey summary form on file at the NPS Alaska Support Office. In this report, there has been no attempt to list all of the isolates; they are, however, brought into the discussion, when appropriate, in the chapters that follow.

CHAPTER 2

MINING TECHNOLOGY

Historic mining sites in Alaska's National Parks give us a glimpse of the lives of a hardy breed of the people who sought wealth and adventure in the northland. The stories of some still survive in historic photographs, oral traditions, land records, personal diaries, and in physical remains, such as discarded tools, equipment, and features - tailings, ditches, and shafts – left behind on the landscape. Before we can begin to interpret these remains, we must first go back and fill in the blanks; that is to say, we must consider that each of the artifacts or features was part of a total system or process of mining, much of which is no longer present at the site. To view the whole process, we first need a basic understanding of the technology of mining practiced at the site when it was occupied to serve as a background for the detailed site descriptions that appear in section III of this report.

Established western mining methods were brought into the state by prospectors and developers and adapted to the climate and conditions found in Alaska. These range from small-scale hand methods, employing a gold pan or pick and shovel, to large-scale dredge or hardrock operations. Our knowledge of early mining practices in Alaska stems in part from two excellent publications: one printed by the U.S. Geological Survey in 1905 by Chester W. Purington, and another by the U.S. Bureau of Mines in 1927 by Norman L. Wimmler. Both describe methods and costs of placer mining in Alaska, based on data gathered from placer miners throughout the territory. An annual series of bulletins pertaining to the mining industry in Alaska was also published by the U.S. Geological Survey beginning in 1902. The first two decades of reports were authored primarily by Alfred H. Brooks, and later issues by P.S. Smith. Another valuable series is the Annual Report of the Territorial Mine Inspector to the Governor of Alaska, dating from 1912. In addition to these publications dealing specifically with Alaska, there are many others that present general information about mining technology. Notable among these is Robert Peele's comprehensive *Mining Engineers' Handbook*, first published in 1918 and revised in 1927 and 1941.

In Alaska history, the importance of gold is legendary, but silver, copper, lead, and antimony have also been successfully mined in areas later to become National Parks (table 7). Different types of technology are used for the extraction of these minerals, depending on whether they are found in a lode or in a placer deposit. The original source of the ore, or metal-bearing mineral, such as gold, is in lodes or veins in solid rock (or in other forms discussed below). In the hardrock or lode technologies, the ore deposit is mined *in situ* from the rock matrix in which it occurs. In placer mining, concentrations of valuable minerals, weathered or eroded from their parent rock, are recovered from the sand, gravel, or other alluvium in which they occur.

In mining any mineral deposit, whether it is a lode or placer deposit, the operations can be divided into four stages: prospecting, exploration, development, and exploitation. Prospecting is simply the search for minerals, while exploration is the work necessary to gain knowledge of the size, shape, position, and so on of the deposit. After the deposit has been proven by exploration, the development and exploitation stages of mining begin. Development refers to the driving of openings into a proven deposit, and exploitation (mining) is the work of actually extracting the mineral (Peele 1941: 10-03). The prospecting and exploration stages of placer and lode mining are considered together in this chapter, while the development and exploitation stages are discussed in separate sections on placer and lode mining.

The focus of this chapter is to present the technologies used in both placer and lode mining from the pick and shovel methods practiced in Alaska just before the turn of the century, when the wave of Klondike prospectors rolled northward, until just after World War II, when the lode mining industry underwent extreme mechanization and retooling. It is organized into six sections: the geology of ore deposits, the conditions affecting mining in Alaska, prospecting and exploration, placer mining, lode mining, and site interpretation.

Table 7

Mineral Deposits on NPS Lands in Alaska

Park	Mineral	Type of Deposit
DENA	Gold	Placer/Lode
	Silver	Lode
	Antimony	Placer/Lode
	Lead	Lode
WRST	Gold	Placer/Lode
	Silver	Lode
	Copper	Lode
YUCH	Gold	Placer
GAAR	Gold	Placer
BELA	Gold	Placer
	Tin	Placer
	Lead-silver	Lode
KEFJ	Gold	Lode
KATM	Gold	Lode
LACL	Gold	Placer
GLBA	Gold	Lode

Geology of Ore Deposits

The commercial source of metals, such as gold, silver, and copper, is ore. In technical terms, an ore is a "metal-bearing mineral, or aggregate of such minerals, mixed with barren matter, called gangue, and capable of being mined at a profit" (Peele: 1941: 2-18). An ore is classified according to the nature of the mineral it contains. For example, in native or free milling ores, the metal is present in its elementary form, whereas in a sulfide ore, the metal is in the form of a sulfide and is called a base ore. In oxidized ores, the mineral may be represented as an oxide, sulfate, silicate, carbonate, or some other hydrated form of these minerals (Wills 1981: 7). These distinctions become important when it is time to decide which milling process should be used to dress the ore most economically.

There are four processes - magmatic, hydrothermal, metamorphic, and surface processes - by which ores are formed (Hutchison 1983: 8 - 10). In the first, the ores are derived from metals in volcanic magma that segregate into an immiscible liquid as the rock-forming minerals crystallize at high temperatures. In the second process, hydrothermal solutions pass through pores or fissures in the country rock. Some types of hydrothermal processes are related to igneous events, while others are not. An example of the former is the formation of veins adjacent to small bodies of plutonic granitic rocks. In this case, the metal-rich water or hydrothermal fluid within the magma is injected out along the cracks and joints above and adjacent to the igneous body and the metal is precipitated into veins, such as the silver-lead veins found in the Kantishna District (Alaska Geographic Society 1982: 14-20). Other types of igneous-related hydrothermal processes are replacement deposits, in which hydrothermal fluids replace certain types of rock to form large, irregular masses of ore minerals; disseminated or porphyry deposits; and sulfide deposits formed by rhyolitic or basaltic magma and associated hydrothermal fluids that flow from submarine vents. Hydrothermal solutions may also precipitate their metals when the fluid migrates to a zone with favorable conditions, such as reactive limestone. In this case no igneous process is involved. The Kennecott copper deposits in Wrangell-St. Elias are an example of a low-temperature copper sulfide being introduced into a massive limestone formation (Alaska Geographic Society 1982: 14-20). In the third ore-forming process, metals are concentrated by metamorphism. One type that exemplifies this process is called a contact-metamorphic deposit, commonly occurring where the country rock is calcareous. The fourth category, ore-forming processes that take place on the surface, includes placer formation and is discussed below.

Gold and silver may occur in ore deposits alone, but often are associated with each other and with copper, lead, and iron pyrite. Gold and silver ores are commonly found in quartz fissure veins, occurring in and along faults. These veins appear in schists, slates, other metamorphic rocks, and in intrusive rocks, particularly granite (Peele 1941: 2-24 - 2-25). Besides veins, there are many other types of auriferous deposits including gold in skarn deposits, stockworks, saddle reefs, replacement bodies, and others (Boyle1987). Copper also occurs in various types of deposits, among them are veins along faults, as sulfides in igneous rock, and as contact zones between limestones and igneous magmas (Peele 1941: 2-23). One type of surface process particularly important in the formation of copper ore is called secondary enrichment, produced by alteration of primary minerals. In the case of copper, the secondary enrichment is caused when rainwater oxidizes and dissolves a primary copper mineral, which then trickles downward until it is precipitated by

a reducing agent, such as pyrite. The result is a great concentration of copper at or near ground-water level and an increase in the commercial value of the deposit (Peele 1941: 2-19 - 2-22).

Another type of surface process, called mechanical accumulation, is the principal agent in the formation of placer deposits (Hutchison 1983: 9). They are formed when weathering and erosion release durable heavy minerals from mineralized outcrops and fluvial systems transport these minerals some distance from their origin. Gold is the primary placer mineral, particularly in Alaska, although other valuable minerals, such as antimony in DENA and cassiterite (oxide of tin) in BELA, are also commercially mined. A major source of gold in a placer deposit is the lode or vein where it was originally formed. There are three requirements for the formation of a placer deposit. The first is the presence of a mineral, such as gold, which is unaffected by the usual weathering agencies. The second is the natural process of chemical and mechanical weathering necessary to free the gold from its parent rock; and the third is a means of transport, usually water, to concentrate the gold-bearing rock debris (Jackson 1938:15 Peele 1941:10-533; Levell et al. 1987:2). About two-thirds of the gold production in Alaska comes from placer deposits, much of it from the Interior where the general absence of extensive late Pleistocene glaciation allowed for long fluvial erosion cycles and the development of heavy mineral placers to occur (Robinson and Bundtzen 1979: 2).

Geologists have classified placer deposits in various ways by either the origin or the form of the deposit. The origin is categorized as either eluvial (residual), colluvial, or alluvial (transported). Only the third type is common in Alaska. Alluvial deposits can, in turn, be broken down into several types based on form. Purington (1905: 27) has listed the following types: creek placers, hillside placers, bench placers, river-bar placers, gravel-plain placers, sea-beach placers, and lakebed placers. Another type of alluvial placer is a dry placer, which occurs in arid regions (Peele 1941: 10-535), and not important in Alaska. One final type that is important in Alaska is called a buried placer. It results from the burial of any of the other types beneath a thick cover of gravel, sediment, or lava after the original deposit was formed (Jackson 1938:17).

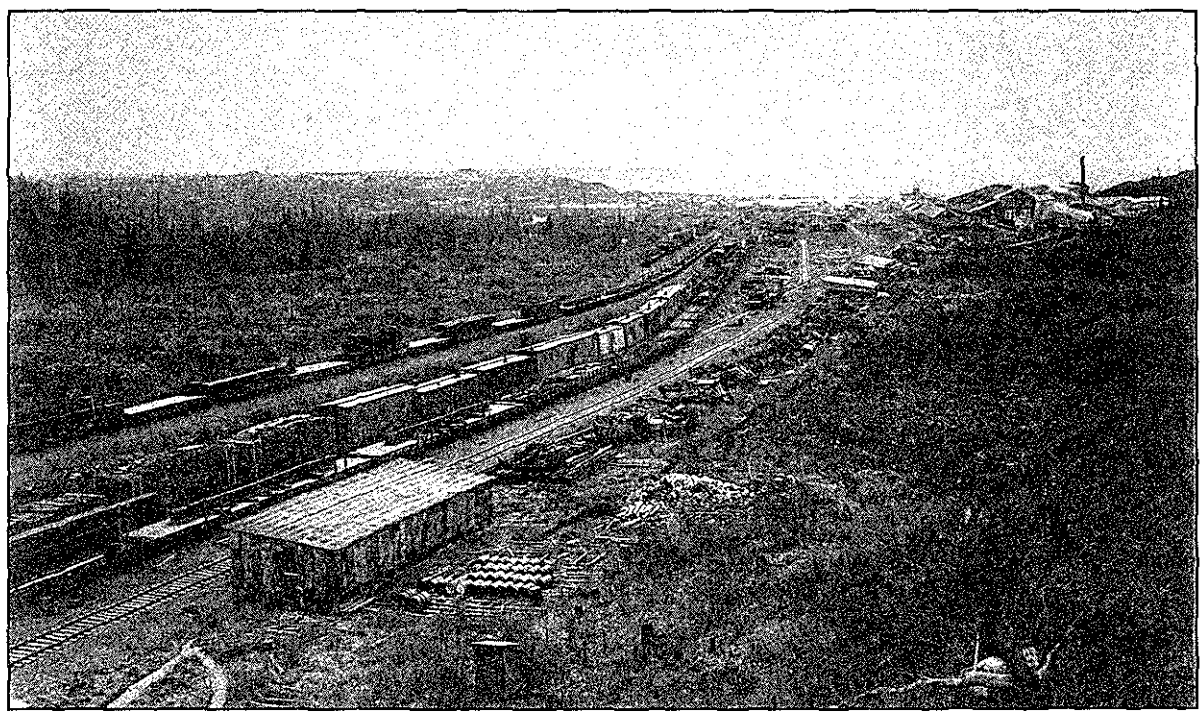
Particles of gold are not distributed uniformly within a placer deposit, but are separated by size and weight by the sorting action of running water. The particles range from large nuggets to minute flecks called colors. In a creek deposit, the agitation of the water causes the coarse, heavy gold to settle close to the bedrock, while finer gold is more widely dispersed throughout the gravels. The sorting of gold within a placer is also primarily due to its specific gravity, which is 19.3 for pure gold (Jackson 1938: 17). Associated with gold in many placers are black sands, grains of magnetite (magnetic iron oxide), which, due to their relatively high specific gravity of 5, also drop to the bedrock or an impervious stratum of hardpan clay (Jackson 1938: 17). Gold occurs in narrow concentrations, known as paystreaks, which are often not continuous or easy to follow out as they frequently represent the configuration of a former channel as it downcut the valley.

Conditions Affecting Mining in Alaska

Chester Purington's optimistic account of turn-of-the-century mining in Alaska was tempered by a few cautionary words describing the obstacles that might confront potential prospectors and miners. He states:

> Mining operations have been made difficult by the short available season, the lack of grade to the streams, poor watersupply, poverty of timber resources, high cost of labor and transportation, concentration of gold on and in the bed rock, and comparatively large thickness of barren overburden, the frozen or worse still, half-frozen condition of the gravel, lack of wagon roads, and inadequate mining and police regulations (Purington 1905: 30).

Most of the obstacles he lists pertain to either the problem of getting men and machinery into remote areas, i.e., transportation, or the problems inherent in working in an arctic or subarctic environment. These conditions, which added color to tales of mining in the remote, frozen north, constituted the day-to-day hardships that miners had to face. They also greatly affected the developing technology and productivity of Alaska mining. Another equally important factor, not mentioned by Purington, was the state of national and international economics and politics that affected the price of gold and other minerals, and thus the entire mining industry. Eventually, some of the obstacles, such as lack of transportation, were partially removed, but others continue to confront Alaska miners even today.



Alaska Railroad, moving freight out of Anchorage, ca. 1930s.
(Anchorage Museum of History and Art)

Transportation. One of the greatest obstacles to profitable mining in the early days was the remoteness of many of the districts. The lack of established lines of transportation and the high freight rates made simply "getting there" a triumph in itself. As a result, mining technology did not develop very rapidly in some of the more isolated districts, and pick and shovel methods were relied upon exclusively until relatively late. The routes of travel often included ocean, river, and overland legs, the latter by dogsled in the winter or pack train in the summer. Even after the railroads became established, river or overland travel was still necessary to get to many districts.

In 1897, most of the stampeders were en route to the Klondike; but the following year, many were headed for Alaska to try their luck on the Kobuk, Koyukuk, or Copper Rivers (Hunt 1990: 55). Unless they chose to enter Alaska via a Canadian river or overland route, they would first arrive at various supply points in Alaska by ocean-going steamers from Tacoma, Seattle, or San Francisco (figure 4). Two of the major towns where would-be miners disembarked were Dyea and Skagway, both on Lynn Canal. Dyea was the trailhead for the Chilkoot Trail, the most famous and well-used passage to Dawson on the Yukon River and the Klondike goldfields. Another route was the White Pass Trail out of Skagway. After the 1898 gold rush, Dyea faded out of the picture when Skagway was chosen as the commencement point for the White Pass and Yukon Railway that would extend 102 miles to Whitehorse (Hunt 1990:67; Brooks 1909: 25). From this town on the Yukon River, water travel would carry the potential prospectors to their destinations farther downriver.

Yet another disembarkation point for stampeders, particularly those who planned to prospect in the Copper River country, was Valdez. The route from Valdez to the goldfields lay over the Valdez Glacier and was fraught with many hardships. The influx of stampeders over the glacier trail began in February 1898. By April of that year F.C. Schrader of the U.S. Geological Survey made a reconnaissance of the trail for arriving prospectors. He was assisted by an army officer attached to an exploration party led by Lt. William T. Abercrombie. However, by May, more stampeders were leaving the country than entering it (Hunt 1990: 69), and it was clear that another route was needed. The following year, Abercrombie landed at Valdez again and began construction of the military trail from Valdez to Eagle, which would provide access to mining districts now encompassed by both WRST and YUCH.

Another option for gold-seekers of a more conservative bent was to take the less arduous, all-water route from Seattle to St. Michael at the mouth of the Yukon River. Here they would transfer to a steamboat and continue upriver to their destinations on the Yukon, Koyukuk, or Tanana Rivers.

The freight rates varied according to whether mining supplies and equipment, lumber, horses, or flour, and so on were being transported (Purington 1905: 228-234). Table 8 shows comparative rates in 1904 for various types of goods and for passengers from Seattle to Valdez via ocean steamers and from Seattle to Eagle or the mouth of the Koyukuk River via steamer, the White Pass Railroad, and water transport on the Yukon River. As shown, the greatest part of the expense was not necessarily getting to Alaska, but getting to the goldfields once the stampeder had arrived on the Alaska shores. This was particularly true for those seeking their fortunes in the Copper River country as the Copper River was never the highway of transport and communication that the Yukon River was for the more northerly Alaska mining districts. For example, in the Nizina District until 1911, all supplies and equipment were brought from Valdez in winter by

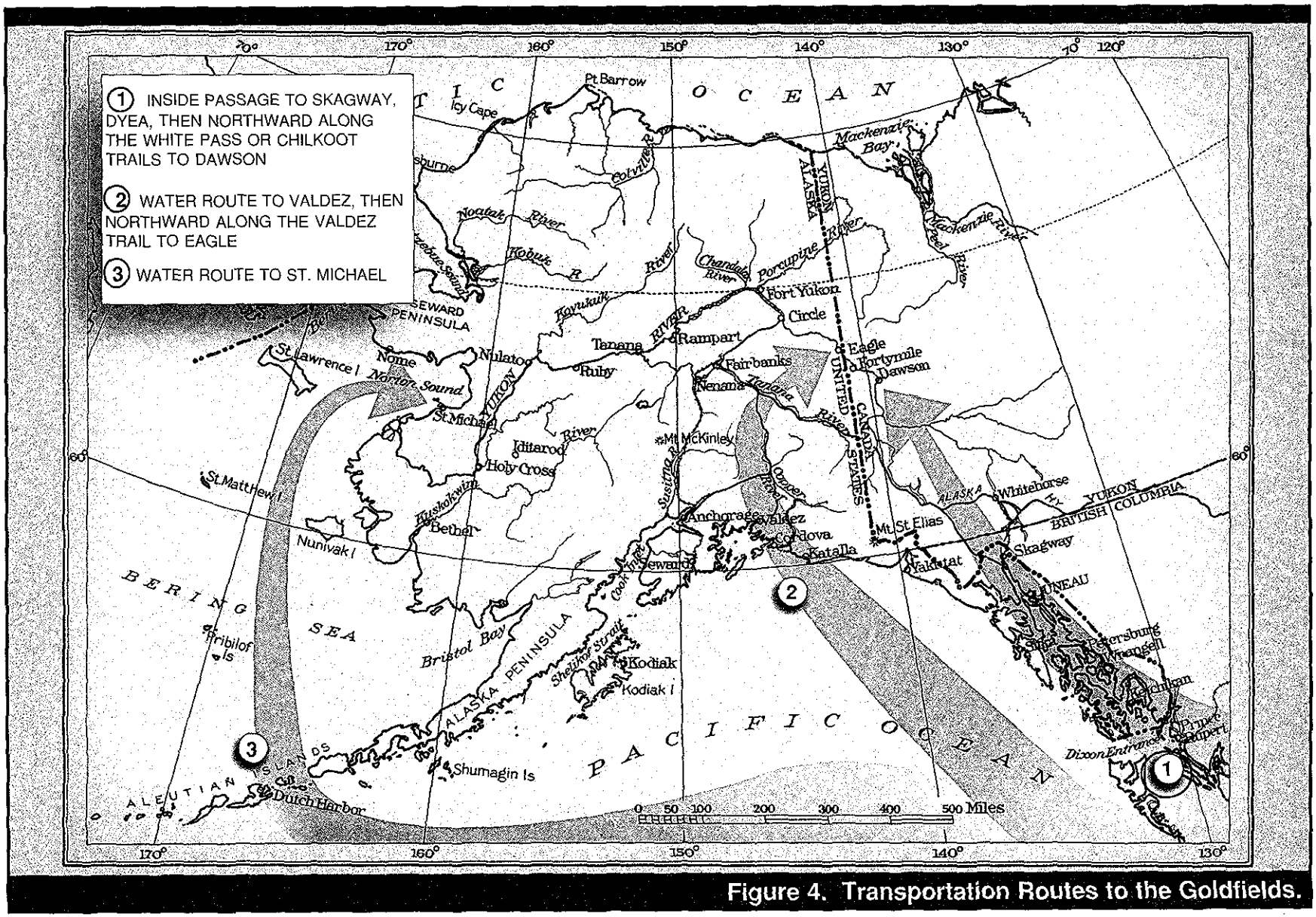


Figure 4. Transportation Routes to the Goldfields.

Table 8

Freight and Passenger Rates from Seattle to Valdez, Eagle, and Mouth of the Koyukuk River in 1904 [1]

Freight/Passengers	Valdez [2]	Eagle[3]	Koyukuk[4]
Loose Machinery < 1 ton	$11/ton	$82/ton	$113/ton
Machinery 1-2 tons	$13/ton	$90/ton	$126/ton
Machinery 2-3 tons	$16/ton	$104/ton	$149/ton
Machinery 3-4 tons	$20/ton	contract	contract
Machinery 4-5 tons	$24/ton	contract	contract
Machinery > 5 tons	contract	contract	contract
General Merchandise	$10/ton	$92/ton	$114/ton
Boats and Canoes	$10-25	———	———
Dynamite and Black Powder	$35/ton	$138/ton	$171/ton
Lumber	$13/m ft	$115/m ft	$148/m ft
Hay	$13/ton	$77/ton	$99/ton
Grain	$16/ton	$77/ton	$99/ton
Horses, Mules, Cattle	$30/head	$98/head	$131/head
Dogs	$5/head	———	———
Passengers (1st class)	$40	$89	$124
Passengers (2nd class)	$25	$72	$98

[1] Taken from Purington 1905: 230-233
[2] Ocean rates only
[3,4] Via White Pass Route, rail and water (June - September)

sled, that would take two to three months. Winter travel was more expedient as the swamps, muskeg, and rivers were iced over and freight could be transported by dog teams, packhorses, or horse-drawn sled much more easily than in the summer. The cost for such freighting was 7 cents to 30 cents per pound ($140-$600 per ton) depending, on the size of the outfit and the condition of the trail (Moffit and Capps 1911: 16). This expense hindered copper prospecting, delayed the installation of placer mining machinery, and was considered the most serious difficulty the prospector in the Chitina Valley had to meet (Moffit and Capps 1911: 16).

After 1911, transportation problems in the southern section of the Copper River country were lessened by the construction of the Copper River and Northwestern Railroad. It linked the fabulously rich copper mines at Kennecott in the Chitina Valley with Cordova on the coast. Besides providing transport out for the millions of tons of copper produced by the mines, it also provided much easier access into the area for prospectors and miners. Four years later, construction of the Alaska Railroad between the coastal town of Seward and Fairbanks, hub of the interior gold mining districts, was begun. By 1923 the 468 miles of track were completed (Capps 1924: 73). This railroad eliminated the necessity of taking the lengthy all-water route up the Yukon River via St. Michael for those set on mining in one of the interior districts. The railroad also greatly reduced the freight rates to points along its line and made year-round camps of the mining operations in the interior district (Wimmler 1927: 18).

A comparison of the freight rates from Seattle to Fairbanks in 1904 and in 1923 is shown in table 9. In almost all categories of freight, the 1923 rates (via ocean liner and the Alaska Railroad) are less than half what the 1904 rates (via ocean liner, White Pass and Yukon Railroad, and river transport) would have been. The most dramatic decrease was seen in the category of machinery, which cost $191 a ton to transport to Fairbanks in 1904, but only $20 a ton in 1923. Wimmler (1927: 24) estimated that the average placer miner in Alaska would require from a few tons to no more than 25 tons of supplies, exclusive of fuel, per season. (More weight would be required for large steam scraper, hydraulic, or dredging operations). In the more isolated districts, the additional coast of overland transportation might double or quadruple the freight rates. If, for example, a miner in 1904 wanted to transport one ton of each commodity in table 9, he would be charged $1,201; and if this price were conservatively doubled for overland transport, the cost would be about $2,400. On the other hand, the same amount of goods could be transported by rail at the 1923 rates for approximately $438, or doubled at just $876.

Table 9

Comparison of Freight Rates from Seattle to Fairbanks in 1904 and 1923[1]

Freight	1904[2]	1923[3]
Groceries/General Merchandise	$150/ton	$77/ton
Explosives	$225/ton	$115/ton
Grain	$135/ton	$49/ton
Hardware/Loose Machinery	$163/ton	$64/ton
Hay	$135/ton	$56/ton
Lumber	$202/m ft	$48/m ft
Machinery < 2 tons	$191/ton	$30/ton

[1] Taken from Purington (1905) and Wimmler (1927)
[2] Via ocean liner, White Pass and Yukon Railroad, and Yukon, Tanana, and Chena Rivers
[3] Via ocean liner and government railroad (rates shown are for less than carload; full carload rates are less expensive)

The reduction in freight costs was undoubtedly a boon to the development of mining technology in some of the districts accessed by the Alaska Railroad (Capps 1924: 74), but the Kantishna District was still too isolated to greatly profit by it. When the stampede of 1905 first brought miners into the area, the Kantishna River, tributary to the Tanana River, was the principal access route both in summer and winter (Bundtzen 1978: 152). Navigation was possible on the Kantishna River as far as the town of Roosevelt and on the Bearpaw River (tributary to the Kantishna) as far as Diamond. In 1920-21, the Alaska Road Commission built a wagon road from Roosevelt to Bear Creek; and from there a trail led to Eureka, the center of mining activity (Stewart 1921:11; Moffit 1933: 305). This river- and overland-route was not only used to bring supplies into the mining camps, but also used for transporting silver ores from several small mines on Quigley and Alpha Ridges out to the smelter in the early 1920s. The economic disadvantages of shipping ores over this circuitous route is described by Bundtzen:

> After being sacked they were transported in late winter to Glacier City from Eureka. From there the ores were hauled by horse-drawn sleds over a twenty-two-mile-long corduroy wagon road to Roosevelt, where they awaited spring breakup. Then a steamer barged the ores down the Kantishna River to the Tanana River, eventually reaching Saint Michael, at the mouth of the Yukon River. The ore shipment finally made it to Tacoma, Washington, by way of ocean steamer. The cost of transporting ore from mine to smelter was $75 a ton - an uneconomic trip unless the silver assay was at least 100 ounces a ton; silver was worth nearly $1 an ounce in 1920 (Bundtzen 1978: 155-156).

Even when construction of the Alaska Railroad provided an alternate summer transportation route, the shipment of silver ore from the Kantishna District, which lay between 50 and 70 miles west of the railroad line, was so expensive that only the richest ore could be shipped (Brooks 1923:36). These shipments were taken by wagon to Roosevelt, and then barged to Nenana, where the ores were transferred to the railroad and transported to Seward. From there the ore was put on a steamship to Puget Sound, and finally was shipped by railroad to Montana for processing. For just the portion of the trip from Kantishna to Nenana the freight coast was reported to be $57 a ton (Seraphim 1960: 8). The expense of transporting the ores to the smelter consumed practically all the mines' profits (Smith 1931: 64-65), and in 1923 production was brought to a halt (Seraphim 1960: 8). A winter haul road connecting the railroad at Kobe (about 40 miles north of McKinley station) to Diamond, which was linked to Eureka by trail, was used to bring in mining supplies and to ship out small tonnages of ore before the mines folded (Bundtzen 1978: 156, 161).

During the next decade, the transportation problems, which had plagued the Kantishna District from the beginning, lessened. In building literally thousands of miles of trails, sled roads, wagon roads, and later paved roads for automobiles and trucks, the Alaska Road Commission did much to alleviate the early transportation problems so prevalent in many districts. One of the major factors in bringing about a resurgence in mining in the Kantishna area in the 1930s was the completion of the road from McKinley Park Station on the Alaska Railroad to Eureka (Bundtzen 1978: 157). In later years, the mining industry also benefited by using aircraft to transport supplies and equipment into, and processed minerals out of, areas not accessible on the ground. An example of this can be seen in the Stampede Creek vicinity of the Kantishna District, where airplane cargo service was used in the 1940s to ship antimony ores out of the mines. The high price of antimony as a strategic mineral made air transport possible (Pittenger and Thomas 1980: 98).

Northern Climate and Environment. Most of the mining methods used in Alaska originated in other areas of the country, or the world, and had to be adapted to the sometimes-harsh climate and environment of the northland. Climatological data for the inland regions of Alaska in the early 1920s indicate a semiarid environment (9-15 inches of annual precipitation), with comparatively warm summers (mean temperatures of 50 F to 58 F degrees) and cold winters (mean temperatures of 0 F to -15 F degrees). The range of extreme temperatures for this period, registering -76 F to 100 F degrees, is striking (Wimmler 1927:15). Unlike the southern climes, where mining can be a year-round process, placer miners in Alaska operated for an average period of less than 100 days a year

(Brooks 1923: 2). The main deterrent to continuous operation was not the physical discomfort of working in sub-zero temperatures, but freezeup of the creeks and rivers, and thus the water essential for sluicing the gravels. Some types of work, such as exploratory shaft-sinking and drift mining, were carried out even in the winter by stockpiling the gravels in winter dumps, which were later sluiced after breakup.

Besides an abundance of water, another requirement for most types of placer mining is a steep bedrock gradient, needed to provide both an adequate amount of water pressure and a sufficient area for dumping the tailings. These requirements are particularly important in hydraulic mining; and, thus, the full exploitation of this method as it had developed in California, was not possible in many regions of the Alaska. Some notable exceptions were found in the Nizina, Chistochina, and Chisana Districts, now encompassed by Wrangell-St. Elias National Park and Preserve. In many districts on the Seward Peninsula and within the Yukon River region, except those adjacent to the Alaska Range, the scarcity of water is due to an absence of high mountain ranges, which would be a center of snow accumulation in the winter and a locus of precipitation in the summer (Brooks 1909: 37). For the most part, the streams in the Yukon placer fields are small and dependent on rainfall for their supply of water. During years with abundant summer rainfall, such as in 1905, placer mining was extremely successful (Prindle 1906: 109), whereas during seasons of drought, which occurred every four of five years, the gold output was severely curtailed (Brooks 1909: 21; Brooks 1914a: 45). Less affected by variations in rainfall than other types of placer mining, was dredging (Smith 1926: 19).

The "poverty of timber resources," another of the obstacles mentioned by Purington (1905:30), was a problem in districts where extensive drift mining was practiced or where large quantities of wood were used for steam thawing and power. In these districts, early miners would strip nearby forests, so it later became necessary to bring wood in from other areas, and thus increase its cost (Wimmler 1927: 28). Even in areas where timber was available, it was often small. For example, native spruce, used for sluice boxes, averaged less than one foot in diameter at the base of the tree in the Koyukuk-Chandalar region (Maddren 1913: 29), now included in Gates of the Arctic National Park. In the Kantishna District, several sawmills were in operation during the early gold rush period; but were later shut down and miners either had to cut their timber with a whipsaw or purchase it from the two remaining sawmills, both of which required a difficult haul over the tundra to reach the most active mining areas (Williams 1986).

Two other environmental factors that confronted the new arrivals to Alaska were permafrost and muck. Permafrost is frozen ground that does not thaw, even in the summer, and muck is the overlying insulation composed of silt, animal and plant remains, and a great deal of ice. Muck can range in thickness from a few inches to 40 feet (Graumann 1977b: 184). It must be stripped of its protective blanket of moss, exposed to the summer air, and washed away, before the gold-bearing deposits below can be reached. Even more difficult to deal with was the permafrost. The earliest practice used in many mining camps was building wood fires to thaw the frozen ground. This required a good deal of ingenuity to do properly, particularly when drift mining as the roof of the drift had to be shielded from the heat to prevent a cave-in. Small operations still used wood fires for thawing, primitive though it was, even after the advent of steam thawing. Other methods, employing hot rocks piled against the face of a drift or hot water played against the surface of a drift by nozzles, were not as widely used or as successful (Parker 1929).

Thawing by steam began in the Dawson camp in 1898 and quickly caught on in Alaska mining camps. In 1902 Brooks (1903: 45) noted that winter mining was carried on by means of petroleum and coal-burning steam thawers, which allowed the miners to sink a pit to the paystreak and then drift mine. The gold-bearing gravel was hoisted to the surface and stockpiled in winter dumps to be sluiced in the summer. The necessary equipment for steam thawing consisted of a boiler, pipelines for conducting the steam from the boiler to the working places, hose to provide a flexible coupling, and the nozzles or points (Parker 1929: 29). Steam points in use in the Yukon placer fields in 1905 have been described by Prindle as follows:

> The steam point is a piece of one-half or three-eighths inch hydraulic pipe, 5 to 8 feet or more in length, with a blunt, hollow point of tool steel for piercing the ground and a solid head of tool steel or machine steel, sufficiently strong to withstand the impact of a mallet or sledge. Steam is admitted through a pipe fitted laterally in a small aperture near the head. The points are placed about 2 1/2 feet apart and from a dozen to twenty or more are used in a plant of average size (Prindle 1906: 121).

One example of the capacity of the steam point to thaw the ground before dredging is given by Wimmler (1927: 76), who states that 100,000 cubic yards of gravel were thawed in one season on Candle Creek in the Kuskokwim District by 80 points, provided with steam by a 100 horsepower boiler, using 12 cords of wood per day.

In 1917 the placer industry was startled by the discovery that cold-water thawing was superior to hot water or steam thawing (Graumann 1977b: 193). This discovery was particularly important for the Alaska placer mining industry as it made possible the dredging of large areas of low-grade ground thought to be too lean or too deep to be successfully thawed (Wimmler 1927: 176). The method involves injecting water at normal surface temperatures and under pressure into the gravel through points resembling steam points. Not only was the cold-water method less expensive than steam thawing, it also turned out to be more efficient (Peele 1941: 10-615 - 10- 617).

Economics. Even in the most remote Alaska mining camp, the world economic situation played a great part in determining the success or failure of the operation. The demand for gold and other minerals fluctuated in response to economic, political, industrial, and social conditions; and, thus, large and small operators alike were tied into the world market. This point is taken up by Brooks, who states that:

> The larger oscillations of the world's gold production are clearly recognizable in the Alaska output...The facts...show clearly that whatever local conditions may affect Alaska gold mining and however these may be improved by the construction of railways and roads and a betterment of the steamboat service, the progress of the industry is to a large extent controlled by factors that are world-wide in their effect (Brooks 1921: 8).

The national and international events that affected Alaska mining most profoundly during the first half of the twentieth century were the fixing of gold prices in 1900 and again in 1934, the two world wars, and the inflation of the post-war years. With the passage of the Gold Standard Act in 1900, the price of gold was set at $20.67 an ounce. The gold standard is an international system whereby the paper money issued by a govern-

ment is backed by and can be exchanged for gold (Cohen 1982: 17). At that time and for several years to come, the economy of the Alaska placer gold industry was based on "quickly exhausted rich bonanzas" (Brooks 1912: 36), mined mostly by hand methods.

The patterns of development in each of the Alaska gold mining districts were similar in that the initial discovery of high-grade "pay" resulted in the early exploitation by individuals and small companies. When this phase of mining had exhausted the rich deposits, mining grounds were consolidated by large companies for the subsequent exploitation of lower grade deposits (Robinson and Bundtzen 1979: 3). The lower grade deposits could not be tapped without incorporating more advanced technology and mining on a larger scale. A financial panic in 1907 prevented large amounts of capital from being invested in large-scale placer mining, but with improving conditions during the next several years, the tendency toward large-scale mining increased (Graumann 1977b: 201-202).

For the copper mining industry, the years from 1914-1918 were very productive because of the high price of copper during World War I. The copper industry greatly profited by technological advances, such as mining of low-grade porphyry deposits on a large scale and the advent of the flotation process, which increased the recovery rate of copper during milling. These developments reduced the cost of producing the red metal and made available vast tonnages of ores that could not have otherwise been mined at a profit (Gardner, Johnson, Butler 1938: 11). After the war, the value of the copper produced in Alaska plummeted. The income from Alaska copper fell from $17,098,563 in 1918 to $8,783,063 in 1919 (Brooks and Martin 1921: 69).

The post-war years were also difficult for the gold mining industry because the war had depleted the labor supply and raised the cost of materials and equipment. During this period, many prospectors, discouraged by the depression and the exhaustion of bonanza deposits, left the territory, and more than half of the placer operations failed due to the adverse conditions (Graumann 1977b: 202 - 203). One of these adverse conditions was the fact that inflation had driven up the costs of mining gold until they approached, and sometimes exceeded, the official price of gold (Cohen 1982: 19). The days of mining profitably on a small scale had passed, at least for the short term.

Even in the post-war years, the owners of larger plants, equipped with dredges or hydraulic equipment, could not afford to let the men and machinery idle, and as a result there was a steady improvement in mining methods and economic management. This trend continued throughout the 1920s. The emphasis had shifted from wasteful mining of bonanza deposits to planning, management, experimentation, and the replacement of obsolete machinery in order to mine low-grade deposits at a low cost (Graumann 1977b: 203-204). The silver mining industry, on the other hand, was not being developed to any extent, although silver-lead lodes were known in many places in interior Alaska. The reason was that silver has a much lower value than gold per unit of weight; and therefore, unless the ore was of especially high grade, it was not worth the capital investment to explore or develop those deposits (Smith 1931: 64).

The worldwide depression of 1929-1934 did not affect the gold industry as severely as it did other businesses and industries. In fact, the large unemployment rate served to renew an interest in prospecting. During that time, the small operator enjoyed a revival because the depression limited the capital available for development (Graumann 1977b: 205-206). The most significant event that further enhanced the appeal of placer mining

and greatly stimulated the mining industry was the increase in the fixed price of gold to $35 an ounce. The price had remained the same since 1900; but in 1934, President Roosevelt signed the Gold Reserve Act, and thus the gold standard was abandoned. This meant that the dollar was no longer convertible to gold and that the private hoarding of gold and the use of gold as money were prohibited. It would be another 34 years before the price of gold would be allowed to seek its own level in the private market, and another 40 years before a bill lifting the restrictions on holding gold by U.S. citizens would be passed by Congress (Cohen 1982: 17 -20).

Gold mines, determined to be non-strategic industries when the U.S. entered World War II, were closed by the War Production Board order L-208 issued in October 1942 (Stewart 1945: 18). Antimony mines, however, considered essential to the war effort, remained opened and prospered during the war years. With the lifting of the restrictive order at the end of the war in 1945, the mining industry as a whole was slow to recover. One of the problems was a shortage of labor, and another was the difficulty in replacing essential equipment and supplies that had been stripped from the mines for use in the construction of defense projects (Stewart 1947: 10). Many properties that had formerly been profitable were too low grade to mine after the war because of inflation, the fixed price of gold, and the fact that gold had to be sold to a single, non-competitive buyer, i.e., the U.S. government (Stewart 1949: 10; Cohen 1982: 21). It wasn't until 1949-50 that the Alaska mining industry began to recover from the post-war slump. The recovery was due in part to greater efficiency in labor and equipment and the fact that small operators were replacing men with machines and adopting up-to-date mining methods (Saarela 1951: 11).

Prospecting and Exploration

Prospecting is the first stage in any mining venture. The search for minerals, particularly gold, fires the imagination of both the seasoned miner and the novice. Knowledge of the geological associations and peculiarities of ore bodies is a great help to the prospector, although some ore discoveries have been made by inexperienced men, or simply by accident (Peele 1941:10-04). A gold pan, a pick and shovel were standard equipment of the earliest prospectors who continued north after the Klondike Gold Rush at the turn of the century (nineteenth to twentieth). They prospected stream gravels and excavated the streambed and banks down to bedrock at various points. During the gold rush stampedes, prospectors might note the occurrence of quartz, evidence of a possible lode deposit; but they were mainly interested in placer deposits, which offered more immediate results. In the rich gold-bearing gravels that were first mined in Alaska, prospecting and mining by hand-shoveling were done simultaneously, with the work being shifted from place to place according to what was found during the course of a day (Jackson 1938: 20).

Prospecting for placer deposits involves panning the gravels, or using a rocker, a long tom, or a short section of a sluice box. In panning, the prospector shakes the pan filled with stream gravels under water, bringing the light material to the surface, and allowing the heavy particles to settle. Eventually, after all the light material has washed away, only the gold and heavy sand remain in the pan. The colors are either picked out by hand or amalgamated with a bit of mercury. It has been said that an experienced prospector can pan about 100 pans in 10 hours, or the equivalent of about 0.6 cubic yards per day (Jackson 1938:20). Although the gold pan is usually thought of as a prospector's tool, it is also used in the cleanup of gold from the sluices at large placer operations.

The use of a rocker increased the volume of gravel that could be processed by two men per 10-hour day to about 3-5 cubic yards (Purington 1905:56). The type of rocker used in the Klondike was a two-part wooden box mounted on rockers and set up near a good supply of water. The shallow upper part, fitted with a perforated sheet iron bottom, served as a hopper for the gravels, and the lower part, fitted with an inclined shelf covered with a blanket and wooden slats below, served to trap the fine gold. Water was ladled into the top as the device was rocked to separate gravels from gold, which was picked off the blanket below (Hunt 1990: 139). Slightly more efficient than a rocker in processing gravels was a long tom, an open box 6 to 12 feet long with a perforated plate or screen at the bottom. A short section of flume, to direct the water, is positioned above the tom, and a riffled box, to trap the gold, is placed below. The three sections, placed on a grade, are worked by two men, one who shovels in the gravels and other who removes the larger stones (Jackson 1938: 23). The primary value of both a rocker and a long tom was in locating and testing a deposit. Once a rich area was located and explored and the real mining began, more effective methods of moving the gravel were used.

The exploration stage of mining begins once a mineral deposit has been found. It is often difficult to distinguish between prospecting and exploration because the term prospecting is sometimes used in the literature to describe the exploratory work required to determine the characteristics and profitability of a deposit. One way to distinguish between prospecting and exploration is the increased level of expenditure involved in the latter to define the boundaries of the deposit or ore body, rather than to simply locate it (Logan Hovis, personal communication). In small-scale placer mining, the prospector and his partners did the exploration work, thereby keeping expenses to a minimum. In many cases, however, the prospector's job was done once the strike was made, and he would seek out a well-financed mining company to buy out the claim and take over the exploration work from there. The results of exploration, plus the experienced judgment of the prospector or mining engineer, would determine whether the paystreak or the ore body could be profitably mined.

Before the introduction of geochemical and geophysical techniques for exploring lode deposits, similar methods were employed for the exploratory work of both placer and lode mining. These methods included the excavation of test-pits, trenches, shafts, and drifts, or drilling. For exploring the boundaries of a placer deposit, one simple, but effective method was panning gravel from natural exposures. The factors to consider in an exploration plan are the pattern on which the test pits, drill holes, and so on are to be laid out, plus the number, size, and depth of excavations to be made. In placer mining, the type of excavation used depends upon the topographic setting, depth of the deposit, depth of the overburden, presence of permafrost, and the presence or absence of water in the cut. Where the gravels are less than 10 feet deep and contain no water, test pits or shafts are the most practical method of exploration. If the alluvium is wet and about 25 feet or more deep, drilling methods are preferable (Hutchins 1908: 54). Spacing of the shafts or drill holes varies according to the type of placer deposit (creek, bench, and so on), and the capital or labor available. Drill holes can be placed on a grid and sunk at regular intervals, while shafts are usually neither as numerous nor as regularly spaced.

Excavations, such as shafts and test pits, were generally more practical and less expensive than drilling for the average Alaska placer miner in pre-World War II days. Larger samples and a better opportunity to physically observe the deposit are the advan-

tages of such cuts over drill holes, which are usually no more than 6 inches in diameter. Shafts can be sunk in shallow, wet gravel if the sidewalls are cribbed and can also be excavated in frozen ground without cribbing, given the proper equipment. For a small prospecting outfit, this equipment might have consisted of a 4-6 horsepower boiler mounted on a sled or skids, a steam point or pipe, a steam hose, and a hand windlass to haul the gravel to the surface (Wimmler 1927: 34). According to the statistics presented by Wimmler (1927: 34), uncribbed shafts or pits sunk in frozen soil in several Alaska mining districts in 1927 were usually no larger than about 4 x 6 ft, and no deeper than about 80 ft.

The sample produced by drilling is considerably smaller in volume than that of a test pit. The sample was taken from the ground surface to bedrock, using equipment operated by hand (or a combination of hand and animal power) or by engines. In either case, the operation involves driving a pipe or casing into the ground, drilling the material in the resulting core, and then pumping and hoisting it to the surface for testing. The power for a hand churn drill was supplied by men, sometimes assisted by a horse, rotating the casing and thus sinking it into the ground by poles attached to a platform placed on top of the casing. Driving the casing, drilling, and pumping were done simultaneously with the hand drill. The advantages of hand drilling were its cost compared to power drilling and the fact that the equipment could be broken down and packed into inaccessible areas. With a workforce of five to seven men or five men and one horse, the cost of operation for a hand drill per day in 1907 was estimated to be $33-$50 (Hutchins 1908: 61-62). By 1927, hand drills were seldom used in Alaska (Wimmler 1927: 38).

A power churn drill is an expensive piece of equipment, costing up to $4,000 delivered to Alaska in 1905 (Purington 1905: 39), but even today it is considered the most accurate method for recovering placer samples (Levell et al. 1987: 15). Power was supplied by either steam or gasoline engine. The drill itself consists of a derrick equipped with cables on which the drilling equipment and pumping equipment are suspended. After the pipe is driven in to obtain a core, the chisel-shaped drill bit crushes the alluvial material, which is then pumped to the surface. The sample obtained is either panned or rocked to recover the gold. In 1907, the whole operation cost between $59 and $91 a day, about twice what hand drilling would have cost (Hutchins 1908: 60).

The exploratory phase of mining is only as good as the sampling plan that accompanies it and roughly indicates the value of the deposit in terms of dollars and cents. The importance of sampling was recognized in the early literature on Alaska placer mining, specifically by Chester Purington, who warned that "neglect to apply some form of sampling to the dumps has caused many lamentable failures in the Klondike" (1905: 43). He was referring to winter dumps excavated by prospectors awaiting the spring thaw. He suggested that four times a day, each conical dump should be sampled by gold pan in the following way:

> one from each quadrant of the dump one-half way down from the top - and one pan from the apex. The results of the 20 pannings are put together before weighing, and 50 percent of the result is taken for the average value of what has been taken out during the day (Purington 1905: 43).

One method of accurately determining the value of a placer deposit involves calculating the results of a drill sample. In this method, one determines the value of gravel in

each drill hole in cents per cubic yard. The figure is derived by dividing the weight of the gold in milligrams times the value of the gold in cents per milligram times a conversion factor of 27 (cubic feet per cubic yard) by the volume of the gravel excavated (depth times the cross-sectional area) (Gardner and Johnson 1934a: 40; Wells n.d.: 46).

Many of the same methods used in the prospecting and exploration stages of placer mining are also used in lode mining, so the discussion on these methods is brief. In prospecting for a lode deposit, the prospector's first clue is often the discovery of a placer deposit. With any luck, it is traced back to the original source of placer gold in the mother lode. Another clue to the presence of a lode deposit is a "float" or a piece of rock broken off from the outcrop of the lode and moved by gravity and running water. In the case of gold, the float is commonly quartz or rock containing quartz and some gold. In hilly country, the float is followed uphill, whereas in flat, previously unglaciated country, the source of the float may be quite close to where it was originally located. An outcrop may or may not be visible, and if not, trenching or test pitting is done to uncover the bedrock in search of the lode. The location of a float in glacial debris, however, makes the source very puzzling to determine because it may have been carried hundreds of miles away by the glacier as it retreated (Jackson and Knaebel 1932: 36-38).

In the exploration stage of lode mining, the procedures are also dependent on a number of factors, such as the position of the ore body relative to surface topography; its shape, size, and dip; and other factors such as location, accessibility for men, supplies, fuel, water, and the amount of money available for exploration (Jackson and Knaebel 1932: 38). The early exploratory work involves shallow excavations, such as trenches, to uncover the outcrop continuously along its strike, or at frequent intervals at right angles to the strike. Before World War I, trenches were dug by hand, with tools such as a long-handled shovel, railroad pick, or pry bar. If penetration into the rock itself is necessary, the exploratory work is done by drilling with pneumatic drills or blasting with dynamite. The next step is to plan for deeper explorations involving the excavation of adits, shafts, crosscuts, or drifts. Preliminary drilling, using either a churn drill or a diamond drill (the circular drill bit is embedded with industrial diamonds), may be done to determine the position of the lode much faster and more cheaply than possible by tunneling or shaft-sinking. Drilling, usually considered as a guide to exploration, does not take the place of shaft-sinking, drifting, or crosscutting in the exploration process (Jackson and Knaebel 1932: 39-44; U.S. Forest Service 1975: 69-73).

In lode mining, the common methods of sampling are channel sampling, pick sampling, drill sampling, grab sampling, and bulk sampling. Bulk samples are said to be the kind that most often adequately represent the grade of the ore. They consist of a few to several hundred tons of ore blasted from the drifts and then processed through a mill. The gold recovered, plus an estimate of the loss in tailings, is assayed, thus giving a total amount of gold in the sample (Jackson and Knaebel 1932: 45, 48). The value of the gold can then be extrapolated from this figure, based on the current market value for the precious metal.

After the exploration phase is complete, the decision on whether or not to proceed with mining is made after making a cost estimate of equipment, labor, and general operations. In placer mining, other considerations are the availability of water for sluicing, the character of the bedrock and gravel, the length of the working season, and the means of transport and access into the area. In lode mining, the location of the mill, type of power

generation to operate the mill equipment, and method of transporting the ore from the mine to the mill are just some of the factors to consider before deciding to develop and exploit an ore deposit.

Placer Mining

Whether complex machinery or simple hand tools are used in placer mining, the sequence of steps for developing and mining a deposit are basically the same. They are (1) excavation of the gravels, (2) transport of the gravels to a processing and recovery system, (3) processing the paydirt to recover the gold, and (4) removal of the tailings (Levell et al 1987: 30). A fifth step, reclamation work, important in current mining practices, did not come into play until mandated by law. The actual method of developing and mining a placer deposit, whether by open-cut methods (surface mining) or by drift mining (underground mining), depends upon a host of variables, such as the nature of the bedrock and topography, the depth and richness of the deposit, the amount of water, labor and capital available, the accessibility of the claim, and the state of mining technology in practice at the time.

The earliest placer mining technology in Alaska involved simple hand methods, using rockers and sluice boxes for separating the gold from the gravels. During the time between the turn of the century and World War I, the technology had improved to include ground sluicing, booming, drift mining, hydraulicking, and dredging. In the 1930s, diesel engine bulldozers and draglines were developed, which improved gravel moving capabilities in mining, and portable centrifugal pumps, which reduced the large water requirements of earlier mining methods by recirculation of the water in use. Some other technological advancements before World War II were mobile, skid or track-mounted washing and recovery plants, and sluiceplates (Levell et al. 1987:26). As discussed above, nearly all placer mining stopped during World War II as it was considered nonessential to the war effort. After the war, the lode mining industry underwent extreme mechanization and retooling, resulting in the evolution of an almost new technology. Placer mining technology, on the other hand, was held back by the low price of gold until the late 1960s when its price was allowed to float on the open market. The course of the changes described above was not linear. Older, less mechanized, and less sophisticated techniques often continued to be used because they were best suited to the deposit being mined, or because the miners did not have enough capital to invest in expensive new machinery (Logan Hovis, personal communication).

Hand Methods of Open-cut Mining. One of the most basic methods of open-cut placer mining, used extensively at the turn of the century in Alaska, is called shoveling-in. This technique, which can be accomplished by either a single miner or a large crew, begins with excavation into the streambank. From the pit that is formed, the miner shovels the gravels directly into a sluice box to be washed. Water is supplied to the head of the sluice by a ditch or flume diverting water from the stream itself or through pipes or a canvas hose. This process continues until cleanup, discussed below, when the gold is separated from the fine sediment trapped by the riffles. Ideal conditions for shoveling-in are shallow creek deposits of no more than 5-6 ft., where the grade is steep enough to position the sluice boxes on the bedrock at the lower end of the paystreak (Peele 1941:10-542).

Another basic method used in placer mining is ground sluicing. It is most useful for removing the overburden from the pay gravel and can be used in conjunction with shovel-

ing-in. In ground-sluicing, a trench, excavated down to bedrock, is used to divert the flow of a stream against or over a bank of placer gravel (Jackson 1938:25). If the grade is steep enough, it is not necessary to excavate to bedrock before ground sluicing begins. The gold is trapped by irregularities on the bedrock or in sluice boxes positioned at the lower end of the trench. This method is advantageous to the miner where the gold-bearing gravel is shallow (no more than 6-8 ft.), where there is an abundant supply of water, and where the grade is steep enough to move the loosened gravels (Peele 1941:10-541). It is also inexpensive and simple, but can be quite effective.

Dams are sometimes used to regulate the flow of water during ground-sluicing if the water supply does not permit steady work. The process of impounding water with a dam above the diggings and releasing it at intervals to wash gravel through the ground-sluices is called booming (Peele 1941: 10-541). One such dam in operation in 1904 on Discovery Fork of American Creek, about 10 miles south of the Yukon-Charley Rivers National Preserve headquarters in Eagle, has been described as follows:

> the ends of the logs were set in frozen ground on both sides and the muck was allowed to refreeze around them. The dam, 40 feet long, consists of 12-inch timbers, from 9-18 feet long, laid up in two rows, 5 feet apart, earth and rock filled, and braced with cross timbers.... The dam, self-dumping gate, and accessory flumes were built by two men, and are said to have cost, in labor and time, only $300 (Purington 1905: 57).

For many deposits, shoveling-in to a sluice box or ground-sluicing were not feasible, and other methods of transporting the gravel were needed. Some of the various contrivances used were buckets, wheelbarrows, stoneboats (flat, runnerless sleds for transporting loads), or small mine cars on tracks. An inclined runway or a small hoist may also have been used when the head of the sluice was elevated to provide for the proper grade. In all these methods, the power could be supplied by hand, both for the excavation and the transport of the gravels.

As a boost to manual labor, draft animals were enlisted at some placer mines to increase the volume of gravels that could be moved per day. A horse-drawn scraper was one such improvement. Before the ground was scraped, a common plow with a team of horses was used to break up the ground for the scraper. Purington states that "two horses, or, better mules, hauling a scraper, ... scrape into the (sluice) boxes from 30 to 40 cubic yards of gravel a day over a distance of 75 feet" (1905: 60). In comparison, the volume of gravel shoveled-in by one man ranged from 2 3/4 to 7 1/2 cubic yards per 10-hour day in various Alaska mining districts (Purington 1905: 59).

A sluice, used not only in hand methods of open-cut mining, such as described above, but also in hydraulicking, drift mining, and so on, is the standard gold recovery device in placer mining. A sluice is simply a long, inclined trough for washing and separating ore from the alluvium, and operates under the principle of gravity separation. In other words, the fine-grained, light sediments are removed and lifted by the water; and the higher density particles, such as gold, settle out. Before the 1930s, the standard design for a sluice had 12-foot telescoping sections (Logan Hovis, personal communication). Each section was an open box, two inches narrower at one end than the other so that adjoining boxes would telescope a few inches into each other (Peele 1941: 10-561). This design made it easy to erect and move the sluice boxes and to adjust the slope to maximize gravel pro-

cessing and gold recovery. The boxes were placed on bedrock, in ditches, or were elevated on trestles, depending upon the grade that was needed. The grade was dependent upon the volume of available water.

Riffles, which are blocks, slats, or poles of wood placed crosswise or lengthwise to the flow of water at the bottom of the sluice box, have three functions : (1) to retard material moving over them and give it a chance to settle, (2) to form pockets and retain gold that settles into them, and (3) to form eddies that roughly classify the material in the riffle spaces (Peele 1941: 10-565).

The choice of riffles depends on the particle size of the gold and on the method of placer mining, but various types can be used in different places along the length of the sluice boxes. For example, the pole riffle was a favorite among Alaska miners for coarse gold in shoveling-in operations; whereas the transverse, or Hungarian, riffle, which offered more frictional resistance, was better suited to fine gold. Other types of riffle are cobble or rock riffles; longitudinal or transverse riffles made of heavy-duty railroad rails; wooden Hungarian riffles shod with iron straps; angle-iron or T-iron riffles; and grate riffles, which can be placed in either a transverse or longitudinal direction to the sluice box (Peele 1941: 10-565 - 10-567).

Undercurrents are variants of sluices that serve to recover fine gold, and are used in conjunction with the main sluice. They are usually wider and shallower than the main sluice and are paved with riffles consisting of wooden blocks, cobbles, or poles shod with iron. The positioning of undercurrents can vary. In one variation, the undercurrents are placed alongside and below the main sluice at a point where there is a drop in elevation. A grizzly, constructed of heavy steel rails or flats with 1/4 - 1 inch spaces in between, connects the main sluice with the undercurrents and prevents large cobbles from entering into the latter (Jackson 1938: 28; Peele 1941: 10-569 - 10-570).

Gold is removed from the sluices and undercurrents in a process called cleanup. The careful placement of mercury in the sluices and undercurrents is at cleanup because of its power to amalgamate with gold and silver. Cleanup is done by removing the riffles, starting at the top, and scooping out the remaining heavy sand and amalgam containing the gold. During cleanup, all other operations in the immediate area cease. The water is then turned out of the sluices and selected workers go through the boxes, pulling the riffles and cleaning the cracks with whisk brooms and tools similar to dental picks, to ensure that all the gold is recovered (Logan Hovis, personal communication). In shoveling-in operations, cleanup may be done on a daily basis, while in hydraulicking it may be done only once a season if the water season is short (Gardner and Johnson 1934b: II, 75). The product of cleanup is a sluice concentrate, which is then panned, rocked, or further amalgamated for better separation.

The final process in gold recovery is extracting the gold from the amalgam. The single miner or small operator can do it very simply by heating the amalgam on a clean iron surface, such as a frying pan or a scrap of sheet iron, over an open fire, or forge, or in a furnace until all the mercury is driven off. The problem with this method is that mercury vapors are extremely poisonous, so the process had to be done with care in a well-ventilated place. The gold is then annealed by further heating on the iron surface, and is finally in a salable form. A safer method is to use a retort, either a glass tube sealed at one end and bent downward at the other, or a cast-iron pot with a tight-fitting lid and inserted condenser pipe. When the retort is heated, the mercury is driven off in the condenser pipe,

which is cooled with water, and the liquid mercury is trapped in a receptacle (Gardner and Johnson 1932b: 81-82).

Although hand methods of open-cut mining were rapidly replaced with more technologically advanced methods when the capital was available, these "primitive" methods conducted by one man or by groups of two or three men, persisted until at least the 1920s, or later, in all the mining districts in Alaska. In the report of the Territorial Mine Inspector to the Governor of Alaska in 1923, B.D. Stewart stated that "the day when this form of small scale mining can by profitably conducted has practically passed in most of the districts, but such operations afford a meager livelihood for a large number of prospectors" (Stewart 1923: 27). In the Chisana District, in what is now Wrangell-St. Elias National Park and Preserve, hand methods of mining, including ground-sluicing were practiced until the 1930s and 40s (Smith 1942: 38; Stewart 1947: 19 - 42).

Open-cut Mining with Power Equipment. Power equipment was brought into Alaska for large-scale mining ventures, such as in Nome and Fairbanks, just after the turn of the century. Power equipment, although expensive to buy and transport to Alaska, was ultimately cost effective for large-scale operators because of the increased volume of gravel that could be processed per day. The equipment consisted of mechanical excavators such as power scrapers and power shovels, as well as power hoists and derricks, which mechanically transported the gravel to the head of the sluices. Aerial cableways and draglines (or dryland dredges) did double duty by both excavating the deposit and transporting the gravels to the washing plant. The power sources for the early scrapers, hoists, and cableways were boilers and stationary steam engines, whereas the power shovels and draglines or dryland dredges were equipped with self-contained power sources, usually internal combustion engines (Hovis 1992c).

Steam scrapers were just coming into use during Purington's survey of placer mining operations in Alaska in 1904. An early one he described in the Fortymile District was a horse scraper rigged for steam with pulling and drawback cables. A 10-horsepower boiler powered both the hoist to operate the scraper as well as a bucket elevator that lifted the gravel to the sluice (Purington 1905: 61-62). This type of small drag scraper, made of light construction and difficult to handle under power, was replaced with the heavy Bagley bottomless scraper, which had the advantage of automatically dumping its load. The typical equipment necessary for a Bagley scraper operation consisted of the following: a boiler that supplied power to a three-drum hoist; the scraper itself; masts, cables, sheaves, and guide blocks to move the scraper around the pit; and an underground loading station equipped with cars on a track and operated by an auxiliary hoist to carry the gravel to the dumpbox above the sluice (Wimmler 1927: 96-97; Peele 1941: 10-546). A steam-powered Bagley scraper was the first piece of heavy equipment to be introduced into the Yukon-Charley Rivers area in 1911. It was brought up Fourth of July Creek from the Yukon River, some 10 miles away, by pulling itself forward on its foundation of logs by cables attached to its hoist drums and hooked into holes dug in the frozen ground (Prindle and Mertie 1912: 208).

Slip scrapers, limited to mining shallow, rich deposits, were also in use in Alaska during the early 1920s. The use of all types of steam scrapers was declining by 1924 because their installation and maintenance was too costly to offset the return on the low-grade gravels being mined at the time (Wimmler 1927:95). Steam shovels, although rarely a success in gold placer mining, were yet another type of power excavator used as early as

1902 on the beach gravels in Nome (Brooks 1903: 52). One of the most serious problems encountered with steam shovels was their lack of mobility (Peele 1941: 10-546). Apparently none was operating in the early 1920s when Wimmler (1927) made his survey of placer-mining methods in Alaska.

Two types of equipment for transporting the excavated gravels were power hoists and derricks. In some cases the power hoist was used in conjunction with a track-and-incline system, whereby gravel would be shoveled into cars on an inclined track and hauled up to the head of the sluice with power supplied by the hoist (Purington 1905:72). In another type of haulage arrangement, the gravel would be shoveled into large buckets, slid upon wooden skids, and hoisted to the dumpbox at the head of the sluice by a derrick. The derrick consisted of a mast with a rotating boom that could be raised or lowered (Purington 1905: 68; Peele 1941: 10-544). One plant in the Council Mining District of the Seward Peninsula, which used such a derrick system in 1904, was described as handling roughly 500 cubic yards of gravel in a day (Purington 1905: 69). Derricks were most useful in shallow open-cuts where cleaning of the bedrock must be done with a pick and shovel.

Both aerial cableways and dragline excavators were capable of combining the excavation and transportation functions of power equipment, but the more efficient dragline dredge, which came into use just before World War I, was the more widely used in Alaska (figure 5). It is described as:

> a self-contained digging machine mounted upon skids and rollers or equipped with caterpillar traction. The bucket is operated from the main engine by cable over a series of sheaves and hangs from the end of a long boom...The toothed dragline bucket is lowered into the cut, pulled forward by a haulage cable and filled and hoisted to the end of the boom; the machine is then rotated to the dumping point and the bucket dumped (Wimmler 1927: 109).

The advantages of the dragline over other types of mechanical excavators were its wide digging radius; the fact that it dumped its load at a considerable elevation, thereby eliminating the need for hoisting to the sluices; and its combined operation of excavating, transporting, and elevating the gravels (Peele 1941: 10-547).

Before the mid-1930s, dragline excavators were used in conjunction with conventional sluice arrangements for washing and processing the gravel. An improvement in this system came in the form of a washing plant mounted on scows or pontoons that floated in a pond excavated by the dragline equipment. Standing on dry land, the dragline excavator delivered the gravel to a hopper on the washing plant, equipped with gold-saving equipment practically identical with that on a chain-bucket dredge. (This type of equipment is described below in the section on dredges). Dragline, or dryland, dredges were suitable for use in working deposits too small to warrant installation of a chain-bucket dredge (Peele 1941: 10-601).

A large dragline project, conducted in 1939-41 on Caribou and Glacier Creeks, proved to be the most productive placer gold mining operation in the history of the Kantishna District. The equipment consisted of a dragline or dry-land dredge with a trommel screen, a belted stacker for tailings, and dredge tables for gold recovery. It was mounted on crawlers similar to those on a tractor and fed by a 1 3/4-yard dragline. It was pulled forward either by a tractor or the dragline. During its three seasons of operation, an average of 75 cubic yards of gravel was processed per hour by the ten-man crew working two 10-hour shifts day and night (Bundtzen 1978: 158).

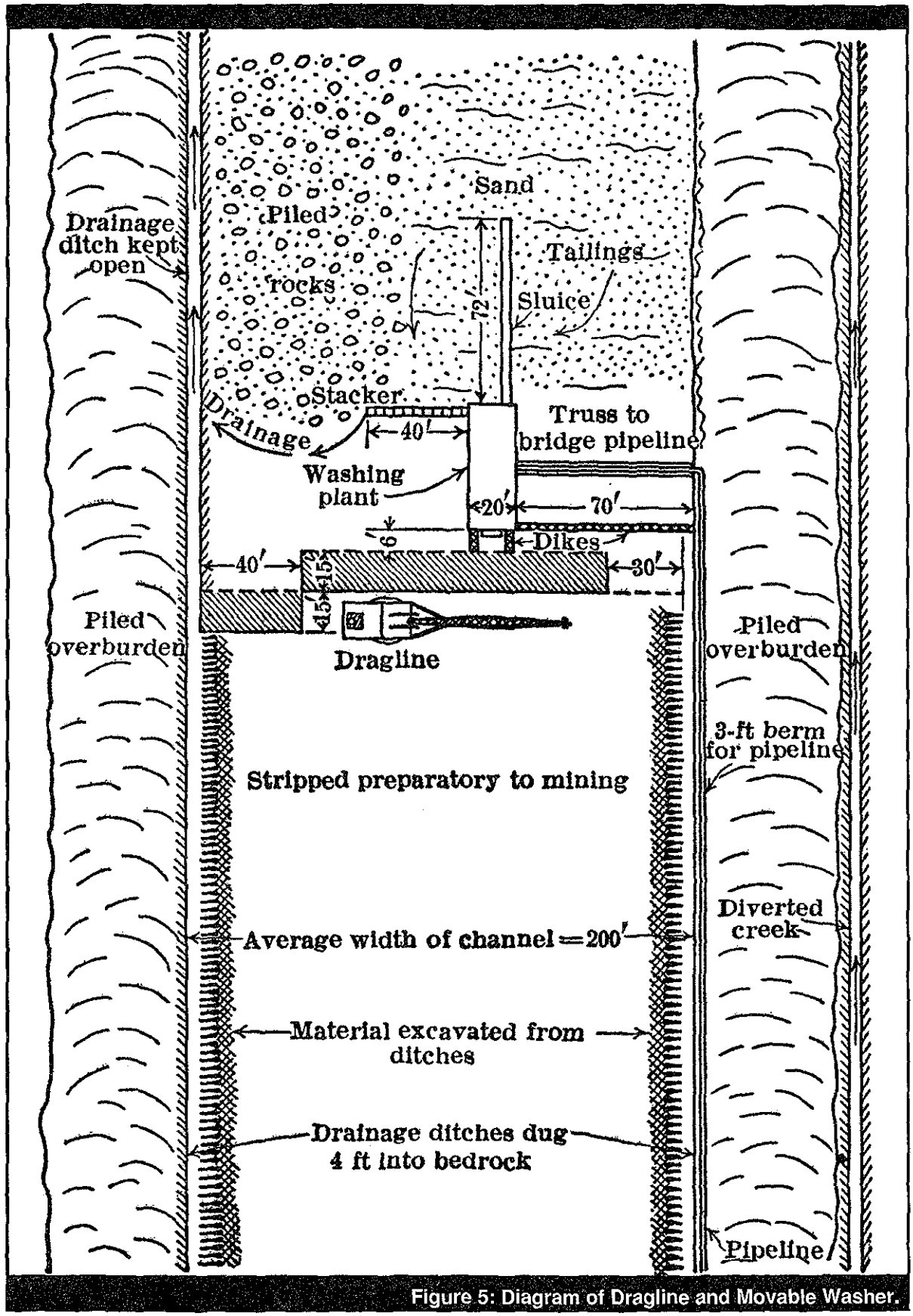


Figure 5: Diagram of Dragline and Movable Washer.

Drift Mining. One of the most important early placer mining methods in Alaska took its name from a lode mining term for a horizontal underground passage driven along a vein, known as a drift (figure 6). Drift mining was profitable where a rich, thick paystreak occurred under a deep barren overburden. Rather than remove the overburden, the miners would excavate either a shaft or an adit, depending on the local topography and type of deposit, down to the bedrock and mine only the gravel next to the bedrock. In Alaska, most drift mining was done in frozen deposits ranging from 25 to more than 200 ft. deep (Wimmler 1927: 13). It was a successful early method as it was well adapted to pick and shovel work and did not require expensive machinery. Another advantage was that most drift mining activities, except sluicing, could be done during the winter as well as in the warm season. In the winter, the gravel would be piled on the surface in "winter dumps" and await sluicing once free-flowing water became available in the spring. Water for sluicing was supplied by gravity flow in ditches or was lifted to the sluice by a pump (Wimmler 1927: 124).

Some of the earliest drift mining in Alaska took place in the high bench gravels in the Nome District around 1900. By 1903 there were 20 shafts and several miles of underground workings in the gravels (Brooks 1904: 53). Drift mining was to gain prominence not only in Nome, but also in the Fairbanks, Hot Springs, Koyukuk, Ruby, and Tolovana Districts (Wimmler 1927: 113). Drift mining was of particular importance in the Yukon-Charley Rivers area, with small-scale drifting continuing into the 1920s near Woodchopper Creek (Mertie 1930: 165). By the 1920s, all the large blocks of virgin ground adapted to drift mining were exploited; and mining of the lower-grade pays was no longer profitable, except by very small operators. These small-scale ventures, employing 2-6 men and using old and inefficient equipment, persisted until the end of the decade (Wimmler 1923: 27; Wimmler 1927: 113).

Drift mining is well suited to frozen ground because it often does not require shoring up with timbers. However, the ground must be thawed before excavation can take place. After a shaft is sunk to bedrock, small drifts are run right and left until the paystreak is encountered, then the workings are extended along the paystreak (Parker 1929:51). Drifts are sometimes driven up to 300 feet from the bottom of the shaft; in wide paystreaks they can be driven in four directions, but in narrow ones, just along the pay. In the early days, mining proceeded outward from the shaft, a method called long-wall advancing; but later the customary practice was to work back toward the shaft, called long-wall retreating, or breasting (Wimmler 1927: 119; Peele 1941: 10-607). Some unfrozen gravels, such as in the Nizina District in Wrangell-St. Elias, were mined with adits rather than shafts, which saved hoisting and pumping, but did require timbering (Wimmler 1927: 120).

Excavation of the gravels was done with picks, hand drills, or sometimes by blasting, and the gravel transported to the shaft by wheelbarrows or cars on tracks. In the early drift mines, gravel was hoisted up the shaft in buckets by a windlass or a whim, a horse-operated device for winding in a hoisting rope. The windlass gave way to steam driven hoists, which were operated from a form of headframe, such as a derrick or tripod at the shaft. An important development in drift mining was the automatic dumping device, which made the installation of headframes unnecessary. It consisted of a bucket, which was raised from the shaft bottom on a cable suspended from the gin-pole and automatically locked onto a carrier at the top. The bucket was attached by a chain sling to a

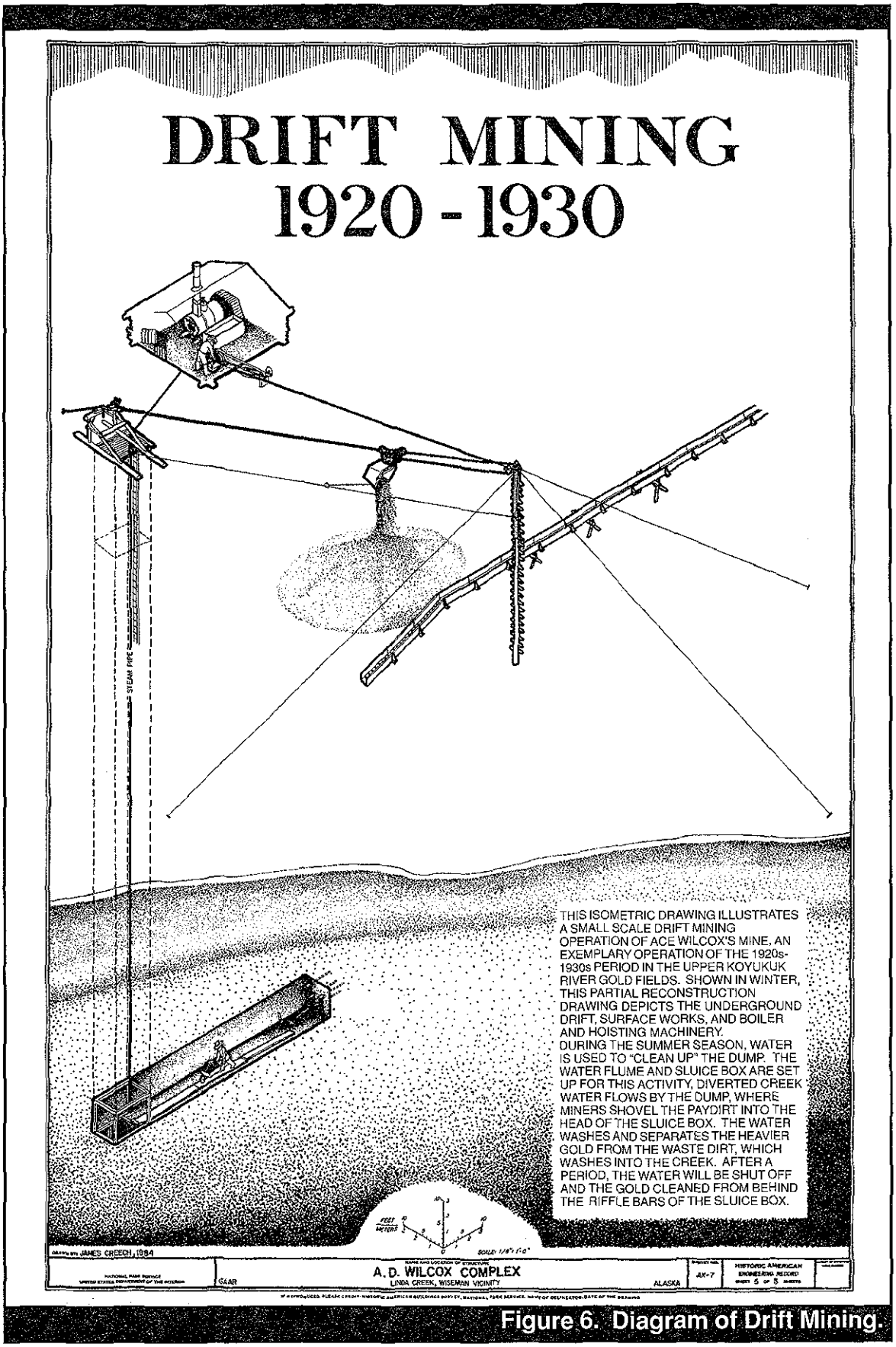


Figure 6. Diagram of Drift Mining.

ring guide on the carrier that transported the bucket up an inclined cableway. When the ring guide encountered a stop on the trip cable, the bucket would be released and its contents upset into a dumpbox or sluice (Parker 1929: 52-52; Peele 1941: 10-608; Wimmler 1927: 122). As time went on, hoisting became more sophisticated. One particularly efficient type of carrier, accompanied by buckets, cable, and steam hoist, was known as the Dawson self-dumping carrier (Purington 1905: 94).

Hydraulic Mining (Hydraulicking). A widely used placer mining method in Alaska was hydraulic mining or hydraulicking, a term applied to excavation of gravel banks by streams of water under pressure. In hydraulicking, water is impounded in reservoirs or diverted from streams and conducted to ditches, flumes, and pipes to an elevated point above the placer. From here, pipes equipped with monitors, called giants and similar in function to the nozzle of a garden hose, jet the water onto the face of the deposit, which is undercut and forced to cave. The water is then washed to the sluice in ditches or on high-pressure streams of water directed by a giant (Peele 1941: 10-550 - 551). As in other forms of placer mining, the requirements for a successful hydraulic operation are an inexpensive supply of water, sufficient bedrock grade on which to place the sluices, and enough dump room for the tailings (Wimmler 1927: 134). The water requirement is particularly important in hydraulic mining because it is used for excavation as well as for sluicing, and thus a further requisite is that the water supply be continuous and under a natural high pressure or head.

Hydraulicking, invented in California in 1852, was well under way in Alaska by just after the turn of the century. In 1904, hydraulicking was in operation in several Alaska mining districts (Purington 1905: 105 - 110); and by 1908, hydraulic mining had been introduced to the Nizina District (Brooks 1909: 39) in what is now Wrangell-St. Elias National Park and Preserve. Although most hydraulic mines in Alaska were small, employing two to eight men (Wimmler 1927: 137), there were some large-scale ventures, including hydraulic plants on Dan and Chititu creeks in the Nizina District (Stewart 1921: 14). Wimmler (1927: 137) states that the larger mines in operation in Alaska in the early 1920s mined 30,000 to 100,000 cubic yards in one season, which represents less than 1,000 cubic yards per day. The smaller mines were considerably less productive.

The most expensive aspect of developing a hydraulic plant is the initial construction cost of the conduits to supply water for excavation of the gravels. In most hydraulic mines, ditches are the main forms of conduit; but flumes are also built where ditches would be impractical, such as across a valley or a ravine. The water pressure being supplied is dependent on both the length of the conduit and the slope or grade at which it lies. On gentle slopes, long ditches are necessary; on steep slopes the same pressure is attainable with a shorter conduit (Purington 1905: 111). Pressure heads of between 50-300 feet are usually necessary to excavate the gravel, which could require many miles of ditch to bring water onto the property by gravity flow (Gardner and Johnson 1934b: 4). Purington estimates that on the Seward Peninsula, one of the most successful early hydraulicking areas in Alaska, there were about 175 miles of ditches completed by 1904 at an average cost exceeding $4,000 a mile (1905: 126).

Other engineering features associated with the conduits used in hydraulic mining are diversion dams and reservoirs. The dams, located on the stream that supplied the water to the project, were usually just a few feet high and may have been earth-filled timber cribs or rock-filled cribs faced with boards. Reservoirs were built either just above



Hydraulic mining, using a hydraulic monitor or giant. Last Chance Mine in the Juneau mining district, 1901.
(U.S. Geological Survey, A. H. Brooks Collection 572)

the dam or at the lower end of the ditch (Gardner and Johnson 1934b: 12-13). Reservoirs located near the end of the ditch were useful in preventing waste when the giants were turned off (Peele 1941: 10-552).

The equipment used in hydraulicking consisted primarily of

- the pipeline needed to carry the water from the ditch or flume to the washing pit;
- one or more giants used for excavating and driving the gravel;
- sluice boxes for collecting the gold;
- derricks, winches, or stoneboats for removing the boulders; and
- possibly a hydraulic elevator for raising the gravel, sand, and water out of the pits into the sluice boxes. A wooden headbox, used to regulate the pressure, was built on the ditch to divert water downslope to the mine and was attached to the main feeder pipe, called a penstock, measuring from 11 - 22 inches in diameter and leading down to successively smaller diameter pipes that served to increase the water velocity (LaLande 1985: 34). The pipes, from a few hundred to a few thousand feet long, were constructed of riveted sheet steel with slip or stove-pipe joint and equipped with valves or air vents to regulate the flow of water. The diameter of the pipe was selected to accommodate the volume and pressure of water available. The sections of pipe were laid from the washing pit to the penstock and headbox on the hillside above and supported by timbers placed beneath them at close intervals (Gardner and Johnson 1934b: 18).

The giant, or monitor, connected to the bottom of the pipeline, was responsible for directing and controlling the stream of high-pressure water. The size of the giant, gauged by the diameter of its nozzle in inches, ranged from 1 to 10. The amount of water discharged in cubic feet per minute was determined by both the size of the nozzle and the effective head. For example, a giant with a 2-in. nozzle operating under 100 ft. of head could discharge 94 cubic feet of water per minute, while a giant with a 10-in. nozzle operating under the same head would discharge 2,360 cubic feet of water per minute (Peele 1941: 10-554). Giants of various sizes could have been used at the same hydraulic mine, depending on the job that was required. A smaller giant might have been used for cutting the gravel in the pit, and a larger one for sweeping the gravel into the sluices (Gardner and Johnson 1934b: 38). Each giant was bolted to a heavy timber and securely fastened and braced to bedrock. The smaller ones, however, or those working under light head could be pointed by hand, while the large ones required a deflector (Peele 1941: 10- 554).

Although the giants were very effective in moving gravels, boulders exceeded the giants' size limit. Boulders were removed by various means, including rolling them by hand, pulling them from the pit with winches or derricks, or by loading them on a stoneboat with a hoist, a method that was practiced at Chititu Creek (Wimmler 1927: 162). The larger boulders were either broken up with hammers or by blasting with dynamite. With respect to tailings, stacking was used as a method of disposal, if there was insufficient dumping room below the sluices. Stacking was at one time done with a horse-drawn scraper, and later with steam scrapers, such as the Bagley or slip-tooth types. If there was enough water to spare from excavation, the tailings were piled with a stacker giant set beside the end of the sluice. Dan Creek, where pilings were stacked to 52 feet, is a good example of the capabilities of the stacker giant, that in this case was operated with a 4-inch nozzle under 310 feet of head (Wimmler 1942: 164).

The construction and placement of the sluices was very important in the overall productivity of each hydraulic mine, which could be measured by the "duty of water." The

"duty of water" is equivalent to the cubic yards of gravel that can be broken down and sent through the sluices in 24 hours by one miner's inch of water (1.5 cubic feet per minute) (Peele 1941: 10-555). A survey of the "duty" taken by Purington (1905: 139) shows that the volume varied from less than one cubic yard to 10 cubic yards at a sample of creeks under hydraulic mining in Alaska in 1904. Factors that had to be considered in constructing sluice boxes were length and width, as well as the proper grade for placement. The miners would calculate these figures on the basis of the volume and velocity of water that would be run through the sluices and on the characteristics of the gold-bearing gravel in the deposit. For example, a sluice box 12 inches wide could accommodate 100 miner's inches of water, whereas a box 60 inches wide could accommodate 3,000 miner's inches (Holland 1942: 44).

The best grade on which to position the sluice boxes for average conditions was considered about 6 inches of rise for every 12-ft. section of sluice (Gardner and Johnson 1934b: 69). This translates into a grade of about 4%. In places where there was inadequate grade for moving the gravel to and through the sluices and for disposing of the tailings, the miners had to wash the gravel in a pit or sump excavated in the bedrock, and then raise it to a sluice supported on trestles by means of an hydraulic elevator. This device consisted of a large pipe with a constricted throat that elevated the material to be sluiced on a high velocity jet of water (Jackson 1938: 30).

By 1938, just before the outbreak of World War II, B.D. Stewart, the Territorial Mine Inspector for Alaska, noted "a substantial decrease in ordinary hydraulic operations that employed 5 or more men each" as a result of the expansion in mechanized equipment, such as draglines and dredges (Stewart 1939: 22). After World War II, there was a resurgence in the use of hydraulic mining in Alaska. This time, however, hydraulicking was teamed up with the use of a bulldozer to move the gravel effectively and inexpensively. The usual method was to bulldoze the gravel into the sluices and then wash it through with the hydraulic giants (Stewart 1947: 18). There were 101 placer mines using a combination of hydraulicking and bulldozers in 1947-1948 in Alaska. Although the number of dredges and dragline operations was much lower, they employed considerably more men than the small-scale hydraulic/bulldozer mines (Stewart 1949: 32). Today, hydraulic mining has been phased out or banned in most areas of the country because of the environmental damage it has created (Levell et al. 1987: 28).

Dredging. Dredges were first developed in the gold fields of New Zealand and the tin streams of Malaysia in the late 1800s. By the turn of the century, miners in the United States, Canada, and Australia were experimenting with, and improving upon their design, and thus distinctive types of dredges evolved (Logan Hovis, personal communication). The use of dredges in Alaska began on the Seward Peninsula in 1899, just one year after the first one was successfully operated in the United States in Bannock, Montana (Hutchins 1905: 175; Wimmler 1927: 176; Peele 1941: 10-587). During the first few years, the operation of dredges was experimental and at least one mining engineer, J.P. Hutchins, was skeptical about their future use in Alaska. He stated that "in Alaska, where much frozen ground is encountered, the conditions are not favorable for the successful operation of gold dredges especially as the long winter reduces the number of working days to about one hundred and thirty a year" (Hutchins 1905: 189).

Three years later he was still pessimistic, relating that "probably 100 dredging machines...have been installed in Alaska and all but a few have been failures" (Hutchins

1908: 71). Despite Hutchins misgivings, by 1914 there were 42 dredges at work in the territory; and by 1940, there was a peak of 52 dredges in operation, producing 65% of the placer gold production for the year (Wimmler 1927: 176; Cook 1983: 127). Although dredging resumed after World War II, high operating costs due to inflation, plus the fixed price of gold, made dredge operations unprofitable; and they never again achieved their pre-war numbers. Only six dredges were in operation in the state in 1986 (Levell et al. 1987: 40).

During the early days of dredging in Alaska, various types, including land dredges, and dipper and suction dredges, were tried; but the bucketline dredge proved to be the most successful (Wimmler 1927: 178). (The small suction dredges currently in vogue are not relevant to the discussion in this chapter). Bucketline dredges are best suited for mining large, flat deposits of relatively low-grade material, with few boulders and gently sloping bedrock. Such areas might include creek placers, low benches, elevated beach lines, gravel plains, or offshore deposits. Dredges can be used to profitably mine placers that have already been worked by hand methods, but a great deal of testing is required to ensure that the expense of transporting and setting up a dredge is warranted (Wimmler 1927: 177).

A bucketline dredge combines four placer mining processes - excavating, screening, sluicing, and removal of tailings - into one large piece of machinery. The mechanical equipment is mounted on either a wooden hull in the older models, or a steel pontoon hull in models built since the mid-1930s (Peele 1941: 10-577). The dredge floats on an artificial pond, which is carried forward as the dredge advances, excavating at its bow and depositing tailings at its stern or sides. The water is supplied by gravity through ditches or by pumping. Like other placer mining activities dependent on water in Alaska, dredging is a seasonal operation that terminates after freeze-up in the fall or winter. Thawing frozen ground is also necessary before dredging can begin.

The specific type of bucketline dredge used most widely in Alaska was the California or stacker type dredge (Wimmler 1927: 186; Cook 1983: 128). Improvements have been made in this dredge over its decades of use, but the basic design has remained the same. The digging mechanism in this dredge consists of an endless chain of buckets passing around tumblers at the top and bottom of a ladder designed to carry the bucket line down to the needed excavation depth. The size of the dredge is designated by the capacity of each bucket, ranging from 3-4 cu. ft. for the smaller ones and 6-10 cu. ft. for the medium and large ones. Gravel excavated by the buckets is dumped onto the main hopper, where a chute directs the material onto a trommel screen. Here it is sprayed by water under high pressure and sized into screen oversize and undersize (Peele 1941: 10-581 - 10-582; Macdonald 1983: 349; Cook 1983: 128-132).

The undersize gravel is then treated by the gold recovery equipment, generally consisting of sluice boxes (or gold-saving tables) and possibly jigs. The characteristics of the gold in the placer determine the specific type of gold recovery equipment on the dredges. On the smaller and older dredges, there are two sets of sluices lying at right angles to each other, each set equipped with Hungarian riffles of angle iron or wood. A mercury trap for amalgamation may be located at the head of each sluice box. The transverse sluices discharges onto the longitudinal sluices, and from here the tailings are emptied from the dredge. Cleanup of the sluices is similar to the procedure used in any sluice box operation. Jigs, devices that separate the gold from the sand or gravel by pulsation of water through a screen, are installed on dredges that mine scaly or fine gold. Roughing

jigs can be placed either ahead or behind the sluices, while cleaner jigs always are located behind the sluices. Various other equipment, such as amalgamator plates, ball mill, retort furnace, and melting furnace, can also be installed on the larger and more modern dredges (Peele 1941: 10-584 - 10-587; Cook 1983: 132).

The coarse tailings (screen oversize) are discharged from the dredge by a conveyor belt mounted on a stacker frame. The fine sand tailings (screen undersize after removal of the gold) exit through tail sluices. These waste materials must be dumped far enough away from the dredge to allow it float freely and still be maneuverable. In maneuvering the California type dredge, the operator would pay out and haul in steel cables whose ends were anchored to buried deadmen (heavy timbers used for anchoring) ashore. Its bow could then be pulled from side to side by winches, while the stern of the dredge was pivoted on a spud (a riveted steel column on the box girders of the hull). The spud also served as a fulcrum to hold the barge in place against the reaction of the bucketline's eating away at the gravel bank (Young 1978: 133-134).

Lode Mining

It is not surprising that the earliest prospectors in Alaska were more interested in the search for quickly recovered placer gold than in the more time-consuming and costly enterprise of mining a lode deposit. As Stephen Capps, one of the early U.S. Geological Survey geologists in Alaska pointed out,

> The search for lode deposits almost always follows somewhat tardily after the placer prospecting, for the development of a lode mine requires a considerable investment in the driving of shafts and tunnels in rock, in the purchase and transportation of supplies and machinery, and except for free milling gold, in the reduction and marketing of the product (Capps 1915: 50).

In some cases, lode deposits were discovered almost by accident. One of the legends about the 1900 discovery of copper ore deposits on Bonanza Ridge, near the Kennicott Glacier in what is now Wrangell-St. Elias National Park and Preserve, is that Jack Smith and Clarence Warner discovered the green cliffs of outcropping malachite (copper carbonate) by mistaking them as grass for their horses (Graumann 1977a: 5). This discovery eventually led to the formation and development of the Kennecott Copper Corporation, one of the most successful mining ventures in Alaska's history. By 1908, the corporation was in operation; and by 1911, the Copper River and Northwestern Railway, built by the corporation to transport their copper to market, was complete.

This section on lode mining is organized differently from the previous one on placer mining, which was broken down into various methods, such as drift mining, and so on. This section is organized by lode mining processes, rather than by methods. A lode mining process refers to any of several procedures that may be performed near a lode prospect or mine, such as extraction, transportation, and milling or concentrating (Hovis 1992c). Prospecting and exploration, which have previously been discussed in this chapter, are also lode-mining processes. This section is broken down into three sub-sections: open-pit and underground mining (extractive), transportation from mine to mill, and mineral processing (milling or concentrating). The mining practices discussed are intended to be somewhat general and applicable to most any mineral. Gold and copper mining and mineral processing are emphasized, however, because of their importance on National Park

Service lands. The Kennecott copper mines provide examples of the various extractive, transportation, and mineral processing techniques that are presented.

Open-Pit and Underground Mining. The open-pit method is used in mining deposits near the surface. Many large, low-grade deposits can be profitably mined this way because of the lower costs and higher productivity of these mines in comparison to underground mines. Stripping the soil and barren rock to expose the ore body is one of the first steps in the development phase of open-pit mining and is followed by the excavation of a series of benches arranged either in a spiral or as levels with connecting ramps (Fernette 1982: 122).

The exploitation phase of open-pit mining involves a drill-blast-load-haul cycle, which has been described by Fernette (1982:123) as follows: first blast holes are drilled in the rock (they are typically 6-12 inches in diameter and placed 15-30 feet apart in a grid pattern); secondly the holes are loaded with explosives and blasted; the broken rock is then loaded by power shovel or front-end loader; and finally the rock is hauled out of the mine by truck, rail car, or conveyor. In the past, small open-pit mines were excavated by hand, by means of animal-drawn slip or drag scrapers, or by power-operated drag scrapers with or without previous preparation by drilling and blasting (Jackson and Hedges 1939: 357).

One type of open-pit mine is referred to as a glory-hole. The glory-hole is in the form of an inverted cone, or series of cones, with the sides sloping downward to a raise or mill hole extending upward from an underground haulageway driven below the ore or beneath the bottom of the glory-hole. The ore is mined in narrow benches from the sides of the pit and then drawn down through the raise into waiting mine cars, where it is trammed or hoisted to the surface. Glory-hole mining was used at Kennecott for the initial outcropping of ore at the Bonanza Mine. This was the only ore body mined with open-pit methods at Kennecott (Graumann 1977a: 18).

The development phase for underground mining is more involved than for open-pit mining because the planners must consider not only the geology of the ore body, but also problems in gaining access to and removing the ore body, methods for ventilating the mine for the safety of the miners, and for hoisting the broken ore to the surface (figure 7). In mining terminology there are two general types of openings. The first is the development head that provides access to the ore, space in which to work, passages for ventilation, and tunnels for water drainage. The second type of opening is known as a stope, which is the opening created when ore is removed (discussed below). Development openings include shafts, which are used to access ore bodies below the surface; adits, or horizontal tunnels that access ore bodies inside a mountain; drifts, which are driven parallel to the extent of the ore; and crosscuts, which are excavated across and into the ore (Fernette 1982: 124, 127). In underground mining, some of the development work must be done before actually mining the deposit, but the two phases can be done concurrently so that openings are being prepared in various parts of the deposit while other parts are being mined.

After mine development has provided access to the ore body, the exploitation or mining phase begins. The size and shape of the ore body must be considered when deciding on the mining or stoping method. Also, the strength of the ore and enclosing wall rock, the kinds of labor and equipment to be used, the presence of water, and the value of the ore, all must be determined. The three broad classes of stoping methods are: those needing artificial ground support, those using natural or no ground support, and the caving meth-

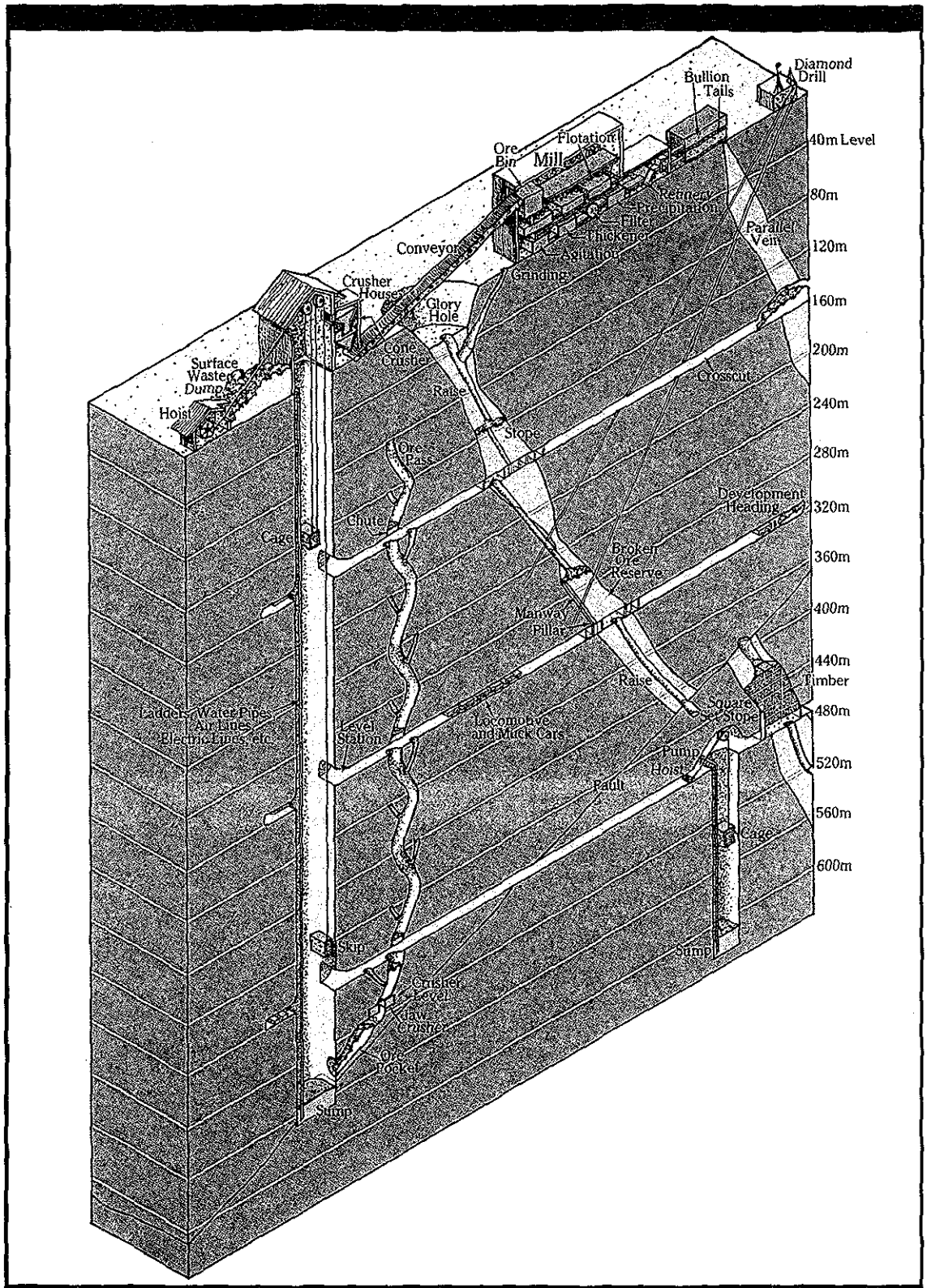


Figure 7: Idealized Cross Section of a Typical Hard Rock Mine.

ods. Each of these classes is further subdivided. For example, where rock strength is low, the mining methods that are most commonly used are square-set stoping, shrinkage stoping, cut and fill, and longwall mining (see glossary for definitions of these terms). Open stoping and room-and-pillar are the two principal methods used to mine deposits with strong walls. In open stopes, little or no support of any kind is required; while in room-and-pillar, pillars of ore or cribs of timber are used for support if needed. The third class of stoping is caving, in which the ore is undercut and caving induced by blasting. As the ore continues to cave under its own weight, it is extracted from regularly spaced draw points (Fernette 1982: 124-126).

One of the most important methods of stoping, developed about 1860, was the system of square-set timbering or stoping, whereby timbers in rectangular sets replaced the ore as it was removed, so that the spaces between the timbers could be filled with waste rock to increase the strength of the support (Gardner et al. 1938: 114-115). This method permitted the exploitation of large ore bodies with weak walls, which could not be handled under the older system of open stopes (Jackson and Hedges 1939: 224-227). Even today, square-set timbering occupies an important place in underground metal mines in which the newer shrinkage and caving methods cannot be employed (Barger and Schurr 1972: 101-102).

Just as in open-pit mining, underground mining proceeds in a drill-blast-muck-haul cycle (Fernette 1982: 124). In hand methods of lode mining, the tools used include hammers and rock drills or jacks for making holes in the ore body, and before 1867, black powder for blasting. Picks and shovels were used for "mucking out" the loosened ore. The labor requirement for underground mining was greatly reduced with the invention of the mechanical drill, run by compressed air, in 1869. The air compressor, usually installed outside the mine, was connected to air lines that ran the drills being used below (Hardesty 1988: 21-22). Another technological revolution, which occurred two years earlier and greatly facilitated blasting, was the invention of dynamite. With some forethought in loading the blast holes, dynamite blasting would not only break the ore from the solid rock, but also produce a good degree of fragmentation so the ore could be easily handled and transported. As a rule, blasting was done at the end of the shift, so there would be "... a period of several hours for smoke to clear and dust to settle before men reenter the stope" (Jackson and Hedges 1939: 256).

After blasting, the broken ore is transported out of the stope, up the shaft, and finally to the ground surface. The haulage and hoisting of the ore entail a number of different steps, the first of which is transporting the ore to the haulage level of the mine. In some methods of stoping, the broken ore moves by gravity directly to loading chutes, which dump the ore into cars (on tracks) or onto conveyors on the haulage level. In others, the ore is loaded from the floor of the stope into cars either by hand shoveling, by scrapers or power shovels (Jackson and Hedges 1939: 259, 267). Scraper loaders, introduced to the mining industry in 1915-1917, were first used as mucking and loading machines but were later used to drag the ore from the working face to the chutes or directly into cars (Peele 1941: 27-02; Jackson and Hedges 1939: 182). Mechanical loaders were designed specifically to operate in confined spaces. Before the advent of mechanical haulage, the cars were either hand-trammed or hauled by horses or mules to the shaft, tunnel, or adit mouth. By the 1930s, hand-tramming had been replaced in large mines by either locomotive hauling

of the mine cars or by "rope haulage," which is the use of hoists for pulling cars to the shaft station where the ore begins its ascent to the surface in a bucket, cage, or a skip.

In the late nineteenth and early twentieth centuries, the technology employed for hoisting revolved around a windlass, a whim, or a headframe hoisting system. A windlass is a hand-operated winch used to lower and raise miners, ore, waste rock and supplies in an iron bucket; a whim is a horse-powered variant of a windlass. The headframe is a "gallows"-like structure erected over the mineshaft. A cable, which passes over a drum or sheave at the apex of the headframe, is powered by either electricity, steam, compressed air or gasoline and serves to raise and lower the miners, equipment, and ore (Hardesty 1988: 27; Jackson and Hedges 1939: 213). Wooden headframes, seldom built after about 1940 except for temporary work or short-lived mines, were replaced by steel and concrete headframes, which are fireproof and much more durable than wood (Peele 1941: 12-70 - 12-72). The methods of hoisting included buckets, cars on cages, and skips. By the late 1930s, buckets were mainly used only at small mines, and the self-dumping skips had largely replaced hoisting in cars because they had the advantages of greater speed, greater load capacity, and fewer labor requirements (Jackson and Hedges 1939: 203-206).

Transportation from Mine to Mill. The usual forms of transportation between mine and mill are roads, trails, and aerial tramways. Aerial tramways, the most important in relation to the lode mines and mills documented on National Park Service lands, transport ore out of the mine in carriers suspended from wire ropes, forming the track between stations at each end of the line. The two types of tramways in general use during the 1930s were the double-rope (or bi-cable) continuous tramway and the jig-back or reversible tramway. The former consists of two stationary cables that support the load, and an endless traction cable that propels it. The traction cable is operated by a motor and controlled by braking equipment. A number of carriers are attached at more or less equal intervals on the cables by means of grips. The reversible tramway system can be single, with one-track cable and one carrier, or double, with two-track cables equipped with a carrier on each. The motor, which runs the traction cable on reversible tramways, operates in one direction to send the loaded carrier to its discharge point and then reverses the operation to bring the empty carrier back (Metzger 1937: 3). Other components of tramway systems are intermediate towers to support the track cable and traction rope, angle stations to deflect the tramway from a straight line course, and summit stations (or breakover stations) constructed at the crest of a line (Peele 1941: 26-02 - 26-27).

In the metal-mining industry, hand-operated tramways are used to transport timber, rails and other supplies to the mine, as well as for transporting ore out of the mines. For hauling the ore out of the mine, the operation begins at the loading terminal where buckets containing the ore are placed in a carriage equipped with wheels to run on the cable above. The carrier is then attached to a traction rope and hauled to the discharge terminal at the mill, where its contents are dumped into an ore bin. The empty carrier is then attached to the traction rope on the return side of the tramway (in a bi-cable tramway) and hauled back to the loading terminal to repeat the process (Peele 1941: 26-08). Each of the terminal stations must be designed to transfer the carriers from cables to rails, or vice versa, to lead them to loading or discharging points, and to return them to the cable. The length of the tramway can vary, but in a bi-cable system the maximum

limit is about 4 miles. Depending on the size and strength of all the component parts, the system can accommodate from 10-100 tons of ore per hour (Peele 1941: 26-08).

Mineral Processing. Mineral processing, which is sometimes called ore dressing or milling, is the phase of mining that takes place after the ore has been hauled from the mine. The processing involves physically separating the valuable minerals from the gangue to produce a concentrate, which can then be sold to the smelter. At the processing plant, the ore is upgraded and its bulk reduced; at the smelter, the metal is actually extracted from the ore. In the case of gold, the fact that a product of high value and small bulk could be produced, often by relatively simple milling processes, made it possible to profitably operate in regions, such as Alaska, despite the high costs of transportation, fuel, and power (Jackson and Hedges 1939: 391).

Several factors need to be considered when deciding upon the location of a mill. Proximity to the mine is important in order reduce handling the ore and to facilitate the return of the mill tailings underground as a fill to support the stoped areas. Also, in mills built before World War II, construction on a hillside was necessary to take advantage of gravity feed of ore and water through the plant (USFS 1975: 91). Other factors of concern are the power and water supplies essential in operating the plant. At most of the mills in Alaska, power was generated in a self-contained plant on site, using either water or steam power, or fuel for an internal-combustion engine. One of the early devices used to provide power was a Pelton water wheel, which created rotary motion that was transferred via line shafting to the mill equipment. Steam or diesel engines replaced Pelton wheels. Even at mills powered by diesel engines, a source of water was necessary in the operation of most of the grinding equipment, concentration tables, and other separation processes. Also in the vicinity of the mill, an assay office might be built for analysis of the percentage of gold, silver, or copper in the final mill concentrate.

Milling involves a number of steps or specific treatments, best portrayed in the form of a flowsheet that is unique for each mine. The technology used at a particular mill depends upon the mineral being extracted, as well as the chemical composition of the mineral. Free milling minerals, or those with gold or silver in their free form, can be easily separated from their rock matrix and require less processing than those found in complex metallic compounds and which require more elaborate and expensive milling methods (Hardesty 1988:38). For example, in free milling gold ores, most of the gold can be amalgamated with mercury after suitable grinding; but the ore does not need to be roasted, leached, or subjected to any other preliminary treatment. Most of the gold ores, however, will yield part of their gold content by amalgamation but have to be subjected to other treatments for a good recovery of the gold to be made (Jackson and Hedges 1939: 392).

In general, processing involves three major stages: crushing, grinding, and separation of the mineral from the gangue. Separation can be broken down into a number of specific operations, such as cobbing and hand-sorting (not preceded by crushing or grinding), amalgamation, gravity concentration, flotation, hydrometallurgy (acid or ammonia leaching, and cyanidation), and various combinations of two or more of these methods, used according to the nature of the ore being processed. As the ore moves through the mill, various terms describe it as it passes from one operation to the next. The concentrate is the product with the highest mineral content that may not require further processing; the middlings are the second quality product that are to be further processed; and the tailings

are the lowest quality product that are either treated as refuse or, given the appropriate technology, sent on for further treatment.

A preliminary step to each of the stages is often sorting and classifying the ore so that only ore grains of the correct size or specific gravity will go on to the subsequent step in treatment. Screens are capable of sorting grain sizes larger than 1.5 mm, but anything smaller must be sent through a classifier (Peele 1918: 1658). One major type is a hydraulic classifier, an apparatus that uses rising currents of water to separate different grain sizes, ranging from coarse to fine, into a series of spigots at the bottom of a classifier tank. The second type, of which there are many varieties, does not use hydraulic water in the classification process (Peele 1918: 1658, 1668). One example is a Dorr classifier, consisting of a settling tank and mechanical reciprocating rakes, which sort the oversize particles from the slime size particles (Peele 1941: 33-13). In a closed circuit mill, ore that is not fine enough to be further processed is sent back to be reground; and thus a series of feedback loops are indicated on the flowsheet.

The first stage in milling involves crushing the ore. For the process a number of different types of crushing devices, some classified as breakers and others as intermediate crushers, have been used in mills during the last century. In the last half of the nineteenth century, stamp mills, along with jaw crushers became the industry standard for crushing. A stamp mill consists of several heavy stamps, connected by a camshaft, which fall on an iron anvil installed in a mortar box (Hardesty 1988: 40-41). Large, free, metal particles are separated from the matrix rock by either a dry or a wet process. In the former, the ore was first heated in a roaster or kiln before being sent to the stamps. In the latter, water was piped into the mortar boxes; and the pulsations of the falling stamps forced the pulp, an ore and water mixture, out of the mortar box onto amalgamating plates or other collection devices (Hardesty 1988: 40-41). Stamp mills were either used as the primary crusher at the mill or as an intermediate crusher following a primary crusher or breaker and preceding rod, or tube mills, described below (Honey 1980:110). Stamp mills were limited in that they were unable to crush the ore finely enough to extract the minerals from low-grade ore by the cyanidation and flotation processes discussed below. Despite the fact that stamp mills were inefficient crushing devices, they were retained at some of the mills well into the 1930s either for financial reasons or because they proved effective for some types of ores (Jackson and Hedges 1939: 395).

Free gold and silver were recovered from the ore processed in the stamp mill by amalgamation. One amalgamation procedure, plate amalgamation, was developed in 1860 and consisted of covering the surface of a sloping copper table with mercury and passing a thin film of pulp (crushed ore mixed with water) over the table. The free gold or silver became trapped by the mercury as it sank to the bottom of the flow. During cleanup, the amalgam (combination of mercury and gold) would be manually removed from the plates and eventually sent to the assay lab to be retorted in the furnace (Cohen 1982: 88).

> Adjusting the pulp, amalgamation tables or plates, stamp operation, etc. appear to have been an extremely fine art rather than a technical science in the early part of this century. As in other processes for ore treatment, experimentation, practice and perhaps blind chance or luck accounted for the success or failure of an operation (Honey 1980: 121).

Another type of amalgamation, barrel or pan amalgamation, was used later in processing, after a heavy concentrate of the mineral was recovered from the concentrating

tables. Pan amalgamation mills were replaced during the last decade of the nineteenth century once cyanide-leaching techniques became available (Hardesty 1988: 51).

Besides stamp mills, other types of crushing devices include various jaw crushers, gyratory crushers, cone crushers, and crushing rolls. In the first category are crushers, such as the Blake breaker and Dodge breaker, with one fixed jaw and one pivoted moving jaw, similar in operation to a nutcracker. The Blake breaker could handle ore ranging in size from 6-24 inches in diameter and discharge a crushed product of 1-4 inches (Peele 1918: 1623). More efficient breakers than jaw crushers were gyratory crushers, which were the preferred form at mills where large capacity was required. A disk crusher, equipped with two nearly vertical steel disks, operated with a gyratory movement analogous to that of a gyratory crusher (Peele 1918: 1627, 1629). In the crushing rolls, a type of intermediate crushing device, two parallel horizontal cylinders revolved toward each other and broke the ore by pressure. The size of the feed was generally less than 1.5 inches (37 mm) in diameter, and the product was a minimum of 1/12 inch (2 mm) in diameter (Peele 1918: 1630). In the 1930s, the cone crusher, an intermediate crusher with a flat-conical, gyrating crushing head and a bowl-like crushing surface (Peele 1941:28-08), was widely adopted by copper mills to produce a finer product (Chapman 1936: 31).

After crushing, the ore is either transported by conveyor or elevator to the gravity concentration department or to the grinding department, depending on how the flowsheet is organized. The devices used in grinding are capable of transforming the ore into a slime, the name given to very fine particles of ore carried in suspension by water (Fay 1947: 623). Some of the early mills used for fine grinding were Chilean (or Chili) mills and Huntington mills. In a Chilean mill, the ore was ground between a pan-shaped, cast-iron base and wheel-like rollers that moved in a circular path, crushing the ore by their weight. The Huntington mill, which worked best on feed larger than 1/4 inch (6.3 mm) in diameter, crushed the ore with rollers on vertical axles that swung out from a central spindle by centrifugal force against a ring die (Peele 1918: 1642). These mills were replaced during the first two decades of the twentieth century by tube mills and ball mills, which would become dominant in the mining industry. Tube and ball mills are large rotating cylinders that grind the ore to the desired size by the jostling and cascading movement of the either loose flint pebbles (tube mills) or iron or steel balls (ball mills) contained inside the cylinder (Peele 1918: 1644, 1648; Hardesty 1988: 42). After grinding, the ore is classified again according to particle size so that the sand is sent back to be reground, while the slimes can pass on to the next stage of the milling process.

The heart of the milling process, separating the mineral from the gangue, is accomplished by various methods or combinations of methods. The oldest method is gravity concentration, used in both placer and lode mining. In fact, the formations of placer deposits result from natural gravity concentration, based on the differences in specific gravity of the ore and gangue materials (Jackson and Hedges 1939: 391). Gravity concentration devices differ according to the size range of particles to be separated. For example, jigs treat material ranging from 50 mm to 1 mm; shaking tables, such as the Wilfley table, treat material from 2.5 mm to the finest granular sand; vanners treat material from about 0.75 mm to the finest granular sand; and round slime tables treat pulp from about 0.12 mm down to and including colloidal material (Peele 1918: 1672). Jigs, often placed near the head of the gravity concentration flowchart, are sieve-like machines that vibrate up and down in water. The upward motion causes the mixed grains on the sieve to stratify,

with the heavier mineral grains at the bottom and the lighter gangue grains on top. The downward motion causes the heavy grains to pass through the sieve and be collected (Peele 1918: 1672; Hardesty 1988: 43). Specific types of jigs are the Hancock vanning jig and the Harz jig.

Shaking or concentration tables often follow jigs in the concentration process. Although there are many different varieties of tables, they are all similar in having slightly inclined surfaces, being shaken with a differential movement in the direction of the long axis, and washing the gravels at right-angles to the direction of motion by a thin film of water (Taggart 1927: 717). They differ in their shape, surfacing, and riffles (Logan Hovis, personal communication). The Wilfley table, one of the most widely used in ore dressing, has a riffled surface that separates the light and heavy grains into layers by agitation. The jerking action then throws the heavy grains toward the head end, while the lights grains are washed down over the cleats into the tailings box (Fay 1947 [1920:743]). Another type is called a James concentrator, the deck of which is divided on a line oblique to the line of motion of the table. The table has two sections, the slopes of which can be varied independently. One section contains riffles for the coarse material, while the other section is smooth, allowing the settling of fine particles that will not settle on a riffled surface (Fay 1947 [1920: 368]).

Vanners, concentrating machines adapted to the treatment of fine sands, consist of an endless belt, usually made of rubber and inclined longitudinally, carried on a frame that oscillates in the plane of the belt. As the belt travels slowly uphill, the shaking motion causes stratification of the solids in the pulp, with the heavier and smaller particles working down to the bottom of the mass on the rubber belt. The waste forms a film on top and is eventually washed down the belt. Of the four types of vanners, each characterized by the type of shake and the direction of slope, the oldest and most used are those with an oscillating side-shake and an end-slope, such as a Frue vanner (Taggart 1927: 763; Peele 1918: 1683). Material that is so fine it cannot be treated by the vanners is sent to round slime tables. These devices are revolving, convex tables usually about 16-18 feet in diameter. They are fed pulp from a central feed cone and washed with water, which carries down the gangue and colloids and leaves nearly all the values on the table (Peele 1918: 1686). Although these devices could process very finely ground material, they were still inadequate in producing high mineral recovery rates and so were superseded by more sophisticated technology, such as flotation (Chapman 1934: 2-3).

Gravity concentration, like most mineral separation processes, requires the use of large quantities of water, which must be removed by a process, called dewatering, before the concentrated mineral leaves the mill. Partial dewatering is performed at various stages in the treatment to prepare the feed for subsequent processes. Dewatering consists of separating a mixture of solids and water into two constituent parts and can be accomplished by drying, filtration or draining, and thickening (Taggart 1927: 969). Thickening is the most widely applied dewatering technique, and is done in a large, relatively shallow tank, aptly called a thickener. In the process the clear liquid is taken off at the top, and the thickened suspension remains at the bottom. The tank is equipped with one or more rotating radial arms, from each of which is suspended a series of blades. The blades rake the settled solids toward a central outlet and assist in compacting the settled particles (Wills 1981: 437-438). According to Wills (1981: 430), thickening removes most of the water and produces a thickened pulp of about 55-65% solids by weight. The remainder of

water is removed by a rotary-drum filter or other filtration device and finally by thermal drying to produce a product of about 95% solids by weight.

Water is also a crucial element in the various types of hydrometallurgy techniques used on ore that is either low-grade or not amenable to separation by gravity concentration because of its mineralogical constituents. Gold, silver, and copper ores are most commonly treated. Although the treatment is similar for each of these ores, the leaching solution differs according to the metal to be dissolved. For gold and silver, cyanide of potassium or sodium is used, while copper may require either sulfuric acid (for copper carbonates, sulfates, or oxides), ferric sulfate (for copper sulfides), or ammonia (for native copper). The steps in the operation are as follows: (1) preparation of the ore for solution by either crushing, and if necessary, oxidation and reduction to a soluble state, (2) solution with a leaching agent, (3) separation of the "pregnant" or mineral-bearing solution from leached solid, and (4) precipitation of the metal (Canby [See Taggart 1927: 950, 953]).

The cyanide process, the hydrometallurgical method of separating gold and silver from the gangue in their ores, was developed during the last decade of the nineteenth century. The preparatory treatment of ore for cyanidation involves crushing, screening, and grinding using jaw or gyratory crushers and then ball-, rod-, or tube-mills. After classification and dewatering, the alkaline pulp then goes to a tank where a dilute solution of sodium or potassium cyanide is run into the tank to leach the pulp. If the pulp has been ground into slime, an agitator or an injection of compressed air is introduced into the tank to dissolve the metals by aeration. One popular device using both mechanical stirring and air to agitate the thickened slime is a Dorr agitator. From here, the pulp goes on to be filtered, often in a vacuum filter. In some models, the device consists of a revolving drum, the surface of which carries the filtering medium. As it operates, the solution is drawn off with a vacuum pump, while the concentrate dries and falls off. The final step in the process is precipitation of the gold or silver on zinc shavings or zinc dust (Peele 1941: 33-10 - 33-25; Jackson and Hedges 1939: 400-404).

Flotation, one of the most important methods of separation, was first introduced into the mineral industry between 1913 and 1916 and can be used for processing gold, silver, and copper and lead (Chapman 1936: 2; Honey 1980: 123). In the copper industry it was first used to reduce losses of copper in the fine tailings from gravity concentration plants, but later became the major process in copper milling (Chapman 1936: 2). In this process, sulfide minerals are separated from the host rock by a device, such as a Janney cell (frothing machine), which creates air bubbles in a pulp or slime solution of pulverized ore, water, and a small quantity of oil. The pulp is agitated to form froth. With the addition of various reagents, the mineral particles become attracted to the air bubbles, while the gangue remains in the water (Wills 1981: 11). The bright metallic particles that cling to the oil in the froth are then skimmed off and sent to the dewatering vats. During the period from about 1910 to 1930, various devices were used in the flotation process. One of the most popular was the Janney agitation-froth machine, consisting of an agitation compartment with two froth-separation compartments. In general, several machines would be installed in a series of from five to 15 circular agitators, each with two froth-separating boxes and preceded by one or two emulsifiers (Taggart 1927: 802-803).

At some mills, flotation may be the only processing technique used, while at others it may be combined with different methods of recovery, such as amalgamation and cyanidation, depending on the mineralogy of the ore. In general, for free-milling gold,

amalgamation recovers the precious metal more cheaply than the other processes. If any free gold remains after amalgamation, cyanidation would be a better technique than flotation for recovering the remainder. However, if the gold is associated with sulfides, flotation is the better choice (Taggart 1927: 867). Flotation concentrates can also be treated by cyanidation, but usually require regrinding before they are cyanided (Jackson and Hedges 1939: 399). The flowsheet of each mill will show how these various processes have been combined to produce the highest-grade product possible.

A classic example of early twentieth century mineral processing technology is the Kennecott copper mill, in operation from 1911 to1938 and located in Wrangell-St. Elias National Park and Preserve. Ore entering the mill from Jumbo and Bonanza mines would first be sorted by a grizzly, a grate that allowed small pieces of ore from the mine to go directly into a jaw crusher. Ore too large to pass through the grizzly was crushed by a handheld sledge. The main ore bin received the crushed ore and emptied it into a trommel. At this point, the high-grade ore, some assaying up to 70% copper, was picked out by hand for direct shipment to the smelter in Tacoma, while the remaining ore was conveyed to a Symons disc crusher for intermediate crushing. Vibrating screens then separated the ore into fine and coarse grind, the latter being sent to a Traylor roller mill for recrushing until fine sand was produced. From the vibrating screens, the sand-and-gravel-sized ore was further sorted and processed by Hancock and Harz jigs, a Drag dewaterer, and a Richards Hindered Settling Classifier before being sent on to the concentration department (NPS 1985-86).

The gravity concentration plant at the Kennecott mill could process 800 tons of ore per day (Graumann 1977a: 24). Its main components were 39 concentration tables (10 Wilfley tables, 9 Plat-o tables, 4 James simplex tables and 16 Plat-o slime tables). Also included in the flowsheet between groupings of concentration tables were Callow cones, various types of pumps and classifiers, a ball mill, and Drag dewaterers. Copper that was separated from the waste rock washed into concentration tanks and was eventually shipped to the smelter. The concentration tables freed some of the copper minerals, such as sulfides, chalocite, and covelite from the waste rock, but other minerals that had been oxidized (carbonates, malachite, and azurite) did not respond to mechanical concentration (Graumann 1977a: 25). These tailings from the concentration department were sent on to the leaching or flotation plants for further processing.

The world's first ammonia leaching plant was started up at the Kennecott mill in 1916 to retrieve the copper carbonates from the gangue. The sulfuric acid method of hydrometallury, then in use for the processing of copper ores, would not work on the Kennecott ore as the host rock, limestone, dissolved in the acid. With experimentation, the problem of removing the carbonates, and thus the copper, from the ore was solved by the invention of an ammonia leaching technique that would dissolve the carbonates but not the limestone (Graumann 1977a: 25). The flowsheet for the ammonia leaching plant begins in the leaching tanks, where the tailings from the concentration mill, assayed at about 1% copper carbonate, are discharged and leaching solutions are added. Solutions that have been enriched with copper are then pumped into storage tanks and then into evaporators. Steam pumped into the evaporators vaporizes the ammonia in the solution, which goes into a condenser, then an absorber, and finally back into the storage tanks for ammonia concentrate. The copper-rich solution flows into a filter and then is pumped into

Table 10

Placer Mining Methods and Potentially Associated Cultural Remains

Methods	Equipment and Structures	Water Diversion/Supply	Landscape Disturbance
Prospecting/ Exploration	Tool scatter, hand or churn drill, rocker	——	Test pits, shafts, drill holes
Open-cut Hand Methods	Tool scatter, shovels, picks, wheelbarrows, buckets, plow, horse scraper, cars on tracks, sluice boxes	Ditches, flumes, dams, ground sluices	Tailing piles, boulder piles, mining pits
Open-cut Power Equipment	All of the above, plus boilers, power scrapers, steam shovels, bulldozers, derricks, draglines, dry-land dredges	Ditches, flumes, dams, ground sluices	Tailing piles (possibly segmented), boulder piles, mining pits
Drift Mining	Tool scatter, shovels, picks, wheelbarrows, buckets, boilers, headframes, whim, windlass, steam points, self-dumping carrier	Ditches, flumes, dams, ground sluices	All of the above, plus shafts, adits, drifts, winter dumps
Hydraulic Mining	Tool scatter, shovels, picks, wheelbarrows, buckets, stoneboats, hoists, derricks, explosives	All of the above, plus pressure box, penstock, pipeline, regulator, hydraulic	Tailing piles, boulder piles, washing pits
Bulldozer/Hydraulic	All of the above, plus bulldozer	All of the above	All of the above
Dredging	Dredge and associated parts	Ditches, dams, ponds	Symmetrical rows of tailings

a settling box. The precipitate, with an assay of about 75% copper, is sacked and finally shipped to the smelter.

The flotation plant was added to the Kennecott mill in 1923 to treat the copper carbonate slime that was too fine to be processed in the ammonia leaching plant. Silver was also captured at the flotation mill. After sand and slime tailings from the concentration department were classified, those less than 2 mm in diameter were conveyed to the flotation department where they were thickened in a Dorr thickener and pumped to Janney cells for roughing, then cleaning, and mixing. The solution was next sent to a series of Dorr thickeners, then filtered and dewatered. Grinding the concentrate in a ball mill was the final process in the flotation process before shipment of the copper was made. Feed that entered the flotation plant was assayed at 3-4% copper, while the concentrate that was discharged assayed at 32-35% copper.

Site Interpretation

The job of interpreting the remains of previous mining activity is a difficult one because the archeologist must not only have a good understanding of mining technology, but must be able to apply the knowledge when most of the tools, equipment, and machinery have long since disappeared from the site. Before tackling the more complex issues of site interpretation, the archeologist needs to address some basic questions about the type of mining that took place at the site. To begin with, did lode or placer mining take place? Even at the most badly disturbed sites, the remaining features, such as the portals of shafts or adits or water diversion systems, will usually indicate which of the two basic types of mining was practiced. A second consideration is the level at which mining took place. Was the site used only for prospecting and exploration, or was actual production mining taking place?

For the next step in interpretation, lode and placer mining sites must be considered separately. In lode mining, the process or processes that took place - whether they be extractive processes such as open-pit or underground mining, transportation to and from the mine, or milling processes - are identified by features such as headframes, aerial tramway stations, or concentration plants. At placer mining sites, the method of mining is inferred by a suite of features which, taken together, signify drift mining, or hydraulicking, or open-cut mining. For example, whereas ditches, dams, and sluice boxes may be associated with any type of placer mining, the presence of pressure boxes, pipelines, and monitors would indicate that hydraulic mining had once taken place at the site. Table 10 lists various placer mining methods and the cultural remains that could be associated with them. In some cases, the most diagnostic features will no longer be visible in the archeological record, and the archeologist will have to make a site type determination on indirect evidence or decide that the type is unknown.

For further interpretation, the archeologist must view the site either on a more detailed level or consider the site more broadly, as part of a possible complex of sites lying within a drainage or even within a mining district. To identify how the technology at the site may have been unique, how innovations may have been used to increase the mine's productivity, and how environmental difficulties may have been overcome, the archeologist must view each of the features as a sub-system in the mining process. Viewing a site as part of a site complex is the ultimate level of interpretation for the archeologist, for then patterns of technological, and even social change, may be apparent. For example, by

considering one drainage in a productive placer mining district, the archeologist may be able to identify sites representing different levels of technological sophistication or may, in fact, find that one method predominated over a long period of time because it proved to be the most effective. It is in these broad types of interpretation that the archeological record is best used to supplement, enhance, and even correct what has been recorded in the historic literature.

Section II
The Parks



Contemporary photograph by Dale Vinson; montage by Francis Broderick

CHAPTER 3

DENALI NATIONAL PARK AND PRESERVE

Geology and Mining Districts

The sweeping arc of the Alaska Range dominates the landscape of Denali National Park and Preserve (DENA). At the great bend in the range is the Mt. McKinley group of peaks that culminate in Mt. McKinley (20,320 feet/6,194 m) and Mt. Foraker (17,400 feet/5,304 m). The perpetually snow-clad peaks and glaciers of the Alaska Range are remnants of a much more extensive cover of ice that existed during several Pleistocene glacial advances. To the north of the range is a physiographic region known as the Northern Foothills (Wahrhaftig 1958: 51; 1965). Here lie the Kantishna Hills, the location of a mining district noted for its placer gold and lode deposits of lead-silver and antimony.

The present-day landscapes of DENA overlie a patchwork of ancient geological units, known as *tectonostratigraphic terranes* (Jones et al. 1987). Underlying the mountainous arc of the Alaska Range and its northern foothills is the Denali fault system, one of the major tectonic boundaries in North America. Uplift along the Denali fault began about 65 million years ago, at the beginning of the Cenozoic era, and coincided with a series of intrusions that form the granitic core of the central group of mountains in the Alaska Range, including Mt. McKinley. It was also during the time of this great tectonic activity that most of the mineral deposits in the park were formed (NPS 1990a: 31; Connor and O'Haire 1988: 196-197). Tectonic uplift during the late Pleistocene is also responsible for some of the rugged topography of DENA, particularly near the Kantishna Hills (Bundtzen et al. 1976).

The Kantishna Hills are composed of various metamorphosed rock units that host the region's mineral deposits. The oldest and most widespread of these units is Birch Creek schist, noted for its antimony deposits. The Spruce Creek sequence, which may be the source of most of the area's mineralization, underlies Quigley Ridge. The Keevy Peak formation is another important mineral-bearing formation thought to occur in the antimony-rich Stampede Mine area. Auriferous bench deposits and gold-bearing stream alluvium, particularly in the creeks mentioned above, is the source of Kantishna's placer reserves. Another area of mineralization, near the eastern boundary of DENA, is located between the West Fork Chulitna and the Bull Rivers. The area, known primarily for the abandoned Dunkle coal-mining site, also contains deposits of gold, silver, and copper (NPS 1984a: 97-97, 155).

The mining district of major importance in DENA is the Kantishna District (figure 8). Located in the Kantishna Hills, the district encompasses many of the small tributaries that ultimately flow into the Kantishna River. Creeks such as Caribou, Glacier, Eureka, Rainy, Glen, Spruce, Slate, Moose, Little Moose, and Myrtle are the tributaries that contain placer deposits so eagerly sought by prospectors and miners. In the Kantishna District, lode deposits of antimony, lead, silver, arsenic, zinc, copper and free gold are located

along a belt that extends for about 55 km in a northeasterly direction from Slate Creek to Stampede Creek. Lying within this belt is Quigley Ridge, location of several high-grade, lead-silver mines (Bundtzen 1978: 153-154). An important antimony deposit is near Stampede Creek, at the northeastern end of the mineralized zone. Brief histories of placer mining and lode mining in the Kantishna District are presented in chapter 12 and chapter 13 of this report.

The northwestern section of the Valdez Creek District is also located in DENA (figure 8). The area of mineralization centers around the West Fork Chulitna River, where gold, silver, copper, and stibnite lodes are located (Berg and Cobb 1967: 23-26). Refer to chapter 13 for a concise history of lode mining in that area.

Cultural Setting

Evidence of human occupation in Interior Alaska now encompassed by or close to DENA dates back at least 11,000 years, during widespread glacial retreat at the end of the Pleistocene. The Dry Creek, Walker Road, Moose Creek, and Owl Ridge sites, all located in the Nenana Valley just north of the park boundary, have archaeological components with dates this early and artifacts that are possibly associated with Paleoindian sites located in more southerly states (Goebel, Powers, and Bigelow 1991). In the millennia that followed, people known to us by the name of the tool tradition that they carried with them - Paleoarctic and Northern Archaic - hunted and camped in the general DENA region (K. Griffin 1990). A tool tradition recognizable as Athapaskan appeared sometime around 1,000 years ago. A more detailed description of the archaeological evidence left behind by these people is presented in chapter 15 of this report.

According to historic and linguistic information, five groups of northern Athapaskans once occupied, at least on a seasonal basis, the region now within the boundaries of DENA (figure 8). The term "group" is used to describe the speakers of individual northern Athapaskan languages, for they can only be grouped by language and territory, and not by tribal identity. The formidable Alaska Range dominates the geography of DENA and separated the territories of Dena'ina and Ahtna to the south and east from the Lower Tanana, Koyukon, and Upper Kuskokwim to the north. The mountains did not, however, pose a barrier to the inter-group trade that was carried out via mountain passes and sometimes across glaciers. Because of a shared heritage and trade networks, the lifeways and material culture of the northern Athapaskans were quite similar. In fact, they have been considered a cultural continuum, each group differing only in certain minor details from their immediate neighbors (VanStone 1974: 8).

All northern Athapaskans were hunters and gatherers whose subsistence activities, and thus settlement, varied during the course of a year. Depending on the resources available, emphasis was placed on either hunting or fishing, but both activities were included within a group's overall strategies. VanStone (1974) considers the typical northern Athapaskan settlement pattern to be that of "restricted wanderers," characterized by great mobility, small band size, and the use of virtually all edible resources within their environment. These resources may have included moose, caribou, sheep, furbearers, waterfowl and other birds, salmon, freshwater fish such as whitefish, berries and other plants. In some areas where there was a locally abundant source of food, such as salmon, that could be harvested and stored, the people would be able to remain at one central base

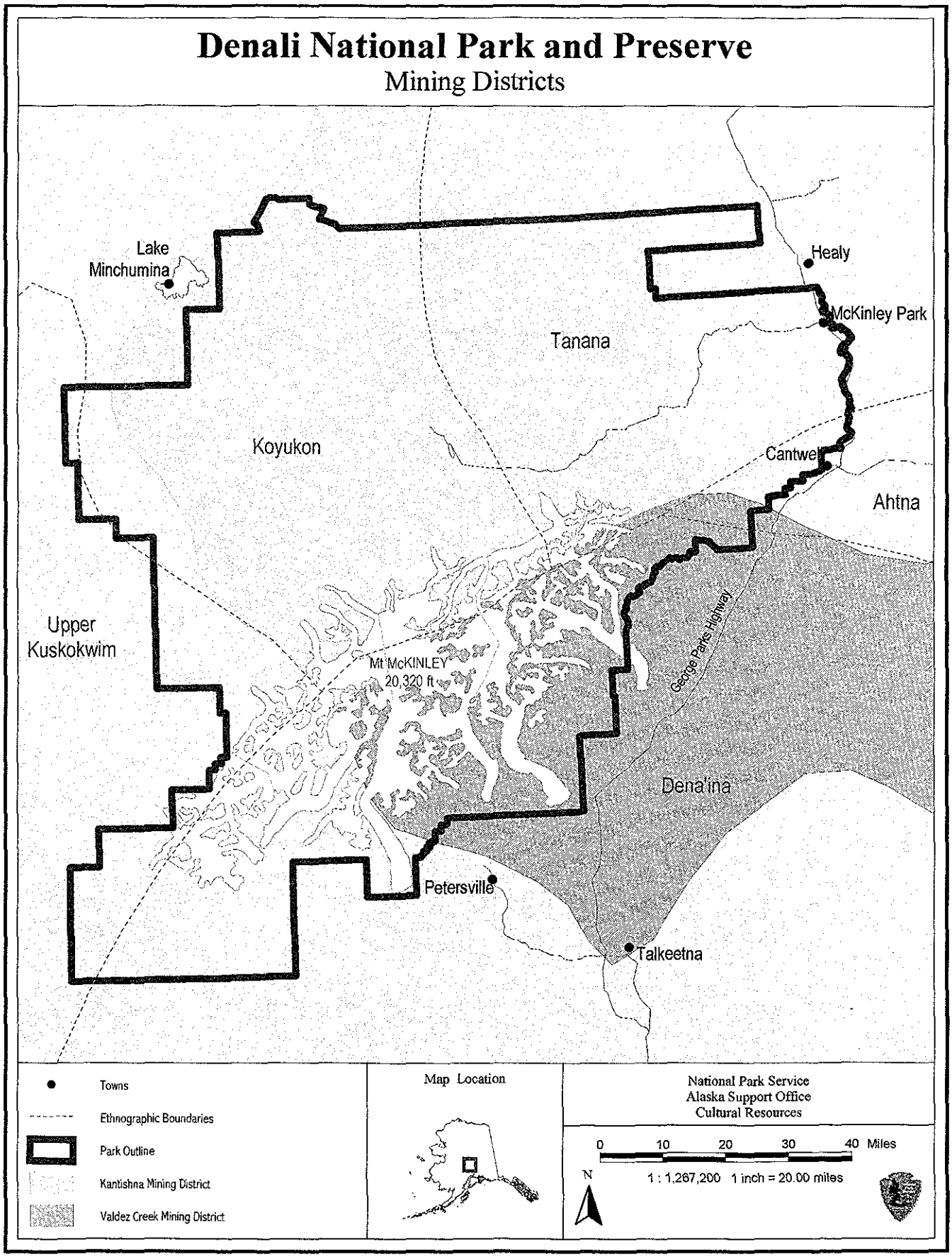

Denali National Park and Preserve
Mining Districts
Lake Minchumina
Healy
McKinley Park
Tanana
Koyukon
Cantwell
Ahtna
Upper Kuskokwim
Mt McKINLEY 20,320 ft
George Parks Highway
Dena'ina
Petersville
Talkeetna
Towns
Ethnographic Boundaries
Park Outline
Kantishna Mining District
Valdez Creek Mining District
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 10 20 30 40 Miles
N
1 : 1,267,200 1 inch = 20.00 miles

Figure 8.

or village for part of the year and spend other parts of the year hunting, fishing, or collecting in various other locales (VanStone 1974: 37-42).

Of the five Athapaskan groups in DENA, the Dena'ina were the first directly contacted by Europeans. Captain James Cook made the first recorded encounter with the Dena'ina in 1778 when he sailed into the inlet later named for him. He mistakenly identified the people there as Chugach Eskimos and noted that they possessed iron and blue glass beads, evidence of what he thought was indirect trade with the Russians (Beaglehole 1967: 364-65; de Laguna 1975: 14-15). The period of direct contact between the Dena'ina and Russians began at least as early as 1784, when Shelikov established the first permanent trading post on Kodiak Island. By 1787 two other forts were built on the eastern shore of Cook Inlet, but the Dena'ina were not easily subjugated and hostilities broke out often with the Russians (Fall 1987: 15-17). Unlike their kinsmen of lower Cook Inlet, the Upper Inlet Dena'ina, who lived in the vicinity of DENA, had only sporadic contact with the Russians and "maintained a viable, distinctive culture into the first decades of the early American period" (Fall 1987: 19, 43).

In contrast to the Dena'ina on the coast, the inland Athapaskan groups were more isolated, and thus less directly affected during the early contact period. Nevertheless, each of the groups participated, either directly or indirectly, in trade with the Russians during the eighteenth century. Of all the groups in DENA, the Tanana were the most isolated in terms of trade with the Russians. There were no Russian posts established in their territory; and until the mid-1800s, they participated only in trade through intermediaries.

Cultural Changes During the Gold Rush Era (1886-1920)

The gold rush period was a time of rapid acculturation for the Native people of DENA. Some of the changes were cumulative ones resulting from a long period of mostly indirect contact with white culture; and others were the result of newly introduced technologies, such as the fishwheel. For the most part, the changes that were occurring to the Athapaskans of DENA were similar to those affecting Athapaskan populations throughout Interior Alaska. Questions of concern here are how mining and miners contributed to acculturation in DENA, and if it is possible to identify and distinguish this acculturation from the tides of change sweeping over all the Native population in Alaska during the gold rush era.

Prospectors began entering Interior Alaska in the 1870s. In 1889, Frank Densmore and some fellow prospectors made their way from the Tanana to the Kuskokwim basin and probably up the Kantishna River in the vicinity of DENA (Brown 1991: 15). It appears that they did not record the nature of contact, if any, with the Natives. A decade later an army expedition led by Capt. E.F. Glenn was sent on a reconnaissance to find routes into the Interior gold fields. In reports from parties exploring the Susitna-Tanana divide, his officers noted that many of the Natives (probably Dena'ina) at Tyonek and Susitna Station were in poor health, in contrast to those of the Interior who appeared healthy and still engaged in their traditional hunting and fishing pursuits (Learnard 1900: 666; Castner 1900: 703-04).

In 1899 another army party, led by Joseph Herron, ventured across the Alaska Range into the Upper Kuskokwim drainage. Herron's (1909) party became lost near the Upper Kuskokwim village of Telida, where they were assisted by Chief Sesui and his people who provided them with food, clothing, and directions to the Tanana River. Photo-

graphs taken by Herron (1909: 42) show Chief Sesui's band in western attire, not the traditional Athapaskan garb. This may have been the first sustained contact between whites and people of DENA in their own territory. In the next few years, with the discovery of gold in the area, the period of isolation would come to a abrupt end.

Even before the arrival of the first wave of stampeders into DENA, changes were beginning to occur in some traditional subsistence practices. Firearms, which had come into widespread use by the turn of the century in Interior Alaska, eliminated the need for the traditional cooperative hunts; and small family hunting parties were able to supply enough meat for their own needs (Gudgel-Holmes 1991: 25). According to the recollections of Eli Charlie, born in 1906 and raised around Cosjacket, the introduction of guns in his father's time made the trips to Toklat Springs to fish for winter starvation rations unnecessary because of the ease in hunting moose (Charlie 1983: 2). Also, the winter-to-early-spring seasonal round was shifting to accommodate more intensive and varied fur trapping, based around individual traplines rather than on a cooperative effort. For movement along these traplines, the Athapaskans had adopted the Eskimo practice of dog traction, i.e. harnessing dogs to sleds to transport their loads (Hosley 1981b: 544).

Gold was first discovered in DENA by Judge James Wickersham, en route to climb Mt. McKinley in 1903. During his travels along the Kantishna River, he encountered a group of Koyukon from the Cosna-Manley band. The particular band of 50 people he met made their winter camp on the lower Tanana River and had ventured south along the Kantishna River to the mouth of the Toklat for their annual early spring moose hunt (Wickersham 1938: 223, 225, 233). In a few short years, such groups of Native hunters would be replaced with throngs of prospectors and miners making their way to another gold strike.

The area of Wickersham's discovery was the Kantishna Hills, known to the Athapaskans as Ch'edzaye. Wickersham recorded this name as "Chitsia," meaning heart, because the highest peak in the range was thought to resemble a moose heart (Gudgel-Holmes 1991: 57). Although he failed to make the ascent, he inadvertently found colors in the gravels of Chitsia Creek in the northern Kantishna Hills, and thus started a stampede into the area in 1904-05. Several thousand people traveled up the Kantishna River, and within weeks many towns, including Eureka, Glacier City, Diamond, and Roosevelt, had been constructed.

By 1906, prospectors, disappointed by the limited extent of the deposits, began to leave en masse (Bundtzen 1978: 151-52). After the mass exodus, about 35-50 non-Natives remained in the district, mostly dividing their time between Eureka (now called Kantishna) in the summer, and Glacier City, Roosevelt, or Diamond in the winter. Besides placer mining, Kantishna residents prospected and mined lead-silver ore along a 35-mile belt stretching between Slate and Stampede Creeks. The minerals so intently sought by miners in the Kantishna area lay in the gravels of rivers and creeks long used by the Koyukon, Upper Kuskokwim, and Lower Tanana during their seasonal rounds.

When Stephen Capps of the USGS visited the Kantishna District in 1916, he observed that

> the natives have no permanent settlements in this area. As the Indians of interior Alaska depend principally on fish for their subsistence, their villages are all on fish streams, and they spend the summer season in catching and drying fish. The

> largest Indian villages in this general region are on Tanana and Yukon rivers, one just above the new railroad town of Nenana and the other at the junction of the Tanana with the Yukon. Smaller settlements are on Lake Minchumina and at Telida, in the upper Kuskokwim basin. From all of these settlements hunters and trappers sometimes make trips to the foothills and mountains of the area here considered, but moose, killed in the lowlands, furnish these men most of their fresh meat, as moose may be obtained nearer the settlements than either sheep or caribou. In the summer of 1916 the Geological Survey parties saw no Indians in the mountains and found evidence only of scattered temporary camping grounds (Capps 1919: 17).

Although Capps may not have encountered many Natives during his visit to the Kantishna District, the continued use of the area is well documented in oral histories, particularly in the recollections of Abbie Joseph, who was born in the Kantishna area in 1894 and whose family home was in the village at the mouth of Birch Creek (Gudgel-Holmes 1991: 86). For the most part, the subsistence activities she describes, such as setting up fish camps and caching meat from caribou and sheep hunts, actually date to the gold rush era. One specific area of continued importance to Abbie Joseph's family was Ch'enok'et, meaning "mineral lick." It was located up Moose Creek, not far from Diamond, and was used for salmon fishing every year. In the vicinity was the location of a memorial potlatch held for her grandparents sometime during the period between 1900 and 1910. The McKinley River was another area that remained the focus of seasonal activities until the last Birch Creek-Bearpaw resident left the area in the 1940s (Gudgel-Holmes 1991: 73, 75).

It has been suggested that a depletion of game, such as caribou and sheep, caused the Natives to abandon their subsistence hunting along the flanks of the Alaska Range. The depletion was thought to be caused by trappers and prospectors using game animals as food for their dog teams and by market hunters killing large quantities of animals for sale in Fairbanks. In fact, a plea was made to Congress by naturalist Charles Sheldon to establish a national park in this area (later to be Mt. McKinley and then Denali National Park) to protect the wildlife from market hunters who might gain access to the area on the Alaska Railroad, which was then under construction (Brown 1991: 87).

The prospectors and miners of the Kantishna District were themselves avid hunters (Bundtzen 1978: 154). However, when Capps visited the area in 1916 he commented that "probably no other part of North America is so well supplied with wild game...as the area on the north slope of the Alaska Range west of Nenana River" (1919: 16). Many others who visited or worked in the area claim that moose, caribou, and sheep were all abundant throughout the first several decades of the 1900s (Schneider et al. 1984: 17). It seems more likely that the gradual decline in hunting in the area may be related more to a change in economic pursuits, such as described below, than to a significant depletion of game for Native subsistence.

A new technology widely adopted by Alaska Natives during the gold rush era was the fishwheel. The fishwheel was apparently a European innovation brought north by some unknown man of the gold rush, and first built on the Tanana River in 1904 (Osgood



Roosevelt John and his wife, Emily, in 1919.
(Fabian Carey Collection, Archives, University of Alaska, Fairbanks)

1971: 139; Hosley 1981c: 550). It revolutionized the traditional fishing economy because it allowed people to take large quantities of fish on deep, muddy main rivers where nets and weirs had proved to be ineffective (Hosley 1981c: 550). The increased supply of fish was dried and used to feed the more numerous dogs needed for sled dog teams. Thus, fishing began to play a more important economic role, for not only subsistence and dog food, but to sell to travelers at the roadhouses that were being built in the area. Fishwheels built on the Kantishna River at the mouth of the Toklat and on Birch Creek and the Bearpaw Rivers remained in use as late as the 1930s and early 1940s (Schneider et al. 1984: 15).

During the gold rush era, the Athapaskans of Kantishna began to participate in a dual economy - partially based on traditional subsistence activities and partially based on wage labor that was introduced by the miners. An example of this is found in the oral history of Willie Folger, born in 1896. He recalls that as a young adult he came to live with his father, Johnny Folger, a trapper in the Kantishna area. Willie worked with a mining operation in Glacier City as a freight hauler and later as a cook in the mining camp kitchen there (Folger 1983: 1-2). Other opportunities for employment were work on the Alaska Railroad being built through Nenana, and on riverboats that were bringing in miners and supplies. Eli Charlie recalls that his father was employed cutting wood for the steamboats in the summer (Charlie 1983: 1). Roosevelt John, one of the last Natives to live in the Kantishna drainage, supposedly ran a roadhouse at Birch Creek Village, a stopover point on the mail trail from Nenana to McGrath (Schneider et al. 1984: 41). Although the mines and mining-related activities provided employment, legal ownership of claims was denied to Alaska Natives until 1924 when Congress passed the Citizenship Act. Until this time, most Natives were not considered to be totally assimilated into the dominant culture, and thus not qualified to be citizens (Schneider 1986: 162; Brown 1991: 69).

The second wave of newcomers into the Kantishna District arrived in 1920 when lead-copper-zinc deposits were discovered at Mt. Eielson, but again the activity eventually died down. The two large-scale hydraulic placer mining operations that were begun along Moose and Caribou Creeks in 1922 also proved to be unsuccessful (Bundtzen 1978: 152-56). Both placer and lode mining declined during the second half of the 1920s because of the remoteness of the district and the exhaustion of easily accessible, high-grade deposits (Hinderman 1983: 28). By this time, the Native population in the area had severely declined. The primary cause was a series of epidemics that had swept through the area, including a measles outbreak in 1900, diphtheria in 1906, and influenza in 1920, 1923, and 1930 (Schneider et al. 1984: 18).

The effects of the epidemics are best illustrated by the recollections of those who lived in the Kantishna area at the time. Eli Charlie remembered the spring of 1923 when he was camped at the Mud (Muddy) River with some others from Cosjacket. One boy went to the hills to "show the whitemen where some minerals were. He came back sick" (Charlie 1983: 2). Before spring was over, five to seven people died near Eli's camp; and others had died at Birch Creek Village. Many of the people were buried at Birch Creek cemetery (Schneider et al. 1984: 18). Another tale is told by Leo Keogh, of Nenana, who carried the mail by dog team in 1929-30 on the trail between Nenana and McGrath. During that time, he recalls only one Native family still living in the Kantishna area, plus an occasional visitor or two who would come in from the Tanana (Keogh 1983: 1).

The ties with the land were difficult to break even after most of the Native population had either died or left the Kantishna area, with many settling in Nenana. In the 1930s, several Native families tried to establish a village at Toklat Springs. Knight's Roadhouse had been built near there in 1909 and served miners, travelers, and Natives who passed through the area. Instead of traditional building materials, the cabins were built of logs, milled lumber, and window glass hauled from Nenana. The cabins were built on poor soil during the winter, and within two years they shifted and finally sank. Toklat Village was then abandoned (Gudgel-Holmes 1991: 55; Andrews 1977: 405).

Although the Kantishna Hills has been the focus of mining in DENA, there are other gold fields within the DENA region, including adjacent areas of the Kantishna District, and the adjoining Bonnified and Valdez Creek Districts (Brown 1991: 60; Berg and Cobb 1967). The Western Ahtna, whose hunting territory extended into the eastern edge of DENA, were greatly affected by prospecting and placer mining on Valdez Creek beginning in 1903. A mining camp, called Denali, was established near the mouth of Valdez Creek in 1907, and by 1908 there were 120 men working placer claims in the area (Orth 1971: 266; Dessauer and Harvey 1980: 26). Valdez Creek, known to the Ahtna as C'ilaan Na' or "abundant-game-creek" (Kari 1983: 66), was an area visited seasonally for hunting and fishing, but a more permanent residence was established here soon after intensive mining began.

According to informants from Cantwell, whose families had once lived at Denali, there was a permanent Native settlement of about 50 inhabitants and perhaps a dozen log cabins at Valdez Creek during the 1910s through 1930s. The Native settlement was located across the creek and nearly a mile from the mining camp. In the early days, the Ahtna supplied the miners with wild game in trade for tea, sugar, flour, tobacco, and clothing; the miners also employed one Native man to transport the mail from Gulkana (Dessauer and Harvey 1980: 27). In later years, cash figured more importantly in their overall economy, and the primary means of making money was through the sale of fish and game to the miners for 35 cents a pound. In the 1920s and 30s, some of the Native men began to work in the mines, doing a variety of tasks such as placering, tunneling, and hydraulicking (Dessauer and Harvey 1980: 26-27, 55-56).

Assimilation for the offspring of Native women and white miners was probably a good deal easier than for most Natives. Such is the case of Henry Peters, the son of a Native woman and a miner. In his late teens, Peters got a "small but good enough placer mine" in lower Valdez Creek, according to Laurence Coffield, a miner in the area for several decades (Dessauer and Harvey 1980: 28). The railroad also provided employment for the Ahtna of Valdez Creek when the mines were not in operation; and the people began moving to Cantwell, on the railroad line, as early as 1916 (de Laguna n.d.: 40).

Although the Upper Inlet Dena'ina were not affected by gold mining in the DENA region, they did not escape the influx of miners into their own territory, particularly in Turnagain Arm and in the Willow Creek District of the Talkeetna Mountains. They were hired as guides, packers, and letter carriers. Also, liaisons or marriages between Dena'ina women and white miners produced a number of offspring. Many Dena'ina today are the descendants of these unions (Fall 1987: 22).

The Ahtna, Lower Tanana, Koyukon, and Upper Kuskokwim people of the DENA region entered the twentieth century with few changes in their traditional culture. Even the Upper Inlet Dena'ina, who had weathered more intense contact because of their prox-

imity to the coast, still had only partially become acculturated into the white culture when the waves of prospectors began entering their territory. For these Athapaskans, selective borrowing of some European and American goods available through trade were the most obvious indications of change. With the increased wealth in trade goods, traditional leaders also acquired more status; and potlatches began to become more extravagant affairs. Less apparent were the gradual changes in settlement caused by hunting and trapping on a more individual family-oriented basis. In the next few decades, much of the traditional lifeway would be replaced by the economy, religion, and technology of the dominant white culture.

Many of the changes - the adoption of dog teams to facilitate trapping, introduction of the fishwheel - were brought on by the tide of historical events. Others changes certainly may be attributable to the increased population and development fostered by mining in the Kantishna District. The introduction of a wage economy and opportunities for employment generated by mining-related activities were major factors in the acculturation of Athapaskans in the vicinity of DENA. More catastrophic was the introduction of diseases to which the Natives had no immunity. In part, this is also attributable to the great influx of miners, prospectors, and associated trades people who carried the diseases. Despite the apparent rapidity of acculturation during the gold rush era, the relative isolation and low productivity of the Kantishna District were positive factors for Natives of the region because the persistence of some aspects of their traditional life survived longer here than in the more intensively mined areas of Alaska.

Summary of Surveys and Sites

CRMIM crews surveyed primarily in the Healy and Mt. McKinley quadrangles, with investigation of only a small parcel of land in the Talkeetna quadrangle. Most of the drainages surveyed in the Healy quad, such as Bull River, Costello Creek, and Colorado Creek, are tributaries of the Chulitna River. The Teklanika River and Windy Creek are the other major drainages represented in the Healy quadrangle survey area. In the Mt. McKinley quad, tributaries of the Bearpaw River, including Moose, Caribou, and Glacier Creeks and their tributaries, constitute the primary areas of field investigation, with the Toklat and McKinley Rivers and their tributaries also being surveyed within the quad. In table 11 below, the coverage is broken down by acres surveyed in each drainage. In some cases, the table also indicates the miles and kilometers of survey along linear features, such as access roads. Detailed maps of these survey areas are on file in Anchorage at the NPS, Alaska Support Office, Cultural Resources Division.

TABLE 11
CRMIM Survey Coverage in DENA by Locale

Locale	Map Quad	Acres	Miles (Km)
Healy Quadrangle			
Bull River	B5	4035	
Chulitna River - West Fork	A6, B6	160	
Costello Creek	B6	120	
Colorado Creek	A6, B6	595	
Colorado Creek/Black Bear Creek	A6, B6	160	
Dunkle Hills	B6	170	
Long Creek	A6	60	
Ohio Creek	A6	180	
Teklanika River	C6	107	
Windy Creek - West Fork	B5	280	
Mt. McKinley Quadrangle			
Bearpaw River	C2	1	
Busia Mt.	C2	320	
Caribou Creek/Access Rd.	C2	1282	10.6 (17)
Crooked Creek	D1, D2	88	
Eldorado Creek	C3	100	
Eureka Creek	C2	425	
Fifteen/Eighteen Gulch Rd.	C2	—	2.5 (4)
Friday Creek	C2	160	
Glacier Creek	C2	441	
Glacier Peak/Access Rd.	C2	200	8.1 (13)
Glen Creek/Road	C2	583	6.8 (11)
Kantishna Hills	B3, C3	600	
Last Chance Creek	C2	100	
Little Moose Creek	C1	7	
Lucky Gulch	C2	1	
McKinley Bar	B3	200	
McKinley River	B3	200	
Moose Creek	B1, B2, C2	1265	
Moose Creek - North Fork	C2	350	
Moose Creek/Friday Creek	C2	21	
Moose Crk/Lake Crk/Access Rd.	C2	440	3.7 (6)
Quigley Ridge/Access Rd.	C2	152	4.4 (7)
Q.Rdg/Wickersham Dome/A.Rd.	C2	1160	3.7 (6)
Rainy Creek/Access Rd.	C2	121	1.2 (2)
Slate/Eldorado Creek/Access Rd.	B3	640	5.0 (8)
Slippery Creek	A3	—	1.2 (2)
Spruce Creek	C2	123	
Stampede Creek	C1	100	
Twenty-two Gulch/Access Rd.	C2	120	3.1 (5)

(continued)

Table 11 (continued)

Locale	Map Quad	Acres	Miles (Km)
Willow Creek	B2	160	
Wonder Lake	B2	380	
Yellow Creek	C2	80	
Talkeetna Quadrangle			
Tokositna River	C2	160	
DENA Total		15,847	50.3 (81)

There were 94 sites recorded in all the DENA survey areas. They are listed in table 12 by drainage and site type. An annotated list of the sites by AHRS number is be in the appendix; that listing also provides references for site location maps. Full site descriptions appear in the chapters that pertain to placer mining, lode mining, historic, and prehistoric sites (chapters 12, 13, 14, and 15, respectively).

TABLE 12
Sites in DENA by Locale and Site Type

Locale	Site Type	AHRS Number
Healy Quadrangle		
Bull River	Prehistoric	HEA-232
Chulitna River (W. Fork)	Lode	HEA-227, HEA-228, HEA-231
	Historic	HEA-229, HEA-230
Teklanika River	Prehistoric	HEA-044, HEA-045
Mt. McKinley Quadrangle		
Bearpaw River	Historic	MMK-001
	Paleontology	MMK-088
Cache Creek	Historic	MMK-094
Caribou Creek	Placer	MMK-023, MMK-039, MMK-040, MMK-041, MMK-042, MMK-043, MMK-044, MMK-045, MMK-047, MMK-048, MMK-049, MMK-070 MMK-114
	Lode	MMK-046
	Prehistoric	MMK-034
Crooked Creek	Placer	MMK-118, MMK-119, MMK-120
Eldorado Creek	Lode	MMK-091, MMK-092

(continued)

Table 12 (continued)

Locale	Site Type	AHRS Number
Eureka Creek	Placer	MMK-086, MMk-087
Friday Creek	Lode	MMK-117
Glacier Creek	Placer	MMK-054, MMK-055, MMK-056 MMK-057, MMK-060
	Historic	MMK-058, MMK-059
Glen Creek	Placer	MMK-062, MMK-063, MMK-122 MMK-123
	Lode	MMK-079, MMK-080, MMK-081
	Historic	MMK-064
	Prehistoric	MMK-066, MMK-071
Grant Creek	Lode	MMK-125
Lake Creek	Prehistoric	MMK-097, MMK-098
Little Moose Creek	Placer	MMK-128
Lucky Gulch	Lode	MMK-127
McGonagall Gulch	Lode	MMK-082
Moose Creek	Placer	MMK-017, MMK-019
	Lode	MMK-090
	Historic	MMK-011, MMK-018, MMK-020, MMK-083, MMK-084, MMK-085, MMK-093, MMK-099, MMK-100
	Prehistoric	MMK-050, MMK-068, MMK-069, MMK-072, MMK-078, MMK-096
Moose Creek (North Fork)	Prehistoric	MMK-101, MMK-102, MMK-103
Quigley Ridge	Lode	MMK-061, MMK-089
Rainy Creek	Placer	MMK-129
Slate Creek	Lode	MMK-077
Slippery Creek	Lode	MMK-116
Spruce Creek	Placer	MMK-067, MMK-124
	Prehistoric	MMK-065
Stampede Creek	Lode	MMK-016
Twenty-two Gulch	Placer	MMK-052, MMK-053
Wonder Lake	Prehistoric	MMK-107, MMK-108, MMK-109, MMK-110
Yellow Creek	Placer	MMK-051

CHAPTER 4

WRANGELL-ST. ELIAS NATIONAL PARK AND PRESERVE

Geology and Mining Districts

Wrangell-St. Elias National Park and Preserve (WRST), extending across 13,000,000 acres in Southcentral Alaska, is the largest national park unit in the United States (NPS 1990b). Several physiographic divisions comprise the rugged terrain of WRST: the eastern part of the Alaska Range, the Wrangell Mountains, the St. Elias Mountains, the Kenai-Chugach Mountains, the Copper River Lowlands, and the Gulf of Alaska Coastal Section (Wahrhaftig 1965: map 1). On and within the boundaries of WRST, there are 21 mountain peaks taller than 10,000 ft/3,048 m. The highest of these, Mt. St. Elias, located on the Alaska-Canada border, rises 18,008 ft/5,489 m above sea level.

The swiftly flowing Copper River forms the western boundary of WRST. It originates as a rivulet in the Copper Glacier on the north face of Mount Wrangell and runs for almost 400 km before entering the Gulf of Alaska (Hanable 1982: 5-6). Its major tributary, the Chitina River, flows in a west-northwesterly direction through the heart of the gold-and-copper-producing region, near the center of WRST. The Nabesna and Chisana Rivers, the major drainages in the northern section of WRST, are both tributaries of the Tanana River, lying still farther north outside the park boundaries. The eastern boundary of WRST is formed by the international border with Canada. Only the southern coastal fringes of WRST lie outside the boundaries of the subarctic boreal forest region, which dominates Interior Alaska.

As in DENA, the landscape of WRST was blanketed by the coalescence of glacial ice during the late Pleistocene, beginning about 120,000 years ago. Even in the Holocene, glacial advances have continued in the Chugach and St. Elias Mountain Ranges. The Malaspina Glacier, at the southeastern tip of WRST, advanced twice in the last several centuries, most recently during the 1700s (Péwé 1975: table 2). The mountainous southern section of WRST and the area even farther south, around the Gulf of Alaska, still support the largest ice fields, piedmont glaciers, and valley glaciers on the North American continent (Selkregg 1974: 3).

Geologically, WRST contains rocks that date as far back the Precambrian, some 600-800 million years ago. One of ancient geological units in WRST, known as the Wrangellia terrane, has deposits as old as the Pennsylvanian Period (about 300 million years ago). They are composed of basalt lava flows, named the Nikolai greenstone, and are overlain by the Chitistone limestone. The rich copper deposits mined by the Kennecott Corporation in the early decades of the twentieth century lie at the contact between the Nikolai and Chitistone formations (Nelson 1989: 11; Plafker 1989: 8). South of the Wrangell Mountains in this same zone of mineralization, copper is also in veins, stockworks, contact metamorphic, porphyry, and volcanogenic deposits, and as native

copper. Another zone of less extensive mineralization lies along the northern flank of the Wrangells (NPS 1990b: 37).

Gold and copper deposits are also in the Chugach terrane to the south. Its rocks were formed in a deep marine environment and date from the Jurassic to the end of the Cretaceous Period (195-60 million years ago). Tectonic movements brought this terrane north to Alaska from its original position around the latitude of California at about 50 million years ago (Plafker 1989: 5).

Three mining districts are in the boundaries of WRST (figure 9). To the northeast is the **Chisana District**, located in the area drained by the Nabesna and Chisana Rivers on the north, and the White River on the east. Metallic lode deposits are scattered throughout the highland parts of the district, most notably near Nabesna, at Orange Hill, and in an area east of Chisana (Berg and Cobb 1967: 205). The placer gold deposits are almost all within a few square miles of Bonanza Creek. The gold in these creeks is thought to be reconcentrated from Tertiary gravels preserved as a 200-foot-thick cap on Gold Hill. There is also some native copper in the Chisana District creeks (Cobb 1973: 115).

The **Chistochina District**, bordering the Chisana District on the west, is divided into northwestern and southeastern sections by the Copper River. The latter falls within the boundaries of WRST. Several small lode deposits of copper, gold, and silver, which occur in the Nikolai greenstone/chitistone limestone formation, are located in the Kotsina-Kuskulana area north of the Chitina River (Berg and Cobb 1967: 38-42). Placer gold deposits in the WRST section of the Chistochina District are near the headwaters of the Copper River. Unlike the economically important placer deposits in the northwestern section of the Chistochina District, the Chistochina placers within WRST have only been prospected, but never mined (Cobb 1973: 24-28).

The **Nizina District**, bounded by the eastern tributaries of the Copper River between the Chitina River and Miles Glacier, falls almost entirely within WRST. The Nizina District is most noted for its bonanza copper deposits, mined by the Kennecott Corporation for more than three decades. Several other copper mines and prospects, though none as productive as the Kennecott mines, and a gold lode deposit, located at the headwaters of Golconda Creek, are also in the district (Berg and Cobb 1967: 52-63). Gold placer deposits in the Nizina District are on Dan and Chititu Creeks and their tributaries, as well as Golconda Creek and the Bremner and Little Bremner Rivers. Dan Creek, with one of the longest records for continuous placer mining in Alaska, also has produced many tons of native copper nuggets, one of which weighed an estimated three tons (Cobb 1973: 30-32).

Cultural Setting

Our knowledge of the prehistoric occupation of WRST is extremely limited, and is derived mostly from inferences made from fieldwork conducted elsewhere in the Alaska Interior. A site, recently surveyed and tested in the Wiki Peak-Ptarmigan Lake area of the park, has produced lithic evidence for tool technologies associated with Northern Archaic and possibly Late Denali traditions and stratigraphic evidence for occupation roughly 3,000 years ago (Patterson 1999). The majority of the archaeological sites recorded in WRST, however, are those related to Athapaskan use of the area.

In historic times, the two Athapaskan groups inhabiting the land now encompassed by park and preserve boundaries were the Ahtna and Upper Tanana. Two other Alaska Native groups, the Eyak and the Tlingit, also resided in the area (figure 9).

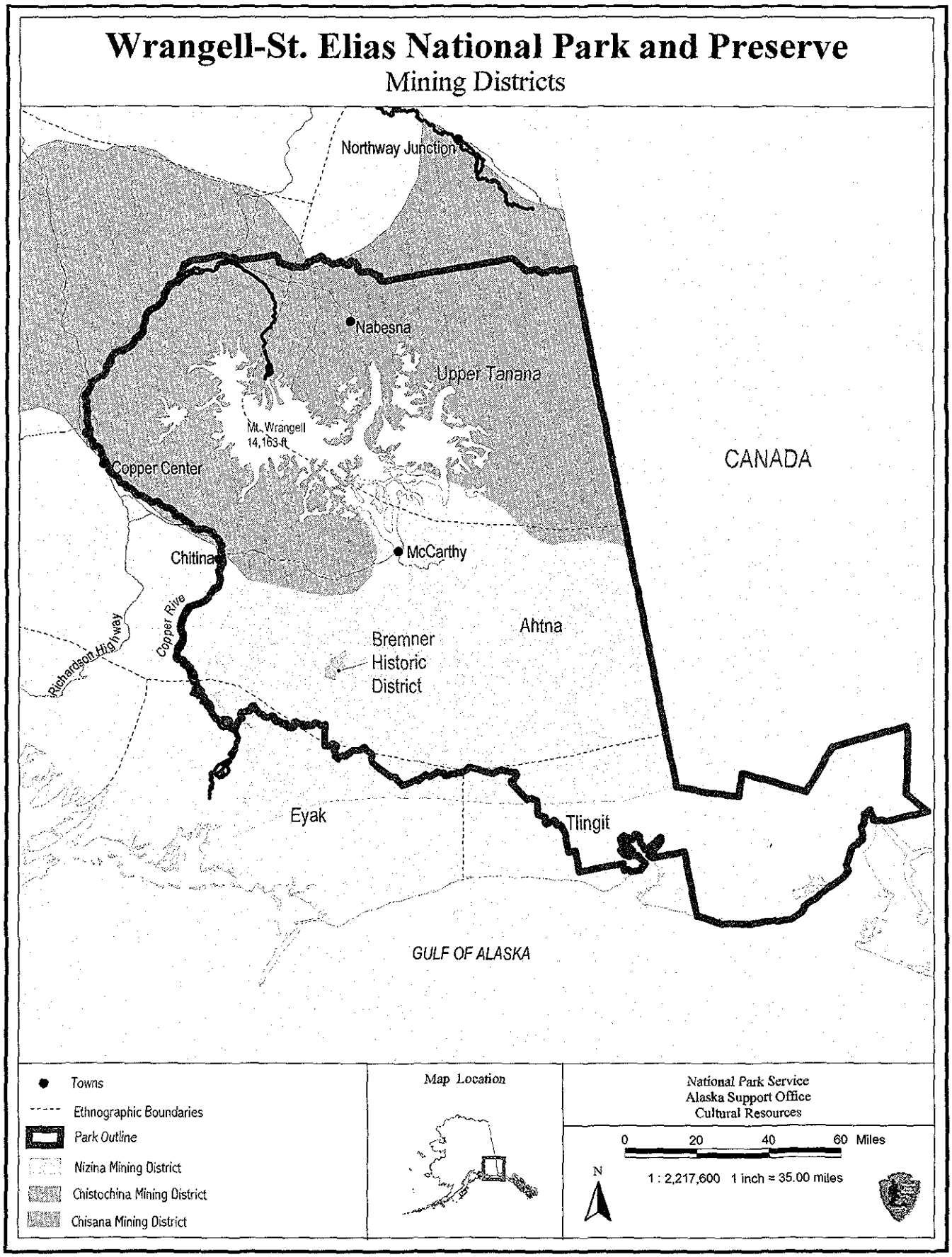

Wrangell-St. Elias National Park and Preserve
Mining Districts
Northway Junction
Nabesna
Upper Tanana
Mt. Wrangell
14,163-ft
Copper Center
CANADA
Chitina
McCarthy
Copper River
Richardson Highway
Bremner
Historic
District
Ahtna
Eyak
Tlingit
GULF OF ALASKA
Towns
Ethnographic Boundaries
Park Outline
Nizina Mining District
Chistochina Mining District
Chisana Mining District
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 20 40 60 Miles
N
1 : 2,217,600 1 inch = 35.00 miles

Figure 9.

Of the four groups, the territory of the Ahtna was by far the most extensive, including most of the land area north of the coastal ice fields. The Upper Tanana occupied the northeast corner of WRST, extending north from the northern flank of the Wrangell Mountains and east from the Copper Glacier. The Eyak were a small enclave of people linguistically related to both the Athapaskans and the Tlingit, but more similar in social organization to the latter (Birket-Smith and de Laguna 1976 [1938: 352]). They inhabited the Copper River delta, south of the park, with only a corner of the Bagley Icefield actually within WRST boundaries. Bordering the Eyak on the east were the Tlingit. Although most of their territory in WRST is also heavily glaciated, they did hold ice-free portions of the coast from Cape Yakataga to Yakutat Bay.

The Ahtna were unique among the Athapaskans for their ability to work raw copper nuggets into fine manufactured implements. According to oral tradition, the copper quest began each year after fishing season had finished. The people would pull skin boats up to the headwaters of the Chitina and Nizina Rivers and begin the search for nuggets on creekbeds, gravel beds, and in the surrounding cliffs. When the boats were filled with nuggets and the meat of game animals, they traveled back downriver where expert smiths worked the nuggets into various copper artifacts such as spear and arrow points and knives. Although the method of working native copper has been lost through the ages, researchers believe that some type of heat treatment, followed by hammering into various tool forms, was probably involved (Reckord 1983b: 25-26; Hovis 1996: personal communication).

The early contact period was vastly different for the coastal Yakutat Tlingit and Eyak than it was for the two Athapaskan groups in the interior of WRST. In terms of culture contact, the WRST groups can be placed along a continuum, with the Eyak at one extreme and the Upper Tanana at the other. While Russian traders, as well as Spanish, French, and English explorers, had made contact with the coastal people by the 1780s, the Ahtna and the Upper Tanana of the Interior were still fairly well isolated more than a century later. By the close of the early contact period in 1885, the Ahtna, however, were fully involved in the fur trade; and they had incorporated many western items into their material culture.

Culture Change During the Gold Rush Era (1886-1920).

In the southeastern coastal extension of WRST, the history of gold mining began almost two decades earlier than in the Copper River country to the north. The discovery of gold at Yakutat ranks, along with the gold belt district of Juneau, as one of the earliest gold strikes in Alaska (Robinson and Bundtzen 1979: 3). By 1880, gold-seekers began to filter into the Yakutat area, where the first beach placer was discovered. Actual mining began in 1887, and by 1888 some 40-50 prospectors were working the black sand beaches of Khantaak Island in Yakutat Bay (Porter 1893: 230). The placers there were never very rich nor extensive (Brooks 1973: 308), but the few miners who remained in the area after the initial boom did contribute to the population by fathering the children of some of the Native women (de Laguna 1972: 197).

Another brief period of mining frenzy was experienced in the Yakutat area during the Klondike Gold Rush when several hundred prospectors landed at Disenchantment Bay and then sledded over Hubbard Glacier to the Alsek River and the interior goldfields

(Brooks 1973: 368). Much more significant in terms of the impact on the Native community here was the development of the fishing and cannery industries that also occurred during the gold rush era.

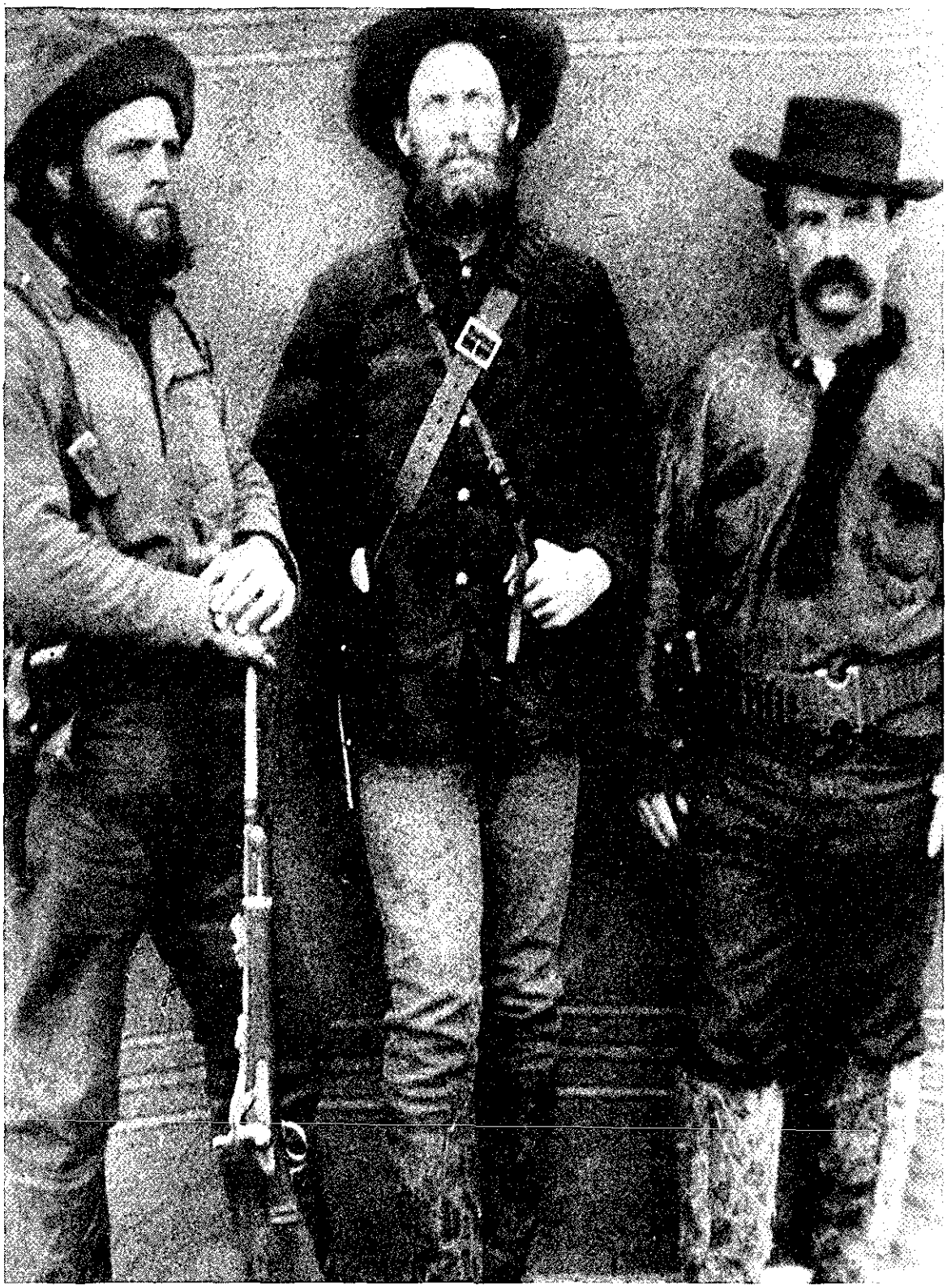
Gold was also discovered near Yakataga, and during the years since the 1890s a small amount has been recovered from the beaches by small operations involving one or two men and simple equipment (Cobb 1973: 33). For the Eyak still living in the area, gold mining probably did not have as strong an impact as the oil and coal exploration and development between Katalla and Cape Yakataga during the first decade of the twentieth century. The town of Katalla was established in 1903 as a supply point for nearby coal and oil fields, and by 1907 the incoming oil prospectors and their families may have numbered in the thousands (Nielsen 1989a: 23-25). The Eyak never numbered more than about 200 according to the highest Russian estimates (Abercrombie 1900a: 397), so this population influx was overwhelming. By the time that Birket-Smith and de Laguna did their archeological and ethnographic fieldwork among them in 1933, the Eyak numbered only 38 (Birket-Smith and de Laguna 1976 [1938: 24]).

North in the Copper River region, the history of mining actually dates back long before the gold rush era, for the Ahtna were mining copper nuggets and working them into tools during prehistoric times. The name first given to the river by the Russian trader Nagaiev was *Mydnaya*, **or** *Miednaia*, meaning copper (Orth 1971: 238; Solovjova 1996, personal communication). Although the Russians were well aware of the existence of copper in Ahtna territory, they never succeeded in locating its source. The origin of the green mineral was actually not the Copper River itself, but on tributaries of the Chitina River, or *Tsedi Na'*, translated as "copper river" in Ahtna (Kari 1983: 7).

Lt. Henry Allen was the first to learn of the copper outcropping locations during his exploration of the Copper River in 1885. When visiting the camp of Chief Nicolai on the headwaters of the Nizina River (then referred to as the Chitistone), Allen was shown specimens of bornite (copper ore) that came from Nicolai's mine (Allen 1900: 487; Moffit and Capps 1911: 16). Nicolai's name was later to become well known by prospectors and geologists who scoured the area for minerals just before the turn of the century (nineteenth to twentieth). Another area where the Ahtna obtained copper was Glacier Creek, a tributary of the Chitistone River where one early U.S. Geological Survey party in the area found "a much-worn wooden shovel and birch bucket...in the loose waste below an outcrop of native copper..." (Moffit and Maddren 1909: 19).

In 1891, the geologist Charles W. Hayes attempted to find the outcroppings described to Lt. Allen, but reports that "unfortunately Nicolai and his tribe were at their summer fishing station, Taral, and it was too late in the season to return to the copper region which we had passed" (Hayes 1892: 144). The hostility of the Ahtna to white intruders had been replaced by this time with an apparent eagerness for trade. When Hayes encountered Nicolai at Taral, he was given a "most hospitable reception" and was included on a trip to Eyak on the coast, where two salmon canneries had been built (Hayes 1892: 126), and where traders were stationed to intercept the commerce in fur from the Interior (Ketz 1983: 76). Within the next decade the focus of trade would be shifted inland as the first wave of prospectors made their way into Copper River territory.

The prospectors to first enter the Copper River valley were not, however, seeking riches in copper, but in gold. One of the routes into the Klondike began at the port of



Lt. Henry T. Allen (center) with Pvt. Fred W. Fickett (left) and Sgt. Cady Robertson (right) at the end of their 1885 Alaska expedition.
(Alaska Polar Regions Dept., University of Alaska Fairbanks #72-164-1N)

Valdez, and continued over the Valdez and Klutina Glaciers, up the Klutina and Copper Rivers, and over the mountain passes to the Yukon. The great wave of prospectors into the area began in 1897. By the spring of 1898, gold-seekers numbering 4,000-5,000 with their outfits had landed at Valdez. Only a small percentage ever got beyond Klutina Lake, where an estimated 3,000 stampeders wintered in 1898 (Rohn 1900: 401; Reckord 1983b: 144). Others ventured as far as the mouth of the Klutina River, where the town of Copper Center sprang up in the winter of 1898 with a population of 500 or so prospectors (de Laguna n.d.: 19).

The hardships of the trail and the prospects of winter forced many of the gold-seekers to abandon their outfits and return home. As a result, the Ahtna acquired tons of abandoned provisions. They began curtailing their trading trips to the coast, particularly since a trading post was established at Copper Center in the fall of 1899 (Ketz 1983: 78). The Ahtna brought not only fur for trade there, but also bartered game, such as fresh moose, caribou, and sheep meat for store-bought foods such as rice and coffee (Reckord 1979: 37,39).

While the first prospectors to travel the Valdez-Copper River route had their sights set on the Yukon and Klondike, the ones who remained began to turn their attentions to the mineral resources of the Copper River itself. In many cases the Natives served as guides for prospectors who began scouring the Wrangell Mountains for minerals in 1898 and 1899. Nicolai guided one prospector, Edward Gates, to his copper vein in 1899 (Schrader and Spencer 1901: 22; Hanable 1982: 61) and for his efforts was paid in "flour and provision" (Rohn 1900: 437). The samples of copper ore brought out by prospectors initiated urgent public requests for mineral surveys and maps of the area. Congress complied and by the spring of 1900 the funds were appropriated.

The Copper River country was made accessible to geologists and prospectors by the military trail (Valdez-Fairbanks Road), surveyed during 1898 and 1899 by army expeditions under the direction of Lt. Abercrombie. Construction of the trail, which began in Valdez and crossed Thompson Pass and the Tonsina River, had extended to Copper Center by 1899. The end of the trail was to be in Eagle on the Yukon River (Schrader and Spencer 1901: 19-20). A military telegraph line, destined to link Valdez with Nome, was also constructed through the Copper River country right after the turn of the century. Telegraph stations were soon opened in Tonsina, Copper Center, Gulkana, Chistochina, and Mentasta Pass (Mitchell 1988), some of them close to Native villages.

Despite the encroachment of outside civilization, the Ahtna continued a semblance their traditional lifestyle for a few more years. In one turn-of-the-century USGS report, Oscar Rohn stated that "every native has a 'stick' or summer house, and salmon cache at some point along the river, where he lives during the summer season, catching and drying salmon, and to which he returns after the fall hunt when the snow becomes too deep to travel" (Rohn 1900: 415). Although the traditional subsistence lifeway was still viable for the Ahtna then, opportunities to enter the cash economy were also becoming available.

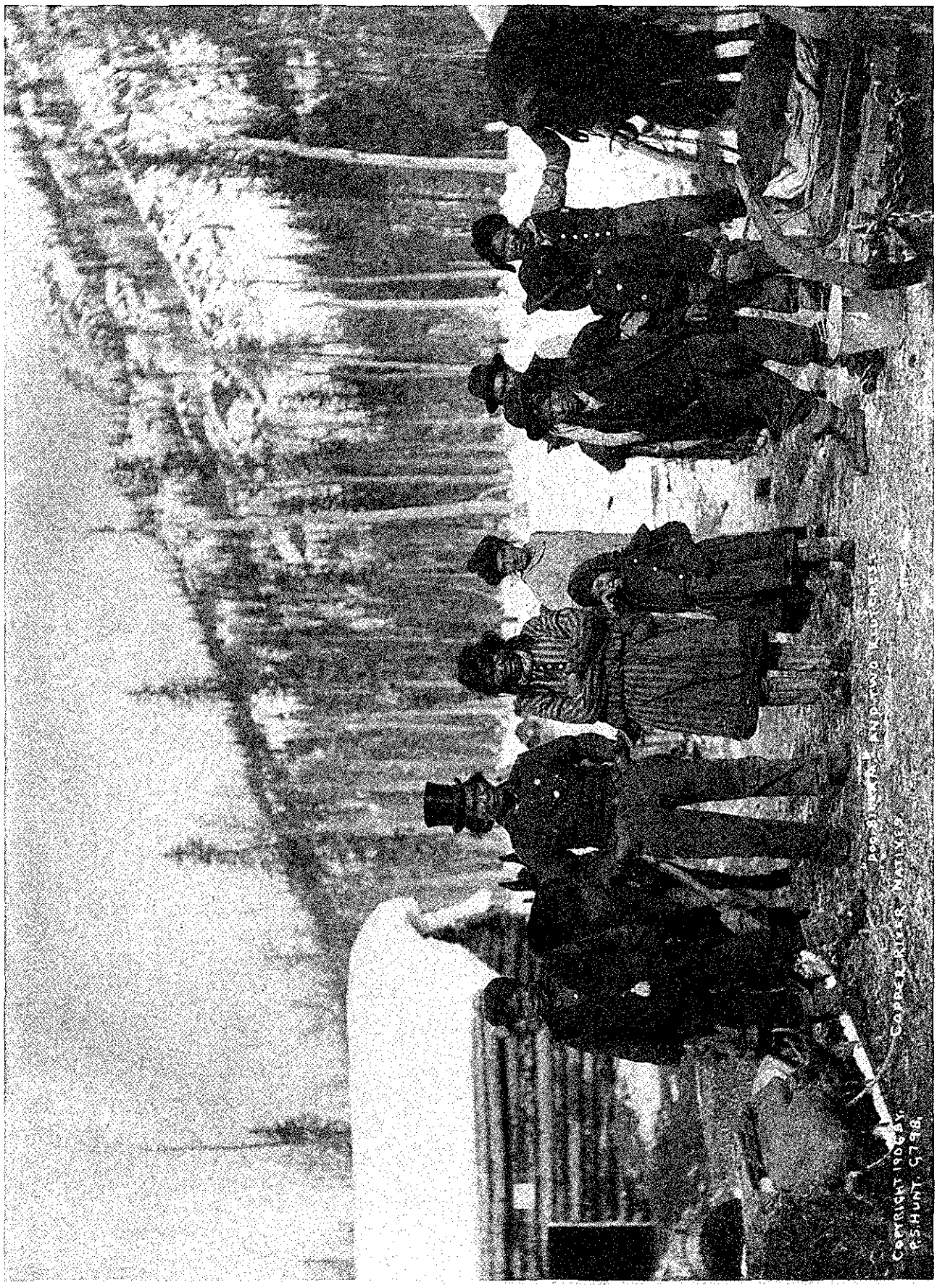
One enterprising Ahtna to take advantage of the prospectors' need for transportation along the military trail was Doc Billum. He lived for part of the year at the village called *Sdates*, near the mouth of the Tonsina River (Reckord 1983b: 116). His name is mentioned frequently in early USGS reports since he had a license to ferry travelers and equipment across the Copper River in small boats at a place called Copper River Crossing, about a mile or two above the mouth of the Tonsina (Moffit and Maddren 1908: 129; Moffit

and Maddren 1909: 13). Neil Finnesand of Chitina recalled traveling up the Valdez-Fairbanks Road in 1904, and crossing the Tonsina in Doc Billum's ferry. The charge was usually $2.50 for the crossing, but one fall when the ice was starting to form on the river Doc Billum raised the price to "20 dollars gold" (Finnesand 1983: 1-2). The mouth of the Tonsina River was also formerly the site of Chief Eskilida's village, but during the gold rush days the increased activity drew Ahtna from other villages to settle there. They also settled at the Upper Tonsina village, near the Tonsina Roadhouse, where they came for trade and work (Reckord 1983b: 121, 123).

Just around the turn of the century (nineteenth to twentieth), gold discoveries were made south of the Wrangell Mountains, which would bring more people and development into the territory of the Ahtna. The discovery of placer gold on the Little Bremner River and Golconda Creek in 1901 enticed a number of small-scale miners in the Hanagita-Bremner region during the next decade (Moffit 1914: 43). Placer gold was discovered in the Nizina District the next year by prospectors, Dan Kain and Clarence Warner, who were initially in search of copper. A short-lived rush of several hundred stampeders entered the area following the initial strike, and by 1903-1904 large-scale mining operations had begun. About 100 or so miners remained, primarily to work the placers along Chititu and Dan Creeks; during the first two decades of operation at least seven semi-permanent camps were established. Mining there continued without interruption until 1950 (Moffit and Capps 1911: 16; Hovis 1990a: 1-2).

The Nizina and Bremner Districts were located in the hunting territory of the Chitina-Taral band, the principal village of which was located at Taral on the Copper River. People continued to live at the village until 1910 or 1911 (de Laguna n.d.: 3), with Goodlata, the son of Chief Nicolai apparently taking over after his father's death in the early part of the century. It was, supposedly, superstition that kept Nicolai's followers from returning to hunt along the Nizina for several years after his death (Moffit and Capps 1911: 16). Ahtna continued to seasonally occupy the Tebay River, in the Bremner District, even after miners began filtering into the area. Chief Eskilida, whose permanent village and fish camp were located at the mouth of the Tonsina River, used a village on the Tebay River as a trapping headquarters until 1918 when it burned down. The village was rebuilt in 1920 (Reckord 1983b: 106).

The most significant discovery made in the Wrangells at the turn of the century (nineteenth to twentieth) was the Bonanza copper ore deposit, located adjacent to the Nicolai Mine. This outcropping of green malachite, located by prospectors Clarence Warner and Jack Smith, was to become the cornerstone of the great Kennecott complex of mines that dominated the economy and development of the Copper River region until 1938 (Grauman 1977a). To carry out the enormous task of supplying the mines and bringing out the ore, the syndicate that owned the mines began construction of the Copper River and Northwestern Railroad in 1906 (Nielsen 1989b: 35). It was to run from Cordova to Chitina, and on to the Kennecott mines. The townsite of Chitina was established in 1908 as a railroad and mining supply center, and soon began to attract the Native population, particularly from the village of Taral which was abandoned in 1910 or 1911 (Orth 1971: 214; de Laguna n.d.: 3). Subsistence activities, particularly fishing, were not abandoned, however; and dip netting for salmon continued for many decades near the Native village of Chitina that grew near the townsite.



"Doc Billum" in Copper River Country. *(Anchorage Museum of History and Art: B62.1.1338)*

The building of the Copper River and Northwestern Railroad opened up the country to further development. It also brought temporary employment for the Natives. Until the railroad was completed in 1911, a sternwheeler linked the yet unconnected sections of the railroad and provided service up the Copper River beyond the Chitina (Hanable and Workman 1974: 19). The people at one of Chief Stickwan's villages known as "Wood Camp" became involved in the enterprise in 1910 by cutting and supplying wood for the steamer's engines (Reckord 1983b: 135). Several Native men also worked part of each year on the Copper River-Northwestern Railroad, but in the fall they would quit work and ride the train up to Chitina and McCarthy for hunting (Reckord 1979: 38).

With the new developments in the region, the Ahtna devised a new economic strategy that combined wage labor, trapping, and subsistence activities. Although most of the wage-earning jobs mentioned above were done by men, women were also able to earn money by selling baskets, beadwork, and skinwork to tourists or workers in Chitina (Reckord 1983b: 113). Trapping continued on the Tonsina and Tebay Rivers until the end of the 1920s, but the traditional style of house construction and settlement layout had changed, as illustrated at the Tebay River village. The village built in 1920 consisted of "several small, one-room log dwellings, which were strung out along the trail for about a mile. Each cabin housed a husband-and-wife team and their children during the winter trapping season" (Reckord 1983b: 106).

The change in style of house construction was one of the more visible signs of acculturation. The permanent winter house built of spruce poles and slabs and covered with spruce bark, such as the one recorded in 1885 by Allen (1900: 472-3) at Taral, was quickly replaced with log cabins like the ones built by Natives at Copper Center in 1902 (Reckord 1983b: 60). The traditional houses could accommodate up to 25-30 people, whereas cabins were usually only occupied by a nuclear family. Change also occurred in Ahtna social organization during the first two decades of the twentieth century. For example, the traditional *denae*, who were responsible for organizing trapping and trading of furs, began to die and younger men no longer assumed their positions. Non-Native traders were the ones who took over the function that once had been served by the *denae*. Many Native customs pertaining to childbirth and isolation during menses were also dropped, and potlatches were not held as frequently (Reckord 1983b: 60, 63). One of the most important agents of change was the school system; some families were forced to move to towns, and children were not allowed to speak their Native languages. By 1927 a school had been established in Chitina, and families from the lower Tonsina area began to relocate here (de Laguna n.d.: 3).Chitina also drew together Ahtna/Upper Tanana from outside the vicinity of the lower Copper River. Such was the case of the King family, originally from the Nabesna area. Paddy King, born in 1905, moved with his parents to Chitina when he was quite young and continued to live there most of his life. Among the many jobs he held was one at the Kennecott mines as a heavy equipment operator, probably sometime in the 1930s. His daughter, Virginia Shreeves, remembers him speaking of taking the train up to Kennecott from Chitina and loading the copper ore for shipment back to the coast. Mr. King also worked at the Valdez Creek mining operations, probably in the late 1920s. Mrs. Shreeves recalled a story told by her father about how he and her mother walked from Chitina to Valdez Creek (a 150-175 mile walk over difficult terrain), hunting and camping along the way (Shreeves 1992).

To the north of the Wrangell Mountains, prospectors were also making discoveries at the turn of the century. However, the pace of development was slower than in the lower Copper River region, mainly because of the great difficulties of transportation to the area. A gold quartz discovery was made on Jacksina Creek at the headwaters of the Nabesna River in 1899, and by 1907 a limited amount of mining had been done on it. There was a small stampede to the headwaters of the White River in 1902 in search of placer gold (Moffit and Knopf 1910: 52,58; Hunt 1991: 64-66). In addition, early in the century, USGS geologists learned from the Upper Tanana living at Cross Creek that copper could be found in the region. The Natives had nuggets ranging from the size of peas up to large pieces weighing 35-40 pounds that had been collected at a small tributary of the Chisana River about six miles above the foot of the glacier (Mendenhall and Schrader 1903: 39).

The influx of prospectors and miners into the Nabesna-White River Mining District during the first decade of the twentieth century was not nearly as overwhelming to the Native communities of the Upper Ahtna and Upper Tanana as it was in mining districts south of the Wrangells. Yet some of the people were gradually becoming dependent upon the goods the white men had to offer. The USGS geologists who made a reconnaissance of the Nabesna-White River region in 1908 described their situation as follows:

> The total native population of the area extending from the head of Copper River to the White is probably not far from 45 or 50. The natives are divided between three villages...one at Batzulnetas, on Copper River; one on Nabesna River, at the mouth of Cooper Creek; and a third on Cross Creek, opposite the mouth of Notch Creek, in the Chisana Valley. The Batzulnetas and Nabesna natives rely on the white men for a considerable portion of their food, but the Chisana natives are more independent. Their more isolated position has brought them less in contact with white men, and they have retained their own manner of living to a greater extent. They depend almost entirely on game for food and lay up a good supply each fall for the winter's needs. All the natives wear clothes obtained from white men, except moccasins, which they make themselves, but they prefer the white man's footwear. Under the influence of white men they have become inveterate beggars, always asking for tea or tobacco, for which, as well as for flour and cloth, they will trade meat or leather goods, when they have them (Moffit and Knopf 1910: 15).

The real mining excitement in the area occurred in 1913 when a report reached Dawson and Whitehorse that a rich placer discovery had been made in the headwater basin of the Chisana River. An Upper Tanana man, known as Shushanna Joe, is credited with leading Billy James, co-discoverer of the Chisana Mining District, to the mouth of Bonanza Creek where the initial gold discovery was made (Bleakley 1996: 101). This news resulted in a stampede of several thousand would-be miners to the Chisana, scene of the last major gold rush in Alaska (Capps 1916: 91). Some of the stampeders came from the Copper River via a Native trail from the Ahtna village of Batzulnetas, across the Nabesna valley and then to the Chisana (Cole 1979: 5). The town of Chisana soon became the regional hub for mining and could boast of 100 structures and 500 residents by the fall of 1913 (Lappen 1984: 28). As in most stampedes, the population quickly began to dwindle. By 1916 only about 200 miners wintered in the area, with the numbers declining from that time on (Hunt 1991: 19).

The Chisana Gold Rush heralded in a new era for the Upper Tanana as the influx of miners and merchants brought increased opportunities for trade and for wage labor. In the past, the Upper Tanana people had contact with miners, but it often required a long trip over Skolai Pass to the Nizina District. Chisana (Shushanna) Joe made the trip to the Nizina many times and packed back powder, beads, tobacco, and tea (McKennan 1959: 28). By the time of the Chisana stampede, the Nabesna people had congregated at Cooper Creek village, strategically located on trails from the coast and from the Interior. They became involved in the business of hauling freight for prospectors and miners to Chisana, using horse-drawn wagons and sleds to transport large loads over Cooper Pass during the two-day trip. They also supplied the miners with lumber. Their "sawmill" consisted of a large frame, operated by two men using an 8-foot long saw, one man standing on top of the frame and the other standing beneath him (Reckord 1983b: 225-230).

People from several Upper Tanana villages, including Cooper Creek and Cross Creek, located close to Chisana, left their villages to work for miners, doing a variety of jobs such as running the sluices, and to pan for gold themselves. They were attracted to the boomtown to trade and buy supplies with money earned in freighting, delivering mail from Chistochina by dog sled in winter, or by trapping. Thus, a small Native community was established at Chisana, comprised of both Ahtna and Upper Tanana people. When the trading post closed at Chisana in 1929, the people began to trade at the posts that had opened in Slana, or at the mouth of the Nabesna (McKennan 1959: 26; Reckord 1983b: 230, 236-237). The villages of Cooper Creek and Cross Creek were not abandoned during the flurry of activity in Chisana, as McKennan found both to be occupied by Upper Tanana in 1929 (McKennan 1959: 17-18).

Despite the fact that cash had become an economic necessity, the Natives in the headwaters area still relied heavily on subsistence hunting and fishing to put food on their tables. "Using tents, they went hunting, trapping, and fishing during the times of each year when these activities were productive and undertook cash labor at Chisana during the summer" (Reckord 1983b: 237). Thus, the mobile, almost nomadic, settlement practiced during traditional times was continued into the twentieth century, particularly for the Upper Tanana in the Chisana River region.

For the purposes of studying culture contact in this chapter, the gold rush period is considered to have ended about 1920. Yet in the Nabesna River area, significant lode-gold mining did not begin until the late 1920s and 1930s on the properties owned by the Nabesna Mining Corporation (Wayland 1943: 177). The renewed mining activity again brought economic opportunities for the Natives of both Upper Ahtna and Upper Tanana villages. People from Batzulnetas and those camping at Tanada Lake were able to earn money in the summer by selling their fish to the mines for the miners' meals. They would catch rides on trucks running on the new road from the mine to the Valdez-Fairbanks Highway (Reckord 1983b: 205,220). The Nabesna Indians also supplied fresh, wild meat to the mining camp. Some of the Natives were also employed at the mine, mostly working aboveground and doing construction and carpentry. During the winter, the mines employed Natives from Gakona and Chistochina to run the mail by dog team to Nabesna (Reckord 1983b: 220).

Trapping continued to be a source of cash income for the Natives in the headwaters region into the 1930s, but it gradually became a less viable way to make a living when the bottom fell out of the fur market. For the Upper Ahtna, winter might be spent near

Tanada Lake, rich not only in fur-bearing animals but also in food resources. Another trapping area was Jack Creek, where a small settlement was built in the 1930s in the traditional hunting territory of the Batzulnetas and Nabesna Indians. Women in the Chisana area could earn between $300-$700 a winter for the skins they tanned, depending on the price of furs (Reckord 1983b: 210-211, 215, 237).

The effects of mining on the Native people of WRST varied considerably from group to group. The Ahtna of the lower and middle Copper River were affected the most, both in terms of the sheer numbers of people entering their territory and the economic development that followed. The largest mining concern in Alaska, operated by the Kennecott Corporation, was established within their hunting territory; and the Copper River and Northwestern Railroad was built along the length of river that provided their livelihood. In little more than a decade, the lower Ahtna were forced from a traditional economy to one in which cash played a significant part. In addition, during that period, many of the old village sites were abandoned in favor of settlement around one of the towns, like Copper Center or Chitina, that had grown to serve the miners.

For the Upper Ahtna and the Upper Tanana, living to the north of the Wrangell Mountains, the impacts of mining came a bit later and were less severe than to the south. Until the Chisana Gold Rush of 1913, they had little opportunity to enter the wage economy and there were no hubs of commerce like those on the lower river. After the mining activity in the Chisana region finally died down in the 1930s, many of the Upper Tanana continued to live in their traditional villages in the area; and many of the Upper Ahtna moved back to villages on the Copper River, such as Batzulnetas. Unlike most of the Lower Ahtna villages dating back to the nineteenth century, the Slana, Suslota, and Batzulnetas villages of the Upper Ahtna all remained occupied until the 1940s (de Laguna and McClellan 1981: 642; Reckord 1983b: 190, 230). One factor in the persistence of these villages may be that these people, particularly the Upper Tanana, who had less contact with whites during the early twentieth century, were less affected by the devastating flu epidemic of 1918 that took the lives of so many Ahtna on the lower reaches of the Copper River.

Least affected by gold mining in WRST were the coastal people - the Yakutat and the Eyak. For these people, culture contact began much earlier and was defined to a much greater extent by the fishing industry, not the mineral industry.

Summary of Surveys and Sites

Table 13 summarizes CRMIM survey coverage within WRST. In the McCarthy quadrangle, survey crews focused on the Kuskulana and Nizina Rivers, both tributary to the Chitina River. Many of drainages listed in the table are small tributaries of the latter. In the Nabesna quad, the fieldwork centered on the area drained by Chathenda and Chavolda Creeks, which are tributaries of the Chisana River, and on the Orange Hill vicinity of the Nabesna River. Elliott Creek, a tributary of the Kotsina River, was the primary survey locale in the Valdez quad. Detailed maps of these survey areas are on file in Anchorage at the NPS, Alaska Support Office, Cultural Resources Team.

TABLE 13

CRMIM Survey Coverage in WRST by Locale

Locale	Map Quad	Acres	Miles (Km)
McCarthy Quadrangle			
Blygh Gulch	B5	43	
Bonanza Ridge	B5, C5	40	
Boulder Creek	B5	8	
Bremner Pass	A7	58	
Calamity Gulch	A5	80	
Chitina River	A2	220	
Chititu Creek	B5	280	
Dan Creek	B5	720	
Geohenda Creek	D3	100	
Glacier Creek	B4	40	
Golconda Creek	A7	865	6.8 (11)
Green Butte/Access Rt.	B5	5	3.1 (5)
Hidden Creek	C6	236	
Kennicott Glacier	C6	1260	
Kluvesna River	D8	60	
Kotsina River/Access Rt.	C8, ValC1	60	42.3 (68)
Kuskulana River/Glacier	C7, C8	2170	
McCarthy Creek	B5, B6, C5	20	14.3 (23)
Monahan Creek	A6	3	
Nelson Mt.	B8	206	
Nikolai Creek	B5	145	
Nizina River	B5	140	
Rex Creek	B4, B5	1200	
Rock Creek	C8	40	
White Creek	B5	305	
White River	C3	349	
Nabesna Quadrangle			
Alder Gulch	A2	40	
Beaver Lake Access Rd.	A2	125	
Big Eldorado Creek	A2	59	
Bonanza Creek	A2	425	3.1 (5)
Canyon Creek	A2	175	
Carl Creek	A2	1600	
Chathenda Creek	A2, A3	78	
Chavolda Creek	A2	30	
Chavolda/Glacier Creeks	A2	10	
Chicken Creek	A2	6	
Coarse Money Creek	A2	—	1.2 (2)
8-Pass	A2	80	
Glacier Creek	A2	35	1.8 (3)
Gold Hill	A2	3717	22.4 (36)
Gold Run Creek	A2	80	
Gold Run/Glacier Creeks	A2	60	
Gold Run/Sargent Creeks	A2	40	

(continued)

Table 13 (continued)

Locale	Map Quad	Acres	Miles (Km)
Little Eldorado Creek	A2	120	1.2 (2)
Nabesna River	A4	3	
Orange Hill	A4	3926	
Poorman Creek	A2	—	1.2 (2)
Valdez Quadrangle			
Cheshina River	D1	60	
Copper Creek	C1	60	
Elliott Creek	C1	920	
Taral Creek	B1	60	
WRST Total	**—**	**20,362**	**97.4 (157)**

As a result of the surveys detailed above, CRMIM crews recorded a total of 147 sites, which appear in table 14 by drainage. Placer, lode, historic, and prehistoric sites are included in this total. An annotated list of these sites by AHRS number can be found in the appendix; the list also provides references for site location maps. Full site descriptions appear in the chapters that pertain to placer mining, lode mining, historic, and prehistoric sites (chapters 12, 13, 14, and 15, respectively).

TABLE 14

Sites in WRST by Locale and Site Type

Locale	Site Type	AHRS Number
McCarthy Quadrangle		
Berg Creek	Lode	XMC-088, XMC-089
Blygh Creek	Placer	XMC-053
Bonanza Ridge	Lode	XMC-081, XMC-085, XMC-086 XMC-087
Boulder Creek	Lode	XMC-112
Bremner Pass	Lode	XMC-115
Calamity Gulch	Placer	XMC-063, XMC-070
Chitina River	Lode	XMC-040, XMC-082
	Historic	XMC-103
Chitistone River	Historic	XMC-071
Chititu Creek	Placer	XMC-012, XMC-061, XMC-062 XMC-068, XMC-077
Clear Creek	Lode	XMC-093, XMC-094, XMC-095
Copper Creek	Placer	XMC-052, XMC-059, XMC-060
Dan Creek	Placer	XMC-007, XMC-069, XMC-074
Glacier Creek	Lode	XMC-072, XMC-073
Golconda Creek	Placer	XMC-119
	Lode	XMC-104, XMC-105, XMC-106, XMC-107, XMC-111, XMC-118
Kennicott Glacier	Lode	XMC-047
Kennicott/Root Glaciers	Lode	XMC-048
Kotsina River	Lode	XMC-041
Kuskulana Glacier	Lode	XMC-100
MacColl Ridge	Prehistoric	XMC-097, XMC-098
MacDougall Creek	Lode	XMC-101
McCarthy Creek	Lode	XMC-043, XMC-045, XMC-050 XMC-064, XMC-096
	Historic	XMC-042, XMC-044, XMC-046 XMC-049, XMC-051, XMC-102
Monahan Creek	Historic	XMC-117
Nikolai Creek	Lode	XMC-080, XMC-113
Nizina River	Lode	XMC-099
	Historic	XMC-108, XMC-109, XMC-110
Nugget Creek	Lode	XMC-090, XMC-091, XMC-116
	Historic	XMC-092
Rex Creek	Placer	XMC-056, XMC-057, XMC-058 XMC-065, XMC-066, XMC-067 XMC-075
Skolai Creek	Prehistoric	XMC-039
Tebay River	Historic	XMC-083
White Creek	Placer	XMC-054, XMC-055, XMC-078 XMC-079
White River	Lode	XMC-084
Young Creek	Historic	XMC-011

(continued)

Table 14 (continued)

Locale	Site Type	AHRS Number
Nabesna Quadrangle		
Alder Gulch/Dry Gulch	Placer	NAB-043, NAB-085
Big Eldorado Creek	Placer	NAB-044, NAB-063
Bonanza Creek	Placer	NAB-046, NAB-047, NAB-048 NAB-049, NAB-050, NAB-053, NAB-059, NAB-060, NAB-061 NAB-062, NAB-064, NAB-079 NAB-080, NAB-087, NAB-089 NAB-102
	Historic	NAB-009
California Creek	Placer	NAB-093
Chathenda Creek	Placer	NAB-082, NAB-092, NAB-094
	Historic	NAB-078, NAB-081
Chavolda Creek	Placer	NAB-071, NAB-083, NAB-084
	Historic	NAB-045
Coarse Money Creek	Placer	NAB-076, NAB-077
8-Pass	Historic	NAB-091
Glacier Creek	Historic	NAB-070, NAB-074, NAB-075
Gold Run Creek	Placer	NAB-065, NAB-066, NAB-067 NAB-068, NAB-069
Little Eldorado Creek	Placer	NAB-051
Nabesna River	Lode	NAB-054, NAB-055, NAB-056, NAB-057, NAB-058, NAB-072
Poorman Creek	Placer	NAB-073
Snow Gulch	Placer	NAB-052
Valdez Quadrangle		
Benito Creek	Historic	VAL-234
Chesnina River	Lode	VAL-241
Copper Creek	Lode	VAL-247, VAL-248, VAL-249
Elliott Creek	Lode	VAL-242, VAL-243, VAL-244, VAL-246
Rainbow Creek	Lode	VAL-245
Taral Creek	Lode	VAL-250

CHAPTER 5

YUKON-CHARLEY RIVERS NATIONAL PRESERVE

Geology and Mining Districts

As its name implies, the landscape of Yukon-Charley Rivers National Preserve (YUCH) is defined by its two major drainages, the mighty Yukon River and its tributary the Charley River. Physiographically, YUCH is in the Intermontane Plateau system, distinguished by low mountain ranges and rolling uplands that rarely exceed 6,000 feet/ 1,829 m in elevation (Wahrhaftig 1965). The northern and eastern sections of the preserve lie along a stretch of the Yukon between the Canadian border and the town of Circle. Along this northwesterly course, the Yukon River has incised steep canyon walls with well-defined terraces. The entire 1.1 million-acre drainage of the Charley River forms the southwestern lobe of YUCH (NPS 1990c: 31).

Unlike DENA and WRST, discussed in previous chapters, the landscape of YUCH was encompassed by a vast unglaciated region during the Pleistocene. This ice-free expanse, connected to Siberia by a broad landmass exposed by the lowered sea levels, formed a biotic refugium known as Beringia. Scientists have been able to reconstruct the paleoenvironment of Beringia, particularly during the last 40,000 years, based on fossil floral and faunal remains in Pleistocene deposits. We know that the vegetation in Beringia consisted of extensive meadows and steppe-tundra on upland sites, shrub thickets on floodplains, open woodlands on some slopes, and lines of trees along water courses. In terms of fauna, some of the best sources of information have come from stratigraphic exposures made by large-scale placer gold mining. Before reaching the gold-bearing gravels, miners were obliged to remove thick layers of organics and glacial silt (muck), in which fossils were frequently embedded (Guthrie and Guthrie 1986: 74). Evidence of Pleistocene fauna, including a molar of a baby woolly mammoth and the skull of a steppe bison, have also been found in the placer creeks of YUCH (NPS 1990c: 110).

Although largely untouched by continental glaciation, the terrain of YUCH did have restricted areas of alpine glaciation, particularly near the headwaters of the Charley River, during the Illinoisan and Wisconsin glacial periods (late Pleistocene). Some of these glaciers extended for several miles down the Charley River Valley (Péwé 1975: 3,16; Young 1976: 9).

A major geological feature in YUCH is the Tintina fault, which runs parallel to and south of the Yukon River valley. It separates the North American continental margin, to the north, from the ancient rocks of the Yukon-Tanana terrane to the south (Mortenson and Jilson 1985: 806). The Yukon-Tanana terrane is formed by metasedimentary rocks that have been extensively intruded by Mesozoic and Cenozoic granite (Foster et al. 1987: 3). Scattered remnants of the Seventymile terrane and the Kandik River terrane are also found within the preserve boundaries (Jones et al. 1987). Tin, tungsten, uranium, and

other metals are thought to occur in mineralized areas in the preserve; but placer gold is the only mineral that has been commercially exploited in YUCH. One of its sources is believed to be Tertiary (beginning 65 million years ago) nonmarine, sedimentary rocks, which contain both disseminated and fossil-placer gold (NPS 1990c: 32). Lignitic coal, near Washington Creek, and oil shale, north of the Tintina fault also exist in the preserve (NPS 1982a: 21).

Portions of the **Circle and Eagle Mining Districts**, both lying to the south of the Yukon River, fall within the boundaries of YUCH (figure 10). Encompassing the drainage of the Charley River, the Circle District is the more extensive of the two in YUCH. No lode mining has been carried out in either of these districts, although a few gold, copper, and lead lode prospects have been explored in the Circle District (Berg and Cobb 1967: 210, 213). Placer mining has, however, been extensive in both districts. In the Circle District, the most concentrated area of placer mining occurs outside the preserve boundaries. Inside the preserve, Alice Gulch, as well as Mineral, Woodchopper, Boulder, Coal, Sam, and Thanksgiving Creeks have all been productive. The placer gold from many of these creeks is reconcentrated from Tertiary conglomerates in the vicinity. In the YUCH section of the Eagle District, Nugget, Surprise, Dome, Eagle, Fourth of July, Canyon, and Fox Creeks, as well as Lucky Gulch, have all been the scene of placer mining activity (Cobb 1973: 116-126).

Cultural Setting

As in many areas of Interior Alaska, the prehistoric culture history of YUCH is poorly known. Generally, the lithic sites constituting the majority of known archaeological resources in the preserve lack tool types diagnostic of a particular period or culture. However, microblades and cores, tools representative of the Denali complex, have been recorded at a few sites in YUCH (Griffin and Chesmore 1988: 138-141). Denali complex sites in Interior Alaska may have persisted until sometime between 3,500 and 1,500 years ago (Mobley 1991; Dixon et al. 1985). The latter date marks the beginning of what we can clearly see in the archaeological record as sites distinctly Athapaskan in nature.

Although late prehistoric sites with recognizable Athapaskan affiliation have not been have been recorded within the preserve, a historic period Han Athapaskan settlement, known as Charley's Village (CHR-001), was documented by an NPS crew in 1992. The territory of the Han once extended along a segment of the Yukon River now in YUCH (figure 10). In terms of modern political boundaries, roughly half of their territory lies in Alaska, and the other half in Canada's Yukon Territory. The northwestern corner of YUCH, north of Takoma Bluff on the Yukon River, is in the Gwich'in (Kutchin) linguistic area (figure 10), while the southern section is in the territory of the Tanana and Tanacross. Both the Han and the Gwich'in are groups who shared a similar cultural pattern with the Athapaskan groups discussed in earlier chapters.

As in other areas of the Interior, Russian trade goods made their way to the Han long before direct contact with Europeans. These trade items included tobacco, tea, blankets, beads, muskets, and metal implements, particularly iron or copper kettles, which soon began to replace their aboriginal counterparts (Osgood 1971: 129). British fur traders of the Hudson Bay Company (HBC) were the first Europeans to reach the upper drainages of the Yukon River in Canada in the 1840s. By 1847 Alexander Murray of the HBC had established Fort Yukon near the confluence of the Yukon and Porcupine Rivers. Al-

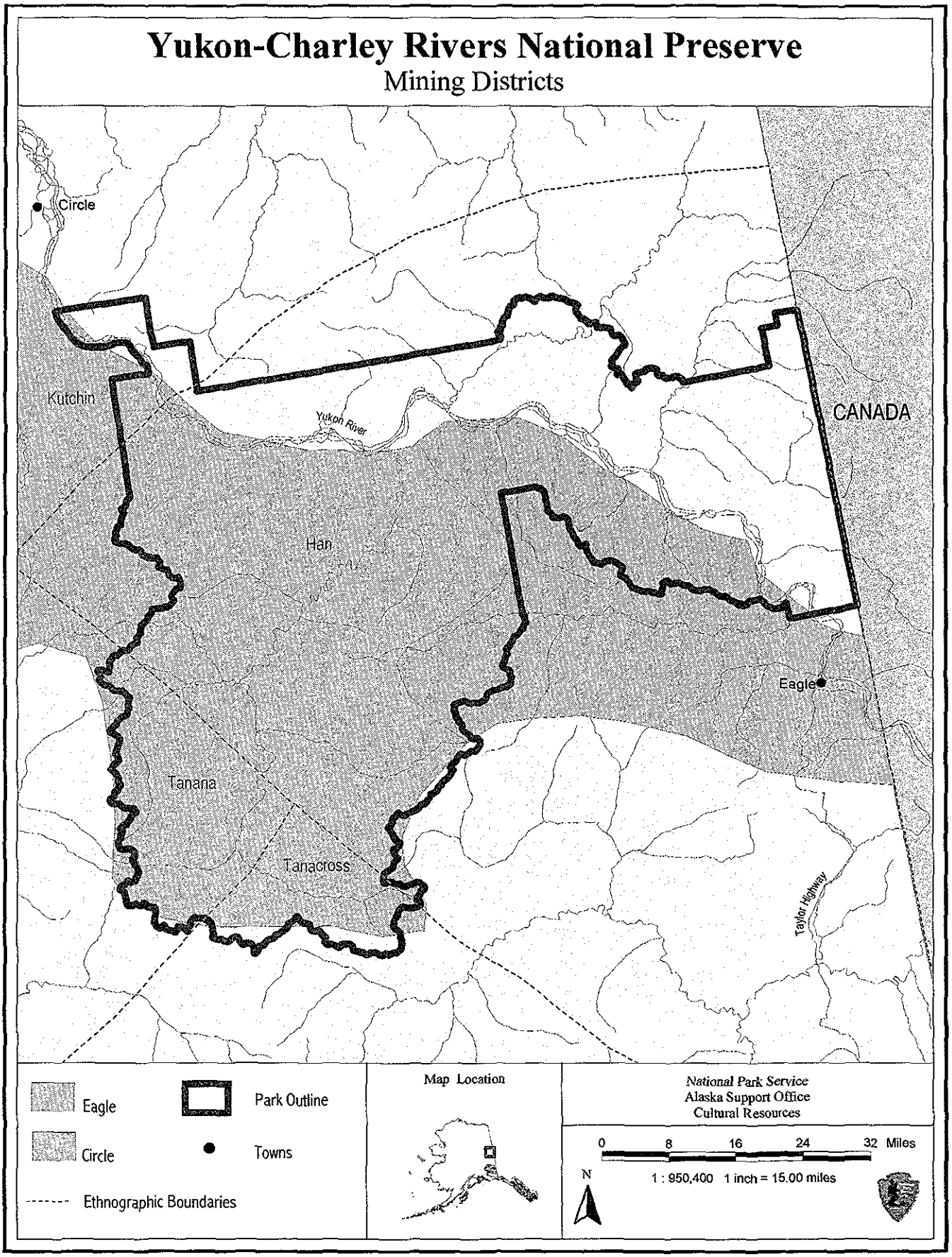

Yukon-Charley Rivers National Preserve
Mining Districts
Circle
Kutchin
Yukon River
CANADA
Han
Eagle
Tanana
Tanacross
Taylor Highway
Eagle
Circle
Park Outline
Towns
Ethnographic Boundaries
Map Location
National Park Service
Alaska Support Office
Cultural Resources
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Figure 10.

though it was in Gwich'in territory, Fort Yukon was the first trading post within easy reach of the Han. After 1847, a new inventory of British goods was available to the Han and Gwich'in, particularly flour, sugar, lard, and biscuits, as well as clothing (Osgood 1971: 3, 129).

Fort Yukon stayed in the possession of the Hudson Bay Company and trade continued with the Athapaskans until two years after the purchase of Alaska by the United States. In 1869, Captain Charles Raymond of the U.S. Army, traveling up the Yukon by steamer, determined that the post was actually on American soil, thus opening the door for the American-owned Alaska Commercial Company (ACC) to step in. Moses Mercier took charge of the post for the ACC, and was still in residence when the first few gold prospectors reached Fort Yukon in 1873. Some of these prospectors hired on with the ACC in order to finance their continued prospecting along the upper Yukon (Orth 1971: 348; Osgood 1971: 8; Graumann 1977b: 36-37). The legendary Jack McQuesten, one of these early prospector/traders, extended his generosity in grubstaking would-be miners and also assumed a paternalistic attitude toward the Natives, providing them with food in times of hunger (Adney 1900: 496).

Cultural Changes During the Gold Rush Era (1885-1920)

Gold stampeders entered the domain of the Han more than a decade earlier than in other Athapaskans' territories. The first major gold strike on the Yukon occurred in Han territory in 1886 on a tributary known as the Fortymile River. Soon after, all the prospectors on the Yukon, numbering about 100, converged upon the Fortymile; and a settlement was established at its mouth (Brooks 1973: 328-31). The Han had a village in this vicinity, known as Fetutlin (Osgood 1971: 31), which was at one time occupied by residents of Johnny's Village (Schmitter 1985: 18; Crow and Obley 1981: 513). Traders at Fort Reliance and Belle Isle closed down and moved to Fortymile to accommodate the influx of miners. As a result, the Han, who had become dependent upon "store-bought" food and clothing, were forced to either make the long trip to the Fortymile for trade or to resettle near the new town (Graumann 1977b: 50, 54).

Six years later, two Creoles named Cherosky and Pavaloff made a discovery to the north at Birch Creek that brought even more miners into the country. The town of Circle City was soon built on the Yukon to serve miners attracted to the Birch Creek District, and the within only a few years the population had jumped to 700 people living in the largest log-cabin city in the world (Graumann 1977b: 61). Circle City was in the territory of the Gwich'in, who were also attracted to the town. "Some built log cabins on the edges of town and mixed freely with the miners and townspeople. Others, more traditional or less acculturated, lived in tents and semi-subterranean houses on an island two miles down the Yukon" (Graumann 1977b: 59). Although the town boasted of dancehall girls and gamblers, there was also a more sedate element in residence who requested that a school be established. When it opened, there were 26 Native or half-Native children, and only four white children in attendance (Graumann 1977b: 66).

During the decade between 1886-1896, the influx of miners to the upper Yukon was relatively small, compared to the thousands of stampeders who converged on Han territory during the Klondike Gold Rush. The Klondike Gold Rush was precipitated by the discovery of colors on Bonanza Creek, a side stream of the Klondike River, in 1896 by Robert Henderson, who passed the word on to George Carmack, a white prospector, and

two Tagish Indians, Skookum Jim and Dawson Charlie (Berton 1986). With news of the strike, the population of Circle City plummeted as would-be miners from there, and elsewhere across the nation, joined the throngs en route to the Klondike. The most famous and well-used route to the goldfields began in Dyea and crossed over Chilkoot Pass to Dawson, at the mouth of the Klondike in Canada's Yukon Territory.

By the winter of 1898-1899, the population of Dawson, the magnetic center of the Klondike gold-producing area, was presumed to be between 20,000 and 30,000 people. Dawson had been built only a few miles from the Han village of Nuklako, with a population less than 100 (Osgood 1971: 32). In Osgood's words, "one can hardly conceive of what such an overwhelming encroachment meant to the Indians" (1971: 13). With such a large population in residence, food shortages became a serious problem. Tappen Adney, a gold rush journalist who accompanied a Han hunting party for about a month, reported that "the Indians killed in all about eighty moose and sixty-five caribou, much of which they sold to the miners in Dawson...and invested the proceeds in finery and repeating rifles" (Adney 1900: 507). The meat was taken to town on sleds where it sold for $1.25 - $1.50 a pound (Adney 1900: 504).

The overflow of miners from the Klondike spilled along the Yukon, one of the main travel routes into the Interior. Not only did gold seekers travel through Han territory, and the southern part of Gwich'in territory along the main river channel, but many of them stayed to work the placer deposits that had been found on American Creek, the Seventymile River, Fourth of July Creek, and Woodchopper Creek (Cobb 1973: 122, 125). Several towns sprang up in YUCH just before the turn of the century, including Seventymile City, later to be moved upriver and named Star City, and Ivy and Nation City near the mouth of Fourth of July. There were also mining camps on Coal Creek and the Charley River (Graumann 1977b: 79,86). The population of these towns and camps dropped as news of other gold strikes enticed some miners away, but despite these fluctuations, the Han had become far outnumbered by whites in their own territory.

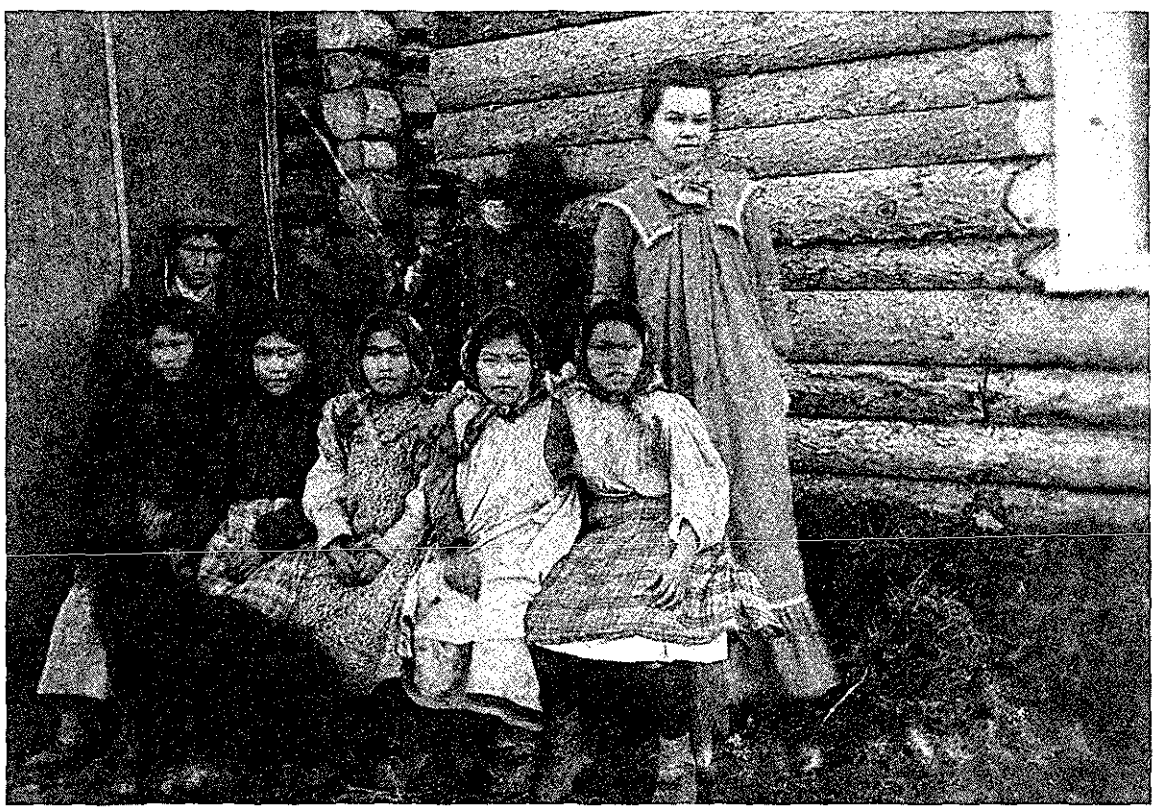
In May 1898, miners began settling in Eagle City, and by summer the population had skyrocketed to 1,700 people. This boom was short-lived, and soon the population stabilized at about 200-400 people (Graumann 1977b: 82-83; Orth 1971: 291). In 1899 Fort Egbert was built in Eagle to maintain law and order, establish communication, and provide relief to destitute miners on the frontier (Scott 1985). The physician, Ferdinand Schmitter (1985), stationed at Fort Egbert, took a great interest in the Han living in Eagle Village (formerly Johnny's Village), and documented what he observed of their culture in 1906. He wrote of a culture that had been "considerably modified by white men," and yet a surprising amount of traditional aspects remained (Schmitter 1985: 1).

The Han subsistence and settlement described by Schmitter (1985) still revolved around seasonal movement between fall and winter hunting camps and fishing along the river in the summer. Fish wheels had begun to replace more traditional fishing gear, and roughly built log cabins superseded the semi-subterranean moss houses of the past. The cash economy had also become important to the Han during the gold rush of 1898, when they were hired as pilots and guides for the exorbitant sum of $10 a day. In 1906, the going rate for wages was $5 a day, and Schmitter states that "the native has a keen appreciation of his own value and will not work for any less than the white" (1985: 13). Women contributed cash to the economy by selling beadwork at the local store. Although the residents of Eagle Village had nominally become Christians and attended the Episcopal

Church (with the children attending the church school), they still held traditional funeral ceremonies and rites of passage.

With the discovery of gold in the Fairbanks area in 1901-1902, the town of Eagle eventually faded from the forefront as the hub of Interior Alaska's mining frontier. Fort Egbert closed in 1911, and Eagle's population gradually dwindled to only 54 people in 1920 (Orth 1971: 291). Despite this fact, a "mining presence" continued to be very much alive in Han territory as indicated by the six post offices, all located near mining camps, that were in operation in 1920 (Saleeby 1992: table). The Han continued to live at Fortymile, Eagle Village (Johnny's), and Nuklako (later moving to Moosehide) at the end of the gold rush era (Crow and Obley 1981: 511). Charley's Village, however, was washed away in 1914, and all its residents moved to Circle (Graumann 1977b: 384). The mining boom town days were in the past for Circle, and by 1930 most of the 50 residents there were Natives (Mertie 1938: 143).

The Han, and to a lesser degree the Yukon Flats band of Gwich'in, experienced early and very intense culture contact during the gold rush era. Many of the changes for the Han pertained to their material culture. Two of the most powerful agents of change were disease and education. Smallpox and diphtheria caused many deaths after 1885 (Schmitter 1985: 6); and schools, originally established in the mining boom towns, brought about rapid acculturation by teaching English at the expense of the children's own native tongue. According to Schmitter (1985), other traditional cultural features, such as ceremonies, remained intact, probably at least until the end of the gold rush era.



Athapaskan students with Mrs. Ensign, Presbyterian missionary's wife and teacher, circa 1902-1905, in Eagle.
(Ark Tower Collection, n.d. PCA 334-8, Alaska State Library, Juneau)

Summary of Surveys and Sites

All CRMIM surveys in YUCH were conducted in the Charley River quadrangle, along tributaries of the Yukon River. They include Coal, Sam, Woodchopper, Fourth of July, and Thanksgiving Creeks and the Nation River. Smaller tributaries of these major drainages were also surveyed and are listed in table 15.

Table 15
CRMIM Survey Coverage in YUCH by Locale

Locale	Map Quad	Acres	Miles (Km)
Charley River Quadrangle			
Ben Creek	B4, B5	295	
Boulder Creek	B5	100	
Colorado Creek	B5	7	
Coal Creek/Access Rd.	A5, B5	341	3.7 (6)
Fourth of July Creek/Access	A2, A3	220	3.7 (6)
Nation River	A2, B2	386	
Sam Creek	B4, B5	122	
Sam-Ben Creeks Access Rd.	B4, B5	-	6.8 (11)
Thanksgiving Creek	B6	<1	
Woodchopper Crk/Access Rt.	A6, B5, B6	3720	0.6 (1)
YUCH Total		**5191**	14.8 **(24)**

A total of 59 sites were recorded in YUCH. Placer mining sites constitute the majority of the sites; but historic, prehistoric, and even one coal mining site are also included in the inventory that appears in table 16. An annotated list of the sites by AHRS number is in the appendix; that listing also provides references for site location maps. Full site descriptions appear in the chapters that pertain to placer mining, historic, and prehistoric sites (Chapters 12, 14, and 15, respectively).

Table 16
Sites in YUCH by Locale and Site Type

Locale	Site Type	AHRS Number
Charley River Quadrangle		
Ben Creek	Placer	CHR-050, CHR-051, CHR-052 CHR-053, CHR-054, CHR-082
	Historic	CHR-100
Ben/Sam Creeks	Placer	CHR-029
Birch Creek Ridge	Prehistoric	CHR-074
Boulder Creek	Placer	CHR-047, CHR-048, CHR-049 CHR-083
Caribou Creek	Placer	CHR-059
	Historic	CHR-058
Coal Creek	Placer	CHR-073, CHR-075, CHR-078 CHR-094, CHR-102
Coal/Cheese Creek	Placer	CHR-095
Colorado Creek	Placer	CHR-098, CHR-099
Eureka Creek	Prehistoric	CHR-076
Fisher Creek	Prehistoric	CHR-077
Fourth of July Creek	Placer	CHR-032, CHR-033, CHR-034 CHR-040, CHR-041, CHR-042, CHR-043, CHR-044, CHR-045 CHR-046, CHR-080
Iron Creek	Placer	CHR-056, CHR-057, CHR-085
Mineral Creek	Placer	CHR-068, CHR-069, CHR-084
Nation River	Historic	CHR-091
	Coal	CHR-090
Sam Creek	Placer	CHR-055, CHR-081, CHR-096 CHR-097
Woodchopper Creek	Placer	CHR-063, CHR-064, CHR-065 CHR-066, CHR-067, CHR-070 CHR-071, CHR-086
	Historic	CHR-072, CHR-079
Yukon River	Historic	CHR-092

CHAPTER 6

GATES OF THE ARCTIC NATIONAL PARK AND PRESERVE

Geology and Mining Districts

Gates of the Arctic National Park and Preserve (GAAR) is located above the Arctic Circle and lies primarily within the Central and Eastern Brooks Range physiographic division (Wahrhaftig 1965: map 1). This mountainous region, composed of peaks up to 9,000 feet (2,743 m) elevation, forms a continental divide with rivers on the north flowing to the Arctic Ocean and Beaufort Sea and rivers on the south flowing to Kotzebue Sound and the Bering Sea. The Brooks Range is bracketed by the Arctic Foothills and by lake-studded lowlands. The climate in GAAR is characterized by long, severely cold winters and short summers.

The area of concern for this study is the upper Koyukuk River. The last major glaciation in the Koyukuk area began about 29,000 years ago, and after a series of retreats and advances finally ended at 11,800 years B.P. The vegetation during this interval was severely limited, and quite different from the rich, productive grassland environment previously proposed for eastern Beringia (Hamilton 1982: 714). The current interpretation of pollen data suggests that upland sites beyond the glacial margins supported a very sparse polar desert, while a more continuous meadow-like tundra was found at lower elevations (Anderson 1991: 178). As in subarctic Alaska (see DENA and WRST), the vegetation landscape of GAAR changed dramatically with the waning of the glaciers. During the Holocene, the herb meadows were first invaded by shrub birch, and later with poplar, spruce, and alder (Anderson 1991). Today the Koyukuk area is a vegetation mosaic composed of spruce-hardwood forests along the main stream channels, moist tundra on poorly drained slopes, shrublands on slopes above the spruce forest, and alpine tundra at higher elevations and on exposed ridges (NPS 1983: 36-37).

The majority of mining claims in GAAR are located in the **Koyukuk District** of the upper Koyukuk River (figure 11). In this district, a belt of Paleozoic metamorphic rocks contains metalliferous lodes of antimony, gold, silver, copper, lead, and manganese (Berg and Cobb 1967: 234). The economically more important placer gold deposits have been found in streams within a 10 - 20 km radius of Wiseman and Coldfoot, both located just to the east of the GAAR boundary (Cobb 1973: 156). The Brooks Range, unlike the more low-lying regions in northern Alaska, supported extensive Pleistocene glaciation. Reworking of many placer deposits occurred as a result of Pleistocene glacial scouring (Cobb 1973: 159).

Cultural Setting and Change During the Gold Rush Era

The territories of the Inupiat and the Koyukon converge in the land now encompassed by GAAR (figure 11). The Koyukon claimed the land surrounding the Koyukuk River and its tributaries in the southeastern section of the park, while the Nunamiut, an

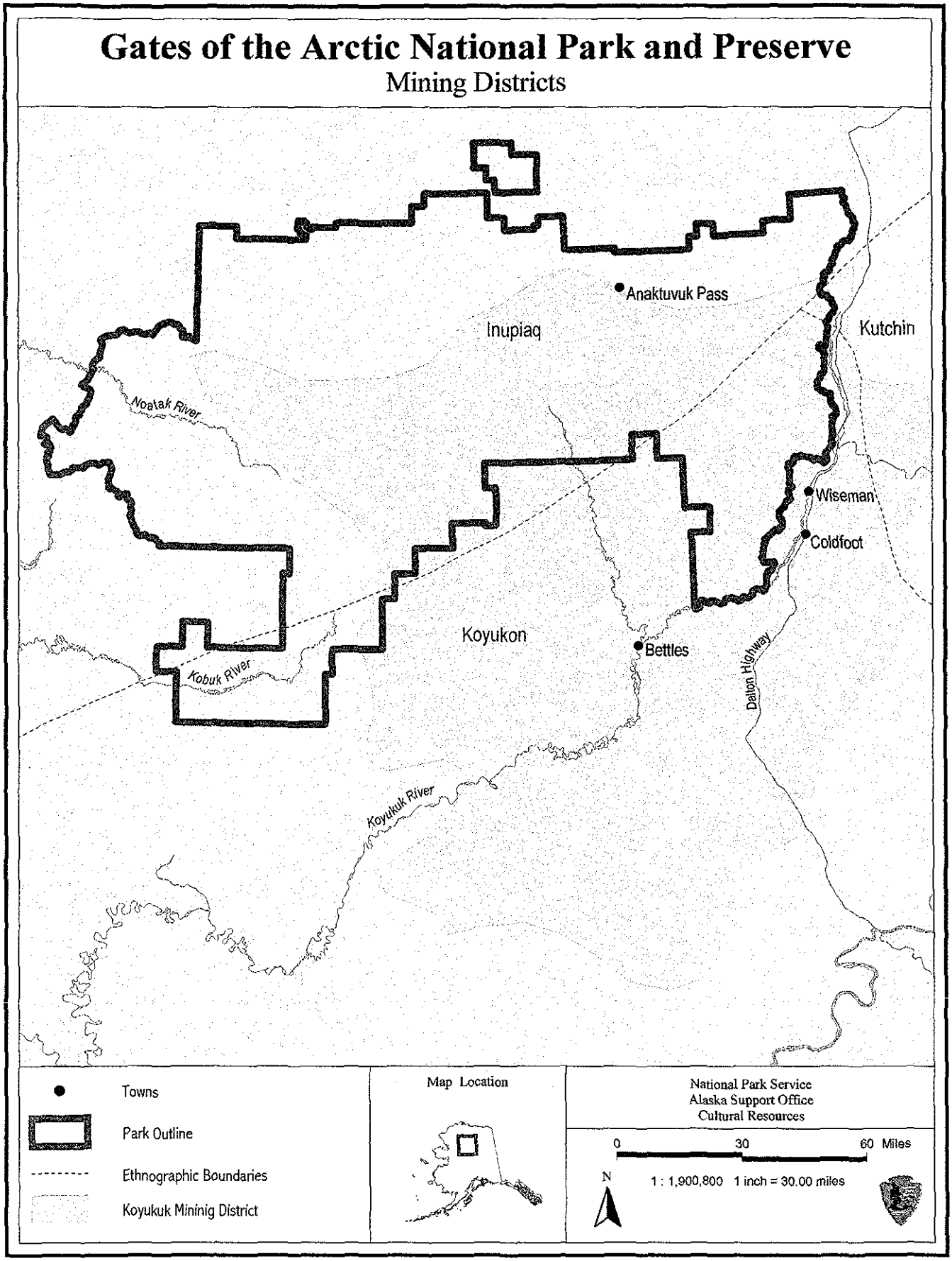

Gates of the Arctic National Park and Preserve
Mining Districts
Anaktuvuk Pass
Inupiaq
Kutchin
Noatak River
Wiseman
Coldfoot
Koyukon
Bettles
Dalton Highway
Kobuk River
Koyukuk River
Towns
Park Outline
Ethnographic Boundaries
Koyukuk Mininig District
Map Location
National Park Service
Alaska Support Office
Cultural Resources
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Figure 11.

inland-based group of Inupiaq-speakers, occupied most of the remaining area now in the park. Another Inupiat group, the Kobuk Eskimos, were peripheral inhabitants of GAAR in its extreme southwestern corner along the Kobuk River (Kunz 1991: 58).

Trade had become important to the Nunamiut, who served as middlemen for goods passing between Siberia and the Canadian Arctic by the early 1800s, but it was not until 1850, when whaling vessels began to ply the Alaska waters, that the effects of culture contact became devastating to these Interior Eskimos. Attracted to the coast for trade with the whalers, the Nunamiut were soon victims of diseases for which they had no resistance and of starvation, as their primary food resource, caribou, became depleted partially as the result of over-hunting. During the height of the gold rush to the Koyukuk in the late 1890s, several Nunamiut drifted down to Bettles to work for the white men and a few continued to trade there in the early 1900s (Gubser 1965: 15), but gold mining was never much of an impact to the Nunamiut in their own territory. Shortly after 1920, the Interior was abandoned and many families were assimilated into coastal villages (Hall 1984: 344). The village of Anaktuvuk Pass was founded in the early 1950s when the Nunamiut began returning to settle permanently in the Interior.

The history of early contact for the Koyukon was also marked by trade for coastal products. Schwatka (1900) reported that trade between these Interior Indians and the Kotzebue Sound Eskimos would take place at the portage at the headwaters of the Koyukuk River. Among other things traded with their neighbors was liquor, originally obtained from whalers and other trading vessels off the coast. Schwatka noted that the "Koyukon...became addicted to the use of alcohol before many of their brethren, and from this fact they have acquired considerable notoriety through difficulties growing out of drunken sprees" (1900: 348). It was not until 1884 -1885 that the Middle and Upper Koyukuk River people experienced white contact in their own territory (A.M. Clark 1981: 586). The upper reaches of their territory, now in GAAR, appear to have been sparsely populated. USGS geologist Frank Schrader reported that only about 100 Indians (Koyukon) lived in the upper Koyukuk region in 1901, and they carried on a brisk trade with the Kobuk Eskimos (Gubser 1965: 13).

These long-established trade patterns and travel routes set the stage for migrations during the early gold rush days on the Koyukuk. As the country north of Bettles was vacated by the Koyukon, who moved south toward trading posts on the river, it was reoccupied by coastal Eskimos and Kobuk River Eskimos attracted to the area by the opportunities to market hunt for the miners and by wage-paying jobs in mining and freighting (Brown 1988: 355). Besides Bettles, the mining communities of Coldfoot and Wiseman were magnets for both whites and Natives. In *Arctic Village*, a classic work of Alaskana, Robert Marshall describes the mutual acculturation of the 77 white and 50 Native (primarily Eskimo) inhabitants of Wiseman during the early 1930s. The essence of his descriptions are found in his dedication of the book, which reads, "to the people of the Koyukuk who have made for themselves the happiest civilization of which I have knowledge" (Marshall 1933). Historian William E. Brown has attributed this successful interaction to the following:

> In sum, sparse population and marginal resources drew Natives and whites together in a mutually supportive blend of life-style and labor...Many Natives became proficient workers, and some became partners with whites, in mining, transportation, and mercantile enterprises. At the same time, because these "imported" activi-

ties occurred seasonally or at marginal levels and could not sustain families year-round, traditional hunting and fishing expeditions kept families close to the land...The upshot of these combinations...was a more comfortable blended Native-white society than that found in most parts of Alaska (Brown 1988: 351-352).



School children at Wiseman in 1938. Their parents and some of them hiked from the Barrow area the previous few years to try and make a living in Wiseman. The fathers of some were non-Native miners. *(Anchorage Museum of History and Art B74.40.131)*

Summary of Surveys and Sites

CRMIM surveys were concentrated entirely in the Wiseman quadrangle (table 17). Most of the drainages listed in table 17 are subsidiary to either the North Fork of the Koyukuk River or one of its primary tributaries, the Glacier River. Snowshoe and Pasco Creeks are tributaries of Wiseman Creek, which flows into the Middle Fork of the Koyukuk River.

Table 17

CRMIM Survey Coverage in GAAR by Locale

Locale	Map Quad	Acres	Km
Wiseman Quadrangle			
Alder Creek/Access Rd.	A2	165	
Conglomerate Creek	C2	24	
Koyukuk River, North Fork	A2	20	
Mascot Creek/Access Rd.	B2, C2	852	
Mascot Creek Ridge	B2, C2	-	8
Pasco Creek	B1	142	
Snowshoe Creek	B1	366	
Wally Creek	C2	40	
Washington Creek/Access Rd.	C1	165	
GAAR Total		**1774**	**8**

Sites recorded during these surveys are listed in table 18 by drainage. A total of 23 sites, including placer mining, historic, and prehistoric sites, make up the inventory for GAAR. An annotated site list by AHRS number is found in the appendix, along with a reference for site location maps. For full site descriptions, refer to chapters 12, 14, and 15.

Table 18

Sites in GAAR by Locale and Site Type

Locale	Site Type	AHRS Number
Alder Creek Access Rd	Prehistoric	WIS-046
Alder Ck/N.Fk Koyukuk	Placer	WIS-045
Conglomerate Creek	Placer	WIS-266, WIS-267
Glacier River	Placer	WIS-216, WIS-217, WIS-220 WIS-221, WIS-222
Mascot Creek	Placer	WIS-218, WIS-219, WIS-228 WIS-276
North Fork Koyukuk	Placer	WIS-047, WIS-048
Pasco Creek	Non-Mining	WIS-214
Sawyer Creek	Non-Mining	WIS-215
Snowshoe Creek	Non-Mining	WIS-049
Washington Creek	Placer	WIS-225, WIS-226, WIS-227
Wiseman Creek	Non-Mining Prehistoric	WIS-212 WIS-213

CHAPTER 7

BERING LAND BRIDGE NATIONAL PRESERVE

Geology and Mining Districts

Bering Land Bridge National Preserve (BELA) is on the northern Seward Peninsula and encompasses both coastal and inland areas. The Bering and Chukchi Seas and Kotzebue Sound border the BELA coastline, while the Bendeleben Mountains form its southern boundary. The Bering Strait, from the shores of BELA to Siberia, is roughly 90 km, a distance once spanned by land instead of water. The landmass that connected the two continents is often referred to as the Bering Land Bridge, and hence the name of the preserve. This unglaciated expanse, exposed by the lowered sea levels during the Pleistocene, is also known as Beringia.

The landscape of BELA during much of the late Pleistocene appears to have been a treeless steppe-tundra, which was invaded during warmer periods, such as the Birch Interval from 15,000 - 8,000 years ago, by species of dwarf shrubs (Schaaf 1988: 1: 8-10). The vegetation today is characterized as wet tundra, predominantly sedges and grasses, with large patches of moist and alpine tundra, and shrub thickets along drainages, alluvial bars and flood plains (Viereck and Little 1972: map; Schaaf 1988).

Although mining on the Seward Peninsula is usually equated with the rich beach placer gold finds made in Nome just before the turn of the century (nineteenth to twentieth), lode and placer deposits are actually widespread across the peninsula. The primary mining locales in BELA are two tributaries of the Goodhope River, Humboldt and Esperanza Creeks, and the Imuruk Lake region, all located in the **Fairhaven District** (figure 12). Imuruk Lake, the largest body of water on the Seward Peninsula, lies in the southeastern section of the preserve on the Imuruk Lava Plateau, composed of at least five lava flows ranging in age from 5,000,000 years to 2,000 years old. The rift valley between the flows eventually became a drainage basin, and thus formed Imuruk Lake (Hopkins 1963). Beginning in 1908, water from the lake was channeled, via the Fairhaven Ditch, to placer claims located on the Inmachuk River, some 61 kilometers north.

Cultural Setting and Change During the Gold Rush Era

The Native people of BELA are Inupiaq-speakers grouped geographically as the Bering Strait Eskimos (figure 12). The prehistory of these people and their predecessors in BELA has been documented by Schaaf (1988, 1995) and Harritt (1994). Unlike the Natives of the southern coast of Alaska, the Bering Strait Eskimos were not subjected to the culturally disruptive contact of Russian fur traders within their own territory during the late eighteenth and early nineteenth centuries. During the second half of the nineteenth century, however, with the advent of whaling along the northern coast, contact between

the Eskimos and whites became considerably more frequent. When whaling was not showing a profit, whaling crews began to hunt for walrus. The wanton destruction of large numbers of sea mammals led some to believe that the Eskimos, deprived of critical food resources, were headed for starvation.

One of those who believed that the Eskimos needed a more stable resource base was Rev. Sheldon Jackson, a Presbyterian missionary and the first agent for education in Alaska. He arranged for the import of domestic reindeer from Siberia, ostensibly to provide food and skins for the Eskimos. In the decade between 1892-1902, the U.S. government imported 1,280 reindeer, placed with mission churches for subsequent distribution to the Natives. The closest of these institutions to BELA was the Congregational Mission in Wales, which received 118 reindeer in 1894 (Stern et al. 1980: 25, 27). The interrelated impacts of missions, schools, and reindeer at the end of the nineteenth century increased the acculturation process of the Bering Strait Eskimos by altering settlement, subsistence, and belief systems.

It is surprising that silver, and not gold, brought the first wave of miners to the Seward Peninsula. The Omilak Silver Mine was established in 1881 on the Fish River of the southern Seward Peninsula. With the help of Fish River Eskimos as laborers, silver was mined there until the 1890s (Ray 1975:201-02). Gold was actually discovered earlier, in 1866 or 1867, by Daniel Libby of the Western Union Telegraph expedition (Williss 1986:119), but it was the 1898 gold strike that eventually drew worldwide attention to the Seward Peninsula. The discovery, made on Anvil Creek, resulted in an initial stampede of some 1,000 men to Nome, originally known as Anvil City.

The real rush did not begin until August 1899, when placer gold was discovered in the beach gravels of Nome (Williss 1986:122). In 1899 and 1900 the Seward Peninsula was swarming with more than 40,000 prospectors, who covered almost every mile of the country (Ray 1984:300). One notable stampeder was a medical doctor named L.H. French. He chronicled what was perhaps the greatest impact brought to the Native community by this tremendous influx of outsiders, that of disease.

> Since the advent of the gold-hunter with his attendant dissipations, the mortality among the tribes on the coast of the vast gold-bearing peninsula of Alaska, between Norton Sound and Kotzebue Sound, has increased to such a rapid and alarming extent that the native population is in danger of becoming extinct. The diseases which are carrying them off are consumption and pneumonia; before these their constitution seems to be helpless...The Innuit puts off his native raiment, discards the food to which his constitution and the constitution of his forefathers have been accustomed for generations, and substitutes for his fur and his seal oil and dried salmon the manufactured clothing and food of civilization. There is not much room for wonder that colds, consumption and pneumonia follow (French 1985: 31-32).

Fortunately, the perils painted by French were exaggerated. As a result of introduced diseases, including the measles epidemic of 1900, the Native population at the turn of the century was reduced, but not decimated.

According to ethnographer D.J. Ray (1983:180), after the great surge of miners left the Seward Peninsula in the early 1900s, the old settlement and subsistence patterns continued for most of the region without much change. The most dramatic change did not

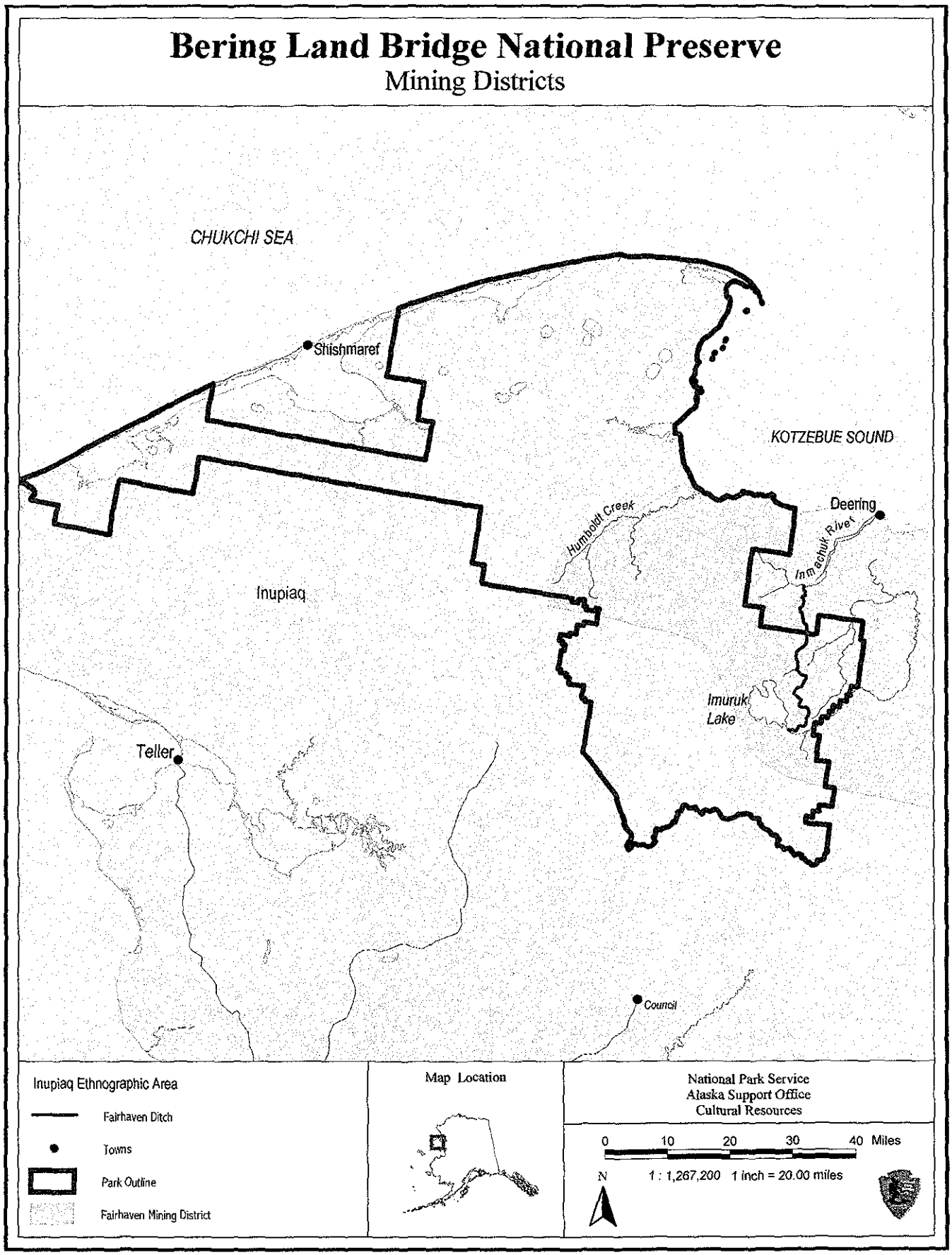

Bering Land Bridge National Preserve
Mining Districts
CHUKCHI SEA
Shishmaref
KOTZEBUE SOUND
Deering
Humboldt Creek
Inmachuk River
Inupiaq
Imuruk Lake
Teller
Council
Inupiaq Ethnographic Area
Fairhaven Ditch
Towns
Park Outline
Fairhaven Mining District
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 10 20 30 40 Miles
N
1 : 1,267,200 1 inch = 20.00 miles

Figure 12.

occur until 1918 when the influenza epidemic killed 900 people on the Seward Peninsula, south of Shishmaref and north of Saint Michael (Stern et al. 1980:44). Some of the small villages were entirely wiped out, and many of the remainder were abandoned in favor of larger villages, often with a mixed population of Natives and whites. As they settled in Nome and elsewhere on the peninsula, they began work at a variety of jobs and allowed their children to attend school (Ray 1975:301).

Summary of Surveys and Sites

In BELA, the survey locales were scattered throughout the Bendeleben quadrangle and are listed in table 19. The Fairhaven Ditch / Imuruk Lake region is in the eastern section of this quadrangle. Both Esperanza Creek and Humboldt Creek are tributaries of the Goodhope River to the north, while Goose Creek and Goose Gulch are tributaries of the Noxapaga River farther south.



"Natives camping on the Beach, Nome, Alaska." (ca. 1900)
(Anchorage Museum of History and Art B70.73.128)

TABLE 19

CRMIM Survey Coverage in BELA

Locale	Map Quad	Acres
BELA: Bendeleben Quadrangle		
Esperanza Creek	D4	43
Goose Creek	C5	96
Goose Gulch	C5	19
Imuruk Lake	C3	47
Fairhaven Ditch/Pinnell R.	C3	<1
Humboldt Creek	D5	340
BELA Total		**546**

CRMIM crews recorded six sites, all of them associated with placer mining, in BELA (table 20). An annotated list of the sites by AHRS number is in the appendix; that listing also provides references for site location maps. Full site descriptions appear in the chapter that pertains to placer mining (chapter 12).

Table 20

Sites in BELA Locale and Site Type

Locale	Site Type	AHRS Number
Esperanza Creek	Placer	BEN-093
Humboldt Creek	Placer	BEN-131, BEN-132, BEN-133
Kugruk River	Placer	BEN-071
Pinnell River	Placer	BEN-072

CHAPTER 8

KENAI FJORDS NATIONAL PARK

Geology and Mining Districts

Kenai Fjords National Park (KEFJ) is located on the southeastern Kenai Peninsula in the Kenai-Chugach Mountains. The topography of this mountainous region is characterized by extremely rugged east-trending ridges; glacial features such as horns, aretes, cirques, and U-shaped valleys; and by deeply indented fjords along its Gulf of Alaska coastline (Wahrhaftig 1965: 40). A vast area of the park (780 km^2) is buried by the Harding Icefield and its radiating glacial arms, some of which extend down to tidewater and calve directly into the Gulf of Alaska. A smaller ice field, known as the Iceworm Peak unit, is in the southwestern extension of KEFJ. The principal peak is Iceworm Peak, a nunatak that rises above the ice to an elevation of 5,800 feet/1,767 m. The Nuka River Pass, a narrow unvegetated corridor, separates the two ice fields (Follows 1978: 46).

The Harding Icefield is a remnant of the glaciation that covered the terrain and waters of almost all Southcentral Alaska during the late Pleistocene. During that time, glaciers south of the Alaska Range coalesced into vast ice caps, intermontane glaciers, and piedmont glaciers that constituted the northwestern part of the Cordilleran ice sheet (Hamilton and Thorson 1983: 38). The late Pleistocene was marked by fluctuating temperatures, resulting in a succession of glacial advances and retreats. The most recent major glacial advance in the KEFJ vicinity, called the Naptowne glaciation, began as early as 48,000 years ago and ended by 5,500 years ago. During Naptowne times, the Harding Icefield was more extensive than it is today, filling the Kenai River and Resurrection Creek valleys to the north (Karlstrom 1964). The coastal fjords, which are such prominent features of the KEFJ landscape, were formed by glacial scouring as they began a final retreat about 9,000 years ago. There have been minor glacial advances and recessions during the Holocene, which are most evident in well-studied areas, such as Exit Glacier (Reynolds 1987: 13-14). Fed by more than 10 meters of snow per year, the Harding Icefield and its glaciers are relatively stable today, despite annual and seasonal fluctuations in their reach (Miller 1987: 3; Norton 1977). The coastal fringe of KEFJ, not locked in a perennial cover of snow and ice, is cloaked in a dense forest of Sitka spruce and western hemlock.

The coastal area of KEFJ lies in an extremely active tectonic zone. The most recent event in its long geological history of subsidence was the 1964 earthquake, which instantly lowered the KEFJ coastline by as much as 6 feet/1.8 meters (Plafker 1969; Follows 1978). One of the best examples of a drowned forest is found in the Nuka Bay area, also noted as the most productive gold and silver mining region in the **Homer Mining District** (figure 13). The lodes in the Nuka Bay area are in graywacke and slate, commonly near small quartz plutons, and consist of quartz veins and stockworks (Berg and Cobb 1967:76).

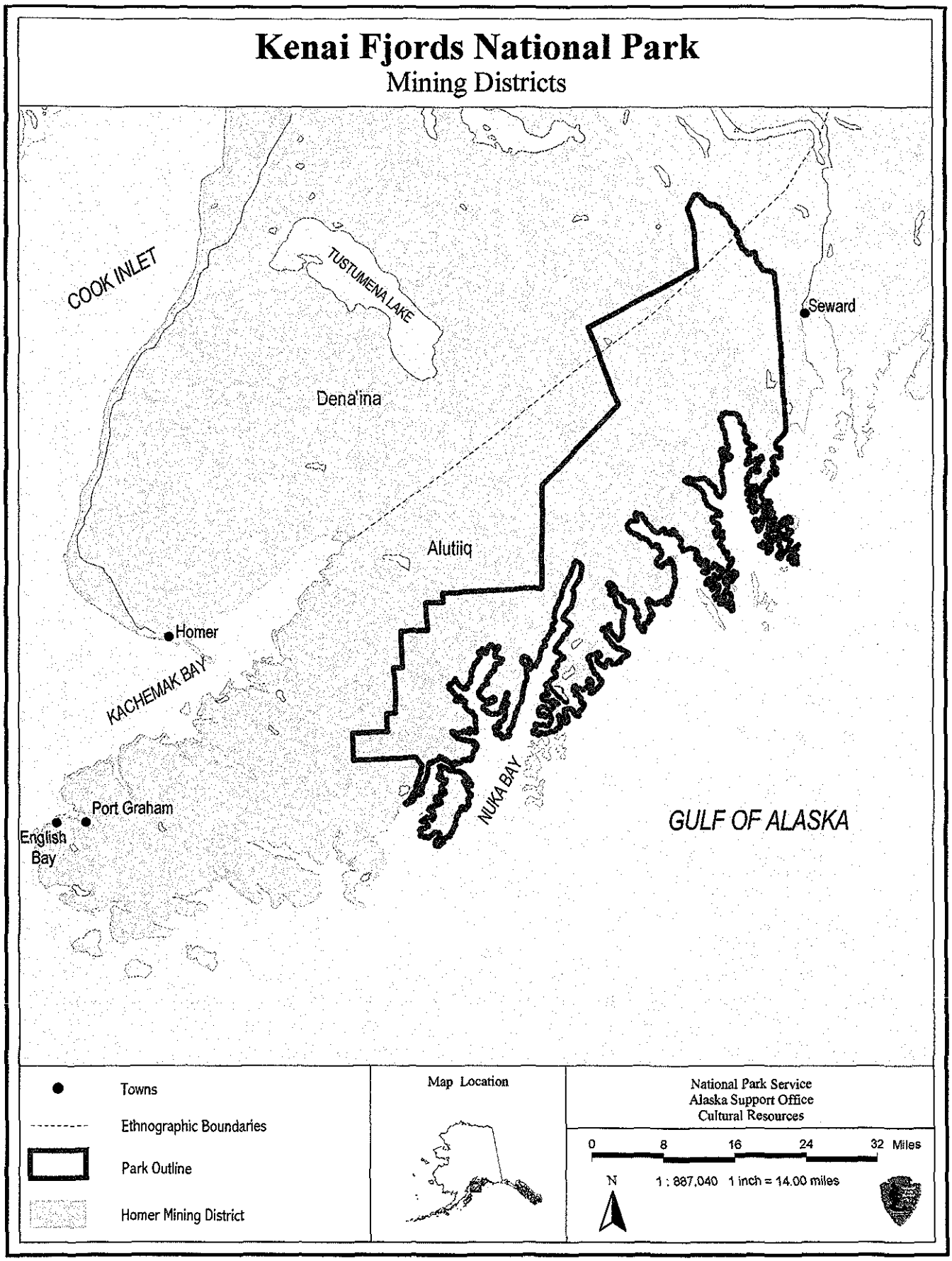

Kenai Fjords National Park
Mining Districts
COOK INLET
TUSTUMENA LAKE
Dena'ina
Seward
Alutiiq
Homer
KACHEMAK BAY
NUKA BAY
GULF OF ALASKA
Port Graham
English Bay
Towns
Ethnographic Boundaries
Park Outline
Homer Mining District
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 8 16 24 32 Miles
N
1 : 887,040 1 inch = 14.00 miles

Figure 13.

Cultural Setting and Change During the Gold Rush Era

The coastline of KEFJ was once the homeland of a group of Alutiiq Eskimos, referred to as the *Unikhkurmiut* (or Unegkurmiut) by the Chugach Eskimos (also Alutiiq), their kinsmen to the east on Prince William Sound. Birket-Smith (1953: 18, 99) suggests that the group occupied most or all of Cook Inlet before the Athapaskan advance into the area, and notes that their settlements were located on Resurrection Bay, Nuka Bay, Port Graham, and Koyuktolik (the latter two on the tip of the Kenai Peninsula outside the boundaries of KEFJ. Whether these Kenai Peninsula Eskimos were actually a separate group from the Chugach is an unresolved question as there is very little information available on them (Clark 1984a: 185).

The Pacific Eskimos and Aleuts were the first native groups to be profoundly affected by the Russian presence in Alaska beginning in the 1740s. For the next four decades, independent Russian fur traders, called *promishleniki*, pressed eastward in their trading ventures from the Aleutian Islands, to Kodiak Island, Cook Inlet, and Prince William Sound. A permanent Russian trading post was established at *Alexandrovsk*, later to be called English Bay on Port Graham[1] (Orth 1971: 315), and another one may have existed in Aialik Bay now in KEFJ. The only well-documented Russian activity took place in Resurrection Bay, where a small fort and shipyard were established. The Russians relied heavily on the local Natives for food and supplies in 1793-94 while constructing the Phoenix, the first ship built in Alaska waters (Pfeiffenberger 1995: 65). By the end of the Russian period, the population of Kenai Peninsula Eskimos was estimated to be just over 200 (Clark 1984a: 187).

After the U.S. purchase of Alaska in 1867, the Alaska Commercial Company (ACC) practically monopolized the fur industry in the territory. The company maintained a trading post at English Bay and had a substation at Yalik (at the extreme southern end of KEFJ) for collecting furs taken in the Nuka Bay area. Thirty-two "Eskimo" lived at Yalik according to the 1880 census (Petroff 1884: 28), but only a decade later the entire KEFJ section of coastline was virtually abandoned (de Laguna 1956: 35). Two factors probably led to the abandonment. The first was the influence of the Russian Orthodox Church in urging the Natives to move to *Alexandrovsk* (Betts et al 1991: 19); the second was the influence of the ACC. The guns, whiskey, and other goods the Natives obtained from the ACC traders effectively transformed their subsistence-based economy to one based on cash in only a few decades. By the time the first prospectors entered the Nuka Bay region by 1909, the Unegkurmiut had long since abandoned their homeland, settling at Port Graham and Seldovia, farther up the coast, where they found work at the fish canneries (Pfeiffenberger 1995: 66-67).

[1] The Russians established a coal mine in the Port Graham area during the mid-1850s (Brooks 1973: 296), and thus the mining industry may have had an effect on the Native population in the KEFJ earlier than in other areas.

Summary of Surveys and Sites

In KEFJ, survey efforts were concentrated in tidewater areas surrounding the North and West arms of Nuka Bay, located in the Seldovia quadrangle (table 21).

Table 21
CRMIM Survey Coverage in KEFJ by Locale

Locale	Map Quad	Acres	Miles (Km)
Babcock Creek/Surprise Bay	C2	-	3.1 (5)
Beauty Bay Access Rd.	C2	15	
Ferrum Creek/Beauty Bay	C2	40	
Nuka Bay	C2	16	
Nuka River	C2	2	
Shelter Cove/Access Rd.	C2	64	
Surprise Bay/Access Rd.	C2	132	
Yalik Bay	B2	1	
KEFJ Total		**270**	**3.1 (5)**

Ten lode-mining sites were recorded during the CRMIM survey in KEFJ (table 22). An annotated list of these sites by AHRS number is in the appendix, while more complete site descriptions are in chapter 13 on lode mining. A map of their locations appears in figure 32.

Table 22
Sites in KEFJ by Locale and Site Type

Locale	Site Type	AHRS Number
Beauty Bay	Lode	SEL-236
Ferrum Creek/Beauty Bay	Lode	SEL-212
Nuka Bay	Lode	SEL-233
Nuka River	Lode	SEL-234, SEL-237
Shelter Cove	Lode	SEL-177, SEL-235
Surprise Bay	Lode	SEL-175, SEL-213
Yalik Bay	Lode	SEL-185



Men in baidarkas at Seldovia in 1916.
(Anchorage Museum of History and Art B91-9-143)

CHAPTER 9

KATMAI NATIONAL PARK AND PRESERVE

Geology and Mining Districts

Located at the base of the Alaska Peninsula, Katmai National Park and Preserve (KATM) is bordered on the east by the deeply fjorded shoreline of Shelikof Strait and to the northeast by Cook Inlet's Kamishak Bay. Bristol Bay lies across the Peninsula, outside the park boundaries, to the west. The park is situated primarily in the Aleutian Range physiographic division, part of the Pacific Ring of Fire, a narrow zone of active volcanism and seismicity associated with dramatic collisions along the edge of the earth's tectonic plates. In KATM alone there are 15 active volcanoes (NPS 1992b).

During the last seven millennia, there have been at least 10 volcanic ash falls, which are still evident in the stratigraphy of the area (Dumond 1981). The most notable of these in historic times occurred in 1912 with the eruption of Novarupta, near Mt. Katmai. The estimated volume of 30 km^3 of ash and pumice released during the eruption blanketed the nearby valley, now referred to as the Valley of Ten Thousand Smokes because of the appearance of countless smoking fumaroles, venting gas and steam after the eruption (Dumond 1981: 11-12; NPS 1992b). Katmai National Monument, created in 1918 as a result of the publicity and scientific curiosity that surrounded the eruption, has since been expanded four times (Norris 1996).

The higher peaks of the Aleutian Range retain glacial remnants of the massive Alaska Peninsula Glacier Complex, an extension of the Cordilleran ice sheet, that covered the landscape during the late glacial maximum, spanning the time period of 25,000 to 10,000 years B.P, and forming the southeastern border of Beringia (Mann and Peteet 1994: 145). Following the retreat of the glaciers, a single lake occupied the area of today's Naknek Lake system, with a surface some 26 meters higher than that of the present Naknek Lake. As the Naknek River began downcutting glacial moraines surrounding the lake, the water level dropped and the various lakes in the system today became separated from one another (Dumond 1981: 13).

The only area that has been actively mined for lode gold within the boundaries of KATM is Battle Lake, located in the northerly portion of the lake-studded region. Some work was also done on a copper deposit near Kukak Bay about the time of World War I; and placer gold was mined along a small, steep drainage at Cape Kubagakli (Berg and Cobb 1967: 14-16; Cobb 1973: 11-12). All of these areas are in the **Bristol Bay Mining District** (figure 14), an area that has been relatively undeveloped in terms of mineral production.

Cultural Setting and Change During the Gold Rush Era

Over the millennia of human occupation on the Alaska Peninsula, cultural influences have been brought to the area by both migration and diffusion from three directions:

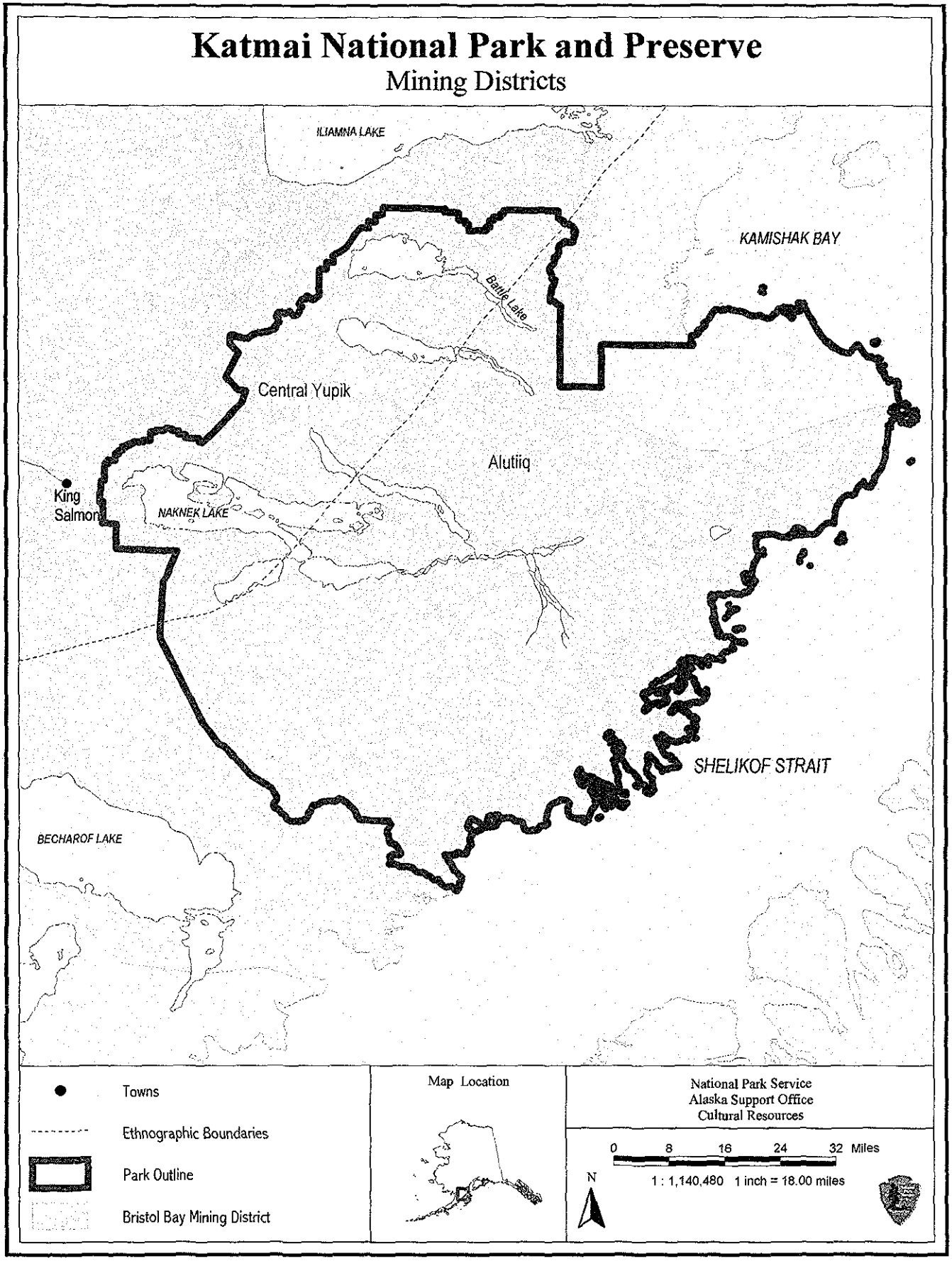

Katmai National Park and Preserve
Mining Districts
ILIAMNA LAKE
KAMISHAK BAY
Battle Lake
Central Yupik
Alutiiq
King Salmon
NAKNEK LAKE
SHELIKOF STRAIT
BECHAROF LAKE
Towns
Ethnographic Boundaries
Park Outline
Bristol Bay Mining District
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 8 16 24 32 Miles
N
1 : 1,140,480 1 inch = 18.00 miles

Figure 14.

from the Bering Sea coast to the northwest, from the Interior to the northeast, and from Kodiak Island to the southeast. As a result, the prehistoric cultures of the Bristol Bay (western) region of KATM are distinctly different than those of the Shelikof Strait region to the east. These differences have persisted into historic times. Linguistic maps show that two Eskimo groups, separated by the Aleutian Range, comprise the Native population of KATM (figure 14).

The most populous group of Pacific Eskimos, the Alutiiq-speaking Koniag, occupied Kodiak Island and the Shelikof Strait coastline of KATM, while a Yup'ik-speaking group, the Aglegmiut, inhabited the Bristol Bay side. Koniag villages once stretched from Cape Douglas south to Kashvik Bay; the Aglegmiut inhabited upper Naknek drainage villages along the Brooks River, the Savonoski River, and Lake Grosvenor (Hussey 1971: 78-82). Of the two groups, the Koniags experienced the earlier and more intense Russian influence, being conscripted into virtual slavery by the *promishleniki* (Russian procurers of furs) to hunt the coastal waters in search of the prized sea otter. The Aglegmiut, on the other hand, were not subject to the traders' labor draft, and the impact on their lives was much less drastic. "In essence, the relationships of the Russians to the upper Naknek drainage Aglegmiut were those of traders and missionaries among an independent people" (Hussey 1971: 150-151).

A Russian American Company trading post operated at Katmai village, near Katmai Bay, from 1799 to 1867, when the U.S. took possession of Alaska. The village lay at the foot of one of the travel routes over the mountains, leading from the Naknek Lake system up the Ukak River to Katmai Pass, and then down the Katmai River to the village. The Aglegmiut made annual trips over the mountains to trade at Katmai village, but were also drawn in the opposite direction, across Bristol Bay to the mouth of the Nushagak River, where a Russian Orthodox Church was established in 1841 (Hussey 1971: 136; Norris 1996: 8; Van Stone 1971: 21). By the end of the Russian period, the economy of the Shelikof Strait Natives had been radically altered from one based on sea-mammal hunting and fishing to one centered on trapping and trading. Of even greater consequence was the fact that all of the villages along the Katmai coast had been severely depopulated as the result of Russian abuse and disease.

Fur trading continued in the American period, primarily under the auspices of the Alaska Commercial Company. By the time the supply of sea otter furs began to decline in the 1880s, another industry, based on commercial salmon fishing and canning was being widely developed. Natives of the Katmai coast, along with gangs of Chinese and Japanese laborers, were employed at a number of canneries that had been established on Kodiak Island in the 1890s (Norris 1996: 12). During that time, Katmai Pass had ceased to be a route for fur traders, but it was still used by an occasional traveler. One of the most notable was U.S. Geological Survey geologist Josiah Spurr, who traveled from Nushagak up the Naknek drainage and over Katmai Pass in 1898. He hired 10 Natives at Savonoski to help pack his load over the pass (Hussey 1971: 195). During the same year, placer gold discoveries were made in Nome and this trail over the mountains was soon to become one of the travel routes used by prospectors en route to the gold fields. The route across the Alaska Peninsula to Bristol Bay and then northward via the coast was termed the "Bering Sea coast route." It was used mainly in the winter, but also to a limited extent in the summer. For the next few years, the arduous Katmai route received moderate use by people passing to and from Nome, and the Natives living along the route, particularly

Katmai village, were employed as guides and probably as packers. The route became infamous through the writings of author Rex Beach, who was one of the prospectors to land at Katmai village in 1901 and negotiate the treacheries to be found on the trail over Katmai Pass (Hussey 1971: 304-305).

The effects of the gold rush on the Natives of KATM were relatively fleeting. Their villages on one of the routes to Nome placed them at an advantage of economically profiting from the increased travel through their territory, but they were not subjected to the influences of a resident white population of miners and prospectors as the extent of placer mining within the entire region has always been very limited. A final abandonment of most of the KATM villages occurred in 1912 with the volcanic eruption that dramatically changed the face of the landscape and human use of the area.



Chief Kamakoff, his wife, and a non-Native woman in Kanatak in 1922. Kanatak, on the south coast of the Alaska Peninsula, lies outside the area hardest hit by the 1912 volcanic eruption that caused Katmai coast residents to abandon their villages. Although these Kanatak residents may not have been affected by the influx of gold miners at the first of the twentieth century, they experienced increased culture contact in the 1930s because of oil drilling in the area. *(Anchorage Museum of History and Art)*

Summary of Surveys and Sites

The CRMIM survey focused on the Battle Lake area of the Iliamna quad in KATM. Table 23 lists the areas and acreage covered during the survey.

Table 23

CRMIM Survey Coverage in KATM by Locale

Locale	Map Quad	Acres
Battle Lake Rd.	A6	49
Alternative Rd.	A6	70
KATM Total		**119**

The CRMIM crew recorded three prehistoric sites in the Battle Lake vicinity (table 24). An annotated list of these sites appears in the appendix, and a more detailed description of them can be found in chapter 15. A map of their location appears in figure 43.

Table 24

Site in KATM by Locale and Site Type

Locale	Site Type	AHRS Number
Battle Lake vicinity	Prehistoric	ILI-059, ILI-060, ILI-061

CHAPTER 10

LAKE CLARK NATIONAL PARK AND PRESERVE

Geology and Mining Districts

Lake Clark National Park and Preserve (LACL) is 100 kilometers north of KATM, with Lake Iliamna separating the two park units. LACL is bordered on the east by the stretch of Cook Inlet from Chinitna Bay north, just past the waters of Tuxedni Bay. Rising from the coastline are the Chigmit Mountains, almost completely encompassed by the boundaries of the park. These mountains are at the junction of two major physiographic divisions: the Aleutian Range and the Alaska Range (Wahrhaftig 1965). As in KATM, the LACL coastline is included in the Ring of Fire and has two active volcanoes - Mt. Iliamna (10,016 feet/3,053 m) and Mt. Redoubt (10,197 feet/3,108 m) - within its boundaries. A third volcanic peak, Mt. Spurr, lies about 35 kilometers east of the northeast boundary of the park. Relict glaciers from the once extensive Cordilleran ice sheet are found in LACL. The most notable are the Double Glacier and the Tuxedni Glacier, extending northward from Mount Iliamna.

To the west of the mountains, is a foothill region of numerous lakes formed as glaciers were receding at the end of the Pleistocene. Lake Clark, the largest of these lakes, is part of the Kvichak River system that drains the entire southern portion of LACL. The Newhalen River connects Lake Clark and Sixmile Lake with Lake Iliamna, the largest lake in Alaska. It is in turn drained by the Kvichak River into the waters of Bristol Bay. This river system provides the single most important spawning and rearing habitat for red salmon in the world (Alaska Planning Group 1974: 23). At the upper end of this river system is Portage Creek, a short drainage flowing into Lake Clark, which is one of the few areas of the **Bristol Bay District** (figure 15) mined for placer gold. Also clustered around the shores of Lake Clark are lode deposits of silver and molybdenum in the Kijik area on the northwestern shore, and iron deposits near Kasna Creek on the southeastern shore. Magnetite deposits are found within the neighboring **Redoubt District**, on Magnetic Island, a small island on the north shore of Tuxedni Bay (Berg and Cobb 1967: 14,16,22).

Cultural Setting and Change During the Gold Rush Era

The Native inhabitants of LACL are the Dena'ina (Figure 15). Although archaeology has provided little information about early Dena'ina prehistory in the area, linguistic evidence suggests that the headwaters area of the upper Stony and upper Mulchatna rivers (within LACL), is their most ancient homeland. By about 1,500 years ago, they began to migrate into the Cook Inlet Basin and at some point also moved in to the Iliamna-Lake Clark area (Kari 1988: 319, 336).

The Dena'ina had one of the richest resource bases in Alaska and consequently the largest aboriginal population of all northern Athapaskan peoples (Kari 1988:319). Their domain encompassed Cook Inlet and extended northward to the southern flanks of the

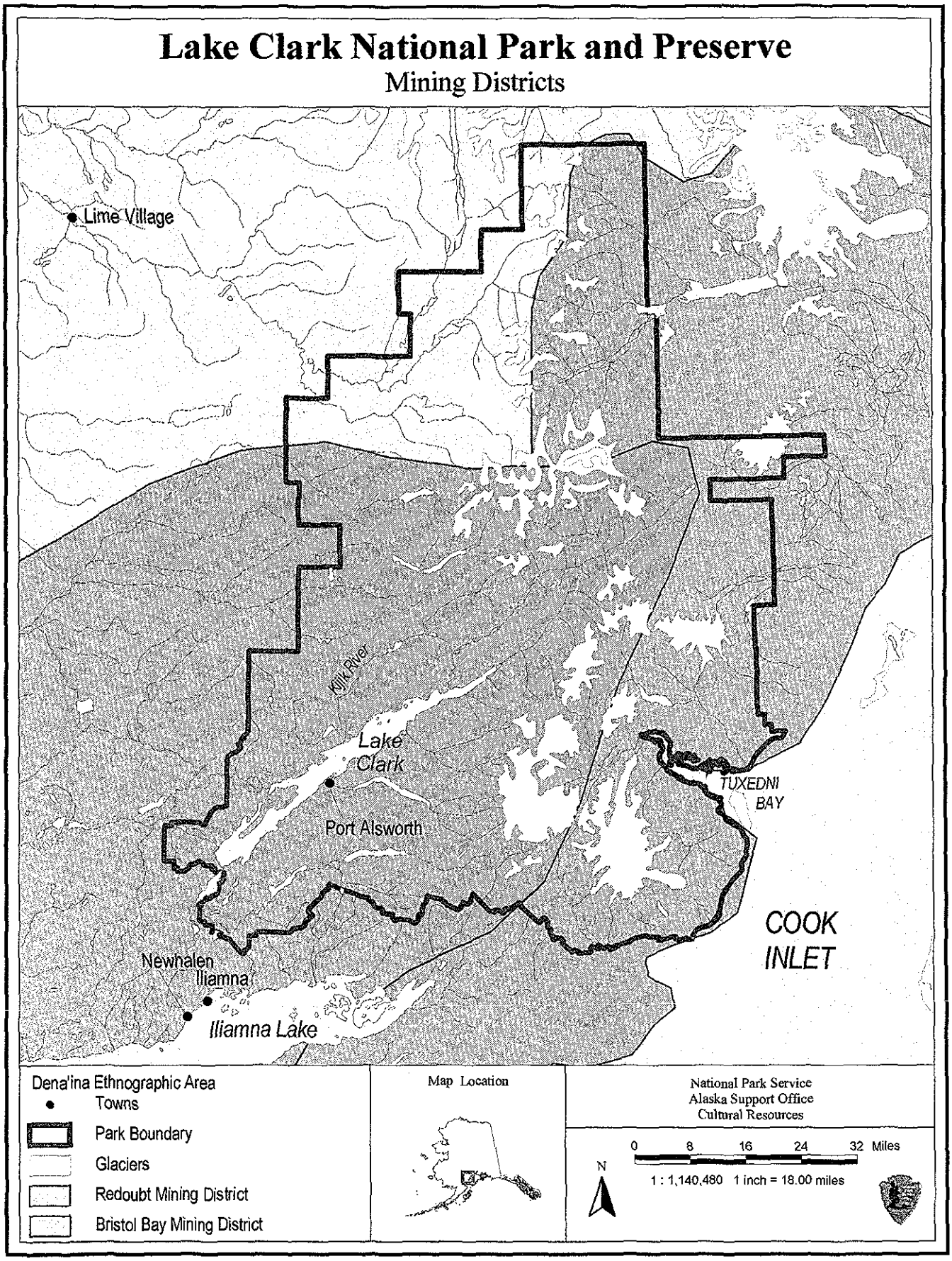

Lake Clark National Park and Preserve
Mining Districts
Lime Village
Kijik River
Lake Clark
Port Alsworth
TUXEDNI BAY
COOK INLET
Newhalen
Iliamna
Iliamna Lake
Dena'ina Ethnographic Area
Towns
Park Boundary
Glaciers
Redoubt Mining District
Bristol Bay Mining District
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 8 16 24 32 Miles
N
1 : 1,140,480 1 inch = 18.00 miles

Figure 15.

Alaska Range. The Dena'ina language is internally diverse, divided into two major dialect divisions - Upper Inlet and Lower Inlet (Kari 1988:324). Geographically, they were divided into three societies - the Kenai Society, the Susitna society, and the Interior Society (Townsend 1981:624). The Dena'ina in the area now encompassed by LACL, primarily within the Interior Society, had villages on Lake Clark, Telaquana Lake, and on Chitina Bay. Other Interior villages, outside park boundaries, were found at the upper end of Lake Iliamna and on the Stony and Mulchatna Rivers. One LACL village near Tuxedni Bay was at the southernmost end of the Susitna Society territory (Townsend 1981: 625).

The Dena'ina were the first Athapaskans to be directly contacted by Europeans, beginning in 1778 with Captain James Cook. By 1787 two Russian forts had already been built on the eastern shore of Cook Inlet (Fall 1987:15-17), and by 1800 a small trading station had been built somewhere in the Iliamna area. The latter trading post did not survive long as the local Dena'ina, weary of their mistreatment at the hands of the Russians, soon destroyed the fort and killed almost all the Russians (Van Stone and Townsend 1970:15). Two factors that were to have long-lasting effects on the Dena'ina during the Russian period were the disastrous smallpox epidemic of 1836-40 and the activities of Russian Orthodox missionaries that followed. Fall (1987:19) estimates that at least 50% of the population died during this scourge, which not only broke down group morale, but also caused a change in community patterning. As the population decreased, the more remote villages were abandoned and the people congregated into one main village in each subregion.

Within the LACL region, the main village during the late 1800s was Kijik (*Qizhjeh*), located at the mouth of the Kijik River where it flows into Lake Clark. Although the Dena'ina lived in the immediate vicinity of Kijik for perhaps centuries, the village itself is thought to have been established during Russian tenure in Alaska (Van Stone and Townsend 1970; Lynch 1982; Lynch and Worthington 1990). Kijik was still occupied in the late 1890s when a minor flurry of prospectors and miners entered the Lake Clark area in the wake of the gold rushes in the upper Cook Inlet region.

> By 1902 it was reported that about a half dozen prospectors were working the gold placers in the Portage Creek area on the north shore of Lake Clark. Prospectors would continue to enter the area during succeeding years, some of them settling down and taking advantage of the hunting, trapping, and fishing opportunities in the region (Unrau n.d.).

Associated with "settling down" in the area was marrying local Dena'ina women and becoming well integrated into the local society. One such union was between Agafia Sava and Pete Anderson, a Bristol Bay fisherman who, along with his wife and Harry Featherstone, filed on mining claims on Portage Creek in 1913 (Branson 1998: 10). As virtually the first non-Dena'ina residents with whom local people had any sustained contact, these prospectors and miners played an important economic and cultural role by introducing new goods and drawing government and American investors into a previously isolated and uncharted Alaska frontier (Ellana and Balluta 1992:234)

The population of Kijik, which had been declining steadily in the last decades of the nineteenth century, took a severe downward spiral in 1901-1902, as the result of a measles epidemic. The disease may have been transmitted by miners and prospectors

during their small influx into the Lake Clark area or by Dena'ina contact with any number of other white entrepreneurs, such as traders at Tyonek, Old Iliamna, or New Iliamna, living in the region at the time. The epidemic did, however, provide the impetus to found a new settlement at Nondalton on Sixmile Lake, which was closer to the trading posts on Iliamna Lake and the canneries of Bristol Bay. By 1909, when geologists were working in the vicinity of Kijik, the village was completely abandoned. The Dena'ina villages on the Mulchatna and near Telaquana Lake appear to have been abandoned at about the same time (Van Stone and Townsend 1970: 18-24).



Agafia Sava Anderson and her children. She and her husband, Pete Anderson, filed on mining claims on Portage Creek in 1913. *(Courtesy of Dorothy Berggren)*

Summary of Surveys and Sites

The CRMIM survey in LACL was conducted near Portage Creek in the Lake Clark Quadrangle and on Magnetic Island, in the Kenai Quadrangle (table 25).

TABLE 25

CRMIM Survey Coverage in LACL by Locale

Locale	Map Quad	Acres
Portage Creek/Access Rd.	B3	119
Magnetic Island	A8	20
LACL Total		**139**

One placer mining site and one prehistoric site were recorded during the CRMIM survey in LACL. They are listed in table 26 by locale. Refer to the appendix, organized by park unit and AHRS number, for brief descriptions of the sites. More detailed information about the sites can be found in chapters 12 and 15.

TABLE 26

Sites in LACL by Locale and Site Type

Locale Site	Type	AHRS Number
Portage Creek	Placer	XLC-089
Magnetic Island	Prehistoric	KEN-324

CHAPTER 11

GLACIER BAY NATIONAL PARK AND PRESERVE

Geology and Mining Districts

Glacier Bay National Park and Preserve (GLBA) is in the southeastern panhandle of Alaska. It is bordered on the west by the Gulf of Alaska, on the east by the Chilkat Range, on the north by the St. Elias Mountains and the Alsek River, and on the south by Cross Sound and Icy Strait. Glacier Bay, extending more than 100 kilometers northwest of Icy Strait, is the outstanding geographic feature for which GLBA was named. The Fairweather Range, a subsection of the St. Elias Mountains, forms the backbone of GLBA. Many of the steep, glaciated mountains in this range rise over 12,000 feet/3,657 m, with the highest peak, Mt. Fairweather, towering some 15,300 feet/4,663 m above sea level.

Within the Fairweather Range is the Brady Icefield and its radiating glaciers, remnants of the Gulf of Alaska section of the Cordilleran ice sheet, which extended some 1900 kilometers from Kodiak Island through the Kenai and Chugach Mountains into Southeast Alaska during the late Pleistocene (Hamilton and Thorson 1983: 38). After the final Pleistocene glacial retreat about 9,000-10,000 years ago, Glacier Bay emerged from its icy burden, only to be inundated once again during another glacial advance, the Little Ice Age, that began 4,000 years ago and ended within recorded history. Just over 200 years ago, Capt. George Vancouver found Icy Strait choked with ice and Glacier Bay a mere indentation in the enormous glacial mass. By 1879, however, when the noted naturalist John Muir visited Glacier Bay, he found that the ice had retreated some 77 kilometers up the bay. Within this, the (twentieth) century, the glaciers have continued to recede. Such a rapid retreat, unique in historic time, has opened many new ecosystems as well as avenues of scientific study, particularly of plant succession, in the GLBA area (NPS 1993; Kurtz 1995:2). The coastal western hemlock-Sitka spruce forest, which occurs on the recently deglaciated shores of Glacier Bay, is less than 150 years old. One endangered faunal species, the humpback whale (*Megaptera novaeangliae*), has begun to use the waters of Glacier Bay as a summer feeding ground only since the last glacial retreat (NPS 1984b: 27, 31).

Reid Inlet, at the upper end of Glacier Bay, was formed by the retreat of Reid Glacier sometime after the 1890s (Orth 1971: 800). Reid Inlet, included in the **Juneau Mining District** (figure 16), proved to be one of the only moderately productive lode gold areas outside the spectacularly rich Juneau mining belt. Small amounts of gold and silver were also found in other hardrock deposits in Glacier Bay, such as on Willoughby and Francis Islands and on the west side of the mountain between Dundas Bay and Brady Glacier. A rich silver lode crops out on the west shore of Rendu Inlet (Berg and Cobb 1967: 160-161). On the outer coast of GLBA in the **Yakutat District**, placer gold has been mined from the ruby red sands of Lituya Bay since before the purchase of Alaska in 1867 (Cobb 1973: 105).

Cultural Setting and Change During the Gold Rush Era

Ethnographically, GLBA is in the Northwest Coast culture area, extending from the Copper River delta on the Gulf of Alaska to the Oregon-California border. In Alaska, this region is distinctive both culturally and environmentally from the rest of the state. The earliest well-documented cultural stage in this far northern segment of the Northwest Coast is the Paleomarine Tradition, first discovered at the GHB2 site, located at Ground Hog Bay in Icy Strait (southeast of GLBA). The earliest component of this site dates to more than 10,000 years B.P. By 5,000 years B.P., the technological emphasis had changed from a microblade and unifacial flaked stone industry to one in which ground stone tools became dominant (Davis 1990: 198). Following that transition, the Developmental Northwest Coast Stage, characterized by shell middens, ground stone and bone technology, winter villages, specialized subsistence camps, and fortifications, was the prevalent cultural signature until historic times (Davis 1990: 199).

The northernmost of the Northwest Coast cultures, the Tlingit, inhabited the coast of southeast Alaska from Portland Canal to Cape Yakataga in the Gulf of Alaska (figure 16). The extreme northwestern Tlingit territory, now included in WRST, was claimed by the Yakutat, one of several geographic tribes or subdivisions of the Tlingit. Farther south in GLBA were the Hoonah Tlingit, who once inhabited the coastal fringe along Lituya Bay, Cross Sound, Glacier Bay, and Icy Strait. Today their only village is Hoonah, on the southwestern shore of Icy Strait. Another Tlingit group, living at the far northern corner of what is now GLBA, occupied Dry Bay. This group, known as Dry Bay, was formed by eighteenth century Tlingit traders from Hoonah and Chilkat country to the east, who mixed with Athapaskan residents of the area. The Yakutat and Dry Bay groups merged about 1910 (de Laguna 1990: 203-205). As a coastal people, the Tlingit were primarily involved in fishing and hunting sea mammals; the Yakutat and Hoonah were the most expert seal hunters of all the Tlingit.

During the early contact period, the Tlingit gained a reputation as being courageous, warlike, and arrogant, and, unlike the Aleuts and Koniags, were not easily subjugated by the Russians. In fact, the Tlingits destroyed the first Russian posts established in their territory: the Russian-American Company headquarters of Novo-Arkhangel'sk in Sitka in 1802, and the one in Yakutat in 1805. They were able to resist Russian domination more successfully than the other groups for a number of reasons, including the size and richness of their territory, the size of their population, and the structure of their social organization. The Tlingit occupied large dispersed villages, each consisting of several independent clans whose intervillage allegiances overrode ties within the village, so they could more effectively organize against their oppressors (Gibson 1987:82-83).

During the first two decades of the nineteenth century, the Tlingit traded not so much with Russians as with the British and Americans, who plied the coastline of Southeast Alaska, bartering firearms and woolen clothing for furs. In later decades, particularly after the widespread smallpox epidemic of 1836-39, the trade with the Russians increased; and the Tlingit not only provided them with land mammal furs in exchange for blankets, cloth, iron utensils, axes, tobacco, and rum, but also provisions necessary to feed the Russian population at Sitka.

By 1860, the Tlingit at Sitka had become accustomed to flour, rice, molasses, and sugar, which became prestige foods to serve at feasts and potlatches (Gibson 1987: 84-89). In the subsequent decades of American rule, Tlingit acculturation continued to radiate

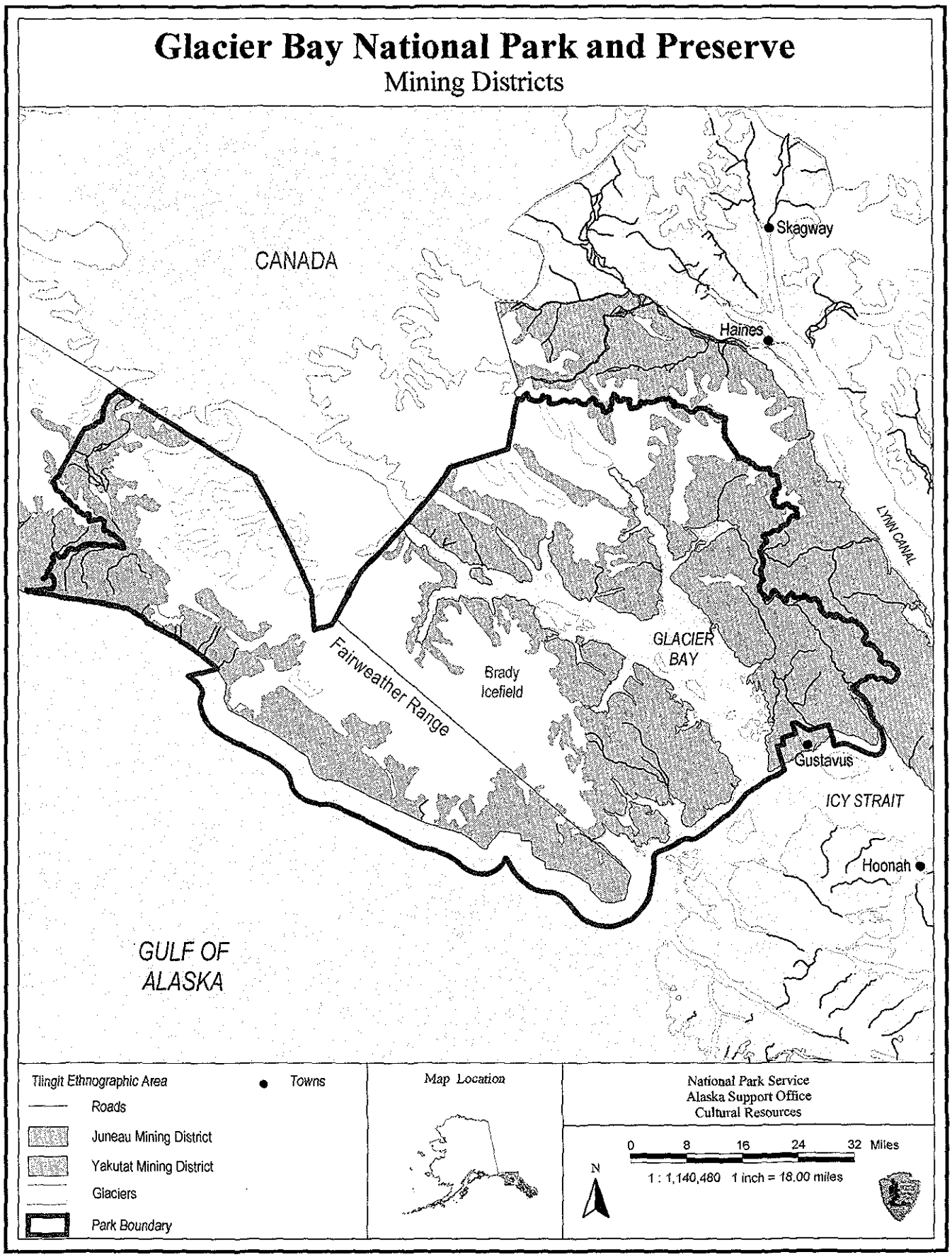

Glacier Bay National Park and Preserve
Mining Districts
CANADA
Skagway
Haines
LYNN CANAL
GLACIER BAY
Brady Icefield
Fairweather Range
Gustavus
ICY STRAIT
Hoonah
GULF OF ALASKA
Tlingit Ethnographic Area
Towns
Roads
Juneau Mining District
Yakutat Mining District
Glaciers
Park Boundary
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 8 16 24 32 Miles
N
1 : 1,140,480 1 inch = 18.00 miles

Figure 16.

outward from Sitka, with Western goods and ideas spreading quickly throughout their territory. It was also near Sitka that the first systematic lode gold developments took place in Alaska at the Stewart Mine in 1872. Although the Sitka lodes were destined to play only a small part in Alaska mining history, they did serve, along with placer discoveries in the Cassiar District of British Columbia, to draw a mining population to Alaska (Brooks 1973: 300-301) and thus into Tlingit territory.

It was not long afterward that Joe Juneau and Richard Harris, both former employees of the Stewart Mine, along with three "Indians," made their initial gold discoveries on Gold Creek, which was staked as a townsite in 1880. Later to be named Juneau, the mining town became the focal point of a fabulously rich lode-gold-mining industry, which drew an even greater influx of white prospectors and miners into the area. The overflow soon began exploring for beach placers along the coast. Beach gold was found on the outer strand line of Lituya Bay, now within GLBA, in 1887. Though not extensive, the Lituya deposits afforded a living to more than a score of miners, using shovels and rockers, for the next few decades (Brooks 1973: 308; Kurtz 1995: 35). The Hoonah Tlingit of Lituya Bay had already abandoned the area in terms of permanent settlement, moving farther up the coast to Dry Bay or Yakutat territory, prior to the small mining boom in the area as Lituya Bay Tlingit ceased to appear in census counts after 1861 (de Laguna 1909: 203-205). Apparently, some Natives still lived in Lituya, either on a seasonal basis or perhaps as wage laborers for the miners, in 1899 when the "Severts incident" occurred. Martin Severts, an employee of the Lituya Bay Gold Mining Co., shot and killed another miner and was restrained by the other miners for several days until they hired some local Tlingits to take over the task of guard duty. Eventually, the Tlingit also grew tired of the job and Severts was convicted and hanged by the surviving crewmembers of the mining company (Kurtz 1995: 38).

The major impact of the Klondike Gold Rush, beginning in 1897, was not experienced in Hoonah territory, but in that of the neighboring group of Chilkat-Chilkoot Tlingit who resided at the head of Lynn Canal. When miners first began trickling into the Yukon via the Chilkoot Trail in the 1880s, the trail was controlled by the Tlingit Raven clan of the village of Chilkoot. These people earned good wages as guides and packers, but their monopoly on the packing business came to an end by the time the Klondike hordes descended and Indians from all over Southeast Alaska traveled to Dyea for packing work (Neufeld and Norris 1996: 25,48). By 1900, Tlingit acculturation was well advanced as the result of contact with merchants, missionaries, and miners, and through employment in the commercial fishing and canning industries (de Laguna 1990: 224). Despite their entry into the labor force, the Hoonah Tlingit continued to use their traditional hunting and fishing grounds in Glacier Bay well into the twentieth century (Catton 1995: 25).



Hoonah Sealing Camp, Glacier Bay, 1899.
(Harriman Alaska Series, Smithsonian Institution)

Summary of Surveys and Sites

In GLBA, the CRMIM survey encompassed only a small two-claim parcel in the Reid Inlet vicinity of the Mt. Fairweather quadrangle. One lode mining site was recorded. Information about this site appears in the appendix (see last entry) and in chapter 13 on lode mining sites. Survey and site data are summarized in table 27.

Table 27

CRMIM Survey Coverage and Site Locale in GLBA

Locale	Map Quad	Acres	Site Locale	Site Type	AHRS Number
Reid Inlet	D3	40	Ptarmigan Creek	Lode	XMF-045

Section III
The Sites



Assay Office at the Stampede Mine (MMK-016)
Photograph by Francis Broderick

CHAPTER 12

PLACER MINING SITES

Placer mining sites are the most numerous site-category recorded during CRMIM fieldwork. They number 177 and account for 51% of all the sites recorded (table 28). Included in this group are placer camps, placer operations, and placer mining camps/operations (refer to chapter 1 for definitions of these site types). This chapter covers a great deal of territory in terms of space, time, and mining technology and presents descriptions of both the mining-related and the domestic features and artifacts at each of these sites. In addition to the sites, there were hundreds of placer mining-related isolates recorded during CRMIM surveys that are not specifically enumerated in this report, but are documented in CRMIM files housed at the National Park Service support office in Anchorage (AKSO).

The great wealth of information provided in the field reports for each of the placer sites made organizing this chapter a difficult task. In fact, as originally conceived, there were to be two chapters pertaining to placer mining sites - one dealing with the vast array of mining features and another with the habitation structures and other domestic features and artifacts at the camps. The two-chapter approach, however, proved to be untenable, as each of the site descriptions became fragmented, half in one chapter and half in the other. In order to unify all the site data into one chapter pertaining to both the mining and domestic components of the sites, it is necessary to provide some background information on the domestic features and artifacts found at the mining camps and camps/operations, before embarking upon site-specific descriptions.

Domestic Features and Artifacts

The sample of 177 placer mining sites includes 127 sites classified as either a camp or a camp/operation. The focal points of these camps are the dwellings or habitation structures, which have all been mapped, described, and photographed on site, providing information about size, materials, type of construction, and condition. These dwellings personalize the mining landscape and provide a point of connection between the technology and the miner. In some cases, the habitation structure is as substantial as a two-story log cabin and in others, simply the trace of an old foundation.

There are three basic types of structures at the camps - tent frames, cabins, and bunkhouses. Their condition dictated the types of data that could be recorded. For example, it was often difficult, if not impossible, to record much about roof construction for structures totally in ruins. Their condition is defined as "good" if the structure was still standing with the roof intact at the time of recording. The usual connotation of the word "good" does not apply here because the structures were frequently quite deteriorated although the roof may have still been in place. The condition described as "standing" indicates that the walls were upright, but the roof collapsed. "Collapsed" indicates that one or

Table 28

Placer Mining Sites by District and Site Type

Kantishna District in DENA

MMK-017	camp	MMK-057	operation
MMK-019	operation	MMK-060	camp/operation
MMK-023	camp/operation	MMK-062	camp
MMK-039	operation	MMK-063	camp
MMK-040	camp	MMK-067	camp
MMK-041	operation	MMK-070	operation
MMK-042	operation	MMK-086	camp/operation
MMK-043	operation	MMK-087	camp/operation
MMK-044	camp/operation	MMK-114	camp
MMK-045	operation	MMK-118	camp/operation
MMK-048	operation	MMK-119	camp/operation
MMK-049	camp	MMK-120	camp/operation
MMK-051	camp	MMK-122	camp
MMK-052	camp/operation	MMK-123	camp
MMK-053	camp	MMK-124	camp/operation
MMK-054	operation	MMK-128	camp/operation
MMK-055	camp	MMK-129	camp/operation
MMK-056	camp/operation		

Nizina District in WRST

XMC-007	camp	XMC-063	camp/operation
XMC-012	camp/operation	XMC-065	camp
XMC-052	camp	XMC-066	operation
XMC-053	camp	XMC-067	camp
XMC-054	camp	XMC-068	operation
XMC-055	camp	XMC-069	operation
XMC-056	camp	XMC-070	camp
XMC-057	camp/operation	XMC-074	operation
XMC-058	operation	XMC-075	camp
XMC-059	camp	XMC-077	camp
XMC-060	camp	XMC-078	operation
XMC-061	camp	XMC-079	camp
XMC-062	camp	XMC-119	camp/operation

Chisana District in WRST

NAB-043	camp/operation	NAB-071	camp
NAB-044	camp	NAB-073	camp/operation
NAB-046	camp	NAB-074	operation
NAB-047	camp	NAB-075	camp/operation
NAB-048	camp/operation	NAB-076	camp
NAB-049	camp/operation	NAB-077	camp/operation
NAB-050	camp/operation	NAB-079	camp
NAB-051	camp	NAB-080	camp
NAB-052	operation	NAB-082	camp/operation

Table 28 (continued)

NAB-053	camp/operation	NAB-083	camp
NAB-059	operation	NAB-084	operation
NAB-060	operation	NAB-085	camp/operation
NAB-061	operation	NAB-086	camp
NAB-062	operation	NAB-087	camp
NAB-063	camp/operation	NAB-088	camp
NAB-064	operation	NAB-089	camp
NAB-065	camp/operation	NAB-090	operation
NAB-066	camp/operation	NAB-092	operation
NAB-067	camp	NAB-093	camp/operation
NAB-068	camp/operation	NAB-094	operation
NAB-069	camp/operation	NAB-102	operation
NAB-070	operation		

Circle/Eagle Districts in YUCH

CHR-029	camp	CHR-049	operation
CHR-032	operation	CHR-050	operation
CHR-033	operation	CHR-051	operation
CHR-034	camp/operation	CHR-052	camp
CHR-040	operation	CHR-053	operation
CHR-041	operation	CHR-054	camp/operation
CHR-042	operation	CHR-055	operation
CHR-043	operation	CHR-056	camp/operation
CHR-044	operation	CHR-057	camp
CHR-045	operation	CHR-059	camp/operation
CHR-046	operation	CHR-063	camp/operation
CHR-047	operation	CHR-064	camp/operation
CHR-048	operation	CHR-065	camp/operation
CHR-066	camp/operation	CHR-083	camp
CHR-067	operation	CHR-084	camp
CHR-068	operation	CHR-085	camp
CHR-069	camp/operation	CHR-086	camp
CHR-070	camp/operation	CHR-094	camp/operation
CHR-071	camp	CHR-095	camp
CHR-073	camp	CHR-096	camp/operation
CHR-075	camp	CHR-097	operation
CHR-078	camp	CHR-098	camp
CHR-080	camp/operation	CHR-099	operation
CHR-081	camp	CHR-099	operation
CHR-082	camp/operation	CHR-102	camp

(continued)

Table 28 (continued)

Koyukuk District in GAAR

WIS-045	camp	WIS-222	camp/operation
WIS-047	camp	WIS-225	camp
WIS-048	operation	WIS-226	camp
WIS-216	camp/operation	WIS-227	camp
WIS-217	camp/operation	WIS-228	camp
WIS-218	camp	WIS-266	camp
WIS-219	camp	WIS-267	camp
WIS-220	camp	WIS-276	camp
WIS-221	camp		

Fairhaven/Kougarok Districts in BELA

BEN-071	camp/operation	BEN-131	camp
BEN-072	camp/operation	BEN-132	camp
BEN-093	camp/operation	BEN-133	camp

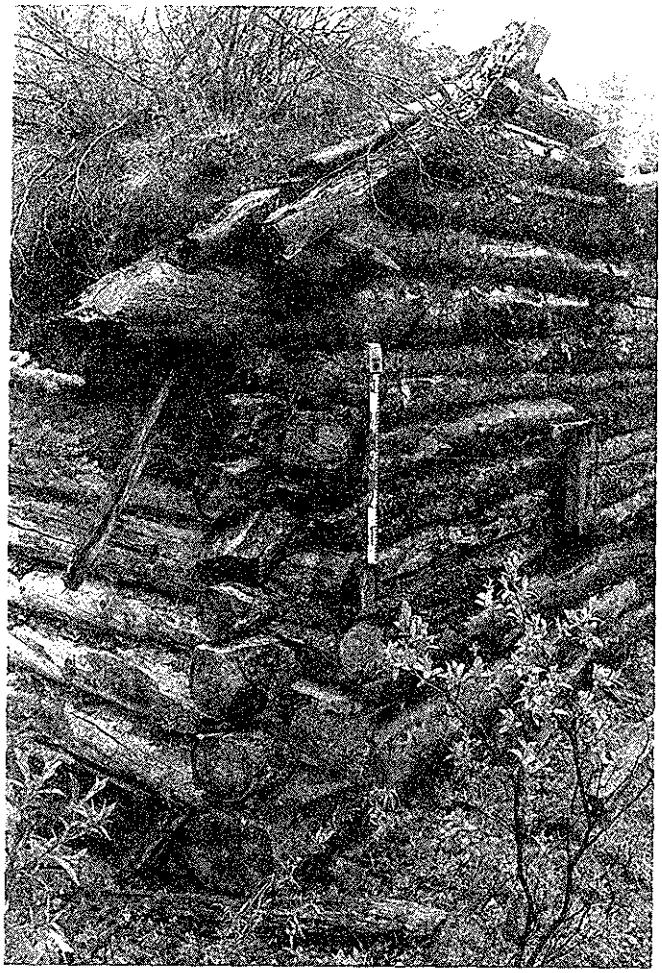
Lake Clark- Portage Creek Vicinity in LACL

XLC-089	camp

more walls had collapsed. If all the walls had collapsed, the structure is said to be in ruins. The final category is "trace," which indicates that only the foundation, depression, or outline is still visible. In reality, the condition of many of these sites is worse than described in this report, as almost 15 years has passed since many of them were first recorded.

For the stampeders the most expedient type of dwelling was the tent. Canvas tents, available in many sizes from various outfitting companies, provided a ready-made shelter. One Canadian outfitter was the Hudson's Bay Company, which advertised duck wall tents in its 1910-1911 catalogue in sizes ranging from a tiny 7 ft x 7 ft (4.5 m^2) to a comfortable 14 ft x 16 ft (20.8 m^2) (Hudson's Bay Company 1910: 254). These tents could be made more permanent by the construction of a log or dimensional lumber frame for them, or by adding wooden siding and roofing as well as interior finishings. In these cases, the canvas remained intact and in place, serving as a sandwiched layer to tighten up the structure (Hovis 1997: personal communication). At some of the camps, a tent frame might be put up temporarily to provide shelter while a more substantial dwelling, like a log cabin, was being built. At others, the miner might simply have built a wooden floor or platform as a dry, level base for the tent and considered it adequate. The evidence of tent frames or platforms may be only a barely discernible outline or trace in the vegetation.

Cabins, built of logs or of dimensional lumber when it became available, are the more visible remains of past mining camps. Log cabins, often built with only the materials available locally and a few tools, were either the first structures built at the camps or the



Typical Alaska log cabin, located on Chathenda Creek in WRST (NAB-082).



Example of an outbuilding at a placer mining camp; this blacksmith shop is at the Fourth of July Creek mine (CHR-080) in YUCH.

first to replace the tents. In our sample, log cabins are associated with virtually all types of placer mining from simple prospecting, hand methods, and ground-sluicing to drift mining, hydraulicking, mining with bulldozers, and dredging. They date from just around the turn of the century to the 1980s, as exemplified by a new log cabin built alongside some historic structures at a camp (CHR-083) in YUCH. The initial construction of most of the cabins, however, dates between the early 1900s and the 1940s. In one writer's opinion, quality-built log cabins were a rarity during the gold rush era, with most cabins lasting less than 20 years (Walker 1984: xi).

Although the cabins are in various stages of deterioration, it is clear that a general concept of what a log cabin should look like guided their construction at the placer camps. This generic Alaska log cabin is well described by Hoagland (1993) in the following passage:

> For whatever its intended duration, the log cabin could be quickly erected by one or two men. In the Interior, where trees were smaller than in the Southeast, the cabins tended to be of round logs and were thus unlike the hewn-log structures of the Russians. The corners were most frequently saddle notched. Foundations were dispensed with; sill logs were laid directly on the ground. Most commonly, a cabin had one room with a door in the gable end. The gable roof was formed of poles, running perpendicular to the ridgepole and purlins, on which were piled moss and earth for insulation. Sometimes settlers flattened fuel cans or butter tins to be used as roof shingles. One or two windows provided the only light; a sheet-metal stove, brought in by river, furnished heat. An arctic entry, or unheated vestibule, was added to the entrance (Hoagland 1993: 66-67).

This type of log construction, not unique to Alaska, has its roots in the vernacular architecture of the North American frontier. Early immigrants to North America, particularly those from Scandinavia and Germany, brought along centuries-old log building techniques that were then adapted to their needs and materials in the new country. One typical characteristic of American log construction is that the open places between the logs, either round or partially hewn, were chinked with whatever was on-hand, frequently moss (Langsner 1982: 11-14). The techniques of corner notching, however, were developed in Europe and include such variants as the saddle notch, V notch, diamond notch, dovetail, and square notch. The notching, in effect, locks the logs together and eliminates the necessity of nailing or pegging. Saddle-notching, as illustrated in figure 17, is the simplest, usually used on logs left in the round, while dovetailing is the most complicated method and the most difficult to execute (Kniffen and Glassie 1982: 245).

Although most of the cabin roofs are gabled, a variety of roofing material is evident on the roofs still intact or discernible in the ruins. As described in the quotation above, many of the cabins were roofed with sod, which provides good insulation but little waterproofing. Sod roofs were constructed by simply piling dirt on top of the roof poles or planks. Vegetation would later take root on the dirt, giving the roof a somewhat rustic charm. If the miner intended to make his cabin a more permanent or comfortable residence, he might add a metal roof of some type. Corrugated tin became available as roofing material in the United States in the 1870s and 1880s; its use on Alaska placer mining cabins was probably a function of the distance of the camp from a major waterway and

Figure 17: Notching and Chinking.

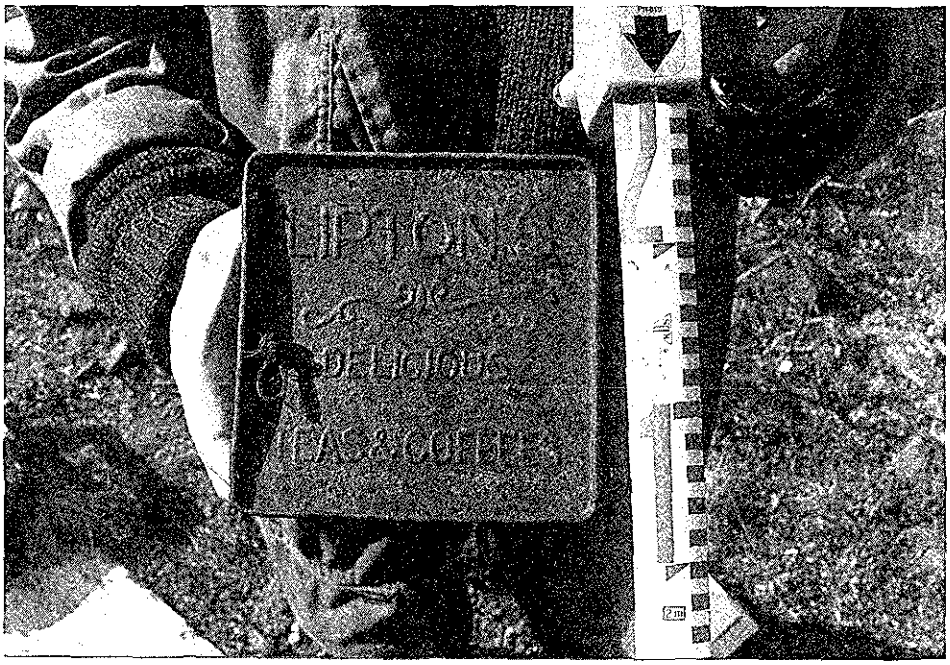
steamboat transportation (Dave Evans: 1995, personal communication). A variety of other types of metal roofing from tin cans to old newspaper print plates is on several of the cabins. Tar paper was also used as a roofing material on both log and milled lumber cabins.

Milled lumber cabins are not as numerous as log cabins at the placer mining camps although sawmills were established during the initial flurry of activity in many mining districts. Despite the fact that dimensional lumber may have been available in the early years, these cabins, with few exceptions, appear to date no earlier than the 1920s. Prefabricated building material, such as beaverboard, plywood, and Sheetrock, is used primarily on the cabins and bunkhouses at camps that housed the crews of large dredging operations on Coal and Woodchopper Creeks in YUCH. The bunkhouses differ little in construction from a cabin, but are furnished differently to serve a different function. Modern structures, such as houses and trailers, that have been recorded at historic mining camps, are also considered here, as they are important for showing the continuity of activities and occupation at the camps.

In addition to the habitations, many of the camps contain domestic structures, referred to collectively as outbuildings. The most common types of outbuildings are sheds, outhouses or privies, caches, and doghouses. Workshops are also at a few camps, as are other less common structures such as greenhouses. Like the tent frames and cabins, many of the outbuildings either have collapsed or are in ruins. The emphasis here is on the number and types of outbuildings, rather than on the details of their design and construction. At some of the camps with recent occupation, the outbuildings may considerably postdate the original habitation structure. Outhouses are most frequently in this category of "new" construction. At the other end of the spectrum are the old structures (old in terms of traditional usage) - the classic elevated log caches - so characteristic of the Alaskan landscape. Many of these caches are modified versions of the platform food storage cache, commonly built by Alaska Native people (Fair 1995). Frequently the legs or uprights of these caches are encircled with tin cans to prevent small mammals from climbing and entering them. The third type of domestic site features are grouped together in a category known as "other features," which includes trash dumps, lumber piles, artifact scatters, and so on. It is often these other features that contain some of the most diagnostic and unique artifacts at the site.

The second major component of domestic remains considered in this chapter is the artifact assemblages. The size of the assemblages varies tremendously, ranging from a complete absence of artifacts to literally thousands at camps that were still being occupied at the time of site recording. In order to interpret what this vast array might mean on a site-by-site basis, we used a system, modified from *The Revised Nomenclature for Museum Cataloguing* (Blackaby and Greeno 1988), to categorize the artifacts into the following groups:

- building materials, household goods,
- personal objects,
- artifacts relating to subsistence,
- food storage, food preparation, food service,
- transportation,
- communication,
- recreation,



Artifacts commonly found at mining camps.

Lipton's can (above) found at NAB-086 on Canyon Creek in WRST.

Enamelware (below) from NAB-082 on Chathenda Creek in WRST.







Examples of mining tools and equipment.

Picks (above) used in placer mining on Poorman Creek (NAB-073) in WRST.

An abandoned boiler (right) found on Colorado Creek (CHR-099) in YUCH.

Table 29

Artifacts Found Commonly at Placer Camps

Artifact Class	Examples
Building Materials	lumber (boards, planks), log, nails, sheet-metal, screen, nuts, bolts, window glass, window frames
Household	bunks, beds, cots, chairs, tables, wood stoves, cook stoves, stove pipe, enamelware basins, washtubs, lanterns
Personal	boots, belts, other articles of clothing
Subsistence	rifle, traps, pelt-stretcher, caribou skin, garden remains
Food Storage	cans (hole-and-cap, solder-dot, solder seam, double-seamed, crimped seam, lapped seam, key-opening); brand names include Hills Bros., Lipton, Klim, etc.; glass jars
Food Preparation	enamelware pots, pans, tea kettles, coffeepots; Dutch ovens; assorted cookware and utensils
Food Service	enamelware plates, cups, bowls; some ceramic fragments
Transportation	sleds, dog-mushing paraphenalia, wagon parts, automotive parts, snowshoes
Communication	newspapers, magazines, radio antennae
Recreation	chewing and pipe tobacco (brands include Prince Albert,Velvet, Granger, Edgeworth, Tuxedo); liquor bottles
Mining Tools/Equipment	wheelbarrows, gold pans, shovels, pick axes, hydraulic pipe, hydraulic monitor parts, ore-bucket, explosives boxes, steam pipes and points
Multipurpose Tools	saws (two-man crosscut, whipsaw), hammers, files, shovels, blacksmithing equipment (forge, blower, anvil), pulaskis, chisels, axes, buckets
Other	wooden crates, fuel/Blazo cans, trunks, oil drums, barrel and barrel hoops, machine parts, modified cans

- mining tools and equipment,
- multipurpose tools, and
- others.

It should be reemphasized that the artifacts recorded at each site were not collected and in many cases were given only a cursory inventory because of time constraints in the field. A more detailed, functionally based artifact classification system was not thought to be appropriate given these limitations of the data.

What is most striking about the artifact assemblages is their similarity from site to site. For example, in the classes of food preparation and food service, the great majority of artifacts are of a particular manufacturing type known as enamelware. This popular type of kitchen/tableware, still in use today in this country primarily for camping, is durable, fairly lightweight, and relatively inexpensive, all definite advantages for a somewhat transient population. Food storage artifacts, represented primarily by cans, are also very common. The terminology used to describe cans, such as hole-and-cap or solder dot, varies among the site reports. The reader is referred to Rock (1984) for a chronology of these different styles of cans. Most consistently recognizable are the discarded Hills Bros. Coffee cans and the Prince Albert Tobacco cans. Also at the majority of camps are a variety of different types of stoves, including Yukon stoves, simple stoves made of barrels or fuel cans, and some fairly elaborate cooking stoves. Other common artifacts include pots and pans, beds, small tools, sleds, boots, piles or scatters of lumber, and in many cases blacksmith forges and bellows. A list of artifacts commonly at placer camps in all the mining districts is presented in table 29. The inventory of unique artifacts, composed of homemade items, items useful for dating the site, or items that relate to economic activities besides mining, are discussed individually in the site descriptions below.

Some very general research questions listed here will be addressed throughout this chapter. They concern the possible correlation between mining method and camp size, the nature of the population that comprised each of the districts, and the interpretive power of the artifact assemblages remaining at the camps.

1) Does a direct relationship exist between the size of the camp and its structures and the type of technology used by its inhabitants, or are other factors involved?

2) Is there evidence of women and possibly children at the camps, or does the stereotype of the predominantly male-inhabited mining camps hold true?

3) Does the archeological evidence allow us to differentiate between the camps of the long-term "subsistence miners" as opposed to the transient "get-rich-quick" types?

4) Do the artifact assemblages truly reflect the nature of site occupation, or are they more a product of post-occupation scavenging and re-use by other miners or vandals?

The following site descriptions are organized into groups by mining district:

- Kantishna District in DENA,
- Chisana and Nizina Districts in WRST,
- Circle/Eagle Districts in YUCH,
- Koyukuk District in GAAR,
- Fairhaven District of BELA, and
- Bristol Bay Region-Portage Creek vicinity of LACL.

The discussion under each district, prefaced by a brief history, is arranged by specific mining method, such as drift mining or hydraulic mining. Sites with features or artifacts associated with two or more methods of placer mining are listed under the method best

represented archeologically or best documented historically. In some cases, the method could not be determined and the sites are classified simply as method unknown.

The Kantishna District

The Kantishna Hills District has been the focus of mining in the DENA area since the early 1900s (figure 8). Judge James Wickersham of Fairbanks discovered gold in the gravels of Chitsia Creek, a tributary of the Kantishna River in 1903. His discovery prompted further prospecting; and by the early summer of 1905, Joe Quigley and Jack Horn had found gold in paying quantities in Glacier Creek. During the next few months, the rush to Kantishna was on. Several thousand prospectors flocked to the area during the summer and fall, staking claims on every creek that heads in the Kantishna Hills. The shallow, easily accessible gold deposits were quickly mined, and the region's mining population dwindled to about 50 people by the fall of 1906 (Capps 1919: 75-76).

The few hardy souls who remained in Kantishna during the first decade or so relied entirely upon hand methods of mining. In the early years, they worked the gravels of Eureka, Glacier, Spruce, Glen, Friday, and Caribou Creeks with picks and shovels (Prindle 1911: 176,179), and later moved to Moose, Little Moose, and Eldorado Creeks, as well as the Bearpaw and McKinley Fork Rivers. The most commonly used mining method was to ground-sluice off the upper gravels within a foot of bedrock and then to shovel the remaining gold-bearing gravels into sluice boxes by hand (Brooks 1912: 38; Capps 1917: 293).

By 1915, some automatic dams and small hydraulic plants were in use in the Kantishna District (Brooks 1916a: 67), but it wasn't until after WWI that development began on two large-scale hydraulic operations on Moose and Caribou Creeks. The first operation, run by the Kantishna Hydraulic Mining Company, started hydraulicking on Moose Creek near the mouths of Eureka and Eldorado Creeks in 1922, after spending two years in preparation by building a ditch and flume system to bring water to the area from Wonder Lake. During the first year of operation, the company cleaned about 50,000 square feet of bedrock using five monitors and employing seven men per eight-hour shift (Davis 1923: 116-117). Mount McKinley Gold Placers, Inc. began hydraulicking in the same year; their operations on Caribou Creek were also facilitated by an extensive ditch and pipeline system, which included 450 feet of ditch, 460 feet of flume, and 4,000 feet of riveted steel pipe (Davis 1923: 119). Although these ventures briefly revitalized the placer industry in Kantishna, they both proved to be financially unsuccessful and were abandoned by 1928 (Brooks and Capps 1924: 41; Bundtzen 1978: 156; Wimmler 1929: 113).

During the late 1920s and early 1930s, placer mining continued to decline in the Kantishna District. What little mining was accomplished was done by hand methods as in the past, using ground-sluicing and shoveling-in techniques to recover the gold (Smith 1931: 41; Smith 1934a: 39; Smith 1938: 56). A reversal in the fortunes of the district began in the mid-1930s. Of primary importance for bringing it about was the increase in the price of gold to $35 an ounce in 1934; another significant factor was the completion of the park road from the railroad through the park to Kantishna in 1937. The road helped to resolve the transportation problems that had beset the mining district for more than 30 years (Bundtzen 1978: 157). The resurgence in mining activity culminated in the late 1930s with plans to open an extensive tract on Caribou Creek with dragline equipment (Smith 1939b: 57).

In 1939, the Carrington Company, also known as Caribou Mines, began its dragline operations on Caribou Creek and became the most productive placer-gold mining operation in the history of the Kantishna District. During its three years of operation from 1939 to 1941, ten men working two shifts, day and night, ran the 1 3/4-cubic-yard dragline (Bundtzen 1978: 158). Another dragline on Caribou Creek, operated by Mehling and Maurer, added to the all-time yearly high of 4,000 ounces of fine gold produced in 1940 (Cobb 1973: 154; Smith 1942: 49). The latter operation was moved to Glacier Creek in 1942. By federal order, gold mining operations slowed to nearly a halt during World War II. In the Kantishna District, the exception to this shutdown was a handful of small operators who mined sporadically during the war years. In 1946, Caribou Mines resumed its dragline operations on Caribou Creek and continued through 1948, employing 14 people each season. A bulldozer and a dry-land washing plant were used in conjunction with the dragline. This equipment was later leased to the Glacier Creek Mining Company and used to mine the creek of the same name in 1949. By the end of the 1949 season, dragline operations on both Caribou and Glacier Creeks were brought to a halt (Ransome 1950: 1388; Ransome 1951: 1365).

Another long-term placer operation in the post-war years from 1947 to 1958 was by a three-person crew on Crooked Creek using bulldozer-hydraulic mining methods (Buzzell 1989: 19). Bulldozer-hydraulic methods were also used on Moose and Eureka Creeks by the Hosler Mines during the late 1940s and early 1950s (Ransome and Kerns 1951: 1404). Small-scale placer mining continued in the district throughout the 1960s by a few persistent operators, but it was not until after 1972, when the price of gold was deregulated by the federal government, that it became economically feasible to rework some stream gravels using modern equipment. All of the recent work in the district has been conducted on a small scale (Buzzell 1989: 22).

Thirty-five placer mining sites were recorded in DENA (figure 18; table 30). The sites reflect the entire range of placer mining methods practiced in the Kantishna District, from prospecting to hand methods, ground-sluicing, hydraulic mining, and mining with power equipment (draglines) and with bulldozers. Twenty-five of the Kantishna sites, categorized as camps or camps/operations, contain one or more habitation structures, which are collectively represented by 12 tent frames, 23 cabins, two bunkhouse, and the two modern structures - a house and a trailer (table 31). Excluding the modern structures, the average size of the dwellings is 17.7 m^2. Logs constitute the primary building material. Of the historic structures, just less than 25% are still standing or in good condition, while the others have either collapsed, are in ruins, or remain simply as a trace on the landscape. In addition, the Kantishna placer mining camps encompass 34 outbuildings (table 32), many of which have collapsed or are in ruins, and a wide range of artifact classes (table 33). Each of the Kantishna placer sites is discussed below, under its associated mining technology.

Prospecting. Although initial prospecting undoubtedly occurred at or near most of the sites, the activities of prospectors are ephemeral, and are often not marked by any cultural remains at all. One site that retains evidence of prospecting in the form of two prospect pits is **MMK-087**, a camp and operation located on Eureka Creek. An unknown method of placer mining also took place in the vicinity as the log cabin at the site, roofed in metal and still in good condition, sits atop old mine tailings. These tailings may be the result of simple hand methods of mining or ground-sluicing, a mining technique practiced

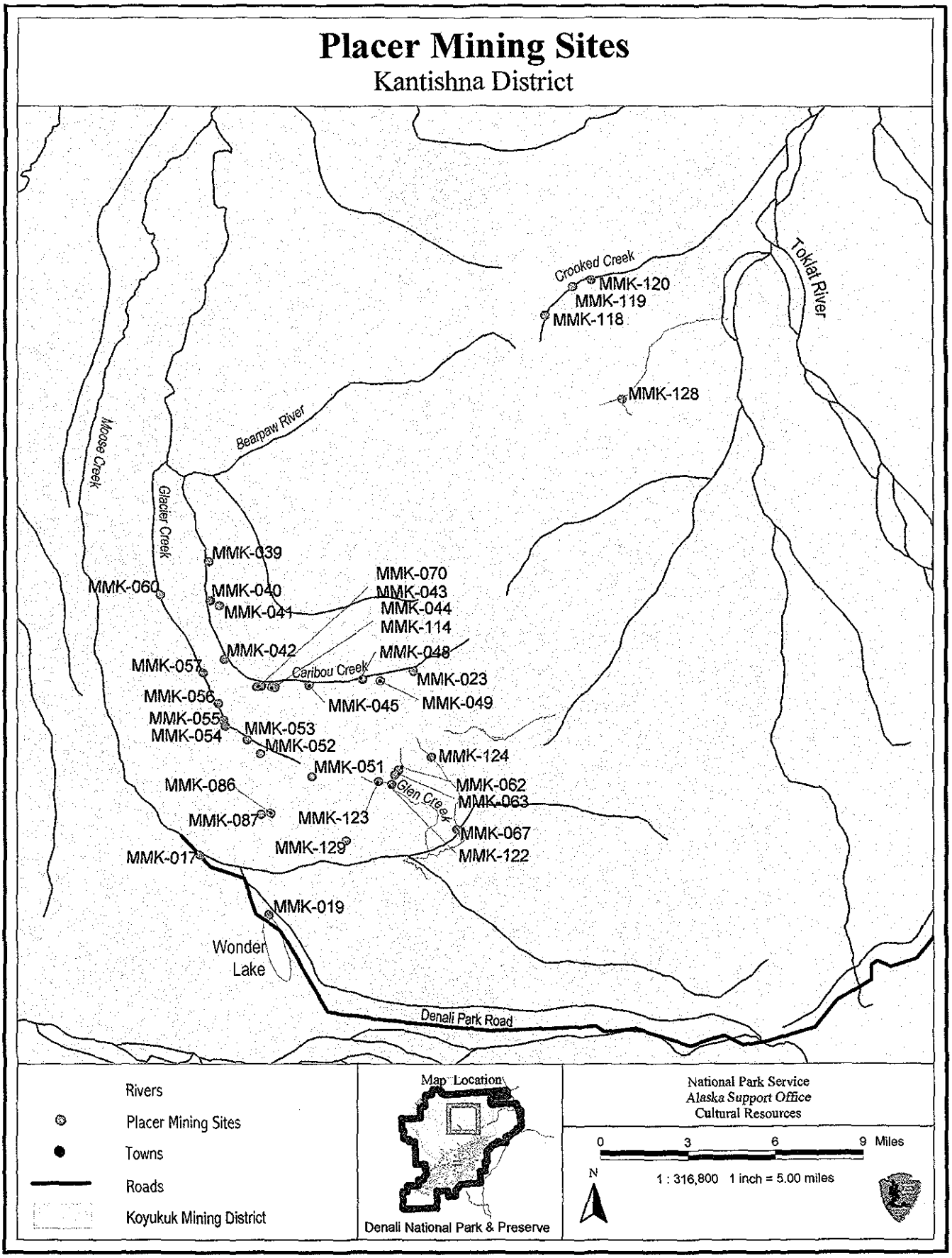

Placer Mining Sites
Kantishna District
Crooked Creek
MMK-120
MMK-119
MMK-118
Toklat River
MMK-128
Bearpaw River
Moose Creek
Glacier Creek
MMK-039
MMK-060
MMK-040
MMK-041
MMK-070
MMK-043
MMK-044
MMK-114
MMK-042
MMK-048
MMK-057
Caribou Creek
MMK-023
MMK-056
MMK-045
MMK-049
MMK-055
MMK-054
MMK-053
MMK-052
MMK-124
MMK-051
MMK-086
Glen Creek
MMK-062
MMK-063
MMK-087
MMK-123
MMK-067
MMK-129
MMK-122
MMK-017
MMK-019
Wonder Lake
Denali Park Road
Rivers
Placer Mining Sites
Towns
Roads
Koyukuk Mining District
Map Location
Denali National Park & Preserve
National Park Service
Alaska Support Office
Cultural Resources
0 3 6 9 Miles
N
1 : 316,800 1 inch = 5.00 miles

Figure 18.

Table 30

Placer Mining Sites in the Kantishna District by Mining Method

Drainage	Prospect	Hand Methods	Ground-Sluice	Hydraulic	Power Equipment	Bulldozer	Unknown
Caribou		MMK-039 MMK-070		MMK-041 MMK-042 MMK-045 MMK-114	MMK-023 MMK-040 MMK-044 MMK-048		MMK-043 MMK-049
Crooked						MMK-118 MMK-119 MMK-120	
Eureka	MMK-087						MMK-086
Glacier					MMK-054 MMK-055 MMK-056 MMK-057		MMK-060
Glen			MMK-062				MMK-063 MMK-122 MMK-123
Little Moose			MMK-128				
Moose				MMK-017 MMK-019			
Rainy			MMK-129				
Spruce		MMK-067 MMK-124					
22 Gulch				MMK-052			MMK-053
Yellow		MMK-051					

Table 31

Habitation Structures at Placer Mining Camps in the Kantishna District

AHRS #	Type	Mat'l	Size	Roof	Corner	Chink	Condition
MMK-017	bunk/cabin	log	37.1 m^2	metal	saddle	various	good
MMK-023	cabin	lumber	15.5 m^2	tar paper			collapsed
MMK-040	*cabin*	log	45.1 m^2	sod, metal	saddle	moss	good
	trailer						modern
	tent frame		3.1 m^2				trace
	tent frame		5.4 m^2				trace
	tent frame		7 m^2				trace
	tent frame		3.8 m^2				trace
MMK-044	*cabin*	lumber	53.9 m^2				standing
	tent frame		6.1 m^2				ruins
MMK-049	cabin	brd/batn	16.3 m^2				*ruins*
	cabin?	lumber	6.1 m^2				ruins
MMK-051	cabin	log	11.8 m^2	wood, canvas	dovetail		collapsed
MMK-052	cabin	log	17.6 m^2	tar paper	dovetail		collapsed
MMK-053	cabin	log	15.5 m^2	cnvs, tpaper	hog-trough		collapsed
MMK-055	cabin	lumber	13.8 m^2	metal			standing
MMK-056	bunkhouse	brd/batn	20.6 m^2	new roofing			good
MMK-060	cabin	log	8 m^2		dovetail		collapsed
MMK-062	cabin	log	36.5 m^2				trace

(continued)

Table 31 (continued)

AHRS #	Type	Mat'l	Size	Roof	Corner	Chink	Condition
MMK-063	cabin	log	9.9 m^2	brd/metal	saddle	moss	good
MMK-067	cabin	log	8.4 m^2	brd/tpaper	saddle		good
MMK-086	cabin	log	11.1 m^2	dbl planks	saddle	moss	good
MMK-087	cabin	log	23.4 m^2	metal	saddle	various	good
	house		31.2 m^2				modern
MMK-114	cabin	lumber	51 m^2				ruins
MMK-118	cabin	log	10.3 m^2		saddle		ruins
	tent frame	log	12.1 m^2				trace
MMK-119	cabin	log	21.9 m^2		square		collapsed
	tent frame	log	18 m^2				trace
MMK-120	cabin	log	38.3 m^2	sod, metal		moss	collapsed
	tent frame	log, lmbr	7.7 m^2				ruins
	tent frame	log, lmbr	7.7 m^2				ruins
MMK-122	tent?	unknown	5.4 m^2				trace
MMK-123	cabin	unknown	18.5 m^2				trace
MMK-124	cabin	log?	12.3 m^2				trace
MMK-128	cabin	log	37.9 m^2	sod	sdl, sqn[1]	various	collapsed
	cabin	log	22.9 m^2	sod	sdl, sqn		collapsed
	tent frame	lumber	4 m^2				trace
MMK-129	tent frame	lmbr, cnv	11.1 m^2				trace

[1] MMK-128 cabin also has pegging on corners

Table 32

Outbuildings at Placer Camps in the Kantishna District

AHRS	Shed	Outhouse	Cache	Doghouse	Workshop	Other	Total
MMK-017		1					1
MMK-023	1		1				2
MMK-040		1	1			1	3
MMK-044		1			1		2
MMK-049							0
MMK-051			1				1
MMK-052			1				1
MMK-053	1		1	1			3
MMK-055	1						1
MMK-056	1						1
MMK-060	1		1				2
MMK-062							0
MMK-063			1				1
MMK-067		1	1			1	3
MMK-086	1						1
MMK-087	1						1
MMK-114			2			2	4
MMK-118							0
MMK-119			1				1
MMK-120		1	1		1		3
MMK-122							0
MMK-123							0
MMK-124			1				1
MMK-128		1	1				2
MMK-129							0
Total	**7**	**6**	**14**	**1**	**2**	**4**	**34**

Table 33

Classes of Artifacts[1] at Placer Camps in the Kantishna District

AHRS	BLDM	HSHD	PERS	SUBS	FSTR	FPRP	FSER	TRAN	COMM	RECR	MTEQ	MULT	OTHR
MMK-017	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
MMK-023		+	+		+	+	+	+	+			+	
MMK-040	+	+	+	+	+	+			+	+	+	+	+
MMK-044	+	+	+		+	+	+	+	+		+	+	
MMK-049	+	+	+		+	+	+					+	+
MMK-051		+	+		+	+		+			+	+	+
MMK-052		+	+		+	+	+	+		+	+	+	
MMK-053		+			+	+	+				+	+	+
MMK-055		+	+		+	+					+	+	+
MMK-056	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
MMK-060				+	+	+					+		
MMK-062		+			+	+	+					+	+
MMK-063	+	+			+	+	+	+		+	+	+	+
MMK-067		+	+		+					+		+	+
MMK-086		+	+		+					+			
MMK-087		+	+		+				+		+	+	
MMK-114	+	+			+		+	+			+	+	+
MMK-118		+	+	+	+	+	+		+	+		+	

(continued)

Table 33 (continued)

AHRS	BLDM	HSHD	PERS	SUBS	FSTR	FPRP	FSER	TRAN	COMM	RECR	MTEQ	MULT	OTHR
MMK-119	+	+	+	+	+			+	+	+	+	+	
MMK-120	+	+	+	+	+	+	+		+	+	+	+	+
MMK-122													
MMK-123		+			+		+	+			+	+	+
MMK-124		+			+	+	+				+		
MMK-128		+			+	+	+		+	+		+	
MMK-129													

[1] The abbreviations used for artifact classes are as follows:
BLDM = building materials
HSHD = household
PERS = personal
SUBS = subsistence
FSTR = food storage
FPRP = food preparation
FSER = food service
TRAN = transportation
COMM = communication
RECR = recreation
MTEQ = mining tools and equipment
MULT = multipurpose
OTHR = other

on Eureka Creek beginning in 1916 (Capps 1917: 302-303). The site also has evidence of a recent occupation (a modern house and artifacts). A pick head is the only mining-related artifact recorded at the site.

Hand Mining Methods. At many sites in Kantishna District hand methods of open-cut mining were practiced early on and later replaced with a more sophisticated technology. In most cases, the evidence of the simpler form of mining is often erased from the archeological record by the ground-disturbing activities of the later operations. Five sites in the Kantishna District, however, still preserve the evidence of hand mining methods. The first is **MMK-039**, located on Caribou Creek. It is composed of a keyhole-shaped pit (5 m in diameter); two bell-shaped prospect pits; the ruins of a dam; a shallow ditch; hand-stacked tailings; a small sluice box of wood and metal; buckets made from a halved Blazo can with added wire handles; and a riveted shovel head. From the configuration of the features on the site map, it appears that the site may have been a modified shoveling-in operation, with sluicing taking place aside the creek. A camp may have once been located at the site as a stove leg and wire screening were also recorded at the site. **MMK-070**, also located on Caribou Creek, contains a horse-drawn scraper, measuring 76 x 74 x 22 cm. This piece of equipment is common to small-scale, non-mechanized mining operations. A lumber scatter situated on top of a tailings pile is also at the site.

MMK-051, a camp on Yellow Creek that dates to the 1920s, is composed of a collapsed cabin and cache. The cabin is small, only 11.8 m^2, and the construction details are somewhat unusual for the district. The three bottom courses of logs are double hewn, on the top and on the bottom, to provide a tighter-fitting wall, while the top three courses are split, half timbers with the flat side facing the interior of the cabin. All notching is modified dovetail. Instead of the more common sod, the roofing material is primarily milled lumber, still covered with bits of canvas and tar paper. The size of the cabin probably indicates that is was occupied by a solitary miner, who, it appears, had previous woodworking experience or skills. A milled lumber cache, once elevated, but now lying intact on the ground, is also at the site, as is a collapsed plywood structure of more recent origin. The mining-related artifacts recorded at the site include a rock chisel, a gold pan, three shovels, and two pick axes. The domestic artifacts include the handle of a dog sled, evidence that mining was not the only pursuit of the site's occupant. Although designated as a hand-mining site, this camp may actually be associated with the remains of an old ground sluice, recorded as an isolate on Glacier Creek, about 500 meters below the mouth of Yellow Creek.

Another camp thought to be associated with hand-mining methods is **MMK-067** located on Spruce Creek. In this case, the mining method is inferred because of the absence of tools or equipment that might indicate any other type of mining. A prospect trench and ground disturbance there are recent in origin. The historic occupation of the site dates to around 1936 (on the basis of a particular style of Hills Bros. Coffee can found there), a time during which hand methods were the primary means of placer mining in the Kantishna District. A windowless log cabin, roofed with boards and tar paper, is in good condition. Also at the site is a collapsed, elevated cache, the remains of an outhouse roof, and the remnants of a root cellar.

The fifth site is **MMK-124**, a camp and operation on Spruce Creek, tentatively dated between 1910 and 1920. Although the mining features at the site, two hand-dug prospect trenches, pertain to prospecting, the camp itself attests to a longer term of residence than

usually associated simply with prospecting. The moss-covered foundation of a cabin and some domestic artifacts are the only remnants of the dwelling that once existed at the site. The artifacts include enamelware and a Yukon-type stove. The only mining tools at the site are a shovel and a mattock.

Ground-sluicing. Ground-sluicing is a variation of open-cut mining by hand. Using this method, the miner diverts the flow of a stream into a placer deposit through a trench, usually dug down to bedrock. Automatic or boomer dams are sometimes used to help regulate the flow of water. In the Kantishna District, three sites appear to be associated with ground-sluicing activities, including **MMK-062**, where recent mining has greatly disturbed the streambed. This site on Glen Creek consists of only one feature, a cabin foundation, which may be the earliest structure for which we have definite historic documentation in the district. The visible remains of the structure, which measures 36.5 m^2, include deteriorated sill logs, displaced wall logs and roof timbers, and two rectangular depressions, thought to be root cellars, within the foundation. The ruins indicate that this structure was a multi-room cabin, with additions perhaps being made over the course of a long occupation. Several years after this camp was first recorded, it came to the attention of CRMIM historian, Logan Hovis, and archeologist, A.J. Lynch, that the camp once belonged to John Stendahl, the great-grandfather of a former National Park Service historian, Rick Kurtz. Kurtz, not only possessed knowledge of the site from his family's oral history, but also had his great-grandfather's diaries and photographs.

Stendahl, an immigrant from Norway, arrived in Alaska in 1902 and filed mining claims on Glen Creek in 1906. He was a true "subsistence miner," ground-sluicing on Glen Creek in the summer and moving to his other cabin in Diamond, about 25 miles northwest on the winter haul road, where he would run trap lines for part of the winter. This pattern continued for more than three decades, until the World War II years. His wife remained in the old country, and so he lived essentially alone in his Glen Creek mining cabin (Rick Kurtz: 1995, personal communication). The size of the cabin and the types of artifacts left behind, niceties such as ceramic plate fragments with a rose pattern[1] and some with teal blue flowers, were originally interpreted as evidence that the cabin was once the dwelling of a miner and his wife. Another interpretation, and as it turns out the correct one, would have been that the cabin was considered a permanent or semi-permanent residence for many years by a miner who was finding gold in paying quantities and was able to build a comfortable lifestyle, complete with a large cabin and even some amenities.

Past ground-sluicing activities at **MMK-128**, a camp and operation on Little Moose Creek, were identified through both historic and archeological evidence. The archeological evidence consists of the three remnants of a boomer dam or dams constructed of logs, sawn boards, and canvas fragments. A dam was constructed at this locale in 1916 (Capps 1919: 93), and may have been used, perhaps sporadically, until the 1940s. Two collapsed log cabins and the trace of a tent frame remain at the site. The cabins are similar in several respects: both have a combination of square notching and saddle notching; in addition to the notching, the logs of both are pegged at the corners; and both had unprotected sod roofs (without an outer layer of metal or other waterproofing). The smaller of the two cabins (22.9 m^2) is the more deteriorated structure and may date to the earliest occupation

[1] Interestingly, the rose pattern seen in photos of the ceramics from this site is different from the rose motifs on china fragments found at the contemporaneous Barnette Street site in Fairbanks (Northern Land Use Research 1997).

of the site. The larger structure (37.9 m^2) is a composite cabin, consisting of two rooms, each with an outside doorway, joined by a narrow passageway. Although the date of construction of the larger cabin is unknown, we do know that it was occupied until at least the 1940s, as a piece of newspaper chinking on one of the interior walls is dated March 1941. An outhouse; the remains of an elevated cache, partially supported by topped, living trees; and an open flat area, thought to have been a garden plot, are among the other features at the camp. The similarity in construction of the two cabins makes it tempting to speculate that they were built by the same person or people, who had a long-term interest in mining these claims on Little Moose Creek. It is clear that the larger of the two cabins was built with care as nice touches, such as a black glazed ceramic doorknob and a decorated metal lockbox, can still be seen within the remains of the collapsed structure.

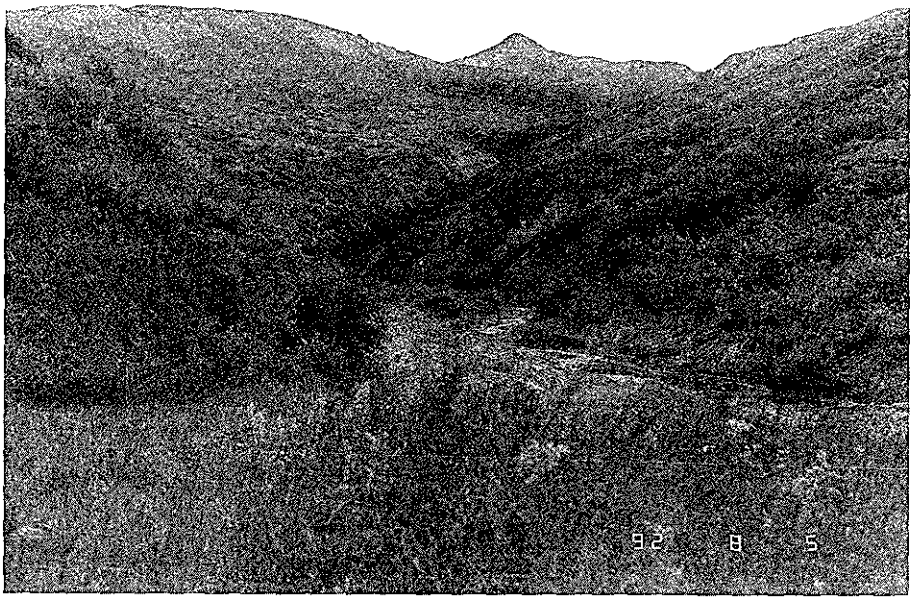
The remnants of another boomer dam, constructed of logs and stone, were recorded at **MMK-129**, a camp and operation on Rainy Creek. Also at this site is a row of hand-stacked tailings, extending a total of 38.5 m, and the wood plank floor of a 10 x 12 ft tent (11.2 m^2). This small-scale venture, probably dating to the 1910s-1920s, is the single imprint on the Rainy Creek landscape that escaped destruction by more recent placer mining.

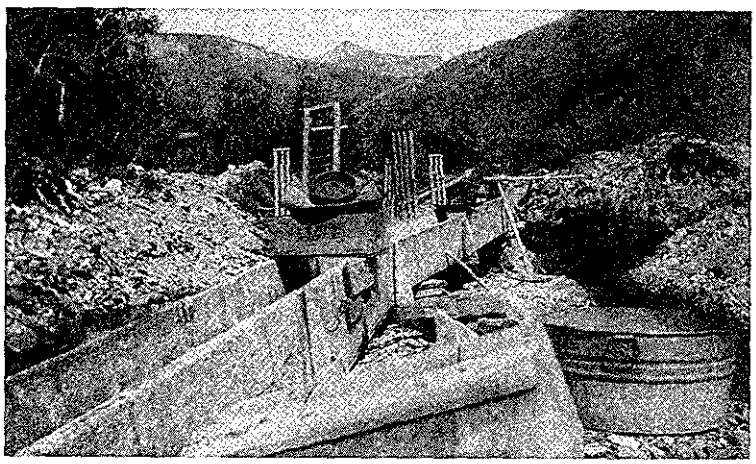
Hydraulic Mining. There are seven sites associated with hydraulic mining in the Kantishna District. One of the two sites associated with the Kantishna Hydraulic Mining Company's operations on Moose Creek during the early 1920s is **MMK-017**, now known as Johnny Busia's cabin site. The cabin, still standing and in good condition, was constructed in 1910 by Doc Sutherland, a principal partner in the hydraulic company. It was later used as a bunkhouse and mess hall for the company's crews (Dan Ashbrook 1982: personal communication to Bill Brown). Johnny Busia, an early Kantishna "subsistence miner" and trapper, moved into the cabin sometime after the company vacated it and continued to live there until his death in 1957. In a 1948 article, entitled "Little Johnnie of Kantishna," Grant Pearson describes the cabin as follows:

> His home is built out of native spruce logs, and it has one large room. This room has two board bunks, cooking stove in one corner, cupboard, table and numerous shelves which are stacked high with magazines and odds and ends. "Anything you want I can find on those shelves," he says. "I can find outfit to repair clothes or watches, mend pots and pans, or anything I need to keep my housekeeping department operating." He also has a built-in porch and supply room (Pearson 1948: 7).

According to Pearson (1948: 7), there was a second cabin at Busia's Camp, identical to his own, that was used to accommodate guests, and an elevated log cache where he stored food, dog food, and tools. Neither of these structures still exists, but there is a modern outhouse at the camp as Busia's cabin was still being occupied by a miner when it was recorded in the 1988.

The second site associated with the Kantishna Hydraulic Mining Company's operation is **MMK-019**, the Kantishna ditch site. The site preserves the remains of a water diversion system built to carry water from the Wonder Lake outlet to the hydraulic operations on Moose Creek across from the community of Kantishna. The site is composed of three dams, a natural drainage ditch, an excavated ditch, and several discontinuous sections of steel water pipe. It extends from the remnants of a log and earthen dam at the







(Top) Placer mining on Glen Creek: MMK-062 on Glen Creek as it appeared in 1992.
(Middle) Flume and mining equipment (same spot as above) used by subsistence-miner, John Stendahl in the 1910s–1930s.
(Bottom) John Stendahl (left) and an unidentified miner at his Glen Creek mine.
(Historic photographs courtesy of Rick Kurtz)

outlet of Wonder Lake, down the Lake Creek streambed for 1-2 km to the two diversion dams, now in ruins. These dams channeled the water into the main ditch line, still clearly evident and extending for about 3.7 km in a northwesterly direction along the edge of a terrace overlooking Moose Creek. At one time the water was carried over Willow Creek through an inverted siphon, of which there are no existing remains. From this point, the water traveled through a pipeline to Moose Creek. As a technological system, the Kantishna ditch maintains integrity of structure, place, and setting.

MMK-045, located on Caribou Creek, preserves the remains of the other large-scale hydraulic operation in the Kantishna District during the early 1920s, the Mount McKinley Gold Placer Company. The site consists of a header box, and a 1-kilometer-long ditchline/earthen shelf used to support a pipeline or flume. No clear association was made between the western ditch end and the header box remains, but it is assumed that the gap between the features is probably due to the re-use of materials, such as penstock and pipe, by miners entering the area after these hydraulic works fell into disuse. The ditch is partially visible on the ground, but portions of it are discernible only on aerial photographs. All that remains of the pipeline or flume is the earthen shelf and underlying support timbers near the site's eastern end.

A placer camp, **MMK-114**, located about 1.5 km downstream from MMK-045, consists of structures attributed to Bill Taylor and Bill Julian who were partners in the Mount McKinley Gold Placer Company. The ruins of a milled lumber cabin, three collapsed outbuildings, and a log cache constitute the main structures at the camp. The mining equipment at this site is composed of hydraulic pipe and a horse-drawn plow. The plow was used to make opening cuts for ditches and to "muck out" the placer diggings (Dan Ashbrook, personal communication to Keith Williams 1986). Also at the site was a doubletree hitch for a horsedrawn wagon and a unique, handmade wood and metal packsaddle. The remains of an old wooden wagon and a ditch and pipeline recorded at MMK-044, only about 50 meters north of this site, may actually be associated with the 1920s hydraulic operation at MMK-114. The ditch/pipeline extends for 50 meters from an intermittent stream draining Caribou Creek to a U-shaped trough excavated into the hillside.

Two other sites on Caribou Creek, **MMK-041** and **MMK-042**, together represent the interrelated components of a third hydraulic mining operation in the Kantishna District. MMK-042 is a linear site consisting of alternating stretches of riveted iron pipe and ditchline. It runs approximately 3.7 kilometers roughly parallel to Caribou Creek. Lengthy sections of the pipeline are intact, as is a section of a wooden flume with attached headgate. Also part of this hydraulic mining system is MMK-041, located just west of the ditch. MMK-041 is composed of two penstock header boxes or regulators, flume remnants, and disarticulated sections of riveted metal pipe, which extend intermittently to a hydraulic giant lying some 350 meters downslope at an old mining area. The diameter of individual pipe sections, which led from the header boxes to the monitor, decreases from 51 centimeters upslope to 24 centimeters farther downslope. When in operation, the header boxes, fed by ditch, flume, or pipe, funneled water into the pressure-building mainline pipe leading to the monitor. The pipes gradually restricted the flow of water by decreasing the pipe diameter and, thus, increased the water pressure for more effective sluicing of the pay gravels (Osborn 1910: 125-128; Peele 1918: 900).

Although local informants have associated MMK-041 and MMK-042 with Mount McKinley Gold Placer Company's large-scale hydraulic mining operation on Caribou

Creek, the length of the Mount McKinley Company's pipeline and ditch system, as described in the literature, was considerably shorter than the feature at MMK-042. In addition, MMK-045, discussed above, more closely fits the location of the Mount McKinley Company's operation (Brooks 1923; Brooks and Capps 1924; Capps 1924; Davis 1923; Smith 1929. At present, not enough is known about these two sites to link them with a specific mining operation. The tarred, riveted pipes at MMK-042 are typical of 1920s installation, and thus the sites are possibly contemporaneous with the Mount McKinley Company's activities on Caribou Creek. Any further correspondence between MMK-045 and MMK-041/MMK-042 is yet to be documented.

The most complete example an early small-scale placer mine in the Kantishna District is **MMK-052**, a camp and operation located on Twenty-two Gulch. Evidence of both hydraulicking and hand-methods of mining, using some small pieces of power equipment, are seen at this site. It probably dates to the 1920s-1940s. The site consists of three loci; the domestic structures are clustered in Locus 1, and the mining features concentrated primarily in Locus 2 and Locus 3. The main domestic structure is a collapsed log cabin, which still preserves its dovetail notching. A depression for a root cellar is near the middle of the cabin's milled-lumber floor. An elevated platform cache, the legs of which are sleeved with cans, is still standing near the cabin. Many of the artifacts typical of placer mining camps are at this site: a cast-iron kitchen range, a variety of enamelware pieces, a hand-made wooden chair, a Hills Bros. Coffee can, and a leather boot. Also remaining at the camp is a ceramic bowl, not unusual for the Kantishna District, but not often found at camps in the other mining districts.

Locus 2 consists of the components of a self-dumping bucket assembly, including a Hercules power winch and pulley. The bucket lies partially buried at Locus 1. When in operation, the pulley may have been attached to the top of a gin pole and rigged to the self-dumping bucket in order to transport tailings across the gulch. Also at Locus 2 are stacks of sluice box segments, sluice gratings, pole riffles, hydraulic monitors, and riveted pipe segments. An interesting example of innovation in the form of shovel heads, reworked into sharp, triangular blades used to clean the sluice riffles, is also at Locus 2. A row of hand-stacked tailings is located near the domestic features at Locus 1. These modified shovels are also found at sites in other districts. Extensive piles of these tailings, found elsewhere on Twenty-two Gulch, may be attributed to miners during the 1920s who worked the gravels of Twenty-two Gulch by hand-methods. One in particular, named in the literature, is Andrew Ness, who operated on the "22-pup" of Glacier Creek in 1922 (Davis 1923: 116).

Locus 3, situated about 450 m upstream from the rest of site MMK-052, is composed of a log and stone dam with a control gate and 450 m of pipeline, largely intact, which gradually decreases in diameter as it extends downstream toward Locus 2. The hydraulic activity at the site is attributed to Joe Raats and Walter Belling and dates roughly to the period between 1938 and 1940 (*Fairbanks New Miner*, March 12, 1940).

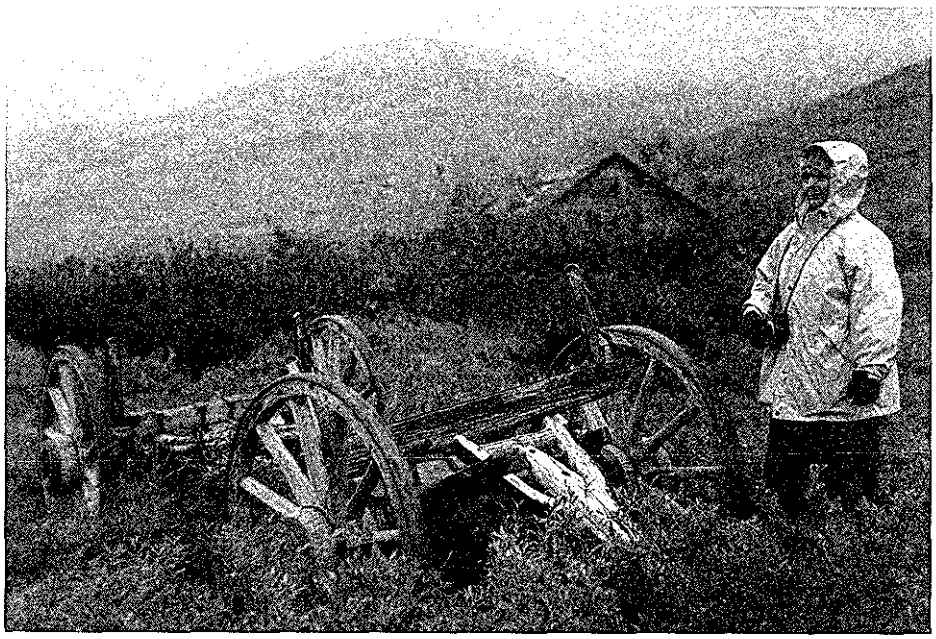
Power Equipment (Dragline). Eight sites, four on Caribou Creek and four on Glacier Creek, preserve the brief, yet productive era of large-scale dragline placer mining in the Kantishna District. The most visible reminders of the era are the long, segmented tailings piles, the signature of dragline operations, on the Caribou creekbed adjacent to **MMK-044**. The camp and operation consists of habitation and maintenance structures built in 1941 by the Carrington Company, plus other features that may date to an earlier occupation of

the site. Although a standing four-room cabin and a privy at Locus 1, along with the maintenance shed at Locus 2, are attributed to the Carrington tenure at the site, one tent platform, a diversion ditch/pipeline, and wagon, also located at Locus 1, may be associated with hydraulic operations at the site between 1922 and 1925 (see MMK-114 discussion above). The Locus 2 maintenance shed houses tools, equipment, burlap bags filled with ore samples, a forge, forge stand, and bellows. These two latter blacksmith tools were used, perhaps, to repair the dragline equipment. An interesting assortment of domestic artifacts, including three different types of stoves and the workings of a tube radio, are also at the site.

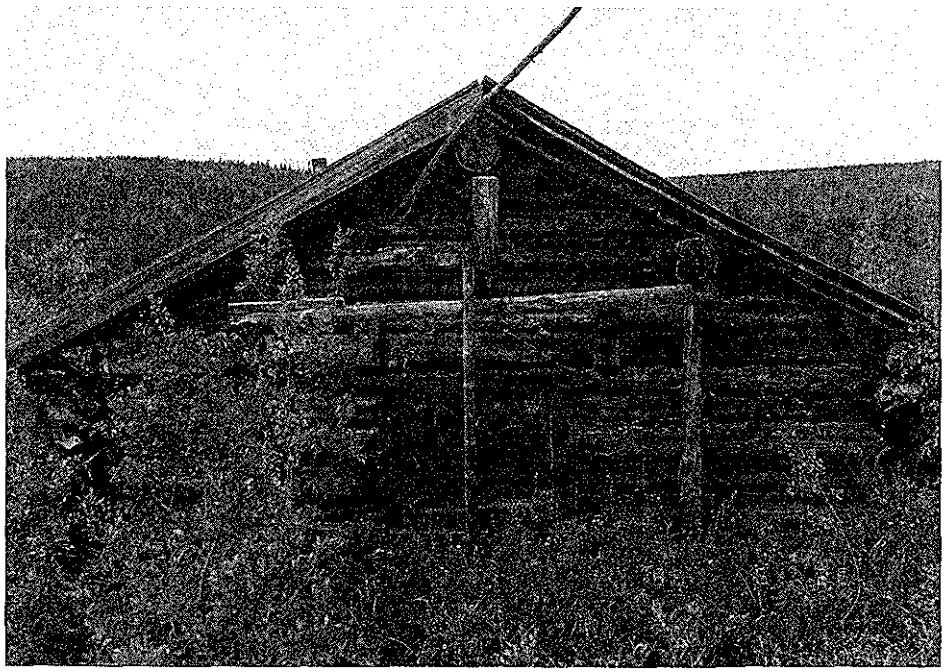
Another site associated with the Carrington Company operations on Caribou Creek is **MMK-023**. The creekbed adjacent to this site and the one discussed below have been mined and reclaimed in recent times so the distinct dragline tailings are no longer visible. During a 1981 survey of MMK-023, the crew noted a board hanging on the shed wall that read: "Caribou Mines McKinley Station Alaska" (Brown et al. 1982). As mentioned above, the Carrington Co. was also referred to as the Caribou Mines. In addition to a collapsed wood frame cabin and a tool shed, there are also two wagons at MMK-023, which date to an earlier period than do the structures. One is a wooden freight wagon with wooden wheels and steel rims, with the inscriptions "WW Co.," or "Winona Wagon Co., Winona, Minn." stamped or painted on the axles. The letters "AEC," which may stand for the Alaska Engineering Commission, were reportedly branded on the rear axles (Brown et al. 1982: 48). The Alaska Engineering Commission built the Alaska Railroad between 1914 and 1923. The second wagon has a flat frame, but no bed, and may have served to haul long articles such as logs or metal pipe. It also displayed the inscription "WW Co." It has been suggested that the wagons were sold near the end of the railroad construction to the Mt. McKinley Gold Placers to use in their hydraulic operations on Caribou Creek in the 1920s (Brown et al. 1982: 48).

Yet another placer camp associated with the Carrington Co. is **MMK-040**. The most noteworthy structure at the site is the Taylor cabin, named after its former occupant, William Taylor, who began mining in Kantishna during the first decade of the district's history. His name is best associated with the Sourdough mountain climbing expedition's first successful ascent of Mt. McKinley in 1910 (Brown 1991: 43-44). Beginning in the 1920s, Taylor owned, worked, and leased several claims mined by the Carrington Company on Caribou Creek. The log cabin, actually built by the Carrington Company in the late 1930s on a claim leased from Taylor, is a sizeable 45.1 m^2, and is constructed in typical fashion, with saddle-notched corners, moss chinking, and a sod roof sheathed with wooden boards and corrugated metal. The cabin reverted to Taylor in 1941 when dragline operations temporarily came to a halt. The mining equipment that remains at the site includes a bulldozer blade, parts and swivel ends for two hydraulic monitors, and a riveted pipe.

A second locus was discovered at MMK-040 in 1992 during a re-survey of the area. Locus 2 contains the moss-covered outlines of four tent frames, associated domestic artifacts, and possible prospect pits dating to early mining and prospecting in the area by Taylor and his partner Bill Julian before hydraulic operations commenced on Caribou Creek (Sam Koppenberg and Dan Ashbrook 1986, personal communication to Keith Williams). It is also possible that the campsite was the temporary habitation of workers for the Carrington Company while the cabin was being built. A modern trailer and recent artifacts at the site attest to its continued use for placer mining well into the 1980s.



Sue Thorsen stands beside freight wagon at MMK-023 on Caribou Creek in DENA.



Taylor cabin (MMK-040) on Caribou Creek in DENA.

The fourth site on Caribou Creek associated with heavy power equipment is **MMK-048**, consisting of two large, cast-iron dragline buckets. One bucket measures 193 x 123 x 86 cm; the other measures 236 x 117 x 60 cm. These buckets were the property of either the Carrington Company or Mehling and Maurer, another dragline operator on Caribou Creek in 1940. The only other cultural material at the site was a scatter of recent engine parts, plywood remains, and 55-gallon oil drums.

On Glacier Creek, the four sites associated with heavy power equipment are all attributable to Ernest Maurer, who moved his dragline operations, including the dragline and caterpillar bulldozer, from Caribou Creek to Glacier Creek in 1942. The main body of a Northwestern dragline, including the self-powered running gear and track-assembly, base platform and turntable, engine, cable assembly, and the base of the boom is located at **MMK-056**. The bucket rests on the ground beside the dragline. Earl Pilgrim, a Kantishna miner of long standing, reportedly drove the dragline into the district (Steve Carwile 1986: personal communication to A.J. Lynch), but there is no record of his using this large piece of equipment for mining. Except for a board and batten bunkhouse and toolshed probably dating to the time the dragline was in operation, the buildings at MMK-056 are comparatively recent. There is also a post-World War II army truck parked at the site. The boom or "arm" to the dragline assembly is an isolate located about 2.1 kilometers downstream at **MMK-057**. The third site, **MMK-055**, consists of a "Diesel Forty" model Caterpillar bulldozer with a cable-operated blade and two standing wood-frame buildings. The cabin at MMK-055 is unique because of its roof, not gabled, but constructed of cambered wood covered with corrugated metal.

The fourth Glacier Creek site is **MMK-054**. This site consists of a 469-meter-long pipeline, composed of 11.8-meter-long segments. Each segment is 66 cm in diameter. The pipeline extends along the west bank of Glacier Creek and is situated about 10 meters above the creekbed. There is a wooden flume at the northern end of the pipeline and a wooden platform, situated near one segment of pipe, which may be the remains of a gold saver. At one time, the pipeline may have extended farther to the north, but mining activities have disturbed any other trace of it. This pipeline was apparently not used for hydraulic mining, but rather to supply a source of high pressure water to Ernest Maurer's dragline operations along the creek (Charles Jahoula 1985: personal communication to NPS archeologists). Maurer mined on the creek through 1944, producing approximately 2,000 troy ounces of gold during the three seasons (Maurer 1942; Hovis 1991a: 4).

Bulldozer Mining. The three sites associated with bulldozer (cat) operations are all located on Crooked Creek, a tributary of the Toklat River in the northern part of the Kantishna District. Although the historic context for these camps/operations has not yet been firmly established, they can tentatively be attributed to the long-term partnership of Dewey Burnett and Margaret Hunter, who began mining a large bench on Crooked Creek several miles from its source in 1924. By 1944, there were records of Margaret Hunter's four-man bulldozer operation on the creek (Stewart 1945); in subsequent years the partners worked the creek with a three-man bulldozer-hydraulic operation (Buzzell 1989: 19). They continued to mine on Crooked Creek off and on over the following 41 years, finally ceasing operations in 1965 (Buzzell 1989).

At **MMK-118**, the farthest upstream of the sites, the habitation area lies adjacent to partially revegetated tailings. The largest of the piles, 19 x 29 m, resembles a ramp with a cat trail leading up to it; there is another revegetated cat-cut on the opposite side of the

creek. In the thick alder brush lining the streambed are a deep ditch and large boulder piles that may be evidence of earlier work on the stream. Besides the ruins of a log cabin and a tent platform at site, there is a raised garden plot and a trash scatter that contains a Hills Bros. Coffee can with a 1927 copyright and a white rubber toy dog. The latter is the one of the few examples of children's toys at the CRMIM placer camps. Also at the MMK-118 is a tube radio receiver with a 1932 patent.

MMK-119 is located about 2 kilometers downstream in an area extensively modified by bulldozer mining. A collapsed log cabin and a partially collapsed elevated cache lie across the creek from large, flat-topped tailings, dissected by cat trails. There are traces of a tent platform built on the top of one of these tailings piles. Another mining feature at the site is a ditch with sections of penstock lying adjacent to it on the terrace edge. Bulldozer parts, including power wheels and track rollers, 55-gallon drums, miscellaneous machinery, and a box of dynamite lie beside or under the penstock sections. One of the fuel drums is labeled with "Rheem" and the numbers: 14 55 38; ICC - 5A." The last two digits of the first number (38) probably indicate the year of manufacture. Domestic artifacts include a tube radio, the swivel for a dog harness, and a gin bottle.

MMK-120, also located on a heavily mined section of Crooked Creek, has both historic and recent components. Within the considerable scatter of machinery and bulldozer parts at the site is a canvas hose, perhaps associated with the bulldozer-hydraulic operations on the creek during the late 1940s and 1950s. One rectangular feature, defined only by sill logs, is thought to be a garage or storage facility for the heavy equipment because of its proximity to the scatter. Also a heavy equipment road leads from the creekbed to the site. A collapsed log cabin, two tent platforms, a cache supported by 55-gallon drums, and two large rectangular garden boxes are the domestic features. A more extensive artifact assemblage, including a 1939 Hills Bros. Coffee can and a short-wave radio, is at MMK-120 than at the other two sites on Crooked Creek.

If the three Crooked Creek sites are all correctly attributed to the Burnett-Hunter placer operations, they may represent a chronological sequence of sites inhabited as mining progressed downstream over the years. This sequence is well illustrated in the size and the condition of the log cabins at each of the sites. At MMK-118, the farthest upstream, the cabin is quite small, only 10.3 m^2, and in an advanced state of deterioration, while the MMK-120 is considerably larger (38.3 m^2) and in earlier stages of collapse. The cabin at MMK-119 is intermediate in both size and condition.

Unknown Methods. Eight of the sites in the Kantishna District are grouped together in the category of unknown methods of mining. These sites occur on Caribou, Eureka, Glacier, and Glen Creeks. In some cases, recent mining disturbance has removed all indication of past technology, and in others the evidence is such that no interpretation can be made about the specific type of mining once in operation. **MMK-043** on Caribou Creek consists only of eight axe-cut logs eroding out of the creek bank. The logs are probably a remnant of some larger structure, perhaps a dam, that has been destroyed or disassembled. Also located on Caribou Creek is **MMK-049**, a camp consisting of the ruins of two wood frame cabins. The site is associated with placer mining primarily by virtue of its location on a known placer claim. Among the artifacts at the site is a wheelbarrow, possibly used in past mining activities.

MMK-086 is a camp and operation on Eureka Creek. Artifacts in and around the cabin date to the 1930s, although the cabin itself may have been built earlier. The scant

archeological evidence of mining at the site proper is low, barren tailings piles located adjacent to the cabin on the creek terrace. There is also a row of buried hand-stacked tailings, exposed in the Eureka creekbed about 300 meters downstream from the site. The cabin was occupied in the late 1920s and early 1930s by a Nelson (Wells 1933: Plate 28), probably Peter Nelson, identified as the man who mined the gravels of Eureka Creek in 1929 with Joe Dalton (Wimmler 1929: Roll 24, Item 1). Considering the age of the site, Nelson may have mined on a small-scale and used either an automatic dam or simple shoveling-in techniques (Wimmler 1925: 59-60). Eureka Creek has been one of the largest and most consistent producers of gold in the Kantishna District, and as a result of intensive ground-disturbing activities in recent decades, much of the evidence of earlier, historic mining methods has been obliterated.

The small log cabin at the site is still standing and in good condition. The fact that the cabin has not collapsed is remarkable, considering that it has not been occupied for a number of years (or even decades). One factor in its longevity may be its roof construction of double, overlapping planks, which appear to have weathered well. Other aspects of its construction - the saddle notching and moss chinking - are more common. Among the artifacts recorded at the site is a fragment of a wooden packing crate, inscribed with "CHENA ALAS." The small mining town of Chena was established on the Tanana River in 1903, and for a few years competed with nearby Fairbanks to be the "hub" of mining in the Tanana Valley. As Fairbanks grew, Chena declined, losing its post office in 1918 and most of its population by 1920 (Orth 1971: 203). One might speculate, based on this slim evidence, that Nelson was typical of a particular breed of miner, who moved from district to district, always in search of a better or richer claim.

Another camp and operation not attributable to a specific mining method is **MMK-060** on Glacier Creek. One feature at the site is described as a mining activity area. This 8-by-10 m feature is actually a storage area for tools and equipment, which can be considered somewhat generic in nature and not necessarily associated with a specific type of mining. Four large penstock sections, aligned side by side, contain a pick, large sledgehammer, Pulaski, rocker constructed from one-half of a steel barrel, and some miscellaneous drums and cans. An unidentified linear object constructed of a base plate and small-diameter pipe sections rests on top of the penstocks, along with three metal trough sections. A tub equipped with handles cut from 55-gallon drums, a metal cart with pull handle, and an engine with pump assembly also lie within this storage area. The domestic features include a collapsed, very small log cabin (8 m^2) with dovetail notching, a collapsed elevated cache, and an A-frame structure perhaps used as a shed (or a doghouse). The site was probably occupied in the late 1930s or early 1940s, based on a patent date of 1936 on a Sanborn coffee can at the site.

Another "unknown" site is **MMK-053** on Twenty-two Gulch. It is a camp with a fairly good inventory of domestic artifacts, but only a monitor joint as an indicator of past mining. Although possibly a hydraulic site, it seems more reasonable to include MMK-053 in the unknown category because of its scanty evidence and lack of historic context. The collapsed log cabin at the site is the only one in the Kantishna sample with "hog-trough" corners. In this expedient, but not particularly sturdy type of construction, the log corners are boxed in with milled lumber rather than being notched. There is also a collapsed shed, a collapsed elevated cache, and a doghouse at the site. Like at many other placer camps, a blacksmith forge and blower are included in the artifact assemblage. This camp may be

related to a line of hand-stacked tailings, now heavily draped with moss and lichen, and a 100-meter-long segment of an old ditch line, both of which were recorded as a cultural isolate (CI-93-07) during a 1993 survey. The tailings and ditch lie on Glacier Creek, approximately 300 meters southeast of MMK-053.

The three remaining sites in the unknown category are all camps located on Glen Creek in areas heavily disturbed by recent mining. **MMK-063** consists of a log cabin, ruins of a cache, and associated artifacts including miscellaneous mining equipment such as sluice box mats and riffles. The small cabin (9.9 m^2), still in good condition, has the typical saddle-notched corners, moss chinking, and board and metal roof. Among the artifacts remaining at the site is a dog sled, a homemade chair, and the sherds of plates. The site, which may date to the 1920s or earlier, has had a number of different occupants and appears to have been used within the last decade or two as a headquarters for placer mining. **MMK-122** preserves only the stone outline of what may have been a tent site, a ring, 1.4 m in diameter built of stones, and some low, linear mounds, which may have been a garden plot. The site appears to have been truncated by a recent mining road. At **MMK-123**, also on Glen Creek, all that remains of a habitation structure is a depression and berm. Among the artifacts are the typical enamelware kitchenware; dog chains and fasteners and a dog bowl; and pieces of a cast iron cookstove, manufactured by "The...Detroit Stoves," with an ornate design motif on its doors and the words "Mesquite." Pipefittings and a pick head at the site are the only indication of past mining activities.

The Nizina District

The history of mineral exploitation in the Nizina District in the WRST area (figure 9) begins long before the overflow of Klondike stampeders entered the Copper River country. It begins, in fact, in prehistoric times with the Ahtna who mined copper nuggets and worked them into a variety of tools and weapons (de Laguna and McClellan 1981: 645). During the 1880s and 1890s, Ahtna Chief Nicolai held a monopoly on the sources of native copper along the headwaters of the Nizina River; but he shared information on their whereabouts with the first American explorers and geologists in the area. Dan Kain and Clarence Warner, prospectors initially in search of copper, discovered placer gold in the Nizina District in 1901. They staked claims on the creek they named "Dan" in honor of Kain. The following year gold was discovered on the district's other major drainage, Chititu Creek, by Frank Kernan and Charles Koppus (Moffit and Capps 1911: 76).

A short-lived rush of several hundred stampeders entered the area in 1902, and by 1903-1904 large-scale mining operations had begun. During these early years, three men - Robert Blei, Charles Koppus, and Frank Kernan - held the majority of claims on Chititu Creek, and together hired 165 people to mine it with picks, shovels, and sluice boxes. Three supply centers also sprang up to serve the miners: Sourdough City at the mouth of Young River; and Kernanville and Koppustown, both near the present-day location of Chititu Camp at the confluence of Chititu, Rex, and White Creeks (Spude et al. 1984: 96). The Nizina Post Office was also established on Chititu Creek in 1903 and operated until 1926 (Orth 1971: 692).

As in many other mining districts, the richest and most easily mined gravels were mostly worked out in the first few years by pick and shovel. Gradually the claims on both Dan and Chititu Creeks became consolidated in the hands of a few owners, interested in

operating on a larger-scale with methods that are more economical. In 1907 a complete hydraulic plant was installed on the lower eight claims on Chititu Creek; and by 1911, there was also one at the mouth of its tributary Rex Creek, and one being prepared for installation on Dan Creek. The plant on Chititu Creek, owned by the Nizina Mines Company, included flumes, pipe lines, and giants, as well as a complete sawmill, electric lighting system, and blacksmith shop. The plant operated efficiently by positioning the giants above a bedrock sluice, which in turn funneled water into the sluice boxes. This arrangement maximized the flow of water and gravels through the system. Another giant was also used at the lower end of the sluices to stack the tailings and keep the end of the boxes clear (Moffit and Maddren 1909: 96-97; Moffit and Capps 1911: 76,103,106).

Developing in the Nizina District at the same time as the placer gold industry was another, more significant mining industry. It was based on the Bonanza copper ore deposit, which became the cornerstone of the great Kennecott complex of mines (Grauman 1977a). To carry out the enormous task of supplying the mines and bringing out the ore, the syndicate who owned the mines began construction of the Copper River and Northwestern Railroad in 1906 (Nielsen 1989b: 35). One of the railway terminals was in McCarthy, which served as a regional hub. It was located across the Nizina River, only about 10 miles north of the gold placer diggings. The first bridge over the Nizina River was built in 1913 (Richardson et al. 1914), and thus alleviated many of the transportation problems that plagued the development of so many of Alaska's mining districts.

In the same year gold was discovered on Dan Creek, another strike was made on Golconda Creek, a tributary of the North Forth of the Bremner River, to the south of the main gold-producing area of the Nizina District. Two small parties of prospectors from Valdez, one consisting of Peter Monahan, Guy Banty, and Henry Anderson, and the other of Harry Happell, W.H. Hawes, Angus Gillis, and Ralph Wheaton staked their claim on Golconda Creek on October 11, 1901. Over the years, the claims were consolidated into the control of only two men, and by 1911 the Golconda Mining Co. had established a hydraulic operation on 18 of the claims. Placer mining continued on Golconda Creek only until about 1916 (Moffit 1914: 43-44; Cobb 1973: 30-31).

The hydraulicking operations on Dan and Chititu Creeks, however, continued for years to come. Howard Birch, brother of the Kennecott developer Stephen Birch, invested in 1918 in an extensive hydraulic system on Dan Creek. This operation changed hands and names several times during the next two decades. In the mid-1920s, it was known as the Dan Creek Mining Company, and like similar operations on Chititu Creek, experienced a boom in productivity during that period. In 1922 John E. Andrus employed 40-50 men on two hydraulic operations on Chititu Creek, using a technique called "piping over the side" in which giants piped the gravels over the side of sluice boxes set below the bedrock surface. The same technique proved successful on Dan Creek. It is reported that the hydraulic plants on Dan and Chititu Creeks were the largest of their kind in Alaska in 1926 (Wimmler 1923: 31; Wimmler 1926: 18; Wimmler 1927: 147; Hunt 1991: 59).

Hydraulic mining persisted in the Nizina District during the 1930s. On Dan Creek, the major operation in 1937, known as Nicolai Placer Mines, employed between seven and 14 men to work the high bench claims above the creekbed. Its plant included pipelines, which brought water from a new reservoir above the canyon, giants, a power plant, and other hydraulic equipment (Smith 1939a: 38-39). The Chititu Creek hydraulic operations of J.E. Andrus, operating under the name of Chititu Mines, were extended to Rex Creek in

the late 1920s, and produced consistently throughout the 1930s. In 1932, the Chititu Mines crew numbered 30, but by 1939 the number had dwindled to 17 (Stewart 1934: 93; Smith 1941: 34). It was during this period that the main camp was moved from the old Nizina Post Office site to the present day location of Chititu Camp (Spude et al. 1984: 98). In addition to these major hydraulic plants on Dan, Chititu, and Rex Creeks, there were several smaller operators at work in the Nizina District during the 1930s.

Production began to falter in the district by 1940. Thanks to Anthony Dimond, Alaska's representative in Congress who started his career as a prospector and miner in the Nizina region, gold mining was allowed in the district throughout WWII despite a federal order restricting it elsewhere. By 1950, Chititu Mines had terminated their once large hydraulic operations, and switched to drift mining (Territory of Alaska 1950: 42). This venture was apparently unsuccessful because by 1952 the company discontinued its operations entirely (Spude et al. 1984: 98). Mining on Dan Creek has survived until fairly recent times, giving it the distinction of having one of the longest essentially continuous histories of mining in Alaska (Cobb 1973: 30). With a total production of 143,500 oz. of gold, as of 1979, the Nizina District proved to be more than three times as rich as the Chisana District, its neighbor to the north (Robinson and Bundtzen 1979: 3). About 40 tons of native copper, one nugget weighing an estimated 3 tons, was also recovered and sold during placer mining on Dan Creek (Cobb 1973: 30).

During CRMIM surveys, 26 placer mining sites were recorded in the Nizina District (table 34). These sites are located on Chititu Creek and its tributaries, Rex, White, and Blygh Creeks; Dan Creek and its tributary Copper Creek; Calamity Gulch; and Golconda Creek in the Bremner region of the district (figure 19). The focus of the surveys was on buildings, so the majority of the sites fall into the categories of camps or camps/operations. The habitation structures at these camps include 13 tent frames, 23 cabins, and 1 bunkhouse, with an average size of 25.1 m^2 (table 35). These structures date from just after the turn-of-the century (nineteenth to twentieth) to the 1950s. Both logs and milled lumber can be considered primary building materials; and unlike the rather poor state of preservation in the Kantishna District, 58% of the structures in the Nizina District are standing or in good condition. There are also 24 outbuildings at these camps (table 36) and a wide range of domestic and mining artifacts (table 37). Also recorded during the surveys were hundreds of isolated features, artifacts, and landscape elements pertaining to mining. It is not surprising, considering the history of the Nizina District, that more than 60% of the sites are associated with hydraulic mining. Most of the hydraulic sites are located on either Chititu Creek or one of its tributaries, drainages not substantially altered by mechanized mining after the 1940s (Hovis 1990a: 3).

Prospecting. Only one site, **XMC-056**, is attributed to prospecting. Located at the upper end of Rex Creek, this camp is situated upstream of the major mining areas on the creek. The site consists of a collapsed tent frame with an encircling rock berm. There is also a low line of stacked rocks paralleling a possible ditch, suggesting that the rocks may have been placed to channel water. About 170 meters east of the tent frame is an inscription, "J.T.'03," on a rock that possibly dates the occupation of the site.

Hand Methods. Two sites dating to the early 1900s preserve the record of simple, hand methods of mining in the Nizina District. **XMC-119**, located on Golconda Creek, has been dubbed "The Maze" site because of its maze-like configuration of tailings extending some 150 meters along the creekbed. The older tailings, now overgrown, lie parallel to the

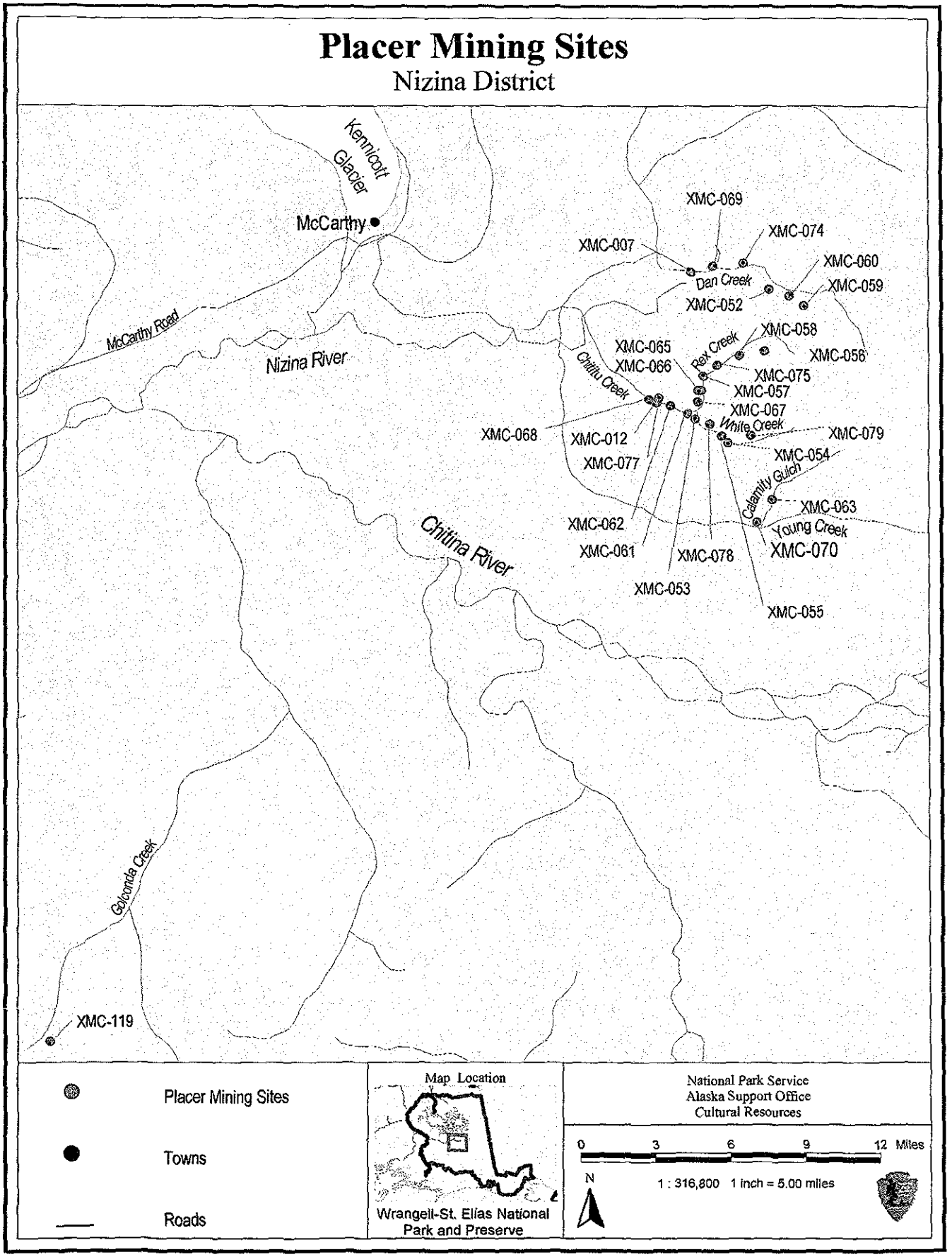

Placer Mining Sites
Nizina District
Kennicott Glacier
McCarthy
McCarthy Road
Nizina River
Chitina River
Golconda Creek
XMC-119
XMC-069
XMC-074
XMC-007
XMC-060
Dan Creek
XMC-059
XMC-052
XMC-058
Rex Creek
XMC-065
XMC-066
XMC-056
Chititu Creek
XMC-075
XMC-057
XMC-067
White Creek
XMC-068
XMC-012
XMC-079
XMC-077
XMC-054
Calamity Gulch
XMC-063
XMC-062
Young Creek
XMC-061
XMC-078
XMC-070
XMC-053
XMC-055
Placer Mining Sites
Towns
Roads
Map Location
Wrangell-St. Elias National Park and Preserve
National Park Service
Alaska Support Office
Cultural Resources
0 3 6 9 12 Miles
N
1 : 316,800 1 inch = 5.00 miles

Figure 19.

Table 34

Placer Mining Sites in the Nizina District by Mining Method

Drainage	Prospect	Hand	Hydraulic	Unknown
Blygh Creek			XMC-053	
Calamity Gulch			XMC-063	XMC-070
Chititu Creek		XMC-077	XMC-012 XMC-061 XMC-062 XMC-068	
Copper Creek				XMC-052 XMC-059 XMC-060
Dan Creek			XMC-069 XMC-007 XMC-074	
Golconda Creek		XMC-119		
Rex Creek	XMC-056		XMC-057 XMC-058 XMC-065 XMC-066 XMC-067 XMC-075	
White Creek			XMC-078	XMC-054 XMC-055 XMC-079

Table 35

Habitation Structures at Placer Mining Camps in the Nizina District

AHRS #	Type	Mat'l	Size	Roof	Corner	Chink	Condition
XMC-007	cabin	log	unknown	tarpaper	V-notch	concrete	good
XMC-012	cabin[1]	lumber	50.3 m^2	tarpaper			good
XMC-052	tent frame	log?	13.7 m^2				trace
XMC-053	cabin	log	12 m^2	mtl, tar paper	saddle	various	good
	tent frame	log/lmbr	12 m^2				ruins
XMC-054	cabin	log	13.3 m^2		saddle		ruins
XMC-055	cabin	log	13.9 m^2		saddle		ruins
XMC-056	tent frame	pole/lmbr	12.9 m^2				collapsed
XMC-057	cabin	lumber	17 m^2				standing
	cabin?	?	22.6 m^2				ruins
	tent frame	lumber	10.8 m^2				ruins
	cabin?	log?	17.3 m^2				trace
	cabin	log	22 m^2				removed
	tent frame	lumber	16.6 m^2				ruins
XMC-059	cabin	log	8.1 m^2	metal	square		good

(continued)

Table 35 (continued)

AHRS #	Type	Mat'l	Size	Roof	Corner	Chink	Condition
XMC-060	cabin	log	34 m^2	metal	saddle	split log	good
	cabin/cache	log, metal	32 m^2	metal	square		good
XMC-061	bkhouse?[2]	log	168.6 m^2	board	saddle	canvas	ruins
	cabin	log	24.8 m^2		saddle	moss, wood	standing
XMC-062	cabin	log	23.7 m^2	tar paper	saddle	clothing	collapsed
XMC-063	cabin	lumber	64.5 m^2	metal			good
	tent frame	lumber	15.8 m^2				standing
	tent frame	lumber	10.7 m^2	lumber			good
	tent frame	lumber	?				ruins
	tent frame	lumber	?				ruins
XMC-065	tent frame	lumber	25 m^2				good
XMC-067	cabin	lumber	18.8 m^2	tarpaper			good
	cabin	lumber	14.9 m^2	tarpaper			good
	tent frame	lumber	11.3 m^2	tarpaper			good
XMC-070	cabin	log	23.8 m^2	sod	saddle		standing
XMC-075	cabin	log	18 m^2	metal	none[3]	canvas	good
	cabin	lumber	6.7 m^2	mtl, tar paper			good
	cabin[4]	lmbr/ply	30 m^2	metal			good
	tent frame	lmbr/mtl	17.1 m^2				collapsed

(continued)

Table 35 (continued)

AHRS #	Type	Mat'l	Size	Roof	Corner	Chink	Condition
XMC-077	cabin	log	19.4 m^2	tarpaper	square	rope/burl	standing
XMC-079	cabin	lumber	?	brd/canvas			standing
XMC-119	tent platf		?				trace

[1] XMC-012 cabin (two-story) also served as the Nizina Post Office and referred to as the commissary building.

[2] XMC-061 two-story structure

[3] XMC-075 vertical log construction

[4] XMC-075 two-room structure

Table 36

Outbuildings at Placer Camps in the Nizina District

AHRS	Shed	Outhouse	Cache	Doghouse	Workshop	Other	Total
XMC-007			1		1		2
XMC-012	2	2					4
XMC-052						1	1
XMC-053		1					1
XMC-054							0
XMC-055							0
XMC-056							0
XMC-057							0
XMC-059			1				1
XMC-060	1	1		1			3
XMC-061		1					1
XMC-062							0
XMC-063							0
XMC-065	2						2
XMC-067			1				1
XMC-070			1				1
XMC-075	2	1					3
XMC-077			1				1
XMC-079	1						1
XMC-119		1	1				2
Total	**8**	**7**	**7**	**0**	**1**	**1**	**24**

Table 37

Classes of Artifacts[1] at Placer Camps in the Nizina District

AHRS	BLDM	HSHD	PERS	SUBS	FSTR	FPRP	FSER	TRAN	COMM	RECR	MTEQ	MULT	OTHR
XMC-007								+			+	+	
XMC-012	+	+	+		+	+	+	+	+	+	+	+	+
XMC-052			+		+								+
XMC-053		+	+		+		+	+			+	+	
XMC-054													
XMC-055													
XMC-056					+								
XMC-057		+									+		+
XMC-059		+					+	+			+		
XMC-060						+					+	+	
XMC-061		+							+	+			
XMC-062	+	+	+		+	+	+		+	+	+	+	
XMC-063		+						+					
XMC-065		+									+	+	+
XMC-067	+	+									+	+	
XMC-070		+		+				+				+	+
XMC-075	+	+	+		+	+	+	+	+		+	+	+
XMC-077		+							+				

(continued)

Table 37 (continued)

AHRS	BLDM	HSHD	PERS	SUBS	FSTR	FPRP	FSER	TRAN	COMM	RECR	MTEQ	MULT	OTHR
NAB-077	+	+	+		+	+	+			+	+	+	
NAB-079					+					+			+
NAB-080		+	+		+	+	+					+	+
NAB-082		+			+	+	+		+		+	+	
NAB-083		+			+	+	+	+		+	+	+	+
NAB-085		+			+	+					+	+	
NAB-086			+		+					+			+
NAB-087					+	+						+	+
NAB-088	+	+			+						+	+	+
NAB-089			+		+								+
NAB-093					+			+					

[1] The abbreviations used for artifact classes are as follows:
BLDM = building materials
HSHD = household
PERS = personal
SUBS = subsistence
FSTR = food storage
FPRP = food preparation
FSER = food service
TRAN = transportation
COMM = communication
RECR = recreation
MTEQ = mining tools and equipment
MULT = multipurpose tools
OTHR = other

stream, while the more extensive unvegetated tailings are oriented at right angles, sometimes intersecting the revegetated piles. Other features located within the "maze" include a primary ditch with numerous feeder ditches for sluicing, as well as rock supports for sluice boxes at the end of the smaller ditches. A crude, homemade monitor at the site was probably used by early miners for a low-pressure wash. There are another two loci at this site: one consists of a smaller group of tailings on the opposite side of the creek, and the other the foundations of a camp lying on the terrace above the "maze." The only evidence of habitation is a leveled area thought to have been the platform for a tent frame. A fairly good assortment of domestic artifacts, including a dog sled, a double-ender horse-drawn sled, a variety of cans, a purple full-mold glass bottle, and the ubiquitous enamelware were at the camp. A cache of modern suction dredging equipment was discovered at the site in a rectangular bedrock pit that appears to have been used as a shelter.

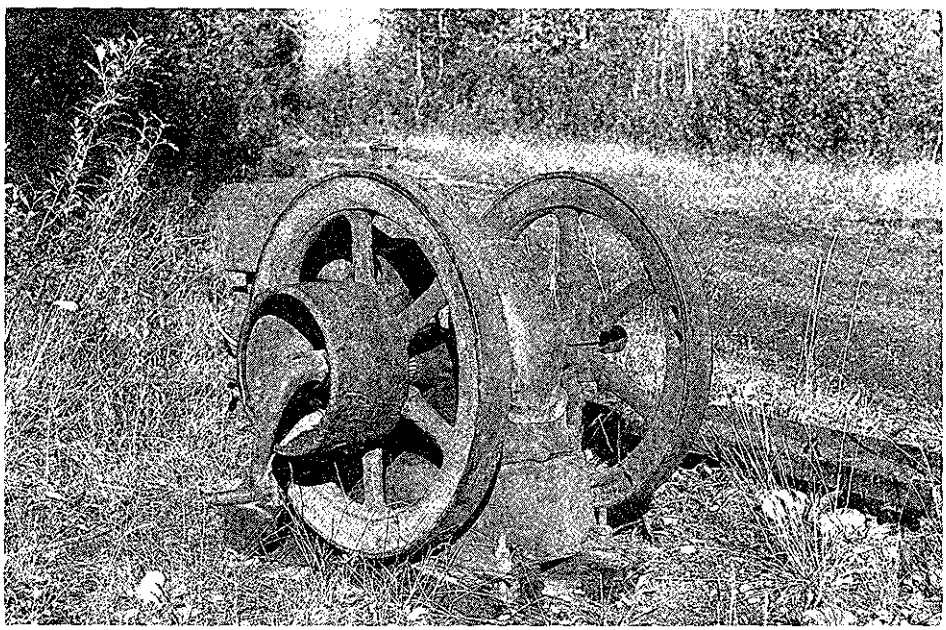
XMC-119 is assumed to have been the camp and placer workings of John Van Iderstein, one of the early prospectors who came into the Bremner area in 1902. He began work on No. 4 Above Discovery on Golconda Creek in the same year and apparently stayed on for about a decade. Unlike other small-scale operators who sold out to the hydraulic operations of the Golconda Mining Company, Van Iderstein continued to work his claim with simple shoveling-in methods. This site is an excellent example of hand mining techniques as practiced in Alaska in the early days of the century (Hovis 1993a). (Refer to White [2000] for further site information and a site map.)

The other early site associated with hand mining methods, **XMC-077**, is located on Chititu Creek. Surrounded by evidence of later hydraulic mining, the site is the sole representative of the simpler form of technology practiced on Chititu Creek in the early days of the district's history. The site consists of a partially collapsed log cabin and outhouse. A newspaper with a date of 1915 is tacked to the front door. Unlike the majority of the cabins with gable roofs, this cabin had a shed roof covered with tar paper. It was constructed with tight-fitting square-notched corners and had a woodshed attached to the side. Another variant is chinking of rope and burlap instead of moss. A white enamel doorknob and a carved, round wooden doorknob are nice features of this small one-room cabin. A great deal of effort was put, it appears, into making it a comfortable home. Although there are no artifacts directly related to mining recorded at the site, there are a few domestic artifacts remaining in the cabin.

Hydraulic Mining. Hydraulicking, the dominant form of mining in the Nizina District for a number of decades, is well represented by 17 sites and scores of isolates. Three hydraulic sites are on Dan Creek. **XMC-074** is a relatively intact water diversion system, consisting of dam remnants, a flume, a regulator, pipeline, and pipeline tunnel. The system extends for approximately 1.3 kilometers along the canyon, beginning at two dam remnants, situated on both sides of Dan Creek. One is constructed of logs, planks, poles, and sheet metal; and the other is a large cribbed square divided into three compartments, all filled with rocks. Just downstream is a wooden turnout, used to divert water, and the beginning of a 100-meter-long wooden flume line. At one time, the flume apparently terminated in a two-room regulator, which is still standing. Just upslope is a board and batten tool shed. At the exit end of the regulator is a 36-inch pipe, which extends into a pipeline, crossing back and forth from the south to the north side of Dan Creek. For one stretch it is high on a cliff face, supported by wooden trestles. At the western end, the pipeline enters a tunnel, carved out of solid rock, and exits about 60 meters downstream where it virtually



Well-built log cabin (XMC-077) on Chititu Creek in WRST.



Pelton wheel found at XMC-007 on Dan Creek in WRST.

disappears as a result of more recent mining activities. This water diversion system was constructed in 1935 by the Nicolai Placer Mines Company and probably used until at least 1940 when the claims were leased to another mining association (Spude et al. 1984: 91).

XMC-069, which is approximately one kilometer downstream from the pipeline tunnel, is another site probably associated with the Nicolai Placer Mines hydraulicking operations on Dan Creek. The major feature at this site is a standing, framed structure that houses an Ingersoll-Rand air compressor system, with patent dates of 1909-1920. The compressor is connected by an 8-inch belt drive to a Pelton wheel. A belt-drive, hand-crank drill press, made by Champion Blower and Forge Co. (patent date 1904), is also inside the building. The compressor building and attached shed are adjacent to a hydraulic pit, a scatter of pipe, and an intact monitor. Stretches of pipeline are located upstream on Dan Creek and on Boulder Creek to the north of the site. At one time the XMC-074 pipeline may have extended as far west as XMC-069, and the compressor building may be the "power plant" referred to in the description of the Nicolai Placer Mining Company's operation on Dan Creek in the Alaska Mineral Industry report of 1937 (Smith 1939a: 38-39).

The third site on Dan Creek, **XMC-007**, is a camp with a record of occupation spanning several decades. The site doubled as a mining camp and a post office from 1911 to 1932 (Orth 1971: 256), and continued to be occupied well into the 1980s when a CRMIM crew made a cursory inventory of it. All three of the buildings at the site - a cabin, workshop, and cache - are in good condition and appear to have been repaired. An unusual feature of the cabin is its concrete chinking. A variety of mining-related artifacts were recorded, including drill bits, a Pelton wheel (1899-1901 patent dates), a monitor and monitor nozzles, an ore drill and fittings, a plow, saw milling machinery and parts, and others. The site appears to have been used as a storage area, and thus the artifacts may have been collected from various locales.

Some of the best examples of the hydraulic mining that took place in Alaska during the 1920s and 1930s are at the sites and isolates on Chititu Creek and its tributaries. In some cases the buildings and structures at these sites were actually constructed in earlier decades and later reoccupied, taking on new functions as the mining technology in the district progressed. A prime example of this re-use is at **XMC-012**, also known as the Nizina Post Office. This is an extensive site composed of 26 features, among them the commissary building, which originally served as a U.S. Post Office from 1903 until 1926 when mail delivery was shifted to nearby Dan Creek. The commissary building was modified several times to serve as a support facility for placer mining, particularly hydraulicking, activities along Chititu Creek. The original two-story structure has exterior shiplap siding is painted grayish white with yellow trim. A light fixture and wiring remain on the ceiling of the first floor of the building. The first one-story addition was made on the east side of the original structure, with an interior doorway connecting the two. In this addition, there are cubbyholes and shelves dating from the period when it was used as a post office. The second addition was built on the front (north) of the post office room, and the roof extended over it. A final addition, with tongue and groove siding, was made to the rear of the original structure. Most of the artifacts have been scavenged. A frame shed, a cold storage shed, and two outhouses complete the domestic features at the site. Also found are several mining-related features: cribbed log dams, a sluice gate, a flume support, a regulator box on a flume line, a cribbed log shaft, a prospect pit, a ditch, and ditch

gate. The natural landscape surrounding the site has been greatly altered by past mining, in evidence as large tailings piles, shafts, and prospects pits.

Approximately 400-500 meters downstream from XMC-012 is **XMC-068**, a hydraulic operation and a storage site for mining and saw milling equipment. The site is surrounded on the east and west by hydraulic pits and on the north by extensive tailings piles and the mined floodplain of Chititu Creek. The two main structures at XMC-068 are sheds, one of which contains a wide variety of mining tools and equipment, such as pipe cutting and threading tools, hydraulic monitor nozzles, and the blades and bucket for a Pelton wheel. Outside the shed there are, among other artifacts, pieces of canvas and rubber hose, coils of electric wire, and the pieces of a hydraulic elevator and associated gate valve. The latter piece of equipment, used for raising the gravel, sand and water out of hydraulic pits and into the sluice boxes, is a type rarely found at CRMIM mining sites because it is not particularly efficient in areas with sufficient topographic relief and hydraulic head (Hovis 1995: personal communication). The second shed contains a Pelton wheel and the sawmill machinery. Other features at the site are two test pits or collapsed shafts, a freight sled used to haul pipe sections or logs, two stone boats, piles and scatters of penstock, a collapsed outhouse, and several features associated with the sawmill operation. Hydraulic operations near this site can only be broadly dated as occurring sometime between 1920 and 1950. The sheds were probably constructed near the end of that period when placer mining on the creek was winding down and the need for storage of equipment became apparent. The fact that the buildings were used for storage probably indicates a planned departure from the site and not just a temporary abandonment.

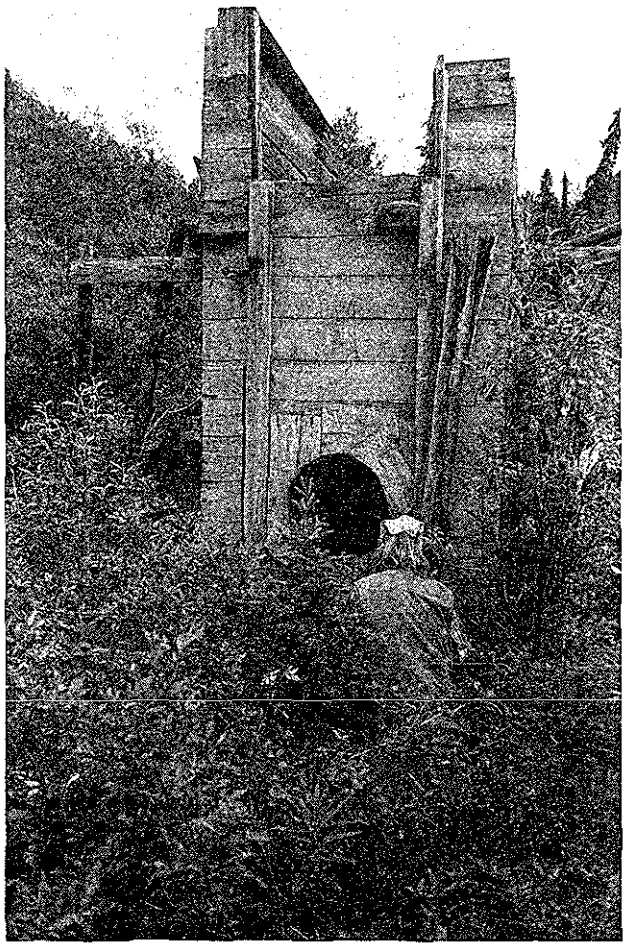
Two camps have been recorded on Chititu Creek between the Nizina Post Office and Chititu Camp, located at the confluence of Chititu, Rex, and White Creeks. **XMC-061** is the older of the two, occupied at least as early as 1912, the date on a postal routing slip collected at the site (catalog number WRST 1162). Another "communication artifact" is a fragmentary World War I solicitation for war stamps. The ruins of a very large (168.6 m^2) log structure, probably a bunkhouse, is at the site. The remnants of a dormer window and staircase indicate that it was once a two-story structure. It appears on the 1921 mineral plat of the claim. The second dwelling is a standing log cabin with no windows. The site is adjacent to several hydraulic tailings piles, a hydraulic mining pit that is now revegetated, and a collapsed tunnel. Among the many isolates downstream from the site are a bedrock trench used as a sluice, a crib dam remnant, a cribbed pit, and another collapsed tunnel. The use of bedrock sluices is mentioned in the literature as a source of additional water power for the hydraulicking operations on Chititu Creek (Moffit and Capps 1911: 106).

The collapsed cabin at **XMC-062** dates to the 1920s or early 1930s, and like XMC-061, is adjacent to numerous isolates and landscape features associated with hydraulic mining. Associated with the collapsed log cabin are a number of domestic artifacts, including beer and liquor bottles, tobacco cans, bunks, a rocking chair, a desk, other household and personal items, and a New York Sunday newspaper dated May 29, 1932. Between the site and the creek is an extensive, revegetated hydraulic pit; just upstream there are three cribbed dam remnants, a shaft or test pit, a collapsed tunnel, pipe and flume supports, and a regulator and collapsed flume associated with one of the dams.

Chititu Camp is the major campsite associated with hydraulicking on Chititu Creek. It was not formally recorded by CRMIM crews, but was documented and mapped

during a Historic American Building Survey (HABS) in 1983. The site, consisting of an upper and a lower camp, includes 30 features: a bunkhouse, mess hall, bath house, blacksmith shop, stables, machine shop, powerhouse, sheds, cabins, outhouses, and hydraulic pipe storage. The original camp was apparently directly across Chititu Creek, at a site now covered by hydraulic mine tailings. A large rectangular hydraulic mining pit, now revegetated, also lies adjacent to the camp complex. Chititu Camp served as the headquarters for Andrus' mining operations on Chititu and Rex Creeks during the 1920s and 1930s. The lower camp is the older section of the site, occupied in the 1920s as an office and maintenance center, while the upper section contains the bunkhouse and other buildings for housing and feeding large crews of mine workers. They were apparently moved from their camp at the Nizina Post Office (XMC-012) sometime during the 1930s (Spude et al. 1984: 98).

Two other sites that appear to be associated with Chititu Camp and its hydraulic operations are **XMC-053** on Blygh Gulch and **XMC-078** on White Creek. XMC-053 is a camp, located about 200 meters south of the main Chititu Camp complex and occupied contemporaneously with it. The dates "1921-1940" have been penciled on a door board of the log cabin at the site. The small cabin, still in good condition, has a stone foundation and a tar paper and corrugated metal roof. There are newspapers in the cabin that date from the 1920s through 1946. The ruins of a tent frame were also recorded at the site. A trommel and a pitchfork were the only mining-related artifacts recorded at the site. XMC-078 is a hydraulic water system, which includes dam remnants, a pipeline, a regulator, and several low cribbed log walls. Beginning upstream about one kilometer southeast of Chititu Camp is the first feature in the system, a long, cribbed long wall, partially buried by alluvium and vegetation. The cribbed log dam remnant and a two-room wooden water regulator, with a narrow flume no longer attached, are located downstream. Wooden supports for a pipeline are located intermittently for approximately 500 meters below the regulator. Stacks of penstock are also along the route. Although the system does not extend as far downstream as Chititu Camp, it is assumed that the diverted water was used in hydraulic operations at or below the camp.



Headbox used to regulate water pressure during hydraulic mining on Chititu Creek (XMC-078) in WRST.

At least three of the Rex Creek sites (located on patented claims held by the JEA Corporation) also appear to be related to the Andrus Chititu Mines operations. About one kilometer upstream from Chititu Camp is **XMC-067**, which encompasses two cabins and a tent frame in good condition, as well as a standing cache. The camp apparently once housed a large since 10 metal cots remain in the tent frame. Also found are powder boxes (explosives) with the dates of 1936 and 1938. Tailings piles, wood supports for penstock pipe, a stoneboat, and log cribbing are isolates within the boundaries of the claim where the site is situated.

XMC-065 and **XMC-066**, directly opposite each other on Rex Creek, are located immediately upstream from an extensively worked hydraulic area, erroneously labeled "dredge tailings" on the USGS quad map. XMC-065 is a camp composed of a tent frame and two sheds. The tent frame, in good condition, is 25 m^2 and has a gable roof made of canvas and flattened Blazo cans. Mining-related artifacts recorded at this site include canvas hose, monitor nozzles, hydraulic pipe, and a windlass. The structures, tentatively dated to the 1920s, may actually predate the Chititu Mines tenure on the lower portion of Rex Creek. They were, however, probably reoccupied later when the Andrus company began mining on the Rex Creek claims. XMC-066 consists of a standing generator shed, which at one time housed a water turbine, such as a Pelton wheel. The generator may have supplied power to mining sites all along Rex Creek. A pipe scatter, dam remnant, and monitor barrel are just upstream from the shed.

Another camp complex, **XMC-057**, is situated near the upstream extent of the claims once mined by John Andrus. With the exception of one standing wood frame cabin, the site consists primarily of the ruins of three wooden tent frames or cabins and the foundations of two other structures. A number of other features - a trash scatter, as well as log and milled lumber ruins of undetermined function - are also at the camp. A dam remnant is located at the upstream end of the site, and a flume pipe runs along the gravel bar for about 65 meters. The ruins of a regulator, a dam remnant, and a cribbed dam are isolates that lie on the opposite side of Rex Creek. Although the structures on this claim do not appear on the 1920 plat map of the claim, the dam (dam remnant) and a flume and penstock are indicated. Based on the varying conditions of the structures, it seems that they were not built contemporaneously, but represent long-term occupation and reuse of the site through the decades of hydraulic mining on Rex Creek.

XMC-075 lies approximately one kilometer upstream from XMC-057. This camp complex consists of two wood frame cabins and a log cabin in good condition, as well as a partially collapsed tent frame, two sheds, and an outhouse. The structures are arranged lineally along a bench, within a claim patented by the Edison Association Placer Mines. Upstream from the large-scale mining operations of the J.E. Andrus Company, this site has a history of more small-scale ventures. The claim on which the site is located was apparently mined in the late 1910s and early 1920s by Art Powell (Spude et al. 1984: 119). In 1924, Powell, along with one other man, hydraulicked on the left limit bench of the creek (Wimmler 1925: 19). By 1936, the Edison Association had taken over the claims along this stretch of Rex Creek; and three men, using two giants, were again mining the area hydraulically (Roehm 1936b: 4). The structures and some of the artifacts at the site appear to date to the 1940s or 1950s, when the site was occupied by Walter Holmes (Spude et al. 1984: 119). The construction of his log cabin is a variation on the usual theme of horizontal logs joined by notching. This cabin is made of rough-hewn vertical logs, chinked

with canvas and roofed with corrugated metal. One of the wood frame cabins has two rooms and is wired for electricity and plumbed. There are some artifacts recorded within the sheds that appear to be much older than the dwellings, perhaps dating to Powell's tenure on the creek. The creekbed near the site has been heavily mined; there is also evidence of bulldozers and modern gold dredging equipment being used in more recent times. The area around the site was still being mined in 1984 when the HABS crew originally recorded it.

XMC-058 is farther upstream on Rex Creek, outside the claim boundaries of the Edison Association. This hydraulic operation, situated in the canyon wall, consists of two adits with timbered portals. These adits were driven through the rock of the canyon wall to tap placer gravels that lay above. The east adit, approximately 10 meters deep, has one square-set (a structural support) and a timber scatter at the portal. The west adit has three square-sets and a wheelbarrow in the portal, and powder boxes, dated 1942, and Blazo cans scattered about. Both of the adits have stream gravels at their mouths. The historic context of these adits has not yet been identified.

The remaining hydraulic mining site, **XMC-063**, is located on Calamity Gulch, a tributary of Young Creek. The most notable structure at this important site is the Murray-Dimond cabin, still in good condition. This two-room, wood frame cabin has a porch, an attic, a bathroom and shower, and a finished floor and ceiling. The site was originally occupied by Anthony J. Dimond and Joe Murray, who worked the gravels of Calamity Gulch together until 1911, when Dimond injured himself and could not return to mining. Murray continued mining in the area with marginal success for the next decade, but finally leased his claims on Calamity Gulch to Carl Anderson, "Scotty" Atkinson, and Billy Mather. They discontinued their operations in the late 1920s. The original partners, Murray and Dimond, gained more success as lawmakers than they did as miners. In later years, Murray became a member of Alaska's Territorial Legislature, and Dimond assumed the role of Alaska's representative to Congress (Spude et al. 1984: 72-73, 76-77).

Besides the cabin, the site preserves four tent frames, two sawmills, and the remnants of a sizable hydraulic mining operation extending for several hundred meters along the creek. This operation, credited to Anderson, Atkinson, and Mather, includes a trestled wooden flume running from a splash dam on Calamity Gulch to a regulator north of the main cabin. A metal flume pipe extends from the regulator to a hydraulic pit below the cabin. A large number of disassembled flume pipes, steel rail, a standard-gauge handcart, and monitors indicate that a large hydraulic operation was originally planned for the site. At the southwest end of the hydraulic pit are a three-drum tugger and a 1919-1920 vintage, hand-crank Chevrolet pickup. A long tom is also located on the creekbed upstream from the dam.

Unknown Mining Methods. Seven of the sites recorded in the Nizina District are assigned to the category of unknown mining method. These sites lie in peripheral areas of the district, off the main gold-producing creeks mined by large-scale operators. **XMC-070**, a camp located near the mouth of Calamity Gulch, consists of a standing log cabin and the base of a cache. The only mining-related feature in close proximity is a dam remnant across the gulch. The cabin was originally built by Murray and Dimond's prospecting partner, J.D. Fred Stevenson, in 1911. Stevenson worked Calamity Gulch most intensely while he was building the cabin and planned to start a small-scale hydraulic operation on his claims. There is no archeological evidence that these plans ever materialized. He

continued to mine the creek with little success until 1920. The site was occupied again for mining purposes in the 1970s (Spude et al. 1984: 74).

Three campsites are on Copper Creek, a tributary of Dan Creek. **XMC-052** consists of the sill logs of a tent frame adjacent to a short ditch that runs parallel to Idaho Gulch. An assortment of cans and some real rubber rain pants are the only artifacts at the site, which is thought to date to the early 1900s. Farther upstream near the confluence of Texas Creek is **XMC-060**, a camp that consists of two cabins in good condition, a shed, an outhouse, and a doghouse. The construction of the one-story cabin is typical with its saddle notching and its corrugated tin roof, but also shows a variation in its split-log chinking. The two-story building, of recent construction, doubles as a dwelling and a cache. Unlike the unpeeled logs of the older cabin, the logs of this structure were hewn, then saddle-notched and squared off at the corners. The pole supports of the log cache were covered with corrugated tin, forming a living area below. Mining tools are attached to the front porch wall of the older cabin. The construction date of this camp and the history of mining associated with it are unknown. It was being occupied at the time of CRMIM survey in 1986, and thus a complete artifact inventory was not made.

The third site on Copper Creek, **XMC-059**, is still farther upstream, near the confluence of Radar Gulch. This camp, which dates to the 1920s or 1930s, consists of a small log cabin, occupied at the time of survey, and a collapsed cache. A small pile of light rails and some drill steel are the only mining-related artifacts at the site. Between XMC-060 and XMC-59 on Copper Creek, there is evidence of small-scale hydraulic mining that includes hydraulic pits, pipe sections, monitors, a possible dam remnant, and a length of intact flume line complete with a wooden junction box. There is, however, no archeological or historic evidence to tie this operation, possibly dating to the 1920s, with the two campsites despite their proximity.

The final group of mining camps is located on White Creek upstream from the hydraulicking area discussed above for XMC-078. Situated less than one kilometer apart, **XMC-054** and **XMC-055** both consist of cabin ruins with unknown dates. At XMC-054 there are also three adjacent pits that lie west of the ruins, and at XMC-055 there is a small ditch to the south. With the exception of penstock pipe and logs washed down from a dam farther upstream, no isolates were recorded within the claims where the sites are situated. **XMC-079** is still farther upstream. The cabin and tool shed at this site are still standing but are in poor condition. The structures, tentatively dated to the 1940s, appear to be built of salvaged lumber. An Anchorage newspaper inside the cabin is dated 1984. The only evidence of mining at this site is two gold pans.

The Chisana District

In 1913 the attention of northern miners turned to the Chisana region of the WRST area, setting of the last great gold rush in Alaska (figure 9). Geologists noted the presence of gold in a sample taken on the Chisana River as early as 1902, but the inaccessibility of the area discouraged all but a few prospectors during the decade that followed. Among the prospectors were partners William E. James, N. Peter Nelson, and Frederick Best, who came into the area in 1912. James, Nelson, and Matilda Wales (James' long-time companion) are the ones credited with making the big strike in the Chisana District on Bonanza Creek on May 3, 1913. James followed the gold-bearing gravels up Bonanza Creek to

Little Eldorado Creek where he found the panning even more profitable. News of their discovery soon spread far and wide, and by late summer the stampede to Chisana had begun (Brooks 1914b: 315; Capps 1916: 91-92).

Stampeders entered the Chisana region by the thousands and established Bonanza City and Chisana City as the two hubs of the district. Chisana soon eclipsed Bonanza City as the business and governmental center for the district. Although there was a constant stream of travelers arriving and departing throughout the fall and winter, only a few hundred were in residence at any one time. The scarcity of supplies and claims of any value forced most of the newcomers to leave the area as quickly as they had come. At the end of the first winter, the 200 to 300 people who remained had marked the limits of the rich placer creeks within the district. These streams were tributaries to either Chathenda or Chavolda Creeks and lay within a 5-mile radius of Gold Hill. They included Bonanza, Big Eldorado, Little Eldorado, Canyon, Skookum, Poorman, and Glacier Creeks (Capps 1916: 91-94).

During the frantic summer months of 1913, miners throughout the district used hand methods, including pick and shovel work and shoveling into sluice boxes. By the fall of the year, they shifted to drift mining along Bonanza Creek and the benches of Little Eldorado Creeks. According to the diaries of Fred Best, he and other miners on Bonanza Creek burned holes into the frozen ground all during the winter and into the spring in their attempt to reach bedrock (Buzzell 1988b: 5).

Early in 1914, James and Nelson, the major claim holders in the district, leased several claims on Bonanza Creek and No. 1 on Little Eldorado Creek to a mining partnership, which in turn assigned the major portion of their lease to F.T. Hamshaw. Hamshaw's 1914 operation was quite large, employing between 30 - 100 during the season. They mined the creek by ground-sluicing off the upper portion of the gravels, leaving a foot or two above bedrock to be shoveled into sluice boxes. A horse team and scraper were used to clear the tailings away from the lower end of the sluice line whenever a large group of shovelers was working the creek (Capps 1916: 104). In addition to Hamshaw's operation, there were another 21 mines operating, and 325 men working, in the Chisana District in 1914 (Brooks 1915: 60). A value of $250,000 was placed on the gold mined during the 1914 season, the peak year of production for the Chisana District (Moffit 1943: 170).

After the boom year of 1914, the production of gold quickly diminished in the Chisana District as the rich grounds were quickly worked out and shortages of water and wood were a constant problem. Most of the mine operators still working during the 1920s were Chisana veterans who had come in during the stampede. One of the operators was William James, who began hydraulic stripping on historic claim Bonanza No. 9 in 1915 (*Chitina Leader*1915: 5, 43). By 1923, the gravels of Bonanza, Little Eldorado, Gold Run and Big Eldorado Creeks were being mined for the second time around by ground-sluicing or booming, using dams equipped with automatic gates. The dams averaged 100 feet wide and had 8- to 12-foot gates. The miners also used hand-operated derricks to remove large boulders from the creeks. Access into the district during the 1920s was still difficult and freighting still very expensive. The main route into Chisana was a 100-mile trip over glaciers and glacial streams from McCarthy, by pack train in the summer and by dog sled in the winter (Wimmler 1924a: 28).

As in Kantishna, there was a brief resurgence of the mining industry in the Chisana District during the 1930s. The increase in the price of gold to $35 an ounce, an improve-

ment in transportation into the district, and the introduction of new technology were all factors in the increased levels of production. During the winter of 1934, two caterpillar tractors were driven into the district over the new road from Gulkana to Nabesna (Roehm 1936a: 2). Equipment, such as these bulldozers, was put to work exploiting bench gravels, old creek channels, and lower-paying stream gravels not mined in earlier years. From 1934 to 1940, the Nelson Mining Company was the largest operation in the district. Run by N. P. Nelson, one of the founders of the Chisana District, the company employed between four and six men each season and used hydraulic equipment and a bulldozer to mine the bench gravels of Bonanza Creek (Moffit 1937: 105; Smith 1937: 47; Stewart 1937: 64; Moffit 1943: 172). To provide enough water for their hydraulic operations, Nelson and the other operators, such as Earl Hirst, constructed elaborate ditch and flume systems along the hillsides and steep canyon walls of Bonanza Creek (Roehm 1936a: 1).

Only a handful of miners resumed work in the Chisana District after World War II. Four hydraulic operations, a groundsluice operation, a drift mine, and a bulldozer-hydraulic operation were active in the district during 1945-46 (Stewart 1947: 19). The number of operators declined in years to follow. By 1954 geologist Fred Moffit declared that the gold placers seem to be "nearly worked out" (Moffit 1954: 196).

Unlike the Nizina and Kantishna Districts where large-scale placer mining operations were established, placer mining in the Chisana District was always on a relatively small scale. "The remoteness of the area, shortages of water on some streams, and the small extent of deposits all prevented the development of large operations" (Cobb 1973: 115). What was remarkable, considering the hardships of mining in such a district, was the tenacity of some of the earliest prospectors and miners in the area, such as Billy James and Nels Peter Nelson. The two were last seen at Chisana in the mid-1950s, still hoping for one more big strike (Kirchoff 1989: 69). Geoffrey Bleakley (1996) wrote an excellent historical account of the Chisana Mining District that covers the century from 1890 to 1990.

Remnants of the last great gold rush and the decades of mining that followed are still to be found along the creeks and hillsides of the Chisana District. CRMIM crews documented 43 sites and numerous cultural isolates on Big Eldorado, Bonanza, California, Canyon, Chathenda, Chavolda, Coarse Money, Glacier, Gold Run, Little Eldorado, and Poorman Creeks, as well as Alder Gulch and Snow Gulch (figure 20; table 38). For detailed information about the isolates in the district, the reader is referred to *The Chisana-Gold Hill Landscape, A Cultural Landscape Report* (Feldman 1998). Included in the Chisana sample discussed here are 30 sites classified as camps or camps/operations, with a total of 55 habitation structures (table 39). The average size of these structures is 12.6 m^2. Tent frames (also tent platforms and tents) account for 35 of the structures, while cabins account for only 15. There is also one bunkhouse, one modern skid shack, and three other probable habitations. Most of these dwellings, primarily constructed of milled lumber, are in poor condition, with only 36% still standing or in good condition. Also recorded at the Chisana camps are 66 outbuildings (table 40) and a variety of domestic and mining artifacts (table 41). Each of the Chisana sites is described below according to its appropriate placer mining technology.

Prospecting. Five prospecting sites have been recorded in the Chisana District. **NAB-084**, an operation located on a narrow terrace adjacent to Chavolda Creek, consists

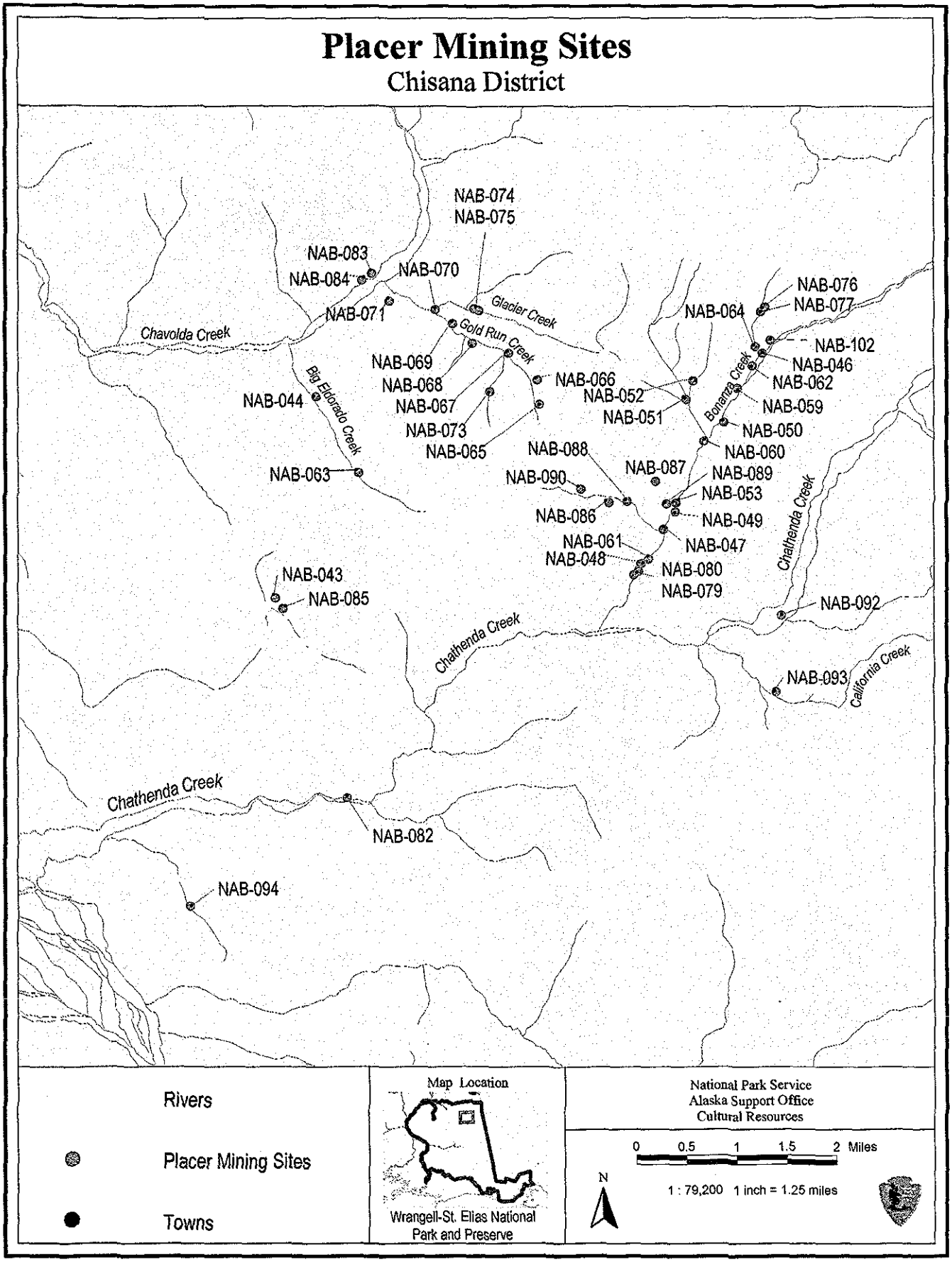

Placer Mining Sites
Chisana District
NAB-074
NAB-075
NAB-083
NAB-084
NAB-070
NAB-071
Glacier Creek
Chavolda Creek
Gold Run Creek
NAB-069
NAB-068
NAB-067
NAB-073
NAB-065
NAB-066
NAB-044
Big Eldorado Creek
NAB-063
NAB-064
NAB-076
NAB-077
NAB-102
NAB-046
NAB-062
NAB-059
NAB-050
NAB-060
Bonanza Creek
NAB-052
NAB-051
NAB-088
NAB-087
NAB-090
NAB-089
NAB-053
NAB-086
NAB-049
NAB-061
NAB-048
NAB-047
NAB-080
NAB-079
Chathenda Creek
NAB-043
NAB-085
NAB-092
Chathenda Creek
NAB-093
California Creek
Chathenda Creek
NAB-082
NAB-094
Rivers
Placer Mining Sites
Towns
Map Location
Wrangell-St. Elias National Park and Preserve
National Park Service
Alaska Support Office
Cultural Resources
0 0.5 1 1.5 2 Miles
N
1 : 79,200 1 inch = 1.25 miles

Figure 20.

Table 38

Placer Mining Sites in the Chisana District by Mining Method

Drainage	Prospect	Hand Methods	Grnd-Sluice/ Booming	Drift	Hydraulic	Unknown
Alder Gulch				NAB-043 NAB-085		
Big Eldorado		NAB-063				NAB-044
Bonanza		NAB-049 NAB-050 NAB-053		NAB-046	NAB-048 NAB-059 NAB-060 NAB-061 NAB-062 NAB-064 NAB-087 NAB-089	NAB-047 NAB-079 NAB-080 NAB-102
California	NAB-093					
Canyon	NAB-086				NAB-088 NAB-090	
Cathenda				NAB-082 NAB-092 NAB-094		
Chavolda	NAB-084	NAB-071				NAB-083
Coarse Money				NAB-077		NAB-076
Glacier	NAB-075		NAB-070	NAB-074		
Gold Run	NAB-067	NAB-065 NAB-069	NAB-066	NAB-068		
Little Eldorado		NAB-051				
Poorman					NAB-073	
Snow Gulch				NAB-052		

Table 39

Habitation Structures at Placer Mining Camps in the Chisana District

AHRS #	Type	Mat'l	Size	Roof	Corner	Chink	Condition
NAB-043	tent frame	log?	8.3 m^2				trace
NAB-044	cabin/tent	log?					trace
	cabin/tent	log?					trace
NAB-046	cabin	lumber	23.6 m^2	print plates			good
NAB-047	cabin	lumber	17.6 m^2	wood/Visqueen			good
NAB-048	tent platf						trace
	tent frame		11.1 m^2				trace
NAB-049	tent frame	lumber	11.1 m^2				standing
	tent frame	lumber	6.7 m^2				standing
NAB-050	tent frame	lumber	11.2 m^2				collapsed
	tent frame	lumber	16.6 m^2				standing
NAB-051[1]	tent frame	lmb/canv	19.2 m^2	Blazo cans			good
	tent frame	lumber	25.9 m^2	Blazo cans			good
	tent frame	lumber	7.5 m^2	Blazo cans			good
	tent frame	lumber	7.5 m^2	Blazo cans			good
	tent frame	lumber	9 m^2	Blazo cans			good
NAB-053	tent platf	lumber	7.5 m^2				collapsed

(continued)

Table 39 (continued)

AHRS #	Type	Mat'l	Size	Roof	Corner	Chink	Condition
NAB-063	cabin	log/lmbr	23.5 m^2	canvas			good
	tent frame	lumber	10.2 m^2				collapsed
	tent platf		11.8 m^2				trace
NAB-065	cabin	lumber	23.4 m^2	tarpaper			good
	tent frame	lumber	11.3 m^2	canvas			good
NAB-066	cabin	lumber	11.4 m^2	tpaper/cnvs			good
	bunkhouse	lumber	9 m^2	brd/batten			good
NAB-067	cabin	lumber	14.1 m^2	ch wire/tpr			collapsed
NAB-068	cabin	lmbr/cnv	10.4 m^2	brd/batten			good
	tent frame	pole	7.2 m^2				collapsed
	skid shack		8.6 m^2				modern
NAB-069	tent frame		10.2 m^2				trace
	tent frame		14 m^2				trace
	dwelling?		9.2 m^2				trace
NAB-071	tent frame	lumber	11.1 m^2				collapsed
	tent frame	pole/lmbr	6.5 m^2				trace
NAB-073	tent		12.9 m^2				trace
	cabin	lumber	18.9 m^2	wood/cnvs			good
NAB-075	tent frame						trace
NAB-076	tent		15.8 m^2				trace
	tent		10 m^2				trace
	tent						trace

(continued)

Table 39 (Continued)

AHRS #	Type	Mat'l	Size	Roof	Corner	Chink	Condition
NAB-077	cabin	log/lmbr?	9.2 m^2				trace
	cabin?		6.7 m^2				trace
NAB-079	tent platf		8.3 m^2				trace
NAB-080	tent frame	log/lmbr					ruins
NAB-082	cabin	log	16.7 m^2	sod	v-notch		good
NAB-083	cabin	log	33 m^2	sod	v-notch	moss	standing
	cabin	log	14.7 m^2	sod	square	various	standing
NAB-085	tent frame	log/canv	6.9 m^2				ruins
	tent frame	log	10.6 m^2				ruins
	tent frame	log/canv	10.9 m^2				ruins
NAB-086	tent frame		32 m^2				trace
NAB-087	tent frame		13.5 m^2				trace
NAB-088	cabin	lumber	5.8 m^2				ruins
NAB-089	tent frame		6.2 m^2				trace
NAB-093	tent	canvas					trace
	cabin?	log/lmbr	12 m^2				trace

[1] NAB-051 - all structures have been modified through decades of use.

Table 40

Outbuildings at Placer Camps in the Chisana District

AHRS	Shed	Outhouse	Cache	Doghouse	Workshop	Other	Total
NAB-043							0
NAB-044			1				1
NAB-046	3	1	2	1			7
NAB-047							0
NAB-048	1	1		1	1		4
NAB-049							0
NAB-05O		1		3			4
NAB-051	1	1	1			2	5
NAB-053							0
NAB-063	3	1	1				5
NAB-065	1	1					2
NAB-066	1	1	1	2			5
NAB-067							0
NAB-068	2	1		2			5
NAB-069							0
NAB-071	2	1	1	4		1	9
NAB-073							0
NAB-075							0
NAB-076							0
NAB-077	1			3		1	5
NAB-079							0
NAB-080							0
NAB-082		1					1
NAB-083	1	2		9			12
NAB-085			1				1
NAB-086							0
NAB-087							0
NAB-088							0
NAB-089							0
NAB-093							0
Total	16	12	8	25	1	4	66

Table 41

Classes of Artifacts[1] at Placer Camps in the Chisana District

AHRS	BLDM	HSHD	PERS	SUBS	FSTR	FPRP	FSER	TRAN	COMM	RECR	MTEQ	MULT	OTHR
NAB-043					+	+					+		
NAB-044		+				+	+				+	+	+
NAB-046		+						+			+		+
NAB-047			+			+	+	+			+	+	+
NAB-048		+	+		+		+	+			+	+	
NAB-049													
NAB-050		+			+	+	+	+			+	+	
NAB-051		+							+		+		+
NAB-053		+	+		+	+	+	+		+	+		
NAB-063		+	+		+	+	+			+	+	+	
NAB-065		+						+	+			+	
NAB-066		+	+		+	+	+	+			+	+	
NAB-067	+	+	+								+	+	
NAB-068		+	+		+		+				+	+	
NAB-069	+	+	+		+	+	+	+		+	+	+	
NAB-071	+	+	+		+	+				+	+	+	+
NAB-073		+	+	+	+	+	+			+	+	+	
NAB-075					+								

(continued)

Table 41 (continued)

AHRS	BLDM	HSHD	PERS	SUBS	FSTR	FPRP	FSER	TRAN	COMM	RECR	MTEQ	MULT	OTHR
NAB-077	+	+	+		+	+	+			+	+	+	
NAB-079					+					+			+
NAB-080		+	+		+	+	+					+	+
NAB-082		+			+	+	+		+		+	+	
NAB-083		+			+	+	+	+		+	+	+	+
NAB-085		+			+	+					+	+	
NAB-086			+		+					+			+
NAB-087					+	+						+	+
NAB-088	+	+			+						+	+	+
NAB-089			+		+								+
NAB-093					+			+					

[1] The abbreviations used for artifact classes are as follows:
BLDM = building materials
HSHD = household
PERS = *personal*
SUBS = subsistence
FSTR = food storage
FPRP = food preparation
FSER = food service
TRAN = transportation
COMM = communication
RECR = recreation
MTEQ = mining tools and equipment
MULT = multipurpose tools
OTHR = other

of a collapsed adit, with rough cut timbers that may have been a door. A spoil pile and a small prospect pit are situated in front of the adit, as is a sheet metal stove, which suggests that there once was a camp at this location. Alternatively, the stove remnants may also be evidence of heating water for thawing the frozen ground in the adit. Another site attributed to prospecting is **NAB-075** on Glacier Creek. This camp and operation consists of two prospect pits, a tent frame depression, and stone cairn that may have been a claim marker. Found adjacent to the tent frame outline were two small pieces of a glass bottle base, colored a deep purple. They date the site to the pre-World War I era. Also in a small stream channel at the site was a ground-stone maul (Accession # ARCC-00115). The origin of this prehistoric artifact was not determined, despite a thorough survey of the surrounding area. A third site, **NAB-093** on California Creek, is composed of two loci. A pit, two meters in diameter, thought to be either a prospect or a drift pit, is at Locus B alongside the fragments of an old canvas tent. A possible cabin foundation and an assortment of camp debris are located at Locus A.

NAB-086 is a campsite associated with early gold prospecting on Canyon Creek. The one habitation feature is the rock outline of a former tent frame. Although there are no features or artifacts related to mining within the site boundaries, there is upstream evidence of limited placer mining, testing of bedrock exposures, and construction materials storage. Among the domestic artifacts at the site are at least four, square "Lipton's Delicious Teas and Coffees" cans, which date to circa 1914 (Mary Pfeil 1995: personal communication). One of these cans has been modified with perforations, some of which have braided wire still visible in them. The bottom of a cylindrical can has been perforated with about 150 small holes. This type of modified can, probably put to a variety uses around camp and at the mines, is common at the CRMIM sites. Also found were soldered cans and a hand-blown, aqua-green glass bottle which, along with the semi-buried condition of the tent foundation, date the site to the earliest years of prospecting and mining in the district.

The fifth prospecting site, **NAB-067**, located on Gold Run Creek, contains a portable churn drill, mounted on a wooden skid. The drill, used to test the bedrock beneath placer gravels, is composed of a cable reel, sand reel, clutches and drive shaft bolted onto an angle-iron frame, measuring 2.4 x 1.2 x 1.5 m. There are an number of associated tools and fittings on or beside the drill; they include a chisel bit, a sinking bar, a rope socket, a pipe bailer (used to remove the cuttings from the drill hole), two square socket wrenches, two pipe wrenches, pipe clamp, and a 2.3-meter-long section of casing pipe. Also associated with the drill are a gold pan, hammer, two double-bit axe heads, an 8-pound sledge, a galvanized pail, and a water trough made from sections of riveted pipe. The type of construction suggests that the drill dates to the 1930s. It was imported from Canada by Ivan Thorall and Iver Johnson in 1956 (R. Spude; 1983, field notes), and apparently used without success in the general area before abandoning it at its present location, which bears no evidence of being a drill hole site. The drill is in good condition and relatively complete, making it a potential museum or display piece. Also at the site is a collapsed wood frame cabin, which is not necessarily associated in time or function with use of the drill.

Hand Mining Methods. The eight sites associated with hand mining methods are located on Bonanza, Chavolda, Gold Run, Big Eldorado, and Little Eldorado Creeks. Two of the three Bonanza Creek sites, **NAB-049** and **NAB-053**, lie on historic claims Bonanza 3A and 3B. These were among the claims most intensively worked, with small flumes and

sluice boxes, in the summer of 1913. NAB-049 retains sections of one of these flumes. It begins 85 meters upstream from the site's two standing tent frames and ends at a collapsed wooden sluice with steel riffles. Also associated with mining at the site are a steam boiler, stripped of parts, a stack of penstock elbows, a 6-m length of riveted pipe, remnants of a wheelbarrow, a pump motor, a row of hand-stacked rocks, steam boiler parts including steam points, and a variety of multi-purpose tools. Approximately 150 meters upstream is NAB-053, which consists primarily of a collapsed tent frame and domestic artifacts. There is a small dam remnant recorded at the site and several mining features recorded as isolates east of the site. These isolates include hand-stacked tailings, augers, a flume, another dam remnant, a penstock elbow, and a possible horse-drawn scraper. Other items evident of the use of horses in early mining in the vicinity are the crosstree of a horse harness and horseshoes found at NAB-049. The rear axle of a wooden wagon (horse-drawn?) is also at NAB-053.

Fred Best and Joe McLennan were identified as the miners on historic claims Bonanza 3A and 3B (Buzzell 1988b: 5,7). According to his diaries, Fred Best and various lessees began drift mining on these claims from the fall of 1913 through the winter of 1914. By May 1914, Best and at least nine other men again began to work the gravels of these claims with a pick and shovel and wash them through dump boxes and sluice boxes lined with pole riffles. Two long flumes carried the creek water across the working cut (Capps 1916: 102-104; Buzzell 1988b: 7). Historic records indicate that these claims were mined again from 1938-1940 by Shushanna Joe and other Natives, using only shoveling-in techniques (Peterson 1977: 90; Moffit 1943: 172). The features and artifacts still at NAB-049 and NAB-053 probably date to both the 1913-1914 and the 1938-1940 periods. One can speculate that the boiler and parts at NAB-049 may actually date to Fred Best's short-lived stint of drift mining on the claims.

The third Bonanza Creek site associated with hand methods is **NAB-050**, approximately 1.6 kilometers upstream of the two sites discussed above. The mining features at NAB-050 include the ruins of part of a flume system and a flume trestle. The flume remains, part of NAB-059 (see Chisana hydraulic section), are located above the rest of the site on a bench overlooking the creek. Dimensional lumber from the flume may have been salvaged to construct the tent frames at this camp and operation. On the opposite side of the creek are several piles of hand-stacked cobbles and boulders, the remnants of a wooden dam, and a possible drift pit. A pickaxe and riveted penstock pipe are also at the site, which appears to date from the 1930s or 1940s. Abundant signs of small-scale hand mining activities are up an unnamed creek that bisects the site. These include rows of hand-stacked cobbles and small boulders, the remains of several small dams, a small ditch system, and a prospect pit. No miner's name is associated with this site.

NAB-069, on Gold Run Creek, is another site associated with hand methods. It appears to date between 1915 and 1925 based on the cans and glass at the site. Although only the foundations and one plank floor remain of the tent frames at the site, a wide assortment of other features and domestic artifacts were recorded. They include two freight sleds, a trash dump, two barrel stoves, both Tuxedo and Prince Albert Tobacco cans, shipping crates, a cobblers boot form, and others. In addition, there is a series of ground disturbances, thought to be an overgrown mining cut; a test or prospect pit; and a dry-piled rock wall, which was probably built from rocks discarded during mining. A rocker box top, hand mining tools, and steam points are also at the site.

A later hand mining site, **NAB-071**, was recorded on Chavolda Creek. It is an extensive habitation site probably occupied during the 1930s and associated with placer mining operations on Glacier, Gold Run, and Poorman Creeks. In addition to the two tent frames at the site, there are two sheds (a wood shed and a tool shed), the ruins of an outhouse, a finely made meat cache with screen sides, four doghouses, and a storage hutch. The usual assortment of domestic items - enamelware pots, Prince Albert and Hills Bros. Coffee cans, stovepipe, and fuel cans - are also at NAB-071. An overgrown roadway that passes through the site probably linked it with placer workings on these other creeks. The only direct evidence of mining at the site is hand tools and two wooden explosives boxes (gelatin-type).

The remaining three sites attributed to hand placer mining in the district all have evidence of both historic and recent occupation. **NAB-051**, on Little Eldorado Creek, dates back to at least the early 1920s, as evidenced by a copy of the "Seattle Daily Times," of October 15, 1922, on an interior wall of one of the site's tent frames. There are five tent frames at this site, all constructed of milled lumber, roofed with Blazo cans, and in good condition. Also in good condition are the shed, outhouse, and cache. An animal enclosure and a water tower used as a shower complete the inventory of domestic features at the site. NAB-051 is attributed to hand mining by virtue of its location in an area of rich placer gravels, mined primarily with shoveling-in techniques. Other types of mining, particularly hydraulicking, may have also taken place near the site. Mining-related artifacts recorded at the site include a hydraulic giant nozzle and some steam points. In recent years, Russell Moody has used the camp structures concerning his mining operations in the vicinity.

NAB-063 is another site that has been occupied in recent years for renewed small-scale mining. This camp and operation, located on Big Eldorado Creek, is sometimes known by the name of the recent claimant as "Dipple's Camp." The camp consists of a plank and split log cabin, with a porch, still in good condition, as well as one collapsed tent frame and the trace of another. There are also three sheds (one historic and two moderns), a plywood outhouse with aluminum news printing plates incorporated in its construction, and a cache of mining equipment at the site. Mining-related artifacts include a wheelbarrow, hand tools, and a sluice box scatter. Several other mining features within about 100 meters of the site have also been recorded as isolates on the creekbed. These isolates include an historic mining area with extensive hand-stacked tailings, a prospect pit, ground-sluicing area, and a windlass. An historic water supply ditch runs along the hillside, just upslope from the site (National Park Service 1992a). Recent mining on Big Eldorado has not significantly altered the setting of the features that still exist on and around this site, leaving the landscape much as it was when historic mining activity ceased on the creek in the late 1930s (Hovis 1990b: 3).

Recent occupation is also evident at **NAB-065**, located on Gold Run Creek. The domestic structures at the site, situated in an area of recent low-level placer mining, appear to have been built within the last 20-30 years from salvaged wood and canvas. The interior of the one cabin is well equipped, with every indication that the occupants intended to return. Older features at the site include a building platform and a ditchline. A profile of the ditch suggests it was constructed with a horse drawn plow and then finished with hand tools. The intention of the ditch-builders was probably to collect and channel seepage from the wet tundra covering much of the area. The remnants of what may have

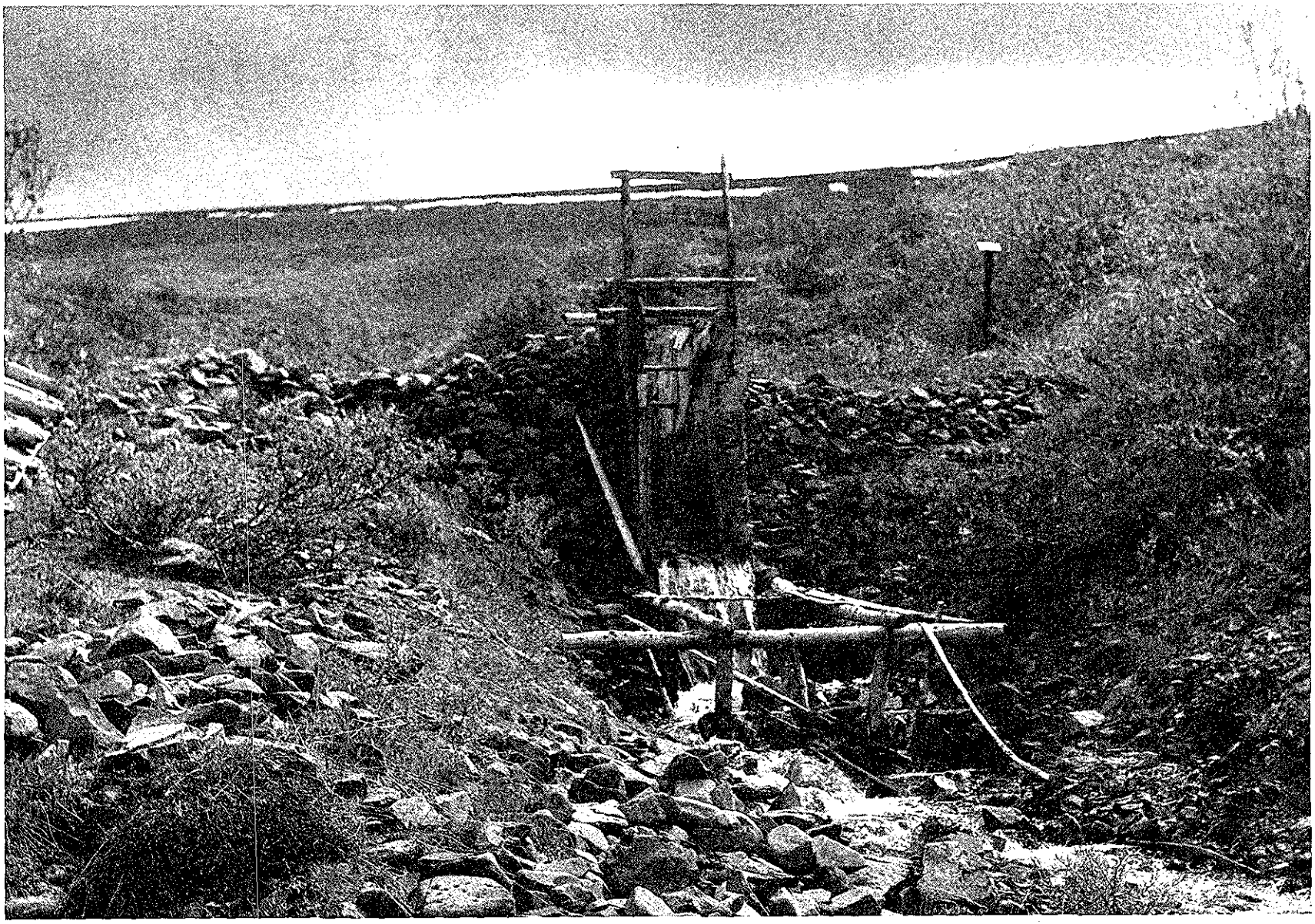
been a long-tom, for washing placer gravels, was near the building platform. Also recorded at the site are five weathered sections of a wooden sluice or flume. The ditch, platform, and long-tom may date early hand-mining operation on Gold Run Creek, while the sluice or flume sections are typical of 1920s construction.

Ground-Sluicing. Although ground-sluicing was a common method of mining used in the Chisana District, the archeological evidence of it is sometimes difficult to interpret or is obscured by more recent mining activities. The best evidence is usually in the form of automatic or boomer dams, such as those at **NAB-066** on Gold Run Creek. The dam at NAB-066 is still an imposing feature, measuring 10.4 x 2.8 m. Constructed of hand-piled stones and earth, the well-preserved dam is equipped with a spillway, wood gate, and pole frame below the dam to support the boomer deck. The boomer deck, no longer preserved on this dam, would absorb the initial impact of the rushing water and deflect it way from the base of the dam, causing a booming sound; thus, the name. A wooden rocker box, shovels and a pick lie in the streambed near the dam. Another rocker box is located downstream from the dam near large piles of hand-stacked tailings, dating to the same era as the boomer dam. According to Capps (1916: 112), this area of Gold Run Creek was worked in 1914, and a dam was built to impound water for ground-sluicing. The dam still in existence at NAB-066 is probably the same one referred to by Capps. It serves as a tangible reminder of the labors of the early Chisana miners during the gold rush days.

Other mining equipment at a storage area feature at NAB-066 includes five sets of pole-riffles, another rocker box, a dump box for a sluice, a gold pan, and shovels. This equipment may be associated with the domestic structures at the site that date to the 1920s. A cabin, constructed of salvaged wood of various sizes and covered with white canvas over tar paper, is still in good condition. A very small bunkhouse, measuring only 9 m^2, is also in good condition. Several other features are at the site, including hand-stacked tailings, piles of lumber and poles, a can dump, and various artifact scatters. Leather harness fragments may indicate that the use of dogs for transportation was once an important activity for the miners.

A second ground-sluicing site is **NAB-070** on Glacier Creek. A dam, which was the central element of ground-sluicing operations on the lower portion of the creek, has been breached and its parts scattered widely on the streambed below the site. At this operation, there are portions of the dam still anchored to both sides of the creek. They consist of log supports, rock cribs, and dimensional lumber. NAB-070 also preserves remains of past hydraulic operations in the form of a possible regulator and sluice or flume sections. Miners at this site constructed a terrace from stream cobbles and rock originating on the hillside. An upright boiler, 2.4 m high, rests on this terrace, along with lumber, pipe fittings, a ladder, and other miscellaneous artifacts. Whether the boiler was used in conjunction with drift mining is unknown. Although not highly portable, it may have been moved around to sink test pits or to thaw areas of frozen ground to be mined later. A board and canvas scatter also at the site may be remnants of a tent frame that covered the boiler or facing stripped from the dam.

Drift Mining. CRMIM crews recorded a total of 10 drift mining sites in the district. They range from small operations with evidence of only short-term occupations to large camps and operations with many domestic features, evidence of multiple periods of occupations, and various methods of mining. These sites are widely distributed across the district and are not narrowly restricted in time to the early gold rush days, as one might



This boomer dam (NAB-066), used in ground-sluicing on Gold Run Creek in WRST, probably dates to 1914.

infer from the historic literature. In addition to the sites, there are several isolates associated with drift mining, such as drift pits and windlasses, recorded in the district, particularly on Big Eldorado Creek (NPS 1992).

The smallest drift mining sites are two operations, **NAB-092** and **NAB-094**, located on Chathenda Creek. The former consists only of two drift pits, measuring 2 m x 3 m x 60 cm deep and 1.5 m x 2 m x 40 cm deep. Several sawed logs are also scattered about the site. The latter is composed of a drift pit, measuring 2 m in diameter and 70 cm deep. Posts and poles, some notched, are in the pit and others are around the pit. An upright post-and-board fragment is also located on the east side of the pit, and a spoil pile on the north. Some of the posts apparently formed a superstructure and some appear to have been shoring for the sides of the pit. Neither of these sites has been dated. They appear to represent brief periods of site occupation, perhaps for only one season.

A more extensive drift mining operation is at **NAB-052** on Snow Gulch. The site, which lies on a bench above the creek, consists of a boiler, surrounded by the remains of a pole-and-lumber structure that had previously enclosed it. A drift pit with timber supports, a rocker box, flume sections, a steam point, and other small pits and piles of cobbles were also at the site. The remains of a ditch are located on the opposite bank of Snow Gulch. Drift mining at the site is estimated to date from the 1930s, based on the style of boiler and a glass bottle also found there. The bench on which the site is located was extensively worked before the 1930s drift mining operation was established there.

Another drift mining operation is **NAB-074** on Glacier Creek. The archeological evidence consists of some wooden framing that appears to be a windlass and two tarnished brass globe valves for steam or cold water pipes. Other mining-related features at the site include the remnants of a boulder diversion dam, a possible log-and-lumber dam, an old mining area off the stream channel, a scatter of flume sections made with peg and dowel construction, the bottom of a 55-gallon drum modified into a bucket, pipes, pipe fittings, small hand tools with carved wooden handles, and a wheelbarrow. Hand mining methods have also been used at the site at some point in its history. The site is thought to date to the 1920s or 1930s based on the flume construction and the appearance of the hand tools.

All the other sites attributed to drift mining in the district have camp features associated with them. The oldest of these may be **NAB-082**, a camp and operation located in a stand of spruce on an alluvial terrace adjacent to Chathenda Creek. Two drift pits, each measuring 1.5 x 1.8 m were recorded at the site. One of the pits is surrounded by a berm and associated with what appears to be a small spoil pile. Soldered cans with a variety of closure styles in the can dump suggest that the site's one-room cabin may have been occupied around the time of the original Gold Hill Stampede. This cabin is one of the few examples of log cabins in the Chisana mining camp sample. It has inverted V-notching, logs hewn on their interior sides, moss chinking with some nailed-in battens, and a roof of unpeeled poles and sod. Considering that sod is moisture retentive and the roof does not have a metal or shingle outer layer as waterproofing, it is remarkable that the cabin is still standing.

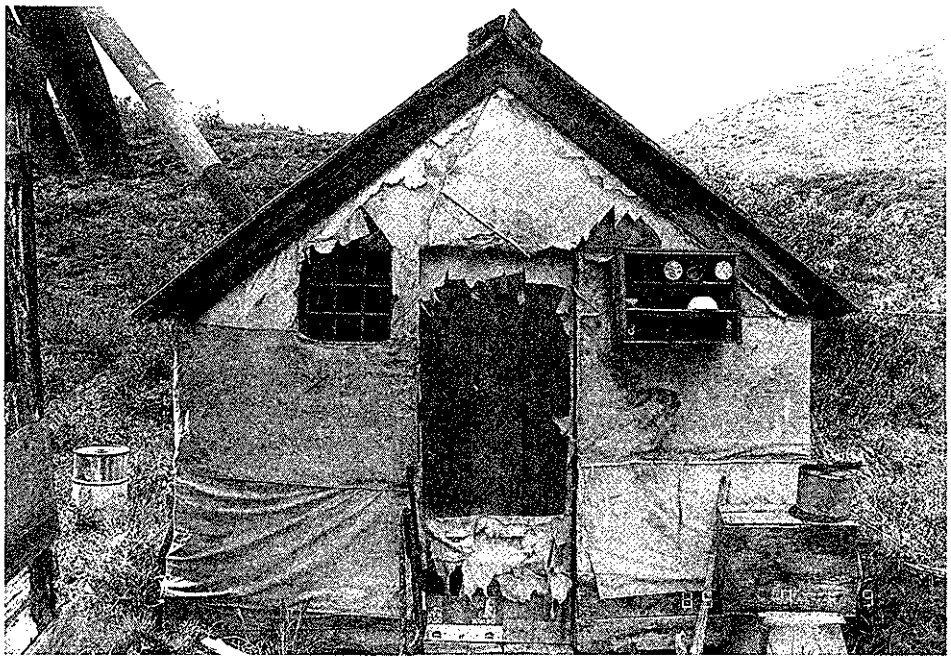
Two other drift-mining sites, probably only occupied on a short-term basis during the 1920s or 1930s are **NAB-043** and **NAB-085**. These sites are near each other at one of the Alder Gulch lakes. NAB-043 consists of a tent frame ruins, two collapsed drift mine shafts with timber cribbing, and a collapsed windlass. At NAB-085 are the ruins of three tent frames, an unusual stacked-stone cache, and a small assortment of domestic artifacts.

There is also a "sinking bucket," commonly used in drift mining. The bucket is hand made, mostly with 1 x 8 inch boards. Hand-stacked rock piles line both sides of the creek at the site and may indicate that hand-mining or ground-sluicing also took place there. Ladders, shovels, and a gold pan complete the assemblage of mining-related artifacts at NAB-085.

NAB-077, a camp and operation on Coarse Money Creek, appears to date to the 1940s or 1950s on basis of the artifact inventory associated with the domestic features at the site. Two of these features, thought to have been cabins, are represented only by foundations, which probably indicates that the original structures were salvaged for their lumber. There is also a shed, probably used to hang meat, three doghouses, and the plank floor of another outbuilding. The usual assortment of domestic artifacts, including a bellows used for blacksmithing, is also at the site. An open shed built over a winter drift pit lies on a narrow bench on the opposite side of the creek from the camp itself. This shed, which has a plank floor supported by spruce poles, is in danger of collapse because of down slope soil movement. Also at the site are a flume, two gold pans, a pick head, and wheelbarrow. The presence of isolates, such as dam remnants, flume systems, and ditches immediately adjacent to the site or nearby on the creek suggests that drift mining was not the only method employed during the history of mining on Coarse Money Creek.

The remaining two drift mining sites are more extensive than the others and are similar in that both have evidence of recent occupation. One of these sites is **NAB-046** on Bonanza Creek. The main cabin at the site is reported to have been the first post office on Bonanza Creek, built around 1915, and originally located at the mouth of Little Eldorado Creek. It was moved to its present location on Bonanza Creek sometime later (the date is unknown) by N.P. Nelson, who used the site as his headquarters for many years. The camp was later occupied by Ivan Thorall, who has mined in the area since the 1950s. The wood frame cabin is T-shaped and is roofed with tin offset printing plates. There are also three sheds, all roofed with scrap tin, an outhouse, two caches, and a doghouse. The camp contains a variety of mining-related features and artifacts, including drift mining boilers, a disassembled hydraulic giant, sluice boxes, and the flume section of what appears to be the Coarse Money Creek dam (NAB-076). Mining methods associated with this camp undoubtedly changed throughout the decades of its use. Although evident at the site, drift mining was not necessarily the most significant method in terms of time expenditure or gold production.

NAB-068, the second large drift-mining site with a recent occupation, is located on Gold Run Creek. Included in the habitation features are a board and canvas cabin, in good condition, and well-stocked with provisions; a collapsed tent frame; a modern skid shack; a storage shed; a blacksmith shed; and two doghouses. One of the household tables is surfaced with 1973 offset printing plates. In addition to the domestic features, the site contains features related to drift mining, ground-sluicing, and more recent methods of mining. The drift-mining features include five pits or depressions, some of cribbing or ladders; spoil piles adjacent to the pits; a portable steam boiler with sheet-metal housing; two windlass remains; and a square-sided, tapered wooden bucket with rope handles typically used to raise gravel from small-scale drift pits. Two of the pits mentioned above were dug into a bulldozed road, indicating that the work was done sometime after the mid-1930s when the first bulldozers came into the district. A ditchline, diverted stream channel, dismantled flume or sluice, equipment scatters, and a recent dumpbox and equipment are also at the site. It was occupied during the 1970s and early 1980s by Mr. Dipple,



Canvas and board cabin (NAB-068) typical of the habitation structures in the Chisana District of WRST. This cabin was occupied by Mr. Dipple as recently as the 1980s.

whose name is associated with other camps in the Chisana District. NAB-068 is a good example of the integration of older equipment and features into newer, small-scale, placer operations.

Hydraulic Mining. Hydraulic mining sites, located primarily on Bonanza Creek, are well represented in the Chisana District. The remnants of four water diversion systems, along with their associated camps and operations, form the core of these sites. The first of these systems, designated as **NAB-059**, consists of both flumeline and ditch and extends for approximately 1.5 km on the east side of Bonanza Creek. The flumeline begins at a prominent rock feature known as Castle Rock and continues downstream for 1.2 km over some steep, rugged terrain. A ditchline, which begins just below the confluence of Bonanza and Little Eldorado Creeks, runs parallel with, and slightly downslope from the flume for about 300 meters, and then continues alone for another 300 meters or so. The flume system includes the remains of a holding dam; a dump box to catch rocks and silt; stretches of the wooden flume structure; sections of flume foundation; the remnants of a number of turnouts, regulator boxes, flume bridges; and the ditch. This water diversion system was designed to divert water from upper Bonanza Creek to hydraulicking areas below its confluence with Little Eldorado Creek. A sluicing area, which consists of a pile of riveted metal water pipe and short ditches equipped with riffles, was added after the flume was abandoned as it has destroyed a large section of the flume foundation. The ditch was probably also built later than the rest of the flume system as a way of extending the system farther down the Bonanza Creek valley to another hydraulic mining area.

The ditch portion of the flume system gradually disappears above a large hydraulic extraction area, designated as **NAB-060**. This site consists of two loci. Locus 1 consists of a pit dug out of the side of the bench using hydraulic giants. The lower end of the pit contains an earthen deflective dam, two giants, and a line of sluice boxes with rail riffles, still in their original context. The features at this locus well illustrate how hydraulic mining was done: the giants discharged water under pressure to wash the gravels from the bench, while the dam channeled the water-driven pay gravels into the line of sluice boxes where

gold was eventually recovered. Also at this locus were pipe valves and Y connectors for the water pipes, which have been removed from the site, and several shovels. Locus 2 is an area of extensive hydraulic mining, ca. 300 m long and 100 m deep, that has been cleared to bedrock. The features at this locus include a series of sluice box support poles; recent camp and dam remains; and a scatter of equipment, both recent and older. The older artifacts consist of shovels, pole riffles, picks, pitchforks, an outhouse seat, and what appears to be a portable forge.

NAB-059 and NAB-060 preserve the remains of N. P. Nelson's large hydraulic operations on Bonanza Creek that date from the mid-1930s to 1940. Nelson built the flume system, NAB-059, to provide the water and water pressure necessary to mine the buried creek channels on historic claims Bonanza No.5 and 6. Although the portions of the flume system are in ruins, other sections retain their structural integrity. NAB-060, still barren of vegetation several decades after abandonment, is an excellent example of a hydraulic extraction site. Together the sites provide an illustration of the engineering and technological details of a complete hydraulic mining operation.

The second set of related hydraulic sites on Bonanza Creek are **NAB-048** and **NAB-061**. These sites are located on the east bank of lower Bonanza Creek between 1-2 km downstream from N.P. Nelson's operation described earlier. NAB-061 consists of two distinct hydraulic mining excavation pits, designated at locus 1 and locus 2. Much of the bench at locus 1 has been excavated, leaving an oval pit surrounded on three sides by steep gravel and bedrock walls. The pit includes an assortment of different sizes of riveted, metal water pipe, a regulator box that was part of a flume system, portions of the foundation of the rest of the flume system, a storage box with steam boiler plumbing parts, and sluice box parts. Locus 2, located about 90 meters farther upstream, is a series of open cut hydraulic excavations surrounded by bedrock walls. A turnout box and part of the flume system, which extends upstream for another 300 meters or so, is the principal feature associated with this portion of the site. Most of the flume system that supplied water to the two extraction areas has disintegrated or the lumber has been salvaged for use elsewhere.

NAB-048 adjoins Locus 1 of NAB-061. The camp features - traces of a tent frame and a tent platform, a shed (once attached to the tent frame), a two-story outhouse, and a collapsed workshop/blacksmith shop - are built on a terrace made of tailings from the earliest days of mining in the district. Among the domestic items at the camp are various "transportation artifacts," such as wagon and sled parts, and a snowshoe. Small mining equipment and steam boiler parts were also recorded at the site. There is a hydraulic mining area, along with a regulator and penstock, recorded as isolates directly across the creek from the site. NAB-048 is the camp used as the base of hydraulicking operations for Earl Hirst from 1935-1940. Hirst was one of the few miners who turned to hydraulic mining in the Chisana District during the mid-1930s. He built the flume system (NAB-61) along the canyon to carry water to his hydraulic operations behind the camp, on benches on the east side of Bonanza Creek where he uncovered an old creek channel. Hirst used steam boilers to thaw the frozen gravels before hydraulicking them into sluice boxes, and employed 1-4 men each season (Moffitt 1943: 172).

The third flume system, designated as **NAB-064**, extends for almost 2 kilometers along the west side of Bonanza Creek. The various components of this water diversion system include sections of ditchline, a flumeline with some intact segments of wooden

flume boxes built on an excavated bench above the stream, and a section of flume foundation, now covered by a road. The most prominent features of the water diversion system are a holding dam, constructed of logs and dimensional lumber and still partially intact, on Coarse Money Creek, and a wooden bridge or trestle that crosses a small, unnamed tributary of Bonanza Creek. The ruins of a dam at the head of the ditchline, an isolated flume box section, an old horse plow, and a scatter of artifacts are also associated with this linear site. This water diversion system was probably constructed in stages in different periods and perhaps by different miners. The only mention of such a flumeline in the literature dates to a newspaper account written on August 17, 1915. The article states that W. James, his brother, and crew of 6 men stripped Bonanza No. 9 hydraulically with a nozzle connected to the end of a 1,000-foot flume extended from the mouth of Coarse Money creek. James and Nelson were extending a ditch that would connect with the flume used by James (*Chitina Leader* 1915: 5,43). Whether James and Nelson continued with this project or another miner completed it later is unknown. Also unknown are the exact locations where water from this system was used for hydraulic mining. One possibility is the area bounded by the confluence of Bonanza and Little Eldorado Creeks on the south and the former flumeline (now a road) on the north (L. Hovis: 1994, personal communication).

NAB-062 is a staging area for placer mining equipment that lies adjacent to NAB-064, about midway along its length, on a low bench just above Bonanza Creek. The equipment includes riveted pipe in a variety of lengths and diameters, pipe connectors, sluice box sections, a keystone drill mounted on skids, a disassembled hydraulic giant, and a horse drawn scraper. Also located on the bench are rock piles, probably indicating that placer mining had taken place on the bench before its use as a staging area. The extensive amount of pipe and the giant suggest that the site was used in conjunction with a hydraulic mining operation, although the operator and date have not been identified. Considering its proximity to NAB-064, one could speculate that the two sites were related and pertained to the same operation.

The fourth water-diversion system, **NAB-090**, is located along the Canyon Creek drainage. It consists of a ditch that extends for 4.4 kilometers from the headwaters of Canyon Creek, along the hillside north of the creek, down a small, unnamed drainage, referred to as "Ewe Gulch," to a hydraulic mining cut just above Bonanza Creek. A sod dam diverted the flow of water from the headwaters of Canyon Creek into the ditch, which at one time also caught water from small rivulets flowing down the hillside. The flow of water was controlled on the "Ewe Gulch" section of the ditch by a header box, two small reservoirs, and a flume that consisted of 10 sections, each 3.7 m long, resting on wooden supports or on short trestles. The flume ended in a large hydraulic mining cut, measuring 20 m long by 10 m deep. Two horse bridles and a few other artifacts were in this cut. Two long-handled, round-nosed shovels found along the ditchline are reminders of the labor involved in hand-trenching such an extensive system.

Three camps, **NAB-087**, **NAB-088**, and **NAB-089**, are thought to be associated with the construction and maintenance of this ditchline. NAB-087 and NAB-089, located about 200 meters apart on "Ewe Gulch," consist only of tent frame foundations and small assemblages of domestic artifacts, dating to the 1920s or 1930s. NAB-088, located on Canyon Creek, is the ruins of a cabin occupied sometime between the 1920s and the 1940s. The

only mining-related artifacts recorded at NAB-088 were a pick and a shovel. The historic context for all four of these sites is unknown.

The remaining hydraulic site in the district is **NAB-073**, a camp and operation extending for some 900 meters along Poorman Creek. The mining features at the site indicate that hydraulicking was probably the last in a series of placer methods used on the creek over a period of two or three decades, beginning in the gold rush days. These features include hand-stacked tailings; two prospect pits; ditch remnants; a collapsed plank dam; a boomer dam; a dam connected to heavy riveted pipe and associated with a regulator box; riveted penstock of decreasing diameter; a monitor housing; two stacks of flume sections and isolated flume sections; several sluice sections; a rocker box; shovels; picks; and a gold pan. Also recorded downstream from the site are the remnants of an eroded ditchline, which diverted water from Poorman Creek to Gold Run Creek. A tent frame at this site, now only a trace, was reportedly occupied by Earl Hirst, an early Chisana stampeder who prospected on Poorman Creek (Ivan Thorall: 1982, interview on file NPS), and later had a hydraulic operation on Bonanza Creek. The identities of the miners who worked Poorman Creek with hydraulic methods during the 1930s or 1940s are unknown. They left behind a two-room cabin with a front porch, still in good condition, but rapidly deteriorating at the time the site was recorded. Among the artifacts remaining at the site are several modified cans, one of which appears to be a strainer made from a coffee can.

Unknown Methods. Seven of the sites in the Chisana District have not been assigned to a specific type of placer mining; four of them are located on Bonanza Creek. **NAB-047** is a camp consisting of a wood frame cabin in good condition and an assortment of artifacts. It was occupied from at least 1931 (the date of a newspaper on the inside wall) until 1990. Residents probably used various mining methods through the decades. A boiler, a gold pan, and a suction dredge are among the artifacts, both recent and historic, recorded at the site. Like many of the sites in the district, there are artifacts, i.e., a sled, forge, and hood, indicating that both dog mushing and blacksmithing were auxiliary activities to mining at the site.

NAB-102, located at the upper end of Bonanza Creek, also has evidence of a variety of mining techniques. Features at the site consist of ditches bordered by hand-stacked tailings and three pits, related to either drift mining or prospecting. One of the pits was excavated by a bulldozer and is associated with large spoil piles. Artifact scatters at the site include sluice box remnants, shovels, a pick head, and a gold pan. Domestic artifacts suggest that the site once may have been a camp, despite the lack evidence of a habitation structure.

NAB-079 and **NAB-080** are camps situated approximately 200 meters apart, well above the stream channel on Bonanza Creek. NAB-079 contains the remains of a tent platform and a very small artifact assemblage. NAB-080 contains the ruins of a tent frame and larger assortment of artifacts, including what appears to be a woman's shoe. Neither site has artifacts or features directly related to mining. There are, however, several isolates such as a dam remnant, sluice box and tool scatter, and an historic mining area located on the creekbed below them. The dates of occupation for NAB-102, NAB-079, and NAB-080 are unknown.

The remaining three sites in the category of unknown mining methods are camps located on various creeks throughout the district. **NAB-044** on Big Eldorado Creek consists of the sill logs of two cabins or tent frames, some domestic artifacts, hand-drilling

equipment, pipe fittings probably used in conjunction with a boiler for thawing frozen ground, a wheelbarrow, and other mining-related tools, including a modern rock hammer. The site appears to date to the 1930s based on the condition of the galvanized steel artifacts. A possible water diversion ditch is located between the site and the creek, and another one is located on the opposite bank. Just upstream from the site are rock piles, the remains of a dam, and a ditch.

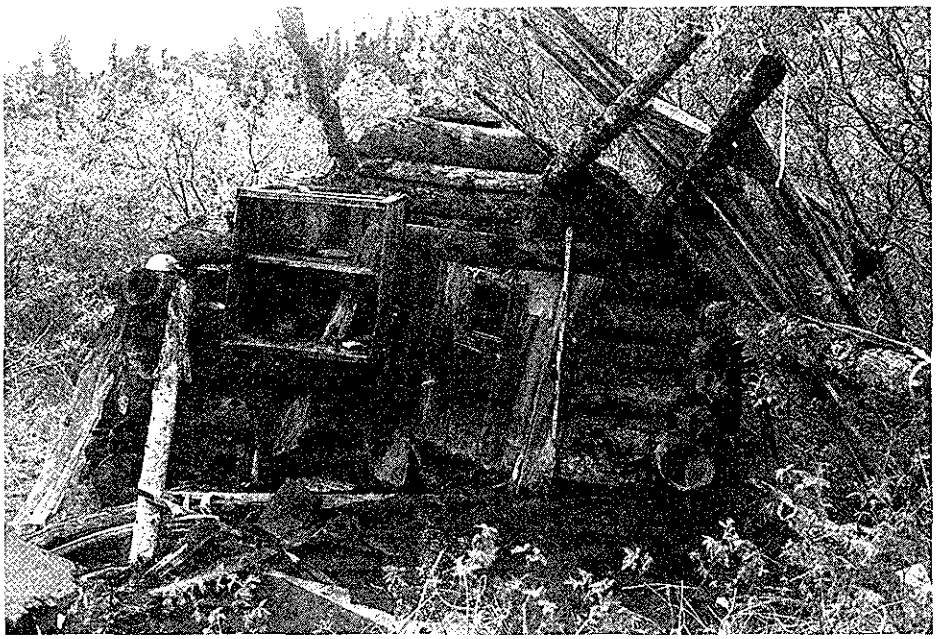
NAB-76, located on Coarse Money Creek, comprises the remains of three tent frame foundations and a can scatter that appear to date to the first few years following the Chisana stampede. A rock dam with a wooden gate, probably more recent than the tent frame, lies in the creek about 25 meters south. This dam may actually be associated with NAB-077, a younger mining site immediately downstream from NAB-076.

NAB-083 is an extensive camp on Chavolda Creek and contains two standing, but badly deteriorated cabins. The smaller of the two has square-notched logs, chinked with canvas, and had a sod-covered slab lumber roof. The second cabin measures 33 m^2, including an add-on pole, lumber, and canvas porch. A handmade, wooden double bed of exceptional quality, still standing within the crumbling walls of the cabin, and a handmade, wooden doorknob attest to the woodworking skills of the miner/cabin-builder. There are also 12 outbuildings at the site: a shed, two outhouses, and nine doghouses, along with a wide assortment of other miscellaneous domestic features and artifacts. Most of the household furnishings have been homemade; one of the wash basins is marked with the initials "K.E.R.". One might speculate that this cabin was the home to a couple, rather than a solitary male miner. A badly deteriorated sinking bucket and a pipe elbow are the only indications of mining found at the site. The occupation at NAB-083 may be associated with either of two nearby sites: NAB-045, a sawmill described in chapter 14 or NAB-084, a prospecting site discussed earlier.

The Circle/Eagle Districts

The boundaries of YUCH encompass portions of both the Circle and Eagle mining Districts (figure 10). The area of the most concentrated mining in the Circle District, the larger and more productive of the two, lies primarily to the west of the preserve and includes such notable placer creeks as Birch, Mastodon, and Mammoth Creeks. Birch Creek was the scene of the first gold discovery in the district, made by Cherosky and Pavaloff in 1892 (Yeend 1991: 2; NPS 1990c: 36). News of their discovery reached the Fortymile River area and enticed many miners north to seek their fortunes. The town of Circle was soon built on the Yukon River to serve the miners, and within only a few years the population had grown to 700 people, living in the largest log-cabin city in the world (Grauman 1977b: 61). Gold discoveries in 1895 on the American and Seventymile Rivers (now in the Eagle District) brought even more miners into the country, but the real influx did not occur until 1898, following the rush to the Klondike.

The overflow of Klondike stampeders led to considerable prospecting along the streams tributary to the Yukon between the international boundary and Circle (Brooks 1907: 198). Thus, the first gold strikes within the YUCH boundaries were made on Yukon tributaries, such as Fourth of July, Sam, and Ben Creeks, just before the beginning of the twentieth century. Towns, including Seventymile City (later moved and renamed Star City), Ivy, and Nation, also sprang up at that time. By May 1898, the town of Eagle had been established and served as the hub of mining in Interior Alaska for a brief period



Chavolda Creek camp (NAB-083).

The last standing wall of one log cabin at the site (above).

A homemade double bed found inside the cabin (below).



(Grauman 1977b: 79-86). As seen again and again during the gold rush era, the boom period for Eagle soon faded and prospectors and miners moved on to the site of the next big gold strike. By 1902, the rush was on to Fairbanks, and the flurry of mining activities near YUCH quieted down for a time.

During the first decade of the twentieth century, simple mining methods with a maximum amount of human labor characterized mining in the Circle/Eagle Districts. Only the richest parts of the gravel were mined by "shoveling-in" during the summer and drift mining in winter. The winter work was aided by the use of steam bucket hoists and steam points (Brooks 1907: 188-189; Yeend 1991: 38). Mineral Creek, a tributary of Woodchopper Creek was one of the productive placer streams in the YUCH region in those early years. Eighteen men in 1906 were at work on the creek, using one small hydraulic plant for stripping the overburden, three steam hoists, and a great deal of energy shoveling gravel into sluice boxes (Brooks 1907: 204).

A steam-powered scraper was the first piece of heavy equipment to be introduced into the YUCH area (Eagle District) in 1911. It was brought up Fourth of July Creek from the Yukon River, under its own power, a distance of about 10 miles. A large hook, used as a deadman, was secured in holes dug in the frozen ground, and the scraper was pulled forward on its foundation of logs by means of cables attached to a drum (Prindle and Mertie 1912: 207-208). The scraper, brought into the area by James Taylor, was used in conjunction with hydraulic equipment to mine more efficiently the gravels of Fourth of July Creek. By 1919, Taylor joined with B.D. Vanderveer and Paul Rhodius to form the July Creek Placer Company, and for the next several years, they ran a successful hydraulic operation on a large claim block on Fourth of July Creek. At times, the company employed up to 20 men (Kain 1994a: 7).

The problem of supplying adequate water to the hydraulic works was solved by George Matlock, who became manager of the July Creek Placer Company in 1922 (Kain 1994a: 7). The company built more than 10 miles of ditchline, supposedly hand dug to four feet deep. Several men, who lived along the ditchline during the summer months, kept up its maintenance (D. Layman 1994: personal communication). An upper ditch funneled water from the headwaters of nearby Washington Creek to upper Fourth of July Creek, where it joined a lower ditch that conducted the water to a penstock. From there, water ran through a chute to a small reservoir, another penstock, then 800 feet of pipe to the hydraulic pit. Giants with 3-inch nozzles moved the gravels in the pit, while a similar-sized giant was used for stacking the tailings. Despite the extensive ditch system, the water supply was meager. It was impounded in the reservoir during most of the season and used only intermittently (Wimmler 1925: 49-50). During the late 1930s, there were at least two hydraulic operations on Fourth of July Creek. July Creek Placer Company continued to operate until 1940, and by 1943 all placer mining came to a halt by orders of the War Production Board (Kain 1994a: 8).

Although Fourth of July Creek was one of larger producers in the YUCH region during the early 1930s, there were even larger developments afoot by 1934. Ernest Patty, a mining engineer at the University of Alaska, prepared for bringing in a dredge to mine the gravels of Coal Creek. Patty was associated with Maj. Gen. A.D. McRae, a Canadian financier, and together they formed Gold Placers, Inc. to undertake this large-scale venture. A pontoon-type bucket dredge, broken down into parts, arrived in Coal Creek in October 1934, and was reassembled and ready to run by July 1935. In order to thaw the

frozen alluvium of Coal Creek, a hydraulic crew worked ahead of the dredge, stripping and thawing. During the summer season, the dredge was operated around the clock and could handle about 3,000 cubic yards of gravel in a 24-hour period (Mertie 1938: 253-254). By the end of the first summer season, production totaled 3,484 oz. of gold and 382 oz. of silver, valued at more than $122,000. Pleased with their financial success, Gold Placers, Inc. made plans to purchase claims on Woodchopper Creek, one drainage to the east, and begin a second dredging operation under the name Alluvial Gold, Inc. By 1937, the Woodchopper dredge was completed and began operating during the first week of July (Johnson and Kain 1993: 15-16; Mertie 1938: 253-256).

Dredging on Coal and Woodchopper Creeks continued until World War II, when almost all gold mines in the country were closed per the War Production Board order L-208. Dredging was resumed on these creeks after the war years with limited success. By 1964 the Woodchopper operations came to a close. The Coal Creek dredge continued to be used intermittently until 1975 (Cobb 1973: 119; Johnson and Kain 1993: 16; NPS 1987: 15). These two dredges, along with other dredges and draglines in operation in the Circle District, are responsible for most of the total gold production reported for the district (Cobb 1973: 119).

Despite the large-scale production possible with dredges, mining on a small-scale continued in the Circle District throughout the 1930s, early 1940s, and after World War II. An excellent example is in the history of the Sam and Ben Creeks, worked by a succession of independent miners from 1898 until the late 1970s. Alfred Johnson and Sandy Johnson (no relation to each other) staked claims on the creeks in 1898 and settled into long-term subsistence mining lifestyles. They prospected, drift-mined, and mined with hydraulic methods during their tenure on the creeks. Arthur Reynolds was another miner who adopted the same way of life, spending the last 23 years of his life (1927-1950) on Sam Creek. After 50 years on the creeks, Sandy Johnson sold his remaining claims on Ben Creek to Barney Hansen in 1944. Hansen, in turn, sold the claims to James R. Layman in the early 1960s. Layman and his son Dennis continued to mine in the area until the late 1970s (Kain 1994b: 8-9). As with their predecessors, the Laymans used hydraulic methods and automatic dams and incorporated bulldozers into their mining operations (D. Layman 1994: personal communication).

The history of mining in YUCH would be incomplete without mention of Joe Vogler of Fairbanks, who purchased the Woodchopper Creek claims from Alluvial Gold in 1971. By 1976, he had acquired 59 more claims on the drainage. Most of his mining activities, using a front-end loader and a trommel, were along Mineral Creek, a Woodchopper Creek tributary (National Park Service 1990c: 40). Vogler's political opinions and his vocal opposition to the National Park Service often launched him into controversy as well as into the limelight.

Forty-nine CRMIM sites recorded in YUCH, ranging from simple prospecting operations to extensive dredge-mining camps, preserve eight decades of placer mining history in the Circle/Eagle District (table 42). These sites are located on tributaries of the Yukon River, beginning with Fourth of July Creek to the east (in the Eagle District). Sam, Coal, and Woodchopper Creeks, tributaries lying west of the Charley River are all in the Circle District. Sites are also located on Ben, Boulder, Caribou, Cheese, Colorado, Iron, and Mineral Creeks, smaller tributaries of these major placer streams (figure 21). Included in the sample are 29 camps or camps/operations, each represented by at least one habitation

Table 42

Placer Mining Sites in the Circle/Eagle Districts by Mining Method

Drainage	Prospect	Hand/GS	Drift	Hydraulic	Dredging	Bull/Hyd Bulldozer	Unknown
Ben Creek			CHR-053 CHR-054			CHR-050 CHR-051 CHR-082	CHR-052
Ben/Sam Creeks		CHR-029					
Boulder Creek				CHR-047 CHR-048 CHR-049			CHR-083
Caribou Creek							CHR-059
Coal Creek					CHR-102		CHR-073 CHR-075 CHR-078
Coal/Cheese Creeks					CHR-094 CHR-095		
Colorado Creek	CHR-099	CHR-098					
4th of July Creek	CHR-032 CHR-033 CHR-043		CHR-040	CHR-034		CHR-042 CHR-044 CHR-045 CHR-046 CHR-080	CHR-041

(continued)

Table 42 (continued)

Drainage	Prospect	Hand/GS	Drift	Hydraulic	Dredging	Bull/Hyd Bulldozer	Unknown
Iron Creek			CHR-056				CHR-057 CHR-085
Mineral Creek			CHR-069 CHR-084	CHR-068			
Sam Creek	CHR-055		CHR-096 CHR-097				CHR-081
Woodchopper Creek			CHR-064 CHR-066 CHR-067 CHR-070		CHR-063 CHR-065 CHR-086		CHR-071

structure (table 43). Cabins (N=32), primarily built of log, outnumber all other dwellings at these camps. Most of these cabins are built along very similar lines, with sod roofs, some covered with tin, and almost all have saddle notching. There are also 11 tent frames (or platforms), eight bunkhouses, one house, and one lean-to in the sample. Most of the habitation structures (53%) are in poor states of preservation, either collapsed, in ruins, or exist as only a trace at the site. The average size of all structures with known dimensions is 20 m^2. In addition to habitation structures, there are 68 outbuildings at these sites (table 44) and a rich assortment of domestic and mining artifacts (table 45). A discussion of each of these sites, grouped by mining technology, is presented below. In the cases where there is evidence of multiple site occupations and for two or more mining methods, the site is listed by its most recent occupation or technology.

Prospecting. Five sites are included in this category. Three of the sites are composed only of pits or depressions. **CHR-032** and **CHR-033** are located within 200-300 m of one another on Fourth of July Creek. CHR-032 consists of six square shaped pits with berms, probably excavated by a bulldozer, and thus post-dating the early 1930s when bulldozers were first brought into the district; CHR-033 contains four pits, also with berms. Both of these sites lie on terraces just to the north of the creek. One of the pits at CHR-033 may have served as some type of crude shelter as timbers, a hearth, and a continuous layer of wood were there. The third site, **CHR-055**, located on a small knoll on the east side of Sam Creek, contains two pits, but no other cultural remains.

The other archeological evidence of prospecting sites are portable steam boilers, designed to aid in the digging of prospect holes and shafts in frozen ground. Such boilers were at **CHR-043**, located on Fourth of July Creek, and at **CHR-099**, on Colorado Creek. The boiler at CHR-043 measures .75 x .45 m, and is 45 cm high. It has two large rings on its side for inserting carrying poles. The boiler at CHR-099, partially buried in the muskeg, is slightly larger, measuring 1.12 x .66 m. A number of spare parts were close to the boilers at both of the sites, but no pits or shafts were encountered. Also at CHR-099 were two sets of wood and rubber riffles. The dates for both of these sites are unknown.

Hand Methods/Ground-Sluicing. Only two sites fall within this category. The first is **CHR-029**, the Alfred Johnson cabin, located near the mouth of Ben Creek. This site consists only of the ruins of a cabin, obscured by groundcover. Through oral accounts, we know that Alfred Johnson, an early miner and trapping in the Ben/Sam Creeks area, built the cabin sometime around the turn of the century. It was destroyed by fire in 1928 (Grauman 1977b: 441). Since there is no evidence of mining of any type at the site, it is assumed that Johnson was using simple hand methods of mining, known to be used almost exclusively during the first decade of mining in the area and usually not particularly visible in the archeological record.

The second site, located on Colorado Creek, is **CHR-098**, also known as the Phil Berail cabin. Nothing specifically relating to mining has been found at this campsite, but we know from the historic literature that Berail had a one-man ground-sluicing operation on Colorado Creek in 1950 (Saarela 1951: 41). A 55-gallon barrel, deeply embedded in the ground just outside the cabin door, dates to 1937; and so it seems likely that the cabin was built by an earlier miner. Perhaps the original occupant was George Davis, who mined on Colorado Creek in the 1920s (Wimmler 1929: 143) or R.A. Bowman, who had a one-man drift mining operation on the creek in 1946 (Stewart 1947: 37).

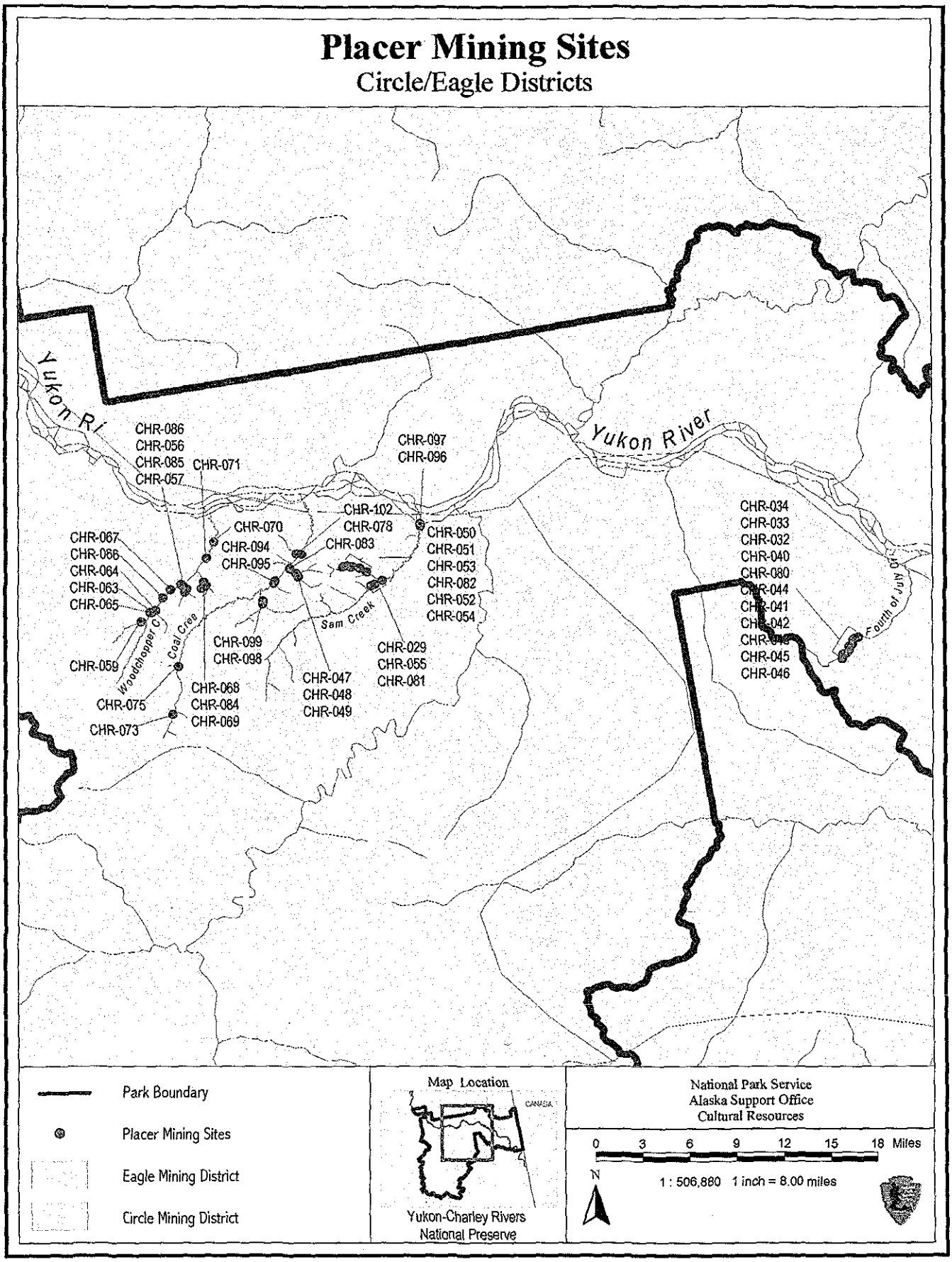

Placer Mining Sites
Circle/Eagle Districts
Yukon Ri
Yukon River
CHR-086
CHR-056
CHR-085
CHR-057
CHR-071
CHR-097
CHR-096
CHR-102
CHR-078
CHR-083
CHR-070
CHR-094
CHR-095
CHR-050
CHR-051
CHR-053
CHR-082
CHR-052
CHR-054
CHR-067
CHR-066
CHR-064
CHR-063
CHR-065
CHR-059
Woodchopper C
Coal Cree
Sam Creek
CHR-099
CHR-098
CHR-029
CHR-055
CHR-081
CHR-047
CHR-048
CHR-049
CHR-068
CHR-084
CHR-069
CHR-075
CHR-073
CHR-034
CHR-033
CHR-032
CHR-040
CHR-080
CHR-044
CHR-041
CHR-042
CHR-045
CHR-046
Fourth of July Cr
Park Boundary
Placer Mining Sites
Eagle Mining District
Circle Mining District
Map Location
CANADA
Yukon-Charley Rivers
National Preserve
National Park Service
Alaska Support Office
Cultural Resources
0 3 6 9 12 15 18 Miles
N
1 : 506,880 1 inch = 8.00 miles

Figure 21.

Table 43

Habitation Structures at Placer Mining Camps in the Circle/Eagle Districts

AHRS #	Type	Mat'l	Size	Roof	Corner	Chink	Condition
CHR-029	cabin	log	33.3 m^2				burned
CHR-034	cabin	lumber	7.2 m^2	tarpaper			standing
CHR-052	cabin	log	56.3 m^2	sod	saddle		ruins
CHR-054	cabin?	log	11 m^2		saddle		ruins
CHR-056	cabin	log	24.4 m^2				collapsed
CHR-057	tent frame		12.6 m^2				trace
CHR-059	cabin	log	30.9 m^2		saddle	moss	collapsed
CHR-063	cabin	log	24.4 m^2	sod	square	moss	good
CHR-064	cabin	log	14.8 m^2		saddle	moss	collapsed
	cabin	log	7.6 m^2		sdle,sqn	moss	standing
CHR-065	lean-to	sheet mtl					ruins
	tent frame	log	10.5 m^2		saddle		ruins
	tent frame	log,lmbr	6.9 m^2				trace
CHR-066	cabin	log	15.9 m^2		saddle	moss	collapsed
CHR-069	tent platf	log	16 m^2				ruins
	tent platf		3 m^2				trace
	tent platf		10 m^2				trace
	tent platf		12 m^2				trace
	tent platf		2.4 m^2				trace
	tent platf						trace

(continued)

Table 43 (continued)

AHRS #	Type	Mat'l	Size	Roof	Corner	Chink	Condition
CHR-070	cabin	log	18.8 m^2	sod	sdle,sqn	moss	collapsed
CHR-071	cabin	log	8.6 m^2	sod	saddle	moss	collapsed
CHR-073	cabin	log	18.7 m^2	sod	saddle	moss	collapsed
CHR-075	cabin	log	8.4 m^2		square	none	collapsed
CHR-078	cabin	log	21.2 m^2	sod	saddle	moss	collapsed
CHR-080	cabin	log	16 m^2		square		collapsed
	cabin	log	30 m^2	mtl/tpaper		moss?	good
CHR-081	cabin	log	57.3 m^2	sod	saddle		standing
CHR-082	cabin	log	55 m^2	sod/metal	saddle		good
CHR-083	cabin	log	38.4 m^2	sod/metal	saddle	various	good
	cabin	log					new
CHR-084	cabin	log	29.6 m^2	sod	saddle	moss	collapsed
	cabin	log	24.7 m^2	sod,boards	saddle	moss	standing
CHR-085	cabin	lumber	9.2 m^2				ruins
CHR-086[1]	house	various					good
	cabin	log	45 m^2	metal	saddle		good
	cabin	log	20.3 m^2	metal			good
	cabin	various	8.8 m^2				good
	cabin	various	8.8 m^2				good
	cabin	various	8.8 m^2				good

(continued)

Table 43 (continued)

AHRS #	Type	Mat'l	Size	Roof	Corner	Chink	Condition
CHR-102[2]	bunkhouse	beaver bd	20.4 m^2	metal		good	
	bunkhouse	beaver bd	22.6 m^2	metal		good	
	bunkhouse	beaver bd	20.4 m^2	metal		good	
	bunkhouse	beaver bd	20.4 m^2	metal		good	
	bunkhouse	wd siding	29.9 m^2	metal		good	
	bunkhouse	plywood				modern	
	bunkhouse	plywood				modern	
	bunkhouse	beaver bd	22.6 m^2	metal		good	
CHR-094[3]	no dwellings						
CHR-095	cabin?	log	29.4 m^2			trace	
	tent platf	lumber	18.6 m^2			ruins	
	tent platf	lumber	14.4 m^2			ruins	
CHR-096	cabin	log	15.8 m^2	sod,metal	square	ms,burlap	good
CHR-098	cabin	log	34.7 m^2		square	ruins	

[1] CHR-086 - building material of the house and cabins not constructed of logs is sheetrock and lumber or plywood.

[2] CHR-102 Coal Creek Camp - several of the structures are built on skids and have been moved to present site.

[3] CHR-094 Cheese Creek Camp - the original location of the Coal Creek Camp; all of the habitation structures have been moved.

Table 44

Outbuildings at Placer Camps in the Circle/Eagle Districts

AHRS	Shed	Outhouse	Cache	Doghouse	Workshop	Other	Total
CHR-029							0
CHR-034							0
CHR-052							0
CHR-054							0
CHR-056	1						1
CHR-057							0
CHR-059				2			2
CHR-063							0
CHR-064							0
CHR-065							0
CHR-066				1			1
CHR-069				1			1
CHR-070			2				2
CHR-071							0
CHR-073				1			1
CHR-075	1			4			5
CHR-078							0
CHR-080	1	1	1	3		1	7
CHR-081			1	2			3
CHR-082	1	1	1			1	4
CHR-083		1				2	3
CHR-084				1			1
CHR-085							0
CHR-086	2	4			1	8	15
CHR-102	2	3			1	11	17

(continued)

Table 44 (continued)

AHRS	Shed	Outhouse	Cache	Doghouse	Workshop	Other	Total
CHR-094	1				1	2	4
CHR-095							0
CHR-096			1				1
CHR-098							0
Total	9	10	6	15	3	25	68

Table 45

Classes of Artifacts[1] at Placer Camps in the Circle/Eagle Districts

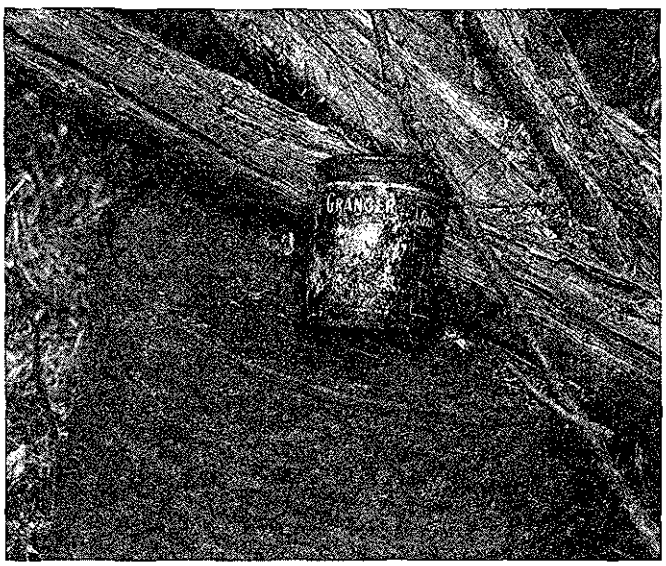
AHRS	BLDM	HSHD	PERS	SUBS	FSTR	FPRP	FSER	TRAN	COMM	RECR	MTEQ	MULT	OTHR
CHR-029		+			+	+							
CHR-034		+	+		+						+		
CHR-052	+	+			+					+			+
CHR-054													
CHR-056		+	+		+					+	+	+	
CHR-057		+			+		+						
CHR-059		+								+			+
CHR-063		+	+	+	+	+		+	+	+	+	+	+
CHR-064		+	+				+						
CHR-065		+			+						+	+	+
CHR-066					+								
CHR-069		+	+	+	+		+				+	+	+
CHR-070	+	+	+	+	+	+	+	+	+	+	+	+	
CHR-071		+			+								
CHR-073		+											+
CHR-075		+			+						+	+	
CHR-078		+			+								
CHR-080		+						+		+	+		

(continued)

Table 45 (continued)

AHRS	BLDM	HSHD	PERS	SUBS	FSTR	FPRP	FSER	TRAN	COMM	RECR	MTEQ	MULT	OTHR
CHR-081		+	+	+	+	+		+			+	+	
CHR-082	+	+		+	+				+		+	+	
CHR-083		+							+				
CHR-084		+	+		+	+	+		+	+	+	+	+
CHR-085	+	+			+	+	+	+				+	+
CHR-086	+	+	+		+	+	+	+	+	+	+	+	+
CHR-102	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
CHR-094											+	+	
CHR-095	+				+					+			+
CHR-096	+	+			+	+	+	+	+	+	+	+	+
CHR-098		+			+					+	+		+

[1] The abbreviations used for artifact classes are as follows:
BLDM = building materials
HSHD = household
PERS = personal
SUBS = subsistence
FSTR = food storage
FPRP = food preparation
FSER = food service
TRAN = transportation
COMM = communication
RECR = recreation
MTEQ = mining tools and equipment
MULT = multipurpose tools
OTHR = other



Granger Tobacco can on top of barrel dating to 1937 outside the Phil Berail cabin on Colorado Creek (CHR-098) in YUCH.

Drift Mining. Twelve sites attributable to drift mining have been recorded by CRMIM crews. Those sites are located on Fourth of July Creek, Ben and Sam Creeks, and the Woodchopper Creek drainage. **CHR-040**, the only drift-mining site on Fourth of July Creek, lies along a stretch of the streambed that has been heavily mined by hydraulic methods. Various types of equipment and features, including a boiler that appears to be homemade, a steampoint, two wooden bucket hoists, a mine shaft with a ladder in it, cut firewood, and buckets, indicate that drift mining took place at the site. A ditch system and thermokarsts, thought to be the result of ground-thawing activities, were also identified. The date for this site has yet to be determined.

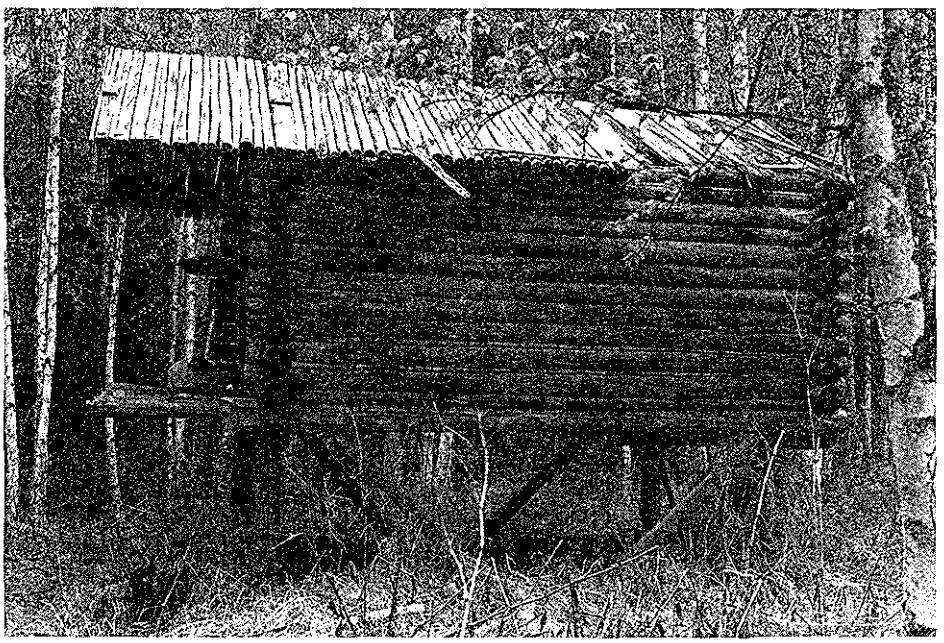
Four drift mining sites were identified on Ben and Sam Creeks. **CHR-053** on Ben Creek is an operation, consisting of a portable steam boiler, possibly homemade; a cribbed drift mining shaft; a wooden drift bucket with spare parts inside; a pile of 1-inch pipe, probably used to conduct steam and/or hot water down the mining shaft; and various other associated artifacts. **CHR-054** lies about 1.5 kilometers farther down Ben Creek. This camp and operation consists of the foundation of a log structure, possibly a cabin, and a cribbed drift mining shaft, filled with collapsed logs, silt, and water. No artifacts of any kind were found in association with these features. The historic context and dates for both of these sites are unknown.

CHR-096, located close to the mouth of Sam Creek, retains more site integrity than the drift mining sites on Ben Creek. The log cabin and elevated cache at this camp/operation, both still in good condition, were built by Sandy Johnson sometime between 1898 and 1917 (Grauman 1977b: 432, 445). The cabin was built with double purlin or double ridgepole construction, not often found in the CRMIM sample of cabins. Although a suitably large single ridgepole may not have been available near the cabin site, the technique may actually have been used by Johnson out of preference because two side-by-side logs provide a larger surface area for roof pole attachment (Dave Evans, personal communication: 1995). Along with several other features at this site is a cribbed drift pit, measuring 5 x 2 m. The logs lying on top of the pit may have once been part of a superstructure used for hoisting up the gravels. There were also four small depressions, probably prospecting pits, and the remnants of a sluice box found at the site. Located so close to the Yukon River, the

main transportation corridor, this camp also served as an overnight shelter and a supply point for all the miners living up Sam and Ben Creeks (Kain 1994b: 8). Some of the domestic artifacts at the site indicate that it was occupied within the last 10 years or so. Possibly associated with this site is **CHR-097**, a small assemblage of drift mining artifacts found at the mouth of Sam Creek, only 200 meters north of CHR-096. The assemblage consists of a rectangular iron bucket (0.6 x 0.8 m), partially buried in the ground, a scatter of cut logs, wire, pipefittings, and a few other miscellaneous artifacts.

The remaining seven drift mining sites are located on the Woodchopper Creek drainage, including its tributaries Mineral and Iron Creeks. These sites, for the most part, probably date to the period before large-scale dredging activities began on Woodchopper Creek in the late 1930s. One of the earliest may be **CHR-069**, located on Alice Gulch, a small tributary of Mineral Creek. The camp features at this extensive site consist of five depressions with berms and one wooden platform with log cribbing, all identified as tent platforms. There is also one doghouse, an assortment of domestic artifacts, and a steam-powered drive train attached to an axle with a circular saw blade on one side, indicating that lumber milling was done at the site. The mining features include 30 mining pits; boiler body and parts; an open-cut mining area; a ditch and log cribbing; and a dam. There are also three shafts at the site, two of which are cribbed. One of the cribbed shafts has iron pipes, possibly steam points, and a ladder extending from its walls, as well as vertical posts protruding from the ground immediately adjacent to it. Although evidence of drift mining predominates at the site, it appears that open-cut mining was done at some point. The major period of activity in the Mineral Creek area was between 1906 and the 1920s.

Downstream from CHR-069, on the main branch of Mineral Creek is **CHR-084**, a camp possibly connected with drift mining. The site consists of two log cabins, one standing and one collapsed, once owned by George McGregor, a well-known old-timer in the



Elevated log cache built by Sandy Johnson on Sam Creek (CHR-096) in YUCH.

area. He last occupied the site sometime in the 1930s, before selling out to Alluvial Gold, Inc., the company that operated the Woodchopper Creek dredge (Grauman 1977b: 479). The cabins are typical for the district, with sod roofs, saddle notching, and moss chinking. Along with the common assortment of domestic artifacts at the site are some that are unique, including a box painted with "Geo. McGregor Woodchopper Alaska via Skagway," a *Newcastle Courier* newspaper dated 1916, some 1930s editions of *National Geographic* magazine, and a birdhouse. Birdhouses have been found at a number of placer sites in the Circle/Eagle sample, but have not been recorded in any of the other districts. Although there are no mining features at this site, there are a few mining-related artifacts, such as brass and iron pipefittings and steam boiler pipes, that are usually associated with drift mining.

A more definite association with drift mining was at **CHR-056**, a camp/operation on Iron Creek. Along with a collapsed cabin, there are 15 mining pits or shafts of various dimensions at the site. One of the pits has a sheet metal shed immediately adjacent to it. Another shaft has a pulley block with a hook, used for hoisting up gravels, suspended from a crossbeam near the roof of its wooden superstructure. The structure, including its metal corrugated roof, is in excellent condition. Tentatively identified at the site is the remnant of a wooden dump box used at the head of a sluice box line. Among the few artifacts at the site is a birdhouse. Based on the different states of preservation of several features at the site, it seems that it has had at least two periods of occupation, one dating to the "pre-dredge era" on the Woodchopper Creek drainage and one perhaps two or three decades later.

There are four drift-mining sites on Woodchopper Creek, all of which are outside the heavily dredged section of the creek. **CHR-064**, farthest upstream, consists of a small (7.6 m^2), windowless, log cabin, a larger collapsed cabin; and a 2 x 2 m mining shaft with a berm on three sides. Among the artifacts identified at the site are the wooden crank and shaft of a windlass. **CHR-066**, located about 1.5 kilometers downstream, also contains the remains of a windlass, in addition to a collapsed cabin, a low-roofed shed or doghouse, and two trenches flanking the north and south sides of the cabin. The next site downstream, **CHR-067**, is wedged between a ditch and two roads. It is composed of a well-preserved, cribbed drift-mining shaft and associated artifacts. Included in the assemblage is a rectangular iron haul bucket with attachments lying on top of what appears to be a windlass. In addition, a heavy-gauge barrel stove found there was probably used as a boiler. A woodpile, a ready fuel supply, is located next to the boiler. Interestingly, this site has been personalized with names on two of the artifacts. The name "J. Cornel" is painted in black on the flashing for the barrel stove, and the name "Elaine" has been written in raised letters on a specially modified 5-gallon fuel can equipped with a makeshift stopcock. A variety of other artifacts were also recorded at the site.

Located several kilometers downstream from the other drift mining sites on Woodchopper Creek is **CHR-070**, a camp and operation consisting of three pits or mine shafts, a semi-collapsed cabin, two caches (one in a tree and one in a 55-gallon drum), and a rich assortment of domestic artifacts. One of the shafts is cribbed and has a pole structure built over it. It is partially filled with water. Another of the shafts has collapsed, and the third appears to be quite shallow. This is one of the few sites in the district with "subsistence" artifacts, i.e., a snare and some rifle cartridges. There is also a handmade, metal ornament in the shape of a fish, and another birdhouse at the site. No dates have been estab-

lished for the occupation of CHR-070 or the other Woodchopper drift-mining sites already discussed. Their primary periods of occupation were probably before the late 1930s, but it is possible that some of the operators at these sites were "hold-outs," who hung onto their claims and perhaps even continued to mine on a small-scale basis despite the considerable presence of Alluvial Gold, Inc. and its dredge.

Hydraulic Mining. The use of hydraulic mining techniques is found at five sites in the YUCH site inventory. Of these sites, the oldest is probably **CHR-068**, located on Mineral Creek. There is evidence of both drift mining and hydraulicking at the site; the latter takes the form of a modified streambed that appears to be the result of hydraulic mining. Other mining features and artifacts include the remnants of an earth-filled dam, a drift mining pit, a ditch, remnants of a sluice and a flume, the brake pads of a mechanical winch, the interior pipes of a boiler, the base of a large steam boiler, and various other pieces of boiler machinery and equipment. Two patent dates were on these pieces of boiler equipment: 1898 on a tube gauge, and 1882 on a brass stopcock. This site may date as early as 1906 when it was noted by USGS geologist A.H. Brooks that hydraulic stripping and three steam hoists were being used to aid "shoveling in" operations (Brooks 1907: 204). By 1925 the stream was primarily being work by hydraulic methods (Mertie 1938: 257).

Three hydraulic sites on Boulder Creek are within one kilometer of each other and are likely to be related to the same operation. **CHR-049**, the farthest upstream, consists of a sophisticated dam feature that was constructed to block, store, and divert the waters of Boulder Creek. Taking advantage of a locale with a small, natural ridge running perpendicular to one bank of the creek, the builders created a 2-m high, earth-filled dam on the opposite bank. The two sides of the dam appear to have been connected by a log bridge and a log check-dam used to divert the water into an adjacent impoundment area. It is estimated that water in the impoundment, at its greatest capacity, may have inundated approximately one acre of land. The downstream section of the check dam abuts a wooden flume that extends for about 20 meters. The flume is in line with a diversion ditch, some 8 meters farther downstream. Hydraulic pipe is in and next to the ditch. Although a definite date has not been established for this water diversion system, the dense vegetation on the earth-filled dam suggests that it was constructed in the 1930s or earlier. A rectangular depression was also recorded at this site.

At the downstream end of the three sites is **CHR-047**. This site appears to have been the primary activity area for the hydraulic operations on Boulder Creek. It is linked to CHR-049, discussed above, by the ditch that originates immediately below the CHR-049 dam. The main concentration of artifacts at CHR-047 is centered on the tailings adjacent to Boulder Creek. They include sluice boxes, a canvas hose, a wheelbarrow, hydraulic giants and nozzle parts, wooden "chocks" that may be sluice box riffles, a shovel, the remains of a trestle support for a pipeline, a concentration of pipes, scattered pipe of various diameters, and assorted metal and wood debris. A steam boiler, along with pipe sections, valves, and other associated parts, were found alongside the main ditchline running parallel to Boulder Creek. Another ditchline, which begins at the top of a steep slope bordering the main channel of the stream, diverts water from the north fork of Boulder Creek and channels it downslope into the main section of ditchline. Remnants of a wooden diversion, gate, and dam, or headbox, are found along this secondary ditch.

CHR-048 is located midway between the two other Boulder Creek sites. Near the site, the main ditchline, which follows the base of the sloping streambed, appears to be a natural depression or ravine that the miners modified to suit their purposes. The major features at CHR-048 consist of a road system that encircles three large rectangular depressions with berms, and a smaller shallow depression. A few pieces of mining equipment, including a nozzle and hydraulic pipe were scattered around the site. A 55-gallon drum containing tools and spare parts was found in the ravine. Although further research is necessary to establish a definite historic context for these three Boulder Creek sites, it is tentatively suggested that Martin Adamik, a miner, is associated with the sites. Adamik mined the stream and bench gravels of Boulder Creek from 1918 to 1943, using both hydraulic and drift mining technologies (National Park Service 1990c: 39). These sites are important historically because they represent the continuation of small-scale mining by independent operators on the Coal Creek drainage, even after the advent of large, corporate dredging activities that had begun in the vicinity during the late 1930s.

Another hydraulic site that may date to the 1930s or earlier is **CHR-034**, located on Fourth of July Creek, near the downstream end of the heavily mined section of the creekbed. This camp and operation includes a milled lumber cabin on skids and the remnants of hydraulic pipelines. One of the pipelines consists of discontinuous sections of 8-inch pipe that runs parallel to the creek for about 100 meters, and parallel to a stretch of overgrown tailings. A 55-gallon drum serves as a support for one section of the pipeline. Two nozzles, the parts to a nozzle mount, and other fittings are alongside the pipeline. Another length of pipe, 14 inches in diameter, lies perpendicular to the creek. Other scattered pipes also appear to represent a series of perpendicular pipeline sections, some of which are associated with wood frame structures that may have been either head boxes or turnouts. The pipe sections all begin alongside a winter trail and appear to end somewhere near the main pipeline. If the winter trail was originally a ditchline, the perpendicular pipelines may have been used to carry water downhill to various hydraulic working areas and may not be temporally related to the main pipeline that runs parallel to Fourth of July Creek. These perpendicular pipes may have supplied water to monitors in an arrangement called "piping over the side" described by Wimmler (1927: 146-156). Although claims on the creek were worked by hydraulic methods as early as 1916, the use of fuel drums as pipe supports suggests that the operation date no earlier than the 1930s. CHR-034 is a good example of the productive period of hydraulic mining on Fourth of July Creek before World War II, and before bulldozers began to be widely used in the district.

Dredging. Because of their size, dredges are the most visible type of placer mining equipment. Extensive landscape modifications are even more enduring evidence. Both of the dredges on NPS land in Alaska are located in YUCH: the Coal Creek dredge, and the Woodchopper Creek dredge. In addition to the dredges, sizable camps, distinctive tailings, and abandoned mining features and equipment remain on Coal and Woodchopper Creeks as evidence of the large-scale ventures that once flourished in the YUCH region.

The **Coal Creek dredge** (included within mining district **CHR-089**), with a history of almost 40 years of intermittent use from 1936-1975, still lies where it was last operated, about 1.6 kilometers from the mouth of Coal Creek (National Park Service 1987). It worked its way up the creek valley and was then turned to work downstream. The dredge is of the California type, equipped with a spud, bowlines, and stern lines for maneuverability. It was powered by two diesel engines, one for the main belt drive, which operated

the digging ladder and the trommel screen, and the other for the belt stacker and the water pumps (Mertie 1938: 253 - 254). Left behind in the wake of dredging are the arc-shaped tailings, uniform in size and resembling a herringbone pattern from above (Logan Hovis 1990: personal communication). These tailings stretch upstream from the dredge for 10 or 11 kilometers. The ditch that supplied water for the stripping and thawing prior to dredging is overgrown, but still visible on the hillside above Coal Creek.

The Coal Creek Mining Camp, **CHR-102**, was moved to its present location on Coal Creek and Beaton Pup in 1952. The large crews who were needed to prepare the ground and to operate and maintain the dredge were housed and fed at this camp. It consists of 26 buildings, most of them built between 1934 and 1940. The original structures include bunkhouses, outhouses, a mess hall, a recreation hall, an assay office, generator shed, storage buildings, bathhouse, and a machine shop, all built on skids so they could be easily moved (Johnson and Kain 1993). Fuel drums, the rusting bodies of old vehicles, miscellaneous mining equipment, and a large wooden sluice are also at the camp. The camp is currently being used as temporary housing for National Park Service employees, while doing fieldwork in YUCH.

The original site of the Coal Creek Camp, **CHR-094**, is located 3.6 kilometers upstream near the confluence of Coal and Cheese Creeks. Although the site was dredged and most of the buildings moved to a location on Snare Creek in 1941, three standing and one burned structure on permanent foundations remain at the site. One building is a warehouse, which still contains an extensive inventory of parts and supplies for running a dredge; another building houses blacksmith tools and equipment, such as a handmade forge and anvil, as well as a workbench and a variety of tools and metal parts. The third building is a small sheet metal shed. Remains of the original Coal Creek machine shop, burned in 1950, include a drill press, geared belt pulleys, a boiler and other equipment found within or near the charred outline of the building. An Ingersoll Rand compressor, two other boilers, and a tractor were across the road from these structures. **CHR-095** lies approximately 250 meters southwest of CHR-094, on the opposite side of Cheese Creek. This camp may represent the remains of the dredge master's residence during the occupation of the original Coal/Cheese Creek Camp. Two deteriorating wooden decks, thought to be tent platforms, the trace of a possible log cabin, and a scatter of artifacts and poles are all that remain at the site.

The **Woodchopper Creek dredge** still lies on the creek about 5.5 kilometers from its confluence with the Yukon River. Last operated in 1964 (Cobb 1973: 119), this 72-bucket dredge was stripped in order to keep the Coal Creek dredge in operating condition. The tailings, not as extensive as those on Coal Creek, extend upstream for almost 4.5 kilometers. **CHR-086**, the original Woodchopper Creek Camp, is located near the mouth of Iron Creek. The Woodchopper Creek camp is quite large, consisting of 22 structures, some of which are in ruins. According to historic documentation, the camp was built in 1936 and at one time accommodated more than 30 men (Grauman 1977: 483). The structures include a manager's house, workshop, two sheds, mess hall/kitchen, meat processing shop, recreation hall, four outhouses, two log cabins, several frame structures, a house depression, and a rich assortment of domestic artifacts. Dredge buckets and a D-3 caterpillar tractor were also at the site. Four of the cabins initially built and located at the camp were moved downstream to the mouth of Mineral Creek to serve as a base camp for Joe Vogler's

operations. A number of large trucks, bulldozers, and equipment are housed at Vogler's camp (Grauman 1977: 488).

Two other Woodchopper Creek sites are also associated with dredging activities. **CHR-065** is a ditch, which runs approximately 6.4 kilometers along the northwestern side of Woodchopper Creek between Caribou and Mineral Creeks. It was built in 1937-38 to supply water for the hydraulic stripping and cold-water-thawing of the dredging grounds. The ditch, averaging 1.5 m wide and 1 m deep, has a berm on its downslope side for most of its extent. There are 19 features along the ditch, including a sheet metal lean-to, the remains of two tent frames, turnouts, regulators, flumes, cribbed log dams, two mine shafts, and some miscellaneous features. The ditch system, still in good condition, terminates in a large landscape "scar," which may represent an area stripped of overburden or a once-active mining area.

One of the structures at the head of the ditch is designated as **CHR-063** and is thought to have been the caretaker's residence. The log cabin, with sod roof and moss chinking, is still in good condition and fairly typical for the district, but constructed with greater attention to craftsmanship than usually found. It has peeled logs, some of which are pegged together, six-pane windows, a puncheon floor, a cold cellar with trap door, and hand-carved door handles. The handmade furniture inside also displays detailed workmanship. Newspapers dating to 1939 and 1946 line the door. Among the artifacts is a trapper's pelt-stretcher. Also at the site are a drift pit and three other depressions, which may date to an earlier period of mining on Woodchopper Creek, or may simply indicate that the caretaker was "moonlighting" when not maintaining the ditch.

Bulldozer Mining and Bulldozer-Hydraulic Mining. Bulldozers came into use in the Circle District in the mid-1930s to prepare the ground for dredging. They were used to strip away the trees, brush, and tundra lying atop the "muck," which was in turn stripped by hydraulic methods (Patty 1969: 97). The more widespread use of bulldozers as the primary piece of excavating equipment did not come about until after World War II. Evidence of mining with bulldozers and a combination of bulldozer-hydraulic methods is seen at five sites on Fourth of July Creek and two sites on Ben Creek.

The most imposing site on Fourth of July Creek is **CHR-080**, the Fourth of July Mine. The site is reportedly associated with James Taylor, the first to use hydraulic mining on the creek; George Matlock, who built the ditchline to supply water from Washington Creek to operations near the site in the early 1920s; Richard Bauer, who brought the operations at the mine into prominence as the largest mining camp in the Eagle District in the 1930s; and Yukon Placer Mining Company, responsible for introducing bulldozer technology to Fourth of July Creek in the late 1940s (Grauman 1977: 339; Stewart 1949: 48). More historic research is necessary to firmly document some of these reported associations. James Layman took over the Fourth of July claims and this camp in 1964.

CHR-080 retains a rich artifact and feature inventory, including two log cabins, one collapsed and one in good condition and recently occupied; a cache; doghouses; vintage boilers; a fairly recent bulldozer; and a variety of other pieces of mining equipment. The work shed contains a drill, grindstone, and blacksmith forge, which may date to the very early 1900s. The camp itself is situated on extensive tailings piles, which are probably the result of pre-World War II hydraulic mining. It appears that some of the site features and older artifacts were moved to the site from other locations. Evidence of this is in the main

habitation cabin, where the interior of each log is clearly numbered, apparently to aid in reassembling it in its present location.

CHR-044 is situated on a slope directly above the tailings underlying CHR-080. The site consists of a scatter of heavy earth-moving equipment parts, a roller assembly, large bucket scoops, miscellaneous hardware, block and tackle, as well as a number of domestic artifacts. By virtue of its proximity, this refuse scatter appears to be associated with the Fourth of July Mine. It is not surprising to find such a jumble of artifacts at CHR-044, considering the many episodes of occupation and the different types of technology documented at the Fourth of July Mine.

CHR-045, located approximately one kilometer upstream from CHR-080, is another Fourth of July Creek site attributed to the Yukon Placer Mining. The evidence is in the form of empty 55-gallon barrels labeled with "YPM" or stenciled with the name "Yukon Placer Mining." The site is situated on tailings and appears to be a storage area for mining equipment. Along with the drums are a pile of 8-inch diameter hydraulic pipes, a monitor barrel of riveted pipe, elbow joints, and a counter-balance lever and weight box for a monitor. Whether the hydraulic equipment dates to an earlier episode of mining on the creek or is actually associated with Yukon Placers bulldozer operations is problematical. Two other sites attributed to Yukon Placer Mining are **CHR-042** and **CHR-046**. Both of these sites consist of 55-gallon drums welded together to form water diversion tunnels or culverts. Segments of ditchline are also included in the water diversion systems at the sites. Neither tailings nor bulldozer cuts are at the sites, so it appears that they were peripheral to the main bulldozer operations on Fourth of July Creek. Yukon Placer Mining Company continued its operations on the creek until 1951 or 1952 (Holdsworth 1953: 64).

Another extensive camp and operation mostly recently mined by the Laymans (father and son) is **CHR-082**, located on Ben Creek. Like the Fourth of July Mine, the Ben Creek Mine has had a long history of occupation. The cabin was originally built sometime between 1898 and 1917 by Sandy Johnson, a Finnish immigrant, who was a notable local woodworker as well as being a miner (Grauman 1977: 445). The saddle notching on this cabin was done with extreme care; there is a recess hewn in the log next to each notch for shedding water. The logs fit so tightly that only a thin chinking of moss was necessary. Similar techniques were probably used on this cabin and on nearby Slaven's Roadhouse where Johnson hewed the logs flat on the interior and grooved the bottoms to fit snugly over the log below. This technique, seen in Russia-Alaska architecture, is not often associated with the American gold-rush period (Hoagland 1993: 246). Johnson's cabin was built without a ridgepole, but with six purlins below the sod and nine above to support the metal roof. One of the outbuildings at the site is a log cache with two birdhouses built under the eaves. One was made from an old MJB coffee can with a hole in the top and the other was constructed out of wood and birch bark. Perhaps Johnson started the interest in bird-watching, evident at several of the mining camps in the district.

There are at least two boilers at the Ben Creek Mine that date to Johnson's tenure at the site. One boiler, lying in the woods next to the road, was supposedly brought in by Johnson and a hired hand who rolled it all the way over from the mouth of Sam Creek, a distance of about 13 kilometers. The other portable steam boiler by the cabin was used by Johnson for drift mining. Other evidence of his drift mining is in the overgrown tailings around the cabin and road and the drift bucket still lying in the cache, just behind the cabin. Barney Hansen bought the claims from Sandy Johnson in about 1945 and used

hydraulic methods to mine the creek. James Layman purchased the claims around 1960 (D. Layman 1994: personal communication).

Mining features and artifacts that date back to the operations of Hansen and the Laymans are on the north side of Ben Creek, just across from the camp. On the hillside above Ben Creek is a reservoir, with a penstock pipe outlet running along a side cut to a modern sluice box in the valley bottom. To the east is a bulldozed area with a considerable amount of equipment, including a 1953 Studebaker 2 1/2 ton, 6 x 6 army flatbed truck; a pile of penstock pipe; old sluice parts; bulldozer and other heavy equipment parts; a C. Kirk Hillman drilling rig on skids; a shed sided with offset press plates from the *Fairbanks Daily News-Miner*; and an open-air maintenance shop with a selection of tools, oil cans, electric generators, and spare parts. On the creekbed there is a modern automatic dam, stockpiles of penstock pipe, including one pile on an old trailer with iron wheels. The road leading from the reservoir crosses the creek and continues to the cabin. The front end and bucket from a John Deere backhoe lie on the north side of the road at the creek crossing.

Dennis Layman provided the following explanation of how he and his father mined at this site, using bulldozer-hydraulic technology. Ben Creek is a slack water creek. Water from farther up Ben Creek was supplied to the mining operations via a ditchline (excavated by heavy machinery before the Laymans' time), and collected in an impoundment area. There was a pole with a flag on it at the top of the impoundment that could be seen from the cabin just across the creek. The flag was equipped with a float mechanism that would indicate when the impoundment area was full. When the flag was up, they released the water (that took about two hours to drain) and funneled it through a length of penstock down slope to the processing area on the creek. It would take several days for the impoundment area to be refilled. A dam, lying just upstream from the main mining area, was part of this water diversion system. It would automatically trip itself when it reached a certain pressure and would "flush out" the creek. (The dam was built by Hansen, but maintained by the Laymans). A hydraulic giant was also employed to remove the overburden from the gravels before the bulldozer ramped the gravels to the processing area, consisting of a grizzly and sluice (built by the Laymans). The Lincoln welder that still lies at the site was used by the Laymans to repair the "cat" when it was broken (Dennis Layman 1994: personal communication).

CHR-050 is also associated with the water diversion system that supplied water to the hydraulic and bulldozer-hydraulic operations at the Ben Creek Mine site. It consists of a wooden headbox and 1-inch-diameter pipeline lying along a ditch about 500 meters upstream from the main operation on Ben creek. This ditchline enters the small reservoir described above at CHR-082. Another possibly associated site is **CHR-051**, a cribbed log, earth-filled dam, and located about 100 meters west of a more recent one described earlier. The older earth-filled dam may have been an integral part of the water diversion system before it was washed out and replaced by the newer dam.

Unknown Mining Methods. Eleven sites are attributed to this category. In some cases they are composed solely of cabin ruins with nothing to physically link them to mining, except for their location on known mining claims or their proximity to other mining sites. The only site classified as an operation is **CHR-041**, located on Fourth of July Creek. It consists of a wood and steel dam partially blocking a short stretch of ditchline

that feeds into Fourth of July Creek. Tailings are at the "Y" intersection between the ditchline and the creekbed.

There are two sites in the unknown category on Sam and Ben Creeks. One of these sites, **CHR-081**, is really only unknown in terms of mining technology, not in terms of historic documentation. This camp on Sam Creek was the former residence of Arthur O. "Cap" Reynolds, who made his living as a "subsistence" miner there for 23 years, from 1927 until his death in 1950. Reynolds' cabin, another example of Sandy Johnson's workmanship, has not fared well and is in an advanced state of deterioration. Like the cabin built by Johnson at the Ben Creek Mine, this one is large (57 m^2), but its roof has a single ridgepole rather than only purlins. Still remaining at the site are two doghouses, a cache, two collapsed structures, and a variety of artifacts, including a dogsled. An integral part of his "bush" lifestyle, Reynolds and this sled are pictured in an historic photograph of the site. The only piece of mining equipment recorded near this camp was a remnant of flume or sluice box. According to Reynolds' diaries, mining took a back seat to hunting and trapping, but he maintained his interest in prospecting even into his last years (Kain 1993).

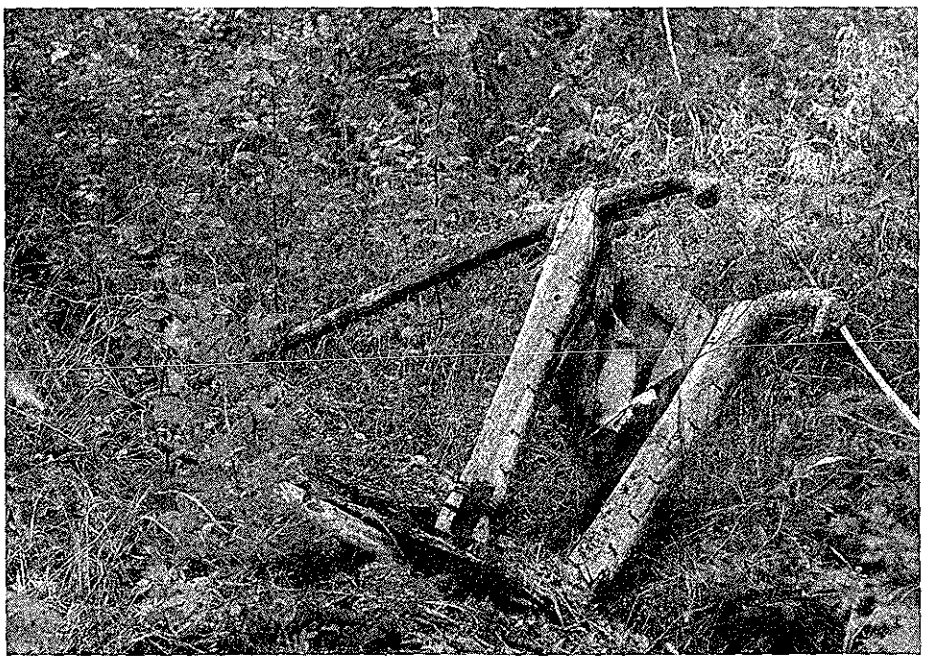
Another site in the unknown category is **CHR-052**, a camp located on Ben Creek. Only the sill logs remain of the cabin once standing at the site. The lack of other structural debris probably indicates that the logs were scavenged and put to some other use. There were no features or artifacts related to mining found at this camp; but its location on a claim midway between CHR-053 and CHR-054, two drift mining operations about 1.5 kilometers apart, does suggest an association with mining.

The mining methods at four sites on Coal and Boulder Creeks have also been classified as unknown. **CHR-073** lies the farthest up Coal Creek on an old mining claim. The site consists of a collapsed cabin, doghouse, and a 2.0 x 2.5-m depression adjacent to a short trench that runs to Coal Creek. Two drift pits are located 100 meters downstream from the site. **CHR-075** is located another 5-6 kilometers downstream, but still above the heavily dredged section of Coal Creek. In addition to a small, collapsed log cabin, log shed, and four doghouses at the site, there are two mining pits or shafts and a variety of mining-related artifacts, including a pick, shovels, a wheelbarrow, and a ladder. A fuel drum cache is also at the site. This evidence, although slim, suggests that these two camps may have supported drift-mining activities at one time; but the more definitive features and artifacts associated with drift mining are absent. As these sites are located several kilometers upstream from the claims once dredged by Ernest Patty's company, Gold Placer, Inc., they may have been occupied during the 1930s or 1940s by independent operators still using small-scale mining methods, or they may represent even earlier operations. The cache of fuel drums at CHR-075 probably indicates that the site was re-occupied, possibly after World War II.

CHR-083 is another example of the continuation of small-scale mining in the Coal Creek vicinity after the advent of the large dredging operation. This site, lying near the mouth of Boulder Creek, consists of an old log cabin, occupied as recently as the 1980s; an old greenhouse frame and drying racks; as well as modern drilling equipment, a small caterpillar tractor, and a cabin under construction. The fourth site, **CHR-078**, is located directly across Coal Creek from the Coal Creek Camp. The collapsed log cabin, again typical in construction, pre-dates bulldozer cuts that have been made in its vicinity, and probably also pre-dates dredging operations begun in the 1935. Considering its proximity



Arthur O. "Cap" Reynolds, a true subsistence miner: historic photo of Cap taken at his cabin on Sam Creek.



Cap's sled, the same one pictured above, was found at his cabin (CHR-081) by a CRMIM crew in 1986. (*Historic photograph from the personal collection of Margaret Morgan, Glenwood Springs, Colorado*).

to the main Coal Creek Camp, one could speculate that the cabin was re-occupied by personnel associated with Patty's operations sometime between the late 1930s and the early 1960s.

Sites with the least mining-specific information are on the Woodchopper Creek drainage. They include **CHR-071** on Woodchopper Creek; **CHR-057** and **CHR-085** on Iron Creek; and **CHR-059** on Caribou Creek. At three of these camps, CHR-071, CHR-057, CHR-085, there are no physical remains to link the sites with gold mining except for their location on, or just adjacent to, mining claims. At CHR-059, there is a depression, measuring 3.4 m in diameter and containing a saddle-notched log, in addition to the cabin and doghouse at the site. The cabins at three of these sites are either collapsed or in ruins; there is only a trace of a tent frame at CHR-057. Their poor condition suggests that they pre-date the consolidation of claims on the Woodchopper Creek drainage by Ernest Patty and General McRae in the 1930s. One datable artifact was recorded at CHR-071; it is a blue-green glass bottle with a patent date of 1918 on its bottom.

The Koyukuk District

This large district encompasses the upper reaches of the Koyukuk River, including the North, Middle, and South Forks (figure 11). The northeast section of the district, from the community of Coldfoot northward, will be the focus of discussion here. Gold, in paying quantities, was first discovered in the Koyukuk District on Tramway Bar, a bench placer in a canyon along the Middle Fork, in 1893 by one of the early prospectors in the region. The first real wave of gold-seekers, the overflow from the Klondike, did not make their way north to the Koyukuk until five years later in the late summer of 1898. About 200 poorly equipped men wintered on the South Fork, Middle Fork, and Alatna drainages that year. Those who survived - fortunately, most of them - beat a hasty retreat after break-up. A hardier, more permanent group of miners followed; one of them, Knute Ellingson made a strike on Myrtle Creek, a secondary tributary of the Middle Fork, in 1899 (Marshall 1933: 30-31).

The Myrtle Creek discovery and one the following year on the Hammond River, another tributary of the Middle Fork, initiated the first of two major stampedes to the upper Koyukuk and gave rise to the town of Coldfoot on Slate Creek. Some of the stampeders continued on to the North Fork and its tributaries Washington and Mascot Creeks, where gold strikes were made in 1902 (Maddren 1913: 109). During this first boom period, a total of about $800,000 of gold was mined from shallow placer deposits on various streams along the Koyukuk (Marshall 1933: 37). Mascot Creek contributed $90,000 to this total, much of it in the form of coarse, large nuggets. Although the gravels of Mascot Creek were not considered to be very rich by the miners, the ease with which they could be handled made the work profitable (Maddren 1913: 108-109). By 1906, the white population along the Koyukuk had dwindled to about 160 people (Marshall 1933: 41). Many left to join the stampede to Fairbanks in 1902 or to the adjacent Chandalar in 1906.

The second boom period on the Koyukuk began in 1907, following a very profitable discovery made on Nolan Creek, north of Coldfoot, by three Swedes, John and Louis Olson and John Anderson. Using a small boiler to thaw the frozen ground, they drift mined 120 feet below the surface of Nolan Creek. Their 300-foot-wide strip of ground yielded $100,000 in gold the first winter, and $250,000 at the end of three years. Word of this

bonanza spread quickly and soon the Nolan Creek valley was the scene of a small stampede (Marshall 1933: 41-42; Hunt 1990: 193). Many of the drifts were driven using wood fires, but this time-consuming practice was replaced by steam-thawing techniques. By 1911, when the work on Nolan creek began to wane, prospectors discovered yet another deep-channel deposit on the nearby Hammond River. During this second boom, the hub of activity moved from Coldfoot north to a new town at the mouth of Wiseman Creek, called Wrights, then Nolan, and finally Wiseman. After five years and over a million dollars in gold production, the richest claims on Nolan Creek and the Hammond River were mined out, and the Koyukuk population again declined as miners joined the ranks of soldiers during World War I (Marshall 1933: 42-43; Cobb 1973: 159).

For a brief period in the 1920s, there was an attempt to launch big-time corporate mining on Nolan Creek and the Hammond River, but the plans were foiled in part by low-water that prevented the river transport of heavy equipment (Brown 1985: 404). Transportation to the remote Koyukuk has always been a problem in the district. Partially because of high freight rates for bringing in goods and equipment, the pattern of small-scale mining was the norm in the district for most of its history. The breed of self-reliant, independent miner who stayed on in Koyukuk country is exemplified by the following account of Harry Leonard, a miner from the Wiseman camp, that appeared in a Fairbanks newspaper in 1938. "He drifts in winter and open cuts in summer on Gold Creek, 12 miles above Wiseman. He works alone, and has two sled dogs for company and for travel in winter" (*Alaska Miner* October 4, 1938).

An extensive reconnaissance of mining along the upper Koyukuk was made in 1937 by Irving Reed, a geologist for the Territory of Alaska Department of Mines. His documentation of the miners and their activities on creeks tributary to the North Fork is the basis for identifying and interpreting many of the historic mining sites recorded by NPS crews in the 1980s and '90s. Reed made note of cabins and several deep drift-mining shafts on the Seattle (Glacier) River that were sunk in the "early days." The deepest of these shafts was 258 feet down to bedrock. On Washington Creek, about one mile above the mouth of the right fork, Reed refers to a dam that was built in the early days and a small cut that was "boomed out." He also mentions a cabin and a small cut that had been shoveled out of the creekbed elsewhere on Washington Creek. Conglomerate Creek was another one prospected and mined to some extent during the "early days" (Reed: 1938: 80-87).

One creek actively being mined during Reed's reconnaissance was Mascot Creek. According to his report, there were three miners - Nick Ikovich, Austin Duffy, and Vincent Knorr - in residence on Mascot Creek in the summer of 1937. Duffy, who owned claims 1, 2, 3, and 4 Above Discovery, was prospecting along the edges of the old workings that summer. Both Ikovich, who owned the claims above Duffy's, and Knorr, who owned the claims below, were ground-sluicing and shoveling-in during Reed's visit (Reed 1938: 82-87). Although Reed encountered very deep prospecting pits on Mascot Creek, the deep-channel deposits drift mined so profitably on Nolan Creek and the Hammond River were not found on Mascot Creek.

By the late 1930s, the attempts to bring heavy equipment into the district succeeded, and a moderate-sized bulldozer and hydraulic operation, employing a work force of nine men, began on Myrtle Creek (Stewart 1941: 87). After the war years, mining activities on Myrtle Creek continued, and a dragline and more crewmembers were added to the operation (Stewart 1949: 43). As in the past, however, most of the operators worked on a

small-scale without the benefit of mechanization. This is well illustrated in the brief listing of placer mines in the Koyukuk District in 1946 by the Alaska Territorial Commissioner of Mines. They included..." one dragline, one bulldozer, one hydraulic, one drilling, one drift, four shovel-in, three ground sluice and about fifteen prospectors" (Stewart 1947: 22). One of these small-scale miners was Vincent Knorr, who continued his one-man shoveling-in operation on Mascot and other creeks in the Koyukuk until well into the 1950s (Holdsworth 1953: 56). Knorr was perhaps among the few long-term miners in the district for whom "gold was more a means to enjoy the country than to make a fortune" (Brown 1988: 305).

The dwellings and work places of the Koyukuk miners are still visible on the creeks and rivers in the district, even after many decades of abandonment. CRMIM crews recorded 17 placer mining sites in GAAR located on Alder, Conglomerate, Mascot, and Washington creek, as well as the Glacier River and the Middle Fork of the Koyukuk River (figure 22; table 46). They date from the early 1900s to about 1940 or slightly later. Within this inventory are sites associated with hand methods of mining and ground-sluicing, drift mining, possibly hydraulicking; most are categorized as mining method unknown. At the 16 sites classified as either a camp or a camp/operations by far the most common type of dwelling is a single log cabin, usually either collapsed or in ruins (table 47). The average size of all habitation structures, including the 17 cabins and one tent frame with known dimensions, is small, only 17.5 m^2. Only four of the camps still have evidence of outbuildings, primarily caches (table 48). The artifact inventory at the Koyukuk sites is much more limited than in the districts previously discussed, consisting primarily of the household, food storage, and other categories (table 49). A discussion of each of the Koyukuk sites is presented below under its appropriate mining technology.

Hand Methods. Although mining by hand was probably the most prevalent method used historically by miners in the Koyukuk District, most of the sites lack historic or archeological evidence to specifically tie them to this simple method of mining. Only two sites - **WIS0-047** and **WIS-048** - are classified as hand-mining sites in this report. A third site, WIS-218, known to be associated with shoveling-in and ground-sluicing, is discussed below under the category of Multiple Mining Methods. WIS-047 and WIS-048 are adjacent to each other on the Middle Fork of the Koyukuk River about three kilometers downstream from Tramway Bar. The latter site is a ditch system runs along an unnamed tributary and terminates at the edge of a steep embankment 10 meters north of the river. The main ditch begins on the tributary just above a dam, now composed only of some poles protruding from the bank and posts lying across the bottom of the creek, and runs along a bench terrace that gradually narrows and becomes steeper. In certain places, the well-defined berms of the ditch have been reinforced with river cobbles. There are several side ditches and possible diversion type boulder dams on the main ditchline. There is also a large prospect pit with wood reinforcements at the site.

WIS-047 consists of the ruins of a log cabin that served as the camp for the mining operations at WIS-048. This cabin is typical for the district, small (14.1 m^2) and constructed with a sod roof, saddle-notched corners, and moss chinking. Associated with the cabin is a can dump, composed of at least 50 cans visible in a heavily overgrown depression. Among the cans were Hills Bros. Coffee cans that date between 1914 and 1922 based on their sizes, labels, and opening styles. This site has one of the more extensive artifact

inventories in the Koyukuk sample and includes a homemade rope snowshoe and several modified cans (recycled and put to other uses).

Reed refers to the section of river where WIS-047 and WIS-048 are located as Hamil Bar by Reed (1938: 148). Although no one was working there at the time of his visit, he states that it was worked by hand methods in the early days. The ditch at WIS-048 was probably used to supply water to the bench workings in a similar way as Reed describes for the early operations on Tramway Bar. He states that water for mining purposes was first brought to Tramway Bar in 1908 by a ditch that originated on upper Mailbox Creek.

> The method of mining used was to pile the boulders of the old channel into windrows and shovel in the gravel between. The tailings were disposed of by cutting channels in the top of the canyon wall and running them into the river below (Reed 1938: 146).

The boulders and cobbles noted at WIS-048 may be remnants of the system described above.

Drift Mining. The four sites attributed to drift mining are all located on the Glacier River. The first two are located near the winter trail from Nolan, which crosses the Glacier River and heads to Mascot Creek. **WIS-216**, known as the Charles Yale (or Yehle) cabin site, is located on the Glacier River. It is composed of a drift mineshaft, two large log cabins in good condition, a wooden rack probably for holding steam pipes, and a radio antenna. The drift mineshaft is a depression, 3 m in diameter, with remnants of log cribbing and portions of a hand winch lying nearby. The rack is composed of three wooden frames, each made from three vertical poles spanned by crosspieces; additional poles hold the frames upright and space them apart from one another. The function of the structure was probably to store steam pipe when not in use. Among the many artifacts in the two log cabins are newspapers that date to 1910 and a ripped stock certificate for United Wireless Telegraph Co. with a 1904 date and the name "Charles" still visible on it. Other chronological markers are newspapers fragments – one *Seattle Times* dated 1938 and a *Fairbanks Daily News-Miner* dated 1976. There is also a freight sled and another homemade snowshoe at the site.

Charles Yale reportedly built the larger of the two cabins at WIS-216 and lived in it for 10 years during the early decades of the 1900s. He sank a drift-mining shaft, 51 meters deep, here during his tenure on the creek (Reed 1938: 80). When Robert Marshall (1933) visited the site at the end of the 1920s, the cabin had already been abandoned for a number of years and was then being used as a shelter by people traveling over Glacier Pass. According to Harry Leonard (Brown 1985: 493, personal communication), Vincent Knorr used the site after it had been abandoned by Yale, and the smaller cabin, which is the younger of the two, was used as a barn.

WIS-217, also on located on the winter trail, is known as the A. P. Ness cabin site. It consists of five features - two drift mineshafts, two tailings piles, and the ruins of a log cabin. Steam pipes, three wooden ore buckets, and a Yukon stove constructed of two square Blazo cans are inside the cabin. The shaft lying adjacent to the river is log-cribbed and measures 1.6 x 1.6 m. A tailings pile that accumulated when overburden was removed from this shaft measures 15 m in diameter and is approximately 1.8 m high. The second shaft, lying at the bottom of an excavated depression, has a log-cribbed portal and a handmade ladder that descends into the shaft. The shaft was capped with logs and sod after its final use. Another tailings pile is associated with this shaft. In the early days of mining in

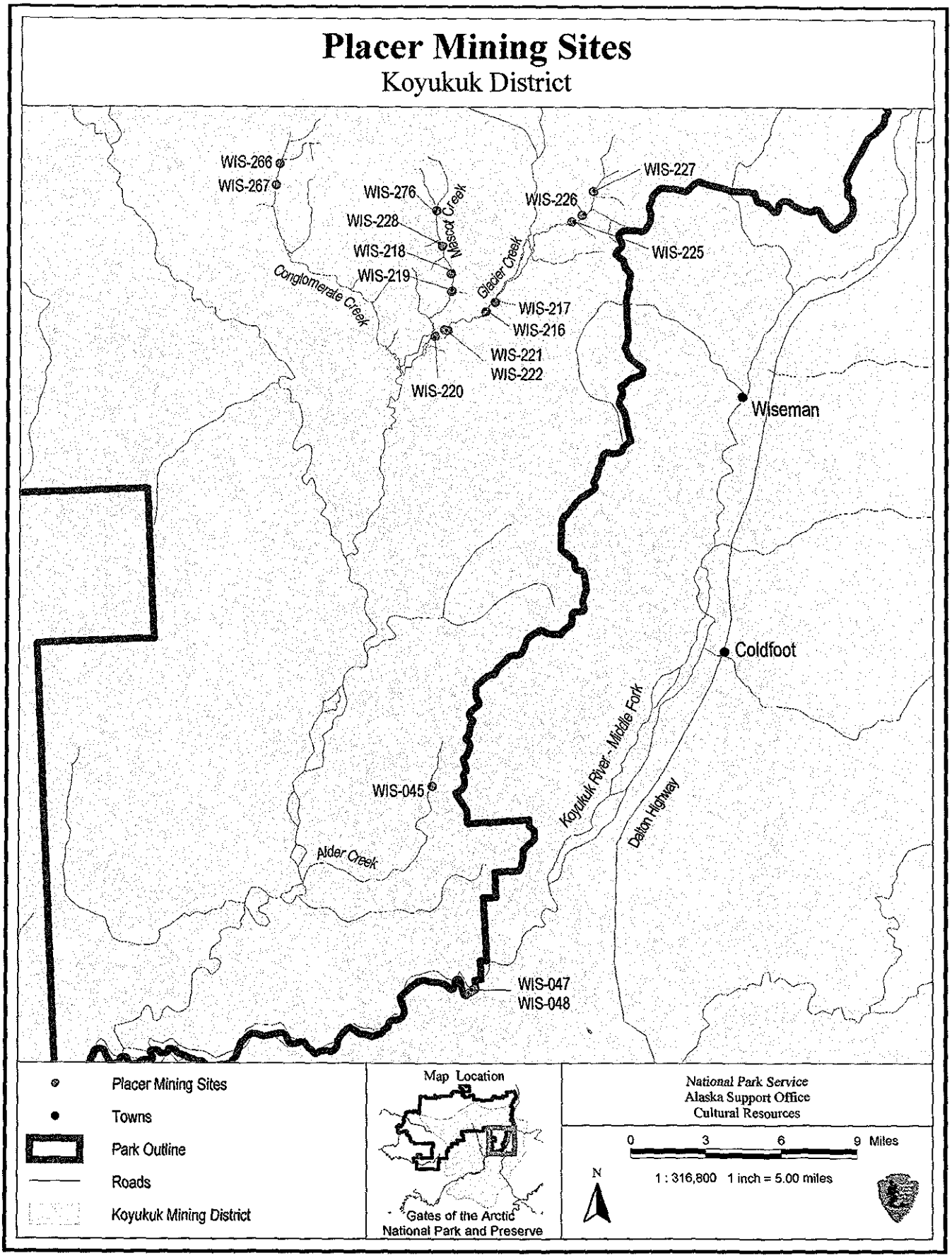

Placer Mining Sites
Koyukuk District
WIS-266
WIS-267
WIS-276
WIS-228
WIS-218
WIS-219
Mascot Creek
Glacier Creek
Conglomerate Creek
WIS-227
WIS-226
WIS-225
WIS-217
WIS-216
WIS-221
WIS-222
WIS-220
Wiseman
Coldfoot
WIS-045
Alder Creek
Koyukuk River - Middle Fork
Dalton Highway
WIS-047
WIS-048
Placer Mining Sites
Towns
Park Outline
Roads
Koyukuk Mining District
Map Location
Gates of the Arctic
National Park and Preserve
National Park Service
Alaska Support Office
Cultural Resources
0 3 6 9 Miles
1 : 316,800 1 inch = 5.00 miles
N

Figure 22.

Table 46

Placer Mining Sites in the Koyukuk District by Mining Method

Drainage	Hand	Drift	Multiple	Unknown
Alder Creek				WIS-045
Conglomerate Creek				WIS-266 WIS-267
Glacier River		WIS-216 WIS-217 WIS-221 WIS-222		WIS-220
Koyukuk River (Middle Fork)	WIS-047 WIS-048			
Mascot Creek			WIS-218	WIS-219 WIS-228 WIS-276
Washington Creek				WIS-225 WIS-226 WIS-227

Table 47

Habitation Structures at Placer Mining Camps in the Koyukuk District

AHRS #	Type	Material	Size	Roof	Corner	Chink	Condition
WIS-045	cabin	log	14.4 m^2		square	moss	collapsed
WIS-047	cabin	log	14.1 m^2	sod	saddle	moss	ruins
WIS-216	cabin	log	38.2 m^2	sod,cans	sq,saddle	moss	good
	cabin	log	33.9 m^2	sod		wool	good
WIS-217	cabin	log	13 m^2		saddle	moss	ruins
WIS-218	cabin	log	17.2 m^2	sod	saddle	moss	good
WIS-219	cabin	log	7.3 m^2		saddle	moss	ruins
WIS-220	cabin	log	16 m^2	sod	saddle	moss	ruins
WIS-221	cabin	log	8.6 m^2	shed	saddle	moss	collapsed
WIS-222	cabin	log	11.2 m^2		saddle	moss	standing
WIS-225	cabin	log	23.9 m^2		saddle	moss	collapsed
WIS-226	cabin	log	18.1 m^2	sod	pegged	moss	ruins
WIS-227	cabin/tent	log	11.1 m^2				ruins
WIS-228	cabin	log	20.7 m^2	can,cnv,sod	square	moss	collapsed
	tent frame	log/lmbr	22 m^2				ruins
WIS-266	cabin	log	12.4 m^2	sod	saddle	moss	ruins
WIS-267	cabin	log,lmbr	20.2 m^2		various		ruins
	tent frame?	pole,lmbr					ruins
WIS-276	cabin	log	12.3 m^2				trace

Table 48

Outbuildings at Placer Camps in the Koyukuk District

AHRS	Shed	Outhouse	Cache	Doghouse	Workshop	Other	Total
WIS-045			1				1
WIS-047							0
WIS-216							0
WIS-217							0
WIS-218		1	1				2
WIS-219	1						1
WIS-220							0
WIS-221							0
WIS-222							0
WIS-225							0
WIS-226							0
WIS-227							0
WIS-228			2				2
WIS-266							0
WIS-267							0
WIS-276							0
Total	1	1	4	0	0	0	6

Table 49

Classes of Artifacts[1] at Placer Camps in the Koyukuk District

AHRS	BLDM	HSHD	PERS	SUBS	FSTR	FPRP	FSER	TRAN	COMM	RECR	MTEQ	MULT	OTHR
WIS-045		+			+							+	+
WIS-047	+	+	+		+	+	+	+					+
WIS-216	+	+	+		+	+	+	+	+		+	+	
WIS-217		+			+	+					+		
WIS-218		+									+	+	
WIS-219					+							+	+
WIS-220													
WIS-221		+			+								+
WIS-222		+									+		
WIS-225		+			+								+
WIS-226		+	+		+	+							+
WIS-227	+				+								
WIS-228	+	+	+		+	+		+				+	+
WIS-266													
WIS-267													
WIS-276		+			+		+			+	+		+

[1] Abbreviations used for artifact classes are as follows:
BLDM = building materials,
HSHD = household,
PERS = personal,
SUBS= subsistence,
FSTR = food storage,
FPRP = food preparation,
FSER = food service,
TRAN = transportation,
COMM = communication,
RECR = recreation, MTEQ = mining tools and equipment, MULT = multipurpose tools, OTHR = other.

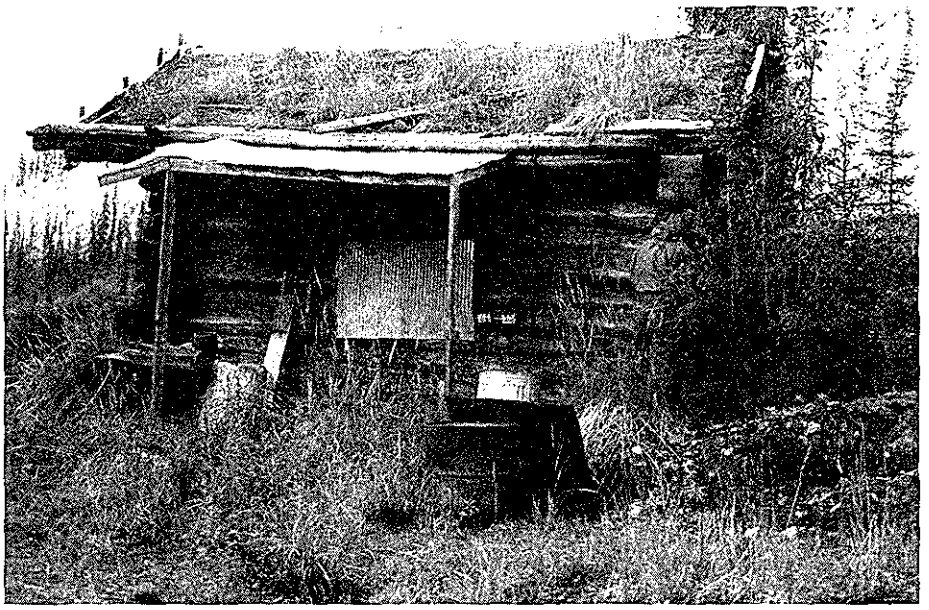
the area, A. P. Ness sank three shafts in this vicinity, reported as being about 1/2 mile (.8 km) above the Yehl (Yale) cabin. The deepest of his shafts was sunk to 79 meters below the surface. Apparently, the gravels did not show enough value to warrant any further prospecting and the area had long been abandoned by the time of Reed's visit (Reed 1938: 80).

The other two drift-mining sites are about three kilometers downstream from WIS-216 on opposite sides of the river from each other. **WIS-222** consists of a "boiler cabin," a drift shaft with log cribbing around its portal, an associated tailings pile, a large pile of decayed logs, and a depression (1.5 x 2.3 m) of unknown function. The boiler and other related equipment were removed from the cabin, but certain details of its construction seem to indicate that a boiler, the main power source for the drift mine, was once housed within. On the north wall there are two pegs, each of which extends out 30 centimeters and were probably used as racks for steam points. On the west wall is a small opening where it is thought that cables attached to a steam hoist passed through the cabin to the outside to operate an ore bucket. (The drift-mining shaft aligns with this opening). There are also the remains of a bed in one corner of the structure, so it appears that it doubled as a residential cabin (Sackett 1985: 486-488). Just outside the cabin are the remnants of a handmade wooden ore bucket, which was apparently hoisted by two sets of ropes on opposite sides of the bucket.

Located directly across the river is **WIS-221**, consisting only of the collapsed remains of a single-room log cabin that appears to have had a shed roof. Its proximity to WIS-222 may indicate that it was the residence associated with the drift mine. In the winter, the frozen river would not be an obstacle to accessing the mine, but in summer, the river crossing would be very inconvenient. This cabin, in fact, may not be mining-related. The cabin is constructed in a similar way to a woodchopper cabin (WIS-214 - see chapter 10) on Glacier Pass and may reflect the same activity. The presence of cut logs southeast of the cabin can be used as evidence of either mining (the need for log cribbing) or woodchopping. Reed (1938) does not mention mine sites, either abandoned or in-use, in this vicinity during his 1937 reconnaissance. Since Reed so conscientiously reported all evidence of mining, it is likely that these sites post-date his visit.

Multiple Mining Methods. The best example of a mining camp associated with a wide range of technology, from simple hand methods to mining with heavy, mechanized equipment is **WIS-218**, the Vincent Knorr cabin on Mascot Creek. This camp consists of a well-built, standing log cabin, a collapsing outhouse, and the remains of a cache. Artifacts, both inside the cabin and surrounding it, attest to many decades of use. Knorr owned the Discovery claim and No. 1, 2, 3 Below and No. 5 Above; he was ground-sluicing and shoveling-in when Reed made his visit to Mascot Creek in 1937. He apparently lost his setup in a sudden flood in the fall of the year (Reed 1938: 85). According to the records of the Territorial Mine Inspector, Knorr continued to shovel-in on Mascot Creek until 1953; by 1954 the A. and S. Mining Company took over his claims and began a three-man "non-float" operation (non-dredge) on his claims (Holdsworth 1955: 43,77).

In addition to the features and artifacts immediately surrounding the cabin, there is a stack of riveted, tarred penstock pipe lying just downstream and across the stream from the site. This same type of pipe is at sites in DENA, WRST, and YUCH and is commonly associated with hydraulic operations dating to the 1920s or 1930s. Our knowledge of the mining history on Mascot Creek from the "teens" to the mid-1930s is very sketchy,



The Vincent Knorr cabin (WIS-218) on Mascot Creek in GAAR.

so it is possible that an episode of hydraulic mining preceded Knorr's tenure on Mascot Creek. The pipe may have also been used in low-pressure hydraulicking as an adjunct to hand mining. In more recent years, during the late 1960s or later, the Knorr cabin was used as an assay laboratory as evidenced by the addition of a vapor hood to the interior and the presence of mercury amalgam retort parts, crucibles, and glassware. A series of placer companies - Maple Leaf Gold, Cinco, and Mascot Mining, Inc. - continued to mine, using heavy equipment, along this stretch of Mascot Creek in the 1970s and 1980s (files, NPS, ARO, Regional Minerals Management). The use of Knorr's cabin for mining purposes has continued until the present by "snipers" who mine the coarse, nugget-sized gold that first attracted attention just after the turn-of-the-century. Most of the artifacts remaining at the site relate to these more recent mining activities.

Unknown Mining Methods. Ten sites in the Koyukuk District, all camps, are grouped in this category. Very little remains to tie these sites to mining besides their locations on existing or abandoned claims. **WIS-045**, located on Alder Creek, a tributary of the North Fork, consists of a collapsed log cabin and spruce-pole platform cache. There are also three small depressions of unknown function at the site. Although the artifact assemblage at the site is sparse, the few remaining cans suggest that the site was occupied early in the twentieth century. Two other sites, both located on Conglomerate Creek, are similarly devoid of mining artifacts or features. **WIS-266** consists only of the badly deteriorated remains of a log cabin; **WIS-267**, lying about 1.5 kilometers downstream, also consists of cabin ruins with the possible remnants of an outhouse or a tent frame nearby. Neither of these sites contains any datable artifacts clearly visible on the surface. No mining was being done on Conglomerate Creek in 1937; but Reed mentions that good prospects were found on the creek in the early days, and some mining had been done (Reed 1938: 87).

Four other mining camps are located on or near Mascot Creek. **WIS-220** is actually situated on the Glacier River, but lies only 300-400 meters from its confluence with Mas-

cot Creek along the winter trail. Like the sites described above, it consists only of the ruins of a log cabin and contains no visible artifacts. **WIS-219** is the farthest downstream of sites on Mascot Creek. Originally recorded in 1984, the site was said to consist of the ruins of a log cabin and a storage shed and to have possibly been occupied by Austin Duffy (Sackett 1985: 477-479). The site was revisited several times; and by 1995, there were virtually no remains of the shed and only the slightest trace of the cabin. It is clear, by interpreting Reed's (1938) account of the names and claim locations of miners on Mascot Creek in 1937, that Duffy was <u>not</u> associated with this site, but with a site farther upstream. WIS-219 can only be attributed to an unknown miner who probably worked the creek sometime during the first two decades of the twentieth century.

By the mid-1930s, Austin Duffy took residence on Mascot Creek. He owned claims No. 1, 2, 3, and 4 Above Discovery; and his cabin was located on the upper end of Claim No. 1 Above (Reed 1938: 84, 86). This claim probably corresponds to Claim No. 2 Above on 1994 AutoCAD maps of Mascot Creek. By virtue of its claim location and a photograph included in Reed's report, **WIS-228** is most likely the site associated with Austin Duffy. Unfortunately, this site was <u>also</u> misidentified (as the Nick Ikovich cabin) in the original site report (Sackett 1985: 480-482). WIS-228 consists of a partially collapsed cabin, two ruined caches, the ruins of a log-and-lumber tent frame, and a large scatter of cultural materials, including a handsome homemade bed with grass matting, the upper component of a "stovepipe" oven with a galvanized octagonal door, and several modified cans. The cabin has been damaged by a recent mudslide and is eroding down the embankment into Mascot Creek. According to Reed (1938: 86), Duffy was prospecting along the edges of his old workings in 1937, but produced a "relatively large amount of gold for one man in 1936." Reed does not mention the methods used by Duffy, but one might assume that he was mining by hand.



Bellows found at WIS-228 on Mascot Creek in GAAR.

In addition to Vincent Knorr and Austin Duffy, there was a third miner on Mascot Creek in 1937; his name was Nick Ikovich. He was ground-sluicing and shoveling-in on his claims, No. 6, 7, and 8 Above Discovery at the time of Reed's visit. His cabin was located on either the upper end of No. 6 or No. 7 Above Discovery (Reed 1938: 83,86-87). Although this vicinity corresponds to the location of **WIS-276**, the site does not appear to be associated with Ikovich. The site consists of a trace of a log cabin and four artifact scatters, lying

on a small bench above Mascot Creek. One scatter contains a riveted shovel head that was modified by removing a V-shaped section from one side, leaving a curved projection, commonly used to clean the riffles of a sluice box. A pole and wire structure, thought to be a support for penstock pipe, lies on top of the cabin depression and postdates the original occupation of the site. The cabin, very badly deteriorated and overgrown, was probably occupied during the earliest years of mining on Mascot Creek. According to Maddren (1913: 109), miners using hand methods worked the creek from No. 3 Below to No. 7 Above Discovery during the years 1903-1905. All remnants of the Ikovich cabin pictured in Reed's report (1938: opposite 82) have apparently been destroyed either by more recent mining activities or landslides/mudslides on this section of the creek.

The last three sites in the district are on Washington Creek, another tributary of the Glacier River. **WIS-225**, the farthest downstream, consists only of a collapsed log cabin. A date for this site has not been determined, although it is certainly before 1940. **WIS-226**, located about one kilometer upstream, also comprises the ruins of a cabin, as well as a large quantity of cans and cookware, and the plank floor of another structure of unknown function. There is a sealed drum of Miner's Lamp Carbide near the can dump. According to the style of a Hills Bros. Coffee can at the site, the occupation began after 1926. **WIS-227** lies another two kilometers upstream and is similar to the other two sites. The ruins of a log cabin or tent frame, a scatter of food cans, a square platform area, and a log pole floor compose this site. Its condition suggests that it predates the 1940s. There were apparently no miners on Washington Creek at the time of Reed's 1937 visit, but he did mention that a boomer dam had been constructed and some areas along the creekbed



Artifact scatter, including modified shovel and cans, found at WIS-276 on Mascot Creek in GAAR. These artifacts were probably used by miners using hand methods of mining just after the first of the twentieth century.

had been shoveled out in the early days. According to Reed (1938: 81), gold recovery was "insufficient to make mining the creek attractive."

The Fairhaven District

The Fairhaven District encompasses much of the northeastern Seward Peninsula, including a section of BELA between Imuruk Lake and Kotzebue Sound (figure 12). Not surprisingly, the fist gold discovery in the district was made in 1900, at a time when gold-seekers were working their way inland from Nome, where the precious metal had been discovered in the beach gravels a year to two earlier. During the first few years of the twentieth century, most of the activity in the district was focused on the Candle Creek vicinity, east of the present-day BELA boundary. A rich strike was made there in 1901 and the mining camp of Candle was established (Cobb 1973: 69; Orth 1971: 179).

Within BELA, the real mining excitement did not begin until 1905, when the Fairhaven Water Company commissioned engineer C. L. Morris to construct a ditch that would carry water from Imuruk Lake some 38 miles to the company's claims on the Inmachuk River. Built in 1906 - 1907 with no mechanization, the Fairhaven Ditch is a marvel of construction, in terms of planning, engineering, and human labor. It ran from the lake outlet, where a 500-foot dam was built, across 17 miles of lava formation to the Wade Creek-Pinnell River divide. From there, the water was diverted into the Pinnell River and then into a lower section of the ditch that drained into the Inmachuk River and its tributary Arizona Creek. Initially, the water was used in hydraulic elevators and giants to mine the gravels of the Utica group of claims about two miles below the mouth of the Pinnell River. The Fairhaven Water Company, able to fully exploit its claims on the Inmachuk because of water provided by the ditch, produced $500,000 worth of gold in 1908. The company later operated a dredge on the Inmachuk. The ditch remained in use until sometime before 1920, when the Inmachuk claims were reported to have played out (Henshaw 1908: 99; Henshaw 1909: 358-359; Williss 1987).

A second locus of activity within the BELA portion of the Fairhaven District was the upper reaches of the Goodhope River, which includes Esperanza and Humboldt Creeks. USGS reports indicate that little prospecting was done in this vicinity until the winter of 1907-08 when a party of Laplanders discovered gold near the mouth of Esperanza Creek. News of the discovery caused a stampede from all parts of the Fairhaven District in the late summer of 1908. Ditches to convey water for sluicing and diversion dams were put in during the year in order to mine six claims near the lower end of the creek (Henshaw 1909: 369; Henshaw 1910: 366), but the lack of relief made sluicing difficult. A low-level of mining, including the use of a bulldozer, apparently continued intermittently in the vicinity until the 1970s, based on field observations (Hovis 1991b: 1).

Prospecting began on Humboldt Creek as early as 1901 (Williss 1986: 137), but actual mining did not take place until 1918 and 1919 when both gold and cassiterite, the oxide of tin, were removed by non-hydraulic open-cut methods (Cathcart 1920: 189, 196). By 1931, Humboldt Creek was mentioned in the literature as having the largest of several small hydraulic mining camps near the Inmachuk River. The "large camp" was operated by only four men, who apparently had several successful seasons (Smith 1933: 47; Hovis 1992a: 6). According to local sources, this operation was run by a Mr. Walsh, who worked along the headwaters of the creek (Williss 1986: 191). It seems that mining came to halt on Humboldt Creek in 1937 and was not resumed again until a decade later when N.B.

Tweet and Sons began a bulldozer-hydraulic operation (Stewart 1949: 46). By the next year, M.J. Walsh, presumably the same Walsh mentioned earlier, also produced a moderate quantity of gold from Humboldt Creek placers using hydraulic (and bulldozer?) methods (Ransome 1950: 1383). Except for a decade-long hiatus during the 1950s when they were mining on the Kougarok River, the Tweet family continued to mine or test the gravels of Humboldt Creek until 1991 (Hovis 1992a).

As in the other mining districts on the Seward Peninsula, large-scale mining with dredges became quite productive in the Fairhaven District beginning just after World War I through the 1930s (Williss 1986: 194). These dredges, located on Candle Creek, the Kugruk River, and the Inmachuk River, all operated outside the area now encompassed by BELA. In fact, except for the burst of activity generated in building the Fairhaven Ditch during the early years of the twentieth century, there has been comparatively little mining on BELA, lands given the intensity of mining elsewhere on the Seward Peninsula (Hovis 1991b).

The remains of six historic mining sites have been documented during CRMIM surveys in the Fairhaven District (table 50). These sites, located on Humboldt and Esperanza Creeks and on the Kugruk and Pinnell Rivers, are associated with hydraulic, bulldozer, and bulldozer-hydrualic methods of mining (figure 23). A single cabin or a tent frame/tent platform is at each of the sites, although only a trace of two of these structures still remains (table 51). They all appear to have been constructed of milled lumber or planks and average 19.4 m^2. Outbuildings have only been preserved at one of the camps (table 52), but a fairly representative assortment of artifacts were documented at most

Table 50

Placer Mining Sites in the Fairhaven District (BELA) and the Bristol Bay Region-Portage Creek (LACL)

Drainage	Hydraulic	Bulldozer	Bulldozer-Hydraulic
Kugruk River	BEN-071		
Pinnell River	BEN-072		
Esperanza Creek		BEN-093	
Humboldt Creek	BEN-133		BEN-131, BEN-132
Portage Creek			XLC-089

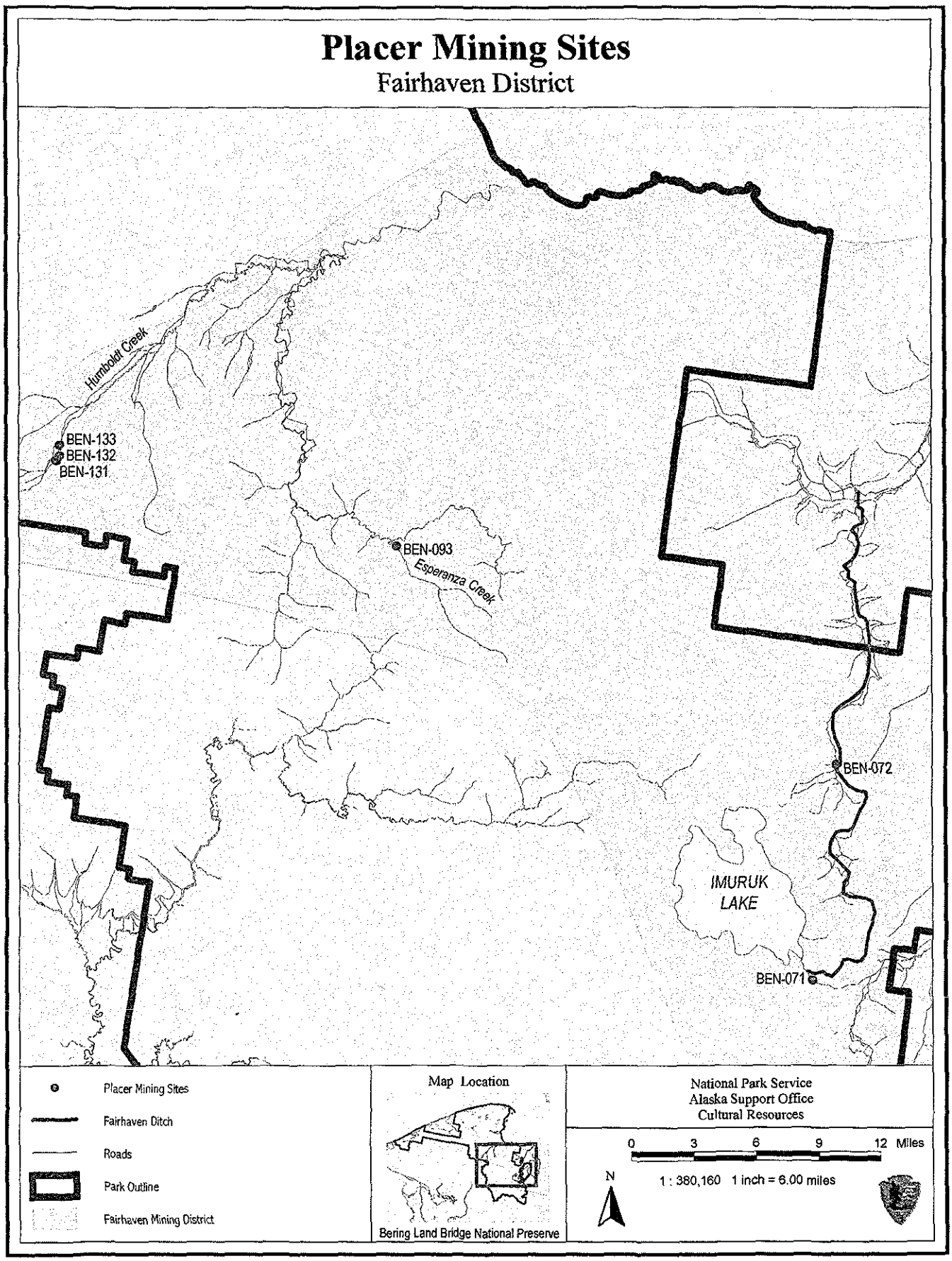

Placer Mining Sites
Fairhaven District
Humboldt Creek
BEN-133
BEN-132
BEN-131
BEN-093
Esperanza Creek
BEN-072
IMURUK
LAKE
BEN-071
Placer Mining Sites
Fairhaven Ditch
Roads
Park Outline
Fairhaven Mining District
Map Location
Bering Land Bridge National Preserve
National Park Service
Alaska Support Office
Cultural Resources
0 3 6 9 12 Miles
N
1 : 380,160 1 inch = 6.00 miles

Figure 23.

Table 51

Habitation Structures at Placer Mining Camps in the Fairhaven District and the Bristol Bay Region-Portage Creek Vicinity

AHRS #	Type	Material	Size	Roof	Corner	Chink	Condition
BEN-071	cabin	lumber	24.6 m^2	tar paper			standing
BEN-072	tent platf	planks	19.2 m^2				ruins
BEN-093	tent frame?						trace
BEN-131	cabin/tent	lumber	25 m^2				trace
BEN-132	cabin	plank	13.3 m^2	tar paper			good
BEN-133[1]	cabin	plank	15 m^2	planks			good
XLC-089[2]	house	log/pole	87.9 m^2	metal	dovetail		good
	cabin	log slab	13.1 m^2	shiplap			good
	cabin	log slab	13.3 m^2	metal			good
	cabin	log	67.5 m^2	metal	hog trough	cnv/burlp	good

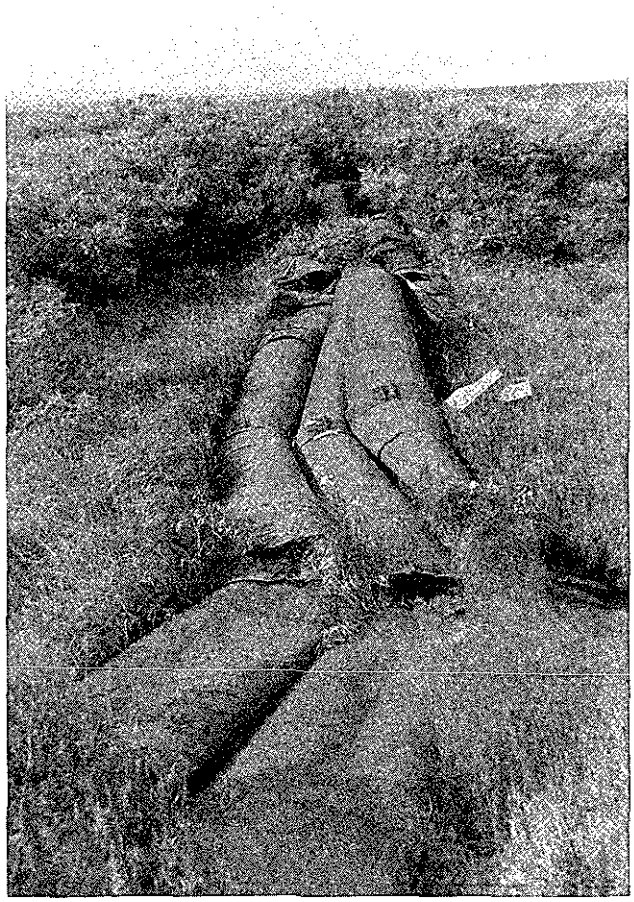
[1] BEN-133 - cabin has attic.

[2] XLC-089 - house consists of four rooms and two porches added on at various times; different types of corner treatments, including dovetail, notching are found on the house; the log cabin is two-story.

Table 52

Outbuildings at Placer Camps in the Fairhaven/Kougarok Districts and the Bristol Bay Region-Portage Creek

AHRS	Shed	Outhouse	Cache	Doghouse	Workshop	Other	Total
BEN-071							0
BEN-072							0
BEN-093							0
BEN-131							0
BEN-132							0
BEN-133		1	1		1		3
XLC-089	2	1	4	1	1	5	14



Penstock pipe (BEN-071) used in constructing an inverted siphon, part of a water control system between the Fairhaven Ditch and Imuruk Lake in BELA.

Table 53

Classes of Artifacts[1] at Placer Camps in the Fairhaven District and the Bristol Bay Region-Portage Creek

AHRS	BLDM	HSHD	PERS	SUBS	FSTR	FPRP	FSER	TRAN	COMM	RECR	MTEQ	MULT	OTHR
BEN-071	+	+		+	+	+	+					+	
BEN-072		+			+		+					+	
BEN-093	+	+	+		+			+				+	+
BEN-131	+	+			+	+						+	+
BEN-132	+	+			+	+					+	+	+
BEN-133	+	+			+			+		+	+		
XLC-089	+	+	+	+	+	+		+	+	+	+	+	+

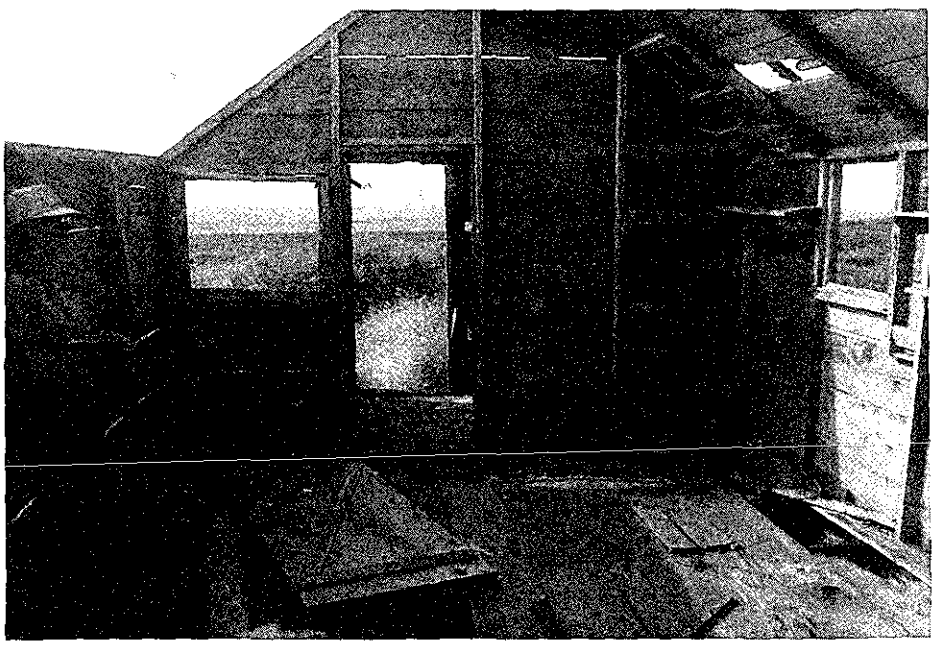
[1] Abbreviations used for artifact classes are as follows: BLDM = building materials, HDHD = household, PERS = personal, SUBS = subsistence, FSTR = food storage, FPRP = food preparation, FSER = food service, TRAN = transportation, COMM = communication, RECR = recreation, MTEQ = mining tools and equipment, MULT = multipurpose, OTHR = other.

sites (table 53). In addition to the sites recorded by CRMIM crews, a number of Fairhaven District placer mining sites have been documented during previous archeological surveys in BELA and are included in the discussion below.

Hydraulic Mining. The premiere mining site in the district is the Fairhaven Ditch, **BEN-069**, extending over 60 kilometers from the outlet of Imuruk Lake to the Inmachuk River to the north of the preserve boundary. Although the ditch was recorded prior to CRMIM surveys in BELA, a CRMIM crew did return to it in 1991 to locate and document hazardous material associated with past mining in the area. A pedestrian survey covered some portions of the ditch, and a helicopter over-flight covered others. Two camps/operations associated with ditch operations and maintenance were recorded during the pedestrian survey.

The first is **BEN-071**, located along the ditch, just over a kilometer from its origin at Imuruk Lake. The site is composed of two loci: Locus 1 includes a standing wood frame cabin and the artifacts that surround it, while Locus 2 contains several components of a water control system used to collect and regulate water flow between the ditch and the Imuruk Lake/Kugruk River system. The main feature in the water control system is an inverted siphon, constructed of three metal penstock sections, side-by-side, which span a low marshy area connected to a large, drained reservoir near the cabin. The total width of the siphon is about 2.7 m and it extends almost 60 m long. A rectangular enclosure of boards and posts functioned to collect water from the downstream end of the siphon near the reservoir. An earthen berm, 65 m long, separates the siphon from the Fairhaven Ditch. Another component of this water control system is the remains of what appears to have a headbox lying between a segment of the ditch and the adjoining reservoir. The siphon and its related features were apparently built to facilitate the flow of ditch water through this low, hummocky terrain.

The standing cabin at the site is constructed of milled lumber, once covered with canvas and tar paper. The cabin has a shed entry and the remains of two sets of three-stacked bunk beds inside. Among the artifacts found at the site are the typical enamelware items; multipurpose tools such as a shovel, pickaxe, and wheelbarrow; a stove constructed from two five-gallon cans; and more recent items such as military-issue cans and utensils. The most interesting discovery at the cabin is the graffiti engraved on the front door, now fallen



Inside of cabin at BEN-071. Graffiti on the door, now fallen off its hinges, includes an engraving of a Lapp reindeer herder.

within the cabin. One of the graphics depicts a thin-faced man, with a broad nose, smoking a pipe. He is wearing a jacket with a mandarin-style collar and a distinctive small cap, similar to clothing of Lapp reindeer herder. Numerous reindeer bones, including crania with attached antlers, are also scattered about the cabin.[2] Given the unmistakable identity of the man depicted on the cabin door and the fact that "Laplanders" were involved in prospecting activities in the district (see Esperanza Creek discussion above), it seems likely that the site was occupied by Lapp reindeer herders sometime after the Fairhaven Ditch had fallen into disuse. Lapp ownership of reindeer herds on the Seward Peninsula began as early as 1901 and by 1911 they were beginning to disperse to new grazing lands elsewhere in Alaska (Stern et al. 1980: 37). This example of multi-cultural occupation is unique among the sites in the CRMIM sample.

The second site, **BEN-072**, is located approximately 29 kilometers from the outlet at Imuruk Lake, where the natural bed of the Pinnell River serves as the ditch. The site consists of an earthen dam, about 200 m long, that served to regulate the flow of water after the ditch crossed a marshy, low energy section of its route. The ruins of a wooden gate structure are still on the dam. At the east end of the dam is a tent platform with domestic artifacts, including cans, a metal barrel hoop, modified shovel heads, parts of a cast iron wood stove, and two hand-carved board hide stretchers. The camp was probably established so employees of the Fairhaven Water Company could monitor and control the flow of water through the dam.

A number of other sites were identified during the helicopter over-flight of the ditch in 1991, but were not actually recorded. They include a two-cabin group that appears to be similar in size and construction to the cabin at BEN-071. These cabins were visited by Williss in 1985 and identified on his Historical Base Map as #25B. He suggests that they were related to the construction and maintenance of the ditch (Williss 1986: 199). The ruins of two tent frames lying farther north along the ditch were also identified from the air, as was another inverted siphon near the BELA boundary. The over-flight also revealed that two cabins that appear on USGS quad maps adjacent to the ditch no longer exist. One appeared to be reduced to a few pieces of dimensional lumber floating in a pond, and the other had burned. For a discussion of the archeological remnants of other Seward Peninsula mining ditches and their associated camps, the reader is referred to H. Smith (1991).

Besides the sites associated with the Fairhaven Ditch, one additional hydraulic mining site - **BEN-133** - was recorded by CRMIM crews on a heavily mined section of Humboldt Creek. The site's primary feature is a plank-framed cabin, known locally as the Walsh cabin after its former owner who had a successful hydraulic operation on Humboldt Creek during the 1930s (Williss 1986: 191), and again briefly in 1948 (see discussion above). The cabin is still standing with its roof intact, but is in rapidly deteriorating condition. It has an attic and a shed addition that contains the remains of two metal bed frames. At the request of the BELA staff, the CRMIM crew collected three brown glass beer bottles, with intact paper labels dating to the 1930s, from the attic (catalogue numbers BELA-594, 595, and 596). The outbuildings at the site are a toppled meat cache, the

[2] Sami herders were brought from Lapland to Alaska in the early 1900s to instruct Inupiat Eskimos in herding deer. The bones outside the cabin cannot be attributed to caribou, which may be confused with those of reindeer, as the cabin was constructed after caribou had disappeared from the Seward Peninsula.

ruins of an outhouse, and the ruins of a blacksmith shop. Other features include a machine part scatter with lengths of riveted pipe; a trash dump with a wide assortment of cans, bottles, and a gold pan; a fuel drum scatter; a heavy-gauge metal rock-stacker used in hydraulic mining operations; a homemade freight sled with a steel cable once used for tow-vehicle attachment; and a water diversion ditch that passes through this site. A Fresno shovel (scraper) and penstock remains are located across the creek from the Walsh cabin. Distinct tailings piles, also dating to the 1930s hydraulic operations on Humboldt Creek, flank the stream channel in the site vicinity.

Bulldozer Mining. Only one site, **BEN-093** on Esperanza Creek, is in this category. This site has evidence of at least two occupations - one historic occupation probably dating to 1907-1909, and another more recent occupation that continued in the area until the late 1970s or early 1980s. The main features at the site are an equipment yard, a large ditch along the north side of the creek, large spoil piles on each side of the creek mouth, a reservoir in the Goodhope River floodplain, a bulldozer "cat" trail that enters the site from the northeast and makes a loop around the equipment yard, and a large trench within the loop, which forms the northern edge of the site. The presence of a habitation feature, probably a tent or tent frame, is suggested by a cluster of artifacts that include a folding wooden cot frame, a handmade screen door, a window frame, and a possible propane tank. Except for possibly the ditch, these features and artifacts date to the recent site occupation.

Among the few historic features and artifacts recorded at the site are the remains of a dam, consisting only of a line of uprights and some milled lumber. The dam lies just upstream from an opening of a small, overgrown ditch on the south side of the creek. Twenty meters upstream, buried in the silts and gravels, is some very weathered lumber with metal brackets thought to be the remains of a sluice box. Another battered and partially buried sluice, constructed of lumber and metal, was near the large ditch, now heavily vegetated, to the north of the creek. Also nearby are a steam point and an enamelware plate. These remains - the ditches, dam, and sluice boxes - have all been mentioned in the historic literature (see discussion above) describing mining activities near the mouth of Esperanza Creek in the early years of the twentieth century.

Three other sites documented in the Esperanza Creek - Goodhope River vicinity during a 1985 archeological survey in BELA may also be related to mining. They are BEN-091, a one-room sod house on the floodplain of the Goodhope River; BEN-095, a cluster of artifacts assumed to represent a mining camp, located on the Goodhope River about 1.8 kilometers west of BEN-093; and BEN-097, a two-room sod house on the east side of Esperanza Creek (Schaaf 1988: Volume II).

Bulldozer-Hydraulic Mining. Two sites, both located on a heavily mined section of Humboldt Creek, are attributed to bulldozer-hydraulic mining. The one farther upstream is **BEN-131**, a camp consisting of a rectangular cabin depression with an encircling berm and pieces of milled lumber strewn inside and associated artifacts scatters surrounding it. Among the artifacts are a Lang's wood-burning stove, a grindstone, a forge hood, various cans and bottles, and thirty 55-gallon drums that appear to be surplus military barrels dating from 1946-1947. There is also a hydraulic nozzle adjacent to the cabin depression. This camp has had at least two periods of occupation, pre- and post-World War II. The cabin remains and some of the artifacts date to the earlier occupation, probably to the 1930s hydraulicking activities along the creek. After the war, the Tweet family took over the claims and erected Quonset huts, now evident as only clearings at the site, to support their bulldozer-hydraulic operations (Cheryl Tweet Jong 1989: personal communication to CRMIM crew). The can and bottle dump and the barrel scatter date to the Tweets occupation of the site.

BEN-132, located about 400-500 meters downstream, is also associated with the Tweet family mining operations. It consists of a plank-frame cabin built atop a tailings pile, four framed wall or roof

sections lying flat and adjacent to the cabin, numerous 55-gallon drums, and a trash dump. The cabin was built in 1964 (Cheryl Tweet Jong 1989: personal communication to CRMIM crew) and was being occupied at the time of site recording. Scattered among the non-historic artifacts are a few remnants of earlier hydraulic mining that appear to have been assembled from elsewhere and may date as early as the 1940s. One example is a heavy gate valve bolted to two short sections of riveted pipe that now lies on top of the extensive tailings at the site.

Bristol Bay Region - Portage Creek

In the Bristol Bay region, no rich placer deposits have been found and few areas have ever been developed much beyond the prospecting stage (Cobb 1973: 11). Among these few areas is Portage Creek, a five-mile long stream that enters Lake Clark from the northwest (figure 15). The first gold discovery was made in the area just after 1900, and by 1909 several ounces of coarse gold had been recovered near the canyon of Portage Creek (Hovis 1989b: 1). Early mining along the creek climaxed in 1910-1912 when several men were said to have worked on the lower four claims and recovered about $2,000 worth of gold (Capps 1935: 94). Although limited work continued for the next few years, no production was reported for the 1920s or 1930s.

A new chapter in Portage Creek mining history opened in 1935 when Fred Bowman acquired the placer claims on the creek. He did not actually begin to work until late in 1939, and shortly thereafter was forced to shut down as part of the wartime restrictions on gold mining. He began by using hydraulicking techniques, but expanded his operations to include a bulldozer when he resumed work in 1945 after the war. Bowman always had a small crew, never more than four or five. He later streamlined it to a two-man operation, and then to a one-man operation just before he died. Bowman's son Howard took over the family's mining interests after his father's death in 1959. Despite the decades of work on Portage Creek, the total production is estimated to have been less than 1,000 troy ounces of gold (Hoagland 1982; Hovis 1989b; Kain 1991a).

The Bowman Camp, **XLC-089**, is the only mining site recorded by CRMIM crews on Portage Creek (figure 24; table 50). The camp itself consists mainly of residential features (tables 51 and 52), but a number of isolates located a few hundred meters upstream, provide us with a glimpse of the mining technology used by Fred Bowman during the 1930s, 40s, and 50s. Located farthest upstream is the remnant of a wing dam, once used to divert water to a nearby bedrock cut. A hydraulic giant in good condition lies about 35 meters downstream. Farther downstream is a cluster of mining equipment, mostly dating from the 1930s. This cluster contains a water wheel and winch, both built in 1936; a gin pole, constructed of a spruce tree with board steps and attached cables; a small tool shed; a stone boat used to move boulders; a modern wooden frame rocker box; and a scatter of other artifacts. The water wheel, winch, and gin pole were all components of a rock-moving rake designed and operated by Fred Bowman so he could single-handedly remove large rocks and boulders from the creek (Kain 1991a). The fourth isolate found above the mining camp is an equipment scatter, including steel riffles, pipes, a cart or wagon, fuel drums, and some modern artifacts adjacent to a mine cut. The dirt road running from the camp ends near this equipment scatter.

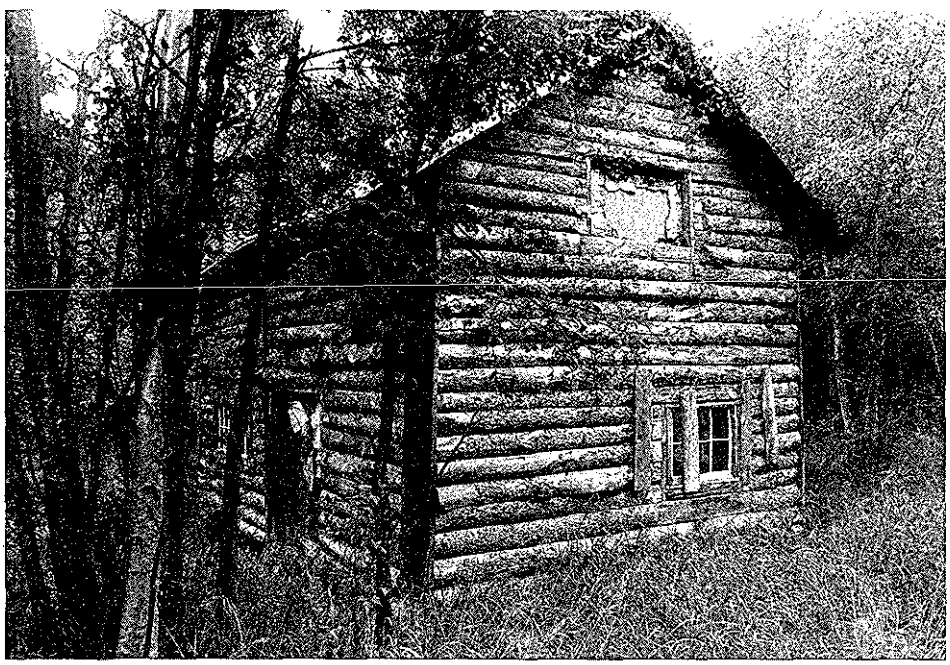
The Bowman Camp is quite extensive, consisting of four habitation structures - a house and three cabins - as well as 14 outbuildings (figure 25). The Bowmans' belongings, not systematically inventoried, are still stored in many of these structures. The main house, constructed in stages, has three interior rooms and two porch additions. The original structure was built of peeled logs, with dovetail corner notching, in 1934-35 by Harry Bowman, Fred's father. An older log cabin on the property, dating to 1914 mining on the creek, was moved and attached to the original structure in 1938 to serve as a kitchen. A guestroom and an indoor bathroom, both built of logs squared on three sides,



Bowman Camp (XLC-089) on Portage Creek in LACL.

Logan Hovis records a tractor found at the site (above).

A two-story log cabin with hog-trough corner (below).



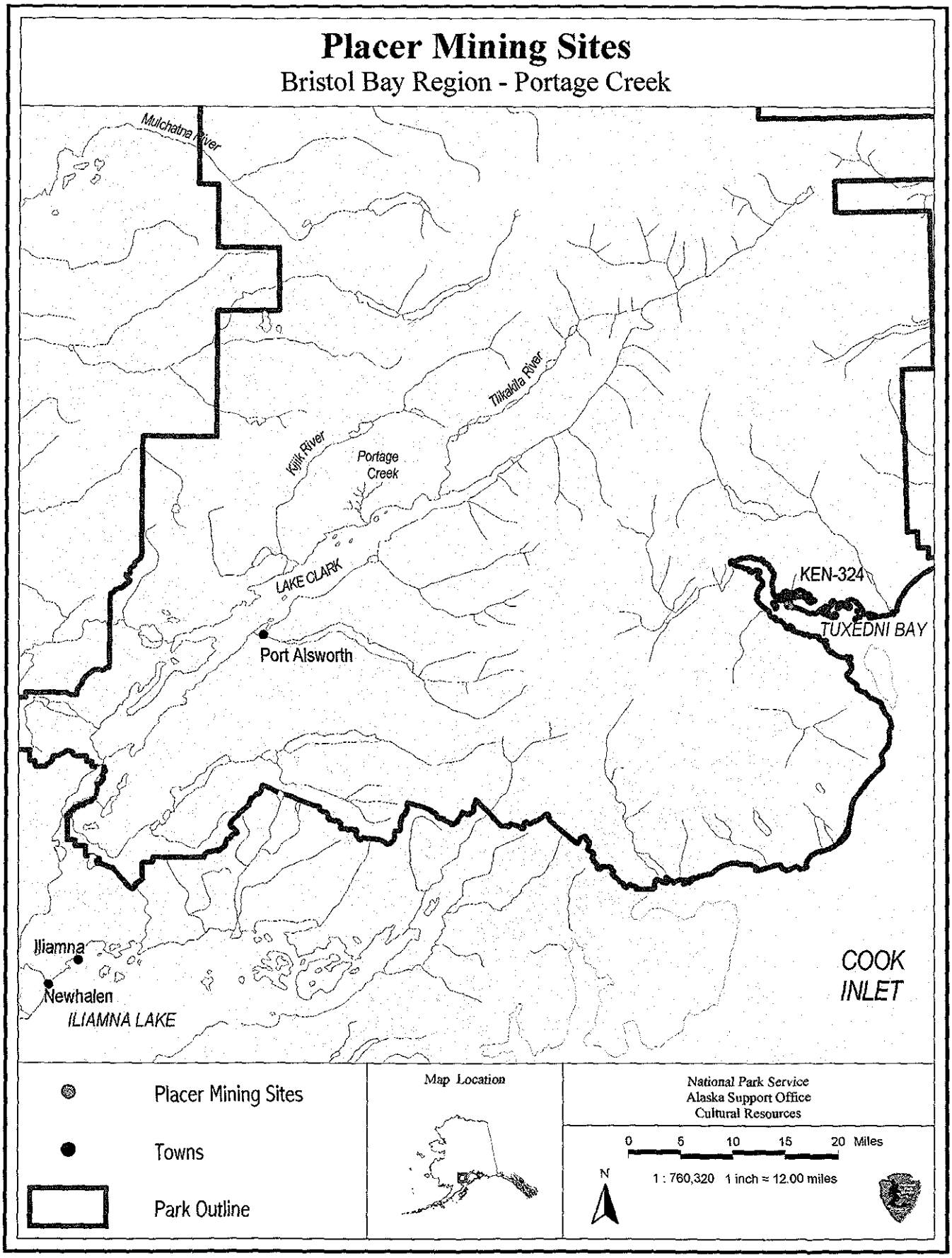

Placer Mining Sites
Bristol Bay Region - Portage Creek
Mulchatna River
Tlikakila River
Kijik River
Portage Creek
LAKE CLARK
Port Alsworth
KEN-324
TUXEDNI BAY
Iliamna
Newhalen
ILIAMNA LAKE
COOK INLET
Placer Mining Sites
Towns
Park Outline
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 5 10 15 20 Miles
N
1 : 760,320 1 inch ≈ 12.00 miles

Figure 24.

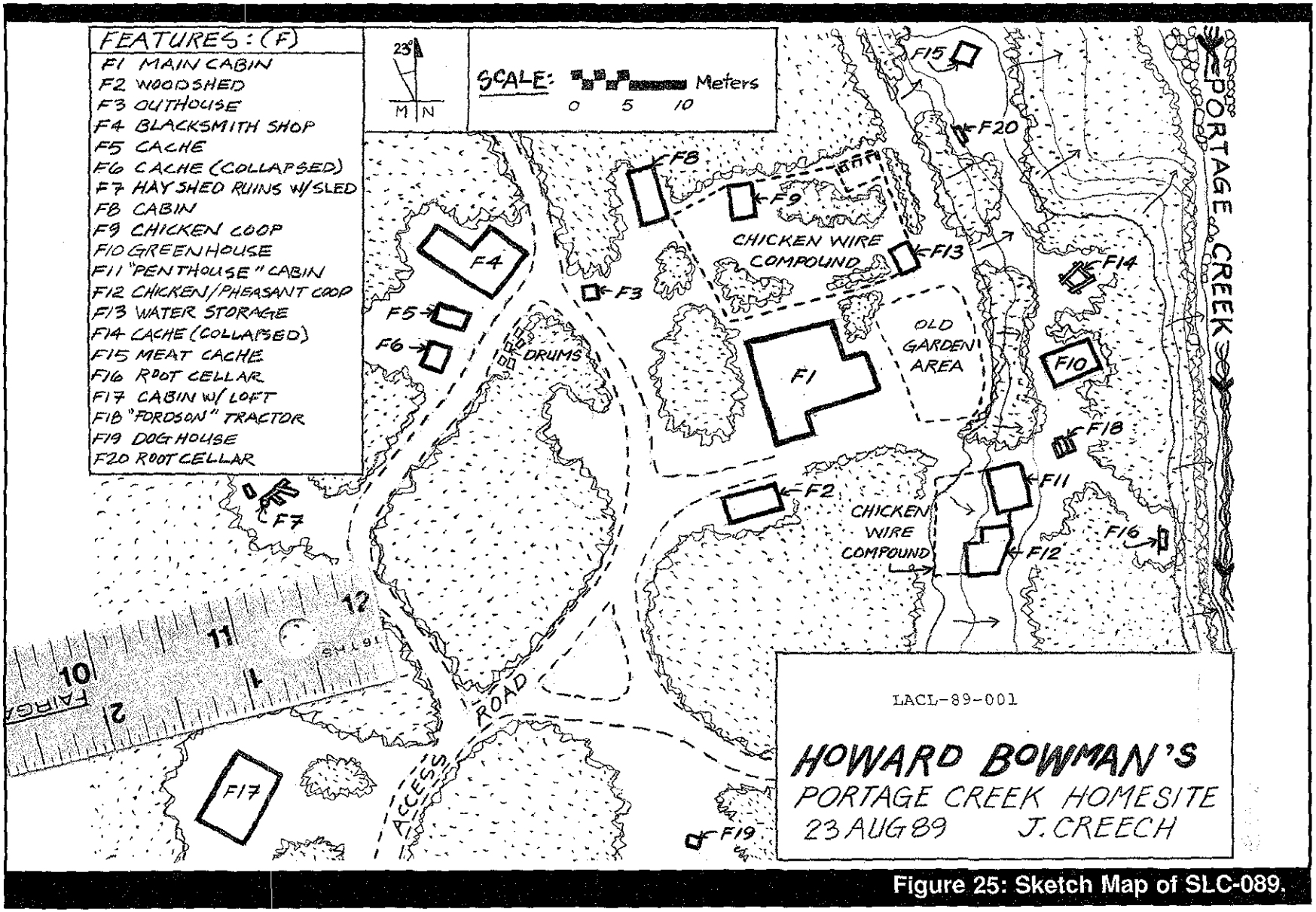


Figure 25: Sketch Map of SLC-089.

were also added to the house, making it a sizeable 87.9 m^2. To provide additional living quarters for a crew, the family built "the penthouse cabin" in 1936. It is constructed of spruce end-slabs nailed vertically over interior wall frames and measures 13.3 m^2. A guest cabin of similar dimensions, but constructed of horizontally placed log slabs, was built in the same year. The fourth habitation structure is a two-story cabin, built in the 1940s of unpeeled, squared logs joined with "hog trough" corners. Howard Bowman re-roofed three of these dwellings with corrugated metal in 1968. The eclectic building techniques at this camp are somewhat surprising, and stand in contrast to the techniques used in the Circle/Eagle sample of cabins, which are so similar, almost generic, in construction with their saddle notching, sod roofs, and moss chinking.

The variety of outbuildings at the camp - a woodshed, two chicken coops, meat cache, elevated cache, root cellar, greenhouse, doghouse, hay shed, blacksmith shop, and others - reflect the many activities in the lives of year-round Bush residents. Many of these buildings were also re-roofed by Howard Bowman, but others have fallen into disrepair. The most interesting of these outbuildings is the blacksmith shop, which has retained most of its contents in place from the time when the camp was in full operation. A homemade forge dominates the interior; there is also a model of the rock-moving rake designed and built by Fred Bowman to help him mine the creek as a one-man operation. The small sample of the Bowman's household items that have been inventoried also convey the sense of self-reliance. Notable among them is a homemade copper still. The camp and its surrounding mining features are a testament to the Bowmans' ingenuity in sustaining mining operations through the decades in a very isolated setting.

Discussion

The sites described above are tangible reminders of a dynamic era in Alaska history when a practically unknown, isolated frontier became a settled territory. They exemplify the sweep of mining history from the stampede and early bonanza days of hand mining, through a period of greater financial investment and advanced technology, to a post-World War II period of gradual re-emergence as an industry. Although the CRMIM placer mining sites are widespread in a geographical sense, they are restricted chronologically. The earliest of the sites date to just around the turn of the century (1800s-1900s), while the most recent date to the mid-1940s, thus representing less than five decades of history. Many of these sites continued to be occupied in the decades that followed, but our concern here has been primarily with the historic component and not the "modern" periods of occupations.

With few exceptions, the earliest placer camps are in poor condition, with the structures in ruins or scavenged for their building materials. Fortunately, some artifacts - notably cans, enamelware, remnants of stoves, and hand tools - remain to mark the location of the early gold-rush camps in most of the districts. The only early camps with standing structures, such as the Nizina Post Office site (XMC-012) and the Ben Creek Mine site (CHR-082), are those that continued to be occupied by later generations of miners who invested the time and money to repair and maintain them. Frequently, the evidence of early hand mining or ground-sluicing has been disturbed or destroyed by subsequent mining; but in some cases, hand-stacked tailings, dam remnants, or overgrown ditches preserve the remains of early mining episodes at sites with later, more visible and more extensive occupations. Also still evident are drift-mining features, such as cribbed shafts, which date to the first decade of the twentieth century in both the Circle/Eagle and the Koyukuk Districts. The Fairhaven Ditch (BEN-069) and the Maze Site (XMC-119) provide other notable examples of well-preserved pre-1910 mining features.

Placer sites that date to the following decade (1910-1920) are more numerous than the early sites, but they are similar to the earlier sites in terms of technology and site condition. What begins to

appear in this decade are a few sites associated with hydraulic mining in the Nizina, Chisana, and Circle/Eagle Districts. The best example of a hydraulic mining feature dating to this period is at NAB-064, a flume system that extends for two kilometers along Bonanza Creek. Also notable is XMC-061, a hydraulic camp on Chititu Creek with the ruins of a very large bunkhouse that was occupied as early as 1912.

The initial occupation of many of the sites dates to the 1920s and 1930s, which were decades of increased financial investment and mechanization in the placer mining industry. These sites are associated with a wide range of technology, including hydraulicking, drift mining, dredging, and a limited amount of bulldozer mining, all of which have left distinct signatures on the landscape. Among the most prevalent, if not the most visible, of these landscapes features are the ditchlines, which supplied water for hydraulic operations recorded in the Kantishna, Nizina, Chisana, Circle/Eagle, and Fairhaven Districts. Simpler methods of mining with hand tools and ground-sluicing, however, were not forsaken by small-scale operators as evident at a number of camps, particularly in the Chisana District. Some of these camps, such as NAB-051 and NAB-063 (the Dipple camp) continued to be occupied until the late 1980s. In a few cases, long-abandoned camps that date to the 1920s-'30s era still have structures that are standing or in good condition. One example is the exceptionally well-built log cabin at XMC-053, a site associated with the Chititu Creek hydraulic operations.

Hydraulic mining and dredging continued at many sites until the early 1940s, when wartime restrictions were imposed on the mining industry. In the Kantishna District, the early-1940s-era sites are also associated with large-scale dragline operations that flourished for a brief period. The long, segmented tailings piles adjacent to MMK-044 are the most visible reminders of this profitable period in Kantishna history. After World War II, mining activities resumed at a few sites, most notably MMK-118, MMK-119, MMK-120, which are all bulldozer operations on Kantishna's Crooked Creek. In the decades that followed, it is clear that many of the historic camps were occupied intermittently by miners and others, often until very recent years. Some of the best preserved camps, such as the Johnny Busia cabin site (MMK-017) and the Vincent Knorr cabin site (WIS-218), have had long-term occupation by persistent men who apparently enjoyed the rigors of "subsistence mining."

Archeological Patterns. The archeological patterns in each of the mining districts are summarized in table 54. These patterns are based on the types of placer technology that predominate in the district; the scale of the mining operations; the number, type, size, and construction of habitation structures; the number and type of outbuildings; and the types of activities, other than mining, that can be inferred by the artifact assemblages. As in any archeological site, the patterns we see in the presence or absence of particular groups of features or artifacts at the placer camps are related not only to cultural factors, such as use, discard and abandonment, but also to the processes of site deterioration and destruction.

The most clear-cut distinctions between districts can be found in comparing data on the average structure size. The Nizina District (25.1 m^2) and Circle/Eagle Districts (20 m^2) top the list. (The sample size of camps in the Fairhaven District [6] and the Portage Creek vicinity [1] are too small to be considered valid for comparison). At the other end of the scale is the Chisana District, with dwellings averaging only 12.6 m^2. The Kantishna and the Koyukuk Districts lie mid-way along the continuum, with averages of 17.7 m^2 and 17.5 m^2 respectively. These contrasts in size, as well as in building type and construction, reflect a number of different factors, including technology and scale of mining in the district. In the districts where greater financial investments were made and a bigger work force was necessary, as in the Nizina and Circle/Eagle Districts, are larger and more permanent types of habitations, such as cabins and bunkhouses. In at least one district - the Chisana District - where small-scale mining was predominant, we find smaller dwellings, typified by milled lumber tent frames.

Table 54

Archeological Patterns Found at Placer Mining Camps/Camps & Operations in All Districts

District	Sample Size	Archeological Patterns
Kantishna	25	Wide range of technology - mostly hydraulic and power equipment Both large- and small-scale operations Habitations are primarily cabins; primary building material is logs. Average number of habitations per camp = 1.6; average size = 17.7 m^2 Average number of outbuildings = 1.4; elevated cache most common. Activities: blacksmithing, freighting, dog mushing, carpentry, and gardening
Nizina	20	Hydraulic mining is predominant. Both large- and small-scale operations Habitations are primarily cabins; both logs and milled lumber are primary materials. Average number of habitations per camp = 1.9; average size = 25.1 m^2; Average number of outbuildings = 1.2; sheds, outhouses, caches common Activities: blacksmithing, freighting, and sawmill operation
Chisana	28	Unmechanized technology - hand methods, ground-sluicing, drift, and, hydraulic Primarily small-scale operations Habitations are primarily tent frames; milled lumber is most common building material. Average number of habitations per camp = 1.9; average size = 12.6 m^2. Average number of outbuildings per camp = 2.4; doghouses most common Activities: blacksmithing, freighting, dog-mushing, carpentry, mountain-climbing?, boot-making?
Circle/Eagle	29	Widest range of technology - everything from prospecting to dredging Both large- and small-scale operations Log cabins predominate; largest sample of bunkhouses Average number of habitations per camp = 1.8; average size = 20 m^2 Average number of outbuildings = 2.3; many outbuildings assoc. with dredge camps Activities: blacksmithing, freighting, dog mushing, sawmill operation, carpentry, hunting, and trapping.
Koyukuk	16	Hand mining and drift technology Small-scale operations Almost entirely log cabins Average number of habitations per camp = 1.2; average size = 17.5 m^2 Average number of outbuildings = 0.4; outbuildings in poor condition Activities: blacksmithing, dog mushing, and carpentry

(continued)

Table 54 (continued)

District	Sample Size	Archeological Patterns
Fairhaven	6	Hydraulic and bulldozer-hydraulic technology Large- and small-scale operations Both cabins and tent frames; milled lumber used exclusively Average number of habitations per camp = 1; average size = 19.4 m^2 Average number of outbuildings = 0.5; outbuildings assoc. with only one site Activities: blacksmithing, reindeer herding
Portage Creek	1	Bulldozer-hydraulic technology Small-scale, family-run operation House and cabins; logs and slab-log construction Average number of habitations = 4; average size = 45.5 m^2 Average number of outbuildings = 14; wide variety of outbuildings Activities: blacksmithing, dog mushing, sawmill operation, carpentry, gardening, hunting, trapping, home brewing, poultry raising

The relationship between technology/scale and habitation size is, however, limited in explaining some the differences between districts. Other factors, such as the availability of construction materials and district-specific settlement patterns also need to be considered. For example, the placer creeks in the Chisana District are mostly above timberline, unlike the well-timbered building site of the town of Chisana where the early miners set up their winter log cabins. Thus, the prevalence of milled lumber and canvas tent frames at the camps is partly a function of transportation, i.e., the ease in hauling lumber as opposed to logs, and the seasonal nature of many of the camps.

Despite some of the more obvious contrasts in structures from district to district, we also find that many variations of cabin size and construction exist not on a district level, but on an individual level. These variations are related to differences in individual intent, carpentry skills, expediency levels, building preference, and perhaps even cultural biases. To return to some of the questions posed at the beginning of the chapter, we might ask: Was the camp occupied by a strike-it-rich-quick type or a subsistence miner? Was mining a year-round (as in drift mining) or a seasonal pursuit? Was he solitary or did he have a partner? In many cases, there is simply not enough information remaining at the site to answer these questions. In other cases, the archeological record can be enlightening. One such example is at NAB-083, one of the few log cabin camps in the Chisana District. The sizeable cabin at the site (33 m^2) as well as the suite of artifacts, which include a homemade wooden double bed and other well-crafted household items, suggest that the cabin was probably home to a couple, rather than a solitary male miner. The number and types of outbuildings at this site, including nine dog-houses, are further evidence that a long-term investment had been made by the miner/cabin-builder. A correlation between cabin size and complexity and the intended length of occupation has also been found in a study of cabin remains, some of which are associated with mining, in Yoho National Park, Canada (Loy and Sneed 1973).

In terms of outbuildings, there is also a slightly different pattern among the districts. The classic, elevated log cache is most common in the Kantishna District, while doghouses are by far the

most common in the Chisana District. In the Circle/Eagle Districts, where dredging mining was a dominant activity, we find many examples of "other" outbuildings, such as an assay office, mess hall, recreation hall, bathhouse, and warehouses. While the number of outbuildings per camp averages between 1-2 in most of the districts (again not including the Portage Creek vicinity), the average in the Koyukuk District is only 0.4 per site. This disparity might be attributed to the age and condition of many of the camps in the Koyukuk District, built near the turn of the century (nineteenth to twentieth) and now in advanced stages of deterioration.

Although the camps in each of the districts show somewhat different patterns in terms of their buildings, their artifact assemblages are remarkably similar from site to site. Represented by a fairly basic array of functional items (table 29), these assemblages were limited as to what was available "in town;" what could be ordered and transported into the district; or what could be made from local or recycled materials. Some of the most innovative items in the assemblages are those made of recycled cans, modified to serve a variety of new purposes. Cans were often modified into buckets simply by adding a wire handle, or converted into roofing material by flattening. Rectangular Lipton tea cans were made into candle-lanterns by puncturing them with holes. This reuse of materials, particularly cans, was a common practice not only in the CRMIM sample of districts, but also at placer mining camps in the Fairbanks District (Sattler, Higgs, and Bowers 1994).

In contrast to the commonly found artifacts, are those labeled as "unique." This unique inventory is composed of homemade items, and items useful for interpreting who lived at the camps (solitary men, or women and children?) and details about their lifestyles and activities. For example, ceramic or porcelain dinnerware, in contrast to the more common enamelware, was recorded at a few sites in the Kantishna and Nizina Districts. Also found in these districts were some convenience artifacts, such as wringer washers, fixtures for electric lights and for plumbing, all of which convey a sense of permanence about the camp. A pool table and a movie screen are some of the unique artifacts at dredge camps at the Circle/Eagle District, where laborers were obviously provided with leisure time and recreational activities. Notable among the inventory of handcrafted artifacts are the birdhouses at several sites in the Circle/Eagle Districts, a wood and metal saddle at MMK-114, and rope snowshoes at WIS-047. The presence of a child, and possibly a family can be inferred at one camp in the Kantishna District, MMK-118, where a unique artifact, a rubber toy dog was in a trash scatter.

From the features and artifacts remaining at the camps, we know that the miners were involved in a variety of other activities besides mining. Often, these activities were not mere idle pursuits, but necessary means of simply "getting by" in a remote setting. The most common activity was blacksmithing, followed by dog-mushing, freighting, carpentry, and subsistence activities such as gardening, hunting, and trapping. The widest range of activities was found at the Bowman Camp (XLC-089), where even poultry-raising and home-brewing were sidelines to mining.

It has been said that the challenge in historical archeology is to contribute insights into the past that go beyond those available from the historic record (Spencer-Wood 1987: xi). The remains of the CRMIM placer mining sites provide such insights by allowing us to glimpse the daily lives of people who were pivotal in shaping Alaska's history. We now have a better mental image of nameless prospectors and miners, who not only labored over their sluice boxes, but who also relaxed with their cups of Hills Bros. Coffee and their hand-rolled Prince Albert cigarettes. We know that some of them, or perhaps their wives, kept gardens in the summer; we know that some were expert carpenters who fashioned attractive, well-made furniture when something only serviceable would have also done the job. We can see the tenacity of the small-scale miner who hung on for the sake of making a living, seeking a fortune, or simply enjoying a unique lifestyle.

CHAPTER 13

LODE MINING SITES

During CRMIM fieldwork, a total of 85 lode mining sites were recorded in four park units - DENA, WRST, KEFJ, and GLBA (table 55). They account for 25% of the entire site CRMIM inventory and differ from the more numerous placer mining sites in several respects. The quest for gold was the primary pursuit among placer miners; but copper, silver-lead, and antimony also attracted hard rock miners. Lode sites often include adits associated with underground workings, which are features not found at placer sites. They are also better documented historically than some small-scale, ephemeral placer operations, and are frequently more extensive in terms of numbers of features and artifacts. Mineral processing sites are the most complex sites recorded during the CRMIM Program, some of them consisting of mills with large inventories of equipment and tools, and are usually associated with either a camp or transportation features or both. Lode sites also tend to be located at higher elevations, frequently more than 3,000 feet above sea level, thus making them more difficult to access. This can be advantageous as sites not visited or disturbed tend to have more archeological integrity than those that are easily accessible. The similarities between placer and lode sites pertain mostly to the types of domestic features and artifacts found at their camps (see chapter 12 for a description of these commonly found artifacts).

As in the preceding chapter, the site descriptions are arranged by mining district: the Valdez Creek (Chulitna Area) and Kantishna Districts in DENA; the Chistochina (Kotsina-Kuskulana Area), Nizina, and Chisana Districts in WRST; the Homer District in KEFJ; and the Juneau District (Reid Inlet) in GLBA. The discussion for each district, introduced by a brief history of lode mining in the area, is organized by lode mining process. These processes include prospecting and exploration; development work; extraction; transportation; and milling and concentration, all of which have been discussed in chapter 2. It is often difficult to assign a site to a particular process based on only the archeological evidence, and thus historic records become particularly important for site interpretation (Hovis 1992a). For the cases in which two or more processes, such as extraction and milling, are evident at the site, they are classified under the appropriate combined heading. The few sites that could not be categorized by mining process are listed simply as "process unknown."

Valdez Creek Mining District (Chulitna River Area)

The northwestern section of the Valdez Creek Mining District extends across the boundary of DENA near the West Fork Chulitna River (figure 8). Gold, silver, copper, and stibnite (antimony) lodes are located in this area of mineralization. The Golden Zone lode claim was the first to be staked in 1909, and by 1917 a dozen or more claim groups had been staked on or near the West Fork. Although development was made in the form of

Table 55

Lode Mining Sites by District and Site Type

Valdez Creek District (Chulitna Area)

HEA-227	—	operation
HEA-228	—	camp/operation
HEA-231	assoc. with Golden Zone Mine	operation

Kantishna District

MMK-016	Stampede Mine	camp/operation
MMK-046	—	camp/operation
MMK-061	Little Annie Mine	camp/operation
MMK-077	Taylor Antimony Mine	operation
MMK-079	Glen Prospect	operation
MMK-080	Skookona Lode Prospect	operation
MMK-081	Humboldt Prospect	camp/operation
MMK-082	McGonagall Prospect	camp/operation
MMK-089	—	camp
MMK-090	Galena Prospect	operation
MMK-091	Alpha Ridge Mine	camp/operation
MMK-092	Never Sweat Claim	camp/operation
MMK-116	Slippery Creek Camp	camp
MMK-117	Quigley Mine Camp	camp
MMK-125	Copper Mountain Mining	camp
MMK-127	Lucky Gulch Cabin	camp/operation

Chistochina District (Kotsina-Kuskulana Area)

VAL-241	—	camp
VAL-242	Lower Camp	operation
VAL-243	Lower Camp	camp
VAL-244	Middle Camp	camp
VAL-245	—	operation
VAL-246	Upper Camp	camp/operation
VAL-247	—	camp
VAL-248	—	operation
VAL-249	—	camp
XMC-041	—	camp
XMC-088	North Midas Mine	camp/operation
XMC-089	North Midas Mill	camp/operation
XMC-090	Nugget Creek Mine	camp
XMC-091	Nugget Creek Mine	camp/operation
XMC-093	—	camp/operation

(continued)

Table 55 (continued)

XMC-094	—	camp
XMC-095	—	camp/operation
XMC-100	—	camp
XMC-101	—	camp/operation
XMC-116	—	camp

Nizina District

VAL-250		camp
XMC-040	Hubert's Landing	camp
XMC-043	—	camp
XMC-045	Big Ben Millsite	camp
XMC-047	—	camp
XMC-048	Regal Mine	camp/operation
XMC-050	Gateway Millsite	camp
XMC-064	Mother Lode Tram/Camp	camp/operation
XMC-072	Nelson Camp	camp
XMC-073	Nelson Prospect	camp/operation
XMC-080	—	camp
XMC-081	Bonanza Tram	camp/operation
XMC-082	O'Hara Prospect	camp
XMC-085	Jumbo Mine Tram	camp/operation
XMC-086	Jumbo Mine Tram	operation
XMC-087	Jumbo/Glacier Tram	camp/operation
XMC-096	Green Butte Mine	camp/operation
XMC-099	—	operation
XMC-104	Lucky Girl Mine/Mill	operation
XMC-105	Bremner/Yellowband Camp	camp/operation
XMC-106	Sheriff Mine	camp/operation
XMC-107	Yellowband Mine	camp/operation
XMC-111	Bremner Camp	camp/operation
XMC-112	Westover Prospect	camp/operation
XMC-113	Nikolai City	camp
XMC-115	Grand Prize Mine	camp/operation
XMC-118	—	camp

Chisana District

NAB-054	—	camp
NAB-055	—	camp/operation
NAB-056	—	camp
NAB-057	—	operation
NAB-058	—	camp
NAB-072	Rambler Mine	camp/operation
XMC-084	—	camp

(continued)

Table 55 (continued)

	Homer District (Nuka Bay Area)	
SEL-175	Sonny Fox	camp/operation
SEL-177	Nukalaska Mining	camp/operation
SEL-185	Sather Prospect	camp/operation
SEL-212	Earl Mount (Glass-Heifner)	camp/operation
SEL-213	Charles Goyne Mine	camp/operation
SEL-233	Nuka Bay Mines	operation
SEL-234	Alaska Hills/Paystreak	camp/operation
SEL-235	"Old West Workings"	camp/operation
SEL-236	Rosness & Larsen Prospect	camp/operation
SEL-237	Nuka Bay Mine Camp	camp
	Juneau District (Reid Inlet Area)	
XMF-045	LeRoy Mine	camp/operation

tunnels, adits, and trenches at the most promising claims, the only mineral production, as of 1917, was a small amount of placer gold (Ross 1933; Berg and Cobb 1967: 23-26; Hovis 1992b).

Lode mining activity in the area increased in the early 1930s, particularly on the south side of the river near the Golden Zone Mine, which proved to be the only property in the area with commercial potential. W.E. Dunkle gained control of the mine in 1937 and proceeded to put it into production. By 1938, a camp, mill, hydroelectric power plant and sawmill had been constructed, and the Alaska Road Commission had built a road and attendant bridges to connect the mine with the Alaska Railroad's Colorado station. It was also probably during that time that a tributary road was built from the West Fork Chulitna River to the Dunkle Coal Mine. The production of the coal mine was reserved to power the plant at the Golden Zone between 1939 and 1941. A total of 869 tons of concentrated ore were shipped from the mine in 1941-1942, after which time it was closed because of war time restrictions on mining (Berg and Cobb 1967: 23-26; Hovis 1992b).

There are three CRMIM sites, two operations and one camp and operation, associated with lode mining near the West Fork Chulitna River (figure 26; table 56). One of the sites is probably related to mineral production at the Golden Zone Mine, while the function of the other two could not be determined.

Transportation and Mill. **HEA-231** is on a gravel bar on the floodplain south of the West Fork Chulitna River near the mouth of Bryn Mawr Creek. The road along the river, running up to the Golden Zone Mine, passes just south of the site. The single site feature consists of a tank-like cribbed wooden structure, measuring 1.6 by 1.6 m, and 3 m high, partially enclosed by a collapsed wooden building. A galvanized sheet metal liner, within the structure, is partially buried in the ground. A horizontal axle protrudes from the west wall of the tank. Other structural parts of the building and electrical wiring lie scattered over the gravel bar around the site. Also found in these ruins is a belt pulley with line

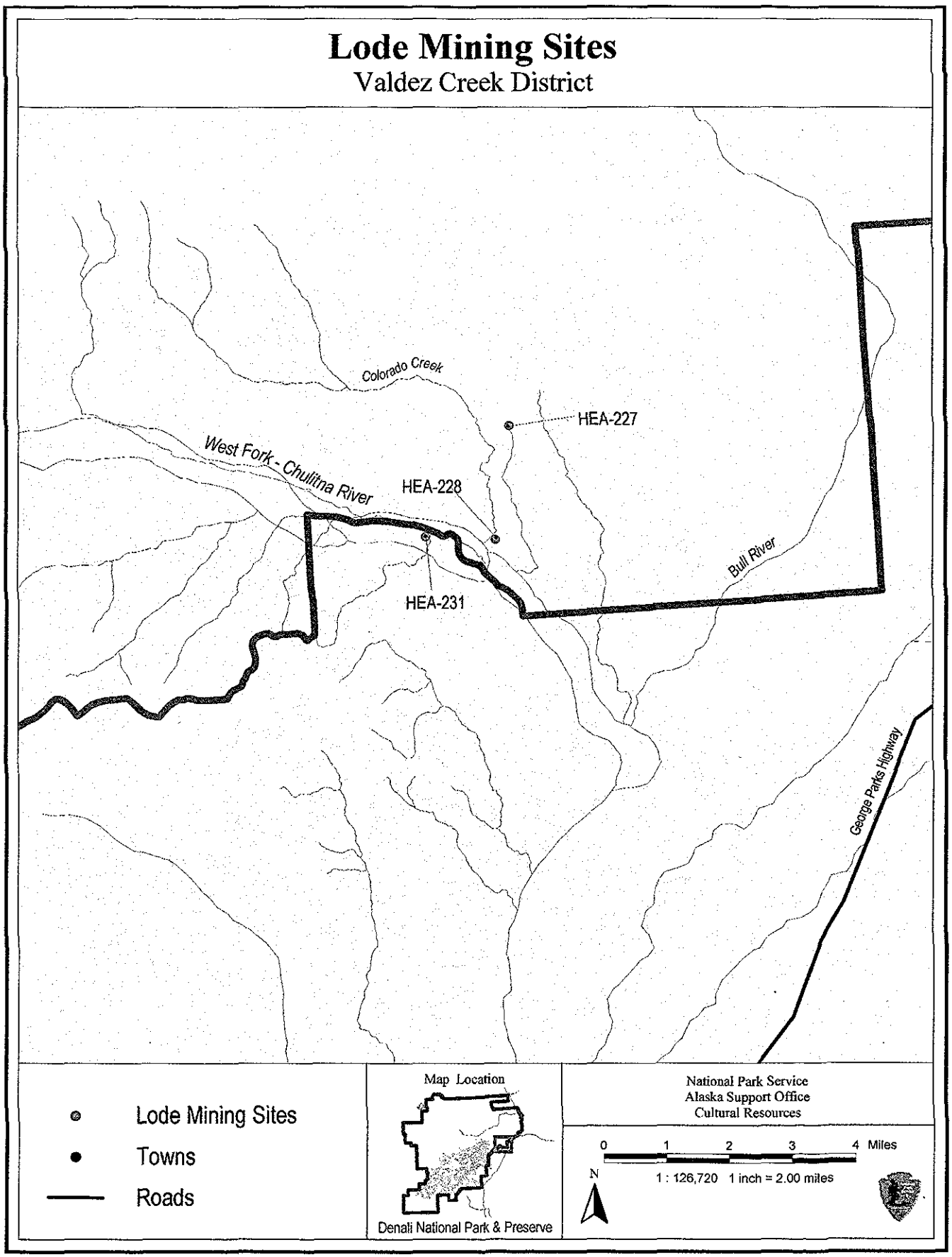

Lode Mining Sites
Valdez Creek District
Colorado Creek
HEA-227
West Fork - Chulitna River
HEA-228
HEA-231
Bull River
George Parks Highway
Lode Mining Sites
Towns
Roads
Map Location
Denali National Park & Preserve
National Park Service
Alaska Support Office
Cultural Resources
0 1 2 3 4 Miles
N
1 : 126,720 1 inch = 2.00 miles

Figure 26.

Table 56

Lode Mining Sites in the Valdez Creek District (Chulitna River Area)[1] and the Kantishna District[2] by Mining Process

Locale	Prospect	Development	Extraction	Ext/Milling	Milling	Trans/Mill	Unknown
Chulitna R. (W.F.)						HEA-231	HEA-227, HEA-228
Caribou Creek			MMK-046				
Eldorado Creek		MMK-092	MMK-091				
Glacier Peak/	MMK-080	MMK-079	MMK-082				
Glen Creek		MMK-081					
Lucky Gulch					MMK-127		
Mt. Eielson	MMK-125						
Quigley Ridge		MMK-089	MMK-061 MMK-090	MMK-117			
Slate Creek			MMK-077				
Slippery Creek							MMK-116
Stampede Creek				MMK-016			

[1] Sites beginning with HEA.
[2] Sites beginning with MMK.

shafting, indicating that power transmission may have been a function of the structure. HEA-231 is probably associated with the sawmill and bunkhouse located on the road, about 100 meters southeast of the site, but outside the DENA boundary. These other buildings were most likely part of a lower camp built in 1937-1938 in conjunction with the Golden Zone Mine in the hills above on Bryn Mawr Creek.

Unknown. Two sites are attributed to this category. They are both located along the road system that connects the lode mining sites and the Dunkle Coal Mine with the Alaska Railroad at Colorado Station. **HEA-228**, located at the confluence of Colorado Creek and the West Fork Chulitna River, is composed of four loci. Locus A, B, and C each consists of a log cabin and associated outbuildings (table 57), while Locus D consists of a log and beam bridge spanning Colorado Creek. The only mining features at the site are a prospect pit and a trench at Locus C; steel hydraulic pipe is also found at the site. The cabins at both Locus B and C are in good condition and were constructed with lofts. The cabin at Locus B is roofed with tar paper and flattened 20-pound Hill Bros. coffee cans. The Locus A cabin, now in ruins, appears to have been the original location of the site. In the cabin ruin is a wooden box printed with a shipping stamp that reads "J COLVIN COLORADO." No one by this name is mentioned in historic records, but many claims were described without reference to their owners. A variety of domestic artifacts is at the site, including eight stoves and a unique, handmade chair (table 58). Dates on the Hills Bros. Coffee cans range from 1922 to 1936. Some 1940s military-issue C-ration cans and some recent artifacts remaining at the site attest to the continued occupation of the site.

HEA-228 is centrally located with respect to both placer and lode claims. Early placer mining took place in 1907-1917 across the West Fork on Bryn Mawr Creek; and several lode prospects, including the Silver King and Golden Zone Mines, were worked in the area from the 1910s through the 1930s. It is also possible that one or more of the cabins were built at the same time as the bridge during road construction in 1937-1938, when the Alaska Road Commission upgraded the pack trail along the West Fork to serve the Golden Zone Mine.

HEA-227, located alongside the old gravel road that extends from the West Fork Chulitna River to the Dunkle Coal Mine, lies within about 300 meters of both the Silver King and the Liberty lode prospects. The site consists of a large (5.8 x 3.0 x 1.6 m) wooden box, the ruins of a log structure, possibly a cache, and a breached earthen dam. The box, which has a ramp-like opening and walls that are braced with steel angle irons, may have been a truck or sled bed used to haul ore (or coal) from the nearby mines. The box probably dates no earlier than 1937-1938 period when the road was built. The other two features, not necessarily associated with the large box, may date to earlier prospecting or development work at either the Silver King or Liberty claims.

Kantishna District

The search for lode deposits in the Kantishna District (figure 8) commenced in 1905 when early gold prospectors in the area began finding galena (lead ore) with high silver values and stibnite (antimony ore) in their sluice boxes. One of the first and most prominent of these prospectors was Joseph Quigley, who launched the development of lode mining in the district with his discovery of a stibnite outcrop at the Last Chance Mine on Caribou Creek. The high price of antimony induced Quigley and his partner Jack Horn to mine and ship some of the ore, but the project was soon abandoned when the price of the

Table 57

Habitation Structures and Outbuildings at Lode Mining Camps
in the Valdez Creek (Chulitna River Area) District[1] and the Kantishna District[2]

AHRS #	Structure	Mat'l	Size	Condition	Outbuildings[3]
HEA-228	cabin	log	11.1 m^2	ruins	2 oh, 1 ch
	cabin	log	11.4 m^2	good	
	cabin	log	21.1 m^2	good	
MMK-016	bunkhouse	log	83.6 m^2	good	2 sd, 2 oh, 1 ch, 1 wk, 3 oth
	cabin	log	59.0 m^2	good	
MMK-046	cabin	lumber	11.1 m^2	good	1 oh, 1 ch, 1 wk
MMK-061	cabin	lumber	10.0 m^2	good	—
MMK-081	tent frame	log	—	ruins	1 wk
MMK-082	cabin	log	10.2 m^2	ruins	1 oh
MMK-089	cabin	lumber	8.9 m^2	good	—
MMK-091	cabin	lumber	22.5 m^2	good	1 oh, 1 ch, 1 wk
MMK-092	cabin	lumber	17.5 m^2	recent	1 oh
MMK-116	cabin?	log	19.3 m^2	trace	1 oh, 2 ch
	cabin?	log	10.2 m^2	trace	
	cabin	log	56.1 m^2	good	
	cabin?	log	70.0 m^2	trace	
MMK-117	cabin	—	24.0 m^2	trace	1 oh
	cabin	log	81.0 m^2	trace	
	cabin	log	24.4 m^2	trace	
MMK-125	cabin	log	34.7 m^2	good	2 oh, 6 ch
	cabin	log	45.0 m^2	trace	
	tent frame	log/pole	13.7 m^2	trace	
	tent frame	—	21.2 m^2	trace	
	tent frame	—	11.4 m^2	trace	
	tent frame		10.6 m^2	trace	
	tent frame		11.0 m^2	trace	
	tent frame		20.5 m^2	trace	
MMK-127	cabin	log	17.3 m^2	good	1 oth

[1] Site number beginning with HEA.
[2] Site numbers beginning with MMK.
[3] Abbreviations for outbuildings are as follows: sd = shed, oh = outhouse, ch = cache, dgh = doghouse, wk = workshop, oth = other.

Table 58

Artifact Classes[1] Represented at Lode Mining Camps in the Valdez Creek (Chulitna River Area) District and the Kantishna District

AHRS	BLD	HSHD	PER	SUB	FST	FPR	FSR	TRAN	COM	REC	MTE	MLT	OTH
HEA-228	+	+	+		+	+	+	+	+	+	+	+	+
MMK-016	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
MMK-046	+	+							+		+	+	
MMK-061		+			+	+		+				+	
MMK-081		+			+					+	+	+	
MMK-082	+	+		+	+	+	+					+	
MMK-089					+				+	+		+	
MMK-091	+	+	+			+	+	+		+	+	+	
MMK-092					+	+					+	+	
MMK-116					+			+			+		+
MMK-117	+	+		+	+	+	+	+		+	+	+	+
MMK-125		+	+		+	+		+			+	+	+
MMK-127	+	+	+		+	+	+	+	+	+	+		+

[1] The abbreviations used for artifact classes are as follows:
BLD = building materials; HSHD = household; PER = personal; SUB = subsistence; FST = food storage; FPR = food preparation; FSR = food service; TRAN = transportation; COM = communication; REC = recreation; MTE = mining tools and equipment; MLT = multipurpose tools; OTH = other.

ore dropped (Wells 1933: 353). Quigley also began prospecting on a ridge between Friday and Eureka Creeks, where he located and staked a number of lead, zinc, silver, gold, and copper-bearing veins beginning in 1905. Later geological fieldwork would indicate that Quigley Ridge, as it has come to be known, is in the southern section of a larger belt of mineralization that extends in a northeasterly direction for about 55 kilometers from Slate Creek to Stampede Creek (Bundtzen 1978:154).

Other early lode prospectors in the district were Tom Lloyd and William Taylor, who along with their partners, made a number of discoveries on Glacier Peak and the headwaters of Glen Creek northeast of Quigley Ridge between 1906 and 1909. One of their discoveries, the Glen Prospect, was developed during that period with tunnels driven along a quartz vein; but work at the mine was discontinued by 1909 (Wells 1933: 353, 373). Perhaps more noted as mountaineers than as miners, Lloyd and Taylor were among the group that made the first successful ascent of the North Peak of Mount McKinley in 1910. Lloyd, Taylor, and partners also prospected along Slate Creek, where they developed an antimony mine, referred to as the Taylor Mine, and eventually produced 125 tons of high-grade ore in 1916 (Bundtzen 1978:154). The price of antimony declined before the ore was shipped, and thus it was never marketed (Capps 1924: 144).

John Stendahl, a placer miner on Glen Creek, also became involved in lode prospecting at the headwaters of Glen Creek in the mid-1910s. He located and started development work on a gold and silver-bearing quartz vein known as the Humboldt Prospect (Buzzell 1989). The Skookona Prospect and the McGonagall Prospect, both near Glacier Peak, were also developed during this time; but apparently, no production was made at the former (Capps 1919: 100). Three tons of silver-gold ore were reportedly shipped from the latter prospect before it was abandoned (Buzzell 1989). During the World War I years, lode mining was hampered by a lack of facilities for assaying ore samples, by the high cost of developing claims, and by the difficulties and high cost of transporting ore to market. Only in the years following the war would hard-rock mining for silver, gold, and antimony become commercially viable enterprises in the Kantishna District.

Known to be an outstanding prospector, Joe Quigley continued his explorations on Quigley Ridge in the decades after his original strikes, and by 1918 he had discovered a rich galena-bearing vein on his Little Annie claim. Quigley leased this claim and 19 others to Thomas P. Aitken in 1919. During the year, Aitken set up a camp consisting of a blacksmith shop, ore-sorting table and grizzly, and a bunkhouse for 15 men at the Little Annie Mine (Stewart 1921: 12). By the end of year, the Little Annie claim had produced 500 tons of high-grade silver- and gold-bearing ore, which was sent to a smelter in Selby, California (Davis 1923: 127). This was the first profitable ore mined in the district (Buzzell 1989). Quigley's abilities as a prospector were again rewarded at another of his claims, the Red Top Lode, which adjoined the Aitken group on the west. The claim, which contained a vein of high-grade silver-lead ore, was then leased in 1922 to Hawley Sterling of Fairbanks, who mined the claim in the winter and hauled the ore, averaging more than $200 per ton in value, to Kobe on the Alaska Railroad. It was then shipped to the smelter by way of Seward (Davis 1923: 123). Other claims that contributed to the total ore shipment from the Kantishna District in the early 1920s were the Gold Dollar, Golden Eagle, and Galena claim, all on Quigley Ridge; the Alpha Mine on Eldorado Creek; and the McGonagall Prospect on Glacier Peak (Stewart and Dyer 1922: 72; Wells 1933: 366).

Throughout the 1920s, Joe Quigley, sometimes with the help of his wife, Fannie, continued to prospect in the district. Although they discovered and staked a lead-copper-zinc deposit at Copper Mountain, later to become Mt. Eielson, no ore was ever shipped from the claim. A much more profitable discovery was made by Quigley in 1929 at the Banjo claim near Lucky Gulch on the eastern section of Quigley Ridge. The quartz-sulfide veins at Banjo contained free gold. Unfortunately, Quigley was injured when a rock fell on him from a tunnel he was driving, and his career as an underground miner came to an abrupt end. After Quigley's accident, group of investors tested his block of claims, and by 1935 they had formed the Red Top Mining Company. The focus of work was directed at the Banjo claim and by 1938, seven miles of road, an airstrip, a small ball mill, assay shop, bunkhouses, blacksmith shop and other structures were assembled to start production. From 1939-1942, the Red Top Mining Company, operating with a crew of eight men, produced more than 6,000 oz. of gold; more than 7,000 oz. of silver; and 40,000 lbs. of lead and zinc by-products (Bundtzen 1978: 155, 157-158). The company's mining was brought to a close in 1942 by the war restrictions on mining non-strategic minerals.

Kantishna's wealth of antimony, deemed strategic for the war effort, kept lode mining alive in the district even during the war years. The prominent figure in bringing the Kantishna antimony industry into production was Earl Pilgrim, who acquired the claims at the Stampede Mine, where a 26-foot-wide vein of nearly pure stibnite had been located early in the century. Pilgrim began mining at Stampede, located at the northeastern corner of Kantishna's mineral belt, in 1936 and continued on a fairly continuous basis until 1970. Much of the ore was shipped out in the winter along the Stampede Trail by tractor and sled. Pilgrim also constructed an airstrip to facilitate the transport of his ore, and by 1947 the first 40-ton shipment of antimony ore was flown out of the district (Bundtzen 1978: 158-160).

For the district in general, hard-rock production diminished in the years following the 1930s and 1940s boom, but interest in the area did not. Exploration for silver and other metals on Quigley Ridge and drilling for additional antimony reserves on Stampede and Slate Creek continued in the 1960s. The Red Top Mine was brought back into production in 1973 with the aid of aid of a 35-ton-a-day flotation mill (Bundtzen 1978: 160).

A total of 16 historic lode-mining sites were recorded by CRMIM crews in the Kantishna District (figure 27; table 56). They represent the entire range of mining processes from prospecting and exploration to milling and concentration. They include several early examples of mine development as well as mines that were commercially productive. Domestic features - cabins, tent frames, and a variety of outbuildings - are found at most of the sites in the sample (table 57), as are many personal and household artifacts (table 58). The sites, described below, are grouped by mining process.

Prospecting/Exploration. The two sites in this category, one in the Glacier Peak area and the other near Mt. Eielson, are associated more with exploration than with prospecting. **MMK-080**, known as the Skookona Prospect, is located atop a high ridge between the headwaters of Glen and Glacier Creeks. Ten prospects pits and trenches, scattered within a 300-meter-long area, compose the site. The largest of the prospect pits is 7 x 4 m, and 1.5 m deep; the smallest is 5 x 1 m, and .5 m deep. Tailings piles or berms are associated with each of these features. Five rock cairns and a stone foundation, probably for a claim post, are also found at the site. The broken pieces of a few hand tools and wooden crates are the only artifacts recorded at the site. These pits were probably dug

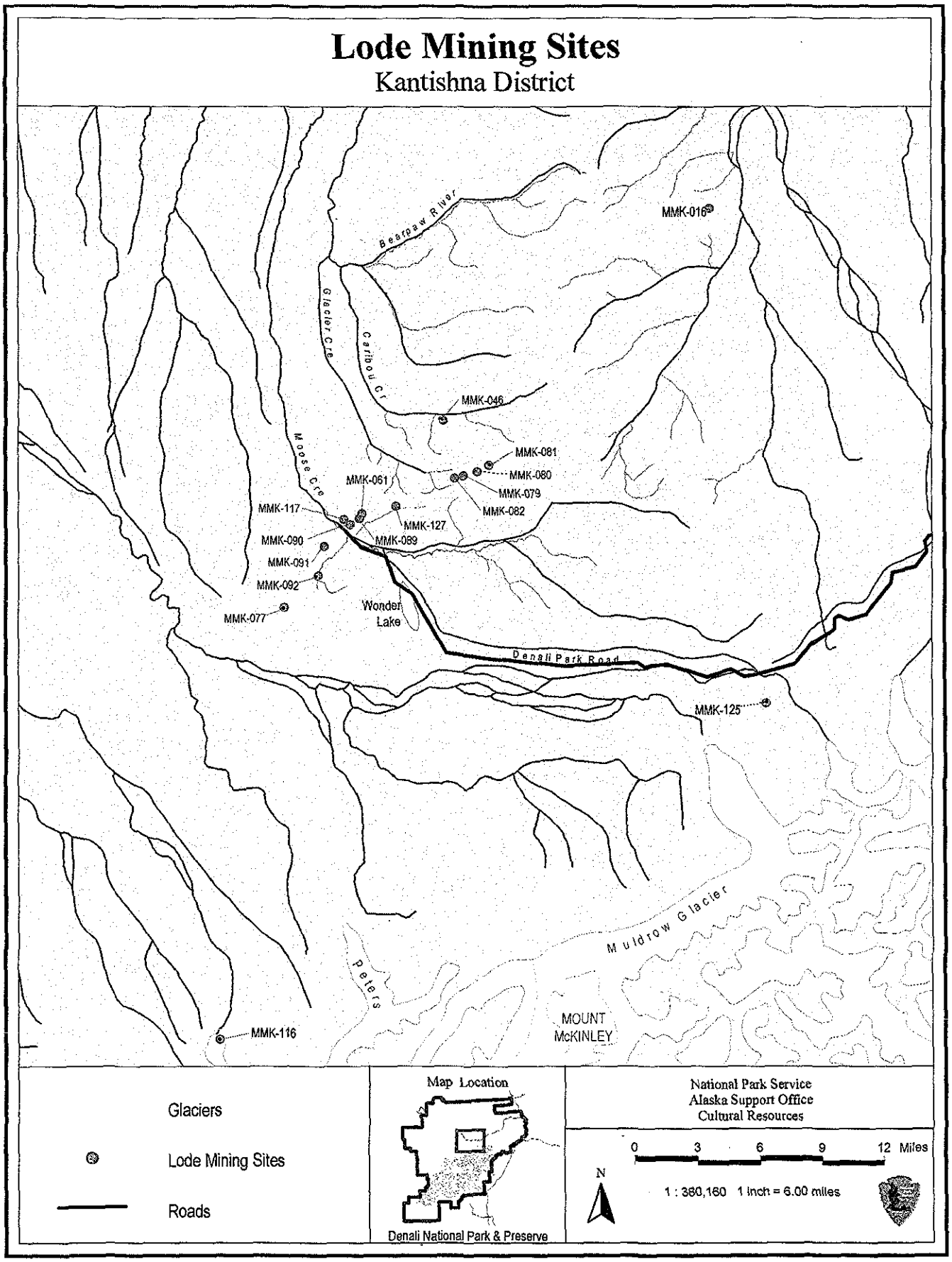

Lode Mining Sites
Kantishna District
Bearpaw River
Glacier Cr
Caribou Cr
Moose Cr
MMK-016
MMK-046
MMK-081
MMK-080
MMK-079
MMK-082
MMK-061
MMK-117
MMK-127
MMK-090
MMK-089
MMK-091
MMK-092
MMK-077
Wonder Lake
Denali Park Road
MMK-125
Muldrow Glacier
Peters
MMK-116
MOUNT McKINLEY
Glaciers
Lode Mining Sites
Roads
Map Location
Denali National Park & Preserve
National Park Service
Alaska Support Office
Cultural Resources
0 3 6 9 12 Miles
N
1 : 380,160 1 inch = 6.00 miles

Figure 27.

before 1916, when development work, including a number of open cuts and a 12-foot shaft, was begun (Capps 1919: 100). The identity of the first prospectors at the site is unknown, although they may have been William Taylor, Tom and Bill Lloyd, and Charles McGonagall, who were most active in the Glacier Peak area. Although the area was again examined by prospectors in the decades that followed, there was apparently no ore produced or shipped to market from the prospect.

The second prospecting/exploration site, **MMK-125**, is also known as the Copper Mountain Mining Camp. Located on a wide terrace between the north slope of Mount Eielson and the Copper Mountain Bar, it is the only site included on the CRMIM roster not actually recorded during mining-related fieldwork. It was documented in 1993 as part of another cultural resources compliance project in DENA; all the site descriptive data is taken from Leeper et al. (1993). The camp consists of at least 22 features, including the Herning cabin and the foundation of the Grant cabin. The former was the property of Harold Herning, a park ranger who turned to mining in the mid-1940s. He had the Fairbanks-built cabin moved to its present location in 1954 to serve as the base of operations for his prospecting activities, which were to continue in the area for more than two decades. The Herning cabin, built of bark-stripped logs squared at the ends, is still in good condition. An unreinforced exploration shaft (adit) is also located in the general vicinity of the cabin on the east side of Grant Creek (Buskirk 1976).

Before Herning bought the Mt. Eielson mining claims, probably during the mid-1940s, the camp was owned by O. M. Grant, one of the original prospectors in the Mt. Eielson area. Joe and Fannie Quigley were the first to stake claims on Mt. Eielson (then called Copper Mountain) in 1920 after they had discovered lead-copper-zinc deposits in the area (Bundtzen 1978:155). By 1921, Grant and his partner F.B. Jiles (Giles) had also staked claims in the vicinity. Photographs taken in 1926-1927 of the Grant cabin show a log cabin with large earthen berms and heavy chinking on the exterior walls. Besides the two cabins, features at the camp include the foundations of six tent frames, six caches of various types, the remains of two outhouses, log and artifact scatters, and a ditch used to bring water from nearby Grant Creek for camp use. The tent frame foundations, built of either stone and earth or of logs, once supported canvas wall tents pictured in 1922 and 1926/1927 photographs of the camp. Also pictured in these photographs are the Grant cabin and a platform cache, the remains of which can still be seen at the camp. The presence of ceramic crucibles, cupels, and glass tubing with rubber stoppers in the foundation of one of the tent frames suggests that the structure served as an assay office during Grant's tenure at the site. Shovels, pipe, a geologist's sieve, spades, and buckets are the only other evidence that the camp was once occupied by miners.

MMK-125 has been attributed to the exploration phase of mining as very little development work was ever done in the Mt. Eielson area. As of 1947, there were only three short adits and a number of small prospect pits and open cuts on the Jiles claim, located about 1.6 kilometers east of MMK-125, and no production had been made at any of the claims (Muir et al. 1947: 1748). The number of archeological features found at the site is unusual considering the low level of actual mining that took place in the area. According to the archeological assessment of the site, these features can probably be attributed to prospectors who worked the Mt. Eielson claims during the 1920s and 1930s and resided at Grant's Camp on the Snowdrift claim. The people who gathered at the camp enjoyed a tremendous view of Mount McKinley on clear days, while possibly trying to exploit Copper

Mountain's marginal mineral resources (Leeper et al 1993). The claim continued to be occupied through the 1970s for annual assessment work (NPS - DENA correspondence files, Mt. Eielson Mining Claims).

Development. Lode mining development is represented in the Kantishna District by five sites. These sites are in the Glacier Peak/Glen Creek area, on Quigley Ridge, and on Eldorado and Slate Creeks. **MMK-079**, known as the Glen Prospect, is located on the southeast side of Glacier Peak, above the headwaters of the West Fork of Glen Creek. It consists of two adits, about 50 meters apart, which are now collapsed and appear as depressions. The remains of timber supports are still visible at both adits. Just downslope from the lower adit is a scatter of lumber fragments and mining equipment, including a modified shovel head cut in an irregular, angular pattern. Downslope another 35 meters are a prospect pit and a riveted shovel head. The most unusual feature at the site is a partially collapsed stone structure near the upper adit. The three walls of the structure, made of hand-laid blocks of schist, abut the side of Glacier Peak, which forms the fourth wall; the structure has no roof. There is also a stone tent ring located on the tailings at the lip of the upper adit. The larger rock structure was built as a shelter in the late 1960s by a transient who lived part of the year in the area. The tent ring may also be associated with his short-term occupation of the site.

The adits at the site represent one of the earliest lode prospects to undergo extensive development work in the Glacier Peak area. The prospect, located on a quartz deposit, was owned by a small group of miners, with Tom Lloyd holding the controlling interest. The first of two adits, started in 1906, extended 300 feet into the hillside. Another adit, located higher on the hillside, was 40 feet long and had a winze at one end. The prospect was said to carry promising amounts of quartz, but no work was done at the site after 1909 (Wells 1933:373). Within seven years the upper adit was caved and the lower tunnel was obstructed (Capps 1917:318; Capps 1919:100). No commercial ore was ever shipped to market from this claim.

The second site in the Glacier Peak/Glen Creek vicinity is **MMK-081**. Lying at 4,100 feet elevation, the site is situated on the steep face of an unnamed peak, approximately 250 meters above the east fork of Glen Creek. It consists of two features: a mine tunnel (adit) excavated into the cliff face and the remains of a blacksmith shop downslope. A tailings pile fans downslope from the adit entry, now collapsed and filled with talus. The top of the pile was leveled off to create a shelf, which appears to have been used as a work and storage area. A tool cache, composed of five rivet-head shovels, a wheelbarrow, the remains of a bellows, two pick heads, and a claim post are located on the north end of the shelf. A low, rock wall is built at the southern end of the tailings to hold the debris in place. The blacksmith shop consists only of a few pieces of milled lumber scattered down a grassy slope south of the adit. The remains of a stove, some notched logs, and a few pieces of hardware are also near this feature. Farther downslope are the remnants of another bellows and some pieces of lumber.

This site, known as the Humboldt Prospect, was originally located in the early 1910s by John Stendahl. By 1916, the site included a 48-ft. tunnel as well as a blacksmith shop and tent near the tunnel mouth. Another tent was erected in the valley below. Geological reports indicate that several hundred pounds of ore from the prospect was shipped to Fairbanks for treatment, and yielded good returns, mostly free gold (Capps 1919: 99). Stendahl maintained at least partial ownership of the claim until at least 1931, and some

additional development work was done (Wells 1933: 374); but apparently no more ore was shipped out of the mine.

MMK-089, located on the southeast side of Quigley Ridge overlooking Eureka Creek, is another site where development work was done early in the century. The only standing structure at the site is a cabin, constructed of rough-hewn planks supported by log floor joists, underlain by a log retaining structure to level the cabin at the downgrade. The cabin has a double-layer plank roof, partially intact, and plank floor. The interior walls are papered with pages from *Success Magazine*, dated 1907 and 1911 and the *Ladies Ho*—— (the entire title is no longer legible). There are several bottles and glass fragments, some of which are purple (manganese), and other miscellaneous artifacts inside the cabin, and a board scatter, probably from a collapsed structure, adjacent to the south wall of the cabin. An overgrown trash dump, consisting mainly of heavily rusted cans, lies downslope about 25 meters from the cabin.

The site is located on the Silver Pick lode claim, one of 13 contiguous claims staked by Joe Quigley between 1910 and 1918. By 1916, development work on this lead-silver claim consisted of several open cuts and a 188-foot adit (Capps 1919: 105). Some additional work was done during the next several years, and by 1930 the tunnel had been excavated to 200 feet and had a short drift (Moffit 1933: 330). A patent on the claim was issued to Joe Quigley in 1926 or 1927, but it is unclear whether Quigley actually built the cabin. There is no mention of a cabin in the literature or on the patent survey maps of the claim. Quigley owned this claim until 1935 (Buzzell 1989). Further research is needed to identify the builder, the date of construction, and length of occupation of the cabin.

The most recent of the sites in the development category is **MMK-092**, the historic Never-Sweat Lead-Silver Mine, located on a steep slope overlooking Eldorado Creek near the southern tip of the Kantishna Hills. The site consists of five collapsed mine adits, their tailings, mining tools and equipment, and a 1950s cabin and outhouse. The cribbed support logs at the adit entrances now protrude out of the rubble. Their entrances are reinforced with retaining walls built of rock tailings. A bench-like work area adjacent to one of the adits contains a collapsed lean-to; parts of a forge; a pulley; and a handmade, hand-operated winch. The remains of a dump-bucket, a wheelbarrow, and various other small artifacts are also near this adit. Steel pipe, probably the remains of a steam-thawing line protrude from the tailings downslope from the four upper adits. Still farther downslope is a well-constructed, single-room cabin with shiplap siding and a corrugated metal roof, still in good condition. The name of the man who operated the mine in the 1950s, "F.P. Bunnell," is written on the outside of the cabin. The fifth collapsed adit and an outhouse are situated along with the cabin on a flat bench above Eldorado Creek.

The Never-Sweat claim was filed by John Busia (see MMK-017 in chapter 12) in 1931. During the early 1930s, he drove a 40-ft. adit into the slope a few feet above the creek level and excavated two open cuts upslope (Wells 1933: 376). The only evidence of Busia's work still evident at the site is the collapsed adit near the cabin. The upper four adits can probably be attributed to the labor of Frank Bunnell during the 1950s or to later miners who refiled the claim in the 1960s. There are no records to indicate that any of the ore mined at the site was ever shipped to market.

Extraction. The six sites in this category are similar in that the process of systematic mining, generally on a profitable basis, has been historically documented at each of them. These sites are scattered throughout the district, from Slate and Eldorado Creeks

northward to Quigley Ridge, Glacier Peak, and Caribou Creek. Early antimony mining operations are represented at two of the sites. The first is **MMK-046**, located at the confluence of Last Chance and Caribou Creeks. It is composed of two loci separated by about 200 meters. Locus 2, the mine operation, lies closest to Caribou Creek with features on both sides of Last Chance Creek. It consists of one cribbed shaft, one collapsed shaft, an open cut, a cribbed portal, and the remains of a hoisting system composed of a block and pulley in a wooden frame. A refuse heap, made up of several 55-gallon drums and mechanical equipment, including a tugger motor probably associated with the hoist, is also found at locus 2. This operation is located in the general vicinity of the first lode venture in the district, where Joe Quigley mined for antimony as early as 1905. The site of Quigley's operation was visited in 1916 by USGS geologist Stephen Capps (1919:108-109), whose descriptions of the shafts do not match the features remaining at the site. Since there appear to be no features or equipment dating to Quigley's early work still in the area, the features must date to a subsequent operation, probably coincident with a wartime period, when there has been the greatest demand for antimony (Bundtzen 1978).

Locus 1 comprises the domestic features at the site. The small cabin, constructed of wooden siding, was wired for electricity and equipped with a radio antennae pole on an outside corner. A wooden storage shed, also in good condition and equipped with early electrical wiring and fixtures, along with the remains of a log cache, an outhouse, a trash dump, and assorted artifacts complete the inventory at locus 1. Although the structures appear to date from the 1930s, the artifacts appear to date to the 1940s and later. Along with the fairly common types of mining and multipurpose tools at the site were some more interesting items: a small hand-fashioned stove, a Remington standard model typewriter, and a hand-crank coffee grinder (no Hills Bros. Coffee drinkers at this site!). The cabin group has been used by both lode and placer miners in the Caribou Creek drainage during recent decades (Dan Ashbrook 1986: personal communication to CRMIM crew). A dirt road that runs along one side of Caribou Creek provides access to the site and was apparently used for transporting ore while the mine was in operation.

The second antimony site is **MMK-077**, which consists of remnants of the upper peripheral portion of the old Taylor Antimony Mine near the headwaters of Slate Creek. Severely disturbed by recent mining activity, the site remains include a deteriorating frame outhouse at the base of a hill, and a prospect pit (19 x 15 m; 1.8 m deep) and old tractor track on the hillside above. Cultural refuse on the site includes a pile of wooden timbers, the remnants of a wagon undercarriage and running gear, and a pile of debris that may have be the remains of a bulldozed cabin. Several cultural isolates, including barrel-shaped steel drums and handmade metal tools of unknown function are scattered downstream from the site. A short side road connects the prospect with another road (tractor trail) that continues along the south side of Slate Creek.

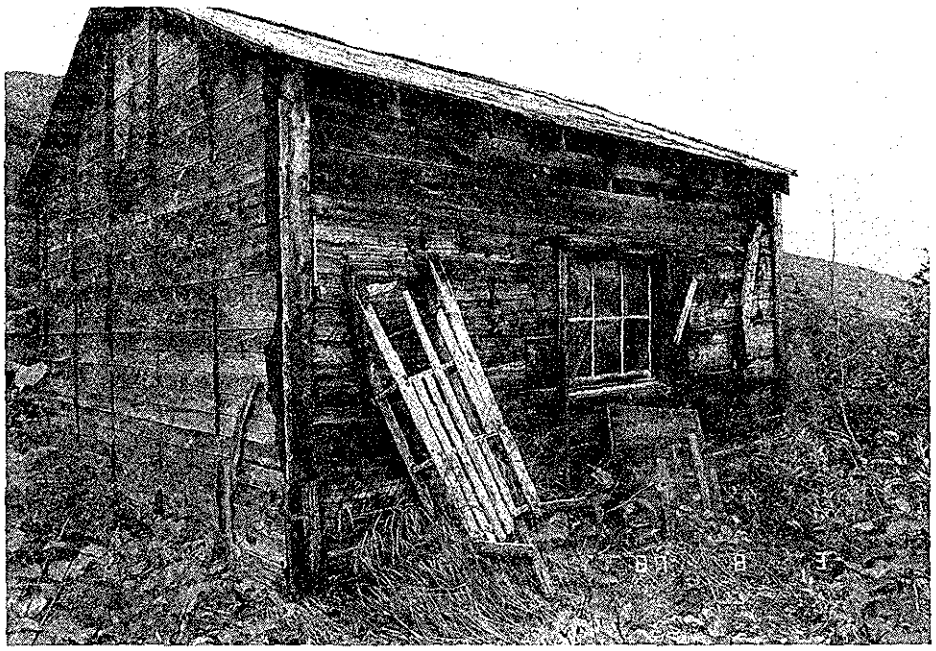
The Taylor Antimony Mine was opened in 1915; and by 1916, about 125 tons of handpicked ore had been mined and readied for shipment. The ore was abandoned at the mine when the price of antimony dropped too low for it to be profitably marketed (Capps 1924: 144). Thirty-seven tons of the ore, however, was eventually shipped outside by Earl Pilgrim, operator of the Stampede Antimony Mine, during the winter of 1941-42. Loaded onto sleds pulled by tractors, the ore was transported from Slate Creek to the Alaska Railroad and then by boat from Seward (Ebbley and Wright 1948: 221). All that remains of the historic Taylor Mine is the ruins of what appears to be an old freight wagon and

possibly the large prospect pit. The tractor trail leading to the pit can probably be linked to Pilgrim's transport of the ore during the World War II years.

The other sites in the mineral extraction category are all associated with the boom period of lead-silver mining that took place in the Kantishna District during the 1920s. The first is **MMK-082**, located in a steep V-shaped valley on the west side of Glacier Peak and south of the headwaters of McGonagall Gulch. It consists of the ruins of a cabin and privy, two collapsed mine adits and associated equipment, and a prospect pit. The cabin, which rests on a narrow, man-made shelf, was built using post and beam construction with walls fashioned from hand-hewn planks. The plank roof was covered with a combination of canvas, tar paper, and birch bark strips that overlapped like shingles. Flattened Blazo cans sheathed the ridgeline of the roof and exterior corners of the walls. The interior walls of the cabin were also lined with canvas and tar paper and old copies of the *Saturday Evening Post*. Numerous artifacts, including cans and liquor bottles that date from the 1930s still lie inside and around the cabin. The two adits and prospect pit are located upslope from the cabin. The lower adit has a retaining wall composed of hand-stacked tailings extending from its entry. A set of handmade rails, built of lumber with steel strips, also extends from this adit. Just downslope are a set of ore-cart wheels and a home-made steel-rail anvil. The site appears to have been undisturbed since it was abandoned.

The site lies on the historic upper McGonagall claim, where Charles McGonagall discovered a vein of mineralized quartz, probably in the early 1910s. By 1916 a USGS party visited the claim and described it as having a substantial cabin, a 12-foot tunnel near the cabin, and an open cut (Capps 1919: 100). By 1922, the tunnel had been developed to a length of 30 feet (Davis 1923: 131), and to 40 feet by 1931 (Wells 1933: 372). He reportedly shipped three tons of silver-gold ore to market before abandoning the mine as unprofitable. Prospecting may have occurred at the site in the 1930s, but no ore was shipped from the mine after McGonagall gave it up (Buzzell 1989: MMK-082 site file). McGonagall owned a lower claim, about one-half mile to the west, at which he also did a considerable amount of development work.

Another of the early silver-producing mines is **MMK-091**, located on the southern flank of Alpha Ridge above Eldorado Creek. It consists of a collapsed adit, two prospect pits, and camp features and artifacts associated with a historic silver-lead mine. The site features are situated in two clusters adjacent to an old, overgrown access road. One cluster is composed of the mine features: the adit; a scatter of logs, rail, and cross-ties that appears to be the ruins of a dump line from the adit; an ore box or cart collapsed around a pile of ore; a single-cylinder hand pump that may have been used to pump water out of the mine; and the prospect pits, which are 5 m and 7 m in diameter. Also in this cluster is a frame workshed, covered with tar paper, still in good condition. Sections of pipe, pipe fittings, and steam-thawing points rest on shelves and a bench in the workshed, while a 55-gallon drum fashioned into a forge and wooden chopping blocks lie on the floor. The second cluster, 150 meters northeast, contains the camp features. The cabin, constructed in similar fashion to the workshed, is also still standing with the roof intact. The cabin's loft has collapsed, and its weight on the floor has exposed a cellar below. Various domestic artifacts, including milk glass cold cream jars, are still found inside the cabin. A wooden dogsled, with a lower Yukon type of basket, leans against the corner of the cabin. An outhouse, cold storage cache, can and bottle scatter, and a wooden tripod that once supported a radio antenna are also in this camp cluster.



Frame cabin, once sheathed with tar paper, at the Alpha Ridge mine site (MMK-091) in DENA. A wooden dog sled is propped against the cabin's corner.

This Alpha Ridge Mine was among the first lode-mining operations in the Kantishna District to produce lead-silver ore and ship it to market. In 1921, ten tons of ore, assaying at more than $200 per ton (with silver at $1 an ounce) was produced by the mine (Wells 1933: 354). The ore was apparently "rawhided," i.e., dragged in rawhide bags, down from the mine to Eldorado Creek and then hauled out by sled (Moffit 1933: 332). The mine, operated by the partnership of Brooker and Farrar, continued to produce galena ore until at least 1926, but apparently no significant development work has been done since then (Moffit 1927:30; Buzzell 1989). Although the claim on which MMK-091 is located as been re-staked in subsequent years, the features and artifacts at the site do not appear to be greatly altered from the 1920s period of occupation and small-scale mining that took place on Alpha Ridge.

Two other CRMIM sites related to commercial silver production are located on Quigley Ridge. The first is **MMK-061**, the Little Annie Mine site, located on the steep north side of Quigley Ridge. This site consists of an adit, two prospects or open-cuts, and a wood-frame cabin, still in good condition. The entryway to the adit consists of a partially collapsed rock retaining wall and a split-log passageway. The adit is cribbed and has collapsed to within about 2 meters of its portal that measures 1.2 x 1.2 m. The adjacent cabin is situated on a large tailings pile produced by the excavation of the mine tunnel. The cabin is sheathed with wooden boards, canvas and tar paper, held in place with vertical battens. A cast iron stove is among the few artifacts still found in the cabin. The prospect cuts are located approximately 50 meters upslope from the cabin and adit.

The adit to the Little Annie Mine dates to the early years of lode prospecting in the district. In 1916, Joe Quigley drove the adit some 30 meters into the hillside where it intersected the main ore vein (Capps 1919: 104), which was later mined by Thomas Aitken. Under Aitken's supervision, the mine produced several hundred tons of high-grade lead-silver ore between 1919-1921 and became the first commercially viable lode mining operation in the Kantishna District. During the mid-1930s, the Red Top Mining Company

acquired the claim and substantially developed the site (Buzzell 1989). The cabin was probably built during that period and served as a support base for the company's operation on the Little Annie claim.

The second of the Quigley Ridge sites is **MMK-090**, the Galena Mine site, located on a steep drainage at the southern end of Quigley Ridge overlooking Moose Creek. It consists of four historic mining adits and associated tailings plumes. Three of the adits are completely collapsed; the portal of the fourth adit is still standing but in imminent danger of collapse. The entry to the fourth adit is framed with logs that support a hinged door. Two stone retaining walls extend outward from the entry, and remains of log supports protrude from the adjacent slope. Fragments of wooden boxes and burlap bags, a coal shuttle, and the remains of a wooden ore cart or dump bucket are near this adit and its tailings. A completely overgrown spur road connects the site with Quigley Ridge Road.

The Galena prospect was discovered in 1913 by Charles McGonagall, who did the initial development work on the claim. In 1920 it was leased to James Haney, who built a camp and a sled road to the workings. By 1922, he had mined and sacked 100 tons of lead-silver ore, which were shipped to California for smelting (Davis 1923: 123). The Galena Mine was one of the eight lode claims on Quigley Ridge that marketed ore between 1919 and 1924. Although the archeological record at the site is limited, it does represent the early boom period of lode mining in the Kantishna District.

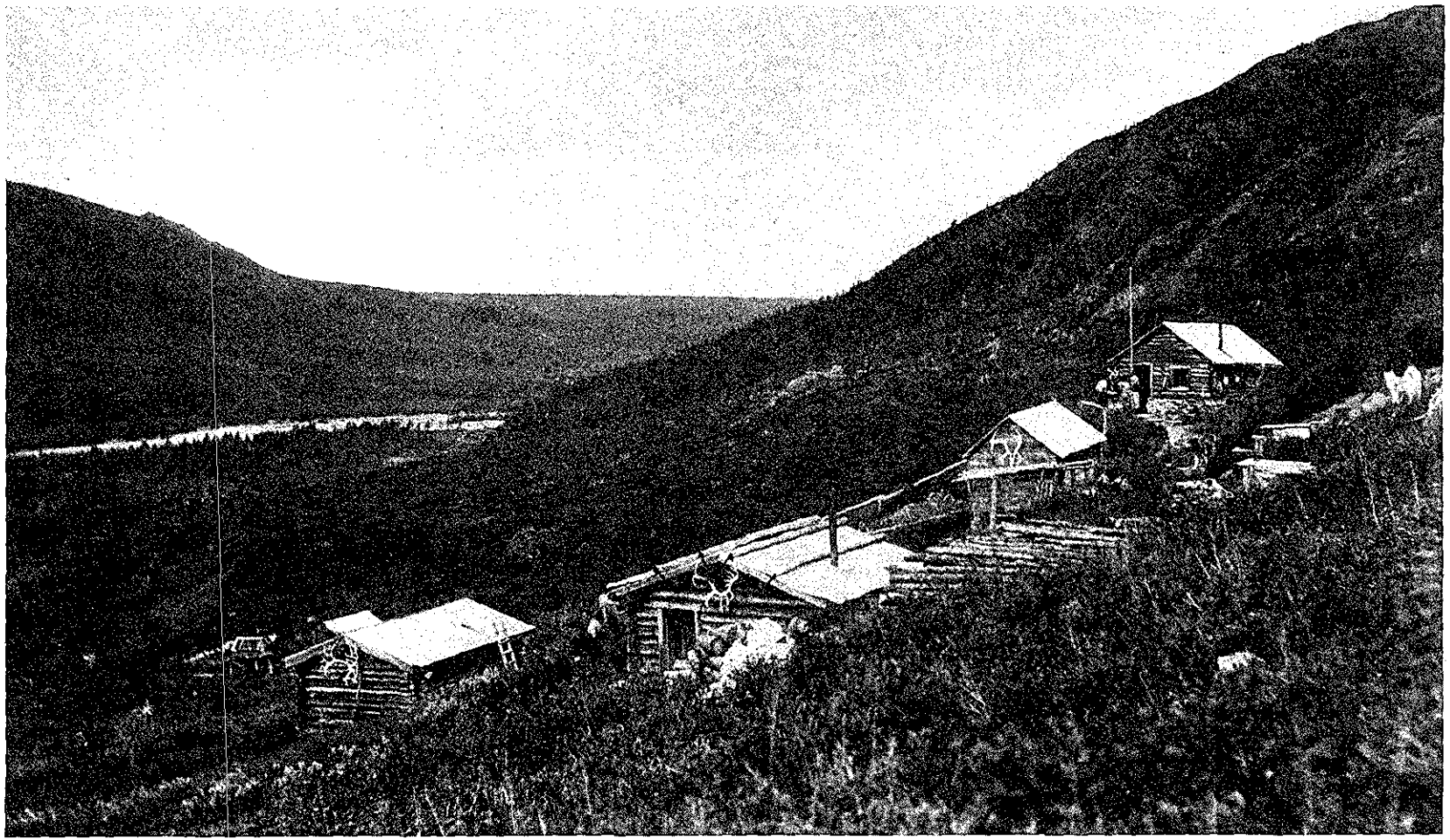
Extraction and Milling. The sites in this category represent some of the most commercially successful mining ventures in the Kantishna District. **MMK-117**, the Quigley Mining Camp, is associated with silver-gold production at the Red Top Mine. It is located at the west end of Quigley Ridge, northeast of the confluence of Moose and Friday Creeks. Heavy vegetation at the site all but conceals the ruins and foundations of the once-extensive camp of Joe and Fannie Quigley adjacent to the mine on the historic Red Top claim. This mine is indicated, but not named, on the USGS Mt. McKinley C-2 quad map. The name "Red Top Mine" appears on the quad map at the opposite end of Quigley Ridge at the location of the Banjo mill, which was operated by the Red Top Mining Company. The duplication of the name **Red Top** has been the source of some confusion while documenting the two sites, both associated with pioneer lode prospector, Joe Quigley.

Before field recording MMK-117, CRMIM crewmembers made a map of the site by using black and white photographs taken during the 1930s occupation of the camp. The map helped in locating some of the site features, which would have otherwise been difficult to discern in the heavy vegetation. The remains of the camp include:

- the stone foundation of the main cabin,
- the sill logs of another cabin,
- a collapsed outhouse,
- a garden area composed of 10 terraces bordered with rock retaining walls,
- the ruins of a wooden wagon,
- a can dump,
- and a scatter of domestic artifacts in a clearing that probably represents a cabin pictured in the historic photograph.

A number of metal dog dishes is all that remains of a dog yard with doghouses pictured in the photograph.

Despite the poor condition of the features, the artifact inventory still scattered around the site provides a glimpse of the Quigleys' true subsistence lifestyle. Three stoves



Residence of Joe and Fannie Quigley on Quigley Ridge in DENA. (*Anchorage Museum of History and Art B88.12.215*)

and an impressive array of baking equipment - bread pans, cake pans, stacked sets of triple loaf pans, and a breadbox - were found around the site. Also found were liquor bottles, a dense beer bottle scatter, and a Budweiser can with a date of 1936. Caribou bones were found in the dump, suggesting that the animal had been shot, butchered for food, and its bones discarded. Even these sparse remains confirm what we know of the Quigleys from the literature: Fannie Quigley was an avid gardener, an accomplished cook and baker, and an excellent hunter, and somewhat of a "lush" (Bundtzen 1978; Wold 1990). The brown beer bottles at the site probably remain from Fannie's attempts at beer-making. According to the recollections of Edgar Brooker, Jr., who lived in Kantishna as a teenager:

> Both Fannie and Joe liked their booze...Fannie, also, at great cost and trouble had acquired enough beer bottles, caps, malt and other ingredients to brew up home made beer...Joe was not in favor of her making and getting boozed up on beer, but somehow just before Joe would return home from hunting or prospecting, Fannie would hide the beer—except for one occasion when he had been away about a week and returned from Fairbanks. The stock of beer was out in plain view. Fannie was plastered. Joe broke all of the bottles, a real calamity. At 100 miles from civilization, beer bottles are still priceless (Brooker n.d.).

The Red Top Mine is approximately 100 meters southeast of the Quigley Camp. The Red Top Mine was one of the major producers of silver-lead ore in the Kantishna District during the early 1920s; it was in operation as recently as the early 1980s. Most of the historic components of the mine have been disturbed by more-modern buildings and structures. The National Park Service, Mining and Minerals Division initiated a hazardous waste clean-up project at the mine in 1993 as part of a large-scale effort to remediate old mining claims that were slated for acquisition by the federal government. During the clean-up, an old rock retaining wall just outside the mine adit, which probably dates to Joe Quigley's tenure at the site, was partially buried, but not otherwise disturbed.

The historic mill (**MMK-022**) at the mine site on the Banjo claim, another of Joe Quigley's former properties, is at the opposite end of Quigley Ridge. CRMIM crews were not able to record the site as it lies on a patented claim. The six-level mill, with a daily capacity of 24 tons of ore, was designed by Charles Bunnell and built in 1937-38. An aerial tramway from the mine delivered the ore to the first level, which was equipped with a grizzly ore sorter and a rock crusher. An ore bin/feeder located on the second level fed the ore to a Gardner-Denver ball mill, which mixed the ore with water and crushed it still finer. From the ball mill on the third level, the ore was transported to Wilfley tables on the fourth and fifth levels, and finally to a retort on the sixth level. The mill was powered by a six-cylinder Caterpillar diesel engine and generator (Brown et al. 1982: 46-47).

Another site in the category of extraction and milling is **MMK-016**, the Stampede Mine. This is the premiere antimony-mining site in the state of Alaska. The history of active mining at the site began in 1915 when about 150 tons of ore were reportedly excavated from the Stampede deposit of almost pure stibnite. The property changed hands several times, but no ore shipments were made until 1937, the year after Earl Pilgrim acquired the claims and began building the camp. Only hand-picked ore, assaying at 52% or more of antimony, was shipped until 1939, when Pilgrim had a 40-ton mill constructed at the mine to concentrate the low-grade ore (White 1942: 332). This mill and a second mill installed at the mine both proved to be unsatisfactory in terms of mineral recovery, so

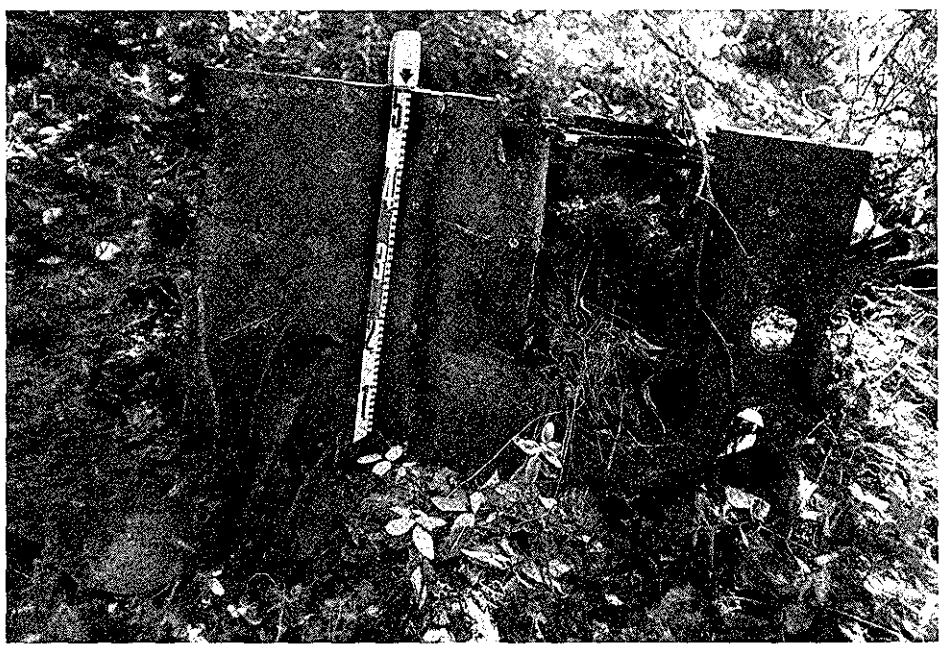


Joe and Fannie Quigley outside their Quigley Ridge cabin in 1930 or 1931. (*Anchorage Museum of History and Art B88.12.214*).

Pilgrim undertook a systematic rehabilitation of the mill and a renovation of the camp complex in 1942-1943. Many of the structures and features that still exist at the site date to this mine-rehabilitation period (Brown 1987). The history of the mine, as briefly discussed in the Kantishna history section above, is one of intermittent booms and near-busts as a result of the fluctuating price of antimony on the world market and the high costs of transportation out of the Kantishna District.

The Stampede Mine has been visited and partially recorded on various occasions by National Park Service personnel, including a CRMIM crew and mining historian. The following descriptions are based on these numerous site reports, memoranda, and trip reports included in the NPS files. The most thorough documentation of this site is found in its National Register nomination form, prepared by Jacobs (1999). The camp complex is composed of Pilgrim's cabin; a bunkhouse; a mess hall; two outhouses; blacksmith's shop/garage; a storage or supply building; an elevated log cache; a weather station; a collapsed greenhouse, supply shed, and headframe; the foundation of an assay office; and a number of miscellaneous features. The Pilgrim log cabin, consisting of two rooms constructed at different periods, served as the family residence during summer operations at the mine. The cabin has an attached meat cache with a shed roof and screened sides. A log bunkhouse, rough-hewn on the interior, housed the summer work force at the mine. Several cot frames are stacked next to the back outside wall of the bunkhouse. Meals for the crew were prepared in the adjacent mess hall. This three-room frame structure is roofed with corrugated tin and is still in good condition.

The two-story log blacksmith shop still contains an impressive array of equipment and small tools used to power, maintain, and operate the mine for almost four decades. These mid-century mining artifacts bear testament to Pilgrim's amazing improvisational skill as a mining engineer. He is described as "a man who might have fashioned a moving part from a raw chunk of rock, if necessary" (Brown 1987:8). Other supplies for the operation of the mine are in the two storage or supply sheds or warehouses, one of which is now collapsed. They were both built along similar lines, with wood framing sheathed with canvas and later with siding and corrugated tin. Also remaining at the site are several large pieces of equipment: two vintage trucks (one with a winch), a John Deere crawler-loader, a boiler, a Warner & Swassy backhoe, and an Allis Chalmers bulldozer.



A cook stove now lies at the north end of the ruins of the Quigley cabin (MMK-117).

The most imposing structure at the site is the mill building, now stripped of its corrugated metal siding and roof, but with its interior processing equipment somewhat intact. The exterior of the mill was literally blasted away during an unfortunate explosives demolition accident that occurred at the site on April 30, 1987. The assay shed, located about 100 meters east of the Pilgrim cabin was completely leveled as a result of the explosion. An evaluation of the mill equipment made after a recent visit to the site indicates that the various circuits and the systematic arrangements of equipment - power generation and transmission, crushing and sizing, jig and table concentration, and dewatering equipment - are still clearly evident in the framework of the mill building (Hovis 1995a). The mine portal, located above and behind the mill building, is collapsed. Despite the regrettable incident that destroyed some of the Stampede Mine complex, the site still provides an excellent example of the component parts of a large-scale lode mining operation and of the ingenuity required for economic success in a remote Alaska setting.

Milling/Concentration. Only one site, **MMK-127**, has evidence just for milling and concentration. This site, the Lucky Gulch cabin, is just upstream of the confluence of Lucky Gulch and Eureka Creeks and 0.6 kilometers south of the Banjo Mine site on Quigley Ridge. The cabin, perched on a small bench on the eastern slope of Lucky Gulch, is constructed of peeled logs joined in a "hog trough" style at the corners and is still in good condition. The gabled roof is covered with tar paper insulation and sheathed by sheets of corrugated metal. The small, open-sided structure attached to the outside wall of the cabin was probably used for storage. The furnishings inside the cabin - two double-tiered plywood bunks, a table, and wood stove - are all homemade. Articles of clothing and cans remaining in the cabin attest to a fairly recent occupation, as do the 1975 Alaska automobile license plate and the 1975 California motorcycle license plate nailed to outside walls. A 55-gallon drum cache containing smaller drums, assorted artifacts, and cylindrical plastic vials, is located adjacent to one of the cabin walls.

The other domestic structure at the site is a homemade plywood shower stall. There is a toy truck lying on the shower stall floor; and a water storage tank, made from a 55-gallon drum painted black, lies nearby. Two can dumps, one southeast and the other northwest of the cabin, contain mostly recent plastic containers and cans. Two exceptions are an evaporated milk can (4 in. high and 2 15/16 in. in diameter), the dimensions of which may date it to the 1917-1929 period (Simonis 1989), and an historic grey mottled enamelware pot with a wire bale handle.

Lying 10 meters downslope from the cabin is a Harz-type jig, measuring 2.1 x 1.0 x 1.9 m. The jig hardware - pulley, sheave, and plunger crank housing - are attached to the top of a post and beam framework. The framework encloses a milled lumber box divided into two compartments, one for the plunger and one with a screen for the ore bed. The jig operates as follows: the downward action of the plunger forces a current of water up through the screen, bringing the ore into partial suspension; the return motion of the plunger causes the water level to lower and the ore to once again settle on the screen. This process of agitation and subsidence is repeated until the heavier ore particles have settled to the bottom and the lighter gangue particles can be skimmed off the surface (Taggart 1927: 666). Adjacent to the jig is a homemade sheetmetal dumper box, possibly used to funnel ore into sluice boxes. Also found at the site, near the cabin, were stopers and jacklegs, which both support jackhammers used to excavate ore from lode deposits.

MMK-127 is a somewhat problematic site as the dates of occupation and cabin construction, the identity of past residents, and even the type of mining that took place at the site are all unknown. From the condition of the cabin and its furnishings, it appears that the initial occupation began no earlier than the 1950s. The two possibly earlier artifacts in the site dumps may have been brought in from elsewhere or are the only remnants of a still earlier still occupation. The jig, stopers, and jackhammers are thought to have been brought down to the camp from the Banjo Mine on Quigley Ridge, not far above the site. This hard rock mining equipment may have been used to process samples taken from prospects in the surrounding hills, or the jig may simply have been used to further concentrate the placer sands from Eureka Creek. Further research is needed in order to place this site in its proper historic context.

The final lode mining site in the Kantishna District is **MMK-116**. This camp, located on Slippery Creek, is some 40 kilometers southwest of the main concentration of lode mining sites in the Kantishna District. The site consists of a three-room log cabin in good condition, the log foundations of three other cabins or tent frames, an outhouse remnant, a stacked-rock cache feature, various depressions, a water tank, and two piles of weathered timbers. The cabin is constructed of square-hewn logs, joined with double square notching, and neatly sawed on the protruding ends. The cabin's rooms, arranged in a linear fashion, appear to have been originally built as two structures, joined together by a small interior room. The room to the west served as a bedroom, complete with three sets of double bunks, while the room to the east served as a kitchen. A storage room, in the middle, still contains a variety of tools, including an ammunition box with blasting caps, which have since been removed from the site. A large inventory of artifacts dating to the 1960s and 1970s - personal belongings, household goods, kitchenware, an unopened food cans - were recorded inside the cabin. In front of the cabin is a scatter of modern machinery, including a D6B Caterpillar tractor and a second bulldozer of similar size with a seal reading "State of Alaska Department of Public Works Hyster D-6." Fifty-five gallon fuel drums are also in the scatter. The tractors were used during reclamation work on the road that passes alongside the cabin and zigzags to the mine farther up the mountain. Behind the cabin are the sill log foundations of cabins or tent frames that probably predate the occupation of the standing cabin.

The discovery of gold, copper, and mercury deposits on Slippery Creek was made by William Shannon in 1921 (Reed 1961: A-28). Shannon staked several claims in the Slippery Creek vicinity, one of which was the Merinser claim. MMK-116 appears to be located on or near this historic claim, situated on a sharp northward-trending ridge at an altitude of about 5,000 feet near the head of the west fork of Slippery Creek. The claim is known to have deposits of stibnite and cinnabar (mercury), as well as sulfides of iron and copper. Development in the form of a few open cuts was made on the claim by Shannon during the early 1930s (Moffit 1933: 313-14, 321), but it appears that the prospects were soon abandoned.

Shannon's Camp lay two miles west of the Merinser claim on upper Slippery Creek (Pilgrim 1929). It is possible that Shannon built a "spike camp" at the claim, perhaps consisting of framed canvas wall tents similar to one pictured at another of his claims in the Pilgrim (1929) report. A camp such as this would explain the presence of the sill log foundations remaining at MMK-116. The standing cabin at the site was built sometime after Shannon had abandoned the claims. The dimensions of the cabin (ca. 15 x 40 ft.)

roughly correspond to the dimensions of a hewn log cabin reportedly existing at the site in 1941 (DENA archive files), but there is no information on who built it. The cabin probably was built in the late 1930s when some further exploratory work was done on the property; but according to Grant Pearson, it was abandoned again by 1939 (Schmidt 1970: 5).

Chistochina District (Kotsina-Kuskulana Area)

The focus of past lode mining in the southeastern section of the Chistochina Mining District was an area drained by the Kotsina and the Kuskulana Rivers (figure 9). This area, now encompassed by WRST, lies northeast of the confluence of the Copper River and the Chitina River. The Nikolai greenstone and the overlying Chitistone limestone formation occurring there (Berg and Cobb 1967:38-42) are the same general geological features that contain rich copper deposits near the Kennicott Glacier only about 40 kilometers to the east. Considerable attention was focused on the Kotsina-Kuskulana drainages because of the proximity of the extremely rich Kennecott mines and the similarity in geological features that compose the two areas.

The Kotsina-Kuskulana area was initially prospected in 1899 during the mining frenzy associated with the Klondike Gold Rush. Although most of the stampeders into the Copper River Valley were seeking riches in gold, some had learned of the region's wealth in copper through the reports of Lt. Henry Allen, who explored the area in 1885 (see chapter 4). By 1900, prospectors had located a large mass of native copper, measuring 8 feet long and 3 to 5 feet wide, on the bed of Nugget Creek, a tributary of the Kuskulana River. Two years later, development work in the form of open cuts had begun on at least four of the lode claims on a Kotsina River tributary, named Elliott Creek (Mendenhall and Schrader 1903: 24-27). Systematic development work by the Hubbard-Elliott Copper Mines Development Company continued on Elliott Creek for many more years, while other mining companies in the Kotsina-Kuskulana area pursued the exploration and development of Nugget, Clear, MacDougall, and Berg Creeks.

During the decade between 1910 and 1920, there was a push toward mining production in the district. One factor in these increased efforts was the completion on the Copper River and Northwestern Railroad in 1911. The railroad, funded by the Kennecott Corporation, promised much easier access to supplies, labor, and markets for all the mining companies in the Copper River area (Hovis 1990c: 5). In the early part of the decade, the Great Northern Development Company invested heavily in its mine at the head of Clear Creek; but a disastrous snowslide in 1912 destroyed the power plant, most of the camp, and much of the company's momentum. Another active mine during this time was operated by the Alaska Consolidated Copper Company on Nugget Creek. The mill at the Nugget Creek Mine was equipped with crushers, jigs, and sorting tables; there was also an assay office and buildings to care for men and horses. Two 3 1/2-ton trucks were on hand for freighting the ore on the road to Strelna. Despite all these expenditures, the company only managed to ship 160 tons of ore to the smelter; and by 1919 the mine was closed down and the equipment removed from the property (Moffit and Mertie 1923: 126-129; Hovis 1990c: 7).

A flurry of activity was seen at two other operations later in the decade. One of these was the War Eagle property, a mine owned by Chitina-Kuskulana Copper Company on MacDougall Creek. Even though the mine was thought to have considerable promise and three camps and a power plant were installed, development work faltered and it was never brought into production (Moffit and Mertie 1923: 136-138; Berg and Cobb 1967: 42).

According to Logan Hovis (1997: personal communication), the mine was quite possibly a stock promotion or even an outright scam, although no concrete evidence has yet been documented to prove it. The second was a mine on Berg Creek owned by the North Midas Copper Company. A tunnel driven at the mine in 1916 surprised the owners by yielding high values in gold. Thus, a decision was made to develop the property as a gold, rather than a copper, mine (Moffit 1918: 160). The company built a mill, with a capacity of 20 tons a day, in 1918 and connected it with the North Midas Mine by a cable tram running 4,600 feet. A short mill run was made in 1919 and yielded only a few ounces of silver and gold (Moffit and Mertie 1923: 143). Although Ole Berg, the mine manager, tried to revitalize the North Midas during the next few years, it was finally abandoned in 1925 because of the loss of financial backing (Hovis 1990c: 10-11).

By 1930, virtually all mining exploration and development in the Kotsina-Kuskulana area had ended. One of the last mines to remain open was the Mullen prospect on Copper Creek, where several thousand feet of underground prospecting was done on veins of copper-bearing minerals. The prospect, once owned by the Galena Bay Mining Company, was serviced by a main camp located at the confluence Copper Creek and the Kotsina River. It consisted of a large assortment of buildings, including a sawmill, engine house, stable, blacksmith shop, garage, bunkhouse, bathhouse, warehouse, office, mess hall, assay office, and storehouses. The upper camp, situated some 500 feet upstream, contained three bunkhouses, a mess hall, and bathhouse for the mining crews. Like most of the other mining operations in the area, the Copper Creek Mine was never brought into production and was abandoned in 1928 (Van Alstine and Black 1946a: 125-126). Historian William Hunt gives the Kotsina-Kuskulana area the dubious distinction of being the best example in Alaska mining of "disappointment following long-proclaimed expectations of wealth" (Hunt 1991: 78).

The failure of the area, specifically the Kuskulana Valley, to develop into a productive mining district can be attributed to many interconnected causes. At the most basic level, it might be said that no suitable ore bodies were found in the area. Other contributing factors were the collapse of the base metal prices after World War I and a combination of exploration and processing problems. Ultimately, the failure appears to be the result of a "cavalier approach to mining diametrically opposed to the attention to detail and economic rationality that characterized operations at Kennecott" (Hovis 1990c: 18).

Most of the 20 lode sites documented by CRMIM crews in the Kotsina-Kuskulana drainages (figure 28; table 59) are the ones discussed above for which we have fairly good historic documentation. The majority falls under the categories of prospecting or development. Only the North Midas Mine and mill sites and two Nugget Creek Mine sites are associated with the production aspects of mining, i.e., transportation, extraction, and milling. The various habitation structures, outbuildings, and artifact types found at camps associated with these lode mining sites are listed in tables 60 and 61. Each of the sites is described below under its appropriate mining process.

Prospecting. One of the six prospecting sites, **VAL-241**, is located in the Cheshnina River basin in a peripheral area, just to the northwest of the main cluster of Kotsina-Kuskulana lode mines. Although VAL-241 is located on a lode claim, there is no evidence of mining at the site, which is estimated to be only about 20-30 years old. It consists only of the log supports for a tent frame platform. Adjacent to the supports is a circle of stones in which tin cans, bottles, and other mostly recent garbage were burned. Sixty meters

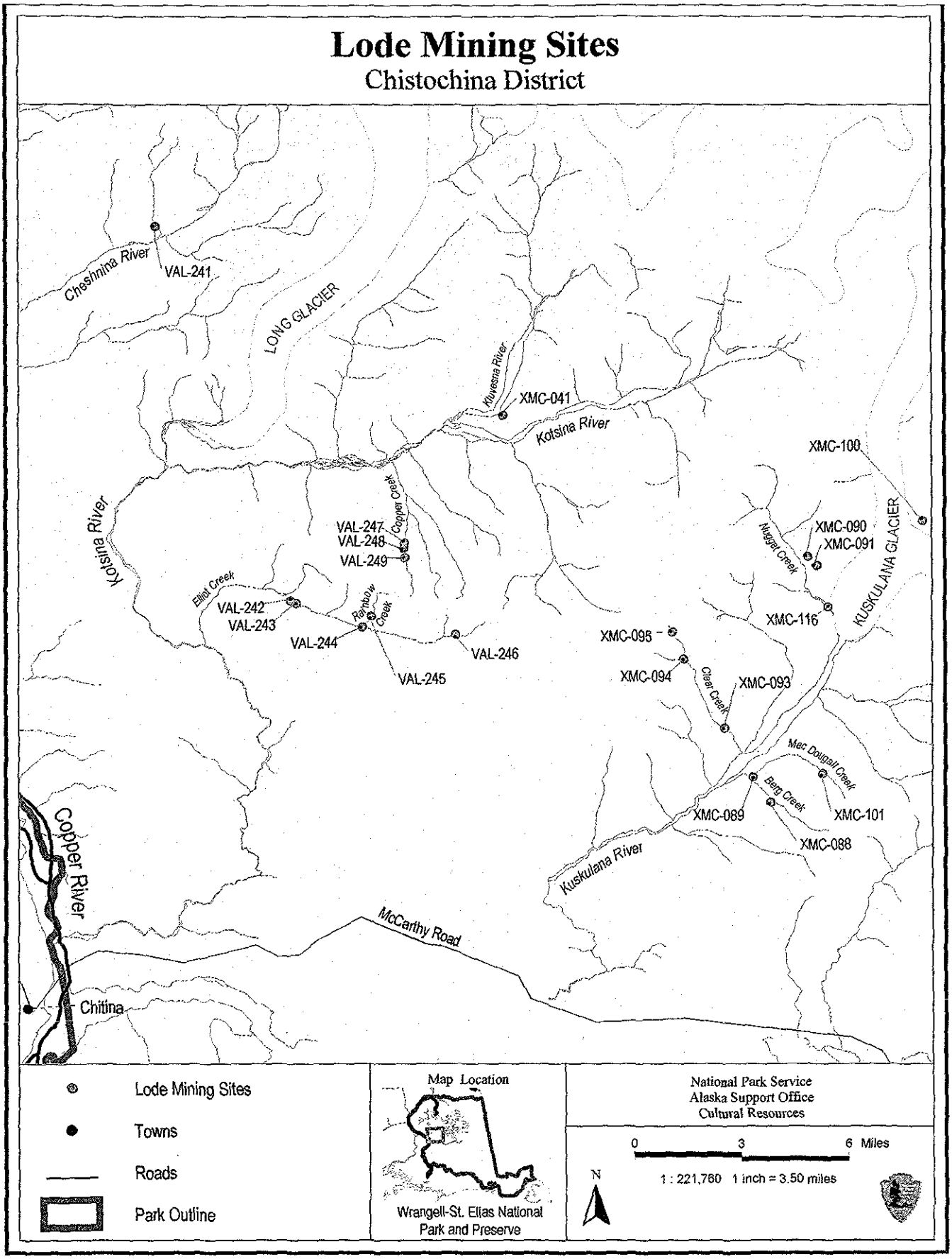

Lode Mining Sites
Chistochina District
Chesnnina River
VAL-241
LONG GLACIER
Klutesna River
XMC-041
Kotsina River
XMC-100
Kotsina River
Copper Creek
VAL-247
VAL-248
VAL-249
Nugget Creek
XMC-090
XMC-091
KUSKULANA GLACIER
Elliot Creek
VAL-242
VAL-243
Rainbow Creek
VAL-244
VAL-246
VAL-245
XMC-116
XMC-095
XMC-094
Clear Creek
XMC-093
Mac Dougall Creek
Berg Creek
XMC-089
XMC-101
XMC-088
Kuskulana River
Copper River
McCarthy Road
Chitina
Lode Mining Sites
Towns
Roads
Park Outline
Map Location
Wrangell-St. Elias National Park and Preserve
National Park Service
Alaska Support Office
Cultural Resources
0
3
6 Miles
N
1 : 221,760 1 inch = 3.50 miles

Figure 28.

Table 59

Lode Mining Sites in the Chistochina District (Kotsina-Kuskulana Area) by Mining Process

Locale	Prospect	Development	Trans/Ext/Milling	Unknown
Berg Creek			XMC-088 XMC-089	
Cheshnina River	VAL-241			
Clear Creek	XMC-093 XMC-094 XMC-095			
Copper Creek	VAL-249	VAL-247 VAL-248		
Elliott Creek (and Rainbow Creek)		VAL-242 VAL-243 VAL-244 VAL-245 VAL-246		
Kotsina Creek				XMC-041
Kuskulana Glacier	XMC-100			
MacDougall Creek		XMC-101		
Nugget Creek			XMC-090 XMC-091	XMC-116

Table 60

Habitation Structures and Outbuildings at Lode Mining Camps in the Chistochina District (Kotsina-Kuskulana Area)

AHRS #	Structure	Mat'l	Size	Condition	Outbuildings[1]
VAL-241	tent platform	lumber	16 m^2	trace	—
VAL-243	cabin	log/lumber	61.6 m^2	standing	1 ch
	bunkhouse	log	22.5 m^2	collapsed	
	cabin	limestone	6.6 m^2	good	
VAL-244	cabin	lumber	156.5 m^2	collapsed	1 sh, 2 oh, 2 ch, 2 oth
	cabin	log/Sheetrock	36.6 m^2	standing	
	cabin	log	20.3 m^2	good	
VAL-246	tent frame	pole/canvas	57.9 m^2	collapsed	1 oh
	tent frame	pole/canvas	44.8 m^2	collapsed	
	cabin	lumber	32.2 m^2	standing	
	cabin?	log	10.4 m^2	trace	
VAL-247	cabin	brd/batten	11.5 m^2	standing	1 oh, 1 oth
	cabin	logs/lumber	66.8 m^2	collapsed	
	bunkhouse	log	44.7 m^2	collapsed	
	cabin	log	9.2 m^2	ruins	
VAL-249	tent platform	lumber	17.3 m^2	trace	1 oh, 1 ch, 1 oth
	tent frame	log	14.3 m^2	ruins	
XMC-041	cabin	log	31.6 m^2	good	1 oh, 3 ch, 1 oth
	tent frame	log/pole	12.3 m^2	ruins	
	tent frame?	log	10.2 m^2	ruins	
	tent frame		16.3 m^2	ruins	
	tent frame			trace	
	tent frame			trace	
	tent frame			trace	

(continued)

Table 60 (continued)

AHRS #	Structure	Mat'l	Size	Condition	Outbuildings[1]
	cabin	log	27 m^2	good	
	cabin	log	15.6 m^2	ruins	
XMC-088	cabin	log/plywood	72 m^2	standing	2 oh, 2 oth
	bunkhouse	log/plywood	54 m^2	good	
	cabin	lumber	18.1 m^2	collapsed	
	tent depression		6.3 m^2	trace	
	tent depression		8.7 m^2	trace	
XMC-089	cabin	log/lumber	60.4 m^2	collapsed	2 sh, 3 oh, 1 wk, 5 oth
	cabin	log	63.4 m^2	standing	
	tent depression	—	16.1 m^2	trace	
	tent depression	—	16.1 m^2	trace	
	cabin	lumb/tar paper	35.7 m^2	standing	
	tent platform	log	17.5 m^2	trace	
	cabin	log	20.8 m^2	good	
	cabin	lumb/tar paper	65 m^2	good	
XMC-090	cabin	log	50 m^2	standing	2 sh, 1 oh, 1 ch, 1 oth
	cabin	log	24.4 m^2	standing	
	cabin	log	50.8 m^2	standing	
	bunkhouse	log	80 m^2	good	
	tent platform	plank	29.2 m^2	ruins	
	tent frame		10.8 m^2	trace	
	tent platform	plank	16.4 m^2	ruins	
	tent platform	plank	16.4 m^2	ruins	
	tent platform	plank	16.4 m^2	ruins	
	tent platform	plank	16.4 m^2	ruins	
	tent platform	plank	32.2 m^2	ruins	
	tent platform	plank	37.5 m^2	ruins	
XMC-091	tent frame	log/plank	24 m^2	collapsed	1 wk, 1 sh, 1 oth
	tent	canvas	25 m^2	ruins	

(continued)

Table 60 (continued)

AHRS #	Structure	Mat'l	Size	Condition	Outbuildings[1]
XMC-093	cbn/bunkhouse	brd/batten	37.7 m^2	collapsed	1 sh, 1 oh, 1 oth
XMC-094	tent depression		?	trace	—
	tent platform		?	trace	
XMC-095	tent depression	—	17.9 m^2	trace	1 sh, 3 wk, 4 oth
	tent platform		14.5 m^2		
	tent depression		20.4 m^2		
	tent platform		17.3 m^2		
	tent depression		12.7 m^2		
XMC-095	tent outline		38.7 m^2	trace	
	tent platform	planks	11.7 m^2	ruins	
	cabin?	log/plank	9.2 m^2	ruins	
	tent depression		11.2 m^2	trace	
	tent depression		15.7 m^2	trace	
XMC-100	cabin	log	38.7 m^2	collapsed	1 oth
XMC-101	cabin/tent	log	30.1 m^2	trace	1 oth
	cabin/tent	log	18.0 m^2	trace	
XMC-116	cabin	log	38.7 m^2	recent	2 ch, 1 oh
	cabin	log	12.6 m^2	trace	
	cabin	log	11.2 m^2	trace	

[1] Abbreviations for outbuildings are as follows: sd= shed, oh = outhouse, ch= cache, dgh = doghouse, wk = workshop, oth= other.

Table 61

Artifact Classes[1] Represented at Lode Mining Camps in the Chistochina District (Kotsina-Kuskulana Area)

AHRS	BLD	HSHD	PER	SUB	FST	FPR	FSR	TRAN	COM	REC	MTE	MLT	OTH
VAL-241					+								
VAL-243		+	+		+	+	+					+	
VAL-244	+	+	+	+	+	+	+	+	+	+	+	+	
VAL-246	+	+	+		+	+	+	+	+	+	+	+	+
VAL-247	+	+	+		+	+	+		+	+	+	+	+
VAL-249	+	+	+		+	+	+	+		+	+		+
XMC-041	+	+	+		+		+	+			+	+	+
XMC-088	+	+	+		+	+					+		+
XMC-089	+	+	+		+	+	+	+	+	+	+	+	+
XMC-090	+	+	+	+	+	+	+	+	+	+	+	+	+
XMC-091	+	+		+		+		+		+	+	+	+
XMC-093	+	+					+	+					
XMC-094		+			+			+			+	+	+
XMC-095	+	+	+	+	+	+	+	+	+	+	+	+	+
XMC-100		+			+		+	+			+	+	
XMC-101	+	+	+		+	+	+	+	?	+		+	
XMC-116		+		+	+		+	+			+	+	+

[1] The abbreviations used for artifact classes are as follows: BLD = building materials; HSHD = household; PER = personal; SUB = subsistence; FST = food storage; FPR = food preparation; FSR = food service; TRAN = transportation; COM = communication; REC = recreation; MTE = mining tools and equipment; MLT = multipurpose tools; OTH = other.

upslope from the site are lapped and solder seam cans and a sled runner. The site appears to have been re-occupied numerous times throughout the years, with the earliest occupation perhaps contemporaneous with the material upslope. Mining at the site may be related to the occurrence of a quartz-epidote vein in the Nikolai greenstone of the upper Cheshnina River basin (Berg and Cobb 1967: 46).

Two related sites, located about one kilometer apart near the headwaters of Clear Creek, represent a large-scale prospecting venture begun by the Great Northern Development Company in 1906. **XMC-095**, situated in a rocky cirque with steep slopes on three sides, is quite extensive with several clusters of features. Uppermost on the northeast side of the creek is a timbered portal, wired for electricity, and a tailings pile with rails and an ore cart. This feature is probably Tunnel No. 1 referred to in the literature (Moffit and Mertie 1923: 127). Across the creek from the tunnel is a leveled platform deeply cut into the slope, some wood scraps from explosives boxes, and a trail. Downstream a few hundred meters is the camp. On the western side of Clear Creek are nine leveled areas, some cut into the hillside, which are thought to have been tent platforms. Two of the platforms still have tent pegs. Cans, bottles (including two purple glass bottles), wood, metal debris, and the butchered bones of a moose are associated with these features. The largest of the features may have been a workshop as it contains various work-related artifacts, such as shovels and blacksmith tongs. Across the creek, eight collapsed outbuildings, now composed only of wooden platforms, represent the main work area at the camp. Still associated with the platforms are a variety of artifacts, which in some cases indicate the former function of the building. For example, one platform contains assaying equipment, such as crucibles, pipettes, and parts of a sample smelter made of glazed bricks, and another has disintegrating books or ledgers and a date stamp, usually associated with a business office. The platforms are all that remain of buildings lost during a disastrous snowslide in 1912-1913, which also destroyed the power plant and killed several men (Moffit and Mertie 1923: 83). A variety of other features, such as trash scatters and Tunnel No. 3, are visible just downstream from this work area.

XMC-094 is a camp located on a terrace adjacent to the confluence of Clear Creek and an unnamed tributary, approximately one kilometer downstream from XMC-095. Across the creek is a collapsed adit, which appears to be Adit No. 4, presumably driven to undercut the adits found near the main operation (XMC-095) above (Van Alstine and Black 1946a: 136). The site consists of two tent depressions, cut into the hillside, a small barrel cache, two scatters of machinery parts, and a linear depression with cans (solder dot with crimped seams) and bottles (one of purple glass). The barrel cache is made of nine barrels of heavy steel supported by a log frame. Each barrel has outer support rings and riveted side seams, along with screw openings in the middle, rather than on the top. The machinery scatter includes a sledge, generator parts, a large machine that appears to be a generator or compressor bolted to peeled log supports, and various white ceramic and green glass insulators probably associated with the line that supplied power to electric drills used in driving the tunnels (Moffit and Mertie 1923: 127). One white ceramic insulator was inscribed with a patent date of 1890; a carbon circuit breaker was inscribed with a patent date of 1907. Other artifacts found at the site are metal tools, broken dynamite boxes, and a barrel stove. There is also a recent campsite nearby where historic artifacts from XMC-094 were collected and piled up. The site dates to a period between about 1905 and 1916, when the Great Northern Development Company was prospecting for copper

along Clear Creek. A third site, **XMC-093**, consisting of the remains of a lower camp that probably serviced the mines above, is approximately 3.5 kilometers downstream from XMC-094. It consists of a partially collapsed, two-room, vertical board and batten cabin. Triple bunks, a barrel stove, benches, shelves, and a single bed are found inside. Also at the site are an outhouse, a collapsed structure that may have been a machine shed, the remains of a barn, and a stack of logs. Artifacts associated with the barn are horseshoes, stirrup parts, two complete freight sleds, and a horse-drawn snowplow. No features or artifacts specifically pertaining to mining are at the site.

Another site attributed to copper prospecting is **XMC-100**, situated at an elevation of 3,300 feet on a revegetated lateral moraine between the two northernmost spurs of the Kuskulana Glacier. The site contains a collapsed log cabin, a can dump, and at least 10 sledges abandoned next to the trail just south of the cabin. The trail leads upslope to the claim area in the Nugget Creek drainage. There is also a fairly recent hunting camp at the site. The one-room cabin, with dovetail notching and square hewn timbers, once measured 7.6 x 5 m as evidenced by the placement of the cabin's original sill logs. In the last 10 years, the cabin has been repaired and its size decreased by moving thee east wall westward and disconnecting the north wall from the rest of the structure. Although the roof has collapsed, it is apparent that at one time the roof was gabled and was constructed from milled planks; the floor appears to have been dirt. Parts of a cast iron stove, barrel hoops, and enamelware plates and basins are among the artifacts found just outside the cabin. To the west of the cabin is a rectangular depression that may have been the foundation of a tent. The cabin, described in the literature as "well-constructed," once lay on the Finch claim of the Big Horn group of claims located between the forks of the Kuskulana Glacier (Moffit and Mertie 1923: 133-134). Copper-bearing outcrops on a ridge near the cabin were probably prospected between about 1905-1915.

The final prospecting site is **VAL-249**, the farthest upstream of the Copper Creek sites, lying at about 3,900 feet elevation. A trail connects it with VAL-247 and VAL-248, lying only about 0.5 kilometers downstream. The site consists of the trace of a tent platform; the ruins of a log tent frame or cabin, an outhouse, and elevated cache; and a log pile lying on a slight bench on a steep embankment above the creek. An open cut (13 x 1.5 m) and a depression, cut into the slope and bordered by a rock retaining wall, are located just above the bench. The depression contains a firepit, various household artifacts, and a heavy cast iron blower probably used for blacksmithing. There is a can dump on the steep embankment below the bench, and an artifact scatter lies farther below on the creek bed. Included in the scatter is a wooden dynamite box containing an enamel saucer; cast iron stove parts; the draw bar for a horse hitch; and other artifacts. Also in this vicinity are two frames consisting of parallel sets of notched logs partially buried in the stream debris. It is possible that this camp is associated with the Cave Prospect, situated in the approximate vicinity of the site but at an altitude of 4,300 feet. Work at this prospect began in the 1910s and continued into the 1920s (Moffit and Mertie 1923: 102-103; Van Alstine and Black 1946a: 129). Considering the steepness of the terrain, there may not have been a suitable site for a camp near the mine adit itself, so a camp may have been built a few hundred feet downslope, putting it in the location of VAL-249.

Development. Among the eight sites attributed to mining development and exploration are two on Copper Creek located just below VAL-249. **VAL-248** is a mining operation on the former Mullen group of claims, once owned by the Galena Bay Mining Company

and later by the Copper Creek Copper Mining Company (Van Alstine and Black 1946a: 125). Lying at about 3800 feet in elevation, the site consists of four adits, a compressor building, a tool room, tailings piles, ore carts and rails, and associated artifacts. The two structures, located adjacent to each other on top of tailings piles, are both partially collapsed. The tool shop contains a blacksmith forge, steel drill bits, nuts, bolts, washers, sections of rail track, and a small compressor mounted on a base with wheels that allowed it to run on the ore cart track. The dominant object in the adjacent compressor house is a large Ingersoll-Rand compressor, 3.2 m long. Two adits, one of which has a timbered portal, are located immediately behind the collapsing structures. Rails lead from the adits, between the structures, and out across the tailings pile. There is a depression at the base of this tailings pile where lumber, cans, and glass jars were discarded. A lumber platform, probably a catwalk, is located in the steep, rocky area between the tool room and one of the adits.

South of the main site concentration is another extensive tailings pile with rail and ore cart jutting out from a collapsed adit. An open-cut just upslope from the adit exposes blue and green copper ore. The fourth adit, with a wood-lined portal, is situated in solid rock downslope from the tool room and the compressor building. Only two adits, presumably one at the base of the cliff just behind the wooden structures and the collapsed adit to the south, are mentioned in a geological report of the site written in 1943 (Val Alstine and Black 1946a: 126-128). These other two adits recorded by the CRMIM crew either were overlooked by the USGS geologists or were drilled sometime after the early 1940s.

The camp, **VAL-247**, is situated only about 100-200 meters downstream from VAL-248 along both sides of an unnamed tributary of Copper Creek. It is referred to in the literature as the "upper camp" on the Mullen claims (Val Alstine and Black 1946a: 126). A standing cabin, with most of its roof intact, is the only site feature found on the west side of the tributary. Remnants of a bridge, constructed of squared timbers and planks, connect the cabin with the rest of the site. The cabin is built of rough-cut boards and furnished with a table, benches, two bunks, and a rusted barrel stove. Various tools, including blacksmith tools, are found in and around the cabin. On the opposite side of the creek are two collapsed L-shaped structures, one of which is built of rough-cut boards and the other of unpeeled logs, boards, and canvas. This latter structure, probably a bunkhouse, contained at least four sets of double bunks. One of the artifacts found in the bunkhouse was a rubber boot lined with a Finnish language newspaper. The other L-shaped cabin appears to have been the mess hall as it contained a cast iron cookstove, a double wooden sink with galvanized metal lining, along with several pans and large cooking pots. Also on the east side of the creek are two collapsed structures made of unpeeled logs and a wood pile. Various domestic articles and scrap building supplies, including what appears to be a telephone wire, were recorded at the structures, which may have also been bunkhouses. Remnants of a waterline are found running from the creek to the features on its east side. An outhouse, barrel dump, and other widely scattered artifacts are located on the low ridge farther to the east.

The telephone wire found at the site was undoubtedly part of the telephone line that once connected the upper Copper Creek Camp to the lower or main camp located near the confluence of Copper Creek and the Kotsina River. This site, known as Coppertown (VAL-235), was not recorded by CRMIM crews, but was documented earlier by a HABS (Historic American Building Survey) team. Once quite extensive (see description above),

the site now consists of the foundations of unidentified buildings, a stable with a collapsed roof, four tent frame foundations, a standing log cookhouse, a frame house recently occupied, the ruins of a log barn and corral, a shed, and a frame powder house still in good condition (Lidfors 1985).

On Elliott Creek and its tributary, Rainbow Creek, are five sites, all related to the mining exploration and development done by the Hubbard-Elliott Copper Mining Company during the first two decades of the twentieth century. The first two, **VAL-242** and **VAL-243**, are located only about 100 meters apart, just upstream from the confluence of Elliott and Five Sheep Creeks. These two sites compose what was known as the "lower camp," connected with Strelna, on the Copper River and Northwestern Railroad, by a pack trail during the summer (Moffit and Mertie 1923: 116). VAL-242, which includes a stable, a partially collapsed log workshop, an outhouse, two wagons, and ten sleds, was used as a staging area to transport supplies and machinery to the mines located in upper Elliott Creek. The stable remains in excellent condition and contains tack, rigging, and equipment used in transporting freight by horse teams. It is constructed of unpeeled spruce logs with canvas chinking and a gable roof of galvanized sheet metal. The inside has hardwood floors and three stalls on each side of the room. The names of three of the horses - "Chub," "Blowdy," and "Prank" - written in white chalk, are still visible above each stall. Feed troughs were located at the back of the stalls. Artifacts inside the stable include burlap feed sacks, bales of hay, sets of harnesses and reins, horseshoes and horse blankets, a ledger book, assorted kitchenware and cans, and others. The workshop, converted from what was originally another horse stable, is a





Lower camp at the Hubbard-Elliott Copper Mining Co. (VAL-242) on Elliott Creek in WRST.
(Top) CRMIM crew member recording the stable at the camp.
(Bottom) Draw bars, used for freighting with horse-drawn wagons, found in the stables.

log structure with an open-sided addition. The addition is roofed with flattened fuel cans. The interior of the workshop is littered with tools and roof and wall debris. Two eight-foot long wagons with spoked wheels of wood and steel rims are next to the workshop. Scattered about the site are 10 freight sleds in various stages of decomposition. An interesting find made at the site is a wooden crate inside the outhouse that contained pages from a Montgomery-Wards catalog and a 1924 *Cosmopolitan* magazine.

The personnel employed at VAL-242 were housed at the adjoining site, VAL-243. The site served as a supply stop for equipment sent from Strelna to the middle and upper copper mining camps along Elliott Creek through the 1910s. This camp includes a collapsed log bunkhouse and log cabin, a small rock-walled cabin, and a cache. The cabin has two rooms, built at different times, and a limestone foundation. The corners of one room are saddle-notched, while the other room has tenon-notched corners. The roof is covered with flattened fuel cans; the walls are chinked with burlap and canvas. The older room, Room A, contains two bed frames, a woodstove, a porcelain platter and other artifacts, and has walls lined with flattened fuel cans. Room B, added later as a kitchen, contains various furnishings and artifacts, including a cook stove. The bunkhouse is constructed of unpeeled, saddle-notched logs laid upon a rock foundation. There are six bunkbeds along the interior walls of the structure. A barrel stove is in the center of the room. The third structure is a rock-lined one-room cabin or storeroom, roofed with flattened 5-gallon fuel cans. Its interior has shelving on three walls. A natural basin formed by two boulders and lined with flattened fuel cans was used to cache items, such as buckets, at the site.

The middle camp on Elliott Creek, **VAL-244**, lies at its confluence with Rainbow Creek. The site consists of three cabins, a stable, a sawmill, a possible collapsed shed, two caches, two outhouses, two trash dumps, two wooden sledges, and various scatters and piles of tools and equipment. H.C. Elliott and Charles G. Hubbard began construction of this camp around the beginning of the twentieth century and made structural additions during the next two decades. It served as the headquarters for prospecting and developing the many Elliott Creek claims, such as the Albert Johnson, Elizabeth, and Goodyear claims, owned by the Hubbard-Elliott Copper Mines Development Company (Moffit and Mertie 1923: 118-121). The majority of the site's 19 features are on a steep embankment above a small terrace on the floodplain. The most prominent feature at the site is a large seven-room cabin, built of unpeeled logs. The cabin, which served as the main living quarters for the camp, was constructed in stages through the years. The cabin consists of a kitchen, dining area with large tables, downstairs sleeping quarters, storage



Overview of the middle camp at the Hubbard-Elliott Copper Mining Co. on Elliott Creek in WRST (VAL-244).

room, bathroom, and two upstairs rooms probably used as bedrooms. A pipeline runs from the creek parallel with the back walls of the cabin. An interesting assortment of artifacts is still found in the structure, including cookware, enamel and ceramic dishware, cutlery, broken records, checker pieces, books, a corn cob pipe, and a partial deck of playing cards.

The three-room log cabin at the site served as both an office and a residence. The presence of screened windows, curtains, a porcelain bathtub (with intact fixtures and detachable clawed feet), two iron beds (rather than wooden bunkbeds), and a water heater seem to indicate that it was used by higher status personnel. Built on a one-room plan, the structure was divided into three rooms by the addition of interior framing and Beaver Board (a trademark name for an early type of Sheetrock). An elaborate piping system provided heated water to the bathtub. Among the many artifacts found in this cabin is a wooden footlocker with "J.J. Cryderman" stenciled on the side. Also at the site is a one-room, recently occupied, log cabin, constructed of peeled logs, hewn flat between the courses. The gabled roof is covered with white canvas protected by corrugated metal, which is a new addition. Inside are a barrel stove, two bunkbeds, and other pieces of furniture. The stables, now in ruins, contain portions of a trough and feed bins for five horses. The sledges found here have metal runners and wooden stanchions. Tools associated with mining at the site include dynamite and blasting caps, ceramic crucibles, test tubes, flasks, and a kiln.

VAL-245, one of the mining operations associated with the Hubbard-Elliott Camp, is located on Rainbow Creek about 300-400 meters upstream from its confluence with Elliott Creek. The site consists of an air compressor (3.5 m long), manufactured by the Chicago Pneumatic Tool Company, and associated equipment in a collapsing wood structure, built in 1921 to expedite drilling on the Rainbow Creek claims (Hinckel 1922: 2-4). The other equipment includes a large air receiver, water regulator, air intake system, wood stove, oil drain system and various artifacts. The compressor system was assembled on a leveled talus slope made up of ore tailings from the adit located just upslope. The compressor room is constructed of planks with battens nailed down to secure canvas and tar paper; it has a flat roof. Immediately adjacent to the compressor room is a second room, almost totally destroyed by rockfall. This room is filled with tools, machine parts, drill bits, and extra machine parts. Lying on the scree slope is a winch, embossed with "Little Tugger." A narrow gauge rail track comes up from the streambed, where sections of rail and scrap metal are found.

An identical compressor was found at **VAL-246**, situated farther upstream on Elliott Creek, in a U-shaped valley near the headwaters. Along with the compressor and the remnants of its shed, there is an adit, a standing cabin, two collapsed tent frames, four woodpiles, a barrel dump, and assorted debris and artifacts dating to the early 1920s. VAL-246 is the upper Hubbard-Elliott Camp, constructed in 1922 to facilitate exploratory work on the Mineral King and Copper King claims (Brooks and Capps 1924: 26). The compressor shed, built of logs and canvas, housed an air receiver, air cooler, compressor hose, barrels, a small forge, and miscellaneous tools and pipe in addition to the compressor. A 2 1/2-inch diameter pipe leads up the scree slope from the compressor to the adit, situated alongside a collapsed wooden structure connected to the compressor building below by two wire cables. A narrow gauge track extends from the adit out onto the tailings pile for a few meters. A variety of tools and other artifacts are scattered near the adit.

The camp buildings are all located on the opposite side of Elliott Creek. Remaining in the best condition is a standing, milled lumber cabin with an open-air shed addition. This building may have served as a mess hall for the crew as a variety of cooking equipment and enamelware plates are still found in or near the structure. At least one of the two collapsed tent frames served as living quarters. The two-room structure contained a homemade barrel stove, cot, homemade cooking stove, household items, and 12 Prince Albert tobacco tins. Also found at the site is a wooden sledge with beam runners, metal shoes, and planks that provided a cargo bed, another lighter weight sled, a collapsed outhouse, and a can dump, composed mostly of lapped-seam, solder-dot closure cans.

The final exploration and development site is **XMC-101**, located on MacDougall Creek. Lying at about 3,250 feet elevation, XMC-101 is the middle camp of three camps, once established by the Chitina-Kuskulana Copper Company along MacDougall Creek and managed by Angus MacDougall (Moffit and Mertie 1923: 137-138; Van Alstine and Black 1946a: 138). The site consists of the remnants of a machine shop, a collapsed adit, a cable transmission line originating on the Kuskulana River, the remains of three wood plank floors, and the debris from unidentified structures. All of the heavy machinery has been removed from the machine shop, which was separated into a compressor room and a workshop. One of the many artifacts associated with this building is a sheet of galvanized metal with "Bloom O'Neil Company Cordova," written on it. A cable transmission line, which originated at a wood-burning power station on the Kuskulana River and ran up to the machine shop, is still in place though many of the wooden supports have collapsed. A variety of insulators - brown, bell-shaped ceramic insulators, white porcelain insulators, and aqua translucent glass insulators - were observed along the line, which terminates at the machine mount where the compressor was once housed. Adjacent to the cables is a galvanized wire that may have functioned as a telephone line. The collapsed adit, on the slopes above, is connected to the machine shop by a 3 3/4-inch pipeline that supplied air for the drills. A narrow ore track is visible from under the rubble of the adit and runs to the top of an adjacent tailings pile. Just described is the War Eagle adit touted by its promoters as being one of the "largest and richest copper mines in the world" (Chitina-Kuskulana Copper Company 1923). Interestingly enough, no copper-bearing minerals were found in a geological sample taken in the adit in 1943 (Van Alstine and Black 1946a: 139).

Downslope from the machine shop are three intact wood plank floors, which are all that remain of board and batten buildings widely scattered still farther downslope. From the artifacts associated with the floors, it is thought that two buildings were living quarters and the third was a stable. These structures were destroyed by snow slides. XMC-101 exemplifies the Kotsina-Kuskulana region as a whole, where major exploratory efforts and expenditures proved to be fruitless in terms of mining production and profit.

Transportation, Extraction, and Milling. Two sites on Nugget Creek and two sites on Berg Creek are included in this category. **XMC-091** is the Nugget Creek Mine site, located about 3.2 kilometers upstream from the confluence of the creek and the Kuskulana River. The Mine, originally operated by the Alaska Consolidated Copper Company, basked in a brief period of glory in 1917-1918 when 160 tons of its copper concentrates were shipped to the smelter (Hovis 1990c: 7). The site is composed of three distinct areas: the upper adit, the mill building and its associated features, and the remains of a shed with machine mounts and barrel caches below. The adit, which has been almost completely

buried by rock slides, is about 100 meters upslope from the mill and about 20-30 meters from the wooden remnants of a possible jig-back tram loading station and a feature that could have been used as a shelter for workers on the tram line. The three-level mill building is badly deteriorated, with most of the roof missing and nearly all the equipment removed. There is no longer evidence of a tram discharge station at the mill, but a collapsed ramp and rail track are still located on the top level of the mill building, where it is assumed that a single front-dumping mine car delivered the ore to the hopper and grizzly below. It is still possible to locate the position of the crushers, jigs, and concentration tables that once existed in the building and to reconstruct its simple flowsheet. Other features near the mill building include a collapsed wooden structure that appears to have covered a lower adit; a collapsed log workshop with miscellaneous pieces of hardware and old dynamite boxes; a collapsed tent frame; trash and wood scatters; hand-forged dump buckets made of the bottom half of old steel barrels; piles of pipe; an ore car; the remnants of a narrow-gauge rail track; and the remnant of a horsedrawn freight sled.

XMC-090, the Nugget Creek Camp, lies approximately 0.5 kilometers upstream from the mine. During the heyday of mining production in 1917, the camp may have housed more than 100 men (Hovis 1990c: 7), who lived in various log structures and tent frames remaining at the camp. A two-story log bunkhouse, hewn between the logs to produce a tight fitting structure, has full dovetail notching and burlap chinking. The upstairs appears to have been used as a sleeping quarters, and the downstairs as a mess hall. There are three standing log cabins at the camp, which are all similar in construction. One of these cabins, one-and-a-half stories high, was wired for electricity and furnished with bunkbeds, double beds, and a galvanized sheet metal washing machine. The ruins of seven tent platforms and the trace of a tent frame are also found at the site. The outbuildings include a one-and-a-half story log barn, also with full dovetail notching, a plank storage cache, an outhouse, a small shed, and a three-room log building that was used as a garage and/or a tool shed. The investors in the mine had enough confidence in its future to supply the capital for building an auto road from the railroad to the mine (Hovis 1990c: 7), which explains the construction of a three-room garage from what had originally been a one-room cabin. An assortment of other features, such as wood, pipe, and log piles; trash pits; a freight sled; and a horse-drawn wagon, complete the inventory of features at the Nugget Creek Camp.

The North Midas Mine and Mill are located about 10 kilometers to the southeast, across the Kuskulana River on Berg Creek. The mill site, **XMC-089**, consists of a tram terminal, the mill building with its associated machinery and parts, 14 standing or collapsed structures, two tent frame locations, and two distinct trash scatters. The most prominent feature at the site is the mill building itself. While the lower portions of the wood frame building are collapsed, most of the major equipment used to process the ore remains intact. Situated on a steep hill, the mill building consists of six levels: the upper two levels were used for crushing and ore storage; the middle two contain a ball mill, classifying equipment, flotation cells and sand table; and the bottom two appears to be occupied by a modified cyanide plant and an assay/bullion room. From the top, the major pieces of ore processing equipment include the following: 1) a dump box with grizzly; 2) a Blake primary crusher; 3) a wire-screen trommel; 4) a Wheeling No. 2 secondary crusher; 5) an ore storage bunker; 6) a ball mill; 7) a Drag type classifier/dewaterer; 8) a Wilfley-like sand or shaking table; 9) two flotation units marked with "K and K Floatation Ma-

chine;" 10) Dorr thickener; 11) wood tanks associated with cyanide leaching; 12) an Olive filter; 13) a dry vacuum pump and air receiver; 14) a centrifugal pump. The power transmission in the mill was actuated by a system of belts, sheaves, and shifts overhead.

The physical remains at the North Midas Mill reveal some interesting facets of the mill revitalization undertaken by Ole Berg beginning in 1922 (Hovis 1990c: 10). Originally, the mill was set up to process gold ore by using an all-cyanide process for gold recovery. The mill equipment still at the site, however, consists of additional pieces, such as the flotation units and sand table, as well as a possibly redesigned cyanide circuit. Also changed was the mill's power generation system that was originally designed for a water wheel, but was converted to a diesel engine because the water wheel proved inadequate as a power source. The archeological evidence provides an added dimension to the story of the mine, which by most historic accounts was merely unproductive. The physical remains at the mill confirm what historic "digging" has revealed about Berg's attempts to upgrade the technology in hopes of turning the mine into a profitable venture. Berg's failure to secure the necessary financial backing eventually brought the operation to a halt (Logan Hovis 1997: personal communication).

A tram terminal with a fixed-line, double-rope cable lies near the base of the mill. The tram system runs upslope to the North Midas Mine (XMC-088). At the time of the survey the cable still extended between the two sites, though the towers in between had collapsed. Ore cars were attached to the cable midway between the sites and at the mill terminal. Another structure is a collapsed barn built of rough-hewn boards; its cupola now rests on the ground. There is a also a small shed, the ruins of a blacksmith shop, a board and batten workshop, and a pipeline made of wooden staves, ostensibly to run the Pelton wheel. A variety of habitation structures - cabins and tent frames - were also recorded at the site (table 60). A three-room cabin, constructed of vertical boards covered with tar paper, has been occupied recently. It may have functioned originally as a mess hall. Another cabin, also in recent use, is constructed of unpeeled V-notched logs, furnished with a barrel stove, an older cast iron stove, beds, table ,and a cupboard. Outhouses, trash scatters, a sledge, and other miscellaneous features complete the inventory at this extensive site.

XMC-088 is located 1.6 kilometers up Berg Creek from the millsite. The adit, tram, and structures at the site were originally associated with the North Midas Mine during the early 1920s. The adit is identified as Adit No. 5, one of the two adits in which gold and silver minerals were discovered by Ole Berg in 1916 (Van Alstine and Black 1946a: 141). Outside the adit and its associated tailings, located at an elevation of 2,800 feet, is a small-gauge rail track with a cast iron cart still resting on it. Each of the cart's wheels has the trademark: "Joshua Hendy Ironworks of San Francisco." The upper end of the deteriorating tram terminal, situated 90-100 meters north of the adit, is marked by a large gear wheel, 1.45 m in diameter. An ore cart track runs on either side of the tram directly below the cables for about 7 meters. It appears that the elevated tram cars were filled with ore directly from track-carts loaded in the mine. Adjacent to the terminal is a milled lumber bunker, now partially buried by rocks. The mining operation also included a compressor, lying in a collapsed milled lumber structure situated between the adit and the tram terminal. The single-cylinder compressor is 3.4 m long. A smaller compressor with a patent date of 1899-1902, a kiln, a welder, and a large pipe constructed of old barrels bolted together are also in the building.

A one-story log cabin and a two-story log bunkhouse are still standing at the site. Both of these structures, renovated with plywood additions or structural supports, were used during the 1960s or 1970s when additional prospecting appears to have been done at the mine. A helipad built on top of the bunker and a scatter of 55-gallon drums also date to this recent period of mining. There is also a collapsed cabin, probably constructed from logs, that appears to have housed mine employees during the 1920s, as various domestic articles are still found in its vicinity. Two tent depressions were also recorded at the site.

Unknown Mining Process. A road from Coppertown extends along the south side of the Kotsina River up to "The Peninsula" between the Kotsina and the Kluvesna Rivers. **XMC-041** is located at the east end of "The Peninsula" and is composed of two cabin groups on an upper and a lower terrace. The majority of the structures are situated on the lower terrace, which is bisected by an access road to the Silver Star and Pandora claims on the slope above. The lower camp consists of a log cabin, with a new metal roof and currently being used for storage; the ruins of a log barn; three collapsed log structures that were probably tent frames; the traces of other possible tent frames; a collapsed outhouse; and three possible caches. The upper cabin contains a recently renovated log cabin and the ruins of a hand-hewn log structure that contains an old medicine bottle, stove parts, horseshoes and a wooden cot. An old crate found just outside the renovated cabin is printed with: "A.L.L. & Co. - Valdez." These cabin groups are located on a millsite, which was reserved for the upslope claims in anticipation of production at the mine. A recent mining camp lies just south of the lower camp. Although the historic context for this site is unknown, it can be tentatively dated between about 1910-1920.

The second site in this category is **XMC-116**, a camp located about 1.6 kilometers up Nugget Creek from its confluence with the Kuskulana River. There are five modern and three historic features at the site. One of the historic structures is the foundation of an old log cabin, reportedly built by James McCarthy in 1900 (Coppess n.d.). James McCarthy was one of the earliest prospectors in the Copper River country and one of the original locators, along with E. A. Gates and Arthur H. McNeer, of the Nikolai group of copper mines on the Nizina River (Hunt 1990:251). Nugget Creek was initially prospected in 1899 and 1900, the year an enormous copper "nugget" was found on the creek by prospectors, probably including McCarthy. There is also the partial foundation of another cabin, or possibly tent frame as shreds of canvas were associated with the structure. It appears that terrace erosion has caused this cabin to topple onto the floodplain. All that remains of the historic cache is an elevated platform positioned atop two topped spruce trees. The modern features - a cabin, cache, outhouse, firepit, and hand-dug well cover - were built in 1966 by Tom Byron before the park was established. The cabin is now maintained for public use.

Nizina District

The Nizina Mining District is south and east of the Kotsina-Kuskulana region, in an area drained by tributaries of the Chitina River (figure 9). Although streams in the Nizina District have been mined almost continuously since the turn of the century for their placer gold, the Nizina is far more notable for its hard rock copper deposits. The copper-bearing rocks of the Chitina Valley extend eastward from the Kotsina River to Glacier and Young Creeks, a distance of about 120 kilometers. In this broad copper zone, the deposits are distributed in two principal districts, the Kotsina-Kuskulana on the west

and the Nizina on the east. All the large deposits are associated with the lower part of the Chitistone limestone, which overlies basaltic lava, known as the Nikolai greenstone (Moffit 1946: 93-94).

Copper has been an important resource of Chitina River territory since prehistoric times, when the Ahtna began to mine copper nuggets and work them into tools. During his 1885 explorations, Lt. Henry Allen learned of a rich copper deposit, named after an Ahtna chief as "Nikolai's Mine," but never succeeded in locating its source. It was not until July 1899 that a party of prospectors, representing various business interests, prevailed upon Nikolai to provide the information necessary to find the mine. Using a map prepared by the Chief, the prospectors located the copper vein on a tributary of McCarthy Creek, now referred to as Nikolai Creek. During the winter of 1899-1900, the Chittyna Exploration Company was formed to develop the Nikolai claims and R. F. McClellan hired to supervise the work. The following summer, prospectors Jack Smith and Clarence Warner, who had been grubstaked by McClellan to do further prospecting in the vicinity, discovered the green cliffs of copper ore on a ridge about 13 kilometers to the northwest of the Nikolai Mine. This outcrop, staked as the Bonanza claim by Smith and Warner and their partners, was to become the keystone of a great mining complex, run by the Alaska Syndicate and later reorganized as the Kennecott Copper Corporation[1] (Schrader and Spencer 1901: 86; Grauman 1977a: 5-6; Hunt 1990: 251; Hovis 1991d: 2).

A central player in the story of the Kennecott Mines was Stephen Birch, a mining engineer who became convinced of the potential of the Bonanza Mine. After years spent in legal and financial battles, Birch finally succeeded in 1906 in merging the interests of the wealthy families of J. P. Morgan and Meyer Guggenheim to form a partnership known as the Alaska Syndicate. At that time, the greatest obstacle to a successful mining venture in Alaska was the lack of transportation. The syndicate overcame the problem by investing $25 million to build a 196-mile railroad from the port of Cordova to the company town of Kennecott and to organize the Alaska Steamship company to deliver the ore to the smelter in Tacoma. The large investment was also used to develop the mines and construct the mill. (Grauman 1977a: 6-7; Pierce and Spude 1986). The first shipment of ore from the Bonanza Mine was made in April 1911 when the Copper River and Northwestern Railroad was complete (Miller 1946: 99).

In the years that followed, other mines near the Bonanza were brought into production by the Syndicate. The Jumbo Mine began production in 1913 and the Erie Mine in 1916. By then, the company had been reorganized through the sale of stocks and bonds into the Kennecott Copper Corporation, with Stephen Birch as its president. In 1919, the Mother Lode Mine also became a subsidiary of the Kennecott Corporation. This group of properties known as the Kennecott Mines consisted of 70 miles of interconnected underground workings, plus an above-ground tramway system that connected each of the mines with the mill. The mines exploited several ore bodies, with the most important being the Bonanza and Jumbo veins, which constituted the largest masses of nearly pure copper ore ever discovered. The Kennecott Mines were in almost continuous operation from 1911 to 1938, when the incredibly rich deposits were finally depleted. When the doors finally

[1] The Kennecott Copper Corporation took its name from Kennicott Glacier, but misspelled it with a second "e." The town that grew up around the mine has been spelled in various ways, but current maps favor the original spelling with an "i" (Orth 1971: 510).



Ahtna Chief Nickoli (Nickolai) provided prospectors with the location of a rich copper lode on a tributary of McCarthy Creek, now known as Nikolai Creek, in WRST. (*Anchorage Museum of History and Art: B80.98.52*)

closed, the Kennecott Mines could be credited with producing more than a billion pounds of copper, worth an estimated 200-300 million dollars (Miller 1946: 98-99; Berg and Cobb 1967: 52-53; Pierce and Spude 1986).

Although the Kennecott Copper Corporation was the titan of copper mining in the Nizina District, a cluster of other copper mines located in the general vicinity of the town of McCarthy also operated in the district. This group included the Green Butte, Regal, and Nikolai Mines, as well as the Westover, Nelson, Erickson, and Radovan prospects. Of these operations, the Green Butte Mine, active from 1922 to 1925, was the most successful in producing high-grade copper ore. Despite sustained development at some of the other properties, the total amount of ore produced or shipped was not very significant (Berg and Cobb 1967: 56-62).

For a short period, there was also a productive lode gold industry in the Nizina District that centered at the headwaters of Golconda Creek in the Bremner River area. Placer gold mining was established early in the century in this area, but interest in lode mining was much slower to develop. The Ramer Brothers were the principal miners on Golconda Creek beginning in 1927, when S.L. Ramer staked the Topsy group of claims (Hovis 1990d: 4). According to one geological report, there were more than a dozen men actively engaged in prospecting in the area in 1933, with most of the work being done by the Ramer Brothers. To facilitate their efforts, a landing field was constructed so airplanes could bring in personnel and supplies from McCarthy (Smith 1936: 24). For the next few years, the Bremner Mining Company, under the direction of Lee Ramer, took the forefront in locating and developing gold prospects. Their properties included the Grand Prize and the Lucky Girl Mines. Development began on the Yellowband group of claims, located about 4.5 kilometers south of the Bremner Mines, in 1935 by another group, under the leadership of Asa Baldwin. His Yellowband Gold Mining Company took over operations of the Bremner Mining Company holdings in 1938 (Hovis 1991e). The amount of gold produced by these three lodes is not known, but it is thought to have been substantial. The mines were worked until about 1942, when wartime restrictions shut down most of the gold mining activities in the country (Berg and Cobb 1967: 63). The history of the Bremner District is thoroughly documented in a recent publication by White (2000).

More than a half-century has passed since most of the Nizina lode mines were in operation, and yet the vestiges of a once-prominent industry are still visible on the landscape. A total of 27 lode mining sites were recorded by CRMIM crews throughout the district (figure 29; table 62). Several of these sites are associated with the Kennecott Copper Mines, and others with the smaller copper and gold mining ventures in operation before World War II. Some of the sites are simply prospects with little physical evidence to tie them to mining. In most cases, domestic features and artifacts of the people who once operated the mines are preserved at the sites. Details about the habitation structures and outbuildings at these camps are presented in table 63; a listing of artifact classes is presented in table 64. The sites are organized by mining process into the following categories: prospecting; development and exploration; extraction and transportation; extraction, transportation, and milling; and unknown.

Prospecting. There are five sites, widely spaced throughout the district, in this category. Two of these prospecting sites are located near the Chitina River. Lying to the east, just north of the terminus of the Chitina Glacier is **XMC-040**. This camp is located near the base of a hill on a level terrace, while the Harrais lode claims are located above

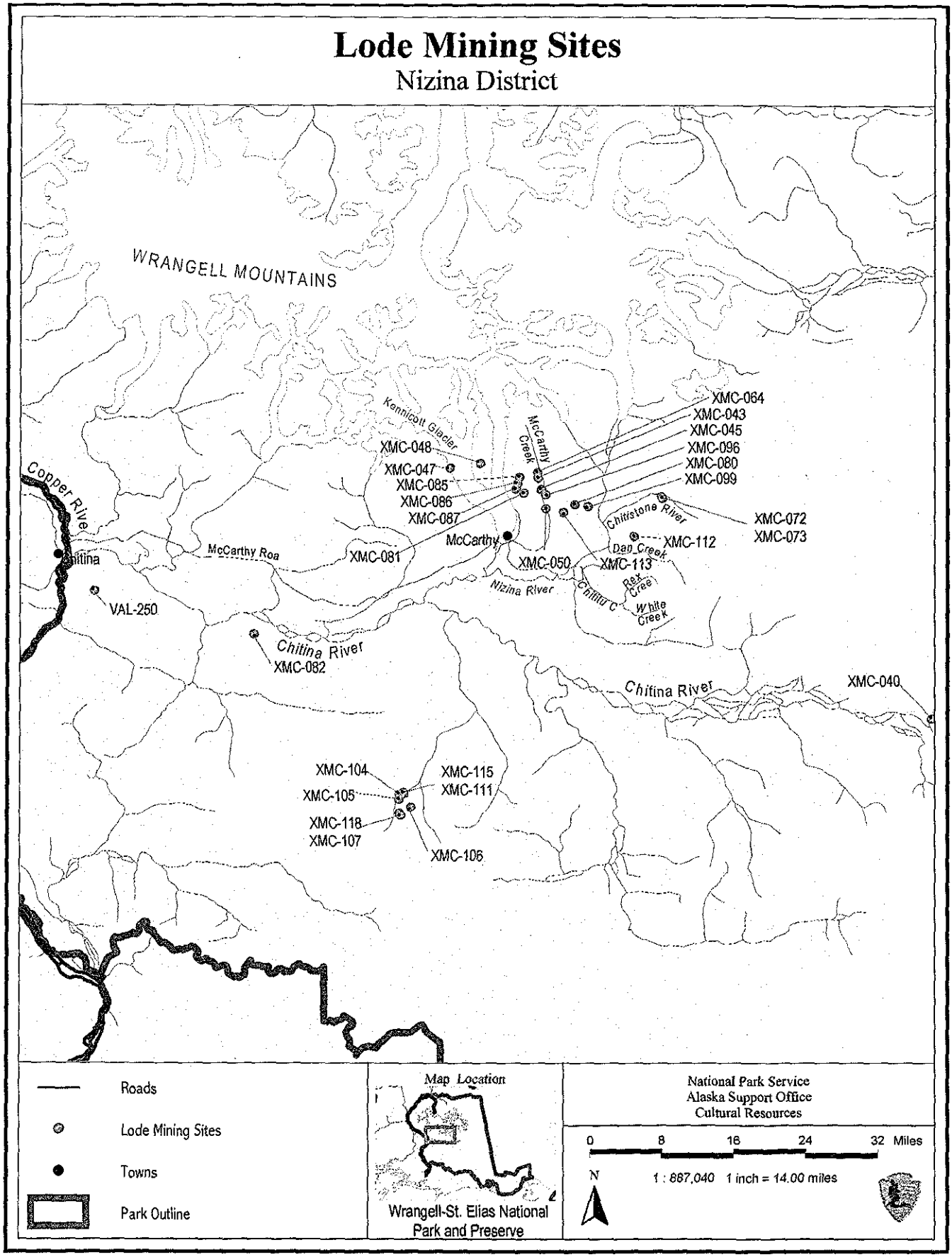

Lode Mining Sites
Nizina District
WRANGELL MOUNTAINS
Kennicott Glacier
McCarthy Creek
Copper River
XMC-064
XMC-043
XMC-045
XMC-096
XMC-080
XMC-099
XMC-048
XMC-047
XMC-085
XMC-086
XMC-087
Chititone River
XMC-072
XMC-073
McCarthy
Dan Creek
XMC-112
McCarthy Roa
XMC-081
XMC-050
XMC-113
Rex Creek
Nizina River
Chititu C
White Creek
VAL-250
Chitina River
XMC-082
Chitina River
XMC-040
XMC-104
XMC-105
XMC-118
XMC-107
XMC-115
XMC-111
XMC-106
Roads
Lode Mining Sites
Towns
Park Outline
Map Location
Wrangell-St. Elias National Park and Preserve
National Park Service
Alaska Support Office
Cultural Resources
0 8 16 24 32 Miles
N
1 : 887,040 1 inch = 14.00 miles

Figure 29.

Table 62

Lode Mining Sites in the Nizina District by Mining Process

Locale	Prospect	Devel/Expl	Ext/Trans	Ex/Trns/Mill	Unknown
Bonanza Ridge			XMC-081 XMC-085 XMC-086 XMC-087		
Bremner Pass			XMC-115		
Boulder Creek		XMC-112			
Chitina River	XMC-040 XMC-082				
Glacier Creek		XMC-072 XMC-073			
Golconda Creek			XMC-106 XMC-107	XMC-104 XMC-105 XMC-111	XMC-118
Kennicott Glacier		XMC-047 XMC-048			
McCarthy Creek	XMC-045		XMC-064 XMC-096		XMC-043 XMC-050
Nikolai Creek					XMC-080 XMC-113
Nizina River	XMC-099				
Taral Creek	VAL-250				

Table 63

Habitation Structures and Outbuildings at Lode Mining Camps in the Nizina District

AHRS #	Structure	Mat'l	Size	Condition	Outbuildings[1]
VAL-250	cabin	log	27.2 m^2	standing	—
XMC-040	cabin	log	14.9 m^2	standing	1 oh, 4 oth
	tent frame	log	11.8 m^2	trace	
XMC-043	tent frame	lumber	9.2 m^2	trace	1 ch, 1 oth
XMC-045	cabin	lumber	22.6 m^2	good	1 sh, 1 oh
	tent frame	log	14.1 m^2	trace	
	tent frame	log	20.3 m^2	trace	
XMC-047	cabin	lumber	unknown	ruins	1 sh
	tent frame	lumber	unknown	ruins	
XMC-048	tent frame	lumber	9.3 m^2	ruins	1 oh, 1 wk, 2 oth
XMC-050	cabin	log	52.3 m^2	collapsed	1 ch, 1 oth
	tent frame	lumber	7.3 m^2	trace	
	tent frame	lumber	<7.3 m^2	trace	
XMC-064	bunkhouse	lumber	204.2 m^2	standing	2 sh, 2 wk, 2 oth
	bunkhouse	unknown	172.8 m^2	collapsed	
XMC-072	cabin	log/plank	32.8 m^2	collapsed	1 sh, 2 oh, 1 ch, 1 wk, 1 oth
	tent frame?	unknown	11.3 m^2	trace	
	cabin	log	31.0 m^2	standing	
	cabin	log	101 m^2	collapsed	
	cabin	log	30 m^2	collapsed	

(continued)

Table 63 (continued)

AHRS #	Structure	Mat'l	Size	Condition	Outbuildings
XMC-073	cabin	log	14.0 m^2	standing	1 oth
	tent frame	canvas	10.2 m^2	collapsed	
XMC-080	tent platform	lumber	unknown	trace	
XMC-081	house	plank	96.8 m^2	good	1 oh
XMC-082	cabin	log	55.7 m^2	good	1 oh, 1 oth
XMC-085	bunkhouse	lumber	321.3 m^2	good	1 oh, 1 wk, 2 oth
	cabin/bunkhse	lumber	387.0 m^2	collapsed	
	bunkhouse	lumber	425.1 m^2	collapsed	
XMC-087	house	lumber	88.4 m^2	collapsed	1 sh, 1 oh
	bunkhouse	lumber	37.8 m^2	collapsed	
XMC-096	bunkhouse	lumber	410.1 m^2	good	4 sh, 5 oh, 1 ch, 3 dgh, 5 oth
	cabin	log	80.2 m^2	good	
	bunkhouse	log	167.4 m^2	standing	
XMC-105	bunkhouse	lmbr/metal	31.4 m^2	good	1 sh, 1 oh, 1ch, 1 wk, 1 oth
XMC-106	bunkhouse	lg/plnk/tin	48.7 m^2	standing	1 oh, 2 wk
XMC-107	tent frame	lumber/canvas	12.9 m^2	good	1 oh, 1 wk
XMC-111	tent frame?	lumber	10.8 m^2	ruins	1 oth, 7 unknown
	cabin	log	20.7 m^2	ruins	

(continued)

Table 63 (continued)

AHRS #	Structure	Mat'l	Size	Condition	Outbuildings[1]
XMC-112	bunk tent	log	21 m^2	ruins	1 ch, 1 wk, 3 oth
	cabin	log	37.5 m^2	collapsed	
XMC-113	cabin	log	9.8 m^2	standing	—
XMC-115	dwelling	lumber/tin	11.9 m^2	good	1 wk
XMC-118	cabin	lg/pole/tin	14.7 m^2	good	2 oh
	cabin	unknown	8 [illegible] m^2	trace	
	tent frame?	canvas/tin	1[illegible] m^2	ruins	
	tent	canvas	4.1 m^2	trace	
	cabin/tent?	log?	18.9 m^2	trace	
	cabin/tent?	log/tin	15.3 m^2	trace	
	cabin/tent?	log/stone	9 m^2	trace	

[1] Abbreviations for outbuildings are as follows: sd = shed, oh = outhouse, ch = cache, dgh = doghouse, wk = workshop, oth = other.

Table 64

Artifact Classes[1] Represented at Lode Mining Camps in the Nizina District

AHRS	BLD	HSHD	PER	SUB	FST	FPR	FSR	TRAN	COM	REC	MTE	MLT	OTH
VAL-250		+			+	+						+	
XMC-040		+			+			+		+			
XMC-043		+			+		+						
XMC-045	+	+											+
XMC-047		+	+		+	+	+	+		+	+	+	+
XMC-048		+								+	+	+	
XMC-050	+	+			+	+		+		+	+		+
XMC-064	nd	nd	nd	nd	nd	nd	Nd	nd	nd	nd	nd	nd	nd
XMC-072		+		+	+	+	+		+		+	+	+
XMC-073		+							+		+	+	+
XMC-080		+	+		+		+						
XMC-081	nd	nd	nd	nd	nd	nd	Nd	nd	nd	nd	nd	nd	nd
XMC-082		+			+			+	+		+		
XMC-085		+	+	+	+			+		+	+	+	+

(continued)

Table 64 (continued)

AHRS	BLD	HSHD	PER	SUB	FST	FPR	FSR	TRAN	COM	REC	MTE	MLT	OTH
XMC-087		+	+		+		+		+				+
XMC-096	+	+	+		+	+	+	+	+	+	+	+	+
XMC-105	+	+	+		+	+	+	+	+	+	+	+	+
XMC-106	+	+	+		+	+	+	+	+	+	+	+	+
XMC-107	+	+	+		+	+	+		+	+	+	+	+
XMC-111		+	+	+	+	+	+	+	+	+	+	+	+
XMC-112		+	+	+	+	+	+	+	+	+	+	+	+
XMC-113		+			+	+		+					+
XMC-115	+	+	+		+	+	+		+	+	+	+	+
XMC-118	+	+	+		+	+	+	+			+	+	+

[1] The abbreviations used for artifact classes are as follows: BLD = building materials; HSHD = household; PER = personal; SUB = subsistence; FST = food storage; FPR = food preparation; FSR = food service; TRAN = transportation; COM = communication; REC = recreation; MTE = mining tools and equipment; MLT = multipurpose tools; OTH = other.
nd= no data

on the hillside. The site features consist of a cabin constructed of crudely hewn logs; a possible barn or stable; tent frame ruins; a collapsed lean-to; a log crib; an outhouse; and a concentration of historic refuse composed primarily of solder-top cans. The ruins of two freight sleds lie adjacent to the cabin group. There is also an NPS-maintained cabin and outhouse located about 50 meters east of the historic remains. An airstrip designated as Hubert's Landing is located on the river flats below the site. This area was first staked as a copper prospect in 1926. Most of the work, consisting of sampling, blasting, and driving drifts in the limestone, was done in the canyon of Margaret creek, just east of the site. Work was discontinued in 1932, and the area only occasionally visited by prospectors since that time. Apparently, no mining-quality ore body has ever been found in this locale (Seitz 1963: 72).

XMC-082 is more than 100 kilometers to the west, on the northern flanks of Nelson Mt. about 3 kilometers south of the Chitina River. This site, the O'Hara lead-zinc prospect, consists of a cabin, constructed of unpeeled, vertical logs, with two shed-style additions to the main room. The attached sheds are built with horizontal logs, saddle-notched on the corners. The cabin is in good condition and still in use during the 1970s and 1980s, probably as a base camp for hunting or trapping. Many of the artifacts in the cabin, such as mining tools and domestic and cooking items date to the historic use of the cabin. A 1932 calendar on the cabin door advertises, "C.T. O'Neil Merchant, McCarthy, Alaska," and a packing crate reads "Jack O'Hara, McCarthy, Alaska via Chitina." A sled with steel runners is propped up near the cabin door. The picnic tables and shower stall built of plywood date to the more recent use of the cabin. Three adits were driven at the O'Hara prospect in 1940, but they did not reveal a mining-quality ore body (Berg and Cobb 1967: 64).

VAL-250 lies still farther to the west, near the headwaters of Taral Creek at an elevation of 3,500 feet. The site consists of a one-room, partially collapsed log cabin built on a rock foundation and roofed with milled lumber covered with canvas. The cabin corners were constructed with a variety of notching styles, including saddle, diamond, and tenon. The craftsmanship used in constructing the cabin is also seen in the interior, where several pieces of homemade furniture, such as chairs, tables and framed bunkbeds, are found. A scatter of cans inside the cabin includes a Hills Bros. Red Can Brand with a 1915 date. This cabin is associated with the Blackney copper prospect, which is said to have been thoroughly prospected since the early 1900s (Berg and Cobb 1967: 62).

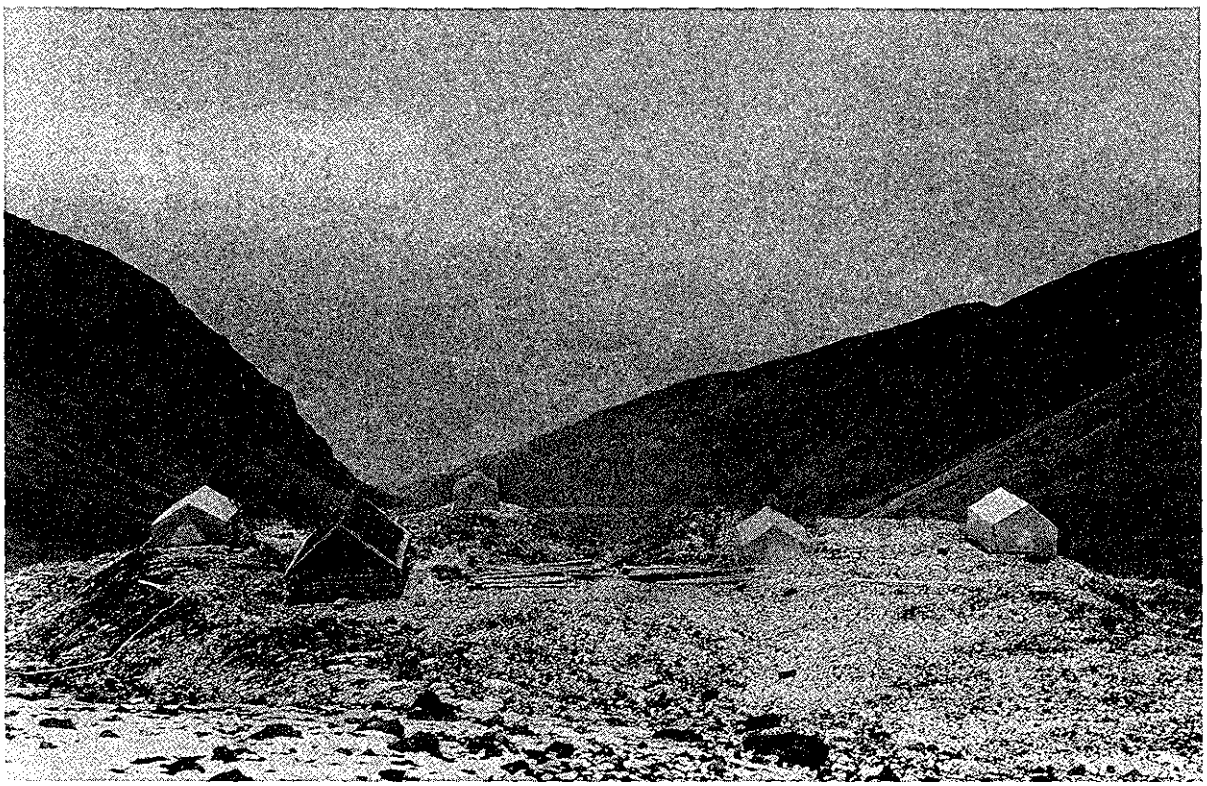
Another prospecting site, **XMC-045**, is located on a level terrace along the west side of McCarthy Creek, below the lower Green Butte Mining Camp. Features at the site include milled lumber cabin with a false front and two tent frame ruins, as well as a new outhouse and shed. The false front to the cabin is apparently an end wall of an earlier structure that was incorporated into the existing building. This cabin is surrounded by a log foundation that is probably associated with the earlier structure. The roof of the cabin is covered with flattened Blazo cans. The camp lies on the Big Ben millsite, claimed by Neils Tjosevig in 1923 and patented in 1928. In addition to the millsite, Tjosevig staked six copper lode claims. The material excavated from one of the tunnels appeared to have little copper mineralization according to one geological report. This 1946 report also indicated that little or no work had been done on the claims since they were patented (Miller 1946: 104-105). The remnants of the early structure and the false front to the standing cabin probably date to Tjosevig tenure at the site, while the date and builder of the reconstructed cabin are not known.

The last prospecting site is **XMC-099**, located about 2.4 kilometers southeast of the Nikolai Mine, on a steep cliff above the Nizina River. The site consists of three adits lying at an elevation of approximately 5,000 feet. Equipment and miscellaneous machine parts are stored just inside the mouth of the two lower adits. There is also a large scatter of cached equipment, including machine parts, lumber, shovels, drill bits, a small Ingersoll-Rand compressor used for supplying power to a hand-held drill, and explosives on a narrow bench just upslope from the adits. Two other caches of equipment were found farther upslope. It appears that this was a small operation dating to the 1950s or 1960s. The tailings deposited outside the adits have now eroded down into the drainage below. The geological literature indicates that a small chalcocite-rich deposit was found in this area and was explored by two short adits. The claim appears to have been work by Henry Schulze (Schultze) during the 1950s (Holdsworth 1959: 65; MacKevett 1976).

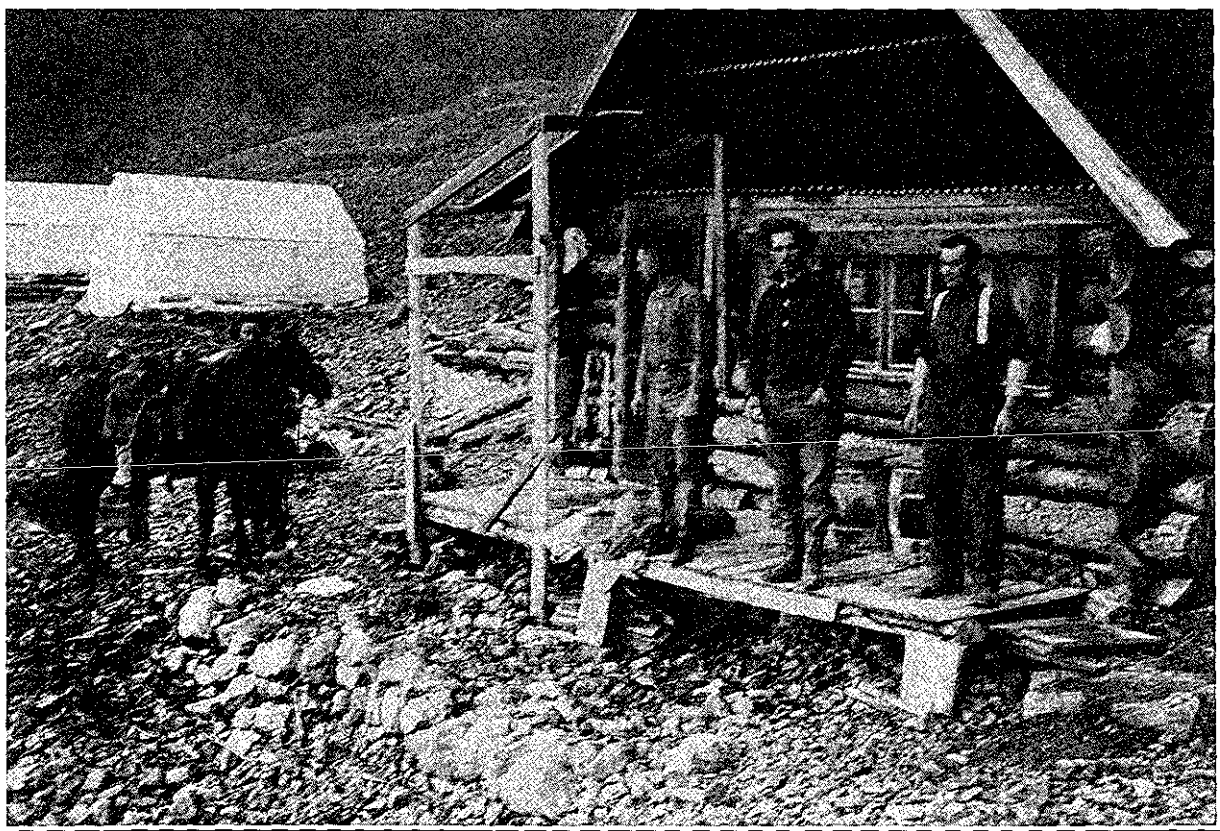
Exploration and Development. Sites in this category are located on Boulder Creek, Glacier Creek, and adjacent to the Kennicott Glacier. One of the most interesting of these sites in terms of its preserved artifact assemblage is **XMC-112**, the Westover Prospect, lying at 4,600 feet on a rock glacier on the east side of Boulder Creek. The prospect was linked to the road on Dan Creek by a 5-km pack trail. The camp features consist of a partially standing log cabin and the foundation remains of four tent frames. Three mine adits, located near the base of canyon about 250 meters from camp, and a nearby blacksmith shop were not completely recorded by the CRMIM crew because of their hazardous conditions. All the structures on the site were damaged by heavy snowfall and probably by avalanches.

The Westover prospect, associated with a Kennecott-type copper deposit, was initially staked in 1906 by the Alaska United Copper Exploration Company, and later transferred to a subsidiary of the Alaska Westover Copper Company. These companies opened more than 1,400 feet of underground workings on the property from 1911 to 1930 when it was abandoned. Some ore was shipped to the smelter in the winter of 1917-1918. Six claims in the Westover group were restaked in 1936 by J. B. O'Neill, but little or no work was done by him or in subsequent years (Miller 1946: 108). The lode mine is also photographically documented in the Milnor Roberts Papers, housed in the archives of the University of Washington library.

The partially standing log cabin at the site probably served as the headquarters, kitchen, and dining room of the camp. An extensive domestic artifact assemblage remains relatively undisturbed inside. Included in the inventory are timepieces and watch fragments, as well as numerous medicinal powders and unguents, primarily for tooth care. It seems that dental hygiene was important to the people who once lived at the camp, as there are several toothbrushes, neatly aligned in a handmade holder, immediately inside the front door of the cabin. Also found in the structural collapse were the remnants of a black corset with metal stays and garters. The four tent frame ruins are delineated by plank floors, deteriorating sill logs, vegetation outlines, and artifact concentrations. These features appear to represent living quarters (a bunk tent), storehouses, and a stable. Although the entire site area is covered with a dense scatter of historic artifacts, including bottles, cans, clothing and mining-related tools, and explosives, the major accumulation is in two gullies that run through the camp. The 1906-1930 occupation documented historically is verified by newspaper fragments and diagnostic bottles and cans still found at the



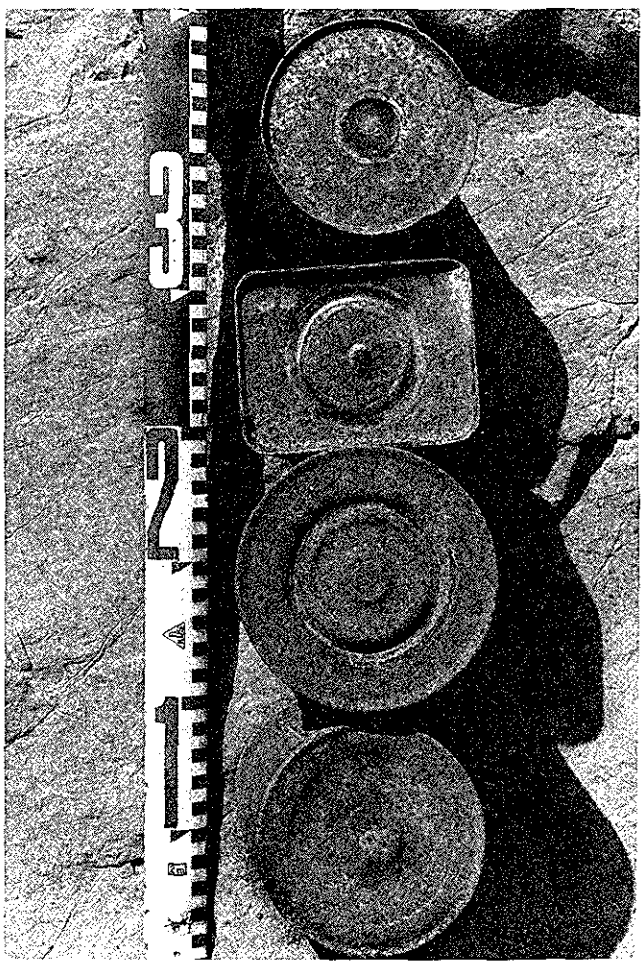
Historic Westover Prospect looking southwest down Boulder Creek showing the camp. The bunk tent is at left; and to its right are the cabin, stable tent, store tent, and cache tent. The canvas hose on the left brought water to the camp (above).
Miners on the front porch of cabin in 1916 (below).
(University of Washington, Milnor Roberts Collection 16113 and 16121)





Westover Prospect on Boulder Creek in WRST.

(Above) Collapsed cabin at XMC-112, with adits on the rock face in the background.



(Left) Solder-dot cans from Feature 6 of XMC-112.

site, which appears to have not been greatly disturbed by post-abandonment artifact collecting.

Development and exploration were also carried out at the Nelson prospect, **XMC-073**, located on Glacier Creek, about 1.5 kilometers from its confluence with the Chitistone River. The site, lying at about 3000 feet in elevation, is composed of mining and domestic features dating to the late 1920s and early 1930s, as well as some more recent diamond drilling machinery and core sampling boxes. Five adits and their associated tailings piles extend across the site in an east-west direction. Mining equipment found near the adits are the ruins of a windlass, a revolving ore-dump car for hand tramming, a compressor housing, and a pipe scatter. There is the foundation of a blacksmith shop on a terrace below the adits, and an old telephone line that runs along the side of one of the large tailings piles. A small standing log cabin and a collapsed tent frame lie on either side of one of the collapsed adits. Domestic items, such as Hill Bros. coffee cans and bedsprings, are still found in these structures.

Lying some 400 meters downstream from the prospect is **XMC-072**, the Nelson Camp. The site consists of four collapsed log cabins, a possible tent depression, the ruins of a blacksmith shop (possibly log), two collapsed outhouses, a cache, two log piles, a frame shed for hanging meat, a board walk that connects the cabins, and a prospect pit composed of a circular depression with hand-stacked rocks. The cabins all appear to have been well built; one of them is one-and-a-half stories high, while another is colorfully painted with white on its threshold and red as window trim. Newspaper scraps dating to 1945 are found in this cabin. Another of the cabins has boarded-up windows and boxes inside, suggesting a planned withdrawal from the camp. A creek that flows through the middle of the site is spanned by a bridge associated with an old road running parallel to the south side of the cabins.

These two Glacier Creek sites are associated with Charles A. Nelson, who staked claims on the creek in 1928. The Kennecott Copper Corporation took option on the Nelson prospect in 1929 and began construction of five exploratory tunnels, totaling 1,100 feet in length, with a crew of 12 men. The crew lived in the camp downstream, which was reported to have five substantial log buildings. The tunnels failed to disclose a large enough ore body to be profitably mined, so the claims were returned to Nelson in 1930. He continued to develop his claims during the 1930s and 1940s, but leased them to the Alaska Copper Company in 1951. The company conducted diamond drilling at the prospect site for only two seasons (Stewart 1934: 90; Miller 1946: 110-111; Ransome and Kerns 1955: 82; Buzzell 1988f). The drilling equipment found at XMC-072 was presumably abandoned at the site because of the expense of removing it.

The two other development and exploration sites are east and west of the terminus of the Kennicott Glacier. **XMC-047** lies to the west, close to the southeast shore of Hidden Creek Lake. The site consists of two loci lying about 425 meters apart along an old trail on the western edge of the glacial moraine. The trail continues southward approximately 15 kilometers to the railroad near McCarthy. Locus A consists of the ruins of a cabin and tent frame, a stack of light rail, two mine cars, stacks of drill steel, and a diverse array of scattered artifacts. The ruins of a powder house lie to the north at Locus B. The frame cabin at Locus A was probably an all-purpose building that served as a kitchen and perhaps storehouse for tools. The ruins of the tent frame, which may have also served as a cache, also contained a stove and kitchen gear, along with solder-top cans. Among the

artifacts found at Locus A are a forge, cobbler's tools, horseshoes, barrels, shovels, picks, cooking utensil, and a bone-handle toothbrush. Only one standing wall remains of the powder house at Locus B. The area below the house is heavily strewn with old explosives; cases of explosives are also found on the floor of the structure. North of the powder house, the trail begins to switch back up the mountain to the copper mine above.

Claims were first staked along the limestone-greenstone contact at Hidden Creek in 1906 by the Great Northern Development Company and the Valdez Exploration Company. The following summer, work crews began building the trail along the glacier and prospecting the claims. At that time, the camp was located on the west side of Hidden Creek Lake, about 4 kilometers from its present location (Moffit and Maddren 1908: 158-159). The Hidden Creek claims were later purchased by the Tjosevig Bros., who relinquished their ownership to the Josevig-Kennicott Corporation sometime around 1915-1916. The latter company proposed building a tram over the mountain south of Hidden Creek and down along the Kennicott Glacier as a means of transporting ore to the railroad (Moffit 1918: 162-163). Apparently, the tram was never built and no ore was shipped, but development work did continue on the claims until 1920 or later (Miller 1946: 119). It is unknown exactly when the camp was moved to its present location, but the archeological remains suggest a date of around 1920.

To the east of Kennicott Glacier, on the southern flank of Donoho Peak is the Regal Mine, **XMC-048**. The site is at 5,440 feet in elevation on an artificial stone terrace constructed below a limestone cliff. Two tunnel portals have been drilled, probably by hand, into the cliff face. On the terrace, in front of the portals, are the remains of a horse-drawn whim, with a 3.5-m draw bar and 24-inch gauge track laid out to transport mine waste from the shaft to the dump. Associated with the whim is a bridge, which would have allowed a horse, circling around the pivot point, to cross, and not disturb, the hoisting cables coming up from the mine. Immediately to the west of the portals is an open cache of old explosives. Some of the explosives and a small rock fall partially cover an unidentified piece of equipment. At the eastern end of the terrace are the ruins of five wood frame structures - an outhouse, a tent frame, an all-purpose structure with blacksmith equipment, an assay lab, and a possible kitchen. Two short prospect tunnels are located approximately 100 meters east of the terrace. To the west of the terrace is a stone platform, which possibly served as the foundation of a tent frame or supply cache. The mine dump and a trash scatter lie below the terrace.

The Regal group of 17 claims was owned by a subsidiary of the Great Northern Development Company, known as the Regal Mines Company. Development work carried out at the mine from 1910 to 1925 consisted of two inclines and three tunnels, but it does not appear that any ore was ever shipped to market. Supplies for the mine were brought to a point about 5 kilometers above Kennecott and then sledded or packed across Root Glacier (Moffit 1918: 163). The structures at the mine were determined to be uninhabitable by 1943 when it was visited by USGS geologist Don J. Miller (Miller 1946: 101).

Extraction and Transportation. The nine sites in this category represent the operations at only three mines or mine complexes: five of the sites are associated with the Kennecott Mine complex, one with the Green Butte Copper Mine, and three with gold mines once held by the Yellowband Mining Company in the Bremner area of the district. Each of these sites provides an example of an operation taken beyond development and exploration to the production stage of mining. The five Kennecott sites, described below,

are part of a huge mining complex, recognized as a National Historical Landmark in 1986 and purchased by the National Park Service in 1998. The Kennecott National Historical Landmark, determined to be the best remaining example of an early twentieth century copper camp in the country, includes the former milltown of Kennicott; the mine camps of Bonanza, Jumbo, and Erie; and the tramway system connecting the mines with the mill. A great deal of historic, architectural, and engineering work has been done to document the extensive inventory of buildings, structures, and other features in the Landmark (e.g., Pierce and Spude 1986; Spude and Faulkner 1987; Sullivan and Shoemaker n.d.; Ludwig and Ream 1995), particularly since its acquisition by the National Park Service. The buildings listed in Kennecott's inventory are: the concentration mill, leaching plant, machine shop, power plant, steel and sack storage shed, electric shop, tramway system with related structures, four mines with related structures, dairy barn, storage building, tent cottage, 21 cottages, apartment house, recreation hall, school, company store, carpentry shop, sauna, two bunkhouses, hospital, assay office, depot, general office, and miscellaneous ruins.

The five sites recorded by CRMIM crews all pertain to the mines, aerial tramway system, and their related structures (figure 30). The system, built between 1908 and 1920, included five trams, three of which transported ore to the mill located at the railhead, one that mainly served to deliver supplies to the Erie Mine, and another that ran from the Mother Lode Mine to a camp below. The two longest segments of the system, each 4.9 km long with a capacity of 600 tons of ore per day, connected the Jumbo and Bonanza Mines with the mill. One segment, 1.7 km long, was a spur from the Jumbo tram junction station to the Glacier Mine, an open cut on the lateral moraine between the Bonanza and Jumbo Mines. Another component of the transportation system at Kennecott was a series of underground haulage tunnels linking the Mother Lode and the Erie Mines to the Bonanza and Jumbo trams. The longest of the tunnels was the 3.7-km Jumbo-Erie crosscut (Spude and Faulkner 1987: sheets 2 and 3).

Three of the Kennecott sites are located on the Bonanza Ridge tramline from the Jumbo Mine to the junction station with the Glacier tramway. Lying at the top of the line in a rocky cirque 5,500 feet in elevation is **XMC-085**, the Jumbo Mine. The mine began active production in 1913 and continued to operate until 1938, giving it the distinction as the most productive of the Kennecott Mines. Several adits, still discernible at the site, are associated with the Jumbo Mine. Only the aboveground features of the mine were recorded by a CRMIM crew, since the mine works and features, such as the tram motor and loading stations, are located underground. Thus, it is difficult to visualize the tramway system in its entirety. At the Jumbo Mine, ore was loaded below the ground surface and brought up in cars via cables that emerged at an aboveground tram station. This feature, along with a wooden bunker, remains at XMC-085. The ore would then be moved along the tramline to the nearby breakover station, a large wood frame structure that supported the weight of the cables before the tramline plunged downward to the next station (Logan Hovis 1996: personal communication). The breakover station and connecting cable are also intact at the site. The original Jumbo tramway was completed in 1915, but was destroyed by snowslides in 1919 after which the loading station was moved underground (Graumann 1977a: 60).

The other structures at the Jumbo Camp include three bunkhouses; a blacksmith workshop; three avalanche barriers; a powerhouse and steam plant; a collapsed tramway

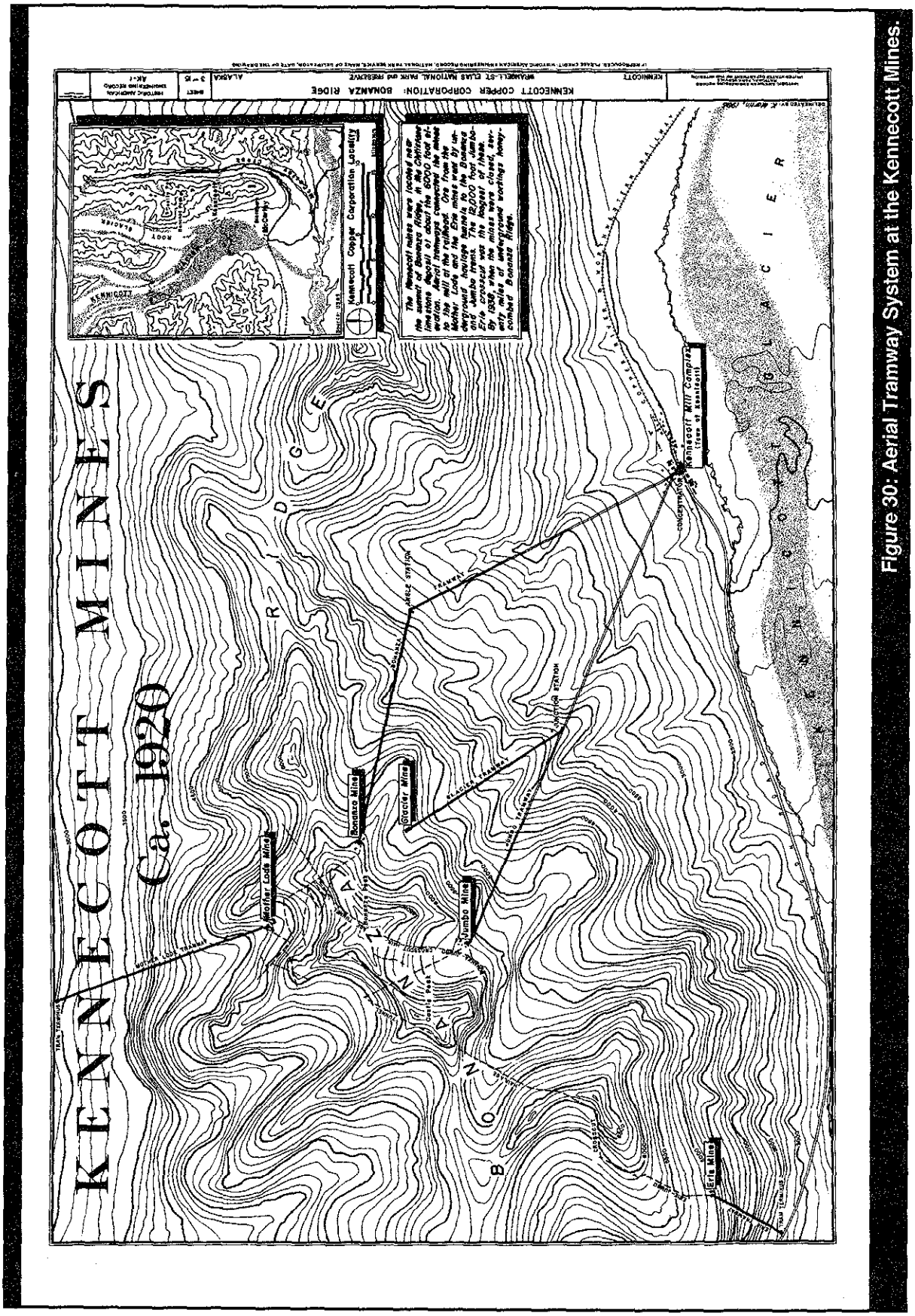


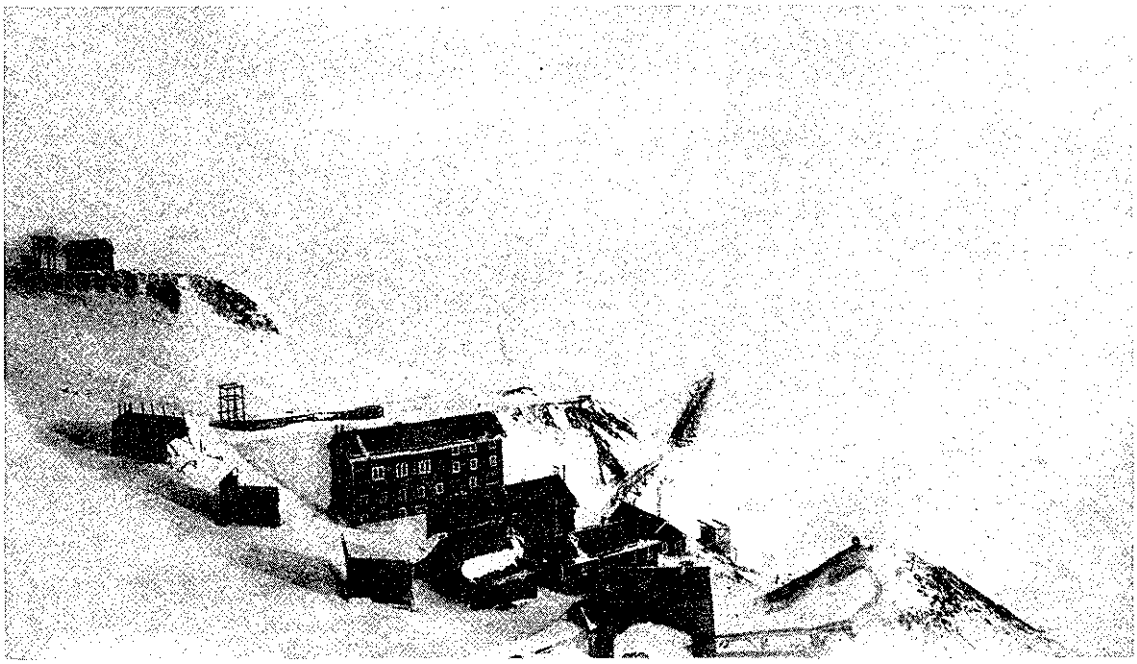
Figure 30: Aerial Tramway System at the Kennecott Mines.

tower; an outhouse; and two structural ruins. At least one bunkhouse and the blacksmith shop were constructed at the same time as the original tramway in 1915. The milled lumber bunkhouses are quite large; one is three stories high and the others are both two high. In the three-story bunkhouse, the first floor was used for bathing, while the second and third floors held the bedrooms. These floors each had 11 rooms, which could accommodate between two and four men per room. The bunkhouses and other buildings at camp were equipped with electricity as evidenced by the electric poles and the ceramic insulators scattered around the site (Graumann 1977a).

The continuation of the tramway from its upper terminus at the Jumbo Mine down to the junction/transfer station with the Glacier tramway has been designated as **XMC-086.** This site extends approximately 2,100 meters and is composed of a linear arrangement of tramway features, including a breakover station, an anchor-tension station, and six towers (three are standing and three are collapsed). This double-rope, aerial tramway system has two stationary cables that support the load and two endless traction cables that propel it (see chapter 2 for a discussion of tramway operation). At the upper end of XMC-086 is a cutbank excavated into the glacial till to allow for clearance of the tram cars. The next feature downslope is the breakover station resting on a bedrock ledge. This heavy timber structure was equipped with a telephone box that still appears to be in working order (the crank turns and the bell rings!). At one of the collapsed towers farther downslope a number of cans and the remnants of a tent platform in the wreckage, which suggests that a temporary camp was established for the construction or maintenance of the towers. Farthest downslope is a standing tower supporting the cables before they cross Jumbo Creek.

Still lower on the tramline is **XMC-087** at the Jumbo-Glacier tramway junction. The site consists of the junction station, a transformer tower, the operator's house, a collapsed bunkhouse, an outhouse, and the ruins of a structure that may have been a shed. The tram junction station is a three-level structure of heavy timber construction, built in two stages. The original structure, built in 1913 as a support feature for the Jumbo Mine, is oriented on a north-south axis. The Glacier Mine addition, aligned on the original structure at an oblique northeast-southwest angle, was constructed in 1920. All the major heavy equipment associated with the braking system and electrical control mechanisms for the tram, as well as the weight boxes for the traction cables, are in place on the ground floor of the Jumbo station. The main working floor above contains all the equipment necessary to detach mine cars for their trip down to the mill and a repair shop. This equipment includes various overhead tracks to support cars being transferred as well as a curved track to load ore from the Glacier tram terminal, automatic attachers and detachers, automatic grips for supplying tension to the cables, etc. The Jumbo portion of the station operated until the mines closed in 1938, while the Glacier tram was partially dismantled at an earlier date. The roofs of both sections of the structure have collapsed.

The operator's house is a finely detailed, well-preserved, two-story structure. It is constructed of horizontal siding with white-painted trim. The original shingle roof has been covered with corrugated metal roofing. There is a brick chimney on the north wall. The first floor has a kitchen, complete with counters and cabinets, an entryway, a corner room, and a main room with wainscoting and a staircase to the upper floor. There are three bedrooms on the second floor. At the time of site recording, 1922 company records pertaining to labor and supplies were found in the main room of the house. A number of



Historic photo of the Jumbo Mine and associated buildings 1923-1925.
(*Anchorage Museum of History and Art, Surgenor Collection B72.32.278*)



The Jumbo Mine site (XMC-085) in 1987.

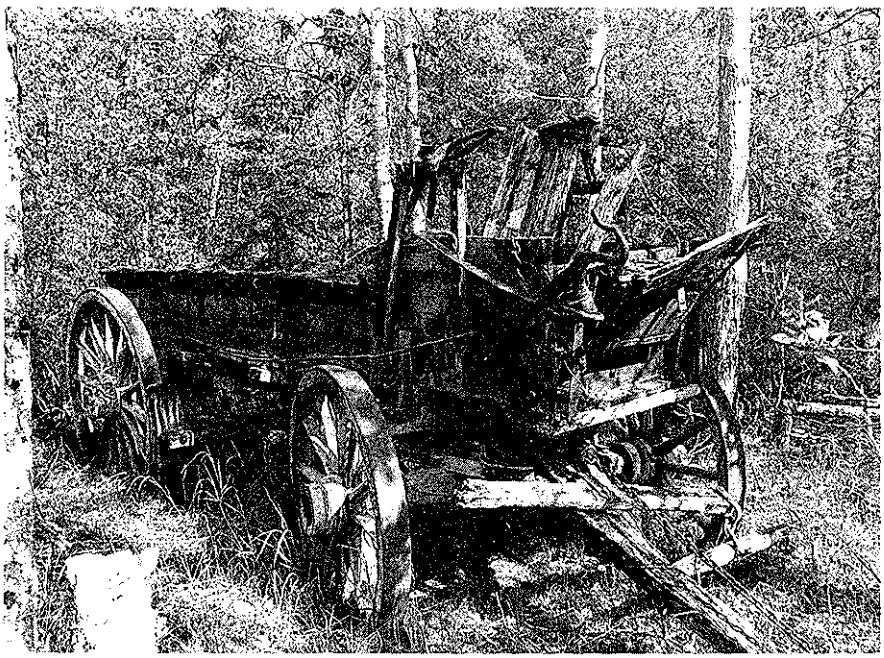
artifacts were also found in the operator's house, but few date to the Kennecott occupation. The other structures at the site have all collapsed.

The fourth Kennecott site is **XMC-081**, the Bonanza tram angle station, which lies on a ridge between National and Bonanza Creeks. As its name implies, the site is located at the angle or junction between the upper and lower sections of the aerial tramway that connects the Bonanza Mine with the mill. The site contains an angle station, a breakover station, portions of the tramline, an operator's house, an outhouse, and a boardwalk. The angle station was originally built in 1908, but burned down and was rebuilt a few years later. The machinery was replaced in the late 1920s. It is four stories high, with a machine room layout similar to the one described above for the Jumbo transfer/junction station. While the roof has collapsed, the work floor level still contains most of equipment associated with the tram, such as the cable weights and ball wheels, attachers and detachers, tram cars, and cable tensioner. The breakover station, constructed of an open timber framework, is connected to the angle station by a wooden walkway, which is braced with metal and free hanging. The two-story operator's house is in good condition and similar in construction and style to the other Kennecott residences in the mill area. It is built of horizontal siding, painted red, and has a covered porch at both entries. At the time of site documentation, the residence was still in use and was padlocked.

The final Kennecott site is **XMC-064**, the Mother Lode Camp and lower tramway station, located on McCarthy Creek. The tramway connected the camp with the Mother Lode Mine lying above on Bonanza Ridge. The features at the site include the tramway terminal, a bunkhouse, a collapsed bunkhouse and kitchen, two sheds, the ruins of a building with a standing chimney, three recent buildings, a diamond drill and a "D-5" caterpillar tractor. The tramway equipment was housed in the superstructure of the terminal, which was counterweighted with hanging wooden bins filled with rock. Some cable is still visible, lying across McCarthy Creek, and decaying burlap sacks are near the terminal. The structure was built by the Mother Lode Company sometime before 1913 when the first ore shipments were made from the mine. After the ore was transported from the mine down to the lower terminal, it was bagged and hauled over the ice and snow of McCarthy Creek, and later the McCarthy Creek wagon road, to the railroad (Moffit 1918: 175; Smith 1917: 38).

In 1919, there were severe snowstorms in the area causing destruction of this tramway and of the powerlines. In order to finance the repair work and further exploration, the Mother Lode Company struck a deal with the Kennecott Corporation, and the mine eventually became a subsidiary of the larger corporation. After the negotiations were complete, crosscut was driven at the 1,200-foot level underground, connecting the Bonanza and Mother Lode Mines. All the Mother Lode ore was then hoisted through the Bonanza shaft, and transported to the mill over the Bonanza tramway (Douglass 1964: 9). The question of whether the historic buildings at the site date to the post-1919 Kennecott tenure at the mine or to the earlier period when it was being operated by the Mother Lode Company must await further historic research. The more recent structures at the site date to the 1960s or early 1970s when diamond drilling was being done in the area.

Located approximately four kilometers south of the Mother Lode Camp on the McCarthy Creek Road is the lower camp of **XMC-096**, the Green Butte Mine. The site is actually composed of two non-contiguous clusters of structures, the lower camp situated on the east bank of McCarthy Creek and the upper camp lying some 2,000 feet higher on the



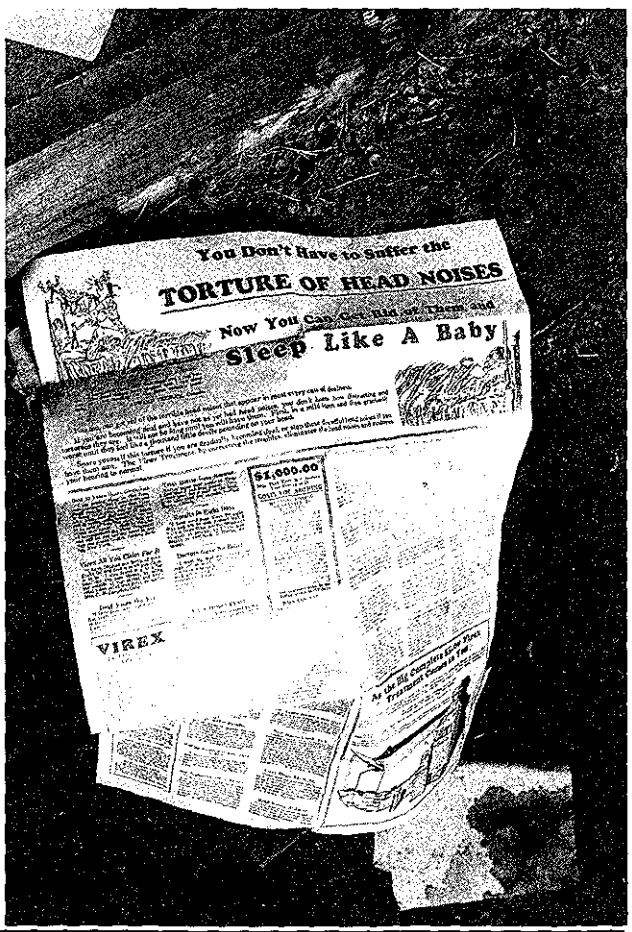
Green Butte mine (XMC-096) in WRST (photos this page).

Freight wagon at the lower camp on McCarthy Creek.

Portal shed adjacent to the upper mine adit.



Advertisement found on the third floor of the bunkhouse at the upper camp.



face of Green Butte. The mine adits, the upper tramway terminal, a bunkhouse, and a variety of outbuildings comprise the upper camp, which was the focus of CRMIM documentation. One of the outbuildings, lying adjacent to the upper adit, is a partially collapsed portal shed, consisting of a blacksmith shop, a compressor room, a warehouse, and a storage area between the building and the rock cliff face. Items such as compressed air hoists and drill steel were in the warehouse; tramway hangers, one with an attached carriage, a portable metal forge, and carbide generators were recorded in the storage area. A wooden frame forge and blacksmith tools are among the items recorded in the blacksmith shop. The major piece of equipment in the compressor room is an Ingersoll-Rand air compressor, labeled as "Imperial Type 10," that remains in excellent condition. A detailed inventory of most of the equipment in the portal shed is available in the XMC-096 site file.

Other outbuildings at the upper camp are a woodshed, a corrugated metal stable and shed, an outhouse, a meat cache, and another shed attached to a covered stairway from the second mine adit to the bunkhouse. The bunkhouse is a three-story frame structure with a kitchen on the ground floor, seven individual bedrooms on the second floor, and two communal bunkrooms on the third floor. The kitchen contains enamelware and assorted pieces of white china manufactured by "J & G Meakin/ Hanley England." One of the bedrooms on the second floor, probably the manager's living quarters, contains a large drafting table covered with papers detailing map coordinates and elevations for the mine. Fifteen beds, one double-sized, are in the third-floor bunkrooms. There are also papers that contain information about the mine's night shift and an advertisement for "rattlesnake oil," with the claim that it will rid people of the "torture of head noises." Payroll slips and 1920s pinups are among the other artifacts found in the bunkhouse. Also a can dump, containing more than 1,000 cans visible on the surface, lies just downslope from the bunkhouse.

The lower camp comprises

- a log bunkhouse with collapsed roof
- another log residence
- two outhouses
- a woodshed
- the ruins of four outbuildings
- a standing outbuilding used as a bathhouse
- a log stable and five wagons
- a sawmill
- a corrugated metal shed
- the lower tramway terminal and collapsed tram supports
- three doghouses
- an electric pole with a fallen electric line that connected the lower and upper camps
- and the ruins of a log warehouse filled with artifacts.

Artifacts inventoried in the warehouse include ore bags, a plow, wheels, mining equipment, and dynamite (National Park Service 1986b).

The Green Butte claims were originally staked in 1903, by John E. Barrett, who was also an owner and developer of the Mother Lode Mine. After the sale of the Mother Lode to the Kennecott Corporation, Barrett formed the Green Butte Copper Company with his earnings and the backing of outside investors. When the price of copper stabilized in 1922, the company proceeded with development of the Green Butte Mine. By 1924, the

company had constructed the tramway from the mine to the lower camp and a bunkhouse that housed approximately 50 miners. The other structures recorded at the site probably also date to the early 1920s, as all operations ceased at the mine in 1925. During its short three years in operation, the mine produced 1,500 tons of high-grade ore (Miller 1946: 103; Spude, Taylor, and Lappen 1984: 138), which was presumably hauled down the McCarthy Road to the railroad and hence on to the smelter. Although the owners of the Green Butte Mine had hoped that the price of copper would eventually rise to its pre-World War I level, it stayed low and the mine was not reopened. In the years that followed, the Green Butte Mine has been spared rampant vandalism because of its inaccessibility and has remained much as it was during the 1920s. "Much of the Green Butte today appears as if the owners had just closed the doors intending to return the following season" (Spude, Taylor, and Lappen 1984: 138).

The extraction and development sites recorded in the Bremner area of the Nizina District are the Grand Prize Mine, the Yellowband Mine, and the Sheriff Mine. **XMC-115**, the Grand Prize Mine, was the first underground workings opened in the area in 1931 by the Ramer Brothers, who later formed the Bremner Mining Company. The site consists of two non-contiguous loci - the lower mine is located at about 4,500 feet elevation and the upper mine at more than 6,000 feet elevation on steep talus slopes west of Golconda Creek. Only the lower mine was visited by a CRMIM crew. Features that comprise the site are a mine adit with a collapsed portal structure, a workshop, a tram loading station, a waste rock pile, and living quarters. Although the adit was filled with snow and ice at the time of survey, a wooden collar and a wall of hand-stacked rocks were still visible at the portal. Eighteen-gauge rails extend from the adit and fork immediately outside the portal. One set continues to the spoil pile, and the other to the tram station.

The station, supported by hand-hewn beams, was a loading area for a double reversible (jig-back) tramway that operated two cars. One mine car, the cables, and a brake assembly fixed to the main sheave remain at the structure. There are also tram tower remains and pulleys located downslope from the station. There is no evidence of a power source for the tramway, which suggests that it ran on gravity, i.e., the weight of the loaded car moving downward would raise the empty car up to be filled. This tramway, installed in 1934 or 1935, connected the terminal with the concentrating mill some 2,500 feet below (see description of XMC-104 below). There was also another tramway connecting the terminal to the upper portal of the Grand Prize Mine (Moffit 1937: 101). A cable from this upper tramway is still at the site. The mine produced 500 tons of ore before the mine was passed over in favor of development on the Lucky Girl vein (see XMC-105), also owned by the Bremner Mining Company, in 1936. Both of these mines were acquired by the Yellowband Gold Mining Company in 1938 (Hovis 1990d: 9), although it is not known whether the Grand Prize Mine was further developed by them.

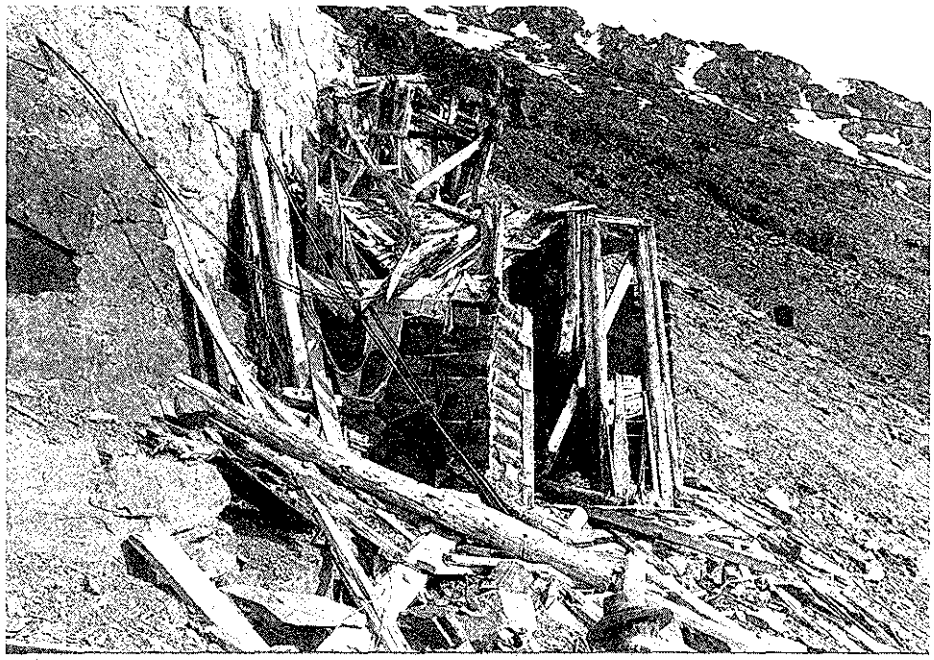
Adjacent to the mine portal at XMC-115 is a building, sheathed in tin, that doubled as a workshop and living quarters. The roof, now partially collapsed, is "laminated" with layers of poles, galvanized roofing tin, dimensional lumber, and log slabs. While much of the interior of the workshop was covered under a snow load during the site recording, it appeared that the contents had not been disturbed since the site was abandoned. Among the artifacts inside are a wooden forge box, a hand-cranked blower, sections of drill steel with chisel bits, and a variety of small tools. The room to the east was the living quarters, which contained a small Yukon stove; bunkbeds and other household furniture; enamel-

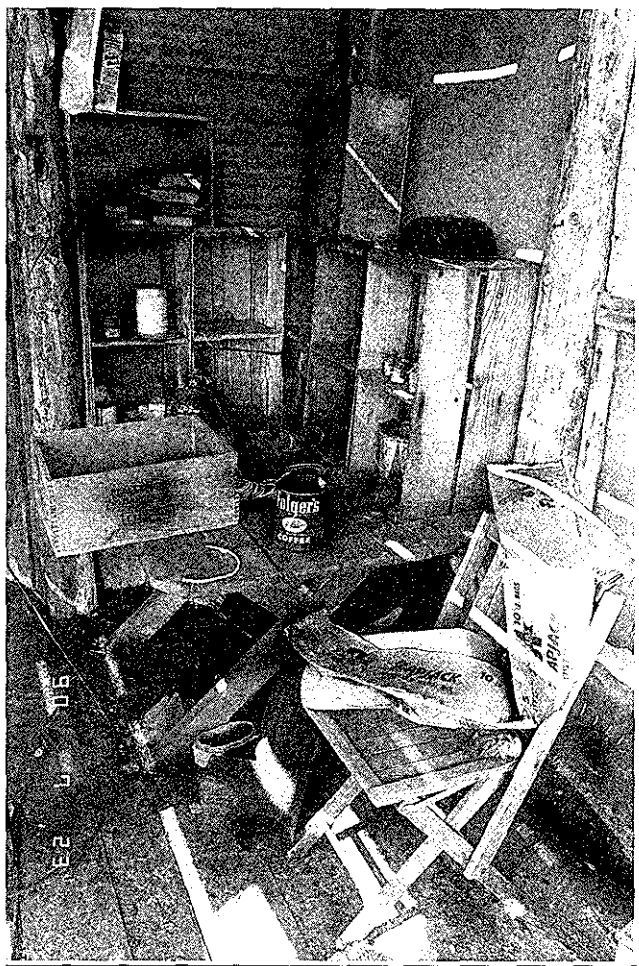
ware and other kitchenware; Hills Bros. Coffee and assorted other cans; various magazines and catalogues dating from 1933 - 1936; and a *Cordova Daily Times* dated February 28, 1936.

The Sheriff Mine, **XMC-106**, is located on the Yellowband Group of claims, east of Golconda Creek and about 2.8 kilometers southeast of the lower Grand Prize Mine. The mine is perched on a narrow ledge, at 6,000 feet elevation, that is adjacent to the steep scree slope of a large cirque. It is one of the few CRMIM lode mine for which both aboveground and underground surveys were completed. There are three adits at the site, along with a cookhouse/bunkhouse, machine shop, blacksmith shop, outhouse, and other mining equipment. The three adits, partially blocked by snow or rockfall, provide entrance to the mine workings, which consist of five crosscuts and three drifts. During the underground survey in somewhat icy conditions, the crew identified several clusters of artifacts and ground supports, which include stopes with ladders and staging and with capped raises; drills, drill columns, and powder boxes; ore cars and a pressure tank enclosed in ice; track ties and spikes; timber storage; tools; a cable spool; and various sets of stulls. Above ground, there is a set of narrow-gauge rail track that exits from adit #2 and extends to a platform by adit #1 where non-ore rock was dumped. In front of adit #3, there is a roofed area with a variety of hardware, fuel drums, a grizzly, the bed of an ore car, cans, wire, and so on. There is also a 2-m-long boiler, with cables and attached drills, and a small winch in the vicinity.

The tram station, with attached shed and powerhouse, is located just below this assortment of equipment, and anchored onto the bedrock with heavy cable. The workings of the tram are still in place and attached to cables extending down to a lower terminal at the bottom of the cirque. The shed contains a motor (possibly for the air compressor), an Ingersoll Rand air compressor, a Caterpillar engine, spools of cable, coils of electrical wire, and heavy shifting levers. Two other structures associated with the operation of the mine are the machine shop (or dry room), covered with flattened fuel drums and corrugated tin, and the blacksmith shop, constructed with an open log frame. In the wide assortment of tools and hardware in the machine shop is a barrel with "Yellowband Gold Mines Valdez AL" stenciled on it. The shop was wired for electricity, and there is an electric transformer with circuit breaker in one corner. A forge, a blower with galvanized hood, blacksmith tools, and miscellaneous hardware are in the blacksmith shop.

The crew at the Sheriff Mine lived in a two-room structure, known as the Cliff House. The building is perched on a ledge, with a rock face at its back, and a steep talus slope to its front; its log and plank framework is covered with galvanized sheet metal. Both rooms contain stoves - a wood stove, an electric cooking range, and a small cast iron gas stove - bed frames, and kitchenware. There are also personal articles, such as shaving mirrors, boots, and miners' helmets. The Cliff House and the other buildings at the site were constructed in 1939. The tramway was completed in the same year, along with a 7.2-km-long road from the bottom of the tram to the old Bremner Mill, now designated as XMC-104. By 1940, the Sheriff Mine was the only lode mine in operation in the entire Copper River region. A total of 10 men worked at the mine that year and supplied the mill with ore from their continued development work on underground drifts, crosscuts, and raises (Smith 1941: 27; Smith 1942: 25-26; Hovis 1990d: 9). Refer to White (2000) for a site map and further details about this site.







The Sheriff Mine (XMC-106) in the Bremner area of WRST.

Tram station with attached shed and powerhouse (top).

Exterior (middle).

Interior (left) views of the bunkhouse, known as the Cliff House at XMC-106.

Another mine in the Yellowband Group, **XMC-107**, is located at an elevation of 5,000 feet, some 2.5 kilometers southwest of the Sheriff Mine. The site consists of a camp, situated on a relatively level promontory between two intermittent streams; the mine workings about 135 meters northeast of the camp; and a lower tram terminal lying at the base of the mountain, 900 meters northwest of the mine itself. An open-cut, running about 45 meters along the mineralized vein, and a snow- and ice-filled adit comprise the mine workings. Several clusters of artifacts, including a miner's hard hat and parts to a rocker box, are located along a trail from the workings through the camp. Although the trail is obscured in some places, it appears to lead to the upper loading station for a double reversible tramway used to transport ore from the mine site to the bottom terminal on the valley floor. Since there is no evidence of ore carts or a track exiting the adit, it is possible that high-grade ore was transported by wheelbarrow or another simple conveyance to the tram terminal. The loading station has three major components: the cable anchors for the tramway, the bull wheel and brake assembly, and the ore bunker and loading chutes. A Westinghouse telephone box with all its parts is fixed to the upper end of the bunker, and one ore car is still just below the bunker. The lower tram station is an open wooden framework, rising about 4.5 meters from a flat-topped knoll. The station is anchored with cables and boulders and has rock-filled log cribs for tension weights. Its four operating cables are on the ground.

The structures at the camp are unique in that they are surrounded by protective dry-pile stone walls, no less than 60 cm thick and in some places about 2 m high. One structure is a tent frame built around an 11 x 9-foot (12.9 m^2) canvas tent and attached porch, partially enclosed with dimensional lumber and roofed with sheets of galvanized metal. The entire structure (along with its wall) is set into the bank at the base of a scree slope so that only the east wall is partially exposed. This arrangement seems to have fulfilled its purpose as the structure is still standing and in good condition after more than a half century of abandonment! The interior is furnished with a double and a single bunkbed. Several pages from the *Seattle Sunday Times*, dated June 12, 1938, are on the top bunk. A powder box, used as a shelf, has the penciled inscription, "moved up here June 28, 38." There is also a storage box on the floor that contains moldering food items and clothing. Six bags of food, probably dating to the late 1930s, are hanging from the ridgepole of the tent frame. They contain rolled oats, evaporated apples, dried beans, and assorted spices. Another structure at the camp enclosed with a similar stone wall is a partially collapsed shop area containing a wide assortment of artifacts, and an adjacent terrace that shares a common wall with the shop. Two wooden powder boxes of explosives are in the shop. Another terrace with a stone retaining wall is adjacent to the tent frame. A can dump and the remains of an outhouse are also at the site.

The open-cut at this site appears to have been exploratory work done on the vein in 1935 by Asa Baldwin, a renowned Alaska explorer, surveyor, and mining engineer and an associate from Seattle, who leased the property from the owners of the Yellowband claims. The adit was planned to open the following year (Moffit 1937: 101-102). By 1938, the Yellowband Gold Mining Company, under the management of Baldwin, had constructed a 3,330 foot tramway (presumably the one still remaining at the site), which ran from the lower workings to the valley floor (Hovis 1990d: 9). According to evidence at the site, the camp structures were apparently also completed in 1938. According to the McCarthy A-7 quad map, the lower tram was connected to the Bremner Mill (XMC-104) along a short

southern extension of an existing road that linked the airstrip with the mill. It appears, based on the archeological remains at the site, that the Yellowband Mine was in operation only briefly during the late 1930s. Refer to White (2000) for a site map and further details about this site.

Extraction, Transportation, and Milling. The three sites in this category are all associated with gold mining in the Bremner area of the Nizina District. Central to the operation of the productive mines discussed above was the Lucky Girl Mill, **XMC-104**, located at the foot of a steep, southeast-facing mountain slope west of Golconda Creek. Other names for this site are the Bremner Mine and the Yellowband, the latter of which appears on the McCarthy A-7 quad map. In addition to the mill, there are four adits, a compressor shed/assay facility, and a water tank foundation at the site. Ore was transported via a haul road that ended in a loading platform and ore chute at the mill. The multi-level mill is in very poor condition as avalanches have destroyed a considerable portion of the building and have damaged or displaced much of the equipment from its original operating condition. Still remaining in the structural collapse are a jaw crusher, an automatic ore feeder, a Marcy ball mill, an amalgamator, and a Wilfley concentrating table. (See chapter 2 for a general description of the milling process). An extensive area downslope is littered with debris from the mill. The avalanche debris is mostly structural remnants of the building, such as concrete and tin roofing, with some pieces of attached machinery.

The underground mining operations at the Lucky Girl site were accessed through four adits. Adit #1 is on the level with the mill, while #2 and #3 are located above on the vein, and #4 is on the overburden below. Two of the adits, #1 and #3, were entered and surveyed by the CRMIM crew during site recording (the portals of adits #2 and #4 have collapsed). In adit #1, the crew observed a series of square-sets with rib and back lagging beginning at about 33 meters into the adit, where a cave-in prevented further survey. Near the portal and extending outside is an 18-gauge track that forks, one side going to the tailings pile and the other that ends abruptly, going toward the mill. Small-diameter water pipes in and near the adit apparently funneled water from the mine to a water tank, now represented by only a few foundation timbers, down the hillside. In adit #3, there is a storage area immediately inside the portal containing riveted pipe, an end-dump mine car, and a ladder. Six raises were located, all with ore passes and loading chutes, assumed to serve the stope overhead. Very wet conditions were encountered in both adits.

One building that has maintained a fair amount of integrity is a three-room shed used as a compressor and assay shop. The building rests against a rock wall adjacent to adit #1. The compressor room is covered with vertically placed dimensional lumber and has tar paper tacked to the inside walls. The major items in the compressor room are a Gardner-Denver compressor, a Westinghouse generator, and a transformer. The door between the compressor room and the assay is covered with parts of dynamite boxes printed with manufacturing information as well as, "Bremner Gold Mining Company, McCarthy Alaska." The adjoining assay room is constructed of horizontal wooden planks and contains tools and an assortment of equipment. There are two kilns in the room, fired by gas jets from acetylene tanks. Boxes and cans labeled with the names of various chemicals or chemical manufacturers are also in the assay room. A third room was added to the shed later, but its function is unknown.

The Lucky Girl Mine was the second of the Bremner Mining Company operations on Golconda Creek. Development work at the mine began sometime between 1931 and 1933, and by 1935, more than 2,000 feet of drifts, crosscuts, and raises were in place. The prospects for the mine were so promising that the company, under the direction of Lee Ramer, began construction of the mill near the mouth of the lower tunnel on the Lucky Girl vein (Adit #1) in 1934. Shortly after its construction, the mill was described as follows:

> The mill...is rated at 50 tons a day and receives its power from a 156-kilowatt hydroelectric plant on Falls Creek, a western tributary that joins Golconda Creek a short distance south of the camp. A compressor plant, rated at 610 cubic feet, was completed in 1934 and is augmented by a portable compressor with a capacity of 120 cubic feet. Two caterpillar tractors are used for hauling. This equipment is supplemented by necessary buildings, such as a blacksmith shop, which is combined with the compressor plant, an assay office, a mess house, and houses and framed tents for living quarters (Moffit 1937: 101).

In the two-year period of 1935 and 1936, the mill was put in operation processing ore trammed down the mountain from the Grand Prize Mine as well as from the Lucky Girl vein. Although underground work continued at the mines in 1937, the mill was inactive. The mill was again put into operation, perhaps as early as 1938, when the Yellowband Gold Mining Company took over the Bremner mines, and continued processing ore until 1942 when most gold mining came to a halt by executive order for the duration of the war (Hovis 1990d; Jenkins, Lappen, and Spude n.d.). Refer to White (2000) for a site map and further details about this site.

The camp buildings referred to in the quote above were probably originally located at **XMC-111** at the headwaters of Golconda Creek. There are no standing structures at the site, only the remains of 14 features defined by rock foundations, depressions, trenches or berms, wooden structural debris, and traces in the vegetation. At least two of the features are determined to be habitation structures based on the domestic and personal artifacts in association with them. Another feature, which is defined by a rock foundation, probably served as an assay office judging by the quantities of crucibles and crucible fragments found in it. Remnants of a possible telephone system, steel pipeline to provide water from the creek, a can scatter, and the remains of a sled are also at the site. A wide array of smoking and chewing tobacco cans still at the site bear the following trademarks: *Copenhagen* snuff cans, *Edgeworth* tobacco slug can, *Prince Albert* and *Granger* rough pipe tobacco cans, *Lucky Strike* metal cigarette box, and a *Chesterfield* tin cigarette box. One interesting artifact near the cabin remains is a homemade wheelbarrow made from a modified 55-gallon drum, with handles made of pipe, and a front wheel that resembles a spoked bicycle tire.

Apparently, XMC-111 was the original Bremner Camp, perhaps built as early as the late 1920s when the Ramer Brothers began their exploration and development in the area. It is strategically located near the two Bremner Mines: only about 300-400 meters south of the lower Grand Prize Mine and about twice as far east of the Luck Girl Mine and mill. The lack of structural debris at most of the features suggests that the structures were removed and installed at another location, presumably the existing Bremner-Yellowband Camp, XMC-105 (see site description below). The move probably occurred in 1939 after the Yellowband Mines had acquired the Bremner property. According to Asa



Homemade wheelbarrow found at XMC-111 at the headwaters of Golconda Creek in the Bremner area of WRST.

Baldwin, president of Yellowband, "...we moved the messhouse, formerly in use by the Bremner company, down to our property on Golconda Creek, put in our tram and got it into operation" (quoted in Jenkins, Lappen, and Spude n.d.: 4). The move would have facilitated the Yellowband operations, which were then focused on the Sheriff and Yellowband mines to the south. The buildings could have conceivably be moved by tractor and possibly sledges over the road that connects XMC-111 and XMC-105 with the airstrip farther to the south. Refer to White (2000) for a site map and further details about this site.

XMC-105 is located about 800 kilometers south of the Lucky Girl Mine and Mill. The camp is composed of several buildings in good condition: a cookhouse/bunkhouse, a storage building, a screened meat cache, an office/assay lab, a blacksmith shop and adjoining mechanic shop, a hydroelectric plant, a building foundation, an outhouse, a sawmill, and a tent frame. Other features at the camps include a dump, the remains of six sledges, and a scatter of dynamite boxes. Many of the camp buildings were constructed in 1934, the same year as the mill, and were probably moved to their present location in 1939. The site continued to be occupied until 1942 when the mines and the mill shut down during World War II. The camp was also inhabited more recently as evidenced by 1970s-vintage artifacts at the site.

The main structures at the camp are all framed with wood and sided with corrugated metal, except for the storage building that has flattened Blazo fuel cans as siding. The storage shed appears to have been an old structure moved from some other location (see XMC-111 above). The office may also have been moved, as it does not seem to be situated on an original foundation. Among the few artifacts in the office are a rough worktable, a drafting table, an old surveying rod, and an oil-burning stove. Stenciled on some of the finished boards inside is "B.G.M.C.," presumably for the Bremner Gold Mining Company. The bunkhouse is a two-story structure with a large kitchen, a dining room, and four other rooms used primarily as bedrooms. The mechanic shop and blacksmith shop still contain a variety of tools and small pieces of equipment used for mining during the

1930s. Near the blacksmith shop there is also a Model T pickup, a horsedrawn wagon, and a Caterpillar bulldozer, labeled on the power control shaft with "Yellowband Mining Co., McCarthy Alaska."

The hydroelectric power plant is not a relocated structure. It sits at the western edge of the camp in its original location. It was run by water originating at Emerald Lake, a small glacier fed lake about 1.6 kilometers northwest of the powerhouse. A dam, constructed of rock between two wood and log bulwarks, lies at the outlet of Carol Creek (referred to above as Falls Creek). The flow of the water from the creek was apparently controlled by a 10-inch pipe with a valve just downstream from the dam. There is evidence of one tent frame near the dam, which may have been occupied by the caretaker of the hydroelectric system. Another dam, located at the point where Carol Creek drops into the Golconda Creek valley, diverted the water along a flume, now quite deteriorated, and ditchline for about 100 meters to a control box (or head box) on a bench above the powerhouse. Water pressure was increased as it flowed through pipes of decreasing diameter (from 25-inch to 10-inch diameter pipe) to the powerhouse. According to historic sources, the power was equipped with a 24-inch Pelton wheel, which ran a Westinghouse generator. Both pieces of equipment remain in the powerhouse. The output of the system was 2,300 volts of electricity, fed over a powerline running several hundred meters to the mill (Hovis 1990d: 7). The powerhouse still contains the original shipping crates for some of the equipment, including the Pelton wheel, addressed to "Bremner Gold Mining Co., McCarthy, Alaska." Refer to White (2000) for a site map and further details about this site.

Unknown Mining Method. The remaining five sites in the Nizina District could not be attributed to a particular lode mining process and are simply classified as unknown. **XMC-118** is on Golconda Creek, approximately 150 meters southeast of the existing airstrip. The site consists of 18 features, primarily structure foundations and debris scatters, with one feature composed of the remains of a freight sled. Only one structure, a poorly built cabin of poles and tin, remains standing. This site may have functioned as a base camp for the Yellowband Gold Mining Company when they began exploration and development work on the east side of Golconda Creek in 1935 and 1936. It may have also served as a warehouse or temporary storage for goods and equipment delivered to the airstrip. The cabins or tent frames once at the site were all very small, and their construction material appears to have been "recycled" for use elsewhere. Perhaps similar to XMC-111, some tents and other structures at this site were relocated when the Yellowband Company moved its base of operations northward to XMC-105. Refer to White (2000) for a site map and further details about this site.

Two lode-mining sites located on McCarthy Creek are also included in the category of "process unknown." **XMC-043** is located about one kilometer downstream from the Mother Lode tram, in a large open clearing along the McCarthy Creek access road. The site features consist of the foundation of a tent frame, a possible wood-lined cache, and a trash pile. There is also heavy wood cribbing along the east side of the clearing. Artifacts observed at the site include kerosene cans, a barrel, enamelware, tin cans, boxes, bed frames, and a woodstove. There were no datable artifacts at the sites and nothing to specifically tie the site to lode mining except for the site's location. A drift mineshaft, thought to be fairly recent and unrelated to the older elements of the site, is located along the streambank on the opposite side of the road.

XMC-050 is located along the McCarthy Creek access road several kilometers south of XMC-043. The site is situated on the Gateway millsite claim, lying at the confluence of McCarthy Creek and its East Fork. The main feature at the site is a badly deteriorated log cabin with a collapsed sod roof. At least one, and possibly two, milled lumber additions were made to the cabin; it also appears that attempts were made to stabilize it. Close to the cabin are two tent frame ruins, one with cots and wall frame partitions in the debris. A nearby cache of fairly recent construction has been built on top of the foundation of an older, larger structure. Dynamite boxes, hardware, ceramic insulators, a woodstove, solder-top cans, a wooden sled with metal runners, 15-pound rail segments, and various other artifacts are scattered around the site. The site appears to have had at least two periods of occupation. Based on some of the artifact types, the earlier one probably pre-dated the 1940s. The historic context for the site has not yet been documented.

The final two sites in the Nizina District are both located on Nikolai Creek. **XMC-080**, on the Surprise lode claim, is near the headwaters of the creek, near the Nikolai Mine. The site consists of a demolished structure that may have been a tent platform or tent frame. All that remains are two piles of dimensional lumber, a short section of stovepipe, purple glass fragments, and a dense scatter of soldered cans. The area has been heavily disturbed by a "cat" track that cuts through the site. Although the site is associated with the operations conducted at the Nikolai Mine beginning in 1900, it is not the main Nikolai Mining Camp.

The main camp was located at **XMC-113**, historically known as Nikolai City. It is situated about three kilometers downstream from XMC-080, along a trail that led to the mine. All that remains of Nikolai City is an empty clearing, pictured in a 1900 photograph with four tents and an open-sided kitchen. The camp housed about a dozen men (Hovis 1991c). The clearing extends back to an upper terrace, where structures from a later occupation of the site are now located. These features include a cabin, a sled, a forge, some barrels, and a scatter of artifacts. The cabin is built of logs and was once roofed with milled lumber covered with tar paper. The collapsed roof mantles the interior, and thus the artifact assemblage at the site is mostly unknown. All that could be observed was a stove fashioned from a Union Carbide drum, some enamelware, cans, and screening. These features and artifacts are not dated, but appear to have been built sometime after the Nikolai Mine was abandoned in 1911 (Berg and Cobb 1967: 58).

Chisana District

In the Chisana District, the focus of lode mining lies to the northwest in the Nabesna River region (figure 9). As in much of the Interior, prospectors began filtering into the area before the start of the twentieth century. By 1899, the area, then known as the Nabesna-White River District, was the scene of increased activity when two government parties - one representing the U.S. Geological Survey and the other the U.S. Army - were sent to explore the little known territory (Brooks 1900; Rohn 1900). In the same year, a gold quartz discovery was made on Jacksina Creek at the headwaters of the Nabesna River by a prospector, K. J. Field. Another member of Field's group was young Carl Whitham, who would later become the most prominent figure in the history of Nabesna mining (Hunt 1991: 64-66). Orange Hill, in the upper Nabesna Valley east of Jacksina Creek, was also being explored in 1899 by prospectors D.C. Sargent and James Galen (Stanley 1979).

Prospecting continued in the area, both for copper and gold deposits, during the first few years of the new century. By 1905, K. J. Field and a partner had formed the Royal Gold Mining Company (later called the Royal Development Company) to work the lode gold claims they had made on Jacksina Creek. In the winter of 1906, they hauled a three-stamp mill by dog sled over the Military Trail and then to their mine at White Mountain, near the confluence of Jacksina Creek and the Nabesna River. This mill was supposedly the first one of its kind moved into the Interior from Valdez (Stanley 1979; Hunt 1991: 65). By 1908, the mill had been used to crush 60 tons of surface ore, which yielded $12 a ton in gold (Moffit and Knopf 1910: 58). The mill was soon shut down, and the few other attempts to explore for lode gold during the next decade or so were focused on Bonanza and Chathenda Creeks in the placer-rich Gold Hill territory (Capps 1916: 118). Prospecting for copper lodes continued in the White River basin, in the southeastern corner of the district, during the early 1910s (Capps 1916: 121-123).

After trying his hand at placer mining on Little Eldorado Creek, in the Chisana District, Carl Whitham returned to White Mountain in 1922 and began to reinvestigate the abandoned quartz mine of the Royal Development Company. Three years later, Whitham discovered a promising outcrop exposed in a bear's diggings. Upon enlarging the hole, he found rich gold ore in a vein he appropriately named, the Bear vein. It took yet another three years of development work and testing before the value of the ore could be confirmed, but Whitham's persistence finally paid off, as illustrated in the following summary of the mine's history.

> In the fall of 1929 the Nabesna Mining Corporation was formed, with Mr. Whitham as president and general manager. A tram was built to the mill site at the base of the cliff, and by the summer of 1939 a small mill was in operation and a permanent camp under construction. The scale of operation was gradually expanded until the mill was treating about 60 tons of ore a day, and the operating season reached a year-round basis in 1935...In 1933 the highway constructed by the Alaska Road Commission reached Nabesna, and thereafter transportation by dog sled, caterpillar, and airplane was superseded by trucking...In 1937 the important No. 49 vein was discovered. Most of the known veins were worked out by early 1939...The gross production at the end of 1940 was $1,869,396...The initial and total capital of the company was $175,280, chiefly from local sources (Wayland 1943: 177).

In the early 1940s, the Nabesna Mining Corporation extended its exploration work to the adjacent Gold Eagle (Rambler) Mine, but the wartime mine closures soon put a halt to all mining that was non-essential to the war effort. After the war, the Nabesna Mine reopened only briefly until 1947, when Carl Whitham died (Stanley 1979).

During the 1940s, exploration for both gold and copper minerals was still ongoing near Orange Hill, southeast of the Nabesna Mine. The porphyry copper deposit of Orange Hill constitutes the only lode of its type known in Alaska. It includes pyrite, chalcopyrite, and molybdenite in quartz diorite; both the intrusive rock and the limestone of the deposit contain a little gold and silver (Berg and Cobb 1967: 208). In 1940, the Alaska Nabesna Corporation had patented 18 Orange Hill claims, including a mill site and a homestead (Moffit 1943: 166-167). Development work by the company included open cuts, shafts, adits, and diamond-drill holes (Van Alstine and Black 1946b: 2). Prospecting and exploration work on Orange Hill have been continued by a series of operators, including North-

west Explorations, the Ptarmigan Company, and Inspiration Gold into the 1970s and 1980s.

The seven lode mining sites recorded by CRMIM crews in the Chisana District are described below. Six of these sites are situated near the Nabesna River, while only one lies along the White River in the southeastern corner of the district (figure 31; table 65). Information pertaining to the habitation structures, outbuildings, and artifacts found at these mining camps is presented in tables 66 and 67. The Nabesna Mine (NAB-011), previously documented in a National Register nomination, was not visited by CRMIM crews, and therefore not described in the site reports below.

Prospecting and Exploration. All but one of the six sites in this category are near Orange Hill. The earliest of the Orange Hill sites is **NAB-056**, located approximately 100 meters downstream from the mouth of California Gulch, a steep-sided drainage on the northwestern flank of Orange Hill. The main feature at the site is a collapsed log cabin, partially buried by alluvial gravels. The log courses were finished flat on the interior with a broad axe and left unpeeled on the exterior. Interior furnishings include a bed, a galvanized wash tub, a cook stove, and a table. A collapsed pole tent frame, a small triangular cache nailed to three trees, and a pole frame blacksmith shop were also recorded at the site. A few artifacts, including a wood-and-leather bellows, are associated with the blacksmith shop. There are three sleds at the site: two are large freight sleds and the third is a smaller dog sled with steel runners. A cabin in this immediate vicinity, assumed to be the same as the one recorded at NAB-056, was described in a 1946 geological report as "partly filled with gravel" (Van Alstine and Black 1946b: 2). Another nearby cabin had already been destroyed by the waters of California Gulch. Although the cabin may date to the period of exploration work by the Alaska Nabesna Corporation in the 1940s, it seems more likely, considering its condition, that it was built by one of the earlier miners in the area.

NAB-055 is another historic site, located only about 300-400 meters southwest of NAB-056. It is situated on a heavily vegetated terrace on the northern flank of Orange Hill, about 0.5 kilometer from the Nabesna River. The tractor trail from the airstrip runs atop the terrace about 30 meters east of the site. The site contains two small prospecting pits, two tent frame bases, a pole tripod, and an overgrown road. The tent frame bases are constructed simply of poles or logs, with other poles scattered around the immediate area. The only artifact found at the site is a bent, metal sled runner. The historic context for the site is not known, but its age is estimated to be more than 50 years old based on the size of the vegetation growing in the prospect pits.

The other three sites in the Orange Hill vicinity are not considered historic as they all date to the 1950s or later. **NAB-054** is located northwest of Orange Hill, adjacent to the airstrip access road, and about 100 meters east of the airstrip. The camp consists of the numerous tent frames in various stages of collapse and disrepair, a standing core sample shed, and other features and artifacts associated with a 1960s mine exploration and drilling camp. At least seven of the tent frames, constructed of plywood, appear to have been living quarters, while another double tent frame was a kitchen/dining room facility. Other domestic features at the site include two outhouses, a plywood shower structure, a trash dump, a sheet metal water storage tank, cattle watering trough, and associated black PVC water pipe. A 1972 Ford Bronco sits atop the terrace above the main cluster of tent frames. Nearby is a large sledge with a lumber deck that supports an arc welder; there is also another heavy freight sledge at the site. The mining tools and equip-

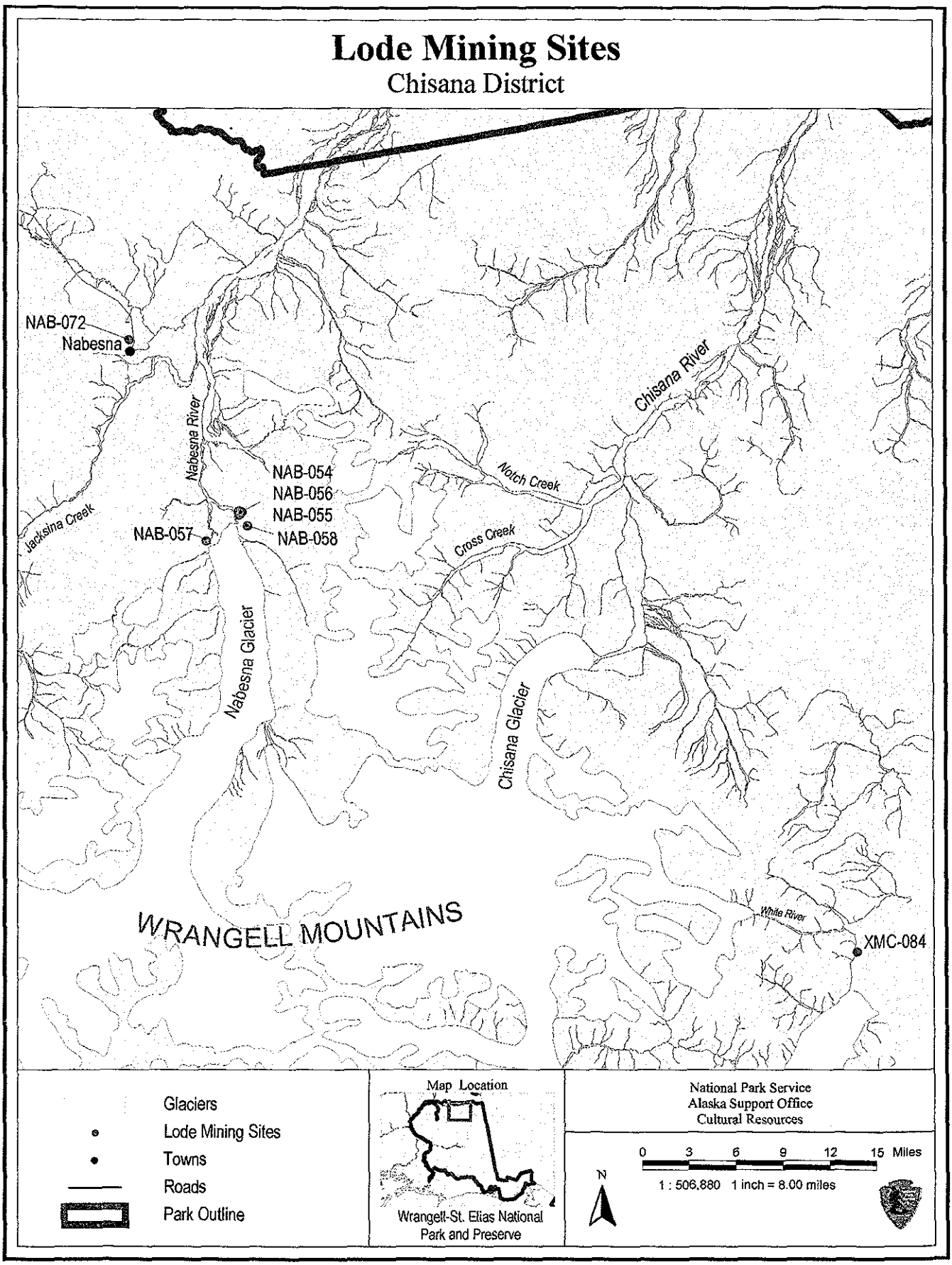

Lode Mining Sites
Chisana District
NAB-072
Nabesna
Nabesna River
Jacksina Creek
NAB-057
NAB-054
NAB-056
NAB-055
NAB-058
Notch Creek
Chisana River
Cross Creek
Nabesna Glacier
Chisana Glacier
WRANGELL MOUNTAINS
White River
XMC-084
Glaciers
Lode Mining Sites
Towns
Roads
Park Outline
Map Location
Wrangell-St. Elias National Park and Preserve
National Park Service
Alaska Support Office
Cultural Resources
0 3 6 9 12 15 Miles
N
1 : 506,880 1 inch = 8.00 miles

Figure 31.

Table 65

Lode Mining Sites in the Chisana District by Mining Process

Locale	Prospect/Exploration	Development
Nabesna River	NAB-054 NAB-055 NAB-056 NAB-057 NAB-058	NAB-072
White River	XMC-084	

Table 66

Habitation Structures and Outbuildings at Lode Mining Camps in the Chisana District

AHRS #	Structure	Material	Size	Condition	Outbuildings[1]
NAB-054	tent frame	plywood	unknown	ruins	1 sh, 2 oh, 2 oth
	tent platform	plywood	15.9 m^2	standing	
	tent platform	plywood	10.3 m^2	ruins	
	tent frame	plywood	10.2 m^2	standing	
	tent platform	unknown	10.2 m^2	ruins	
	tent frame	plywood	9.9 m^2	standing	
	tent platform	unknown	14.4 m^2	ruins	
	kitchen tent	plywood	30.6 m^2	standing	
NAB-055	tent frame	pole	8.3 m^2	ruins	—
	tent frame	log	6.3 m^2	ruins	
NAB-056	cabin	log	29.1 m^2	collapsed	1 ch, 1 wk
	tent frame	log/pole		collapsed	
NAB-058	tent frame	log/pole	unknown	collapsed	—
	tent frame	log/pole	unknown	collapsed	
NAB-072	bunkhouse?	unknown	15.2 m^2	trace	1 sh, 2 oh
	cabin?	plywood	35.6 m^2	good	
	cabin?	plywood	21.3 m^2	good	
	cabin?	plywood	13.7 m^2	good	
XMC-084	cabin	log	23.0 m^2	standing	—

[1] Abbreviations for outbuildings are as follows: sd = shed, oh = outhouse, ch = cache, dgh = doghouse, wk = workshop, oth = other.

Table 67

Artifact Classes[1] Represented at Lode Mining Camps in the Chisana District

AHRS	BLD	HSHD	PER	SUB	FST	FPR	FSR	TRAN	COM	REC	MTE	MLT	OTH
NAB-054		+			+	+	+				+	+	+
NAB-055								+					
NAB-056	+		+					+				+	+
NAB-058		+			+		+					+	+
NAB-072											+	+	
XMC-084		+						+				+	

[1] The abbreviations used for artifact classes are as follows: BLD = building materials; HSHD = household; PER = personal; SUB = subsistence; FST = food storage; FPR = food preparation; FSR = food service; TRAN = transportation; COM = communication; REC = recreation; MTE = mining tools and equipment; MLT = multipurpose tools; OTH = other.

ment include drill pipe casings, drill rods, a mud-settling tank, machine parts, and a steel, screw-type core splitter mounted on a wooden base. Although the site is too recent to be considered historic, it does represent continuity in mining activities that began in the area almost a century ago.

NAB-057 is located in a marshy depression 25 meters above the gravels of the Nabesna River, and about four kilometers south of its confluence with Monte Cristo Creek. The major feature at the site is a diamond drill station, with its 1.2 x 3 m base still in place in the ground. Collapsed alongside the base are 11-m-long poles that once formed a tripod over the drill hole and served to pull up the drill rods. There are also two lengths of drill pipe; a pile of wooden planks used for machinery bases; another two 11-m poles probably used as supports while filling core boxes; a plywood wall that was once part of a tool shed; a possible outhouse pit; and a fire pit with burned cans. The site is associated with mineral exploration during the 1955-1972 copper boom.

NAB-058 is located on a rise above a small pond, approximately 0.6 kilometer southeast of Orange Hill. The site consists of two pole tent frames and associated deteriorating furniture, built mostly of peeled and unpeeled spruce logs. Several Hill Bros. coffee cans, fuel cans, ceramic bowls, and stove parts are also in the domestic debris. All of the coffee cans have key openings, a style of can that was discontinued by the Hills Bros. Company in 1963. Another feature at the site is composed of collapsed poles with nailed-on insulators that may have once supported a generator. Also recorded was a wire-wrapped post, which possibly functioned as a makeshift antenna. A claim notice in the middle of the site is the only indication that the camp was associated with mining activities.

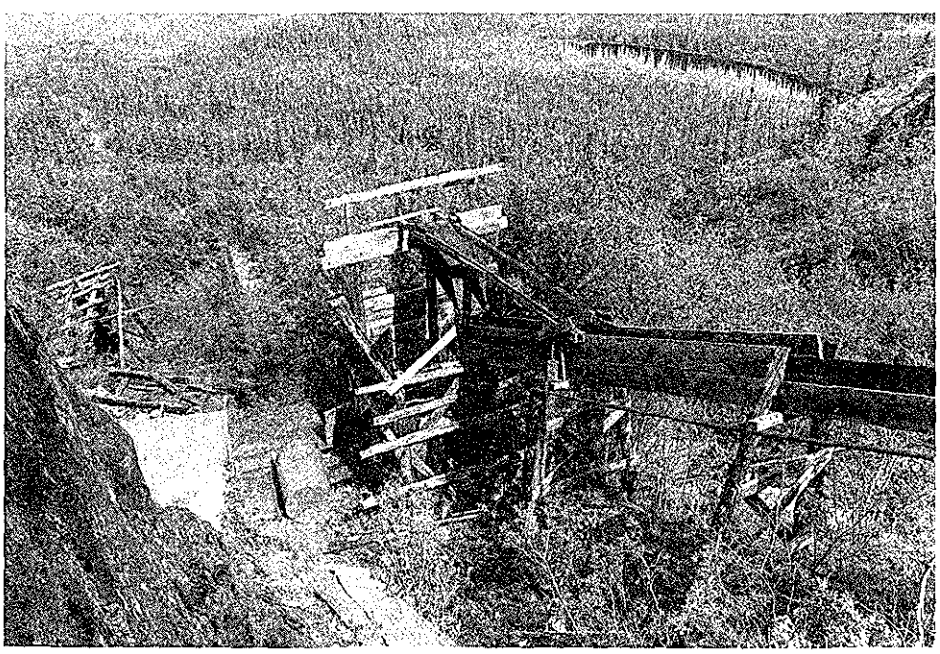
The final site in the prospecting and exploration category is **XMC-084**, lying far to the southeast on a tributary of the White River just below the Russell Glacier. The site consists of a single standing cabin with a few associated artifacts. The cabin exhibits a fair amount of workmanship; the unpeeled logs are rough-hewn on the interior and the corners are square notched and lapped, with wood shims used to tighten the fit. The log courses were scribed before cutting and pegs were pounded in to further stabilize the structure. One iron sled runner and a misery whip saw blade are at the cabin, which probably predates 1915. This camp is probably associated with a group of copper claims near the head of White River that were described by geologist Stephen Capps (1916: 122-123). He stated that the principal work on these claims was an open cut, which was not found to have a great concentration of copper. At the time of his visit to the district in 1914, the claims had been staked and surveyed for patent by the Skolai Mining Company; but apparently, there had been no work done on the claims for some time.

Development. The singe site in this category is **NAB-072**, the Rambler Mine, located approximately one kilometer north of the Nabesna Mine, and about 0.8 kilometer west of the Nabesna Road. The original Rambler Mine claim, known as the Golden Eagle, was probably staked in the late 1920s. Active exploration on the Golden Eagle began in 1940, after production mining came to a halt at the Nabesna Mine and the Nabesna Mining Corporation began efforts to extend its operations into adjacent areas. In 1941, crews drove a 450-foot tunnel into the limestone cliff at the Golden Eagle and built several structures near the mine portal. The work was interrupted in September or October of that year as a fire destroyed some of the structures and part of the power plant. By 1942, federal restrictions had shut down gold mining operations for the duration of the war; but it

appears that mining was resumed shortly after the war. Renewed prospecting and assessment activities, including diamond drilling, were begun on the Golden Eagle/Rambler claims in 1967 (Hovis 1989c).

Most of the structures at the site are situated on an artificially cut and leveled platform or bench adjacent to the lower adit, a feature dating to the original 1940 mining operation. Associated with this early operation is a railway that leads from the adit to a collapsed trestle and ore slide, lying above the remains of an ore storage bin. The forked railway also led to a wooden skipway, which brought ore down from an upper adit. The skipway was equipped with a skip - an iron box on wheels or rollers - used for transporting ore down to another bin located on the level bench. Another original feature is an iron pipe that served as the main service line for compressed air into the mine. Compressed air was probably fed into the line from a powerhouse, the remains of which are now located under one of the recent plywood structures built at the site. A toppled, charred-wood-and steel machine mount, with an attached Worthington compressor and diesel engine, and a compressed air receiver are pieces of early equipment that have been displaced from their original locations.

Several features appear to be related to the original blacksmith/workshop area at the site. They include a rare Gardner-Denver drill steel sharpener with dies, more than 100 pieces of drill steel, as well as a drill column (used to support the drill) and steel puller (used to extract drill steel that became stuck in the rock). Also perhaps associated with the blacksmith shop are the classifier chain rakers, used in milling equipment and probably brought up from the Nabesna Mine. Older mining equipment on the steep slope below the site bench includes a carbide generator (indicating night work at the mine) and a scraper blade. A water reservoir and old outhouse probably also date to the early occupation of the site. Structures at the site dating to the 1960s include three plywood cabins, a milled lumber work shed, a fuel drum storage rack, an outhouse, and a radio mast. One of these plywood buildings was constructed over an old, burned foundation from one of the original mine structures. Although it was never brought into production, the Rambler Mine is nonetheless an important monument to the endurance of Carl



Skipway and ore bin at the Rambler Mine (NAB-072).

Whitham, who spent almost a half century prospecting and working the gold fields of the Chisana District.

Homer District (Nuka Bay Area)

The Homer District encompasses a major portion of the southern and western Kenai Peninsula (figure 13), with most of the mineral localities situated along the Gulf of Alaska coastline. The district's productive gold and silver lodes are clustered around Nuka Bay, a prominent Y-shaped embayment, which forks into an East Arm and West/North Arms. The initial prospecting efforts in Nuka Bay focused on copper, not gold. By 1909, when the first U.S. Geological Survey party visited the southern Kenai Peninsula, three claims had already been staked on the East Arm of the Bay. Although the first actual discovery of gold on Nuka Bay was not made until 1917, more than a half dozen gold lode properties were in the process of development by 1924 (Capps 1938: 25-26; Berg and Cobb 1967: 76-77; Richter 1970: B2-B3; Hovis 1991e: 2-3).

Gold production began in 1925 on the Paystreak claim operated by the Alaska Hills Mines Corp. located on Beauty Bay at the upper end of the West Arm. The following year, active mining began at the Sonny Fox Mine on Babcock Creek at the head of Surprise Bay. The Sonny Fox proved to be not only the largest and most productive gold mine on Nuka Bay, but also the one that operated continuously for the longest period - from 1926 until 1940. The mine is described in a 1938 U.S. Geological Survey report as being equipped with a comfortable log mess house and dwellings, a compressor house, a blacksmith shop, and a mill, connected to the mine by an 800-foot car (surface) tramway over a trestle, and a short aerial tramway. The mine was said to have yielded some "remarkably rich specimens" with assays showing a gold content of many thousand dollars to the ton (Capps 1938: 27).

In addition to the Alaska Hills and Sonny Fox properties, mining quality ore was found at only three other operations located on Nuka Bay. One of these is the Rosness and Larson Mine, located on the northwest shore of the North Arm. The mine, equipped with a small mill driven by a gasoline engine, was brought into production in 1931. Also brought into production during the year was the Goyne prospect, on the west side of Surprise Bay. Without the benefit of a mill to process the ore, it had to be shipped in bulk to the smelter in Tacoma (Pilgrim 1933: 37). The total value of gold produced at these two mines in their two or three years of operation is estimated to have been less than $15,000 (Richter 1970: B3). The third mine, located on the mountainside at the entrance to Beauty Bay, was the property of the Nukalaska Mining Company. It was brought into production in 1934 and proved a much more successful operation. Its physical plant consisted of a mill, office, bunkhouses, cookhouse, and blacksmith shop. During the 1936 mining season, 20 men were employed at the Nukalaska Mine, working in one shift at the mine and three shifts at the mill (Smith 1938: 28). By 1940, when production came to a halt at the Nukalaska Mine, the estimated total value of gold produced at all five of the Nuka Bay properties was $166,000[2]. Since World War II, there has been very little mining activity in the area (Richter 1970: B3). A detailed history of Nuka Bay area mining is in chapter 7 of *A Stern and Rock-Bound Coast, Kenai Fjords National Park Historic Resource Study* (Cook and Norris 1998).

[2] This estimate seems to be grossly in error as Roehm (1941: 7) has estimated a total production figure of $116,000 in gold and silver from the Nukalaska Mine alone.

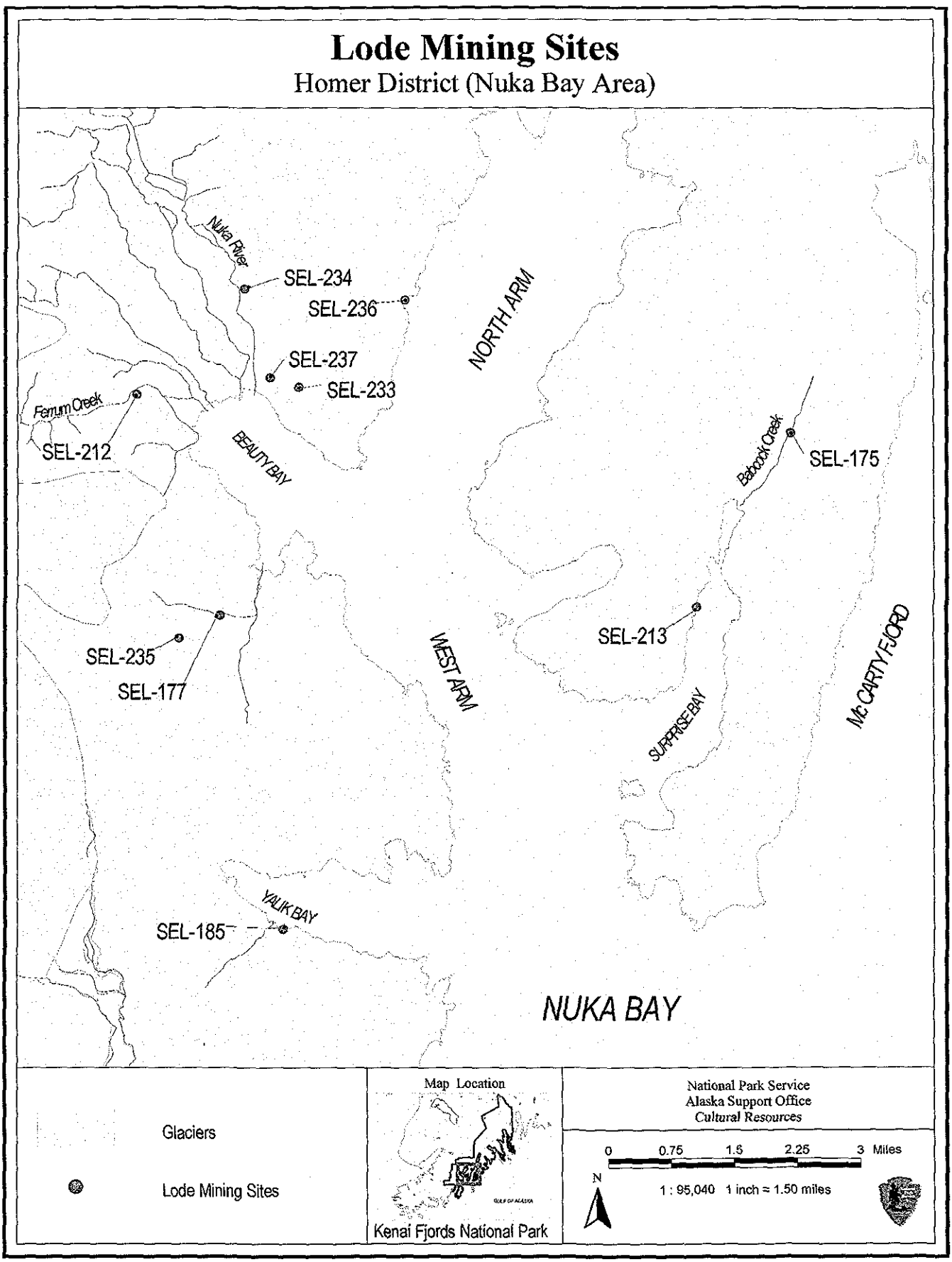

Lode Mining Sites
Homer District (Nuka Bay Area)
Nuka River
SEL-234
SEL-236
SEL-237
SEL-233
NORTH ARM
Ferrum Creek
SEL-212
BEAUTY BAY
Babcock Creek
SEL-175
SEL-213
SEL-235
SEL-177
WEST ARM
McCARTY FJORD
SURPRISE BAY
VALIK BAY
SEL-185
NUKA BAY
Glaciers
Lode Mining Sites
Map Location
Kenai Fjords National Park
National Park Service
Alaska Support Office
Cultural Resources
0 0.75 1.5 2.25 3 Miles
N
1 : 95,040 1 inch ≈ 1.50 miles

Figure 32.

Table 68

Lode Mining Sites in the Homer District (Nuka Bay)[1] and Juneau District (Reid Inlet)[2] by Mining Process

Locale	Prosp/Explore	Development	Trans/Ext/Milling
Beauty Bay		SEL-233 SEL-237	
Ferrum Creek			SEL-212
North Arm, Nuka Bay			SEL-236
Nuka River			SEL-234
Shelter Cove			SEL-177 SEL-235
Surprise Bay			SEL-175 SEL-213
Yalik Bay	SEL-185		
Ptarmigan Creek			XMF-045

[1] Sites beginning with SEL
[2] Site beginning with XMF

Table 69

Habitation Structures and Outbuildings at Lode Mining Camps in the Homer District (Nuka Bay Area)[1] and the Juneau District (Reid Inlet)[2]

AHRS #	Structure	Material	Size	Condition	Outbuildings[3]
SEL-175	cabin	lumber	10.2 m^2	ruins	1 sh, 1 oh, 1 wk, 2 oth
SEL-177	cabin	lumber/steel	—	trace	1 sh, 1 oh, 2 wk, 2 oth
SEL-185	cabin	lumber	17.6 m^2	collapsed	—
SEL-212	bunkhouse skid shack			burned recent	1 sh, 1 oh
SEL-213	cabin bunkhouse bunkhouse	log/lumber lumber lmbr/plywood	— 78.1 m^2 9.4 m^2	trace good good	1 sh
SEL-234	cabin	log	20.8 m^2	collapsed	—
SEL-235	bunkhouse	lumber	24.8 m^2	ruins	1 oth
SEL-237	cabin	log	27.4 m^2	ruins	—
XMF-045	cabin	lumber	15.0 m^2	collapsed	—

[1] Sites beginning with SEL
[2] Sites beginning with XMF
[3] Abbreviations for outbuildings are as follows: sd = shed, oh = outhouse, ch = cache, dgh = doghouse, wk = workshop, oth = other.

Table 70

Artifact Classes[1] Represented at Lode Mining Camps in the Homer District (Nuka Bay Area) and the Juneau District (Reid Inlet)

AHRS	BLD	HSHD	PER	SUB	FST	FPR	FSR	TRAN	COM	REC	MTE	MLT	OTH
SEL-175	+	+		+	+	+	+	+		+	+	+	+
SEL-177	+	+	+		+	+	+	+			+	+	+
SEL-185													
SEL-212	+	+			+	+		+		+	+	+	+
SEL-213	+	+		+			+		+		+	+	+
SEL-234	+	+					+				+	+	+
SEL-235		+	+		+	+	+						+
SEL-237		+					+						
XMF-045		+									+		+

[1] The abbreviations used for artifact classes are as follows: BLD = building materials; HSHD = household; PER = personal; SUB = subsistence; FST = food storage; FPR = food preparation; FSR = food service; TRAN = transportation; COM = communication; REC = recreation; MTE = mining tools and equipment; MLT = multipurpose tools; OTH = other.

CRMIM field crews recorded 10 sites in the Nuka Bay area, including all five of the mines mentioned above (figure 32). These sites, located near small bays or coves around the West and North Arms of Nuka Bay, exhibit a full range of lode mining processes, including prospecting/exploration, development, transportation, extraction, and milling (table 68). The habitation structures and outbuildings remaining at these sites are listed in table 69, and the artifact classes represented at the sites appear in table 70. The sites are described below by mining process.

Prospect/Exploration. **SEL-185**, located on a low, rocky bench on a small peninsula on the south shore of Yalik Bay, is the only site in this category. The site comprises a collapsing wood plank structure, with corrugated metal roof, that was once owned by Peter Sather, known locally as "Herring Pete." The one room cabin with a loft was probably used recently as a shelter or recreational cabin before it began to collapse. The few artifacts noted at the site date to this recent occupation. Trenches, excavated to expose a quartz vein, lie on the lower hillside southeast of the site. There is also an adit in the sea cliff approximately 160 meters southeast of the site and another adit still farther (330 meters) to the southeast. The claims in the site vicinity were originally owned by Al Blair during the 1920s, but Peter Sather took them over before 1931, when Earl Pilgrim visited the Nuka Bay area for the Territorial Mine Inspector (Pilgrim 1933: 38-39). Assessment work continued to be done by Sather during the 1930s (Capps 1938:32), but these claims have apparently never been developed. "Herring Pete" was an avid fisherman, a fox farmer, and an experienced boatman who carried mail, freight, and passengers between the Nuka Bay Gold Mines and Seward (Pedersen 1974:28). His gold mining prospects seem to have only been a sideline to his various other activities in and around the waters of the Kenai Peninsula (Linda Cook 1996: personal communication).

Development. There are two associated sites, both located on the mountainside northeast of the head of Beauty Bay, in this category. **SEL-233** consists of the remains of a lode mining operation, originally known as the Harrington prospect, and later operated by the Nuka Bay Mines Company during the 1930s. Situated on a steep south-facing slope at 1,200 feet elevation, the site comprises an adit with an associated rail and spoil pile, a large concentration of mining equipment and machinery downslope from the adit, and two prospect pits. The equipment concentration includes a Denver Quartz Mill on a wooden brace, a Hendy crusher (resembles a Dodge crusher), two heavy metal rollers that may have been part of a Chilean-type quartz mill, a Fairbanks Morse generator or compressor, along with assorted tools and water pipe. Milled lumber debris scattered around the equipment suggests that a mill building may have originally stood at this locale. A smaller grouping of artifacts and a discontinuous section of rail lie directly above the large equipment concentration. Another section of rail, 18 m long, extends outward from the adit to the spoil pile. A few artifacts - a shovel head, wheelbarrow, wash tub, and enamelware pitcher - are scattered around the spoil pile. Two prospect pits, which average about 2 m in diameter, are located about 80 meters apart on the slope above the adit.

Development work, in the form of open cuts and a timbered shaft, had begun at this site by 1924 when it was first visited by a territorial engineer. When Earl Pilgrim revisited the mine in 1931, he noted that a small gasoline-driven Gibson mill had been installed (Pilgrim 1933: 50), but was apparently never used and was in poor condition only a few years later (Capps 1938: 30). No evidence of this Gibson mill was found (or recognized) when the site was recorded by a CRMIM crew. The abandoned milling equipment

still at SEL-233, i.e., Denver quartz mill, must have been installed after Capps' stopover at the mine in 1936.

During Pilgrim's visit, he also mentioned that a log cabin, owned by the Nuka Bay Mines Company, was located down a trail from the mine and on the road that led to the Alaska Hills property. **SEL-237** is in the same location as this cabin plotted on Pilgrim's map, and appears to have been the living quarters for the mine owners and crew. SEL-237 is a log cabin ruin, with only a few log courses still in place and various types of notching still evident at the corners. The logs are sodden and covered with moss. The two artifacts found at the site are a white enamelware plate with a blue rim and a stove flue. The road and trail mentioned by Pilgrim (1933: 48) are now obscured by vegetation.

Extraction/Transportation/Mill. The first site in this category is **SEL-234**, the mill and camp of the Alaska Hills Mine located on the Nuka River about 2.4 kilometers north of the head of Beauty Bay. The site lies at the foot of a steep ridge that forms the eastern border of the Nuka River valley and Beauty Bay. The mill building, having succumbed to many years of heavy snows and avalanches, is in a complete state of ruins. Rusted tools and machinery, some of it still *in situ*, remain in the heaps of structural debris. Much of the machinery has been removed, leaving only cement slabs, or bases, in the ruins. The mill was built on three tiers, or terraced levels. The lowest level, tier one, lies immediately above a hand-stacked rock face and contained most of the machinery, except for the Pelton wheel. The remains of belt pulleys, Pelton wheel buckets, water piping, containers of fine sediment, and miscellaneous hardware suggest that much of the processing occurred on this level. The Pelton wheel, mounted on a concrete foundation, lies outside the southwest corner of the building ruins. It powered the mill by means of water, conducted through a wooden penstock, from some unknown source. Although the Pelton wheel is in its original position, there is evidence that preparations had been made to remove it.

Tier two is smaller in area than tier one and is defined mostly by the concrete foundation for heavy, ball-mill machinery. Dismantled steel plates from the missing ball mill are stacked on the road outside the building. The uppermost level, tier three, is associated with a cable tram terminal and an ore bin. The debris includes a large stump wound with loose cable, along with scattered wood and metal. The aerial tramway transported ore from at least four adits on the ridge down to the mill. An overgrown road extends south from the mill for 60 meters to the ruins of a metal roofed log cabin that served as a camp for the miners. Very few artifacts were near the cabin ruins, but it is likely that an assemblage lies preserved under the collapsed roof of the cabin.

The camp and mill at SEL-234 lie about 500 meters south of the mine workings, which were not visited by a CRMIM crew. These workings consist of four tunnels, the most productive of which followed the Paystreak vein, first discovered in 1918. The mill was installed by 10 employees of the Alaska Hills Mining Corporation in 1924. Most of the machinery was in place and the building nearly complete when it was visited by H. H. Townsend of the Bureau of Mines. He describes the main mill features as a Black crusher, a 40-ton Worthington ball mill using 6-inch balls, three Deister-Overstrom concentrating tables, an amalgamator, a classifier, a 1,000-foot pipe line, and a 66-inch Pelton wheel. There was also a 1,605-foot long aerial tramway connecting the working tunnel with the mill. Despite problems, such as a snow slide that destroyed many of the buildings in 1928 and reportedly inefficient management, the mine continued to operate until the early 1940s (Hovis 1991e). The Alaska Hills Mine, according to figures presented by geologist

Richter, was the second only to the Sonny Fox Mine in terms of gold production for the Nuka Bay area. The estimated production from 1924-1931 was $45,000 (Richter 1970: B3). As of 1967, when Richter visited the site, the mill had been dismantled and burned, and all the camp buildings were collapsed.

SEL-175, the Sonny Fox Mine, contains the remains of the largest and most productive gold mining operation in the Nuka Bay region. The site, located on Babcock Creek, north of Palisade Lagoon at the head of Surprise Bay, operated continuously from 1926 to 1940, and again in more recent decades. There are two major concentrations of features and artifacts at the site - one associated with the mining process (Locus I) and the other with the milling process (Locus II) - which are connected by a surface tram and an aerial tramway. At Locus I, the main access to the mine (the 210 portal) and the underground workings were examined in 1995 by NPS personnel before closing the adit for visitor safety. No artifacts associated with the historic period of the mine's operation were noted other than the railway for the surface tram and the deteriorating timbering (Hovis 1995b).

The surface tramway was constructed in 1931 or 1932 to connect the mine workings with an aerial tramway terminal at the top of the hill above the millsite. Once extending for 245 meters from the main adit, the tramway is now partially dismantled and some of the rail removed and stacked to accommodate a more recent mill building. Both of the tram trestles are now collapsed. Another recent structure, an assay lab, also lies alongside the tramway. Neither of these buildings is associated with the historic, pre-World War II, period of mining at the site. There are, however, several other historic features in Locus I, including a machine and tool scatter, a crawler (four-cylinder tracked vehicle), a standing outhouse containing explosives, a machine scatter that may represent an old blacksmith shop, and the ruins of a freight wagon with wood and metal spoke wheels. The machine and tool scatter contains items such as an air compressor, a rusted mine car body, a hand-crank forge blower, and an acetylene generator. Many Prince Albert tobacco tins, along with beer, whiskey, and medicine bottles are in the can dump, which appears to extend well below the ground surface.

Four collapsed structures were also recorded at Locus I. At least one of the collapsed structures appears to have a bunkhouse as three folding cots and a metal bedframe were among the artifacts in the ruins, and another may have been a cookhouse. It is interesting to note that Pilgrim's description of the camp buildings, which he said included "a log mess-house, a log bunkhouse, two tent-frame residences, and a log compressor-house and blacksmith shop" (Pilgrim 1933: 33-34), do not conform with the archeological description of the structures at the site. Only one of the collapsed structures recorded by the CRMIM crew was constructed of logs, while all the others were built of salvaged irregular-sized lumber. The log buildings were still standing when Capps visited the mine in 1936 (Capps 1938: 27), so it appears that the lumber structures may actually date to a later, perhaps post-World War II, site occupation.

The major feature at Locus II is the historic mill building, now lacking all of its major structural elements. Despite the absence of the building itself, most of the major pieces of machinery described in a 1938 U.S. Geological Survey publication (Capps 1938: 27-28) are still intact and in place. An inventory of this equipment comprises a Wheeling jaw crusher; parts of a Denver quartz mill; two concentrating tables; a Fairbanks-Morse gasoline engine; an Allis Chalmers generator; and a large assemblage of gears, belt pulleys, lineshafting parts, and fittings associated with power transmission. The mill was

once linked to the southern end of the surface tramway by a two-bucket jig-back aerial tram. All that remains of this tram is the cable brake assembly and a sheet metal ore carrier, which had the capacity to carry about 100 pounds of ore. The original source of power at the mill was apparently a Pelton wheel that lies near the access road to the mine. An overgrown tailings pond and a scatter or discarded machine parts and corrugated metal are also at Locus II.

After 14 years of continuous operation and an estimated $70,000 worth of gold production (Richter 1970: B3), the Sonny Fox Mine appears to have been abandoned by its owners in 1940. The property was re-staked in 1951 as the Surprise Mine, and again in 1968 as the Surprise Bay lode claims. Ownership of the mine changed hands again in the late 1970s and early 1980s (Hovis 1990e).

Another mine that contributed greatly to the productivity of the Nuka Bay region is **SEL-177**, the Nukalaska Mill and Camp. Located at an elevation of 150 feet (46 m) on the cliffs above the south shore of Shelter Cove on Beauty Bay, the site consists of several collapsed structures with a large inventory of artifacts dating from the 1930s. Locus I of the site, the aerial tramline and terminal, is situated approximately 600 meters to the west, above the millsite. The only element of the tramway intact is the east cable, which rises to the mine workings still farther above. It is anchored in place by rock bolts and tensioned by a turnbuckle. A second cable, located 1.7 meters to the west, is now down and lying in the brush. The cable arrangement and absence of a bullwheel suggests that this was a two-bucket, reversible (jig-back) tram. All that remains of the tram terminal is a wooden platform, the cable sheaves, and a collapsed tram tower constructed of a pipe several meters long.

The main concentration of site features, including the mill building ruins, is in Locus II. The wooden mill structure itself was destroyed by fire in 1938; but all the equipment, consisting of 21 distinct sub-features, has remained in place. Power was supplied to the mill by a four-cylinder, diesel Caterpillar engine mounted on a concrete footing. A belt pulley mounted on the main shaft delivered the power to the lineshafting in the building. A smaller belt pulley powered the electrical generator mounted nearby. Other equipment still intact is a Marcy ball mill and a Dorr rake classifier. The main separation process at the mill was flotation, using a three-cell Fahrenwald flotation unit. There was also a second concentration method used to process gold at the mill, but the remains are too deteriorated to determine whether it was gravity concentration in the form of a Wilfley table or a plate amalgamation unit.

In addition to the mill, there are 10 other features at Locus II. Most of these features are buildings that have collapsed or are in ruins. Among the collapsed buildings are three plank-framed cabins, a plank-framed cookhouse, and a powerhouse and blacksmith shop, once covered with a corrugated metal roof. A great array of tools and equipment are still in the shop:

- four-cylinder and one-cylinder motors
- two wheels from a Denver quartz mill
- more than 300 drill steels
- a Fairbanks-Morse engine
- a bit sharpener
- a generator
- a work table with pipes and valves in its drawers



Nukalaska mill equipment (SEL-177), including ball mill, classifier, and flotation unit, on Shelter Cover in Beauty Bay, KEFJ.

- a forge box, whetstone, recent outboard engine
- and assorted hand tools.

Unlike many other sites with a mix of equipment dating to various time periods, this site is exceptional in terms of mining technology because most or all of the 1930s-vintage machinery and tools have been left fairly well intact since the site was abandoned after the 1938 fire. The site has been described by former NPS historian Bill Brown as significant because of "its isolation and pristine abandoned condition" (SEL-177 site file).

The Nukalaska Mine, reportedly located on one of the richest veins in the Nuka Bay region, was not actively developed until 1933 and was brought into production during the next two years. The mine itself, now designated as **SEL-235**, was referred to as the "old west workings," by geologist J. C. Roehm, who visited the Nukalaska property in 1941. The mine adit lies several hundred meters west of the mill, at more than 2,200 feet (671 meters) elevation. In addition to the adit, there was a bunkhouse, ore bin, and tram terminal with enclosed blacksmith shop still standing when Roehm (1941:6) described the site. The bunkhouse, constructed of milled lumber, is now in ruins. A handmade sink and drainboard of corrugated metal, three bed frames, a wood stove constructed from a 55-gallon fuel drum, glass bottles, enamelware items, a stoneware plate, metal grater, hand-crank food grinder, and sections of metal pipe were in the cabin ruins. Also recorded at the site was a pit or trench, possibly for storage, filled with partially buried boards. The portal to the mine was observed at a distance from the cabin ruins from a hovering helicopter. A cable, probably used in the aerial tramway, extends from the portal down to the valley floor. Scattered wood debris was also noted around the portal. Even though the "old west workings" and the mill were abandoned after the 1938 fire, development continued on the Nukalaska property in the form of "new east workings" that were drilled to tap the ore bodies beneath the old workings and to provide a more stable tram site that would not be swept away by snowslides each year (Roehm 1941: 1). These developments never fully materialized as wartime restrictions brought mining to a halt on the Nukalaska property in the early 1940s.

Another of the gold-producing sites in the Nuka Bay area was the Rosness and Larson Mine, now designated as **SEL-236**. The site is located in a small cove on the western shoreline of the North Arm of Nuka Bay. According to Pilgrim (1933: 41-42), the first output of gold from the mine was produced by a small Ellis mill that was erected in 1931. The gold was being mined from an outcrop on the beach, open cuts, and from three tunnels. One tunnel was driven in a bluff near the shoreline, another was almost at tideline, and the third was on the hillside above. Ore mined on the beach was hoisted to the mill ore-bin by means of a "trolley" and windlass. By 1936, the mill was no longer in operation (Capps 1938: 32). Among the features remaining at the mine are the three adits, along with the power plant/mill area and associated machinery, and an artifact scatter of heavy, rusted metal objects on the beach. The remains of a camp could not be found and were perhaps concealed by very dense vegetation around the site.

The main feature at SEL-236 is the power plant, located on a level area at the base of the hillside (figure 33). Various pieces of machinery - a Pelton wheel, an electrical generator, a gasoline engine, and an air compressor - are supported by wood beams or metal bases on the south section of the platform. The floor of the platform is now mostly rotted away, leaving the machines slightly askew on the heavy timber supports below. An air compressor tank lies adjacent to the platform. A jaw crusher mill, logs, and planks are scattered on the hillside immediately southwest of the platform. Deteriorating timbers and lumber on the hill above the jaw crusher suggest that there was once a mill platform (perhaps where the ore bin was located) at the site. The Ellis mill referred to by Pilgrim (1933: 42) would have been a secondary crushing device that processed the ore after it had been through the jaw crusher. This mill could not be found at the site.

The main source of power at the mine was the Pelton wheel. It was supplied with water, from an unknown source, by a metal penstock that still extends down the hillside and attaches to its lower water wheel housing. The power plant is also linked to one of the lower adits by a cable, used to winch up ore from the beach level to the mill. This cable was probably part of the trolley system mentioned by Pilgrim (1933: 41). Both of the other adits are collapsed. A spoil pile and scattered mining equipment lay abandoned near the upper adit.

The remaining two sites visited by CRMIM crews in the Nuka Bay region are similar in that their historic components have been disturbed to a large extent by more recent mining. The first of these is **SEL-213**, originally known as the Charles Goyne property. The site is located along the west shore of Surprise Bay. The camp features are situated on a gently sloping terrace adjacent to the shoreline, while mining features are located on the steep hillside above. The features that date from the early 1930s are two adits, a tramway terminal, a tugger, cabin remains, and a scatter of displaced equipment. The portal of the upper adit lies adjacent to an artificial terrace constructed of waste rock from the tunnel and held in place by recent cribbing. A tramway and loading terminal are situated at the south end of this terrace. It seems that ore was loaded directly into a car, as there is no ore bin or other storage facility. The tram is a single-cable, jig-back system powered by an electric motor, which operates a single drum hoist. Some pieces of the original cable can still be seen; but in general cable and other features of the tramway, including the car, have been recently installed. There are several pieces of machinery on the terrace, which post-date the historic mining operation at the site. Some of the equipment, such as the Le Roi trailer-mounted compressor, may actually be nearing historic status, i.e., 50 years old.

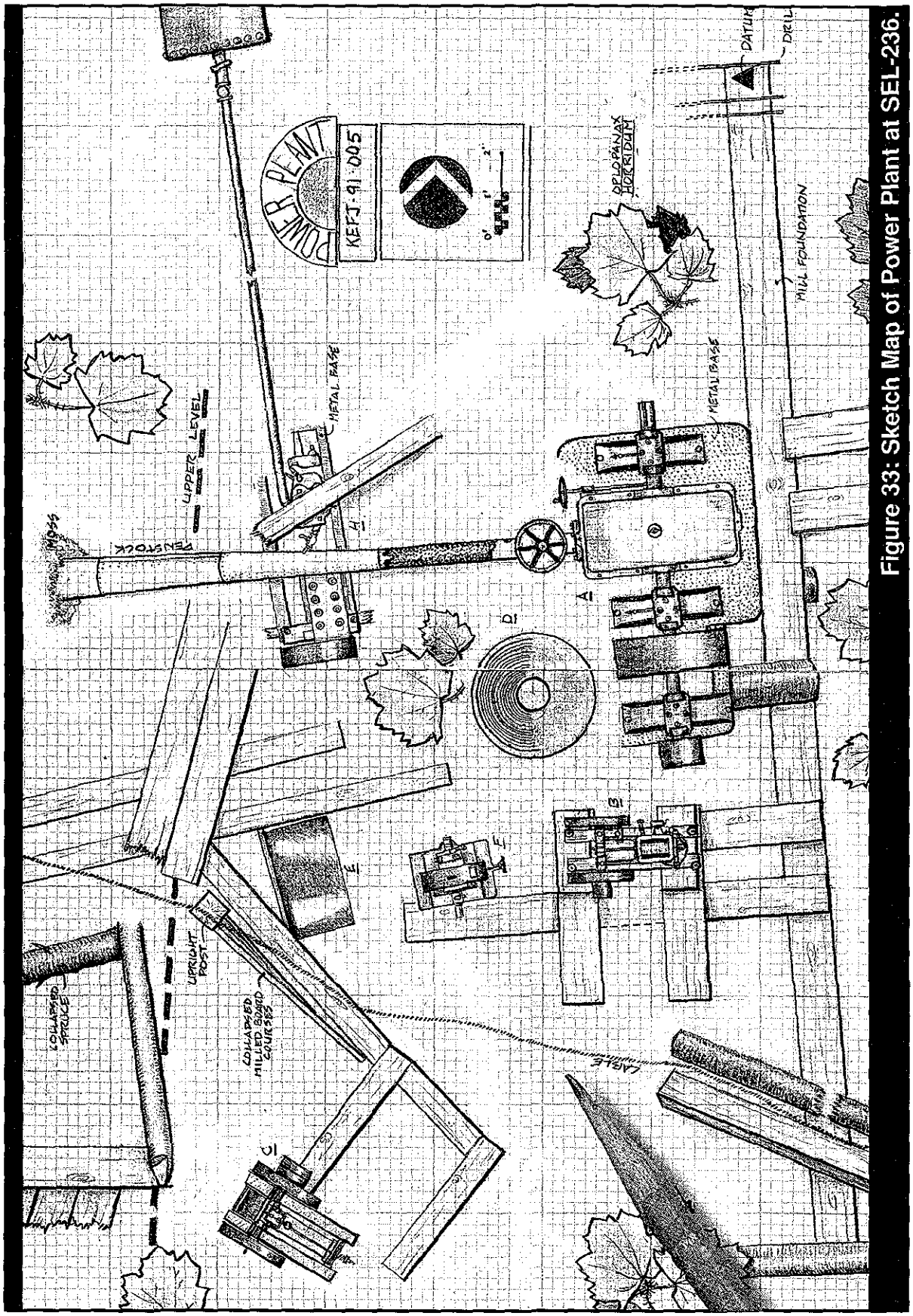


Figure 33: Sketch Map of Power Plant at SEL-236.

The lower adit at the site was also driven during the 1930s and appears to have been little changed since that time. The tunnel is still tracked with 12-pound rail; and the dump pile, which spills onto a lower terrace and out into the ocean, is heavily overgrown. There is a double-drum tugger (air-powered hoist), which probably dates to the 1940s, lying in the streambed close to this adit. The tugger was probably once used at the upper adit, and fell to its present location. An old wheelbarrow and three stacked, square-notched sill logs of an old cabin lying on the beach are other vestiges of the early mining operation at this site. There is also a cluster of scrap metal and old equipment, including the original tramway bucket manufactured by the W.L. Newell Company and parts of a jaw crusher, located near a collapsed 1960s storage shed.

Features that post-date the historic mining period at the site (1950s or later) include an ore bin and crushing machinery situated at the lower end of the aerial tramway, a 1980s-vintage wash plant and concentrating tables, a wooden box containing explosives, a plywood cookhouse/bunkhouse, a plywood and lumber shed, and a portable compressor manufactured by the Chicago Pneumatic Corporation. Some of this equipment probably dates to the 1950s or 1960s when the Golden Horn group made an unsuccessful attempt to revive the mine (Richer 1970: B12). It appears, based on the modern wash plant and concentrating tables at the site, that money was still being invested in the mine as late as the 1980s. It is interesting in the light of this recent activity at the mine to re-read the 1936 geological report that states:

> There can be no doubt that ore having a high gold content occurs on this property, but the developments so far made have not yet demonstrated the presence of an ore body of sufficient size to justify the installation of milling equipment with the assurance that a continuous supply of profitable ore can be obtained (Capps 1938: 31).

The final site in the Nuka Bay region is **SEL-212**, located on Ferrum Creek about 1.5 kilometers northwest of Beauty Bay. The mine at this site, originally known as the Little Creek property, was first developed in 1924 and 1925 by Eric Burman and H. Carlson and later by Earl Mount (Pilgrim 1933:44). In 1932-34, more than 120 meters of underground tunnels and raises were driven on the property, but this work failed to discover enough ore to justify building a mill (Capps 1938: 32). The property lay idle until 1965, when two men from Ohio, a Mr. Glass and a Mr. Heifner, took over the claims. They erected a mill with two jaw crushers, a ball mill, and a Wilfley concentrating table; a machine shop; and a comfortable bunkhouse. In 1967 they began surface mining the northernmost vein (Richter 1970: B8). The archeological remains at SEL-212 consist of an amalgamation of structures and features associated with these various episodes of mining. As this type of "recycling" makes archeological interpretation difficult, some of the features cannot be positively attributed to a particular period.

At the upper mine workings, there is a 100-foot open cut connected to mill buildings by means of a wooden trestled ore slide. A wooden car track and mine car, presumably from an early mining episode, are located below the trestle and slide. The wooden track leads to an overgrown waste dump, where an old ore crusher, manufactured by the Universal Crusher Company, lies abandoned. The only other feature that dates to the 1930s activity is the timbered portal to a mine adit, lying under the more recent structure, which houses the fine ore bin. During the Glass-Heifner operation of the mine, the crudely built trestle and slide served to funnel down the ore to be hand trammed in wheelbarrows to an



Wooden track and mine car dating to the early period of mining at SEL-212 on Ferrum Creek in KEFJ. An old ore crusher lies just below the mine car.

ore bin, which fed a primary crusher. The ore continued through to a fine ore bin and then into mill, a standing frame structure built in the 1960s. Machinery, all dating to the later operation of the mine, remains intact inside the mill building. An abandoned ceramic, brick-lined ball mill, along with several hundred porcelain balls, lies upslope from the mill.

A lower camp is situated below the mill building. Features at the lower camp include: a workshed, a flotation unit, an outhouse, the rusted remains of a caterpillar crawler, a Buda engine and General Electric generator, a recent dump, the ruins of a burned bunkhouse, an Overstrom concentrating table, a Wilfley-type concentrating table, a skid shack, and some other miscellaneous features. It is doubtful that any of these features dates to the historic 1930s-period of mine operation. In general, the site has poor integrity, with most of the older remains having been displaced from their original contexts.

Juneau District (Reid Inlet Area)

The Juneau District encompasses a section of the southeast Alaska mainland from about 80 kilometers south of Juneau, north through the Juneau gold belt and up to Skagway, and then westward to GLBA (figure 16). This district has been the source of almost 75% of all the lode gold mined in Alaska since the first claim was staked near Sitka in 1871. The large mines in the Juneau gold belt, such as the Treadwell, the Alaska-Juneau, the Perseverance, and others, have been the major producers, with a yield of more than 6.5 million ounces of gold and several million ounces of silver and lead through the mid-1960s. Outside the gold belt, the only other mines to produce a substantial amount of gold were located in Reid Inlet in the northwestern corner of the district (Berg and Cobb 1967: 154, 160). During the 12-year period of gold production in Reid Inlet, from 1938-1950, at least 2,500 tons of high-grade ore, averaging $100 in gold per ton, have been mined and milled from the several mines in the area (Rossman 1959: 39).

Reid Inlet was first prospected in 1924 by a Mr. Ibach, who staked claims near Ptarmigan Creek. Shortly thereafter, the area was incorporated into Glacier Bay National Monument, the precursor to GLBA, and therefore closed to mining until 1936 when the restrictions were lifted. In 1938, Abraham Lincoln Parker and his son Leslie discovered the LeRoy vein, soon to become the foremost mine in Reid Inlet. As the story goes, the elder Mr. Parker, in his later years, decided that he wanted to operate a gold mine. Rather than spending his time prospecting, he worked on designing and building a small, two-stamp mill at his home in Gustavus. When it was completed, the two men dismantled it and rafted it to the upper part of Glacier Bay opposite the mouth of Ptarmigan Creek. They began prospecting and within a few hours had discovered the rich LeRoy vein, which they began to mine soon after building an aerial tramway from the vein down to the mill (Rossman 1959: 38). Although it appears that either Parker was incredibly lucky in his reversal of normal mining procedure (i.e., first building the mill, and then finding the prospect), what probably happened is that he had learned of the potential of the area from Ibach, who may have even granted him permission to stake a claim if gold was discovered (Hovis 1993b: 11). The Parkers mined the LeRoy vein until the winter of 1941, when the elder Mr. Parker died. The property was then leased to a group who adopted the name the LeRoy Mining Company. By 1945, they had mined most of the ore accessible from the main working level (Rossman 1959: 38-39). Intermittent work continued at the mine through the latter half of the 1940s, but in 1952 it was closed by the Parker family who had reclaimed control of it (Hovis 1993b: 11).

The LeRoy Mine, designated as **XMF-045**, is the only site inventoried in GLBA under the auspices of the CRMIM program (figure 34). The site is situated along Ptarmigan Creek on a steep, north-facing flank of Mount Parker. The historic features at the site have mostly been destroyed by natural processes and by mining activities during the 1970s and 1980s. There is no evidence of Parker's original two-stamp mill left at the site, and the production mill erected in 1941 was leveled by a snowslide in 1954. Only a few fragments of machinery remain as evidence of this mill. Even the Overstrom concentrating table, originally spared by the snowslide, has since been burned, and the tailings disturbed, presumably in an effort to recover every last bit of gold. The original cabin, with a corrugated metal roof, is still standing; but the addition built onto it in the 1940s is gone except for the floorboards and some domestic refuse. Some remnants of cable and two displaced tram cars are all that remain of the single and double rope aerial tramways. The mine is in a better state of repair than the mill or the cabin. The original east adit and the west adit, connected by a 33-meter long railway grade in 1950, are all still intact. The original blacksmith/compressor shed, located just east of the east adit, is in ruins, but does contain the Chicago pneumatic compressor that powered the operation as of 1941. Like the rest of the site, the shed has been reused and re-equipped on several occasions, leaving a structure (and a site) with very little historic integrity (Hovis 1993b).

Discussion

The inventory of CRMIM lode mining sites is a study in contrasts. Included in the inventory are the structures, equipment, artifacts, and landscape features of industry giants, such as the Kennecott Corporation, as well as the ruins of cabins and collapsed adits of small prospecting ventures that operated with very little capital. Another contrast is seen in the condition of the sites - a few, such as the Green Butte Mine (XMC-096) dat-

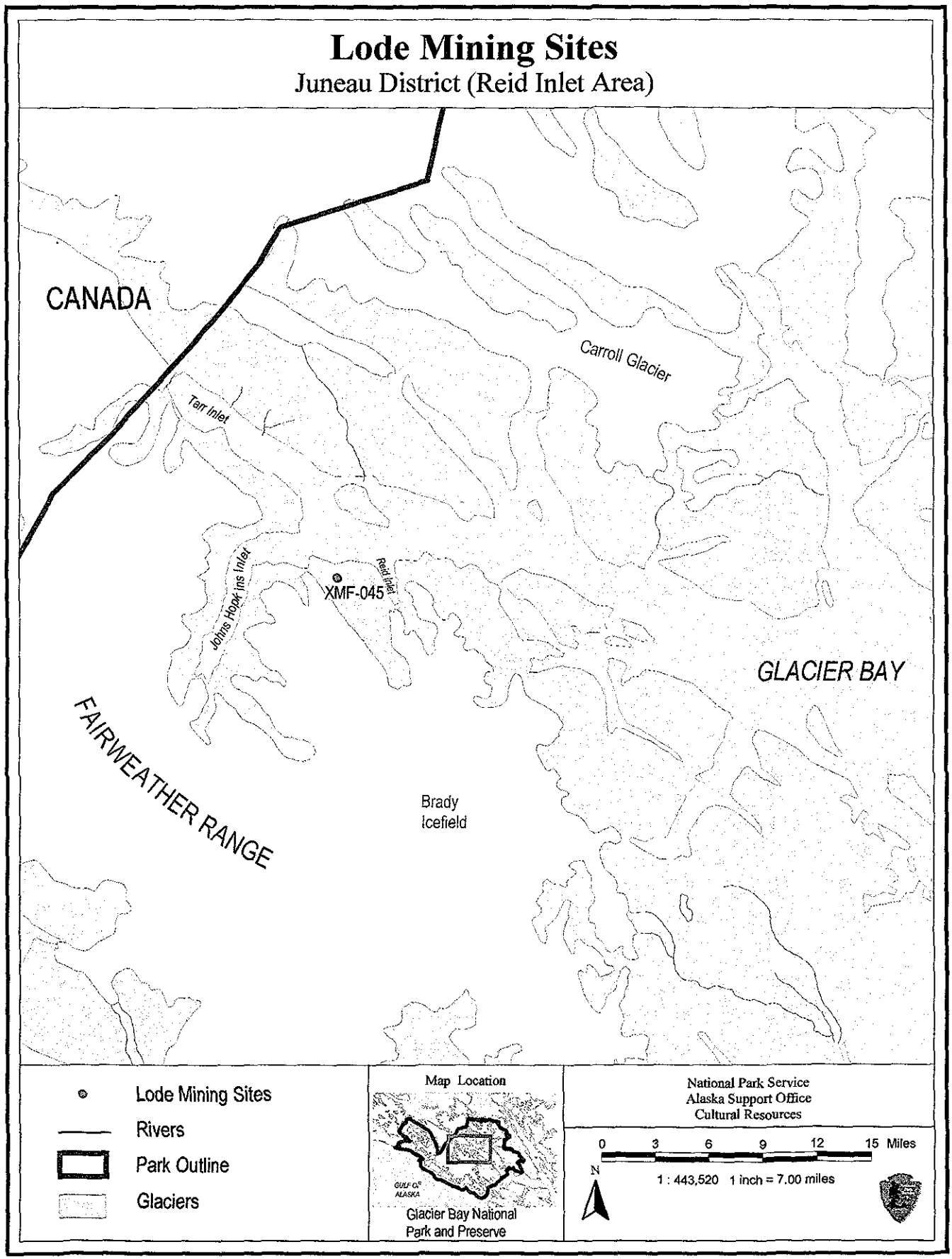

Lode Mining Sites
Juneau District (Reid Inlet Area)
CANADA
Carroll Glacier
Tarr Inlet
Johns Hopkins Inlet
Reid Inlet
XMF-045
GLACIER BAY
FAIRWEATHER RANGE
Brady
Icefield
Lode Mining Sites
Rivers
Park Outline
Glaciers
Map Location
GULF OF ALASKA
Glacier Bay National Park and Preserve
National Park Service
Alaska Support Office
Cultural Resources
0 3 6 9 12 15 Miles
N
1 : 443,520 1 inch = 7.00 miles

Figure 34.

ing to the 1920s, are largely intact after decades of abandonment, while others have been ravaged by natural processes and human destruction. The historic occupation of the lode mining sites, like the placer mining sites, spans only a half-century, from the early 1900s to the 1950s. These sites exemplify the enormous economic, technological, and social changes that were transforming Alaska from a little-known territory into the 49th state.

The earliest lode mining sites, dating to the 1900-1910 period, are in the Kantishna District, in the Kotsina-Kuskulana area of the Chistochina District, and in the Nizina District. One such site in the Kantishna District is MMK-079, the Glen Prospect, where two collapsed adits remain from 1906 development of a quartz deposit in the Glacier Peak area. There are no historic structures remaining at this site. In the Kotsina-Kuskulana area, mining development at the turn-of-the-century is exemplified by sites on Elliott Creek, once operated by the Hubbard-Elliott Copper Mining Company. The best example is VAL-244, where two of the three cabins are still standing. One, which appears to have been occupied recently, has been roofed with corrugated metal and is in good condition. The third cabin, probably the oldest, is a seven-room log structure, now collapsed, that served as the main living quarters for the camp during a period of about two decades beginning just after 1900. The importance of freighting by horse-drawn wagons at these early camps is still seen in the ruins of a stable also at VAL-244.

The most notable mining activity during the first decade of the century took place in the Nizina District at the Kennecott mining complex. Along with mine development and camp and mill construction during the latter part of the decade, crews also began to build the aerial tramway system to bring supplies and men up, and copper ore down from the mines to be processed in the mill. The system (figure 30), built between 1908 and 1920, includes the upper camps where the miners and other personnel lived. Of the five Kennecott sites recorded by CRMIM crews, the earliest is XMC-081, the Bonanza tram angle station, lying on the line connecting the Bonanza Mine with the mill. The original station, built in 1908, burned down and was rebuilt a few years later. The two-story operator's house, still in a good state of repair, may have been built when the station was initially constructed. Three of the other Kennecott sites are located along the tramway from the Jumbo Mine to the junction station with the Glacier tramway. The blacksmith shop at the Jumbo Mine (XMC-085) lying at the head of the tramway, probably dates to the period of mine development, and thus would predate 1913, when the mine was finally brought into production.

Most of the structures at the Kennecott sites, however, date to the decade between 1910 - 1920 when production was spiraling upward. Many of the buildings at the Jumbo Camp (XMC-085) and farther down the line at the Jumbo-Glacier junction (XMC-087) were probably built in 1915 (the year the original Jumbo tramway was completed) or earlier. One of the buildings at XMC-087, the operator's house, is finely detailed and well preserved; another is the junction station, which has much of its braking, electrical, and car-detachment equipment still intact. To the west in the Kotsina-Kuskulana area, development continued throughout the decade, and actually culminated in the production of copper ore at the Nugget Creek Mine (XMC-091). Although the mill building is badly deteriorated and nearly all the equipment removed, the Nugget Creek Camp (XMC-090) is well preserved, with a two-story log bunkhouse and three log cabins still standing at the site.

Mining activities continued in the Kotsina-Kuskulana area into the 1920s. One of the last mines to remain open for development was the Copper Creek Mine (VAL-248). Two collapsed structures at the site, a tool shop and a compressor room, still contain a wide variety of hardware and equipment, including a large Ingersoll-Rand compressor, that date to the 1920s and earlier. The Copper Creek Mine Camp (VAL-247) situated nearby contains a standing cabin, with an assemblage of furniture and other artifacts, and a collapsed bunkhouse and mess hall. As the copper mining began to wane in the Nizina District and in the Kotsina-Kuskulana area in the mid-1920s, another mining industry, based on silver and lead, was just picking up in the Kantishna District. One excellent example is at MMK-091, the Alpha Ridge Mine, which was among the first silver-lead producers in Kantishna. Still standing and in good condition at the site are a work shed and a cabin, both of frame construction, covered with tar paper. The remaining artifacts reveal something more about the lives of the miners than found in the geological reports. For example, milk glass cold cream jars suggest that a woman lived at the camp, and a wooden dog sled indicates that dog-traction was probably used for freighting or possibly even for recreation.

From the mid-1920s through the 1930s, areas that had not drawn a great deal of previous attention came into the mining limelight. Most notable was the Nuka Bay area of the Homer District, where CRMIM crews recorded several sites containing the remains of mills and aerial tramways. The actual structures that housed the milling equipment have all fared very poorly at these sites because of avalanches, fires, or other destructive processes. In some cases, however, most or all of the milling equipment is still in place in the structural ruins. The best examples are at the Sonny Fox Mine (SEL-175) and the Nukalaska Mill and Camp (SEL-177). Unfortunately, like the mill buildings, the other structures at both of these sites, including the aerial tramways, are either collapsed or in ruins. In contrast to the condition of the Nuka Bay sites are the Bremner sites, also dating to the 1930s. The aerial tramways, workshops, and dwellings at many of these gold-mining sites are still in fairly good condition, even after several decades of abandonment. One particularly good example is at XMC-107, where the camp buildings were enclosed with stone walls up to 2 m high to protect them from rock falls and avalanches. At the Sheriff Mine (XMC-106), dating to the very end of the 1930s, the underground workings, tram station, machine shop, and miners' living quarters are all still intact despite more than 50 years of exposure to the elements.

During the early 1940s, the gold mining industry in America came to a virtual standstill because of War Production Board order L-28 that declared gold to be a non-strategic mineral during the war years. One of the few Alaska mines to prosper then (1942-1945) was the Stampede Antimony Mine (MMK-016), as antimony was considered essential to the war effort. Many of the structures and features that still exist at the mine today were constructed during a systematic rehabilitation of the mill and renovation of the camp in 1942-1943. At that time, antimony ore was shipped out by tractor and sled in winter on the Stampede Trail. The gold mining industry, however, was slow to recover even after the restrictions were lifted in 1945. One of the mines to resume operations shortly after the war was the Rambler Mine (NAB-072) in the Chisana District. Some of the 1940s features, such as a railway and skipway and the tools and equipment associated with the blacksmith/workshop area, are still present despite subsequent mining at the

site. Also dating to the 1940s are a few copper and gold prospecting sites in the Orange Hill vicinity of the Chisana District.

Mining at some of the lode sites in the CRMIM inventory continued, with the introduction of new technology, in the decades that followed World War II. At some, such SEL-212 in the Nuka Bay area, recent mining has greatly disturbed the historic component features and artifacts at the site, making most types of archeological site interpretation impossible. Sites that now have more to offer in terms of technological analysis are those that have been abandoned, leaving the processes of site destruction to nature and not to man. Fortunately, there are many in this latter category and many sources of technological information at each site. Perhaps the best example is at the North Midas mill (XMC-089) in the Kotsina-Kuskulana area. Although the mill building, built in 1918, is deteriorating, the equipment is essentially still intact and illustrative of how milling processes can be upgraded in an attempt to increase mineral recovery.

Another great source of information for the industrial archeologists are the toolsheds, blacksmith shops, and power plants remaining at many sites. Examples of well-preserved assemblages of small tools and equipment necessary to run a mine during the 1920s or the 1930s are at

- the Alpha Ridge Mine (MMK-091)
- the Stampede Mine (MMK-016)
- the Green Butte Mine (XMC-096)
- the Galena Bay/Copper Creek Mine (VAL-248)
- the Grand Prize Mine (XMC-115)
- the Sheriff Mine (XMC-106)
- and the Nukalaska Mine (SEL-177).

The best example of a hydroelectric plant is found at the Lucky Girl Mining Camp (XMC-105), where much of a 1.6 km-long water diversion system is still discernible.

Archeological Patterns. As in the preceding chapter, the focus here is to look analytically at the size and structure of the features that compose lode-mining camps and determine if and how they vary from mining district to mining district. Together as a group, the lode mining camps differ from the placer camps in terms of size - the lode habitation structures are generally larger, there are often more of these structures per camp, and in some districts there are also more outbuildings per camp. With a total sample size of 164 structures, the average size of a dwelling in a lode mining camp is 39.3 m^2. This figure is more than twice as large as the corresponding figure for placer camps, which is 19.0 m^2. The contrast in number of dwellings per camp is not as marked, but still the lode mining camps are larger, with an average of 2.5 per camp as opposed to 1.7 for the placer camps. In terms of outbuildings, a contrast is also seen with an average of 2.7 per lode camp and only 1.7 per placer mining camp. These figures are not surprising, considering that the capital investment and the crew size at lode camps was often much greater than at placer camps. As mentioned at the beginning of the chapter, however, the types of domestic artifacts at lode and placer camps are quite similar. In general, two artifact classes - household and food storage - are the best represented, followed by mining tools and equipment and multi-purpose tools. Just as in the placer camps, many good examples of unique and homemade furniture and stoves were recorded at lode mining camps.

In looking at each of the lode mining districts separately, we also see a great deal of differences, not only in the size of the camps (table 71), but also in their general character.

The Kantishna District presents a diverse picture with respect to minerals types - silver-lead, antimony, and gold - and the range of mining processes represented by the sites. These sites document a long period of historic lode mining in the district, from the 1906 Glen Prospect (MMK-079) to the Never-Sweat Mine (MMK-092), operated by F.P. Bunnell in the early 1950s. Some if these sites (MMK-077, MMK-079, and MMK-082) are associated with exceptional people, such as Tom Lloyd, William Taylor, and Charles McGonagall, who were celebrated mountain-climbers as well as miners. Other notable characters were Joe and Fannie Quigley, whose Red Top Mine Camp (MMK-117) still preserves something of their unique subsistence lifestyle despite the fact that the site is now overgrown and in ruins. In general, this lifestyle seems to be much better represented at placer camps than at the lode-mining camps, where the miners appear to have been more single-minded in their hard-rock pursuits. Like the placer mining sites in the Kantishna District, however, there is evidence of both women and children at the lode camps: cold cream jars were found at MMK-091, pages of what appears to be *Ladies Home Journal* at MMK-089, and a toy truck at MMK-127.

In contrast to the diversity of the Kantishna District, the Kotsina-Kuskulana sites are a more cohesive unit, mostly representing a push to copper mining development and production from the early 1900s through the 1920s. As mining continued in the Kantishna District until recent years, some of the sites are a mix of older and newer structures and artifacts, while many of the Kotsina-Kuskulana sites might be considered "period pieces" that have been abandoned and left to the processes of nature during the decades. The Kotsina-Kuskulana Camps are larger, in terms of average number of habitation structures (4) per camp, than camps in any of the other districts. Although most of the sites contain the remnants of at least one, and sometimes up to three or four, substantial log or milled lumber structures, there are also a considerable number of tent frames or tent platforms included in the inventory. These latter structures were assigned to members of the large mining crews needed to develop such properties as the Nugget Creek Mine. The Nugget Creek Mining Camp (XMC-090) is an excellent example of how well-made buildings, such as the two-story log bunkhouse still standing at the site, can survive decades of disuse and neglect.

More than any other group of sites, the Kotsina-Kuskulana sites exemplify the rigors of transportation into remote areas during the early decades of the twentieth century, before major road construction or the advent of airplane travel. Journeying into the Kotsina-Kuskulana area became somewhat easier after the completion of the Copper River and Northwestern Railroad in 1911, but the distance from the railroad station at Strelna to the mines still had to be traveled by horse-drawn freight wagons. The wagons and other artifacts associated with horses and freighting are very noticeable at the sites today. The remains of barns or stables are found at several sites, including VAL-242, XMC-041, XMC-089, XMC-090, XMC-093, and XMC-101. Perhaps the best example is at VAL-242, the lower camp of the Hubbard-Elliott Copper Mining Company, where the stable remains in excellent condition and contains the tack, rigging, and other equipment for horses and wagons. The preservation at these stables is so good that the names of the horses still can be read on their stalls.

Although there are several large mining operations represented by sites in the Nizina District, they are all over-shadowed by the presence of the Kennecott mining complex. The camps in this district, as might be expected, often consist of large, well-made

Table 71

Archeological Patterns Found at Lode Mining Camps and Camps/Operations in All Districts

District	Sample Size	Archeological Patterns
Valdez Creek	1	Site in Chulitna River area possibly assoc. with lode gold production, placer mining, or bridge construction Habitations are log cabins Average number of habitations per camp = 3; average size = 14.5 m^2 Average number of outbuildings per camp = 3 Small sample size, not representative of district in general Activities: woodworking.
Kantishna	13	Sites assoc. with prospecting, development, extraction, and milling Minerals = silver-lead, antimony, gold Habitations are primairly cabins, both log and lumber Aver.number of habitations per camp = 2; average size = 31.1 m^2 Aver.number of outbuildings per camp = 2; caches and outhouses are common Activities: blacksmithing, dog-mushing, trapping(?); also gardening, hunting, beer-making, and baking at one site.
Chistochina	18	Sites in Kotsina-Kuskulana area assoc. with copper development and some production; very little gold production Habitations = cabins, tent frames, and bunkhouses; log and lumber Aver. number of habitations per camp = 4; average size = 30.0 m^2 Aver. number of outbuildings per camp = 3.3; several stables Activities: sawmilling, blacksmithing, freighting (horses).
Nizina	24	Sites associated with large-scale copper mining; also large-scale gold production in the Bremner area Habitations cabins, tent frames, and many bunkhouses; log and lumber Aver. number of habitations per camp = 2; average size = 68.7 m^2 Aver. number of outbuildings = 3.4 Activities: blacksmithing, freighting, woodworking.
Chisana	6	Sites assoc. with prospecting for gold and copper and gold development Habitations are mostly plywood tent frames Aver. number of habitations per camp = 3.2; average size = 16.9 m2 Aver. number of outbuildings per camp = 1.7 Activities: blacksmithing, dog mushing.

(continued)

Table 71 (continued)

District	Sample Size	Archeological Patterns
Homer	8	Sites are assoc. with gold production; extraction and milling Habitations are cabins and bunkhouses; mostly lumber Aver. number of habitations per camp = 1.4; average size = 26.9 m^2 Aver. number of outbuildings = 1.9 per camp Activities: blacksmithing.
Juneau	1	Site in Reid Inlet assoc. with gold production and milling Habitation is a cabin built of lumber One habitation at camp; size = 15.0 m^2 No outbuildings still present No activities indicated This is not a representative sample.

structures that are standing and in good condition today. The average size of the habitations in the district is 68.7 m^2, which is more than twice as large as the average dwelling in any other district. Some of them are two- and even three-story frame bunkhouses that housed the crews employed at Kennecott and the nearby Green Butte Mine. These large bunkhouses are unlike the unique structures in the Bremner area of the district, where gold was mined successfully during the 1930s. At several of the Bremner camps (XMC-105, XMC-106, XMC-115, XMC-118), the cabins were framed with wood and then sheathed with corrugated metal. Surprisingly, these metallic structures seem to weather well and are all still standing, some in good condition. The most unique of the Bremner camps, however, is at one of the Yellowband mines (XMC-107), where a thick protective stone wall surrounds a tent frame that is still in good condition.

There are also more outbuildings, on average, associated with the Nizina District camps (3.4) than at camps in other districts. (Sites in the Kotsina-Kuskulana area are a close second with an average of 3.3 per camp). Besides the more common types of outbuildings, such as sheds, outhouses, caches, and workshops, many of the outbuildings at sites in the district are categorized as "other" (see table 60), and include such diverse structures as barns and stables; kitchens and mess halls; blacksmith shops; storehouses; assay offices; a warehouse; powder houses; generator houses; and meat-hanging sheds. Women and children were certainly an integral part of society at the Kennecott mining complex (Grauman 1977a; Kain 1991b), but even at smaller and more remote lode mining camps, such as the Westover Prospect (XMC-112), there are both historic photographs and archeological evidence (remnants of a corset and garters) to attest to the presence of women in the Nizina District.

The sample of lode mining camps in the Chisana District are distinct from the others in WRST as they, with the exception of the Rambler Mine (NAB-072), represent only prospecting and exploration activities. Most of the habitation structures at these camps are the remains of small (average size = 16.9 m^2) plywood tent frames or cabins, some erected as recently as the 1960s, in the Orange Hill vicinity of the Nabesna River. In contrast to these expediently built structures is one standing log cabin (XMC-084), which exhibits a fair amount of workmanship and dates to pre-1915 copper exploration near the White River at the opposite end of the district.

In the Homer District (Nuka Bay area), the structures consist mostly of milled lumber cabins and bunkhouses, which are relatively small (average size = 26.9 m^2) compared with the dwellings in the Kantishna, Chistochina, and Nizina Districts. The camps are also small in terms of number of habitations and outbuildings per camp (table 71). Although much of the mining equipment, particularly associated with the mills, is still present and marginally intact at the Nuka Bay sites, the camp buildings, with the exception of more recent structures at SEL-212 and SEL-213, are generally in very poor condition. The array of domestic artifacts found at these historic sites is somewhat meager, probably as the result of reuse by a more recent generation of miners or removal by looters. In the remaining two districts - the Valdez Creek and Juneau Districts - the samples each consist of only one site, and are thus not representative of the district as a whole.

CHAPTER 14

MINING COMMUNITIES AND OTHER HISTORIC SITES

In addition to sites specifically associated with placer and lode mining, as discussed in the two previous chapters, the CRMIM inventory includes a variety of other historic sites. This "other historic site" category is composed of 49 sites, located in DENA, WRST, YUCH, and GAAR. They are enumerated and briefly described in table 72. In many cases these other historic sites are mining-related in that they represent the facilities and services essential for providing miners with transportation, building materials, communication, temporary lodging, and a community support system. In other cases, the sites do not pertain to mining, but to subsistence activities, such as trapping, or other miscellaneous functions. A handful of the sites, primarily camps, are so badly deteriorated or lacking in diagnostic artifacts, that there is no longer evidence of how the site may have functioned; and they are simply categorized as "unknown."

Included in the CRMIM inventory of mining-related sites are a few mining communities, such as Eureka/Kantishna and Diamond in DENA, Bonanza City in WRST (Chisana Mining District), and possibly the remains of one other early Chisana community, built in the general frenzy that accompanies the discovery of a new placer deposit. In general, these and other mining communities scattered throughout the Alaska Interior sprang up almost instantaneously as tent cities. As the throngs moved in, businesses were established and more permanent structures, such as log cabins, were erected. These communities became the hubs of communication and commerce for the miners. Often they had post offices or recording offices, and some had roadhouses. When the bonanza days had past in a district, the stampeders moved out as quickly as they had entered, abandoning their dwellings and many of their belongings. Only the hardiest or most persistent stayed on, making do with what they had and "recycling" what was left behind by the others. The remnants of these mining communities and several other historic sites, some occupied only briefly and others intermittently over many decades, are described below.

Denali National Park and Preserve

Seventeen historic sites were recorded by CRMIM crews in DENA (figure 35). Many of the sites are directly or indirectly related to mining, even some that are listed here as subsistence-related (see for example MMK-011) or transportation sites. Chronologically, they span a half-century period from about 1905 to the 1950s. One of the sites discussed below (**MMK-018**) is still occupied today.

Mining-Related Sites. There are six sites in this category, including two mining communities that sprang up during the early gold rush days of the Kantishna District. The first is **MMK-001**, the town of Diamond, located near the head of navigation on the Bearpaw River. It is composed of four features - a log cabin, a frame cache/storage shed, a

Table 72

Mining Communities and Other Historic Sites

Site	Site Type	Function	Name
		DENA	
HEA-229	camp	trapping?	—
HEA-230	operation	transportation	W. Fork Chulitna bridge
MMK-001	camp	community	Diamond
MMK-011	camp	fish camp	Moose Crk. fish camp
MMK-018	camp	roadhouse	Kantishna roadhouse
MMK-020	camp	residence	Fanny Quigley Cabin
MMK-047	operation	transportation	—
MMK-058	camp	unknown	—
MMK-059	camp	trapping	—
MMK-064	other	cache	—
MMK-083	other	grave	Johnny Busia's grave
MMK-084	camp	doghouses	—
MMK-085	camp	homestead	Pollack family homestead
MMK-093	camp/oper	sawmill	—
MMK-094	camp	mountaineering	Cache Creek base camp
MMK-099	camp	community	Eureka/Kantishna
MMK-100	camp	unknown	—
		WRST	
VAL-234	camp	roadhouse?	—
XMC-011	camp	community?	Sourdough?
XMC-042	camp	transportation	—
XMC-044	camp	transportation	—
XMC-046	camp	transportation	—
XMC-049	camp	transportation	—
XMC-051	camp	transportation	—
XMC-071	camp	roadhouse	Peavine Bar Roadhouse
XMC-083	camp	unknown	—
XMC-092	camp	unknown	—
XMC-102	camp	transportation	—

(continued)

Table 72 (continued)

Site	Site Type	Function	Name
XMC-103	camp	transportation	Jake's Bar Camp
XMC-108	operation	sawmill	—
XMC-109	camp	unknown	—
XMC-110	camp/oper	transportation	—
XMC-117	camp/oper	transportation	—
NAB-009	camp	community	Bonanza City
NAB-045	camp/oper	sawmill/community?	Woodrow?
NAB-078	camp	unknown	—
NAB-081	camp	unknown	—
NAB-091	operation	transportation	—
		YUCH	
CHR-058	camp	trapping	—
CHR-072	camp/oper?	unknown	—
CHR-079	camp	unknown	—
CHR-090	camp	coal mine	Nation Coal Mine
CHR-091	operation	trapping	—
CHR-092	camp	trapping/other	Nation Bluff Camp
CHR-100	operation	transportation	Ben Creek airstrip
		GAAR	
WIS-049	operation	transportation	—
WIS-212	camp	unknown	—
WIS-214	camp	woodcutting	—
WIS-215	camp	trapping	—

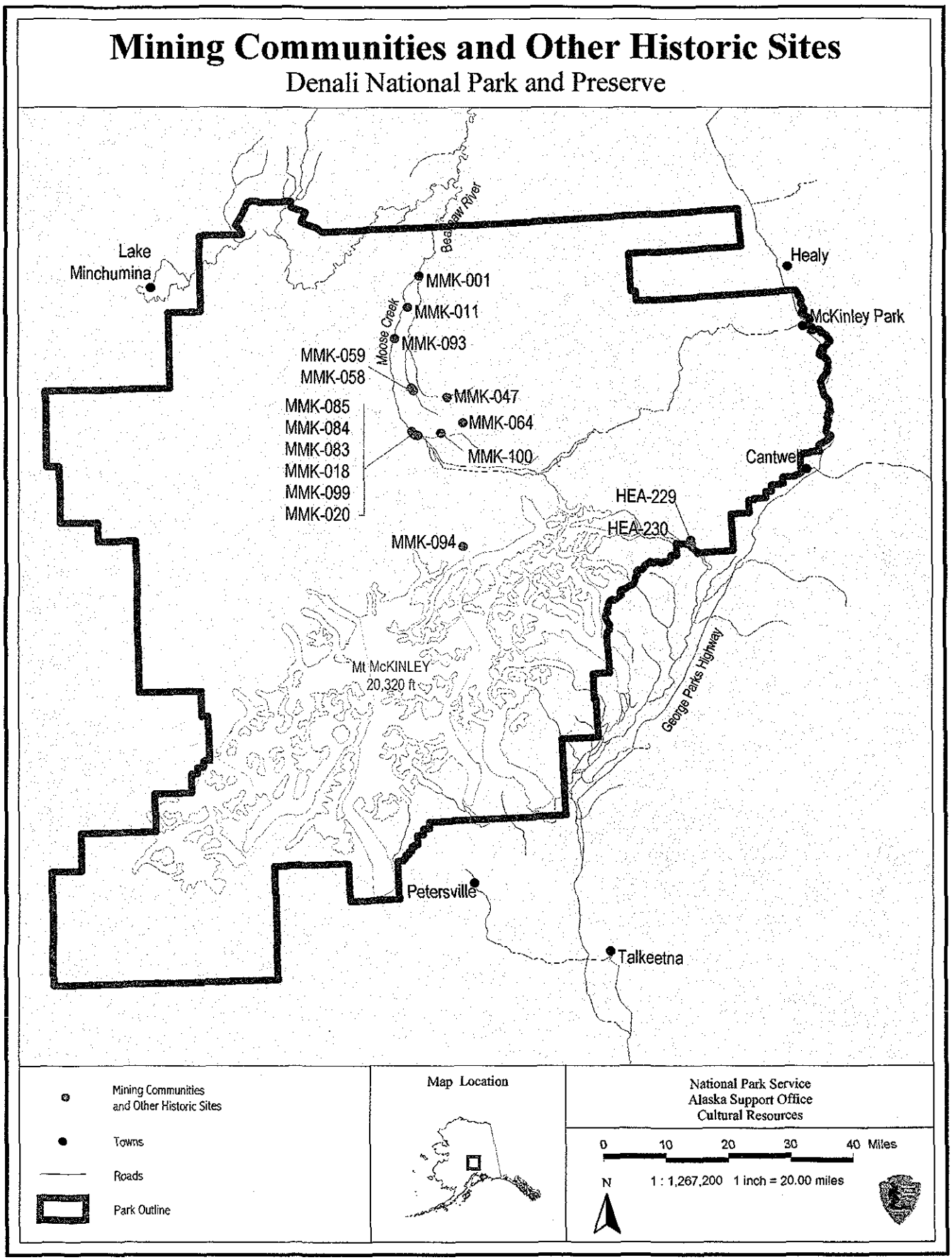

Mining Communities and Other Historic Sites
Denali National Park and Preserve
Lake Minchumina
Beaver Creek
Healy
MMK-001
MMK-011
Moose Creek
MMK-093
McKinley Park
MMK-059
MMK-058
MMK-047
MMK-085
MMK-084
MMK-083
MMK-018
MMK-099
MMK-020
MMK-064
MMK-100
Cantwell
HEA-229
HEA-230
MMK-094
Mt McKINLEY
20,320 ft
George Parks Highway
Petersville
Talkeetna
Mining Communities and Other Historic Sites
Towns
Roads
Park Outline
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 10 20 30 40 Miles
N
1 : 1,267,200 1 inch = 20.00 miles

Figure 35.



Cabin at abandoned town of Diamond (MMK-001) on the Bearpaw River in DENA. A.J. Lynch records this structure, which probably served as a roadhouse and later as the Diamond post office.

log doghouse, and a woodpile - situated in a grassy clearing. All of the features are standing, though the remnants of an earlier elevated cache lie scattered on the ground adjacent to the cache that is still intact. The log cabin, measuring 87 m^2, is constructed of peeled white spruce logs, hewn flat on two or three sides. The corners are double square or double saddle notched; chinking is moss with a crumbling plaster coating. The cabin has two adjoining rooms, one of which may have been a later addition. A few of the many artifacts found inside the cabin include a dog sled; an early snow machine; a 55-gallon drum stove; homemade furniture; and a milled lumber table and shelves, divided into cubicles, which extend the entire length of the east wall. The latter appears to have been used for sorting and storing mail. The storage shed is constructed of rough milled boards and roofed with corrugated metal. Its floor rests on collapsed, deteriorating cache legs. It contains tools, leather dog harness pieces, and a box of newspapers from Topeka, Kansas, that are dated 1966. The shed is probably a recent construction, built of lumber salvaged from earlier structures at the site. The other site features are a 4-m-long firewood stack and adjacent wheelbarrow and a two-room doghouse built of unpeeled logs.

Diamond was founded as a supply town in 1905, the year of the first Kantishna Gold Rush. In 1907, supplies traveled by boat from Diamond to Glacier City on the Bearpaw River, and by dog sled from Diamond to Kantishna. Diamond again became a viable way station during a second rush to the Kantishna District in the 1920s. It lay on the Rex-Kantishna Trail, linking Rex (or Kobe) on the newly completed Alaska Railroad with the mining town of Kantishna. The roadhouse at Diamond also functioned as a stop-over point on the Nenana-to-McGrath dog sled mail run, which was terminated in 1930 when the mail contract was let to an airline company (Schneider et al 1984: 48; Gudgel-Holmes 1990b: 34). The cabin at MMK-001 is most likely the roadhouse built by Lauritz C. Olsen, a resident of Diamond from 1923 to 1950. As the 1920s Kantishna rush was rather short-lived, Olsen may have relied on trading with trappers and Natives from the Bearpaw village area. The roadhouse ceased its operations in 1930 along with the mail

run. The cabin may have subsequently housed the Diamond post office, begun in 1929 and operated until 1951 (Schneider et al. 1984: 49). The cabin has had recent use by trappers.

Established at the same time as Diamond was the mining community of Eureka. What remains of the townsite and its cemetery has been designated as **MMK-099**. It is located on terrace above Moose Creek, approximately 350 meters from its confluence with Eureka creek. The periphery of the site lies only about 30 meters southeast of the Kantishna Roadhouse (MMK-018), separated only by a recent service road. It consists of the traces of six structures, two cold caches, and three overgrown trash scatters. Each of the structural remains is delineated by thickets of willow and alder shrubs that grow on and within the deteriorated foundations. Two of the foundations contain large cellars. The foundations range in size from only 10.2 m^2 to 57.2 m^2. The smallest of the structures is in the size range of a tent frame, while all the others appear to have been cabins. Mostly domestic artifacts, almost all of which are obscured by the heavy vegetation, are associated with five of the foundations. Two of the more unusual items are a porcelain soap dish manufactured in England and an old steamer trunk. Also included within the site boundaries is the old cemetery, consisting of a decaying wooden cross grave marker - identified as Pete Anderson's grave - and surface traces of at least three additional graves.

The community of Eureka was first established during the frenzy of the 1905 gold rush to the Kantishna Hills (see Chapters 8 and 9). The community grew as it was located near many of the active paystreaks. According to Fannie Quigley, a notable long-time Kantishna resident, the town sheltered some 2,000 people in 1905 (Burford 1954: 232). By 1906, the majority of gold seekers had moved on, leaving only about 35-50 people in residence in the entire district. A permanent recording office was established in Eureka, occupied by miners primarily in the summer months, in 1909. Eureka miners would winter-over in Glacier City, Roosevelt, or Diamond on the river system to the north, where timber and game were more abundant. Only a few miners, including Joe and Fannie Quigley, stayed in Eureka year-round. The population again increased in the 1920s, during a second more modest rush to the Kantishna District after the discovery of silver lode deposits on Quigley Ridge. A 1922 photograph taken by Philip Smith of the U.S. Geological Survey shows a townsite of tents and small cabins surrounding the two-story Kantishna Roadhouse, which was the central public structure during the 1920s and 1930s (Bundtzen 1978: 152; Lynch and Smith 1989).

By mid-twentieth century, only a handful of permanent residents lived in Kantishna, as the Eureka community was known by then. Among them were three old-timers: Johnny Busia, Joe Dalton, and Pete Anderson. Johnny, who out-lived the other two, buried Dalton and Anderson in the small cemetery at the site (Lynch and Smith 1989). By his own account, he simply wrapped Dalton's body in a blanket and put him in a shallow hole in the ground, while his friend Anderson was buried in a "...good box...(with) a good fence around the grave...and a good marker" (Brooker n.d.). Johnny died in 1957 and was buried on a terrace (gravesite **MMK-083**) near his Moose Creek cabin (MMK-019).

The main structure in the old town of Eureka/Kantishna was the Kantishna Roadhouse, MMK-018. It is now situated within the recent Kantishna Lodge development near the confluence of Moose and Eureka Creeks. The two-story, log roadhouse is in its original location and is the only feature at the site. The roadhouse, which measures 7 x 6 m (a total of 84 m^2 for the two stories), is constructed of corner-notched logs, hewn square on the ends and flat on the interior surface. The roof is sheathed with boards and covered with

plywood and composite roofing material, while the gable ends are sheathed with ship-lapped boards on both exterior and interior walls. The flooring of the ground level of the building is constructed of planks of variable widths, which now sag slightly, probably due to deterioration of the cellar supports and shifting of the log floor joists. The second story floor is composed of ship-lapped planking. In the center of the floor is a recent post added for roof support. There is also a cellar; but due to slumping, its dimensions are undeterminable. The integrity of the structure in terms of general appearance is good, and the structure has had some recent emergency stabilization. As the building was being occupied at the time of site recording, no artifact inventory was made.

The exact date when the roadhouse was constructed is not documented in the literature, although "old-timers" from the Kantishna area indicate that it was probably in 1919 or 1920. Earl Pilgrim, who mined in the Kantishna Hills for many years, recalled that the roadhouse was built "about 1920" (Tom Bundtzen 1987: personal communication to CRMIM staff). Arthur Schmuck, a miner on Glacier Creek and other Kantishna locales since 1955, remembered that the door lintel of the roadhouse had the date 1919 carved in it (Schmuck 1985: personal communication to CRMIM staff). Schmuck was impressed by this date because it coincided with the year of his birth. The lintel has since been replaced, and the date is no longer apparent.

Historical evidence further confirms the plausibility of the 1919-1920 construction of the roadhouse. After World War I the Kantishna area was deeply depressed with little mining going on except for a few people like Joe Quigley, who prospected and did some preliminary development work on the Quigley Hill Lode Mines. In 1919-1920 a hydraulic operation began gearing up on Moose Creek to build a ditch and pipeline from Wonder Lake to Kantishna. A large crew of men was hired to dig the ditch for this Moose Creek hydraulic operation. The roadhouse would logically have been built then in order to provide lodging, a store, and a post office during the period of heightened activity. The roadhouse, the central public structure of the Kantishna community during the 1920s and 1930s, is the only surviving community structure of that period.

Closely associated with the town of Kantishna was Johnny Busia. His gravesite, MMK-083, is located on a terrace of Moose Creek about 120 meters from the Busia cabin (MMK-019). It consists of a single grave marked by a cross and a bronze plaque. The grave mound is composed of river cobbles, and the cross, constructed of two poles, stands immediately behind an inscribed wooden marker. The inscription is written with yellow paint: "HERE LIES JOHN BUSIA: BORN SEPT. 11, 1891; Died AUG. 10, 1957. Little Johnheie (sic) of the Kantishna; An Alaska Pioneer. REST IN PEACE." The wooden marker dates to the time of interment in 1957, while the adjacent bronze plaque was added in recent years. The plaque reads: "JOHN BUSIA; 1891-1957." As discussed in chapter 12, Johnny Busia was a long-time prospector and trapper in the Kantishna Mining District. Born in Croatia in 1891, he immigrated to America and to the Kantishna District in 1918 to join his father, who had started mining in the area 12 years earlier. He spent the remaining 39 years of his life in the Kantishna area. As the last old-timer left from the early years, he was commemorated in the naming of "Busia Mountain," near Wonder Lake, in his honor (Orth 1971: 170).

The final residence of another old-timer is **MMK-020**. This site, known as the Fannie Quigley cabin, is located near the confluence of Moose and Friday Creeks on the access road to the airstrip. Besides the cabin, a shed and outhouse comprise the site. There are



The Fannie Quigley house (MMK-020) near Moose and Friday creeks in DENA. Karen Sturnick records this structure, which was occupied by Fannie in her final years.

three features at the site: a wood-frame house with attached shed, a detached shed, and an outhouse. All the structures are standing and are in good to fair condition. The house is constructed of 2- by 4-inch wood framing, with an exterior sheathing of ship-lapped milled boards. The roofing is made of corrugated metal. An open porch with tongue-and-groove flooring extends across the front of the house. The maximum dimensions of the house, including the porch and attached shed are 11 by 7.6 m. The interior of the house is sheathed with fabricated panels, and the flooring is of tongue-and-groove construction. In addition to the front room, kitchen, and bedroom, the house also has an attic that runs the entire length of the house. The attic is insulated with moss.

A half cellar with a dirt floor has been excavated beneath the central part of the house. The original dimensions of the cellar, which has flooded, are indeterminable due to slumping around the perimeter. Single and double columns of 55-gallon steel fuel barrels stacked on the cellar floor support the floor joists of the house. An attached shed at the back of the house is constructed of rough-sawed lumber with a corrugated metal roof and a dirt floor. The shed has one window and a few corner shelves, but is without an outer door.

The second feature at the site is an unattached shed, constructed of rough-sawn planks with an exterior sheathing of corrugated metal on three sides. The shed roof is also made of corrugated metal, and the floor is composed of wood planking. Feature 3 is an outhouse is constructed of rough-sawn boards and has a shed roof. At the time of the initial site recording, the crew did not take an inventory of the artifacts in and around the house and shed because local residents were using these structures for storage.

MMK-020 is the last dwelling of Fannie Quigley, a historic Kantishna pioneer and personality who lived in the area from the early 1900s until her death, alone in this cabin, in 1944. Fannie's husband, Joe Quigley, was co-discoverer of the Kantishna Goldfield. The cabin was probably built during the late 1930s by Jess Bockner of Fairbanks, who was also a miner in the Kantishna hills (Jane Haigh: 1991 personal communication). After Joe suffered a serious mining accident in 1930, he moved to Seattle, divorced Fannie, and

later remarried. Fannie resided in this house after the termination of her relationship with Joe in the late 1930s until her death.

Toward the end of her life, Fannie became a kind of curiosity around Mount McKinley. She lived alone, wore rough, men's clothing, swore frequently, and habitually drank. Unable and unwilling to adapt to civilization, she preferred life away from cities (Murphy and Haigh 1997:118).

> Since Fannie's death, local miners have used the house as a residence and for storage. Because of its association with Kantishna pioneer Fannie Quigley, the cultural resource staff at DENA has slated the house for stabilization and rehabilitation (A. Kain: 1999 personal communication).

The final site in the mining-related category is **MMK-093**, a sawmill site located in a stand of cottonwood and birch on the side of a prominent old winter trail that intersects with lower Moose Creek. It is represented by seven features: a steam boiler, steam engine, the ruins of a two-room cabin, stacks of milled lumber and logs, a sawmill, a well, and a wheel-shaped wood and metal apparatus with an unknown function. The cylindrical steel-plate steam boiler, measuring 3.1 m long, is in excellent condition. It bears the name-plate," Hallidie Machinery Co., Engineers, Seattle and Spokane." Decomposed wooden planks resting on top of the boiler suggest that a shed roof once covered it. Adjacent to the boiler is a cast-iron steam engine, consisting of a main steam piston that turns two large flywheels. Long belts, no longer at the site, once extended from the steam engine to a series of flywheels, which ran the sawblade and log carriage of the sawmill. A second piston was used to pump water from the nearby plank-lined well to the steam boiler. The engine appears to have rested on a wooden platform found next to the boiler. The large sawmill, lying just west of the boiler, was manufactured by the "American Sawmill Machinery Co., Hacketstown, N.J., U.S.A." With the exception of the blade, the sawmill is intact, consisting of a red wooden frame, drive assembly, and log carriage. It is estimated that the missing saw blade was roughly 1 m (3 ft.) in diameter. The ruins of a log cabin (42.2 m^2) and nine separate piles or stacks of wood complete the inventory of site features.

MMK-093 probably dates from 1905 or 1906, during the original Kantishna Gold Rush. Lumber was scarce near the mining camps and sawmills were operated to provide rough-cut wood to the prospectors and miners. These mills included the mill at Diamond (MMK-001), built in 1905, and this one on lower Moose Creek (Gudgel-Holmes 1979: 96; Schneider et al. 1984: 62). It is unknown whether the equipment at MMK-093 was originally at Diamond and later moved to the present site, or whether new equipment was brought in. Capps (1919:78) reports that by 1916, after the first boom of activity in the district, the sawmills were dismantled, making it necessary for the remaining miners to whipsaw all the lumber needed for their operations and camps. The age of the site is also apparent by the considerable growth of mature trees in its general vicinity, with not even a trace of a clearing. A layer of silt from the periodic flooding of Moose Creek covers much of the site.

Subsistence-Related Sites. The five sites in this category pertain to trapping, a fish camp, and a homestead. One of the sites, **MMK-084**, is located on a small tributary of Moose Creek in the general vicinity of the old town of Kantishna (MMK-099). The single feature at the site is a partially collapsed log doghouse, measuring 3.7 x 1.5 m, and 73 cm

high. It is composed of four separate compartments, each with a metal tethering ring embedded into the base of its entry. The flat roof is constructed of rusted sheet steel, with only one of the two sheets remaining in place. An array of artifacts, mostly associated with food preparation and the feeding of animals, is scattered around the doghouse. They include a small basin, enamel kettles, a galvanized wash tub, and Blazo-type fuel cans. Although dog mushing was an important element of winter trapping in the Kantishna area, there is no evidence to positively associate the trapping. The condition of the structure and types of cans found at the site suggest that the doghouse may have been constructed during the 1940s.

Another site that has more evidence of trapping is **MMK-059** on Glacier Creek. It is about 0.5 kilometer downstream from **MMK-058** (discussed below). The site features consist of a log cabin ruins, a collapsed four-post elevated cache, and a three-compartment log dog house ruins. The cabin measures 23 m^2. It has saddle-notched corners, reinforced with dowels. The roof was sod, and the floor was dirt. There is a homemade bed frame and table, an iron wood-stove, a tin-covered wooden crate that may have been used as an icebox, and a variety of other artifacts inside the cabin. Scattered around the cabin are snare traps, numerous cooking vessels, bottles, cans, tools, several 55-gallon oil drums, a dog sled, and an alarm clock. Associated with the cache remains are a steamer trunk, sled runners, and a large freight sledge that would have been pulled by horses. The site represents a trapper's cabin, with tools of the trade - the traps, sled, and doghouses still in evidence. The age of the site is unknown.

A third trapping site, **HEA-229**, is located far to the southeast, near the West Fork of the Chulitna River, close to the eastern boundary of DENA. It is composed of a log cabin, the remains of an elevated log cache, deteriorated log doghouse and freight sled, and a trash scatter. It probably dates to the late 1920s or early 1930s. The main feature is a partially standing cabin, measuring 14.2 m^2 and constructed of hewn spruce logs, double notched at the corners. The cabin is without windows. A rock retaining wall borders the west, south, and east sides of the cabin. Inside and just outside the cabin are enamelware pots, bowls, teapot, and wash pan, along with a 1-pound Hills Bros. coffee can (copyright date of 1922), a lightweight iron stove, and assorted hardware, bits of canvas, and other household items. The cache also contained a wide assortment of enamelware, the location of which suggests that they were once stacked neatly inside at one time, grey speckled enamelware in one pile, white enamelware in another. Located immediately east of the doghouse is a narrow sled, with steel sled runners, and a galvanized washtub and metal box.

Although this site is located on a mining claim, there is no archeological evidence to directly link it with mining activity. It is possible that the site was used in conjunction with both mining and trapping, considering that a doghouse and narrow sled were recorded here. The fact that the cabin had no windows might be further indication that it was inhabited as a line cabin for a trapper during the winter months when daylight is minimal, and thus windows not particularly important. The cabin may have had repeated and extended periods of occupations, perhaps serving as a mining camp in the summer and a trapping site in the winter. This site is also discussed by Lynch (1996: 71-74).

Unique among the historic sites is MMK-011, referred to as the Moose Creek fish camp. It consists of a standing, two-room log cabin and a collapsed elevated log cache. It is on a cutbank of Moose Creek, at or very near the end of the creek's salmon run. A



Fish camp on Moose Creek (MMK-011) in DENA. The view into the main room is on the left, and the exterior room is on the right.

smokehouse for drying fish, reported in 1981 (NPS 1981), is no longer evident and appears to have been undermined and washed away by the creek. The cabin, constructed of spruce logs with saddle-notched corners, is composed of a main room and an adjoining exterior room, together encompassing 73.8 m^2. The cabin has been chinked with moss and caulked with mud; its sod-covered roof is now collapsed into the cabin. The inside of the cabin is overgrown with vegetation, including a mature birch tree, perhaps 30 m tall. The main room of the cabin was apparently built before the exterior room, as a door on the original structure was logged in to form a complete wall dividing the two rooms. The exterior room may have served as a dog kennel. A metal ring, similar to the kind used to secure dog chains, is attached to the logged-in partition. A variety of domestic artifacts, mostly food storage items, along with kitchenware and a Yukon-type stove, are inside and outside of the cabin. The second feature at the site is an elevated log cache, which has been undercut by Moose Creek and is now slumping into the creekbed. Within the log ruins are five-gallon lard cans, which served as protective sleeves at the bottom of all four of the collapsed uprights.

MMK-011 is reported to have been a fish camp during the 1910s, used by miners, dog sled freighters, and trappers to catch and dry salmon. It is associated with two particularly noteworthy miners - Joe and Fannie Quigley (Schneider et al. 1984: 61). The location of the site was first published on a 1916 map (Capps 1919: plate II), and was later identified as a fish camp in a 1922 Rand McNally map of the Mount McKinley Region. It was still in use in 1940, as it is listed as a shelter cabin on an Alaska Road Commission map (Gudgel-Holmes 1990b: 35). It is also quite likely that MMK-011 is the site of an even earlier fish camp used by the upper Koyukon before the twentieth century. The Koyukon place name, Neech'oolakhdenh, meaning "terminus of the fish run," identified this place on lower Moose Creek where people once camped for fishing each year (Gudgel-Holmes 1990b: 73).

Another unique site in the historic site inventory is **MMK-085**, located on a terrace of the extensively mined Moose Creek floodplain. It consists of a log structure foundation,

a collapsed elevated cache, and associated artifact scatters. Only one or two courses of logs remain in the foundation, which is completely overgrown with vegetation. It is still apparent that the dwelling consisted of two rooms, one of which contained a small depression probably used as a cold cache cellar. Adjacent to the structure are parts of a child's wagon or baby carriage, white enamelware plates and cups, a string of Christmas tree lights, a Parcheesi board game, a "Lang" stove and associated parts, and various other domestic items. A handbuilt sled, 1.2 m-long, with iron strips attached for runner guards, and a detached wire sled basket lie near the cabin remains, and a 4-m long trench, overgrown with low brush, is located about 20 meters to the northwest. The site is said to have been the homestead of the Pollock family during the 1920s and 1930s (Dan Ashbrook 1987: personal communication to CRMIM crew), but may have also been associated with mining at one time. Frank Pollock, a pilot, often helped Fannie Quigley by flying her supplies into the Kantishna area (Burford 1954: 236). MMK-085 is uncommon in that it represents an attempt to establish a permanent home site in the area.

Transportation Sites. There are two sites in this category; one and possibly both of them are indirectly related to mining. The first, **HEA-230**, lying along the West Fork of the Chulitna River, encompasses the remains of a bridge and the pile-driver framework used in its construction and maintenance. The bridge was constructed of 12-inch-diameter, diagonally braced posts, and 10-by-10-inch timber beams. The structure, once approximately 402 m long, collapsed during the 1964 earthquake, but several intact sections remain. One 30-m segment that spanned the main river channel was constructed with a metal bracket at each truss joint. This method of construction allowed for prefabrication of all parts. Seven courses of log cribbing, filled with cobbles and boulders, surround the piers that support the bridge abutment, lying on the northeast bank of the river. An associated pile-driver framework used in the construction and maintenance of the bridge rests on the northeast bank of the West Fork, north of the bridge abutment. It has an attached 6.1-m-tall headframe that supported the driving equipment. Pulleys, turnbuckles, and 1-inch steel cable remain in place, but no other machinery or motors are present.

The bridge was constructed in 1937-38 as part of the roadwork undertaken by the Alaska Road Commission. It provided access to the Golden Zone mining claims, connecting that operation with the Alaska Railroad and the Dunkle Hills Coal Mine. Howe truss bridges, such as this one, date from 1840; and the type was commonly used throughout the twentieth century. The pile driver framework also appears to have been built in a common style used for bridge construction. It was probably used to build two other bridges associated with Gold Zone Road in 1937-38, one across the East Fork Chulitna River and one over the Bull River. The frame may have been stripped of machinery and abandoned after construction of the last pile foundation bridge on the road. This site is also discussed by Lynch (1996: 74-77).

The second transportation site is **MMK-047**, a badly deteriorated stoneboat skid lying to the south of Caribou Creek, downstream from of its confluence with Crevice Creek and south of the Caribou Creek Road. This isolate is constructed out of timbers and deteriorated 1-by-2-inch planks. The shoe of the skid is made of the track assembly from a dragline or bulldozer, which measures about 5 m long. The date of construction and the exact function of the skid are unknown, but its size suggests that it was used to transport a very heavy object or objects. It is considered a non-mining historic site because there is nothing, except its location, to directly link the skid with placer mining in the area.

Other Sites. Two miscellaneous sites, one associated with an important historical event, are included in this category. **MMK-094**, located on a low terrace of Cache Creek, consists of a rectangular alignment of stones forming a tent foundation and pole fragments of three other tents. Beside the stone alignment, which measures 2.7 x 3.1 m, is a strip of canvas and a grommet with adhering pieces of canvas. In its general vicinity are an amethyst glass bottle neck and fragments, fragments of an amber-colored glass medicine bottle, a round medicine bottle, the rolled strip of metal from a key-closure can, a white wax candle, and fragments of a ceramic cup or bowl. Associated with one of the other tent ruins is the mangled, flattened remains of a Yukon-style camp stove. The site is sparsely littered with very deteriorated cultural debris, such as bottle fragments, cans, wood slats, and a leather boot fragment. Also found at the site is a brass or tin button, 22 mm in diameter, with the figure of an old railroad engine in bas-relief on its front. The button's face also bears the letters, "S.O. & Co. N. Y." Two small shovel probes were made at the site to test for subsurface artifacts. Two fragments of a white ceramic jar were found in one probe, placed within the entry of the stone alignment.

This site is identified as the 1913 base camp of the first expedition to reach the summit of Mt. McKinley. The expedition was headed by Archdeacon Hudson Stuck, who reported that his party approached the mountain at the beginning of the successful ascent by way of Cache Creek, where they made their base camp at the forks on April 19, 1913. Dog teams were used to establish the camp. In addition to Stuck, the expedition included Harry Karstens (who later became the first superintendent of Mt. McKinley National Park, Robert Tatum, and Walter Harper. After reaching the summit on Mt. McKinley's South Peak, the party returned to the Cache Creek Camp in June. They left the tent standing with a stove and many articles they did not need cached inside when they finally abandoned the camp on June 10 (Stuck 1977: 18, 23, 130-131). The camp may also have been occupied by two earlier parties attempting to scale North America's highest peak. One was the 1910 Sourdough Expedition to the North Peak, and the second was the Parker and Brown expedition in 1912 (Moore 1967: 71, 90-93, 103).

The second site, **MMK-064**, located near the base of a talus slope on Glen Creek, is more mundane than the previous site. It consists of a stone cache pit, 1.9 x 1.3 m, created from the natural surrounding rock. A single artifact - a brass button - was found in subsurface testing of the pit. A decayed pole on the floor of the pit may represent the remains of a roof. The button is 2 cm in diameter and has a bas-relief design of a steam engine and coal tender on its surface. It was collected and sent to DENA for curation. The historic context and significance of the site remain unknown.

Unknown. There are two sites, both camps, in this category. MMK-058 is located on Glacier Creek, several kilometers upstream from its confluence with Flat Creek. It consists of the collapsed remains of a log cabin and cache, the ruins of a lumber outhouse, and a cultural refuse area consisting mostly of cans. The cabin, which measures 22.5 m^2, has dovetail notching at its corners, walls that are doweled and pegged for additional stability, and wood flooring. All of these attributes indicate that the builder either was a skilled woodworker or had long-term intentions for the use of the cabin. Inside there is a homemade cupboard with attached counter, a "Mabelwood" wood stove, a Hills Bros. coffee can with a 1936 patent date, and various other domestic artifacts. The elevated log cache, now collapsed, is associated with several fragments of animal bone, the fragment of a "Dundy" marmalade jar, manufactured in London, and several other artifacts. Although the site is

situated on a mining claim, the area is undisturbed by past or present mining activity. Although the site appears to have been something other than a mining habitation site, nothing is known about its historical context.

The second site, **MMK-100**, is located on Moose Creek approximately 1.5 kilometers northwest of its confluence with Rainey Creek in a densely vegetated spruce forest. The site consists of a rather crudely constructed, collapsed log structure (3.7 x 3.0 m). Its walls have been adzed flat on the interior and left unpeeled on the exterior. The structure has no doors or windows, and the height of the standing walls suggests that it had a shed roof. The structure appears to have been a large crib cache. Relatively modern artifacts, such as an unused pickaxe and recent iron nails are located inside the ruins. The structure may date to the 1940s or later. Its function is unknown.

Wrangell-St. Elias National Park and Preserve

CRMIM crews recorded 21 historic sites in WRST (figure 36). The majority of these sites are camps that lie along major transportation routes into and within mining districts now encompassed (or partially encompassed) by the park boundaries. These mining districts, discussed in the previous two chapters, are the Nizina District, the heart of which lies near the center of WRST; the Bremner area of the Nizina District to the southwest; the Kotsina-Kuskulana area of the Chistochina District to the northwest; and the Chisana District to the north. In some cases the camps situated along travel routes functioned as roadhouses; in other cases, they housed the crews that built and maintained the road and trail systems. Along with these transportation sites, are the remnants of mining communities and sites of unknown function, some of which may also have been associated with mining.

Mining-Related Sites. The most notable of the sites in this category is **NAB-009**, the townsite of Bonanza City in the Chisana Mining District. It lies on a small bench at the confluence of Bonanza and Chathenda Creeks. The site, 350 m long and 100 m wide, follows the arc formed by the northern and western banks of the two creeks. Seventy features, many of them obscured by dense vegetation, have been identified at the site. They include six standing or partially standing structures: 3 log cabins, one shed, and two doghouses. There are 35 distinct artifact scatters that consist mainly of food cans and domestic items such as pots, plates, boots, lantern parts, and stove parts. Twelve of these are associated with leveled areas on which canvas tents or tent frames were probably erected. Twelve other depressions with no associated occupation debris were also identified. Other miscellaneous features include freight and horse-drawn sleds, a cold storage pit, prospect pits, claim markers, and old road cuts.

One log cabin, which measures 13.2 m^2, was constructed of logs joined with lap joints, indicating a shortage of building logs of sufficient length. Its roof is board and batten and has been covered with plastic by a more recent occupant. The interior and exterior of the logs have been roughly squared with an axe. Its door has a round porthole style window. There is also a standing T-shaped log structure, which supposedly served as a bordello (Lappen 1982). It is constructed of unpeeled logs, with saddle notching and moss chinking. It may have been built from material salvaged from other structures as its logs are not uniform and its corners are irregular. There is a double roof with moss insulation. Rings for hitching horses are still on all the walls. The "bordello" has three rooms, which are decorated with wallpaper, now in shreds, on walls and ceiling. Very few arti-

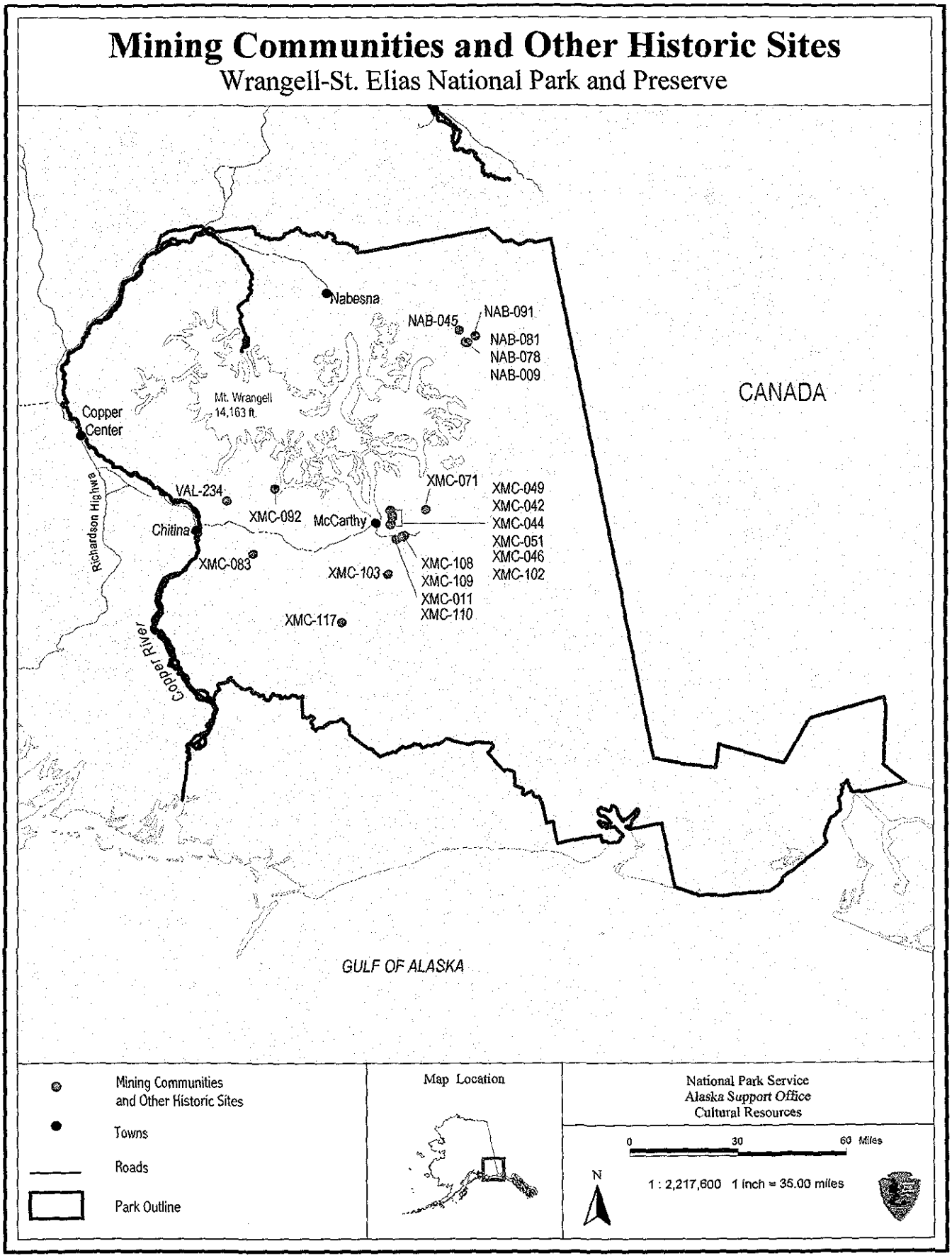

Mining Communities and Other Historic Sites
Wrangell-St. Elias National Park and Preserve
Nabesna
NAB-045
NAB-091
NAB-081
NAB-078
NAB-009
CANADA
Mt. Wrangell
14,163 ft.
Copper
Center
Richardson Highway
VAL-234
XMC-092
McCarthy
XMC-071
XMC-049
XMC-042
XMC-044
XMC-051
XMC-046
XMC-102
Chitina
XMC-083
XMC-103
XMC-108
XMC-109
XMC-011
XMC-110
XMC-117
Copper River
GULF OF ALASKA
Mining Communities
and Other Historic Sites
Towns
Roads
Park Outline
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0
30
60 Miles
N
1 : 2,217,600 1 inch = 35.00 miles

Figure 36.

facts remain inside. The other structures include an unfinished log cabin, a milled lumber shed with a gable roof on a cribbed log foundation, two doghouses made of milled lumber, and the log foundation of a collapsed building.

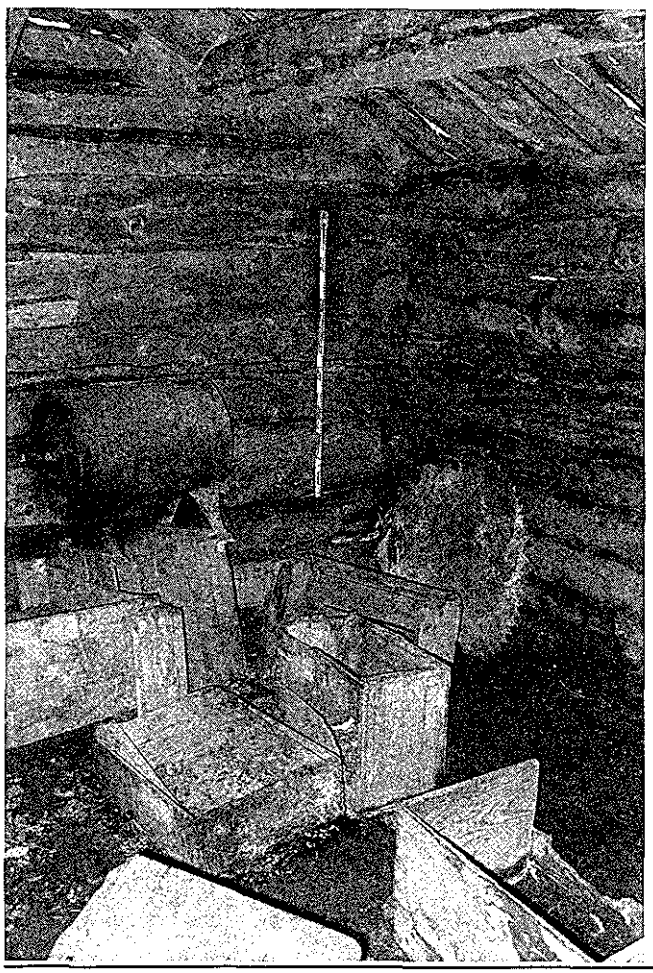
Bonanza City developed as a supply center in the summer of 1913, when nearly 1,000 miners stampeded in the Chisana region in quest of gold. A tent community developed at the site, and by August it included the district recording office, a number of merchants, and living quarters for miners working on lower Bonanza Creek. Generally, the miners lived "in town" and hiked to their claims on the treeless drainages each day. Besides tents, log cabins were erected at Bonanza City throughout the fall and winter. During the summer of 1914, Bonanza City, called the "upper town" by the miners, consisted of more than 100 tents, a few log cabins, and an assortment of stores. The population of the community declined at the end of the season as the gold rush ended, but a few miners continued to live in the community for several more winters. It was later abandoned in favor of winter quarters at Chisana City, which was called the "lower town" (Spude et al. 1984: 322; Buzzell 1988g). Although most of the structures at the site have long since collapsed or their materials been "recycled," the site still contains valuable data about living conditions and the social organization of an early mining community in the numerous features still at the site.

The major mining community in the Chisana District was Chisana City located on Chathenda (or Johnson) Creek. The Chisana Historic District was recorded before CRMIM fieldwork in the area and thus not included here in the inventory of sites. When originally documented, the town site was said to comprise 20 log structures, most of them dating from the winter of 1913-14, and others from the post-1930 period when an airstrip was built and a boom in gold mining occurred (Spude and Lappen 1984). Since the original recordation, Anne Worthington at WRST has initiated ongoing fieldwork to further delimit the structural foundations and boundaries of the historic district. A history of the town of Chisana is included in a recent publication entitled, *A History of the Chisana Mining District, Alaska, 1890-1990* by G. Bleakley (1996).

Another site, possibly associated with a small, short-lived mining community is **NAB-045**, referred to as the Wilson Creek sawmill. It is located on an island off the north shore of the confluence of Chavolda (Wilson) and Glacier Creeks. A small channel of Chavolda Creek cuts through the island lengthwise. The primary feature at the site is a log cabin, measuring 16 m^2, still standing and in good condition at the time of survey. It was, however, being undercut at its northwest corner by stream erosion. The cabin is constructed of unpeeled logs that are hewn on the inside, and has sod chinking and saddle-notched corners. The gable roof is of board and batten, with an overhang above the front door. In the interior, just above the front door, are the inscribed words, "Property of W.E. —ames" (presumably William E. James, one of the founders and long-time residents of the Chisana Mining District). The cabin has a wooden floor of whipsawed boards and one window. The ruins of two other cabins are also at the site. One was a two-room structure, which measured 25.3 m^2 and had a sod roof. According to an earlier site report, a saw blade, enamelware and tools were found on the front porch of this cabin, and the interior contained two beds, one with a handmade headboard and frame, along with a table, chair, indoor toilet, and stove. The other cabin was larger, measuring 33.5 m^2. Both of the cabins have been ruined by the meandering stream channel. A small chicken coop is located several meters to the west of the standing cabin. Pieces of the wood carriage of a sawmill



A T-shaped log cabin, supposedly used as a bordello, and a shed at the abandoned town of Bonanza City (NAB-009) near Bonanza and Chathenda creeks in WRST.



The interior of cabin at NAB-045, the Wilson Creek sawmill, shows a saw blade, stove, and crates.

and a large area covered by sawdust and wood shavings are the primary evidence of sawmilling at the site.

It appears that the site may have been associated with a small mining community, named Woodrow, established by Cordova speculator George Hazelet in 1913. A recording office, managed by U.S. Commissioner J. J. Finnegan was also located here. Several newspapers, including the Cordova Daily Alaskan, gave the confluence of Chavolda and Glacier Creeks as the location of Woodrow; but according to Hazelet's description, his parcel of land lay on the south side of Wilson (Chavolda) Creek (Bleakley 1996: 23, 69), not the north. It is also possible that the changing course of the creek has destroyed all evidence of Woodrow, and that NAB-045 is simply a sawmill site with no connection to this early mining community.

Transportation Sites. The 12 sites in this category are located along a system of trails and roads constructed to access mining camps in four separate centers of extensive mining activity in WRST. Beginning from the west, the first site is **VAL-234**, located in a clearing on the Strelna access road, a few hundred meters southwest of the mouth of Benito Creek. The primary feature is the ruins of a log structure, encompassing 47.3 m^2. The structure, constructed of hewn and axe-notched logs, comprises three rooms and a possible porch entry. The room on the west end is possibly a later addition as its floor level is lower than the other two and its overall condition is much better than the rest of the structure. The west end wall is slightly bermed and substantial ditches run along the north and west walls for drainage. The artifact inventory consists of a kerosene lantern top, flattened kerosene cans, stove pipe, canvas fragments, old Levi's, and a tea can. The ruins of a possible outhouse are about 30 meters from the cabin. A recent "cat" track and fire ring are also at the site. Considering the size of the structure (much larger than most mining cabins) and its location along the main access road from the railroad station at Strelna and the mining camps above on Elliott Creek, the structure may have served as a roadhouse or way station. The Alaska Road Commission constructed a road from Strelna to Elliott Creek in 1911, after the Copper River and Northwestern Railroad was completed, to facilitate mining operations in the Upper Kotsina River Valley (Spude et al. 1984: 12). The ruins probably date to the period between 1911 and the 1920s.

Six of the transportation sites are located along the McCarthy Creek access route, paralleling McCarthy Creek from the town of McCarthy to the Green Butte and Mother Lode Copper Mines. This road began as a trail along the lower four miles of McCarthy Creek in 1907. By 1909, the trail had been extended as far up the valley as the Mother Lode claims. Upon the completion of the Copper River and Northwestern Railroad to McCarthy and Kennecott in 1911, it became possible for heavy equipment to be brought into the Mother Lode. Thus, work commenced on upgrading the trail to a wagon road and later to a year- round "auto-truck" road. By 1919, road construction was complete for purposes of trucking out ore from the Mother Lode Mine. When the Green Butte Mine began its operations in the early 1920s, the basic road connections were in place, and only local roads connecting the mine and mill to the main road had to be built (Hovis 1989a). The sites are all presumed to be originally associated with travel, transportation, or construction along the road. Some may have been reoccupied for other purposes after the closing of the mines in the 1920s and 1930s.

The most southerly of these sites is **XMC-046**, located adjacent to the road, below the confluence of McCarthy Creek and an unnamed tributary draining Sourdough Hill.

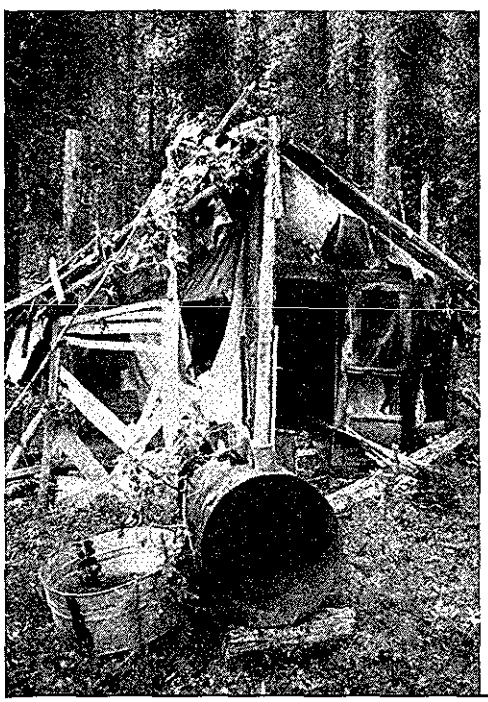


Hauling freight on the McCarthy Creek Road. The road led from the town of McCarthy up to the Green Butte and Mother Lode Copper Mines. *(Wrangell-St. Elias National Park and Preserve Research Library)*

The single feature at the site is a framed cabin (7.3 m^2) in good condition. It is built on skids. The cabin is constructed of tongue and groove siding and painted light blue with white trim. The cabin is surrounded by stacks of milled lumber, old furniture, wooden boxes, and fuel barrels. Much of this material is stacked in orderly piles, suggesting that it may have been salvaged from other sites and simply stored at XMC-046, or may be the refuse left from previous structures in this location. There is no evidence of other structural foundations at the site. The cabin was probably moved onto the site intact, perhaps as a base of operations for road maintenance crews.

Approximately 0.5 kilometer to the north is **XMC-102**, located on a broad terrace adjacent to McCarthy Creek, across the creek from the lower tunnel on the road. The single feature at the site consists of a tent frame, which was later modified by the addition of a larger roof and doghouses under the roof overhang. It is partially collapsed. The modified structure measures 14.3 m^2. The roof boards are log end slabs that have been salvaged from a sawmill, with flattened fuel cans nailed around the stovepipe hole. Lumber siding has been nailed horizontally over the wall frames. The homemade furniture inside includes a bunk with spring mattress, a bench, and a table. There are three milled lumber doghouse built under the roof overhang on the north side of the structure. A large assortment of artifacts is inside and around the cabin. Along with food cans and bottles, enamelware, kitchen utensils, and various bits of hardware, are remnants of wooden shipping crates with stenciling still legible. One crate that was modified to form part of a table reads "J.B. O'Neill/McCarthy AAA." Another has a shipping label "....Pier 2...Seattle, Wash..." stenciled on it. Other artifacts with chronological significance are a riveted shovel, an amethyst glass bottle, and fuel cans with hand-soldered side seams.

The site may date to ca. 1915 or even earlier, based on the presence of the amethyst glass. (Glass that has weathered to a purple or amethyst color dates to a pre-World War I time). The artifact inventory at the site indicates that there was little or no subsequent occupation of the structure in recent times. The design of the tent frame is unique in that the doghouses were included as part of the structural floor plan and provided a measure of insulation to the cabin interior. The early occupation of this site suggests that it may have functioned as way station along the McCarthy Creek wagon road, which provided access to the Mother Lode Mine in the 1910s.



Tent frame and artifacts at XMC-102, adjacent to the McCarthy Road. This transportation site dates to 1925 or earlier.

Farther north along the road is **XMC-051**, located on Nikolai Creek near the intersection of the McCarthy Creek road and the Nikolai Mine road. The site consists of a standing wood frame cabin, which measures 14.5 m^2. It is framed with 2 by 4s and has dimensional lumber siding. The cabin rests on spruce logs supported with stones. The cabin is in good condition and can still be used as a shelter cabin. Very few historic items are associated with the structure, which probably dates to the 1930s. Directly across the creek from the cabin is a campsite with a rock fireplace, an old metal bedframe, and a homemade ladder. A pole bridge across Nikolai Creek is located 70 meters upstream from the cabin, and the remains of a bridge abutment and timbers are located 85 meters downstream. Although the function of the camp is not apparent, its location at the intersection of two roads suggests that it was used as a convenient stopover point for travelers, or perhaps as a shelter for those involved in road maintenance.

Only a few hundred meters farther north is **XMC-044**. This site is located on the McCarthy Creek access road at the foot of a steep canyon wall below Bonanza Ridge. It consists of one standing wood frame cabin and three other features that are completely in ruins. The cabin, which measures 13 m^2, was probably originally a frame tent structure, with walls, roof and porch added later. Its pole framing is covered inside with canvas; its batten roof has tar paper remnants still adhering to it. Fuel drums, a lumber scatter and hardware surround the cabin, but no datable material is evident. The two structural ruins are thought to represent a tent frame and an outhouse. Again, the location of the site suggests that it functioned as a rest stop for travel along the road.

Farther still is **XMC-042**, a site located in a grassy clearing of a terrace on the main branch of McCarthy Creek, downstream from its confluence with the East Fork. The site is located 300 meters upstream from a road tunnel, dynamited out of the rock. Identified at the site are the remains of six structures, which appear to have been log tent frames, now so completely deteriorated that only the overgrown, raised outlines remain visible. Only one of these features still has logs visible and exposed. Four of the structural outlines appear to line up along the overgrown McCarthy Creek access road. There are also rotted boards and nails lying in two discrete areas of the site, possibly representing the remains of caches. Old rusted metal trash and cans are scattered around the eastern part of the site clearing. One Hills Bros. coffee can had a stamped date of 1922. Other artifacts found at the site are "Justrite" tobacco cans and a white china plate with a double-striped green rim. One shovel test, placed in an area suspected of being a trash mound, turned up some bailing wire just below the surface. There is no evidence of mining activity near the site, so it is possible that the site served as a temporary camp for road maintenance workers.

XMC-049 is the site farthest north on the access road and has exposed cribbing and stone retaining walls. It is situated just above a narrow gorge on the east side of McCarthy Creek, one to two kilometers downstream from the aerial tram buildings of the Mother Lode Mine. The site consists of a small collapsed log cabin and a small circular depression (2 m in diameter). The cabin measures 9.3 m^2, with V-notched corners. The logs are chinked with wood and sod. The roof is collapsed, but appears to have been made of sod. Along the road about 25 meters down to the south is an unusual wood framed object, which measures 4.3 m long and about 1.2 m wide. It is constructed of sturdy timbers and wood "flooring." Groove holes cut into the sides were presumably used as tie downs or

handles. The function of the isolate in unknown, but appears to be related to road construction.

South of the Nizina River are three historic sites associated with transportation into the May Creek-Chititu Creek placer gold mining area and into the Bremner lode gold mining area, located still farther south. The first of these sites is **XMC-110**, situated on a terrace of the Nizina River along a pronounced turn in the McCarthy-May Creek Road. The site lies approximately 300 meters south of the southern end of the collapsed bridge over the Nizina River. It consists of an Alaska Road Commission (ARC) maintenance shed, a cabin, the remains of a sled, a steel frame with two attached axles (an ore cart?), a tram cable winch, and collapsed lumber supports of unknown function. The windowless maintenance shed, measuring 22.5 m^2, is constructed of rough milled battens over milled boards and still has an intact shed roof. Squared timbers with tapered ends and wire cable attachments are positioned under the shed, suggesting that it was transported to its present location on sledge runners. A large assortment of tools and maintenance equipment (including empty dynamite boxes) is stored inside. The remains of an adjacent foundation abut the south wall of the shed. This foundation is thought to represent an old "corral" used for storage (see Spude et al. 1984: 133). A small standing cabin with a shed roof lies at the foot of the terrace. The cabin, measuring only 9.6 m^2, is constructed of ship-lapped boards and has two windows. A bed, a table, a shelf, and a hand-fashioned barrel stove are the largest of the many domestic items inside the cabin. Its recent occupation is noted by the date of 1979 on a page from a Time magazine, lying on the table.



Tools and maintenance equipment inside the shed at XMC-110 on the McCarthy-May Creek Road. The maintenance shed was used by the Alaska Road Commission in the 1920s and 1930s.

The other features at the site include braced lumber supports, a tram cable winch manufactured by the Sasgen Derrick Company, Chicago, and a possible ore cart. The site recorders suggest that the supports could have been part of a loading platform, which in turn was related to some type of conveyance system used to lower material or machinery to the river terrace below. The site was occupied in the 1920s and 1930s by Alaska Road Commission crews that built and maintained the McCarthy-May Creek Road. The ARC

abandoned the site in the 1930s after flooding damaged the nearby Nizina River Bridge. The bridge was rebuilt, but was destroyed again some years later (Hunt 1991: 147-148). The site has continued to be occupied, at least on a temporary basis, in the intervening decades.

XMC-103 lies several kilometers to the southwest on an exposed channel bar, known as Jake's Bar, at a bend in the Chitina River. The site consists of two standing log cabins; an elevated log cache; two heavy freight sledges and another sled; a dump (modern); the outline of a burned structure (modern); and traces of the foundations of three older structures. An airstrip is situated just south of the features. The main cabin, measuring 17.7 m^2 including a front porch, is constructed of vertically placed peeled logs, topped with horizontal logs on the gable ends, and roofed with corrugated metal. The logs are chinked with canvas, and the front wall is caulked with a white compound. The structure, built perhaps in the 1940s, has been used recently as a recreational cabin, and its interior strewn with recent garbage. Historic items have been hung, however, on the back wall of the cabin. They include saws, a crowbar, scissors, a rake with a homemade handle, a cooking pot, hand beater, ladles, meat cleaver, horseshoes, potato masher, a teapot, and an assortment of other domestic items.

The second cabin, probably the same vintage as the main cabin, is built of unpeeled horizontal logs and has been used recently for storage. Inside, the cabin has a unique cobble stone floor. Its roof is constructed of pieces of shiplap with a tar paper cover and flattened fuel cans over the ridgepole. Along with more modern artifacts outside the cabin are several historic items: a wagon hitch, horseshoes, an enamelware basin, an old bed frame, barrels, cook pots, and others. The elevated log cache is in good condition, with a ladder still resting in place on the front wall, and an assortment of modern artifacts inside. Recent use of the site is also seen by the presence of a snowmachine, fuel dump, and modern can scatters. Older historic features at the site are three possible cabin foundations. Two of them are located close together at the southern end of the site. One of these appears to have been a two-room cabin. Very few artifacts are associated with these structural ruins.

The site lies in an area that has historically been associated with a transportation route linking the Nizina River to the northeast with the Bremner River to the southwest. Originally, a trail, known as the Nicolai Trail, was used by the Ahtna to travel between their winter village at Taral, on the Copper River to their summer hunting, fishing, and copper collecting areas in the Nizina region. One of the routes of the trail, known as the Hanagita Trail, follows the Hanagita River eastward and then crosses the Chitina at its confluence with the Tana River (about 4 kilometers east of XMC-103). Lt. Henry Allen used a portion of the trail during his 1885 explorations of the Copper River country and later by prospectors and miners (Spude et al. 1984: 78-80). After the Copper River and Northwestern Railway was built in 1911, prospectors to the Bremner area would take the railroad from Cordova to McCarthy, pack over the McCarthy-May Creek trail, then cross the Chitina River and take the Hanagita Trail to the Bremner diggings. In 1914 the Alaska Road Commission upgraded the trail to Bremner, and in 1935 it was converted to a tractor trail (Hunt 1991: 147). Located near one of the major river crossings along the trail, the site (the older structures) undoubtedly served as a convenient stopover point and perhaps roadhouse until the late 1930s when mining in the Bremner District stopped. The

standing structures and the airstrip appear to date to a later period, probably built contemporaneously for recreation or some other undetermined function.

XMC-117 is located on the trail through Bremner Pass, alongside Monahan Creek. It consists of a cabin, two freight sleds, and a general scatter of board, tin, and Visqueen fragments. The cabin, constructed of a lamination of fiberboard between two layers of shiplap boards, measures 14.9 m^2. The roof is corrugated tin, with one sheet replaced by a flattened 55-gallon drum. Much of the back of the cabin is missing. Inside the cabin is wood stove, embossed "Langs Alaska..." with a patent date of 1911. Four beds, two of which are folded, are in the cabin. As it had no flooring, the legs of two of the bunks were supported by pot lids and Prince Albert cans (among other things) to keep them from sinking through the ground. Cans, enamelware, hardware, and tools are inside and outside the cabin. One of the freight sleds is buried in the willows near the cabin; a second almost identical sled is lying a few meters northwest of the cabin. The cabin appears to have been a way station along the road from McCarthy to the Bremner Mines.

The final two sites in this transportation category are located north of the Nizina River, en route to the placer mining operations in the Chisana District. **XMC-071** is situated on a terrace on the south bank of the Chitistone River at Peavine Bar. Its features consist of two log cabins, a scatter of dimensional lumber (a tent frame?), a can scatter, communication wire, and a green glass insulator on a living spruce, and log cribbing in the ground that may have been associated with an outhouse. The first cabin, measuring approximately 45 m^2 is composed of two rooms; the roof and the room to the south have totally collapsed. It is constructed of unpeeled double saddle-notched spruce logs, which are rough hewn on the interior. The chinking is moss with poles or box strips nailed over the chinking. There are a number of artifacts associated with this cabin: parts of a Yukon stove and a cast iron stove; steel mesh beds; a variety of enamelware and cans, including a 5-lb. Hills Bros. coffee can converted into a candle lantern; a wood box with "Kennecott Copper Co." painted on it; and a wooden Olympia beer case, which is covered in canvas and has leather closures. The second cabin is smaller, approximately 20 m^2, but is constructed in a similar fashion. One of the walls and the roof of this cabin have collapsed. A road, running adjacent to the site, leads to the Peavine Lode Mine.

The site is tentatively identified as the remains of Breedman's roadhouse, located at Peavine Bar on the Chitistone River, along the McCarthy to Chisana trail system used by the stampeders en route to the Chisana Gold Rush in 1913. This roadhouse was reported in an August 1913 edition of the Cordova Daily Alaskan to be one of the 11 roadhouses or shelter cabins along the route (Spude et al. 1984:195). The size of the two-room cabin at XMC-071 is considerably larger than most mining or trapping cabins, thus giving further credence to the site identification as a roadhouse.

The final site is **NAB-091**, located along a trail on "No. 8 Pass" above the Chathenda Creek drainage. It is the wreckage of a heavy-duty log sled and a lighter freight sled, scattered down the slope in four separate areas or loci. At two of the loci are clusters of logs, some of which had been adzed and squared, that appear to have been the cargo (on their way to be reused) in one of the sleds. A front axle and the bodies of the two sleds are in the other two loci. The freight sled appears to be a "double-ender," measuring 2.8 m long with steel-shoed runners turned up identically on both ends. The remains of a lamp that reads: "No. 2 Blizzard Dietz NY USA," were found by the body of the freight sled. It appears that the sleds were en route from either Bonanza City or Chisana City to

one of the placer camps on Bonanza or Little Eldorado Creeks on the other side of the pass. The logs were apparently transported for building purposes as the placer streams in the Chisana District are above timberline. It is likely that the site dates before 1920, during the early days of the Chisana Mining District, when horse-drawn double-enders were being used for transporting freight. The sleds may have tipped over on the pass, or been abandoned for some reason and later shoved off the edge of the trail.

Subsistence-Related. The only site in this category is **XMC-083**, which lies on the Tebay River near its confluence with the Chitina River. The site, situated on a winter trapline trail, consists of a small cabin, a root cellar, a cache, and two can-and-enamelware scatters. A number of ax-cut spruce stumps were noted within a 100-meter radius of the site. This two-room cabin, which measures 26.2 m^2, is constructed of peeled spruce logs chinked with moss. The logs are saddle-notched and trimmed at the ends. The sod roof has collapsed into the cabin interior. Both wire and square nails were used in the construction of the cabin. Cookware is scattered about its interior. The semi-subterranean rootcellar, located adjacent to the cabin, has some planking inside and a cover made of metal flashing. There is also metal flashing on the poles of the collapsed cache and remnants of saddle-notched logs, suggesting that it was the standard variety of elevated Alaska cache. It appears that a person named "Joe" once resided at the camp, as his name is etched into the top of one of the cans found in the trash scatter. The types of nails and cans (both crimped and soldered seams) at the site indicate that it may have been occupied in the early decades of the twentieth century. If the site were associated with trapping (considering its location on a trapline), it would have been a primary residence for the trapper and not simply a line cabin.

Other Sites. Two sites, located within about two kilometers of each other, have been assigned to this category: one is a multiple-use site and the other a multiple-occupation site. **XMC-108** is situated on the south bank of the Nizina River, just little more than a kilometer upstream from the mouth of Young Creek. The site, which lies on a dirt road branching off of the Dan Creek road, consists of three features - a log structure, a trash dump, and a log milling area, along with a scatter of artifacts. At the northern end of the site is large, cribbed log structure, measuring 3.5 x 3.3 x 1.7 m, lying on the riverbank. The logs are secured with wire, spikes, reinforcing bars, and pole braces. A blue glass insulator wired to an upright post is adjacent to this feature. The structure may be the southern terminus of either a ford or ferry route across the Nizina River. It directly faces a partially revegetated, bulldozed cut on the opposite side of the river that may have functioned as access on the north side. Cribbed log structures occur not only at this site, but also in several locations on the south banks of the Nizina River.

Located near the Y intersection of the road is a dump, containing a wide assortment of items from stove parts, batteries, cans, and hardware to sled runners and liquor bottles. It consists of debris from a 50-year period, but there is no evidence of segregation by time, thus suggesting that the material had been removed from another locale and dumped at the site relatively recently. The third feature, located across the road from the trash dump, is defined as a lumber-milling area. It includes rough-milled lumber piles and piles of sawdust. A stove made of a 55-gallon drum, with hand fashioned legs and a small assortment of recent artifacts lie in the general vicinity of the milling area.

In addition to the site features, there are stumps of saw-cut spruce trees and a marten trap in the general site vicinity. There is also a telephone line that once followed

the south bank of the Nizina River, and most likely connected the areas of Chititu Creek, Dan Creek, May Creek, and McCarthy. The features at the site appear to be clustered more for the convenient location at the end of a road, rather than because of a functional relationship. The road is the essential element, providing access to the area for purposes of logging, trapping, and a convenient place to discard trash.

The second site in this category is **XMC-011**, a camp located in a clearing on a terrace near the confluence of Young Creek and the Nizina River. It comprises a tent frame, a cache platform and another remnant cache feature, a privy, a scatter of domestic debris, and a collapsed pole structure of unknown function. Only the sill logs and one log course remain of the saddle-notched tent frame. A cold storage unit, located in the center of its floor, is constructed of a 55-gallon drum sunk into the ground through a square, framed hole in the flooring. The hole is covered by an insulated cover. A handmade woodstove, made from an upright metal box and fronted by a cobble hearth, lies near one corner of the tent frame. A milled lumber table, collapsed roofing and shelving, and a variety of artifacts are also in the tent frame. These artifacts include glass bottles, a handmade coal shovel, a bottle capper with a 1920 date embossed on it, bottle caps, cookware, bullet cartridges, and several Hills Bros. coffee cans that have been modified to serve unknown functions. Hills Bros. coffee can are also found near the cache platform, the roof of which has collapsed. A second cache, attached to a fallen spruce tree, is associated with an interesting assortment of artifacts: a wooden ladder, a 1.9-m-long wooden sled, a metal wash pan, a wooden box with 15-20 brown or green glass beer bottles, a large metal wheel, straight and elbow-joint stovepipes, and a shovel blade. The remnants of an old bridge are also at the confluence of Young Creek and the Nizina River. The camp was apparently accessed from an old road, now overgrown with willows and alder, which ran in a southeasterly direction to the McCarthy - May Creek Road.

This small camp appears to have had at least two periods of occupation. It is situated in the approximate location of a site reported by the USGS in 1908 as "Sourdough" (Moffit and Capps 1911: map; Orth 1971: 898), but it is doubtful that the tent frame remnants date to this early occupation of the site. The artifacts of interest here are the beer making supplies - the bottle capper, caps, and beer bottles - which all appear to date to a later period. The camp appears to have been a local brewery, possibly established by road or bridge construction crews away from the more well-traveled road to the south.

Unknown. The four sites in this category are scattered across WRST. Farthest to the west is **XMC-092**, a site located on Nugget Creek just over three kilometers north of its confluence with the Kuskulana River. It consists of one isolated cabin with standing walls and a collapsed roof. The cabin is constructed of unpeeled saw-cut logs, with lap or tenon notching, and split dimensional lumber as chinking. The interior flooring consists of planking nailed to unpeeled logs laid on the ground. Two rusted cans and a piece of canvas were found in the immediate vicinity. Based on the amount of decomposition of the logs, it is estimated that the cabin dates from the 1930s or later; it does not appear to be contemporaneous with the adjacent mill (XMC-091). As there is no evidence to link it with mining or any other pursuit, its function remains unknown.

XMC-109 is almost 60 kilometers to the southeast, on the south bank of the Nizina River, several hundred meters upstream from its confluence with Young Creek. The site consists of the deteriorating lower courses of a log cabin that is now overgrown with vegetation. Only the sill logs and the lower log coursing remain of this 26.7 m^2 cabin. Dowels

protrude from the cut ends of the logs on the north wall. No artifacts could be discerned in the dense vegetation growing around the site. The condition of the cabin suggests that its occupation was relatively early in the twentieth century.

Farther to the north in the Chisana region are two adjacent sites. **NAB-078** is located on a bench above Chathenda Creek, next to a well-defined trail running to Bonanza City. The site is composed of three features - a collapsing tent frame, a woodpile, and a trash scatter composed mostly of rusted cans. The tent frame, which measures 10.1 m^2, has lower walls of rough milled lumber, support beams with shreds of canvas still attached, a wooden floor, and a porch. Inside there are two beds, a shelf with countertop and many artifacts, some of which appear to be in the same position as when they were abandoned. One of the artifacts is a three- burner kerosene stove (Daisy, Windsor Oil Stove, distributed by Montgomery Ward & Co.) with pages of a book, used to light the last fire, still legible. Several items of enamelware have the trademark, "McClarey's Famous Red Enamel Ware." The sill logs of a collapsed cache and a broad scatter of other domestic artifacts, including metal stovepipes and enamelware, are also at the site. The historic context of this site is unknown. It may have been a "satellite" of the once-extensive Bonanza City, or a later placer camp, though there is no evidence of mining tools or activity around the site. At present, the date of the site is unknown, but further research on possibly diagnostic cans and other domestic items may prove some chronological information on the site's period of occupation.

NAB-081 lies on Chathenda Creek, approximately 80 meters west of NAB-078. The one feature at the site is a temporary brush shelter. It was formed by an arrangement of branches piled in a ring around the base of a spruce tree with leaning upright poles radiating from the spruce to the brush ring. The total dimensions of the shelter are 4.6 x 2.5 m. The only artifact at the site is a modified, rusted can with a hand-fashioned wire handle and crimped lip on the top and bottom. The shelter resembles a temporary shelter for a small hunting party, made by leaning poles against a large tree and covering the poles with hides or some other portable covering. Brush shelters have been documented for the Ahtna (deLaguna and McClellan 1981: 645), but the incorporation of living trees into such structures is not common. The date of the site and its possible association with NAB-078 are unknown.

Yukon-Charley Rivers National Preserve

Seven historic sites were recorded by CRMIM crews in YUCH (figure 37). Two of these sites are associated with mining, and three with trapping. The function of the remaining two sites could not be determined.

Mining-Related Sites. Unique in the inventory of mining-related sites is **CHR-090**, lying in the reported location of the Nation Coal Mine. The site is on a grassy slough of the Nation River about 1.4 kilometers from its confluence with the Yukon River. It consists only of a cabin ruin and some log cribbing; no adits, mining equipment, or coal was observed at the site or in the immediate site area. The cabin foundation is a badly decomposed log structure, heavily overgrown and roughly measuring 31.6 m^2. The log remnants are axe squared and single notched. Inside are milled lumber fragments that probably represent the remains of a door jamb or window frame. Possible log floor joists are also visible in the ruins. The presence of both square-cut and wire nails in the remains of the

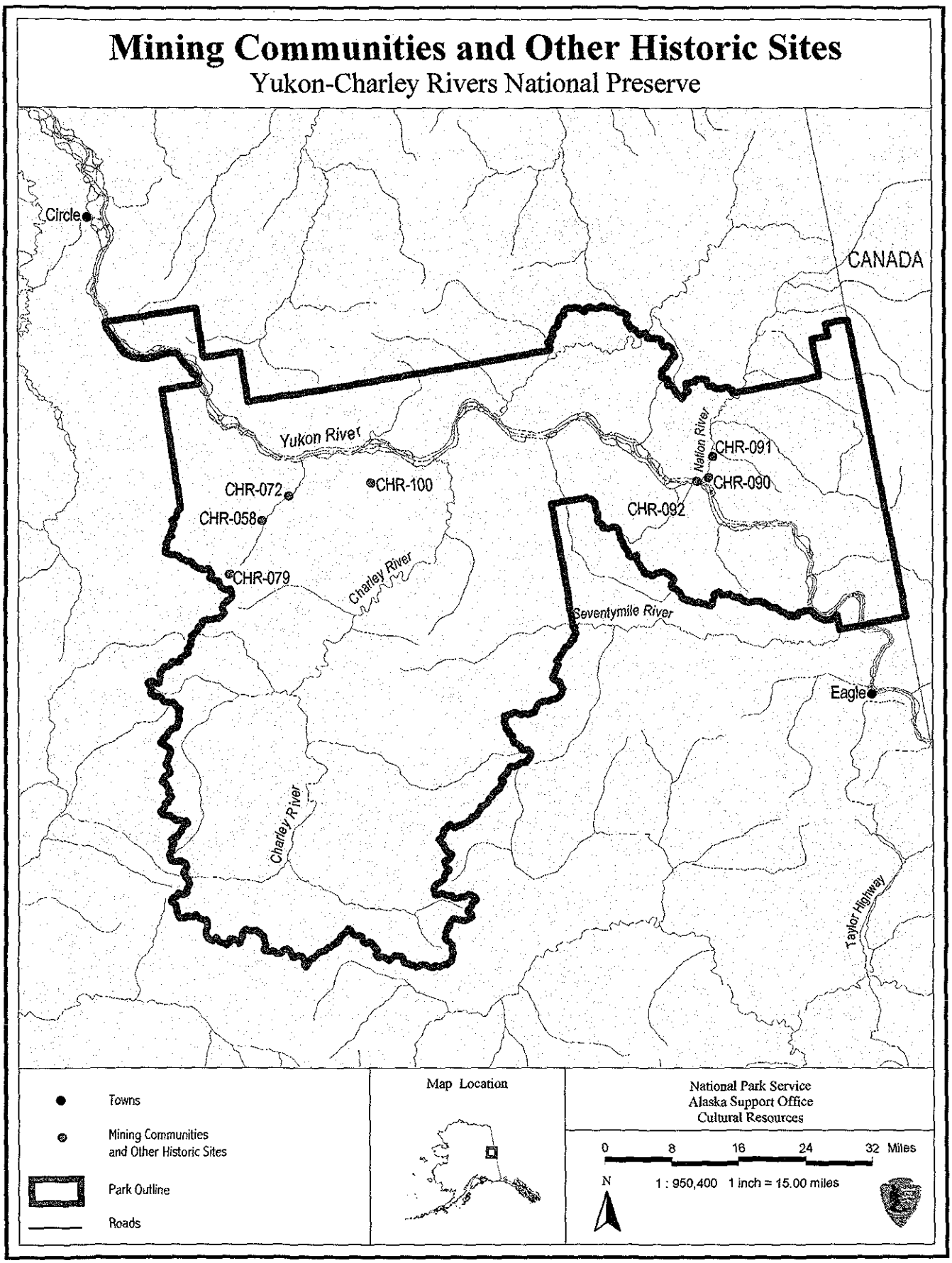

Mining Communities and Other Historic Sites
Yukon-Charley Rivers National Preserve
Circle
CANADA
Yukon River
Nation River
CHR-091
CHR-090
CHR-092
CHR-072
CHR-100
CHR-058
CHR-079
Charley River
Seventymile River
Eagle
Charley River
Taylor Highway
Towns
Mining Communities and Other Historic Sites
Park Outline
Roads
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 8 16 24 32 Miles
N
1 : 950,400 1 inch = 15.00 miles

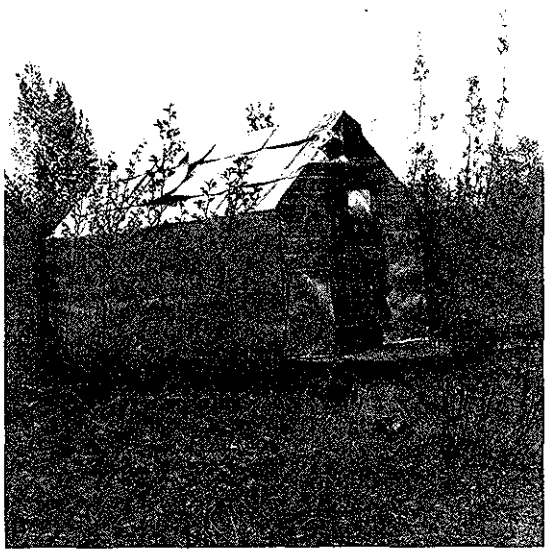
Figure 37.

habitation structure suggests that this site was occupied in the very early twentieth century. Along the cutbank of a dry stream channel that fronts the site are the remnants of log retaining walls, cribbed boxes and scattered notched timbers. The exact function of these log structures could not be determined, but it appears that the boxes once spanned the stream channel.

Grauman (1977b: 304) reports that the Alaska Commercial Co. attempted to open a coal mine in this general vicinity on 1897. "About 2,000 tons of coal were mined, sledded to the Yukon, and burned on river streamers or transported to the Dawson market." The operation was abandoned in 1902, and by 1903 the mine working had caved in. Grauman also reports on the existence of a heavily overgrown road used to transport the coal from the mine down to the Yukon River (1977b: 302).

A second site related to both mining and transportation is **CHR-100**, known as the Ben Creek airstrip. It is located on a relatively flat ridge northeast of the headwaters of Ben Creek. At the northeast end of the strip, which also appears to have been used as a staging area, are three vehicles, parked parallel to one another in front of a wannigan. Fuel drums and other metal debris are scattered around the vicinity of the vehicles and wannigan. The airstrip, approximately 750 m long, was built in 1944 by Barney Hanson, who purchased the mining claims on Ben and Sam Creeks from Sandy Johnson, the original claimant. Hanson used Wein Airlines to bring supplies, needed for his mining operations; but some of the heavy equipment that still lie at the site was brought in by Hanson himself on a "go-devil" (a large sledge). The go-devil was pulled by the old bulldozer/hoist





Ben Creek airstrip (CHR-100):

(Above left) Dennis Layman stands on an International bulldozer used to pull a large sledge (go-devil) with mining equipment up Coal Creek valley in the spring during the 1940s and 1950.

(Above right) This wannigan served as a shelter on the go-devil when bringing supplies up to the airstrip on the ridge.

(an International TD-14), still lying at the airstrip. The equipment was first transported up the Yukon by steamer and then deposited at the mouth of Coal Creek. In early spring it was brought up the Coal Creek valley to the ridge where the airstrip is now. Along with the bulldozer is a Jeep, also brought in by Hanson. It has the name "Ike" painted on its front, to honor General Eisenhower during World War II (Dennis Layman 1994: personal communication).

Hanson subsequently sold the claims and the airstrip to the Layman family, sometime before 1960. The third vehicle - a large grey flatbed truck - was brought it by Dennis Layman's father, Jim. The wannigan, which measures 6.7 m^2, is constructed of wood planks covered with canvas and then with metal sheeting (printing plates from newspapers), and is perched on a log foundation. Inside there is a Yukon stove, sitting on a metal basin and still attached to a stovepipe. The back half of the wannigan is taken up by a bed platform and mattress. Domestic items, such as a broom, lantern, jars, and a basin are also inside the portable structure. The wannigan was used as shelter on the "go-devil" when bringing supplies in (Dennis Layman 1994: personal communication). At the end of the airstrip, just past the wannigan, two roads lead to the claims on the Ben and Sam Creek drainages. At the opposite end of the airstrip is a road that leads to Coal Creek. This site was also recorded by Grauman (1977b: 455-456).

Subsistence-Related Sites. The three sites in this category are all associated with trapping. **CHR-058** lies on a bench on Caribou Creek, upstream from its confluence with Woodchopper Creek. It consists of a partially collapsed log cabin, measuring 13.5 m^2 and constructed of unpeeled logs. The interior walls are rough hewn. The corners are saddle-notched, and some logs are pegged together with dowels. Moss chinking is still evident. The milled lumber door, with a homemade hinge made of a tin can and canvas, is padlocked with a Yale lock and chain. There is a sparse inventory of artifacts inside the cabin: a bed frame made of log saplings, a 5-gallon can with a bailing handle, and one or two other miscellaneous items. No trash scatters were found at the site, and the only other possibly cultural feature is a small depression close to one of the cabin walls. As there was no obvious evidence of mining activities on the claim where the site is located, this very small cabin has tentatively been identified as a trapping site.

One of the best-documented subsistence-related sites in YUCH is **CHR-092**, located on the Yukon River at the southern base of Nation Bluff, a prominent hill on the Nation River delta. CHR-092 is a settlement, composed of 10 features, with a long history of occupation. The main feature at the site is a log cabin built by Christopher Nelson in 1934 (Grauman 1977b: 312). Nelson was an early trapper in the area whose non-stop talking earned him the moniker, "Phonograph." The cabin measures 24.2 m^2 and is now sheathed with flattened cardboard boxes, which obscure some of the original construction details. The gable roof is intact and supported by double purlins near its peak, instead of a single ridgepole. This building technique, seen in other cabins in YUCH such as ones built by Sandy Johnson on Ben and Sam Creeks (CHR-082 and CHR-096), is sometimes used when a suitable ridgepole is not available. The cabin had a porch, which has been converted to an arctic entry, and now functions as a woodshed. The interior of the cabin has fire damage, but is maintained in good condition with the addition of cardboard-box paneling, along with a woodstove, beds, tables, and shelves. At present, the cabin is used by patrolling NPS personnel and Yukon River travelers and probably served a similar function

historically as evidenced by the hand-fashioned boats, sleds, and other artifacts that have accumulated at the site.

The second feature at the site is an elevated log cache, still standing and in good condition. As is customary, the legs of the cache are sheathed with metal fuel cans. The roof is covered with flattened fuel can "shingles," which retain their spouts and handles. Several items, such as cans, are affixed to the legs of the cache to act as noisemakers, and thus deterrents to small animals trying to enter the cache. A boat constructed of milled lumber covered with metal strips, lies near the cache. In the spruce and cottonwoods east of the historic cache, is a recent cache, built atop two topped-off spruce trees. Other features at the site include a garden plot, the rows of which are now obscured by grass; two A-frame doghouses with flattened fuel can roofs; a latrine hole covered with boards; and a large historic and recent trash dump, measuring 7 m in diameter and 0.85 m high. Some of the unique artifacts at the periphery of the dump include a wooden sled basket; a flat-bottomed wooden boat; an oval-shaped wood-burning stove; and a standing spruce, the lower saw-cut branches of which are hung with assorted hardware, such as stove flues, dog chain snaps, hinges, and so on.

Two features that date to even earlier than Phonograph Nelson's occupancy at the site are an overgrown cabin foundation or root cellar, and a brush-covered stockpile of coal, measuring 12 m x 4.5 m x 1 m, and lying at the base of the bluff near a barely discernible roadway. Coal from the Nation Coal Mine (CHR-090), located three or four kilometers to the northeast on the Nation River, was stockpiled here awaiting shipment on the Yukon.

Further evidence of trapping is at **CHR-091**, located on the west bank of the Nation River, approximately five kilometers from its mouth. The site consists of two very deteriorated features lying between a well-used trail and the river terrace. The section of trail where the site is located has often been used to store items such as traps, poles or logs that would be retrieved later. One feature is the corner of a saddle-notched log structure; both sides are five courses high, and their ends have collapsed to the ground. The structure is 2.75 m long. Although the feature is possibly the remains of a cabin or cache, it is more likely to have been a deadfall trap. A deadfall trap illustrated by Grauman (1977b: 360) is very similar to this feature in size and construction. Enough remains of the second feature, lying just a few meters away, to suggest that it was once a cubby set used in trapping. It consists of an axe-cut pole, supported by a leaning forked stick, with several other poles resting on it or collapsed beside it. Mature spruce trees growing at each end of the structure lend support to it. This type of cubby set was formerly used in trapping lynx, curious animals that were attracted by the structure. In the summer, they would be baited with fish; and in the winter, when the fur was prime, they would be set with traps. This type of trapping is documented near the Nation River Bluff cabin (CHR-092) by Grauman (1977b: 318-322).

Unknown. Two sites, both of them on Woodchopper Creek, are included in this category. **CHR-072** is located on an old road near a claim group on Woodchopper Creek. It is composed of a subterranean storage(?) structure, with a log-cribbed "arctic entry" built into the side of a hill on the creek valley. The entry has double doors that lead to an underground hall, and then to a large single door that opens into a room approximately 10 m^2. The exterior door is constructed of milled planks with heavy wire hoops on the outside as door handles. There is a small woodpile just inside the entry. The single inner door is

built of three layers of 2.56-cm (1-in) thick boards. The inner room is cribbed with logs; and the ceiling is constructed of spruce rounds, overlain with planks, and then covered with heavy tar paper. The roof fill is made up of more than one meter of soil. There is a large woodburning stove in the corner of this room, with a stovepipe extending upward through the soil. There is also a scatter of 15-10 Blazo boxes inside the room, and an assortment of coffee cans, 55-gallon drums, pipe, bottles, and a barrel stove outside the structure. The function of this large underground storage facility or cabin (?) is unknown. It may have been a powder magazine constructed sometime during the 1935-40 period when dredging operations were in full swing on Woodchopper Creek, and then subsequently used as a shelter, which would account for the addition of a stove. It may also date to a more recent period and have functioned simply as an underground shelter.

CHR-079 lies in the headwater region of Woodchopper Creek, outside the claims area. It consists of a semi-subterranean cabin with an arctic entry, a cache on pilings, a combined shed and dog kennel, and two collapsed wooden structures. The cabin and entry are both cut into a side slope of the creek. The outside of the entry is flanked by courses of rocks set into the side of the slope to prevent erosion and slumpage. The entryway, now partially collapsed, is sided with half-round spruce saplings. It appears to have never had an exterior door, but leads to the front door of the cabin proper. This door had a window, which would have been the only source of daylight for the cabin occupants. The main room of the cabin, which measures 10 m^2, was dug into the slope and lined with vertically placed hewn logs. Along the tops and bottoms of these logs are horizontal board sills to keep the logs in place. The gable roof, lined with logs and overlain with sod and birch bark, has collapsed into the cabin. A variety of artifacts, including a Yukon stove, food tins, tools, a drafting square, and cookware are inside the cabin. A larger assemblage would probably be found under the roof remains.

East of the cabin is a cache made of peeled, hewn logs, set upon log pilings (i.e., an elevated cache). The cache and its gable roof are intact, but it is leaning heavily to one side and in danger of collapse. The pilings have pieces of sheet metal nailed to the logs to prevent it from being infested by rodents. The cache logs are not notched, but are nailed to each other. There is a sapling bed frame inside the cache, along with some enamelware, a wash tub, a piece of caribou hide, and other artifacts. Outside the cache are a soup pot, the ribs of moose or caribou, and a ladder. Approximately 200 meters up the side stream from the cache is a collapsed shed-like structure with two doghouses attached to one of its walls. The entry to the doghouses is through the shed. This structure is constructed of vertical unpeeled spruce saplings.

There is no evidence in the form of equipment or landscape disturbances to indicate that this camp was occupied by a miner. There was obviously a considerable amount of time and effort involved in the building of this cabin complex, but its function and date of construction remain unknown. Of interest is the fact that no suitable building material would have been found near the cabin, so the logs must have been cut and hauled in from several kilometers away.

Gates of the Arctic National Park and Preserve

Four historic sites were documented by CRMIM crews in GAAR (figure 38). These sites are associated with mining, trapping, and transportation.

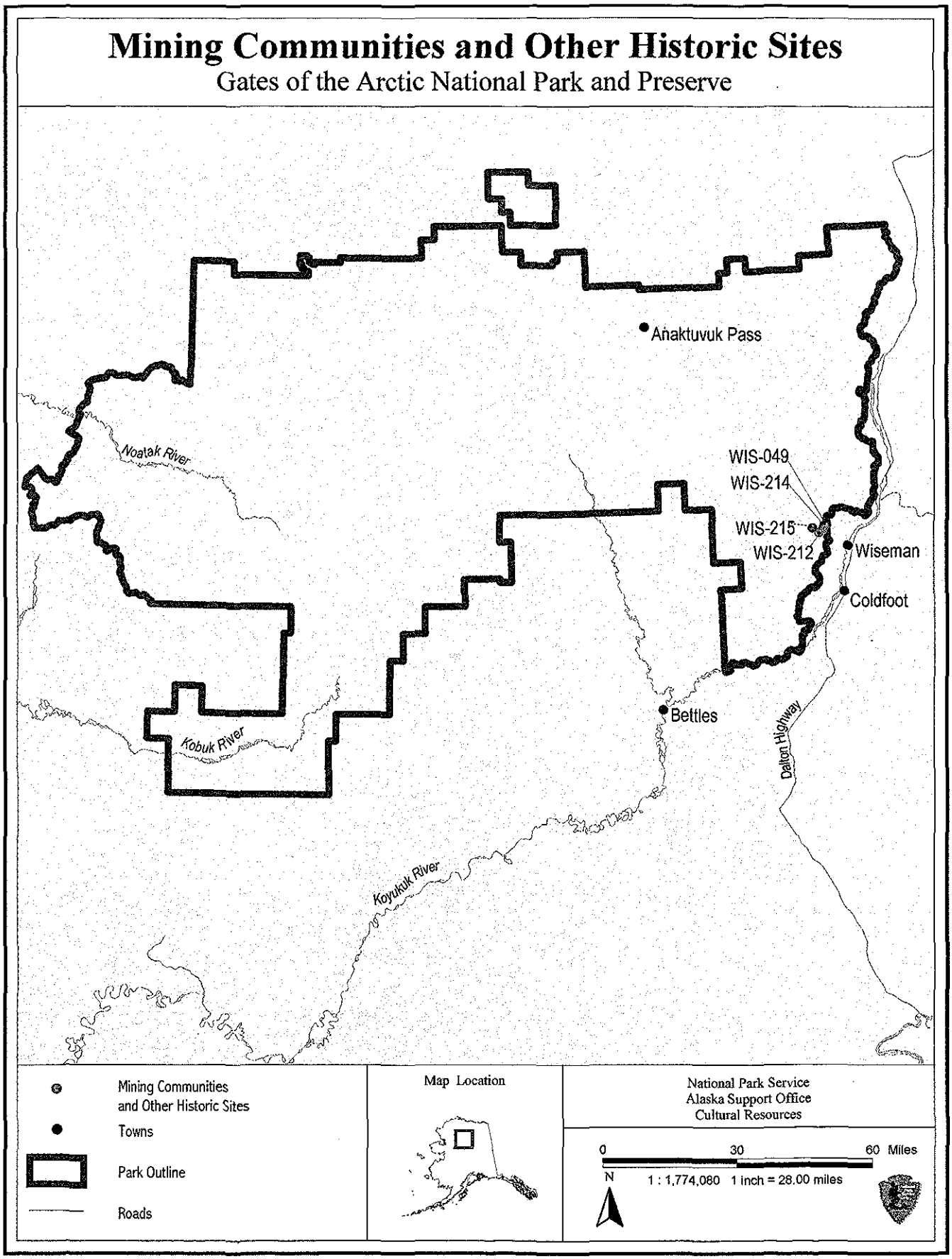

Mining Communities and Other Historic Sites
Gates of the Arctic National Park and Preserve
Anaktuvuk Pass
Noatak River
WIS-049
WIS-214
WIS-215
WIS-212
Wiseman
Coldfoot
Bettles
Dalton Highway
Kobuk River
Koyukuk River
Mining Communities and Other Historic Sites
Towns
Park Outline
Roads
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0
30
60 Miles
N
1 : 1,774,080 1 inch = 28.00 miles

Figure 38.

Mining-Related Sites. The only mining-related site is **WIS-214**, located near Pasco and Gilmore Creeks, about 3.2 kilometers west of the community of Nolan. It consists of the ruins of a single cabin surrounded by cut stumps that dot the entire area around the site on both sides of the winter trail running to Nolan. Stacks of cut logs, lying on and to the north of the winter trail and visible from the air, are assumed to have been cut by the person who once occupied the cabin. The partially collapsed cabin, which measures 10.2 m^2, is constructed of unpeeled logs chinked with moss. The corners are saddle-notched. Three of the walls are left standing; but the fourth, built into the hillside behind the cabin, has collapsed. There does not appear to have been a window in the cabin. The roof was probably built as a shed-style roof. The interior of the cabin is filled with remains of the collapsed roof, but visible through the debris in the northeast corner are the ruins of a pole bed. A wooden table lies along the west wall. In the southeast corner is a wooden Blazo box. Also seen were a Yukon stove made from two square 5-gallon fuel cans, an old frying pan, five 5-gallon fuel cans, and a number of coffee and lard cans. In front of the cabin are a shovel and a Blazo can, and about 4.6 meters to the southeast is a decaying stack of firewood. This site, originally reported by Brown (1985: 503-505), is associated with woodchopping. As such, it represents a unique type of activity and type of service provided in support of mining operations in Nolan during the early decades of the 1900s.

Subsistence-Related. The single site in this category is **WIS-215**, located in an upland spruce forest on Glacier Pass, near the Mascot Creek access route. The only structural remains at the site are the ruins of a small trapper's line cabin, measuring only 6.6 m^2. The cabin, originally reported by Brown (1985: 519), was constructed of unpeeled logs with saddle-notched corners and what appears to have been a gable roof. A homemade sledge made from flattered fuel cans, reinforced by a wood frame, is close to the cabin ruins. The cabin probably dates to the early decades of the twentieth century.

Transportation. **WIS-049** is the single example of a transportation site in the GAAR inventory. It consists of the remnant of an historic road, now overgrown with willows and alders, built along Snowshoe Creek, near its headwaters. The road runs from the "winter trail" along Wiseman Creek to the top of Snowshoe Pass, a topographic feature that divides Wiseman Creek on the east and the Glacier River on the west. The width of the road is about 6 m, and it extends for approximately 3.7 kilometers. It bisects an area of more than 1000 axe-cut stumps. At about 2.2 kilometers above the confluence of Snowshoe and Wiseman Creeks, the road forks to the north and west. The northern fork parallels Snowshoe Creek for a short distance and then ends abruptly. The western fork, built along a narrow bench, parallels an unnamed drainage and heads in a westerly direction, toward the summit of Snowshoe Pass. At intermittent locations along approximately 300 meters of the bench is an abutment or support, constructed from ax- and saw-cut spruce members. Spruce poles, averaging 15 cm across and 1.5 m long and in places stacked three tiers high, comprise the linear sections of the support. The smaller cross pieces of the support are composed of roots, stumps, and limbs spaced 20 centimeters apart. Farther west the design changes to a less substantial, single-pole construction. This section runs for approximately 150 meters before it disappears near the crest of Snowshoe Pass. Along some segments of the roadway, the log remains of a "corduroy" road are visible. Three cans were identified lying next to the road. The log-cabin syrup cans date to the early 1920s or late 1910s, while a crudely soldered, lapped seam can possibly dates earlier. The site appears to have been used as a transportation route, providing access to the Glacier and Middle

Fork of the Koyukuk Rivers during the early decades of the twentieth century. The site is probably associated with the historic gold mining booms just around the turn of the twentieth century.

Unknown. The function of one site, **WIS-212**, could not be determined. It consists of a remnant tent frame, plus a few associated tin cans and other artifacts. It is located approximately six meters south of the Pasco Creek "winter trail" and 35 meters northwest of a Wiseman Creek tributary. The winter trail originates in Nolan and meanders in a westerly direction past Glacier Creek. A short fork diverges from the main trail 12 meters east of the site and terminates about 20 meters west of the site. The single site feature is a tent frame remnant measuring 8.7 m^2. All that remains of the structure are two foundation logs and spruce poles of various sizes, still nailed together. They were apparently once attached vertically to the foundation logs. Boards were used as cross pieces to stabilize the poles. Several cans, six of them identified as coffee cans, were at the site. One butter can had a date of 1945 written on its side. Other artifacts include two gray-streaked, enamel cooking pots; a shoe fragment; and a piece of scrap metal cut from a fuel can. Although this site may have been occupied by a small-scale placer miner, there is no artifactual evidence to directly tie it to mining; thus, its function is considered unknown.

Discussion

This inventory of historic sites, although not as cohesive a unit as the placer and lode mining sites, provides a good example of the types of facilities and services that developed in Interior Alaska as the result of the discovery of precious minerals not much more than a century ago. The earliest of these sites, which ironically is not associated with gold or copper, but with another mining commodity - coal, dates more than 100 years ago. Archeological evidence in the forms of square nails confirms the early historic dating of this site, the Nation Coal Mine (CHR-090) near the banks of the Yukon River. In less than a decade, the historic mining communities of Diamond (MMK-001) and Eureka (MMK-099) had sprung up far to the southwest in the Kantishna Hills of what is now DENA. Mining activity in the heart of the Nizina District (in WRST) was greater still with the building of a huge copper-mining empire at Kennecott and it neighboring mines, such as the Mother Lode. At least one of the small historic camps (XMC-102) along the trail to the Mother Lode Mine dates to the first decade or two of the twentieth century.

The best sample of historic sites in this inventory pertains to transportation, primarily camps along travel routes to hubs of mining activity, such as in the Bremner area or in the Chisana District. Although most of these sites have habitation structures of some type, such as the collapsed log cabins at Breedman's Roadhouse (XMC-071) that sprang up on the trail from McCarthy to the Chisana District in 1913, there is also one example (NAB-091) of the vehicles used in such transport. This site consists of old freight wagons, lost or abandoned en route over the pass from either Bonanza City or Chisana City to one of the placer camps on Bonanza or Little Eldorado Creeks during the early years of mining in the Chisana District. There are also several examples of the camps used by road construction or maintenance crews on the McCarthy Creek road or the McCarthy-May Creek road, spanning a period from the 1910s to the 1930s.

Some of the sites constructed in the early decades of the twentieth century continued to be occupied or to take on new functions in later years. A good example is at MMK-011, the Moose Creek site that was originally used as a fish camp in the early years and

later functioned as a shelter cabin for travelers in the 1940s. Another one is Jake's Bar Camp (XMC-103), located near the historic Nicolai or Hanagita Trail and associated in more recent years with an airstrip. Perhaps the best example of old sites taking on new lives, for better or worse, is seen in the case of MMK-018, the historic Kantishna Roadhouse, which now serves as an outbuilding for a modern lodge. A few of the sites in the inventory, such as CHR-100, the Ben Creek airstrip, were originally built in the 1940s and have just recently passed the 50-year threshold, making them eligible for consideration as historic properties.

By the very the nature of the CRMIM surveys, site discovery was weighed heavily in favor of mining or mining-related sites. A small sampling of other types of activities, such as trapping, homesteading, and mountaineering were also recorded, however, giving us the necessary perspective to see that it was not only the miners, but a wide variety of intrepid souls, who ventured north to Alaska while it was still a little-known and remote frontier.

CHAPTER 15

PREHISTORIC SITES

This chapter presents descriptions of 34 prehistoric sites that were identified in six park units - DENA, WRST, YUCH, GAAR, KATM, and LACL - during CRMIM surveys. Field crews found the sites by extending the survey coverage to areas of high archeological potential adjacent to mining claim boundaries and not as the result of a systematic search for prehistoric sites. This sample indicates that prehistoric sites do occur near historic and modern-day mining activities in the parks, thus verifying the importance of intensive archeological survey in such areas. A brief prehistoric overview, presented below, sets the stage for the park-by-park site descriptions.

Prehistoric Overview

Archeologists in Alaska have identified a number of early, widespread traditions, followed by a succession of more regionally specific traditions and cultures beginning at about 4,000- 5,000 years before present (B.P.). The best sources of information on these traditions in specific park units are the archeological resources inventories written by NPS staff archeologists over the last several years (see for example, Griffin and Chesmore 1988; Griffin 1990; NPS 1998). Another useful document for providing a more regionwide perspective is the *Alaska Regional Plan* for the Systemwide Archeological Inventory Program (Schoenberg 1995).

There are many different definitions for the concept of an archeological or cultural tradition. Essentially, the term refers to a continuity of cultural traits that persists over a considerable length of time and occupies a broad geographical area (Anderson 1968: 63). The beginning and end of a tradition is marked not only by a major change in artifact type, but also a shift in the economy, or the lifeways, of the prehistoric group (Dumond 1982: 39). Although certain artifact styles or types are diagnostic of a specific cultural tradition and are useful in placing sites in a relative chronological sequence, many other lithic tools from assemblages greatly separated in time were manufactured and functioned in similar ways and are therefore considered to be undiagnostic. The context or setting of a site, whether on an elevated lookout point or near a source of water and shelter, is also an important indicator of how and possibly of when the site was occupied.

The first migrants into the New World are believed to have entered Alaska during the late Pleistocene, when much of the land was locked under massive continental glaciers. Some archeologists theorize a coastal migration route into Alaska; but the prevailing view is that the earliest Americans made their entry along an ice-free corridor, known as Beringia, which connected Siberia with Alaska. The nature and identity of the earliest cultural tradition in Alaska is a matter of great debate. Some archeologists have attributed artifacts found in site components predating 11,000 years B.P. to the Northern Paleoindian tradition, a variant of the Paleoindian tradition known from sites with fluted

Clovis projectile points in the North American High Plains and Southwest. One site that supports the hypothesis that Paleoindian cultures originated in the north and were then carried to more favorable climes south of the retreating ice sheets (rather than the more widely held view that the direction of migration proceeded from south to north) is the Mesa site in Alaska. It lies on a prominent hilltop on Iteriak Creek just north of the boundary of GAAR. The oldest radiocarbon date from this site is 11,660 +/- 80 years B.P. and is associated with basally thinned, but not fluted, lanceoloate projectile points (Kunz and Reanier 1994). Among other Alaska sites with pre-11,000-year B.P. dates and possible Paleoindian affinities are four – Dry Creek, Walker Road, Moose Creek, and Owl Ridge - located in the Nenana Valley, just north of DENA (Goebel, Powers, and Bigelow 1991).

The Paleoarctic tradition (or American Paleo-Arctic) is the earliest well-accepted cultural tradition known in Alaska. The characteristic tool assemblage is based on a core and blade technology that features small, wedge-shaped cores, microblades, large polyhedral cores, large blade-like flakes, flakes burins, as well as other tool types (Dumond 1987: 36). Since it was first identified at the well-stratified Onion Portage site on the Kobuk River, dating to as early as 10,000 years B.P., (Anderson 1970), the tradition has been found widespread throughout Alaska. Unlike fluted points of the Paleoindian tradition with no undisputed antecedents in the Old World, the technology used by Paleoarctic people in eastern Beringia (Alaska) clearly has its roots in the contemporaneous cultures of Siberia (Hadleigh-West 1967). The carriers of the Paleoarctic culture appeared to have lived in small, mobile groups and to have hunted a wide range of animals, including bison, elk, caribou, and sheep, as well as small mammals and birds. Their hunting implements were formed by the placement of the thin, parallel-sided microblades end to end, in a row within a grooved piece of bone, wood or antler to form a projectile point with a razor-sharp cutting edge (Dixon 1993: 58, 60).

One of the regional variants of the Paleoarctic tradition is the Denali complex, known from several sites in Interior Alaska, including the Teklanika sites in DENA. Denali complex sites were originally thought to date no later than 8000 B.C. (10,000 years B.P.) by F. Hadleigh-West (1967: 378), one of the pioneering archeologists in the Interior. More recent research by Mobley (1991) and Dixon et al. (1985) has indicated that later phases of the culture may have actually persisted until 3,500 years B.P. or even later.

The Northern Archaic tradition, like its predecessor, was first defined at the Onion Portage site on the Kobuk River, and dated as early as 4000 B.C. (6000 B.P.). A hiatus of 2,000 years separates the Paleoarctic assemblage at the site from the overlying Northern Archaic material, characterized by crude stone points with notched bases, large irregular knives, thin scrapers, notched stone sinkers, and large crescent-shaped or oval bifaces. One of the earliest dated Northern Archaic sites, the Tuktu site, lies in an unforested, tundra environment just outside the boundaries of GAAR in Anaktuvuk Pass. Besides side-notched projectile points and other artifact types typical of the tradition, microblades made from broad cores were also recovered from the site, radiocarbon dated at about 6,500 years B.P. (Campbell 1962; Anderson 1984: 83). This combination of a microblade industry along with a side-notched point industry was also found at sites near Kurupa Lake, at the northern boundary GAAR. The interpretation by Schoenberg (1985: 152) to explain the co-occurrence of these distinctly different artifact types is that past Kurupa inhabitants were descendants of a Paleoarctic population or were a new wave of "microblade...using people"

who were contemporaneous with and acculturated to intrusive groups carrying the "pure" Northern Archaic tradition.

Many sites or site components in Interior Alaska have been attributed to the Northern Archaic Tradition. Included in this group are several in the general vicinity of DENA: the Healy Lake village site (Cook 1969), the Lake Minchumina site (Holmes 1986), Component IV at the Dry Creek site (Powers, Guthrie, and Hoffecker 1983), and several sites along the middle Susitna River (Dixon et al. 1985). The best known Northern Archaic site in the YUCH area, but outside the preserve boundaries, is the Twelve Mile Bluff site on the Yukon River (Griffin and Chesmore 1988: 61). Archaeological survey work conducted in the Wiki Peak-Ptarmigan Lake area in WRST suggests the possible co-occurrence of Northern Archaic and Late Denali lithic technologies in the area (Patterson 1999: 4-5). The Northern Archaic tradition is also found in southwestern Alaska, specifically in KATM where a few Northern Archaic sites have been excavated in the Brooks Lake and Brooks River area (Dumond 1981; ENRI 1993: 88-89).

Only a few sites or site complexes in the Interior provide clear evidence of a technological continuity between the Northern Archaic assemblages and those that can definitely be attributed to the Athapaskans, a people adapted to the northern forests who inhabited the area at historic contact. Although it appears likely, according to the evidence presented above, that an ancestral population of Athapaskans inhabited the Interior (both Alaska and Canadian) by as early as 5,000 years B.P., the date(s) at which specific Athapaskan groups, such as the Tanana or Koyukon, become "visible" in the archeological record is still problematical. An excellent case for extending the ethnic and linguistic boundaries of one Athapaskan group, the Ahtna, back in time to about 1,500 years B.P. is made by (Workman 1976) based on his excavation of GUL-077, a prehistoric site just outside the boundaries of WRST. He lists a number of traits found at the site, including the abundance of Native copper tools, retouched boulder spalls, large semi-subterranean houses, deep cache pits, and others, which, taken in combination, are distinctive of an ancestral Ahtna adaptation (Workman 1976: 161-162). Of all the Interior parks, WRST contains the largest group of Athapaskan (primarily Ahtna) prehistoric, protohistoric, and historic Athapaskan sites, which include numerous villages, camps and hunting sites, and trails (Davis, Bane, and Spude 1981).

Unlike the interior parks (DENA, WRST, YUCH), most of GAAR is included in the tundra and arctic region, which extends several hundred kilometers inland from the coast and is associated ethnographically with the Eskimo peoples (Yup'ik and Inupiat speakers). As early as 4,200 years B.P., the region was colonized by people with a distinctive, miniaturized tool kit of delicately chipped end- and side-blades, burins, microblades, and other tools. These bearers of the Arctic Small Tool tradition are considered by many to be the ancestral Eskimos (Dumond 1984: 74-76). The northern representation of this tradition, found in GAAR, is called the Denbigh Flint Complex. It marks the beginning of what has been termed the "Eskimo Continuum" by M. L. Kunz (1991), who spent many years surveying and inventorying the archeological sites in GAAR. Included in his "Eskimo Continuum" are the Choris, Norton, and Ipiutak cultures, each of which has a distinctive set of traits. These cultures were followed by what Kunz (1991: 53) has termed the "Late Prehistoric Eskimo," but others prefer to label as the latter part of the Thule tradition. The Thule expansion occurred throughout the Arctic about 1,000 years B.P. and brought

with it many cultural traits, such as heavy reliance on sea mammals and permanent coastal villages, that are the hallmarks of ethnographic Eskimo cultures.

KATM and LACL are in the culturally diverse Southwest and Pacific Coast region of Alaska. The brief discussion here will focus on KATM, which is best known prehistorically of the parks in this region. Fifteen years of fieldwork by D.E. Dumond and his students in the Naknek region of western KATM have produced a well-documented local archeological sequence, designated as a series of cultural phases. These phases have been equated with several of the traditions discussed above. For example, the Brooks River Gravel Phase is seen to be representative of the Arctic Small Tool tradition, while more recent phases, such as the Brooks River Weir Phase, are associated with the Norton tradition. The most recent in the local archeological sequence is the Pavik Phase, thought to be a variant of the Thule tradition (Dumond 1981: 25; ENRI 1993: 81). On the Shelikof Strait side of KATM, the archeological sequence, i.e., Takli Alder, Takli Birch, Takli Cottonwood, and so on, is more reflective of the chipped stone/ground slate cultural traditions, such as the Ocean Bay and Kodiak traditions known from Kodiak Island (Clark 1984b: 137; ENRI 1993: 81). This dichotomy of cultures has persisted until historic times, as the people of the Naknek region are Yup'ik speakers, while those on the Gulf of Alaska (Shelikof Strait) coast are speakers of a different language, known as Alutiiq (Krauss 1982).

The term protohistoric has been applied to the brief transitional interlude between the prehistoric and the historic times. Depending on the region, it can be roughly dated in Alaska from the mid-1700s to the late 1800s - a period when Native cultures were experiencing the effects of direct and indirect contact with Europeans and white Americans. It is recognized in the archeological record by the appearance of trade goods, such as glass beads, of non-Native manufacture. The gradual disruption of traditional Native cultures that began in protohistoric times continued with more intensity during early historic contact, a topic that has been discussed at some length in each of the park chapters (chapters 3 – 11).

Site Settings

One way of comparing the prehistoric sites in the CRMIM sample is by site setting. Table 73 lists the sites by park unit and by several other variables and differentiates them into two categories by site setting: sites on elevated terrain and sites adjacent to streams and lakes. The exception is KEN-324, a coastal site. Included in the first category are sites located on elevated glacial landforms such as moraines, or on ridge crests, knolls or bluffs, which are not immediately adjacent to known water sources. Predominant types in these settings are surface scatters that have been exposed by wind or other types of erosion. They are mostly temporary camps or hunting lookouts, represented by lithic waste material (debitage), sometimes with a handful of diagnostic tools. The second category pertains to sites located near sources of water. They are often associated with the more substantial remains of permanent settlements, in locations repeatedly used over a long term, or in special-use locations that may represent only one segment of a yearly settlement/subsistence pattern. Sites placed in this category may be located on elevated landforms, but also have the advantage of a nearby water source. None of the sites in the CRMIM sample was found in caves or rockshelters.

The age of most of the sites in the sample is unknown. Radiocarbon dating has been done for only two sites (MMK-071 and MMK-096), and therefore little can be said regarding the prehistoric cultural affiliations of the sites, with a few exceptions where diagnostic lithic items were found.

Table 73
Summary of Prehistoric Sites[1]

Site	Age	Stratified	Isolate	Scatter[2]	Features	Diagnostics	Setting
DENA							
HEA-044	?	yes		x	no	no	near water
HEA-045	?	yes		x	no	no	near water
HEA-232	10.0-2.7k	yes(?)		x	no	yes	near water
MMK-034	?	no		x	no	no	near water
MMK-050	?	yes		x	no	no	near water
MMK-068	2.0-0.1k	no		x	no	yes	near water
MMK-069	?	no	x		no	no	near water
MMK-072	?	no	x		no	no	near water
MMK-078	?	yes		x	no	no	near water
MMK-102	?	no		x	no	no	near water
MMK-103	?	no	x		no	no	near water
MMK-065	?	no		x	no	no	near water
MMK-066	?	no	x		no	no	near water
MMK-071	2.2k[3]	yes		x	hearth	no	near water
MMK-110	?	no	x		no	no	near water
MMK-107	?	no		x	no	no	near water
MMK-108	?	no		x	no	?	near water
MMK-109	?	no	x		no	no	near water
MMK-096	2.5k[4]	yes		x	hearth	no	elevated
MMK-097	?	no	x		no	no	elevated
MMK-098	?	no	x		no	no	elevated
MMK-101	10.0-3.0k?	no		x	no	yes	elevated
WRST							
XMC-039	?	yes		x	no	no	near water
XMC-097	?	no		x	hunting blinds	no	elevated
XMC-098	Ahtna?	?		x	surface depressions	yes	elevated
YUCH							
CHR-074	5.0-4.0k	yes		x	no	yes	near water
CHR-076	?	no		x	no	no	near water
CHR-077	10.0-0.1k	?		x	no	yes	elevated

(continued)

Table 73 (continued)

Site	Age	Stratified	Isolate	Scatter	Features	Diagnostics	Setting
GAAR							
WIS-046	?	no	x		no	no	near water
WIS-213	?	no	x		no	no	near water
KATM							
ILI-060	?	yes		x	no	no	near water
ILI-061	?	yes		x	no	no	near water
ILI-059	?	?	x		rock cairn	no	elevated
LACL							
KEN-324	?	yes			surface depressions	no	coastal

[1] The present descriptions and summaries are based on available site documentation and in many cases, such as features or stratified deposits, there is a high potential for the existence of additional features or deposits beneath the modern surface.

[2] A scatter is defined as more than one object identified at a site.

[3] Radiometric age determination, 2,230±70 (BETA 18044).

[4] Radiometric age determination 2480±65 (BETA [ETH] 27930).

Denali National Park and Preserve

Twenty-two of the CRMIM prehistoric sites are in DENA (figure 39). In general, these sites are lithic isolates or small lithic scatters with few diagnostic artifacts. Only two of the sites, MMK-071 and MMK-096, had hearth features containing charcoal, which was collected for radiocarbon dating. A description of the one paleontological site found during the CRMIM survey is included after the discussion of the DENA prehistoric sites.

Sites Adjacent to Streams and Lakes. Sites in this category are located adjacent to the Teklanika River, Caribou Creek, Moose Creek, Spruce Creek, Glen Creek, Wonder Lake, and an unnamed lake near Camp Creek. The first two, close to the Teklanika River, are sparsely vegetated with alpine tundra. **HEA-044** is located on the crest of a small knoll an estimated 15-20 meters above the riverbed. This site consists of lithics present on the modern surface, as well as those found in subsurface contexts because of shovel testing. This site appears to be stratified. Artifacts collected are all of obsidian and include a large biface (8.9 x 5.6 x 2.4 cm), a large spall, and three lithic manuports. None of the artifacts observed or collected suggests a cultural affiliation beyond "prehistoric." A second site, **HEA-045**, is located on the crest of a prominent knoll, an estimated 55-60 meters above the east bank of the Teklanika River. Remains at this site include lithics present both on the modern surface and subsurface occurrences located during the excavation of a shovel test. The cultural

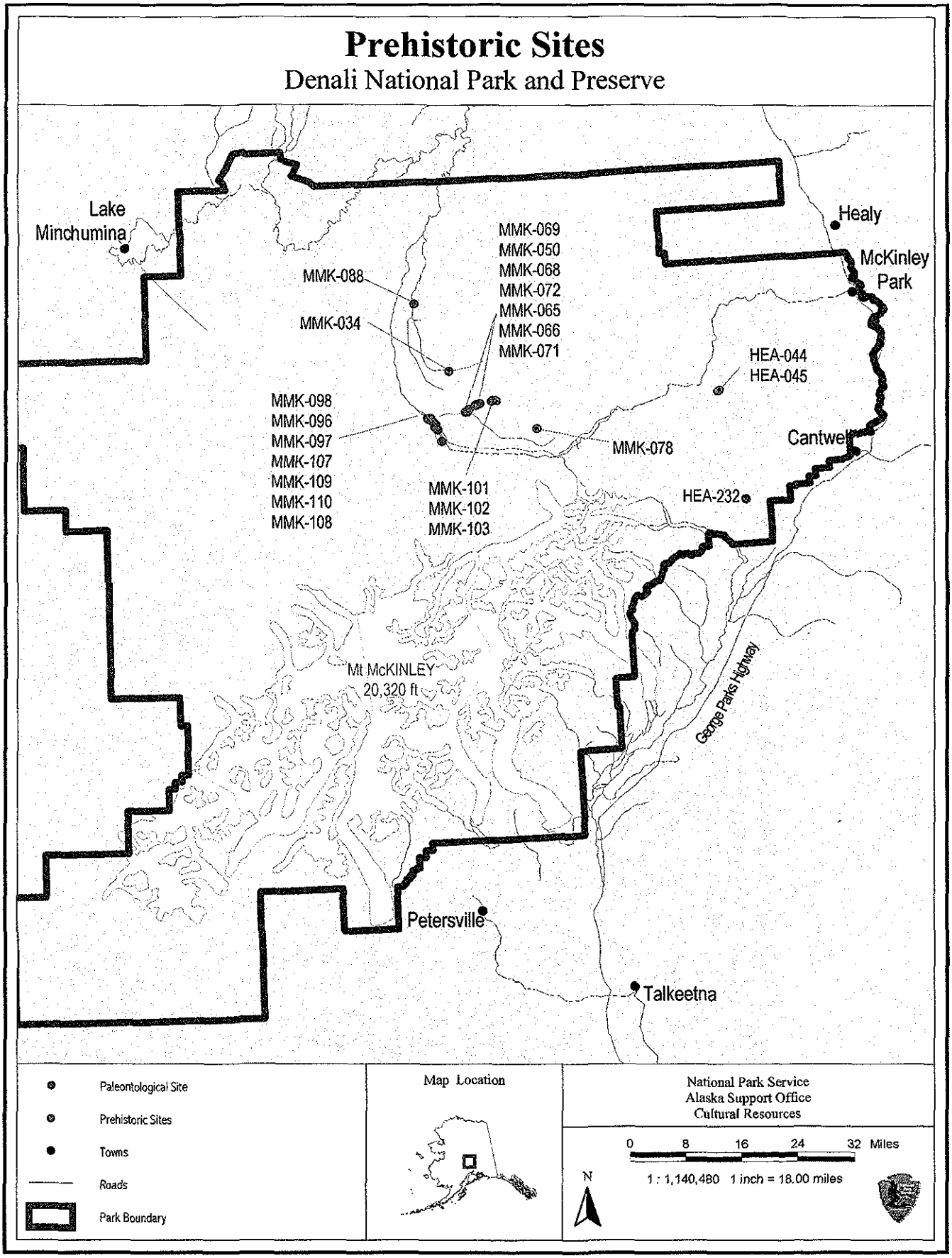

Prehistoric Sites
Denali National Park and Preserve
Lake Minchumina
Healy
McKinley Park
MMK-088
MMK-034
MMK-069
MMK-050
MMK-068
MMK-072
MMK-065
MMK-066
MMK-071
HEA-044
HEA-045
MMK-098
MMK-096
MMK-097
MMK-107
MMK-109
MMK-110
MMK-108
MMK-078
Cantwell
MMK-101
MMK-102
MMK-103
HEA-232
Mt McKINLEY
20,320 ft
George Parks Highway
Petersville
Talkeetna
Paleontological Site
Prehistoric Sites
Towns
Roads
Park Boundary
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 8 16 24 32 Miles
N
1 : 1,140,480 1 inch = 18.00 miles

Figure 39.

deposits at the site may be stratified. Artifacts that were collected include flakes and spalls of chert and obsidian; no objects were found that indicate cultural affiliation beyond that of probable prehistoric origins.

HEA-232 is another of the sites discovered in the Healy quadrangle and is one of the most important found as a result of the survey program. The site, located adjacent to a narrow lake near Camp Creek, consists of a scatter of lithics located on the crest of a ridge that slopes steeply approximately 30 meters down to the lake. Vegetation on the ridge consists of a thin growth of alpine tundra plants. Although lithic debitage and implements were found only on the modern surface, this site is presumed to be stratified. HEA-232 is an important and significant example of prehistoric use of the region because of the apparent age and cultural affiliation of the artifacts represented. Among the items collected are a wedge-shaped microblade core, a microblade and a microblade fragment, all of coarse, dark gray chert. Other items include flakes of chalcedony, chert and obsidian. This form of core is an example of the "Campus" type that has been well-documented and is represented in significant numbers in collections from location such as the so-called "Campus site" at the University of Alaska Fairbanks and in the Akmak and Kobuk complexes at the Onion Portage site on the Kobuk River.

Although interpretations of the age ranges for assemblages with microblade cores and microblades differ among researchers, the occurrences of these tools in stratified sites such as Onion Portage nevertheless establish their appearance as early as 10,000 years ago (Anderson 1988; Clark 1981:108-113; Dumond 1987:45-46). The late occurrences of the tool forms, thought by some to be as late as 3,500-2,725 years ago for the Campus material, are the most problematic with regard to Interior Alaska (Clark 1981:110-111; Mobley 1991:81-83). These problems relate to the apparent long tenure of the technological tradition represented and the appearance, significantly represented in stratified sites, of cultural successors to the American Paleoarctic tradition; this presents a circumstance where Paleoarctic successors or descendants may have lived contemporaneously with extant Paleoarctic people. Based on the preceding, then, the remains found at HEA-232 can be ascribed to the American Paleoarctic tradition, and ascribed to a range of 10,000-3,000 years in age; and by analogy with finds at other sites, can be interpreted as the remains of very ancient caribou hunters in the area. No radiocarbon dating has been done for the cultural remains at this site. Further discussion of this site is in a recent publication by Lynch (1996).

Several prehistoric sites were located along drainages in the Mt. McKinley quadrangle. **MMK-034** is a lithic scatter located on a high bedrock knoll, an estimated 25 meters above Caribou Creek. Lithics that were discovered include chert, chalcedony and quartzite flakes, and a unifacial basalt scraper with a triangular outline. Testing results for this site were negative and indicate that the site is not stratified. Vegetation on the knoll consists of an alpine tundra type. One of the several sites discovered along Moose Creek is **MMK-050**, on a small bench at an estimated 50 meters above the creek. This site resembles those on the Teklanika River, but vegetation on the bench consists only of mosses and lichens. Lithics were observed on the modern surface, and there is indication of subsurface remains as well. Artifacts collected from this site consist of several flakes of different cherts; a single chert biface that may be the distal end of a projectile point. Two chert projectile point bases, one fragmentary and the other a section, were also found.

MMK-068 is a surface lithic scatter composed of three loci and found on a shrub-covered bench above Moose Creek. No stratigraphy is apparent at this site, but a relatively large number of artifacts including basalt flakes were encountered on the modern surface. Lithic implements include a stemmed projectile point (Locus 1), with a thinning flake removed longitudinally from the intact side of the stem, and a total of three bifaces, all of basalt (Locus 2). A single schist slab item with a notch (Locus 3) that may have been used as a spoke shave was also discovered. The assemblage sample at MMK-068 appears to be consistent with late prehistoric and protohistoric Athapaskan technology and can therefore be ascribed to this culture and period, from roughly 2,000-100 years of age.

MMK-069 is an isolate consisting of a single, unifacial, basalt scraper that was also found on a bench above Moose Creek at its confluence with another stream. Vegetation on this bench is also low shrubs. No stratigraphy is apparent at this site. Another isolate found in the Moose Creek vicinity is **MMK-072,** located on a small ridge adjacent to the creek, approximately 90 meters west of MMK-068. Vegetation on this ridge is composed of a sparse lichen cover. The single artifact at this location consists of a crudely flaked tool made of basalt. No stratigraphy is apparent at this site, and no radiocarbon dating has been done for the cultural remains.

MMK-078 consists of a small scatter of chert flakes located on a flat, rocky point of land between two small, upper Moose Creek tributaries. Vegetation in the site area consists of low alpine tundra. Stratigraphy is apparent at this location, but no diagnostic artifacts were found and no radiocarbon dating has been done for the cultural remains. Another upper Moose Creek drainage site, **MMK-102**, was discovered on a shelf overlooking the north fork of the creek. Vegetation on the shelf is sparse alpine tundra. This site consists of a surface occurrence only of two basalt flakes. In the same vicinity is another surface occurrence, designated as **MMK-103**, that is located on a small shelf above the creek. Vegetation in this area is also low alpine tundra. Remains at this site consist only of an isolate, which is a unifacially flaked, siltstone pebble. **MMK-065** is a sparse occurrence consisting of two rhyolite bifaces that were found on a knoll approximately 10 meters above Spruce Creek. Vegetation on the knoll consists of sparse alpine tundra primarily of lichens and mosses. No stratigraphy is apparent at this site.

MMK-066 consists of an isolate on a ridge adjacent to Glen Creek; vegetation on the ridge consists of mosses and lichens. The single artifact, a percussion-flaked biface of cryptocrystalline rock, was discovered on the modern surface. This site is presumed to be stratified. A second site, located on a bench above Glen Creek is designated as **MMK-071**. Vegetation on this bench consists of low shrubs. Results of testing at this location revealed the subsurface occurrence of cultural deposits; collections obtained from below-surface contexts in this case consist entirely of lithic debitage of gray chert flakes and a single buried hearth feature. A single radiometric age determination, obtained from a sample of the hearth material, is 2,230±70 (*BETA* 18044). An ascription to a prehistoric culture for these non-diagnostic types of remains is tenuous insofar as there is nothing in the way of specific implement forms or attributes that would enable a clear determination of cultural affiliation. However, the radiometric age determination nevertheless falls into the time range generally regarded as that of the NaDene' speaking Athapaskan ancestors in interior areas. Because of the subsurface tests, this site has been determined to be stratified.

An isolated find in the water of Wonder Lake approximately three meters from the shoreline is designated as **MMK-110**. This complete point is lanceolate in form and made of

a gray-colored chert. This form of biface is pervasive throughout prehistoric times in the area and is therefore not diagnostic of a particular archaeological culture. Other sites near Wonder Lake include occurrences a short distance from the lakeshore. Among these are **MMK-107**, which consists of a surface occurrence of a single flake and a possible reduction shatter piece, both of gray chert. These remains are located on a rocky ridge approximately 80 meters above the lakeshore. Vegetation on the ridge consists of alpine tundra. A second unstratified site in the same vicinity, **MMK-108**, is located nearer to the lake but is also on the crest of a knoll with a low alpine tundra vegetation cover, approximately 60 meters from the lake and some 20 meters above the lakeshore. These two sites, therefore, do not fit well with the present distinction of site settings either near water or on elevated terrain, but are included under the 'near water' category because of their apparent function and setting. Lithic artifacts discovered on the surface at this location include a single biface section of basalt; all of the other lithics observed consist of flakes of chert, rhyolite and basalt. A third unstratified site in the same vicinity, **MMK-109**, consists of an isolated oblanceolate (or sub-pentagonal) projectile point made of black chert. This point was on the crest of a small knoll near Wonder Lake that is covered by wet tundra vegetation. This bifacial form is consistent with point forms that predate AD 1 in the western subarctic (cf. Clark 1981: Fig. 4, 13 and text), but similar forms occur in later assemblages as well; therefore, this item is not a good indicator of the presence of any particular archaeological culture.



Lanceolate point found at MMK-110 on Wonder Lake in DENA.

Sites on Elevated Terrain. Included in the group of four DENA sites located on elevated terrain away from bodies of water is **MMK-096**. This stratified site contains subsurface remains and is located on a prominent knoll some distance above Moose Creek. Vegetation on the knoll consists of a thin covering of low alpine tundra. Because of testing done at this location, the buried remains of a hearth and a single non-diagnostic rhyolite percussion flake were encountered. Material from the hearth has produced a radiometric age of 2,480±65 years (AMS technique; *BETA* [ETH] 27930), a date that falls within the temporal range of Athapaskan ancestors in Interior Alaska. A lithic isolate found on the crest of a morainal knoll near Lake Creek and Moose Creek is designated as **MMK-097**; the crest of the knoll is barren of vegetation. Remains at this location appear to be unstratified, and limited to the surface occurrence. The isolate consists of a basal section of a biface that may be part of a lanceolate point. A second isolate, designated as **MMK-098**, is also in the Lake Creek/Moose Creek vicinity and consists of a single obsidian flake found on the end of a terrace. The area of this site is barren of vegetation, but surrounding areas have a moss and lichen cover. More substantial, but unstratified remains were discovered at a location on a ridge crest near an upper drainage tributary of Moose Creek; that site is designated as **MMK-101**. Vegetation on the ridge consists of low alpine tundra. Although the lithic artifacts at this site are composed entirely of flakes of gray to black chert, included among these

are a section and whole blade-like flakes. Although they are not sufficient by themselves to establish that the remains are related to a particular prehistoric culture, they nevertheless appear to be consistent with the materials and form of Paleoarctic parallel-sided blades. In this case, they would fall into the period of 10,000-3,000 years. No radiocarbon dating has been done for MMK-101.

Paleontological Site. **MMK-088** is unique in the CRMIM inventory as it represents the site of a natural deposit, not the site of past human occupation. The site, which consists of three specimens of partially mineralized bone, is buried in a gravel terrace that rises above the eastern bank of the Bearpaw River at a point where the river bends sharply to the west. This site has long been reported by word-of-mouth among locals of the Kantishna area, one of whom is said to have recovered a bison skull eroding out of the terrace at the locale. The three specimens include two fragments of long bone and an entire left radius of a large mammal, possibly an extinct species of bison. No cultural remains were noted at the site. The terrace is built of interbedded strata of stream-deposited sand and gravels, probably dating to the Pleistocene times, and thus indicating a similar age for the paleontological specimens.

Wrangell-St. Elias National Park and Preserve

Three prehistoric sites were discovered during the CRMIM survey in WRST (figure 40). Only one of them is a lithic scatter; the other two contain features that may be associated with Athapaskan occupation of the area.

Sites Adjacent to Streams or Lakes. **XMC-039** is in a setting adjacent to Skolai Creek, on a shrub and grass covered knoll. It consists of a surface scatter of gray chert flakes, and appears to be stratified.

Sites on Elevated Terrain. The two sites in this category are both located on the crest of MacColl Ridge. The first of these, designated as **XMC-097**, is located in a saddle on the ridge and consists of two hunting blinds, both of which have crescent-shaped barriers of stacked cobbles, located near the crest of the saddle, and a single manuport of chert. The stacked cobbles of one of the blinds have toppled. Vegetation on the saddle consists of alpine tundra plant types. Hunting blind features are common features in Athapaskan and some Eskimo areas in Alaska. While the actual cultural ascription is problematic because of the pervasiveness of the form throughout the Alaska Interior, it is nevertheless reasonable to provisionally ascribe the occurrence to Ahtna hunting activities.

The second MacColl Ridge site, designated as **XMC-098**, was discovered in a rocky saddle between two knolls on the ridge. No stratigraphy was noted for this site by the recorders, nor were the relationships between the features investigated during the fieldwork. Vegetation at this site is the same as that of XMC-097. Remains consist of six depressions in the modern surface and a single, flat, oblong section of cupreous metal, also found on the modern surface. Although copper working is an industry that was part of the technological assemblage of the Ahtna Athapaskan people of Southcentral Alaska (e.g., Workman 1976), it is not clear if the metal item is related to the surface depressions at this site. However, based on the presence of the metal artifact, use of the location can reasonably be attributed to late prehistoric or historic Ahtna people, with consideration that the site may have been used in pre-Ahtna times as well.

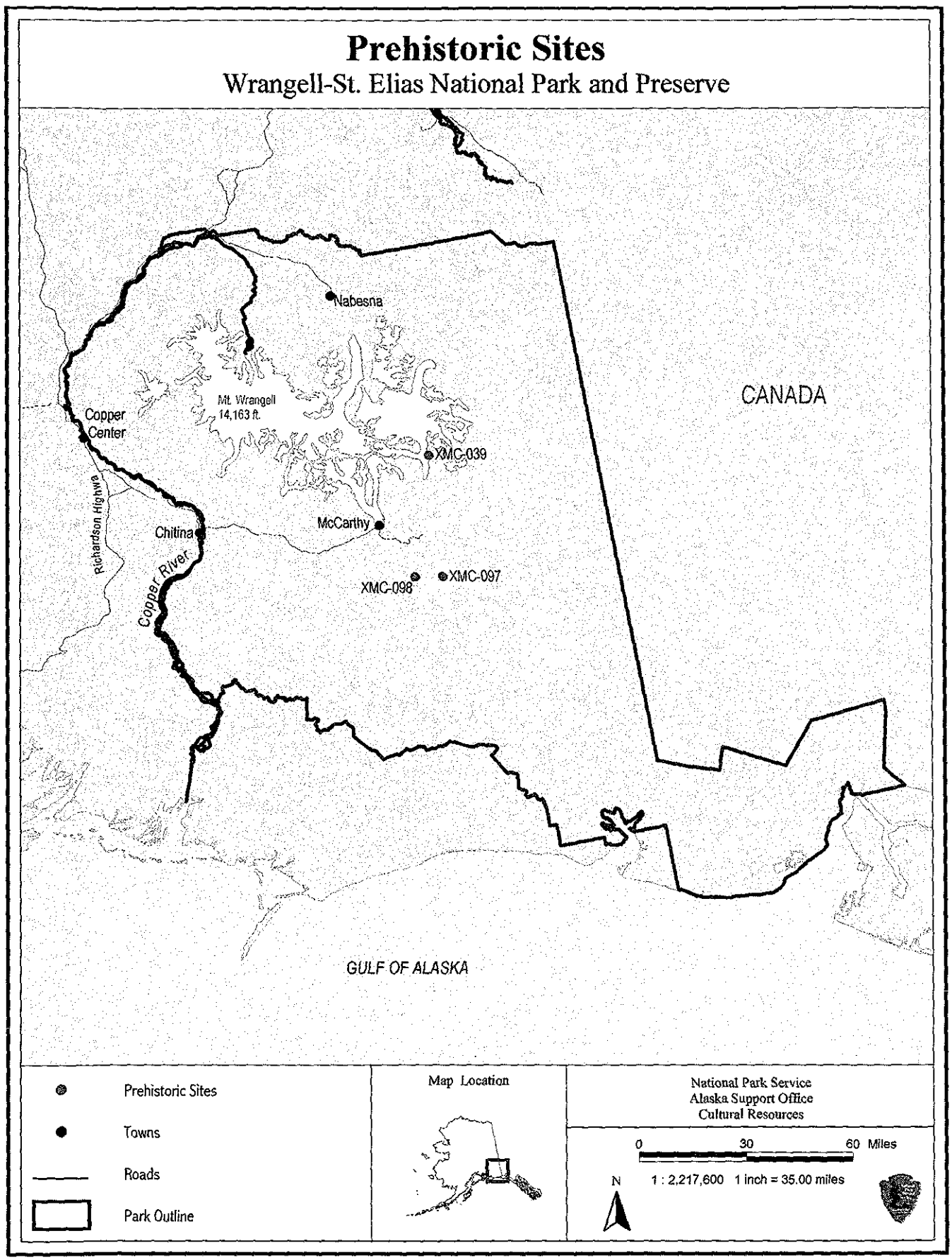

Prehistoric Sites
Wrangell-St. Elias National Park and Preserve
Nabesna
Mt. Wrangell
14,163 ft.
Copper
Center
CANADA
XMC-039
Richardson Highway
Chitina
McCarthy
Copper River
XMC-098
XMC-097
GULF OF ALASKA
Prehistoric Sites
Towns
Roads
Park Outline
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0
30
60 Miles
N
1 : 2,217,600 1 inch = 35.00 miles

Figure 40.

Yukon-Charley Rivers National Preserve

Three sites, all lithic scatters, were recorded during CRMIM survey in YUCH (figure 41). Although the sites have not been radiocarbon dated, two of them contain diagnostic tool types.

Sites Adjacent to Streams and Lakes. A site revealed by a surface lithic scatter was discovered on a ridge above the South Fork of Birch Creek and is designated as **CHR-074**. Examination of this location revealed that the deposits are stratified. Vegetation near the site on this ridge consists of grasses and lichens. Lithics included a number of chert flakes, a single microblade of basalt bearing a distinctive parallel-sided flake scar, and several implements. The implements are all of chert and include a biface fragment and a whole biface of the same material, two side-notched points, and an end scraper. Both side-notched points represent varieties of forms that are consistent with those seen in Northern Archaic tradition assemblages in Alaska, that are securely dated to approximately 5,000-4,000 years of age (cf. Anderson 1988:82; Fig. 74; Clark 1981: Fig. 4, 11 and text; Dumond 1987:54). The apparent association between the microblade and the point forms is a circumstance that has also been documented at Kurupa Lake on the northern side of the Brooks Range in north Alaska (Schoenberg 1985), but the possibility that a Paleoarctic component is represented in addition to Northern Archaic cannot presently be discounted. Another lithic scatter, found on a knoll above Eureka Creek, is designated as **CHR-076**. No apparent stratification was observed at this location. Vegetation on the knoll consists of alpine tundra plant types. Three chert flakes were observed in addition to a tabular section of a chert biface and a single, retouched chert flake.

Sites on elevated terrain. The third prehistoric site in YUCH recorded during CRMIM surveys, designated as **CHR-077** (the "Foster-Keith site"), is located on a ridge near Fisher Creek. Vegetation on the CHR-077 ridge includes lichens, grasses, and birch and alder trees. During the tenure of prehistoric human use of the ridge it is clear that the area served as a hunting lookout, based on the distance from water, and from the apparent absence of surface indications of former dwellings. This location offers panoramic views of the Tanana Uplands to the south and to the north, segments of the Yukon River can be viewed, weather permitting. Preliminary assessment suggests that this site may surpass the HEA-232 DENA site in importance because of the age and variety of artifacts encountered at CHR-077. Although it is presently unknown if either of these sites contains stratified deposits, an important criteria for assessing their relative importance among sites in the Alaska Interior, it is nevertheless clear that both contain remains of some of the earliest occupations of Alaska.

The site name acknowledges Helen Foster and Terry Keith of the U.S. Geological Survey, who discovered the site during their 20 some years of geological work in the region and who brought the site to the attention of a CRMIM crew working in YUCH. Although the size of this site is not presently known, the 1986 survey coverage revealed artifact scatters distributed an estimated minimum of 0.80 km along the crest of the ridge. Helen Foster indicated that the remains may extend an estimated total of 1.6 km; and if further survey of the area substantiates the estimated size, the ridge vicinity would then fall under the formal definition of a "locality" rather than a single site. Four distinct concentrations of lithics were located during the initial recording effort by archeologists in 1986. All four concentrations include flakes and other lithic debitage. Lithic tools identified in "Concentration 1" include one core tablet, five blade-like flakes and a microblade with parallel-sided flake scars, a

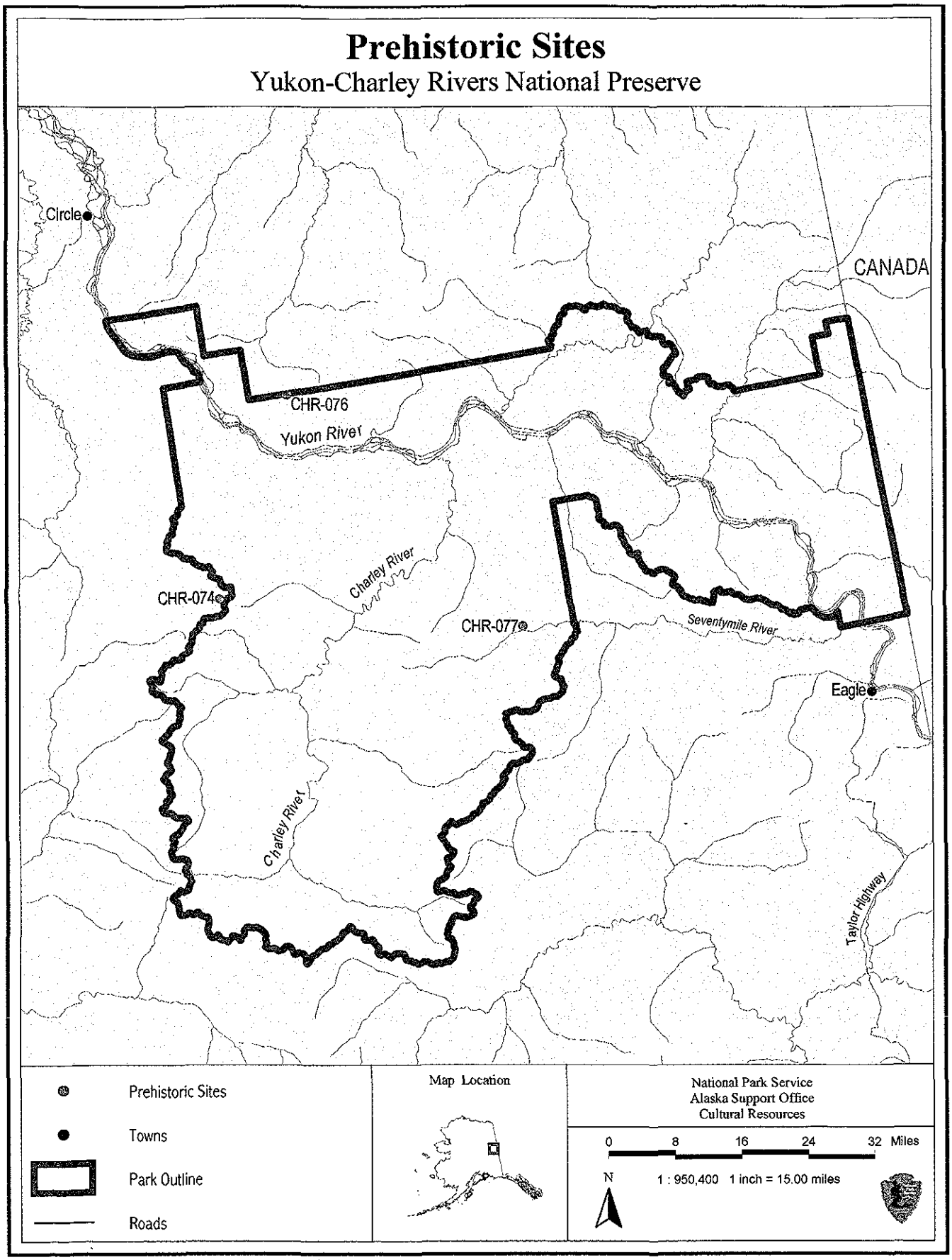

Prehistoric Sites
Yukon-Charley Rivers National Preserve
Circle
CANADA
CHR-076
Yukon River
Charley River
CHR-074
CHR-077
Seventymile River
Eagle
Charley River
Taylor Highway
Prehistoric Sites
Towns
Park Outline
Roads
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 8 16 24 32 Miles
N
1 : 950,400 1 inch = 15.00 miles

Figure 41.

microblade section, three bifaces, two cores, an end scraper, and a point tip. Lithic tools identified in "Concentration 2" include a blade section and a blade with parallel-sided blade scars. Those identified in "Concentration 3" include a biface fragment, two microblades, a microblade core, and a blade. Raw materials also present in the area suggest that it functioned as a material-reduction and manufacturing location. There were only a few flakes and one possible tool in "Concentration 4." During the brief time spent at the location, material types were only cursorily examined, but it was apparent that a rhyolite or basalt was the predominant type in all four of the concentrations, but cherts and volcanic tuffs were also present. A visit to the ridgetop two years later by NPS personnel revealed a number of additional surface lithic concentrations. Results of the two site visits may bring the total number of concentrations found to as many as 12. Although none of the tools discovered in 1988 was diagnostic of a particular prehistoric culture, a safe assumption is that they are most likely later than the forms encountered in 1986, based on their general forms (crudely flaked bifaces and unifaces).

Preliminary analysis of the artifacts encountered in 1986 indicates that more than one variety of "early-man" artifacts is present and that different varieties may be represented in different, semi-discrete concentrations along the ridge crest. Diagnostic artifacts that were encountered were photographed, and two were collected; the collected items were found in "Concentration 3" and include a small wedge-shaped, Campus type microblade core of black chert and a microblade of the same material, both from surface contexts and from within one meter of each other. Each of the other items was discovered in separate locations in the site. Those that were photographed, but not collected include a tabular, Tuktu type of blade core; a haphazard core that suggests Arctic Small Tool tradition affiliations; a single fluted, relatively crudely-chipped Clovis point; and numerous parallel-sided flakes that appeared to include both large and small versions of the form. The tabular blade core can reasonably be designated as the Tuktu type that has been dated in other sites to approximately 6,500 years of age. The fluted point form is consistent with the so-called Clovis type that was initially discovered at the Paleoindian Clovis, New Mexico, site dating to 11,500-11,000 years of age, and has subsequently been encountered in Alaska.

Also of note is the size range for the parallel-sided flakes; parallel-sided, or blade-like, flakes are a characteristic element in Paleoarctic assemblage and a bimodal range in blade sizes has also been identified as a characteristic of Paleoarctic as well (e.g., Dumond 1981). The wedge-shaped or Campus type core and microblade are hallmarks of the American Paleoarctic tradition as defined by Anderson (i.e., 1984:81-83). In the absence of radiometric dating, however, this form also presents problems in assigning an age to the site insofar as the form is very early at Interior locations such as Onion Portage, where it dates to nearly 10,000 years, and quite late at other locations such as the Campus site, where the age has recently been placed at 3,500-2,725 years (i.e., Anderson 1984; Mobley 1991:81-83). Although the maximum age for human presence in this locality must be based at present on the artifact forms represented, another factor that may also be important is the lichen growth visible on many of the lithics. This is also an indicator of the substantial age of the artifacts. In addition to the firm evidence of Paleoindian and Paleoarctic peoples' use of the location there is a strong possibility, and even probability, that the site was used by later people up to and including the historic Athapaskan inhabitants of the region. However, artifacts were not discovered during the initial, brief site recording effort in 1986 that would

clearly establish later occupations; therefore, this matter presently remains in the realm of speculation.

Gates of the Arctic National Park and Preserve

In GAAR, two lithic isolates were discovered in settings adjacent to streams (figure 42). An isolated chert flake was discovered on a low ridge adjacent to Alder Creek, and the site is designated as **WIS-046**. No indications of stratified deposits were observed in this location. The ridge is covered by a sparse growth of alpine tundra. A second isolated flake, in this instance obsidian, was discovered on a knoll adjacent to Wiseman Creek; and that site has been designated as **WIS-213**. No evidence of stratified deposits was seen at this location. Vegetation on the knoll also consists of sparse alpine tundra.

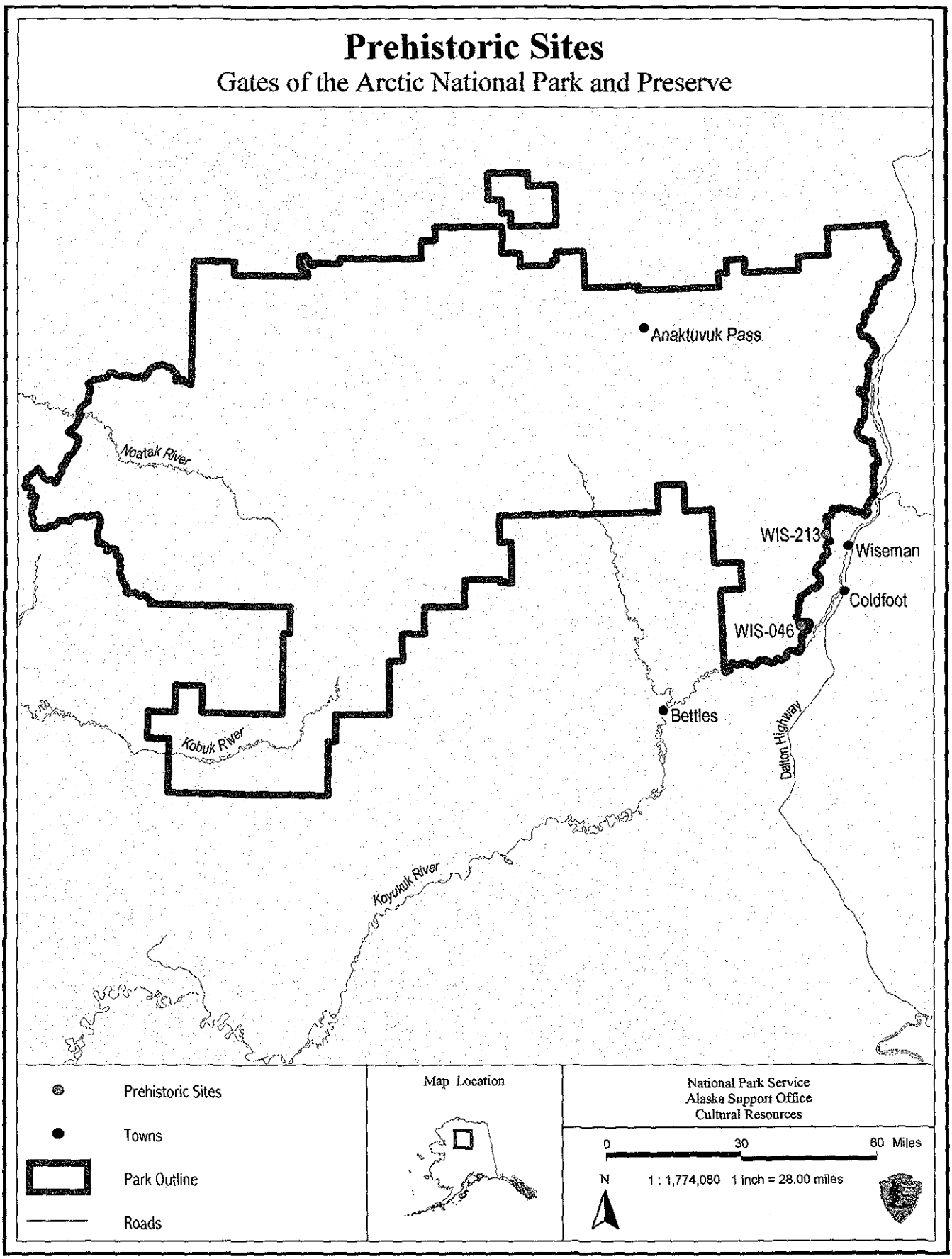

Prehistoric Sites
Gates of the Arctic National Park and Preserve
Anaktuvuk Pass
Noatak River
WIS-213
Wiseman
Coldfoot
WIS-046
Bettles
Kobuk River
Dalton Highway
Koyukuk River
Prehistoric Sites
Towns
Park Outline
Roads
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0
30
60 Miles
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1 : 1,774,080 1 inch = 28.00 miles

Figure 42.

Katmai National Park and Preserve

Three sites were recorded in the Battle Lake vicinity of KATM (figure 43).

Sites Adjacent to Streams and Lakes. A small lithic scatter composed of two chert flakes, discovered on a terrace above the Battle Lake shoreline, is designated as **ILI-060**. Vegetation on the terrace is an alpine tundra type. This site appears to be stratified. A second large lithic scatter, ca. 300 x 150 m, was discovered in the same type of setting adjacent to Battle Lake and is designated as **ILI-061**. Artifacts present at this location include a chert side scraper with one edge reworked into a graver-like tip and a large number of chert flakes on the modern surface. This site also appears to be stratified.

Sites on elevated terrain. A single site, designated as **ILI-059,** was discovered on elevated terrain in KATM and consists of an archaeological feature with no tools observed in association on the modern surface. This is a single rock cairn located on a small promontory approximately 90 meters above Battle Lake. The cairn consists of two large cobbles placed on a boulder; the original construction likely included more of the large cobbles in the vicinity. Vegetation on the promontory consists of a wet tundra type. No evidence of stratified deposits was found at this location. Dating rock cairns is problematic insofar as they are inorganic and cannot be directly sampled for radiocarbon dating. Less direct means, such as associations of hearths or diagnostic tool forms, are most often used in attempting age ascriptions for these types of features. Nevertheless, rock features such as cairns are common in historic Eskimo areas such as the Kuzitrin-Imuruk Lakes area on the Seward Peninsula and the Agiak Lake area on the North Slope of the Brooks Range. Conservatively, then, this feature can be ascribed to traditional Eskimo use of the location, but the feature may alternatively represent an older, pre-Eskimo presence.

Lake Clark National Park and Preserve

A single site located in LACL during a CRMIM survey is designated as **KEN-324** (figure 44). This site consists of three distinct and two less distinct depressions in the modern surface, and is on a small isthmus on the southeastern side of Magnetic Island, now surrounded by a mud flat in northern Tuxedni Bay. This site does not fit well into either of the setting categories used for Interior sites, so it is simply designated as coastal. The site location is a relatively flat area an estimated 4-5 meters above the mud flat. Vegetation in the vicinity consists of high brush, including willows, and a small number of spruce trees. Dimensions of the largest surface depression are approximately 3.7 x 4.0 m, with the long axis oriented 110° to magnetic north. The remaining distinct and possible depressions are smaller and located east of the large depression, running south-southwest to north-northeast and parallel with the crest of the isthmus. An age greater than historic Dena'ina occupation of the area is suggested by the absence of surface structural members and the relative shallowness of the surface depressions. Although no testing was done during the initial recording of this site in 1995, subsequent fieldwork was carried out by an NPS crew, led by A. Crowell, in 1996.

Discussion

In comparison to the single century of occupation represented by historic sites discussed in the three previous chapters, there is considerable time depth, but unfortunately little substantive information, associated with the prehistoric (and one paleontological) sites described here. Oldest among them is the paleontological site, dating back to an unknown

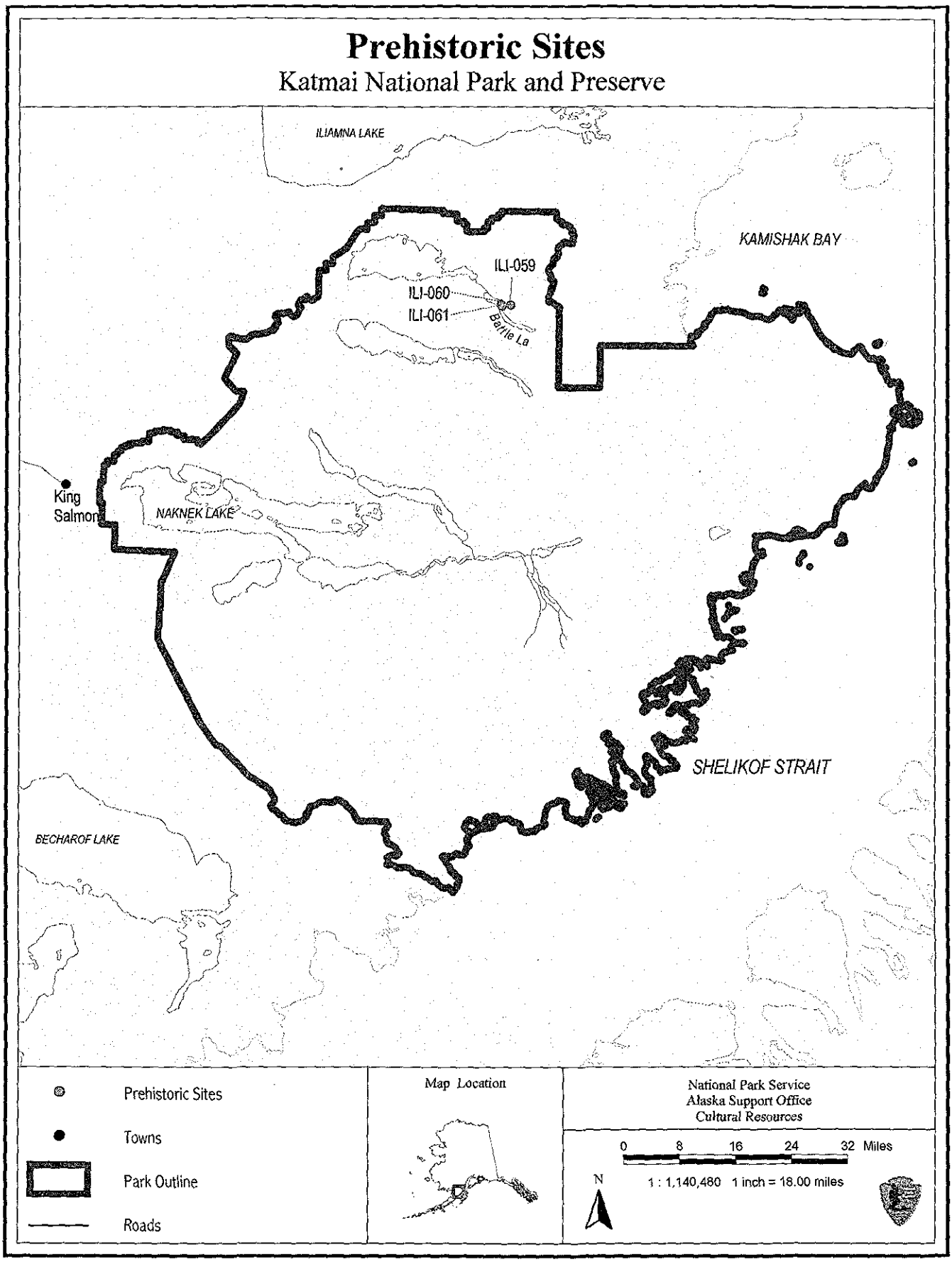

Prehistoric Sites
Katmai National Park and Preserve
ILIAMNA LAKE
KAMISHAK BAY
ILI-059
ILI-060
ILI-061
Battle La
King Salmon
NAKNEK LAKE
SHELIKOF STRAIT
BECHAROF LAKE
Prehistoric Sites
Towns
Park Outline
Roads
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 8 16 24 32 Miles
N
1 : 1,140,480 1 inch = 18.00 miles

Figure 43.

period, perhaps during the Pleistocene. The oldest, most extensive, and probably the most notable of the sites in the prehistoric inventory is CHR-077, the Foster-Keith site, lying on ridge high above the Yukon River in YUCH, with a commanding view of the surrounding terrain. The occurrence of a Clovis-type (Paleoindian) point may date the human use of this ridge as a hunting lookout and tool-manufacturing site to more than 11,000 years ago. The continued use of the locality into Paleoarctic times or later is also well documented by the presence of microblade cores, microblades, and blade-like flakes. These tool types, found also at HEA-232 and MMK-101 in DENA, are diagnostic of a period spanning several thousand years from ca. 10,000 to 3,000 years before present.

Other diagnostic tool types - two side-notched projectile points - were found at a stream- side ridge site in YUCH, CHR-074, tentatively dated to Northern Archaic times, ca. 5,000 to 4,000 years ago. A site that appears to date to a later period by virtue of its diagnostic artifacts is MMK-068 in DENA. The stemmed projectile point and basalt bifaces at this Moose Creek site indicate that it was probably occupied by late prehistoric or protohistoric Athapaskans sometime during the period between 2,000 and 100 years ago. More positive indications of site chronology are at two other Athapaskan-affiliated sites in DENA, sites MMK-071 and MMK-096, radiocarbon dated by hearth samples to 2,230 and 2,480 years ago, respectively. Another two Athapaskan sites (XMC-097 and XMC-098), specifically attributed to the Ahtna, have been documented on MacColl Ridge in WRST. These sites are unlike most of the others in the inventory in that they are represented by features - hunting blinds and surface depressions - rather than by lithic scatters.

The prehistoric sites in this CRMIM inventory have been recorded, for the most part, based on their surface remains; and thus their subsurface components, if any, are virtually unknown. At this point, it is fairly difficult to make any sweeping generalization about the nature of site occupation at sites adjacent to freshwater sources as opposed to those located on elevated landform some distance away from water. Intuitively, it appears that the dichotomy of site settings is a valid one; and with further testing or excavation at some of these sites, we may have proof that these stream and lakeside locales do provide a more suitable base for sustained human occupation.

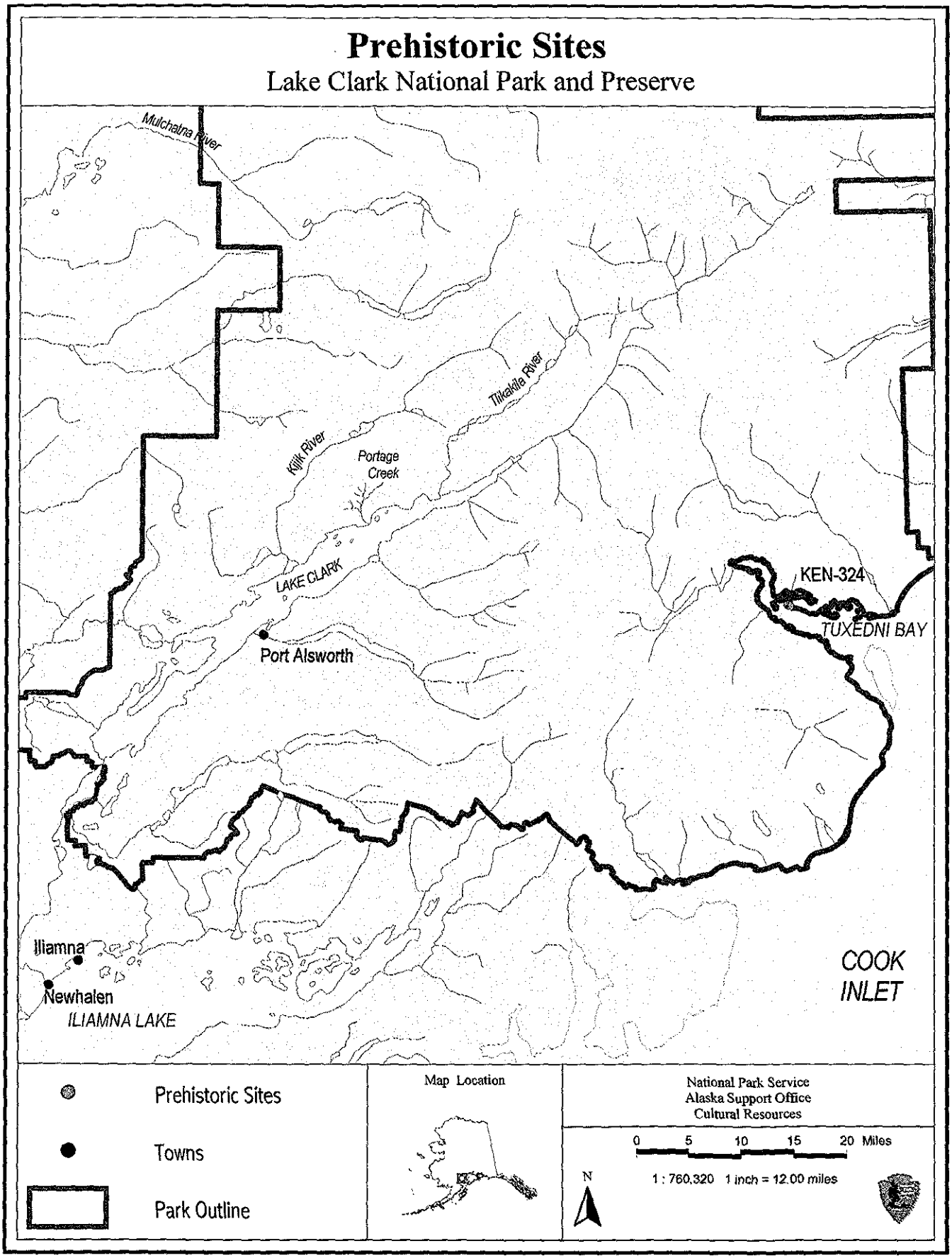

Prehistoric Sites
Lake Clark National Park and Preserve
Mulchatna River
Tlikakila River
Kijik River
Portage Creek
LAKE CLARK
Port Alsworth
KEN-324
TUXEDNI BAY
Iliamna
Newhalen
ILIAMNA LAKE
COOK INLET
Prehistoric Sites
Towns
Park Outline
Map Location
National Park Service
Alaska Support Office
Cultural Resources
0 5 10 15 20 Miles
N
1 : 760,320 1 inch = 12.00 miles

Figure 44.

CHAPTER 16

CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

This volume, which serves as a compendium and overview of 10 years of CRMIM fieldwork and research, documents 345 sites located in nine National Park Service units in Alaska. As the CRMIM survey universe was defined by the boundaries of valid and abandoned mining claims on NPS lands, most of these sites, as might be expected, are directly or indirectly associated with mining. Placer mining sites account for 51% of the total, and lode mining sites contribute another 25% to the inventory. Even in the category of other historic sites (13% of the site total), a large proportion are mining related in that they represent the facilities and services essential for providing miners with transportation, building materials, communication, temporary lodging, and a community support system. The remaining 10% are prehistoric sites, found as the result of extending the survey coverage to areas of high archeological potential adjacent to mining claim boundaries.

This CRMIM overview, broad in geographic scope and coverage, provides data on the largest sample of historic archeological mining sites in Alaska to date. Primary among the objectives in writing the overview has been to describe this extensive inventory of sites in terms of both location and type. Geographically, the sites are distributed all across Alaska from tributaries of the North Fork of the Koyukuk River in GAAR, southward to Reid Inlet in GLBA, westward to KATM on the Alaska Peninsula, and eastward almost to the international border in WRST and YUCH. The great majority of the sites cluster in the Interior of the state in DENA, WRST, and YUCH. They range in size and complexity from prehistoric lithic isolates and the almost indiscernible traces of small mining cabins to the features and structures of mining industry giants such as Kennecott. Typologically, they represent the historic remains of mining camps and operations, roads, sawmills, mining communities, trappers' cabins, and bridges, as well as the remains of ephemeral prehistoric lookouts and chipping stations.

A second objective of this overview has been to place these sites in their appropriate chronological context. Although only a handful of the prehistoric sites have yielded diagnostic artifacts or have been radiocarbon dated, they have provided us with a small sample dating from possibly as far back as 11,000 years ago until the protohistoric period. In comparison, the time frame for the mining and other historic sites is quite short, spanning exactly one century from the construction of the earliest historic site, the Nation Coal Mine (CHR-090), to the present[1], the end of the twentieth century. In many cases, the early sites in the inventory are in poor condition, with the cabins in ruins or scavenged for their building materials. Fortunately, some turn-of-the-century structures, such as those at the Ben Creek Mine site (CHR-082) and the middle camp of the Hubbard-Elliott Copper

[1] Although there are even earlier mining sites in Alaska, they have not been documented in the CRMIM inventory.

Mining Company (VAL-244), are still standing and in good condition. The Fairhaven Ditch (BEN-069) and the Maze site (XMC-119) provide good examples of well-preserved early placer mining features; while in terms of lode mining, several of the 1910- through 1920-vintage sites (e.g., XMC-085 and XMC-087) associated with the Kennecott aerial tramway system are still partially intact.

The initial occupation of many of the placer mining sites dates to the 1920s and 1930s, which were decades of increased investment and mechanization in the industry. The camps and mining features at these sites are associated with a wide range of technology, including hydraulicking, drift mining, dredging, and some bulldozer mining. In several cases, cabins built during this period continued to be used intermittently by miners and others, often until very recent years. Some examples of these well-used and well-preserved camps are the Johnny Busia cabin site (MMK-017) and the Vincent Knorr cabin site (WIS-218). The greatest sources of information about the lode mining industry during the 1920-1930 time period are the mills, tools, sheds, blacksmith shops, and power plants remaining at several sites, including most notably the Green Butte Mine (XMC-096), the Grand Prize Mine (XMC-115), the North Midas mill (XMC-089), and the Nukalaska Mine (SEL-177).

Mining sites dating to the 1940s are not as numerous as earlier sites for several reasons, primarily the federal ban on mining of non-strategic minerals, such as gold, during the war years. One of the few Alaska mines to prosper in the 1942-1945 period was the Stampede Antimony Mine (MMK-016), as antimony was considered essential to the war effort. The best example of placer mining operations during the 1940s is in the Kantishna District of DENA, where large-scale dragline operations flourished for a brief period. The long, segmented tailings piles adjacent to MMK-044 are prominent reminders of this profitable period in the district's history. The mining industry as a whole was slow to recover after the war years; but some examples of early post-World War II sites do exist in the inventory, such as the Rambler Mine (NAB-072) in the Chisana District.

The continued mining at a few of the placer and lode mining sites into more recent decades has had both positive and negative effects on the site. For example, recent mining at SEL-212 in KEFJ has greatly disturbed the historic component of features and artifacts at the site, making most types of archeological site interpretation impossible. On the other side of the coin is CHR-082, the Ben Creek Mine, occupied by a series of placer miners from the early years of the twentieth century. The well-built cabin at the site is still well preserved, despite its age, primarily because of its continued use and upkeep. Evidence of early drift mining and other subsequent technologies are also still in evidence at the site, making it an example of the resourcefulness of small-scale Alaska placer miners over a period of at least 80 years.

The third and fourth objectives of the report relate to the analysis of the archeological patterns, exhibited in the features and artifacts of placer and lode mining camps, which distinguish one mining district from another. These patterns pertain to the number, type, size, and construction of habitation structures; along with the number and type of outbuildings; and types of activities, other than mining, that can be inferred by the artifact assemblages from all the sites in each mining district. On a broad scale, the results have shown that on average the dwellings at lode-mining camps (39.3 m^2) are more than twice the size of those at placer mining camps (19.0 m^2). There is also a contrast in the average number of dwellings (2.5 per camp) and outbuildings (2.7 per camp) at lode min-

ing camps as opposed to those at placer mining sites, which average 1.7 in both categories. These figures are not surprising, considering that the capital investment and crew size at lode camps were usually significantly greater than at placer camps.

When comparing placer mining camps on a district-by-district basis, we also find some clear-cut distinctions on the sizes of average habitation structures. The continuum ranges from 25.1 m^2 in the Nizina District down to 12.6 m^2 in the Chisana District, with the Circle/Eagle (20 m^2), Kantishna (17.7 m^2), and Koyukuk (17.5 m^2) Districts in between. Contrasts in size, as well as in building type and construction, reflect a number of different factors, including the scale of mining in the district, the primary forms of technology, the availability of construction materials, and district-specific settlement patterns. These factors are best exemplified by the Chisana District, where the placer creeks were mostly above timberline, and small-scale, often hand methods of mining predominated. Thus, the prevalence of small milled-lumber and canvas tent frames at the camps is not only related to type and scale of mining, but also to the difficulty of transporting building materials up the creeks and the seasonal nature of site occupation. A similar suite of contrasts exists among the districts where lode-mining sites are located.

Although the assemblages of domestic artifacts were remarkably similar at most of the mining camps, there were also many examples of unique, homemade, and innovative artifacts. Some of these unique artifacts, such as cold-cream jars, garters, and toys, can be associated with the presence of women and children in the mining camps. Notable among the inventory of handcrafted artifacts are the birdhouses at several sites in the Circle/Eagle Districts, a wood and metal saddle at MMK-114, and rope snowshoes found at WIS-047. The most ubiquitous of the innovative items are those made of recycled cans, modified in any number of ways to serve a variety of new purposes. The innovative reuse of all materials is a common theme throughout the inventory of mining and other historic sites. Despite the fact that mining is considered the primary occupation of the people who once inhabited these camps, we know from historic accounts, as well as from the surviving artifacts, that a variety of other activities was pursued. In some cases, the activities were not mere idle pursuits, but necessary means to get by from one mining season to the next. They included blacksmithing, freighting, dog-mushing, sawmill operation, carpentry, and various subsistence pursuits, such as trapping.

The human story behind these sites does not need to end now that they are abandoned and nature has begun reclamation. Those of us who have spent our summers in recording the sites, and our winters in researching them, are all part of their continuing story. Those who are in the position to manage these valuable resources will be the main characters in what we can only hope will be many long-running sequels.

Preservation and Conservation

The policy of protecting prehistoric and historic sites on public lands, first embodied by law with the passage of the Antiquities Act of 1906 (16 USC 431-433), continues to be a vital force in this country. Today, our preservation efforts are guided primarily by the National Historic Preservation Act (NHPA), originally passed by Congress in 1966 and amended in 1980 and 1992. The act authorizes the secretary of the interior "to expand and maintain a national register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, hereinafter referred to as the National Register..." (16 USC 470, Section 101(a)(1)). The national register, referred to

here as the NRHP (National Register of Historic Places), is administered by the NPS and serves as the official list of the country's cultural resources that are worthy of preservation.

As originally conceived, the two major goals of the CRMIM program have been to inventory and evaluate the historic properties on all administratively valid claims in the three parks where the mining injunction was enforced. As the program was expanded to include other mining-related activities and park units, these two goals continued to be the primary responsibilities of the CRMIM archeologists and historians. These and other Section 106 responsibilities, mandated by the NHPA, have been fulfilled through a programmatic Agreement with the SHPO for Alaska and the Advisory Council on Historic Preservation. Among the provisions of the programmatic agreement is stipulation II, which states that "until the Determination of Eligibility evaluation program is completed, NPS will treat all historic properties as potentially eligible for inclusion on the National Register..." (NPS 1988a: 2). The evaluation criteria are listed below:

> The quality of significance in American history, architecture, archeology, engineering, and culture is present in district, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association and (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or (b) that are associated with the lives of persons significant in our past; or (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or (d) that have yielded, or may be likely to yield, information important in prehistory or history [36 CFR 60.4].

The progress of work directed at evaluating CRMIM sites for inclusion on the national register, shown in table 74, is currently in various stages. Only the CRMIM sites associated with the Kennecott mining complex (XMC-064, XMC-081, XMC-085, XMC-086, XMC-087) are considered to be contributing properties in a National Historical Landmark (NHL) district. The Coal Creek Mining District (CHR-089 and CHR-102) has also been included in the ranks of national register sites, and since the first draft of this report was completed, sites included in the Chisana Historic Landscape have been given national register status. For many of the sites listed in table 74, the nomination process - whether it be for a single site, a mining district, or a cultural landscape - is at some point along the road to completion. In one case, the Bowman Mining Camp (XLC-089), the nomination process has been delayed, pending the approval of the landowner, Fred Bowman. None of the CRMIM prehistoric sites has been evaluated in terms of national register status. Only two of the sites, the LeRoy Mine (XMF-045) and the Nation Bluff cabin (CHR-092), have been determined to be ineligible for the register.

Also indicated on table 74 is the status of CRMIM sites in the List of Classified Structures (LCS) program, administered by the NPS. The LCS program is another "umbrella" of preservation/conservation, specifically for structures, both historic and prehistoric, which exhibit some degree of structural integrity. Each of the structures listed in the LCS files has been given a treatment recommendation, ranging from "no treatment" (benign neglect), to stabilization, and finally to rehabilitation. In most cases the recommended treatment is stabilization (B. Houston 1996; personal communication). Only one

Table 74

The Status of CRMIM Sites in Relation to Preservation and Conservation Programs

Site	Name	Type	LCS[1]	NRHP Status[2]
		DENA		
HEA-228	Colorado Creek Cabin	Lode	4	—
HEA-229	Black Bear Cabin	Historic	2	—
MMK-011	Moose Crk Fish Camp	Historic	2	—
MMK-016	Stampede Mine	Lode	15	NOM – d/ip
MMK-017	Johnny Busia Cabin	Placer	—	NOM - d/ip
MMK-018	Kantishna Roadhouse	Community	1	NOM - d/ip
MMK-019	Kantishna Hydraulic Co.	Placer	2	—
MMK-020	Fanny Quigley Cabin	Lode	3	NOM - d/ip
MMK-023	Upper Caribou Creek Cabin	Placer	2	—
MMK-040	William Taylor Cabin	Placer	1	—
MMK-041	Caribou Crk Header Box	Placer	1	—
MMK-042	Mt. McKinley Hydraulic Co.	Placer	1	—
MMK-044	Caribou Creek Cabin	Placer	2	—
MMK-046	Last Chance Crk Cabin	Lode	2	—
MMK-055	Glacier Creek Cabin	Placer	2	DOE - s/e
MMK-056	Glacier Creek Dragline	Placer	2	
MMK-061	Little Annie Mine	Lode	3	—
MMK-063	Glen Creek Cabin	Placer	1	—
MMK-079	Glen Prospect	Lode	1	—
MMK-080	Skookona Prospect	Lode	3	—
MMK-083	Johnny Busia Gravesite	Historic	—	NOM - d/ip/non
MMK-086	Nelson Cabin	Placer	1	NOM - d/ip
MMK-089	Quigley Ridge Cabin	Lode	1	—
MMK-091	Alpha Ridge Mine	Lode	2	—
MMK-099	Kantishna/Eureka	Community	—	NOM - d/ip
MMK-116	Slippery Creek Cabin	Lode	2	—
MMK-117	Quigley Mine Camp	Lode	3	NOM - d/ip
		WRST[3]		
		Chisana Region		
NAB-009	Bonanza City	Community	7	NRHP
NAB-043	—	Placer	—	NRHP
NAB-044	Big Eldorado Tailings	Placer	1	NRHP
NAB-045	Chavolda Creek Sawmill	Historic	1	NRHP
NAB-046	Bonanza Creek Post Office	Placer	8	NRHP
NAB-047	Canyon Creek Cabin	Placer	2	NRHP
NAB-048	Bonanza Crk Complex	Placer	5	NRHP
NAB-049	Bonanza Crk Tent Frms	Placer	3	NRHP

(continued)

Table 74 (continued)

Site	Name	Type	LCS	NRHP Status
NAB-050	Bonanza Crk Doghouses	Placer		3NRHP
NAB-051	Dipple's Camp	Placer	8	NRHP
NAB-052	—	Placer	—	NRHP
NAB-053	—	Placer	—	NRHP
NAB-059	Bonanza Creek Flume	Placer	1	NRHP
NAB-060	—	Placer	—	NRHP
NAB-061	—	Placer	—	NRHP
NAB-062	Castle Rock Staging	Placer	—	NRHP
NAB-063	Dipple's Cabin	Placer	2	NRHP
NAB-064	Coarse $$ Crk Dam	Placer	2	NRHP
NAB-065	—	Placer	1	NRHP
NAB-066	Gold Run Too	Placer	8	NRHP
NAB-067	—	Placer	—	NRHP
NAB-068	Gold Run Below	Placer	6	NRHP
NAB-069	—	Placer	—	NRHP
NAB-070	Gold Run Jay	Placer	2	NRHP
NAB-071	Chavolda/Glacier Camp	Placer	7	NRHP
NAB-073	Poorman Creek Camp	Placer	3	NRHP
NAB-074	—	Placer	—	NRHP
NAB-075	—	Placer	—	NRHP
NAB-076	Coarse Money Dam	Placer	1	NRHP
NAB-077	Coarse Money Crk Camp	Placer	2	NRHP
NAB-079	—	Placer	—	NRHP
NAB-080	—	Placer	—	NRHP
NAB-082	—	Placer	—	NRHP
NAB-083	Chavolda Creek Cabin	Placer	2	NRHP
NAB-084	—	Placer	—	NRHP
NAB-085	Alder Gulch Cache	Placer	2	NRHP
NAB-086	—	Placer	—	NRHP
NAB-087	—	Placer	—	NRHP
NAB-088	—	Placer	—	NRHP
NAB-089	—	Placer	—	NRHP
NAB-090	Canyon Creek Ditch	Placer	—	NRHP
NAB-092	—	Placer	—	NRHP
NAB-093	—	Placer	—	NRHP
NAB-094	—	Placer	—	NRHP
NAB-102	—	Placer	—	NRHP
	Kotsina-Kuskulana Region			
VAL-241	—	Lode	—	NOM - mpm
VAL-242	Elliott Crk - lower camp	Lode	—	NOM - mpm
VAL-243	Elliott Crk - lower camp	Lode	—	NOM - mpm
VAL-244	Elliott Crk - middle camp	Lode	—	NOM - mpm
VAL-245	—	Lode	—	NOM - mpm
VAL-246	Elliott Crk - upper camp	Lode	—	NOM - mpm
VAl-247	—	Lode	—	NOM - mpm

(continued)

Table 74 (continued)

Site	Name	Type	LCS	NRHP Status
VAL-248	—	Lode	—	NOM - mpm
VAL-249	—	Lode	—	NOM - mpm
XMC-041	Kotsina Crk (Peninsula) Cabn	Lode	2	NOM - mpm
XMC-088	North Midas Mine	Lode	—	NOM - mpm
XMC-089	North Midas Mill	Lode	4	NOM - mpm
XMC-090	Nugget Creek Mine	Lode	—	NOM - mpm
XMC-091	Nugget Creek Mine	Lode	—	NOM - mpm
XMC-092	Upper Nugget Crk Cabin	Historic	1	NOM - mpm
XMC-093	—	Lode	—	NOM - mpm
XMC-094	—	Lode	—	NOM - mpm
XMC-095	—	Lode	—	NOM - mpm
XMC-100	—	Lode	—	NOM - mpm
XMC-101	—	Lode	—	NOM - mpm
XMC-116	Nugget Creek Cabin	Lode	1	NOM - mpm
	Bremner Region			
XMC-104	Lucky Girl Mill	Lode	1	NOM - mpm
XMC-105	Bremner/Yellowband Camp	Lode	1	NOM - mpm
XMC-106	Sheriff Mine	Lode	3	NOM - mpm
XMC-107	Yellowband Mine	Lode	2	NOM - mpm
XMC-111	Bremner Camp	Lode	—	NOM - mpm
XMC-115	Grand Prize Mine	Lode	1	NOM - mpm
XMC-117	Monahan Creek Cabin	Historic	1	NOM - mpm
XMC-118	Golconda Creek Cabin	Lode	1	NOM - mpm
XMC-119	The Maze Site	Placer	1	NOM - mpm
	Nizina River Region			
XMC-040	Hubert's Landing	Lode	1	NOM - mpm
XMC-051	Nikolai Creek Cabin	Historic	2	NOM - mpm
XMC-059	Radar Gulch	Placer	1	NOM - mpm
XMC-063	Murray-Dimond Cabin	Placer	4	NOM - mpm
XMC-064	Mother Lode Tram/Camp	Lode	—	NHL (Kennecott)
XMC-070	Calamity Gulch Cabin	Placer	1	NOM - mpm
XMC-072	Nelson Prospect	Lode	1	NOM - mpm
XMC-081	Bonanza Tram	Lode	—	NHL (Kennecott)
XMC-085	Jumbo Mine Tram	Lode	—	NHL (Kennecott)
XMC-086	Jumbo Mine Tram	Lode	—	NHL (Kennecott)
XMC-087	Jumbo/Glacier Tram	Lode	—	NHL (Kennecott)
XMC-096	Green Butte Mine	Lode	—	NOM - mpm
XMC-097	MacColl Ridge Hunting Blind	Prehistoric	1	—
XMC-103	Jake's Bar	Historic	4	—
XMC-110	Nizina River ARC	Historic	2	—

(continued)

Table 74 (continued)

Site	Name	Type	LCS	NRHP Status
		YUCH		
CHR-029	Alfred Johnson Cabin	Placer	—	DOE - d/ip
CHR-032	—	Placer	—	DOE - d/ip
CHR-033	—	Placer	—	DOE - d/ip
CHR-034	—	Placer	—	DOE - d/ip
CHR-040	—	Placer	—	DOE - d/ip
CHR-042	4th of July Creek Mine	Placer	8	DOE - d/ip
CHR-043	—	Placer	—	DOE - d/ip
CHR-044	—	Placer	—	DOE - d/ip
CHR-045	—	Placer	—	DOE - d/ip
CHR-046	—	Placer	—	DOE - d/ip
CHR-050	—	Placer	—	DOE - d/ip
CHR-051	—	Placer	—	DOE - d/ip
CHR-052	—	Placer	—	DOE - d/ip
CHR-053	—	Placer	—	DOE - d/ip
CHR-054	—	Placer	—	DOE - d/ip
CHR-055	—	Placer	—	DOE - d/ip
CHR-080	4th of July Creek Mine	Placer	—	DOE - d/ip
CHR-081	Cap Reynolds Cabin	Placer	—	DOE - d/ip
CHR-082	Ben Creek Mine	Placer	3	DOE - d/ip
CHR-083	Boulder Creek Mine	Placer	4	—
CHR-089/102	Coal Creek Historic District	Placer	27	NRHP
CHR-092	Nation Bluff Cabin	Historic	4	DOE - inelig
CHR-094	Cheese Creek Camp	Placer	3	NRHP
CHR-096	Sam Creek Cabin	Placer	2	DOE - d/ip
CHR-102	SEE CHR-089			
		OTHER PARKS		
SEL-175	Sonny Fox Mine (KEFJ)	Lode	5	DOE -s/e
SEL-177	Nukalaska Millsite	Lode	—	DOE –s/e
SEL-236	Rosness & Larsen Mine (KEFJ)	Lode	1	—
XLC-089	Bowman Camp (LACL)	Placer	—	NOM -s/p
XMF-045	LeRoy Mine (GLBA)	Lode	—	DOE - inelig

[1] LCS = List of Classified Structures: number of site structures listed. Data provided by B. Houston (1999: personal communication).

[2] NRHP = National Register of Historic Places code: DOE = determination of eligibility; NOM = nomination; NRHP = listed; NHL = National Historic Landmark; s = site; d = district; cl = cultural landscape; e = eligible; inelig = ineligible; ip = document in preparation; multiple-property mining = mpm; p= pending approvals; non = noncontributing feature. Data on DENA and YUCH provided by A. Kain (1999: personal communication).

[3] Data on WRST sites provided by G. Bleakley (1999: personal communication).

of the CRMIM prehistoric sites, the MacColl Ridge hunting blinds (XMC-097), has been listed by the LCS program.

Recommendations. As evident in table 74, the evaluation process for the majority of mining sites is well under way. For many of the mining sites in DENA, the cultural resources staff will write determinations of eligibility (DOEs) for each site individually and then incorporate them into a multiple property nomination, with mining as its primary historic context (A. Kain 1999: personal communication). A historic context is a body of information organized by theme, place, and time (National Park Service 1986a: 7). It is recommended that similar multiple property nominations be initiated for other parks units with large samples of mining sites, such as in YUCH and GAAR. Historic contexts for other multiple property nominations could also be developed for individual park units to incorporate sites associated with transportation or subsistence pursuits, such as trapping. It is also recommended that efforts be taken to evaluate the prehistoric sites included in the CRMIM inventory. The sites that have yielded diagnostic artifacts (e.g. CHR-077, HEA-232, etc.) and appear to be stratified are those that should be first targeted for evaluation, using national register criterion "d."

In an ideal world, there would be funds available to stabilize all the structures listed in the LCS inventory. Realistically, however, it is obvious that many of the structures will continue to deteriorate beyond help before the time and resources become available to stabilize or rehabilitate them. It is therefore recommended that there be an emphasis on stabilizing many or all of the structures in a small area, where a cluster of sites/structures related by historic context exists. An example of this approach is described by White (2000) for the Bremner Historic District. Also mentioned in his report is the interpretative potential for such a cluster of well-preserved sites.

Planning for building stabilization has already begun at the Kennecott mill town. Although the structures included in this National Historic Landmark have not been included in the CRMIM inventory (with the exception of the mine and tramway features located above the mill town), the tremendous efforts of the NPS architects and historians certainly deserve mention in this mining context. Their challenge is well described in the following quotation:

> It has been 62 years since the mines closed, and while many of the buildings are remarkably well preserved, the elements and increasing visitation are exacting a heavier toll in recent years. The joy of discovery, the sense of awe that is so central to a person's first visit to Kennecott is in danger of sliding over the hillside and onto the glacier. A way must be found to stabilize the major buildings without destroying the sense of discovery that presently dominates the experience (Hovis 1991e: 15).

Interpretation

Viewed in the broadest sense, interpretation is simply the act of explaining, whether it be to an audience of archeologists and historians, or to park managers, or to the public. Although we routinely "interpret" our work in the process of writing site reports, preparing national register nomination forms, and giving papers at professional meetings, we rarely take the opportunity to appropriately bring this information to the public. In other words, interpretation, directed specifically to an audience of non-professionals in cultural resources, often takes a back seat to what we conceive as our more pressing responsibilities in the office. The great wealth of information gathered under the auspices of

the CRMIM program obliges us to develop a program of interpretation to highlight the sites and stories of life on the Alaska mining frontier.

As a beginning, the CRMIM staff, in conjunction with Video Perspectives of Anchorage, produced a 35-minute and a 20-minute video on the results of our fieldwork. These have been sent to all the NPS units and Visitor Information Centers in Alaska. A booklet, entitled "Gold in Alaska: A Century of Mining History in Alaska's National Parks," was produced cooperatively by the Alaska Support Office (AKSO) and several of the Alaska park units (NPS 1997). It is also available in the Visitor Information Centers at various parks.

Recommendations. Although the booklet mentioned above provides the public with an excellent regional perspective on mining sites in the parks, there is still a vast amount of information, now locked away in files, which could be used for park-specific publications on mining. Shifting the focus from a regional basis to individual parks encourages closer attention to local history and promotes information sharing with the widest possible audience (Hovis 1998: 29). For example, pamphlets, such as one currently available on Fairbanks Gold Mining (Higgs and Sattler 1994), highlighting the history of specific mining districts on NPS lands in Alaska, could be sold for a nominal sum at the visitor centers at each park. Some suggestions for topics are as follows:

1) Placer Gold Mining in the Kantishna District: 1905 Gold Rush to World War II
2) Placer Gold Mining in Chisana-Gold Hill: The Last Gold Rush (1913) to World War II
3) Placer Gold Mining in the Nizina District: The First Half of the Twentieth Century
4) Copper Prospecting and Mining in the Wrangell-St. Elias Region: 1898 to World War II
5) Placer Gold Mining in the Yukon-Charley Rivers Region: Prospecting to Dredging
6) Small-scale Placer Gold Mining in the Koyukuk District: The Bonanza Years.

It is also recommended that cultural resources staff at the AKSO and the individual parks work with park interpreters in DENA, WRST, GAAR, and KEFJ to develop not only booklets, but displays that pertain to historic mining for specific park headquarters or visitor information centers. One innovative way to interest park visitors in mining history, suggested by Beckstead (1998: 13) for YUCH, is to produce a videotape of dredge operation, using historic footage of the actual operation of the Coal Creek dredge.

Continuing Research

We have simply touched the surface, both literally and figuratively, on the research potential of many of these sites. As mentioned several times throughout the overview, what we have gathered, over the course of the CRMIM survey and research, is a very large body of comparative data on a broad sampling of sites, but not a great deal of in-depth archeological information about any of them. Apart from one or two shovel probes dug to test for the location of historic dumps, there has been virtually no sub-surface testing done at any of the mining or other historic sites. The archeological research potential of many of these sites - particularly the oldest ones, which now exist only as the ruins of a cabin foundation - is tremendous. One excellent example of the high quality of research that can be generated from historic archeological excavations is the Barnette Street project in Fairbanks (Northern Land Use Research, Inc. 1997).

Recommendations. It is recommended that a program of historical archeological research be initiated for sites that are the most significant and in the most imminent danger of destruction due to natural processes, such as stream erosion, or vandalism.

Some examples of these sites are CHR-064, which has partially collapsed into Woodchopper Creek, and CHR-066, the cabin that has been largely destroyed by floods. It is also recommended that a cooperative agreement between the NPS and a university department that specializes in historic archeology, such as the University of Alaska, Fairbanks, be instituted to provide the work force and technical expertise necessary for carrying out such projects. The CRMIM inventory of sites could also provide the fuel for many years of graduate-student research on topics as diverse as industrial archeology, the supply network of goods essential for the Alaska miner (based on artifact trademarks), and studies on site formation and abandonment, to name a few. As an example, a site abandonment study has recently been initiated by the cultural resources staff at WRST for the machine shop in the industrial complex at the Kennecott mill town (A. Worthington: 1999, personal communication).

We have been fortunate to have had the opportunity of documenting such a large sample of mining and other historic sites while many of their structures still stand as visible reminders of life on the Alaska frontier. These sites preserve the memory of the old-time prospectors and miners who, by virtue of their labor, vision, and persistence, opened Alaska to those of us born outside the state. Although the time-consuming task of inventorying these sites is complete, we still have a great deal of work ahead of us. This work will assure that our children have the chance to see, first hand, a bit of our own Alaska breed of history.

APPENDIX

ANNOTATED LIST OF CRMIM SITES

Denali National Park and Preserve

HEA-044 Prehistoric. The site is a lithic scatter situated on a knoll bearing an outcrop ping of obsidian. Teklanika River (Figure 39).

HEA-045 Prehistoric. This site consists of a scatter of chert and obsidian flakes. Teklanika River (Figure 39).

HEA-227 Lode mining operation. The site consists of a single large box, possibly an ore box, constructed of milled lumber, the ruins of a cache, and a breached earthen dam. West Fork, Chulitna River (Figure 26).

HEA-228 Lode (or possibly placer) mining camp and operation. The site is composed of four loci. Locus A* consists of the ruins of a log cabin, a collapsed frame outhouse and a trash scatter; Locus B consists of a standing log cabin, the collapsed remnants of a log cache and a trash dump; Locus C consists of a standing log cabin and a standing outhouse; Locus D consists of a wooden beam and log bridge across Colorado Creek. West Fork, Chulitna River (Figure 26).

HEA-229 Historic camp. The site consists of a log cabin, an elevated cache in ruins, a trash dump, a deteriorated doghouse with an associated small sled, and a dete riorated freight sled. West Fork, Chulitna River (Figure 35).

HEA-230 Historic operation. The site consists of a partially collapsed bridge stretching across the gravel bar of the West Fork of the Chulitna River. A piledriver frame work used in the construction and maintenance of the bridge rests north of the bridge abutment. West Fork, Chulitna River (Figure 35).

HEA-231 Lode mining operation. The site consists of a single wooden, crib-like structure, associated with collapsed structural debris, partially buried in the stream gravels. West Fork, Chulitna River (Figure 26).

HEA-232 Prehistoric. The site consists of six lithic artifacts, including three flakes, two microblades, and a wedge-shaped microblade core. Bull River (Figure 39).

* The various systems used to designate loci are not standardized in this report as they reflect data (and designations) from the original site reports.

MMK-001 Historic camp. Diamond Roadhouse. The site consists of standing roadhouse, a shed or cache, and a two-room doghouse. Bearpaw River/Moose Creek (Figure 35).

MMK-011 Historic camp. Moose Creek Fish Camp. The site consists of a standing log cabin and a collapsed elevated cache. Moose Creek (Figure 35).

MMK-016 Lode mining camp and operation. Stampede Mine and Mill. This is an extensive site consisting of the ruins of the Stampede mill, the foundation of an assay office, a power house and shop, a supply building, a cabin, a mess hall, a bunkhouse, an elevated cache, two outhouses, a pipe and storage building, a weather station, a greenhouse, two bridges, and various other features. Stampede Creek (Figure 27).

MMK-017 Placer mining camp. Johnny Busia's cabin. The site consists of a log cabin, a trash dump, and some modern features. Moose Creek (Figure 18).

MMK-018 Historic camp. Kantishna Roadhouse. The site is composed of a standing, two-story log roadhouse. Moose Creek (Figure 35).

MMK-019 Placer mining operation. The site consists of a ditch and pipeline system that extends for approximately 2.5 miles (4 km) along a terrace of Moose Creek. Three dams are also associated with the water diversion system. Moose Creek (Figure 18).

MMK-020 Historic camp. Fanny Quigley's cabin. The site is composed of a wood frame, three-room cabin, a shed, and an outhouse. Moose Creek (Figure 35).

MMK-023 Placer mining camp and operation. The site consists of a partially collapsed cabin, a wood frame tool shed, two wagons, the remains of a cold storage cache, as well as tailings and stream diversion associated with power equipment. Caribou Creek
(Figure 18).

MMK-034 Prehistoric. The site is an isolated lithic scatter, consisting of a unifacially flaked scraper and flaking debris. Caribou Creek (Figure 39).

MMK-039 Placer mining operation. This small-scale mining site consists of three open-pit mining prospects, the remains of a possible dam, a shallow ditch, tailings piles, and associated artifacts. Caribou Creek (Figure 18).

MMK-040 Placer mining camp. The William Taylor site. It consists of a cabin, the ruins of three possible tent frames, three outbuildings, and a variety of artifacts. Caribou Creek (Figure 18).

MMK-041 Placer mining operation. The site comprises two wooden header penstock boxes, the remains of two wooden flume sections and a nearby ditch line. A hydraulic giant is also located at the site. Caribou Creek (Figure 18).

MMK-042 Placer mining operation. The site consists of a pipeline and ditch system that extends for 2.3 miles (3.7 km). Caribou Creek (Figure 18).

MMK-043 Placer mining operation. Axe-cut logs, which may be the remains of dam, con stitute the site. Caribou Creek (Figure 18).

MMK-044 Placer mining camp. The site is composed of two loci. Locus 1 consists of a standing cabin, a privy, at least three tent platforms, a diversion ditch/pipe water system, and the remains of a wagon. Locus 2 consists of a maintenance shed and associated artifacts adjacent to an airstrip. Caribou Creek (Figure 18).

MMK-045 Placer mining operation. The site consists of a ditch line, pipe shelf, flume shelf and regulator, header box. Caribou Creek (Figure 18).

MMK-046 Lode mining camp and operation. There are two loci at the site. Locus 1 is composed of two wood-frame cabins, the remains of a log cache, a privy, a trash dump, and assorted artifacts. Locus 2 consists of one cribbed shaft, one col lapsed shaft, an open cut, a cribbed portal, and the remains of a hoist. Caribou Creek (Figure 27).

MMK-047 Historic operation. The site consists of a single large skid constructed out of timbers, planks, and the track assembly from a dragline or bulldozer. Caribou Creek (Figure 35).

MMK-048 Placer mining operation. Two isolated dragline buckets comprise the site.Cari bou Creek (Figure 18).

MMK-049 Placer mining camp. Two collapsed cabin ruins and assorted artifacts comprise the site. Caribou Creek (Figure 18).

MMK-050 Prehistoric. The lithic scatter consists of a broken projectile point, a point base, and several flakes. Moose Creek (Figure 39).

MMK-051 Placer mining camp. The site is composed of a partially collapsed cabin and ruins of an elevated cache. Yellow Creek (Figure 18).

MMK-052 Placer mining camp and operation. The site has three loci. Locus 1 consists of the ruins of log cabin, a standing cache, trash dump, and hand-stacked tailing; Locus 2 consists of hand-stacked tailings, a power winch, pulley and cable, and various placer mining equipment; Locus 3 consists of a log and stone dam with log cribwork and a pipeline. Twenty Two Gulch (Figure 18).

MMK-053 Placer mining camp. The site contains the remains of a cabin, cache, workshed, and doghouse. Twenty Two Gulch (Figure 18).

MMK-054 Placer mining operation. This site is a pipeline extending 469 m along the west bank of Glacier Creek (Figure 18).

MMK-055 Placer mining camp. The site comprises two standing wood frame structures, a cabin and a work shed, as well as a Caterpillar "Diesel Forty" tractor. Glacier Creek (Figure 18).

MMK-056 Placer mining camp and operation. The site comprises an old dragline and dragline bucket, a former bunkhouse and tool shed, and several modern build ings. Glacier Creek (Figure 18).

MMK-057 Placer mining operation. The metal boom or arm of a dragline (MMK-056) makes up this site. Glacier Creek (Figure 18).

MMK-058 Historic camp. The site comprises a collapsed log cabin, log cache, and out house ruins. Glacier Creek (Figure 35).

MMK-059 Historic camp. The site consists of cabin ruins, an elevated cache ruins, a dog house, sled and sledge remains, and associated artifacts. It is probably asso ciated with trapping. Glacier Creek (Figure 35).

MMK-060 Placer mining camp and operation. A collapsed cabin, cache, small shed, and a storage area for mining equipment are at the site. Quigley Ridge (Figure 18).

MMK-061 Lode mining camp and operation. The Little Annie Mine. It includes a cabin, mine adit, and two prospect cuts on Quigley Ridge (Figure 27).

MMK-062 Placer mining camp. The ruins of log cabin and associated artifacts compose the site. Glen Creek (Figure 18).

MMK-063 Placer mining camp. This site consists of a standing log cabin, the ruins of an elevated cache, and two standing posts surrounded by a cultural refuse scatter. Glen Creek (Figure 18).

MMK-064 Historic site. This cache is composed of a stone-lined pit containing one button. Glen Creek (Figure 35).

MMK-065 Prehistoric. Two bifacially worked tools of rhyolite or argillite were found at the site. Spruce Creek (Figure 39).

MMK-066 Prehistoric. The site consists of a single, bifacially worked tool of dark gray cryptocrystalline silica. Glen Creek (Figure 39).

MMK-067 Placer mining camp. The site consists of a log cabin, the ruins of cache, a root cellar, and a privy. Spruce Creek (Figure 18).

MMK-068 Prehistoric. The site has three loci. Locus 1 contains a single projectile point; Locus 2 is a scatter of seven waste flakes and three tool fragments; Locus 3 consists of a single notched slab of schist. Moose Creek (Figure 39).

MMK-069 Prehistoric. The site consists of a single unifacially flaked tool of fine-grained basalt. Moose Creek (Figure 39).

MMK-070 Placer mining operation. The site comprises a horse-drawn scraper and a board scatter. Caribou Creek (Figure 18).

MMK-071 Prehistoric. The site is described as a fire hearth in possible association with a scatter of 11 chert or chalcedony flakes. Glen Creek (Figure 39).

MMK-072 Prehistoric. The site consists of a single large flake tool of black basalt. Moose Creek (Figure 39).

MMK-077 Lode mining operation. The site contains a portion of the Taylor Antimony Mine, including an outhouse and prospect hole. Slate Creek (Figure 27).

MMK-078 Prehistoric. The site is a small lithic scatter composed of four gray cryptocrys talline-silica flakes. Moose Creek (Figure 39).

MMK-079 Lode mining operation. The site contains two adits, a circle of stones, prospect pit, the remains of a stone structure, lumber, and mining equipment scatter. Glen Creek (Figure 27).

MMK-080 Lode mining operation. The site comprises 10 prospecting pits and trenches scattered along the crest of a ridge. Glen Creek Ridge (Figure 27).

MMK-081 Lode camp and operation. The site consists of the remains of an adit, the ruins of a blacksmith shop and tent frame, other structural debris and artifacts. Glen Creek (Figure 27).

MMK-082 Lode mining camp and operation. The site comprises the ruins of wood-frame cabin, privy, two mine adits with associated equipment, and a prospect pit. McGonagall Gulch (Figure 27).

MMK-083 Historic site. The grave of John Busia and a recent marker compose this site. Moose Creek (Figure 35).

MMK-084 Historic site. The site consists of a four-chambered log doghouse and associated artifacts. Moose Creek (Figure 35).

MMK-085 Historic camp. The site consists of the foundation of a log structure, an elevated cache, now collapsed, and an associated artifact scatter. Moose Creek (Figure 35).

MMK-086 Placer mining camp. The site comprises a standing cabin, three associated collapsed structures or lumber scatters, and a profuse trash scatter extending down slope from the cabin. Eureka Creek (Figure 18).

MMK-087 Placer mining camp and operation. A log cabin, an outhouse converted into a tool and parts storage shed, and two prospect holes compose the site. Eureka Creek (Figure 18).

MMK-088 Paleontological site. The site comprises partially fossilized bones, tentatively identified as bison, eroding from a gravel terrace. Bearpaw River (Figure 39).

MMK-089 Lode mining camp. The site is a standing, wood-frame cabin, associated artifacts, and lumber debris from a collapsed wooden structure on Quigley Ridge (Figure 27).

MMK-090 Lode mining operation. The site consists of four mining adits and tailing piles, plus associated artifacts near Quigley Ridge Road (Figure 27).

MMK-091 Lode mining camp and operation. A lead-silver lode mine with cabins, adits, tailings, and artifacts compose this site on Alpha Ridge (Figure 27).

MMK-092 Lode mining camp and operation. Neversweat Mine. Five collapsed adits, associated mining equipment and refuse, and a recent cabin and outhouse compose the site. Eldorado Creek (Figure 27).

MMK-093 Historic camp and operation. Moose Creek Sawmill site. It consists of an old sawmill, steam engine and boiler, well, collapsed log cabin and associated artifacts. Moose Creek (Figure 35).

MMK-094 Historic camp. This mountaineering site is the location of the base camp for the first successful assault of Mt. McKinley in 1913. The site consists of a stone tent foundation, pole fragments from three other tents, and some associated artifacts. Cache Creek (Figure 35).

MMK-096 Prehistoric. The site consists of a buried hearth and a single associated artifact. Moose Creek (Figure 39).

MMK-097 Prehistoric. The site consists of a single lithic tool fragment, probably the base of a lanceolate projectile point. Lake Creek (Figure 39).

MMK-098 Prehistoric. The site consists of a single obsidian flake. Lake Creek (Figure 39).

MMK-099 Historic community. This is the site of Eureka/Old Kantishna settlement and cemetery. The site consists of traces of six structures, two cold caches, and three areas scattered with trash. Moose Creek (Figure 35).

MMK-100 Historic camp. The site comprises a log structure in very poor condition. Moose Creek (Figure 35).

MMK-101 Prehistoric. The site consists of six pieces of lithic debitage scattered over the crest and slopes of a ridge. Moose Creek (Figure 39).

MMK-102 Prehistoric. The site consists of two lithic waste flakes situated on the exposed edge of a shelf. Moose Creek (Figure 39).

MMK-103 Prehistoric. The site consists of a single artifact situated on a small shelf above the North Fork Moose Creek (Figure 39).

MMK-107 Prehistoric. The site consists of two chert flakes located on a prominent ridge overlooking Wonder Lake (Figure 39).

MMK-108 Prehistoric. The site consists of one fine-grained basalt biface, more than 35 fine-grained basalt reduction flakes, two white chert flakes, and one white rhyolite flake. Wonder Lake (Figure 39).

MMK-109 Prehistoric. The site consists of a single bifacially flaked projectile point of black chert. Wonder Lake (Figure 39).

MMK-110 Prehistoric. The site consists of a chert lanceolate projectile point or knife. Wonder Lake (Figure 39).

MMK-114 Placer mining camp. The site includes the ruins of a number of wood-frame cabins, storage sheds, caches, and numerous artifacts. Caribou Creek (Figure 18).

MMK-116 Lode mining camp. The site consists of a log cabin, two sill log foundations, outhouse remnants, stacked rock wall cache pit, deteriorating log piles, and two large caterpillar tractors. Slippery Creek (Figure 27).

MMK-117 Lode mining camp. Quigley Mining Camp. Only stone foundations and sill logs remain of cabins at the site. Remnants of an outhouse, garden, and stone retaining walls are also visible. Friday Creek (Figure 27).

MMK-118 Placer mining camp. The site consists of a collapsed log cabin, a tent platform ruin, a dismantled cache, and a garden. Crooked Creek (Figure 18).

MMK-119 Placer mining camp and operation. The site comprises a collapsed log cabin, collapsed cache, and a tent platform ruin. Crooked Creek (Figure 18).

MMK-120 Placer mining camp. The features include a two-room log cabin, two log and milled lumber tent platforms, one privy, a garden area, one log cache, and sill logs of an unidentifiable structure. Crooked Creek (Figure 18).

MMK-122 Placer mining camp. The remains consist of rectangular and round stone out lines with a sparse scatter of artifacts. Glen Creek (Figure 18).

MMK-123 Placer mining camp. The site consists of a cabin depression with an assemblage of domestic artifacts. Glen Creek (Figure 18).

MMK-124 Placer mining camp and operation. The site features include the foundation of a cabin, a collapsed cache, and two prospect trenches (Figure 18).

MMK-125 Lode mining camp. Copper Mountain Mining. Included in the 22 site features are two cabins, foundations of six tent frames, six caches, two outhouses, log and artifact scatters, and a ditch. Mt. Eielson/Grant Creek (Figure 27).

MMK-127 Lode mining camp and operation. The site is composed of a standing cabin, hand-fashioned shower stall, a dumper box, a Harz-type jig, and associated hard rock mining equipment. Lucky Gulch (Figure 27).

MMK-128 Placer mining camp and operation. The site consists of two log cabins, a tent platform, a garden clearing, an outhouse, a collapsed cache, six prospect pits, and the remnants of a log and earth boomer dam. Little Moose Creek (Figure 18).

MMK-129 Placer mining camp and operation. The site comprises the ruins of a tent plat form, a row of hand-stacked tailings, and the remnants of a log and stone boomer dam. Rainy Creek (Figure 18).

Wrangell-St. Elias National Park and Preserve

NAB-009 Mining Community. Bonanza City townsite. The remains consist of six standing or partially standing wooden structures; several artifact scatters, some of which are associated with leveled areas where tents may have been located; several depressions; and a variety of other features. Bonanza Creek. Other AHRSnumbers that have been assigned to individual features at the site are NAB-117, NAB-118, NAB-165, and NAB-167 (Figure 36).

NAB-043 Placer mining camp and operation. The site consists of a single tent frame foundation, and two cribbed drift mine shafts that are now collapsed. Alder Gulch/Dry Gulch (Figure 20).

NAB-044 Placer mining camp. The site consists of two cabin or tent frame ruins, cache ruins, associated artifacts and mining equipment. Big Eldorado Creek (Figure 31). The AHRS number associated with tailings piles at the site is NAB-166.

NAB-045 Historic camp and operation. The site consists of the ruins of a sawmill, a standing log cabin, a chicken coop, and the ruins of two other structures. Chavolda Creek (Figure 36).

NAB-046 Placer mining camp. The site consists of a wood frame cabin, three sheds, a meat cache, the ruins of another cache, a doghouse, an outhouse, and associated mining equipment and artifacts. Bonanza Creek (Figure 20). The following AHRS numbers have been assigned to individual structures at the site: NAB-157, NAB-158, and NAB-160.

NAB-047 Placer mining camp. The site comprises a wood frame cabin, six doghouses, and and assorted mining and blacksmithing artifacts. Bonanza Creek (Figure 20).

NAB-048 Placer mining camp and operation. The site consists of a standing shed and two-story outhouse, plus four collapsed structures built on a bench filled with tailings. Bonanza Creek (Figure 20). AHRS numbers assigned to the shed and outhouse at the site are NAB-154 and NAB-155.

NAB-049 Placer mining camp and operation. Site features include two tent frames, a trash scatter, the ruins of a wooden flume, and a variety of domestic and mining-related artifacts. Bonanza Creek (Figure 20). AHRS numbers that have been assigned to the tent frames at the site are NAB-149 and NAB-150.

NAB-050 Placer mining camp and operation. The site features consist of two historic tent frames, an outhouse, three doghouses, a trash scatter, dam remnant, and flume ruins. Bonanza Creek (Figure 20). One of the tent frames at the site has been assigned the AHRS number NAB-151.

NAB-051 Placer mining camp. Site features consist of five standing tent frame structures, an outhouse, an animal pen, a shed, a cache, and a shower. Little Eldorado Creek (Figure 20). The following AHRS numbers have been assigned to individual structures at the site: NAB-127, -128, -129, -130, -131, -132, and –133.

NAB-052 Placer mining operation. The site comprises a drift pit, boiler, rocker box, and flume sections. Snow Gulch (Figure 20).

NAB-053 Placer mining camp. A tent platform and frame, along with associated artifacts compose the site. Bonanza Creek (Figure 20).

NAB-054 Lode mining camp. The site consists of 19 tent frames in various stages of collapse, a core sample shed, and other associated features and artifacts. Nabesna River (Figure 31).

NAB-055 Lode mining camp and operation. The site's features include two tent-frame bases and two prospecting pits. Nabesna River (Figure 31).

NAB-056 Lode mining camp. The site consists of a collapsed log cabin, a tent frame ruin, a blacksmith area, a cache ruin, and small trash scatter. Nabesna River (Figure 31).

NAB-057 Lode mining operation. The site preserves the remains of a diamond drill station, including drill base, drill rod, and other associated features. Nabesna River (Figure 31).

NAB-058 Lode mining camp. The site consists of two pole tent frames. Nabesna River (Figure 31).

NAB-059 Placer mining operation. The site comprises a partially collapsed wooden flume system with associated dams, regulator boxes, and a ditch. Bonanza Creek (Figure 20).

NAB-060 Placer mining operation. The site, a large area of extensive ground disturbance created by hydraulic mining, includes an earthen deflective dam, two hydraulic giants, and a line of sluice boxes. Bonanza Creek (Figure 20).

NAB-061 Placer mining operation. The site consists of two small hydraulic pits, the remnants of a flume line and associated water supply features, and a scatter of mining-related artifacts. Bonanza Creek (Figure 20).

NAB-062 Placer mining operation. The site is a staging area for distribution of placer mining equipment, including riveted metal pipe, sections of sluice boxes, a keystone drill, a disassembled giant, and a horse-drawn scraper. Bonanza Creek (Figure 20).

NAB-063 Placer mining camp. The site is composed of a cabin, outhouse, and storage shed, all in good condition. Big Eldorado Creek (Figure 20). The claim markers at the site have been assigned the AHRS number NAB-168.

NAB-064 Placer mining operation. The remains of a flume system and two dams compose this site. Bonanza Creek (Figure 20). The holding dam at the site has been assigned the AHRS number NAB-126.

NAB-065 Placer camp and operation. The site consists of a group of standing, plywood structures, including a cabin, and two tent frames, as well as a ditch, dam, and old building platform. Gold Run Creek (Figure 20).

NAB-066 Placer mining camp and operation. The site consists of a bunkhouse, large cabin, doghouses, shed, meat cache, plank platform, and a well preserved stone and earth "boomer" dam. Gold Run Creek (Figure 20). The following AHRS numbers have been assigned to individual structures at the site: NAB-134, -135, -136, -137, and -138.

NAB-067 Placer mining camp and operation. The site consists of a portable churn drill and a collapsed wood frame structure. Gold Run Creek (Figure 20).

NAB-068 Placer mining camp and operation. The site consists of a cabin, recent skid shack, three outbuildings, a portable steam boiler, several test pits, a ditch line, a trash dump, and recent mining equipment. Gold Run Creek (Figure 20). The following AHRS numbers have been assigned to individual structures at the site: NAB-145, -146, -147, and -148.

NAB-069 Placer mining camp and operation. The remains of a wooden plank deck, two apparent building foundations, a mining cut, and prospect pit compose the site. Gold Run Creek (Figure 20).

NAB-070 Placer mining operation. The site consists of the remains of a large "boomer" dam and a stacked rock terrace with an upright steam boiler situated on it. Glacier Creek (Figure 20).

NAB-071 Placer mining camp. The site comprises a collapsed tent frame, tent frame platform, two sheds, a meat cache, outhouse, doghouses, and storage hutch. Chavolda Creek (Figure 20). The following AHRS numbers have been assigned to individual structures at the site: NAB-141, -142, -143, and -144.

NAB-072 Lode mining camp and operation. The site contains the remains of the Rambler Mine, consisting of two adits, bunkhouse foundation, and several features relating to power generation, drilling, and circulation of ore in the mine. Four recent structures are also at the site. Nabesna River (Figure 31).

NAB-073 Placer mining camp and operation. The site consists of a wood frame cabin, a tent foundation, three dam remnants, two ditch remnants, riveted penstock pipe, scatters of flume debris, two possible prospect pits, hand-stacked tailings, and a tracked vehicle. Poorman Creek (Figure 20). The following AHRS numbers have been assigned to individual structures at the site: NAB-139 and NAB-140.

NAB-074 Placer mining operation. The site consists of two dam remnants, a pile of flume sections, and associated hand tools. Glacier Creek (Figure 20).

NAB-075 Placer mining camp and operation/prehistoric. The site comprises an outline of a tent frame, two prospect pits, and a prehistoric ground-stone maul that was in a small creek channel. Glacier Creek (Figure 20).

NAB-076 Placer mining camp. The site consists of a raised and leveled tent platform, two other possible foundations, and the remnants of a rock dam. Coarse Money Creek (Figure 20).

NAB-077 Placer mining camp and operation. The site comprises two possible cabin or tent frame foundations, a plank floor foundation, a standing shed, three dog houses, and an open shed built over a drift pit. Coarse Money Creek (Figure 20).

NAB-078 Historic camp. The site features include a collapsed tent frame, an historic trash scatter, and a woodpile. Chathenda Creek (Figure 36).

NAB-079 Placer mining camp. The site consists of a tent frame platform in deteriorated condition and a few scattered artifacts. Bonanza Creek (Figure 20).

NAB-080 Placer mining camp. The site consists of a tent frame ruin and a pit. Bonanza Creek (Figure 20).

NAB-081 Historic camp. The temporary "brush shelter" is the sole feature at this site. Chathenda Creek (Figure 36).

NAB-082 Placer mining camp and operation. The site consists of a log cabin, a can dump, the remains on an outhouse, and two possible drift pits Chathenda Creek. (Figure 20).

NAB-083 Placer mining camp. The site consists of two cabins, nine doghouses, two outhouses, and associated artifact assemblages. Chavolda Creek (Figure 20). Each of the cabins has been assigned an individual AHRS number (NAB-152 and NAB-153).

NAB-084 Placer mining operation. The site consists of a collapsed adit, a sheet-metal stove, a spoil pile, and a small prospect pit. Chavolda Creek (Figure 20).

NAB-085 Placer mining camp and operation. The site consists of three tent frame ruins, mining tools, and hand-stacked tailings piles. Alder Gulch (Figure 20).

NAB-086 Placer mining camp. A stacked rock tent foundation and artifact assemblage compose the site. Canyon Creek (Figure 20).

NAB-087 Placer mining camp. The site consists of the leveled foundation of a tent frame. Unnamed tributary of Bonanza Creek (Figure 20).

NAB-088 Placer mining camp. The site consists of the remains of a collapsed dwelling, a leveled platform, and a scatter of artifacts and building materials. Canyon Creek (Figure 20).

NAB-089 Placer mining camp. The site consists of an assemblage of domestic artifacts associated with a single, small tent-frame foundation. Bonanza Creek (Figure 20).

NAB-090 Placer mining operation. This is the Canyon Creek ditch that extends 4,390 m along Canyon Creek and a segment of Bonanza Creek. A sod dam, a head box, two small reservoirs, and a flume are also at the site. Canyon Creek/Bonanza Creek (Figure 20).

NAB-091 Historic operation. The site consists of the wreckage of a heavy-duty log sled and a lighter freight sled. Chathenda Creek (Figure 36).

NAB-092 Placer mining operation. The site consists of two pits and scattered logs. Chathenda Creek (Figure 20).

NAB-093 Placer mining camp and operation. The site consists of the log foundation of a structure, the fragments of an old canvas tent, and a pit. California Creek (Figure 20).

NAB-094 Placer mining operation. The site comprises a drift pit with remnants of posts and poles that may have been shoring or part of a superstructure. Chathenda Creek (Figure 20).

NAB-102 Placer mining operation. The site consists of a ditch, bordered by hand-stacked tailings, two pits, a spoil pile, and an historic artifact scatter. Bonanza Creek (Figure 20).

VAL-234 Historic camp. The ruins of a log structure compose this site. Benito Creek (Figure 36).

VAL-241 Lode mining camp. The site consists of the remains of a tent platform, a circle of stone, and scattered cans and other refuse. Cheshnina River (Figure 28).

VAL-242 Lode mining operation. The site includes a stable, a partially collapsed log workshop, an outhouse, two wagons, and 10 sleds. Elliott Creek (Figure 28).

VAL-243 Lode mining camp. The site includes a collapsed log bunkhouse, a log cabin, a small rock-walled cabin, and a cache. Elliott Creek (Figure 28).

VAL-244 Lode mining camp. The site consists of three cabins, a stable, a sawmill, a possible collapsed shed, two caches, two outhouses, two trash dumps, two wooden sledges, and various scatters and piles of tools and equipment. Elliott Creek (Figure 28).

VAL-245 Lode mining operation. The site is composed of a compressor system and asso ciated equipment in a collapsing wood structure. A winch and narrow gauge rail track are also at the site. Elliott and Rainbow Creeks (Figure 28).

VAL-246 Lode mining camp and operation. The site, called the "upper camp" consists of a standing cabin, two collapsed tent frames, four woodpiles, a barrel dump, a compressor and shed, an adit, and assorted artifacts. Elliott Creek (Figure 28).

VAL-247 Lode mining camp. The site consists of one standing cabin, two other cabins and a bunkhouse in collapsed or ruined condition, an outhouse, log pile, bridge, barrel dump, and scattered artifacts. Copper Creek (Figure 28).

VAL-248 Lode mining operation. A partially collapsed tool shop and a compressor building are at the site along with four adits, track and ore carts, tailings piles, a decayed log pile, a prospect cut in the cliff, and a depression. Copper Creek (Figure 28).

VAL-249 Lode mining camp. The site consists of the trace of a tent platform, the ruins of a log tent frame or cabin, the ruins of an outhouse, remnants of an elevated cache, a log pile, an open cut, a depression, and a can dump. Copper Creek (Figure 28).

VAL-250 Lode mining camp. The site consists of a partially collapsed log cabin. Taral Creek (Figure 29).

XMC-007 Placer mining camp. The site comprises a log cabin, frame shop, cache, a possible outhouse or root cellar, and a some clusters of machinery. Dan Creek (Figure 19).

XMC-011 Historic camp. The site features include a collapsed tent frame, an outhouse, a standing cache platform, a small cache, and a collapsed pole structure of unknown function. Young Creek (Figure 36).

XMC-012 Placer mining camp and operation. The Nizina Post Office. This site consists of several standing structures, including the Commissary Building or Post Office and outbuildings. There are also several placer mining features. Chititu Creek (Figure 19).

XMC-039 Prehistoric. The site consists of a flake scatter. Skolai Creek (Figure 40).

XMC-040 Lode mining camp. The site contains a cabin, a possible barn or stable, two tent frames, two lean-tos, a log crib, and an outhouse. All are in ruins. Chitina River (Figure 29).

XMC-041 Lode mining camp. The site consists of two renovated log cabins, the ruins of a log cabin and a barn, three collapsed tent frames, the traces of other possible

tent frames, a collapsed outhouse, and three possible caches. Kotsina River (Figure 28). The following AHRS numbers have been assigned to individual structures at the site: XMC-172 and XMC-173.

XMC-042 Historic camp. Six depressions adjacent to an overgrown roadway compose the features of the site. Cans, fuel drums, and lumber are also scattered about. McCarthy Creek (Figure 36)

XMC-043 Lode mining camp. Site features consist of the foundation of a tent frame, a wood-lined cache, and a trash pile that contains a woodstove. McCarthy Creek (Figure 29).

XMC-044 Historic camp. The site consists of a standing, wood frame cabin, along with the ruins of a tent frame, a possible outhouse, and another structure of unknown function. McCarthy Creek (Figure 36).

XMC-045 Lode mining camp. Big Ben Mill site. The features include a milled lumber cabin with a false front, two log ruins, an outhouse, and a shed. McCarthy Creek (Figure 29).

XMC-046 Historic camp. The site consists of a standing, wood frame cabin built on skids. McCarthy Creek (Figure 36).

XMC-047 Lode mining camp. Locus A consists of the ruins of a cabin and tent frame, a stack of rail, two mine cars, stacks of drill steel, and scattered artifacts. Locus B contains the ruins of a powder house. Kennicott Glacier (Figure 29).

XMC-048 Lode mining camp and operation. Regal Mine. The site features include two tunnel portals, a whim, cache of explosives, the ruins of five wood frame struc tures, two prospect tunnels, stone platform, tailings pile, and trash scatter. Kennicott Glacier (Figure 29).

XMC-049 Historic camp. The site consists of a collapsed log cabin. McCarthy Creek (Figure 36)).

XMC-050 Lode mining camp. Gateway Mill site. Features at the site include a large log cabin, double-walled cache, ruins of two tent frames, a scatter of rails, and a woodpile. McCarthy Creek (Figure 29).

XMC-051 Historic camp. A standing, wood frame cabin is the one feature at this site. McCarthy Creek (Figure 36).

XMC-052 Placer mining camp. The site consists of an outline of sill logs, probably from a tent frame, an adjacent leveled area, and an assortment of cans. Copper Creek (Figure 19).

XMC-053 Placer mining camp. The site consists of a standing cabin, the ruins of a tent frame, and an outhouse. Blygh Gulch (Figure 19).

XMC-054 Placer mining camp. The ruins of a log cabin and three pits compose this site. White Creek (Figure 19).

XMC-055 Placer mining camp. The ruins of a log cabin, one test pit, and a ditch are at this site. White Creek (Figure 19).

XMC-056 Placer mining camp. The site consists of a collapsed tent frame with encircling rock berm, a can scatter, a line of stacked rocks, and a possible ditch. Rex Creek (Figure 19).

XMC-057 Placer mining camp and operation. The site features consist of a standing log cabin, cabin ruins, four log foundations, the ruins of two wood-frame structures, a depression, and a dam. Rex Creek (Figure 19).

XMC-058 Placer mining operation. The site comprises two timbered adit portals and a sparse scatter of artifacts. Rex Creek (Figure 19).

XMC-059 Placer mining camp. The site consists of a standing log cabin and the ruins of a cache. Copper Creek (Figure 19).

XMC-060 Placer mining camp. The site consists of a standing log cabin, two-story cache, shed, doghouse, and outhouse. Copper Creek (Figure 19).

XMC-061 Placer mining camp. The site includes a two-story log structure that may have been a bunkhouse, a standing log cabin, and possible outhouse remains. Chititu Creek (Figure 19).

XMC-062 Placer mining camp. The site consists of one partially collapsed log cabin with an extensive inventory of artifacts. Chititu Creek (Figure 19).

XMC-063 Placer mining camp and operation. The Murray-Dimond Cabin. The site consists of a standing cabin, the ruins of four wood frame structures, two sawmills, and the remnants of an extensive hydraulic mining operation. Calamity Gulch (Figure 19). The following AHRS numbers have been assigned to individual structures at the site: XMC-144, -145, -146, and -147.

XMC-064 Lode mining camp and operation. Mother Lode tram and camp. Features at the site include a tramway terminal, a bunkhouse, a collapsed bunkhouse and kitchen, two sheds, standing chimney, three recent buildings, a diamond drill, and a D-5 caterpillar tractor. McCarthy Creek (Figure 31).

XMC-065 Placer mining camp. The site consists of a modified tent frame, an adjacent tool shed, now collapsed, and a standing shed. Rex Gulch (Figure 19).

XMC-066 Placer mining operation. The site consists of a milled lumber, electrical generator house. Rex Gulch (Figure 19).

XMC-067 Placer mining camp. The site consists of a building group that includes two cabins, one tent frame, and a cache. Rex Gulch (Figure 19).

XMC-068 Placer mining operation. Chitutu Creek Sawmill. The site consists of two sheds containing sawmill and hydraulic mining equipment, a collapsed outhouse, two covered shafts, and a few scattered mining related artifacts. Chititu Creek (Figure 19).

XMC-069 Placer mining operation. The site feature consists of a wood frame structure that houses an Ingersoll-Rand compressor system. Dan Creek (Figure 19).

XMC-070 Placer mining camp. The site consists of a standing log cabin and the base of a cache. Calamity Gulch (Figure 19).

XMC-071 Historic camp. The site consists of two partially collapsed log cabins, a small trash scatter, a lumber scatter, and a section of communication wire and glass insulator. Chitistone River (Figure 36).

XMC-072 Lode mining camp. Nelson Camp. The site consists of four collapsed log cabins, a possible tent depression, ruins of a blacksmith shop, a frame and screen meat shed, two collapsed outhouses, a cache, two log piles, a bridge, a board walk, and a prospect pit. Glacier Creek (Figure 29). The meat shed has been assigned the AHRS number XMC-161.

XMC-073 Lode mining camp and operation. Nelson Prospect. Site features include a collapsing log cabin, tent frame ruins, five adits, a diamond drill, a blacksmith shop foundation, a windlass ruins, an ore car, core sample boxes, and an arti fact scatter. Glacier Creek (Figure 29).

XMC-074 Placer mining operation. A water diversion system, composed of a dam remnant, a regulator, flume remains, wooden pipeline trestles, and associated features is at this site. Dan Creek (Figure 19).

XMC-075 Placer mining camp. The site comprises three standing cabins, a partially collapsed tent frame, two sheds, an outhouse, and an assortment of artifacts. Rex Creek (Figure 19).

XMC-077 Placer mining camp. The site consists of a partially collapsed log cabin and an outhouse. Chititu Creek (Figure 19).

XMC-078 Placer mining operation. The site consists of the remains of a hydraulic water diversion system, including dam remnants, stacks of penstock, a regulator, and several low, cribbed walls. White Creek (Figure 19).

XMC-079 Placer mining camp. The site comprises a wood frame cabin and shed, both of which are still standing. White Creek (Figure 19).

XMC-080 Lode mining camp. A possible tent frame and some scattered artifacts are all that remain of the site. Nikolai Creek (Figure 29).

XMC-081 Lode mining camp and operation. Bonanza tram angle station. The site consists of an angle station, a breakover station, portions of the tramline, an operator's house, an outhouse, and a boardwalk. Bonanza Ridge (Figure 29).

XMC-082 Lode mining camp. The site features include a standing log cabin and some recent domestic features. Chitina River (Figure 29).

XMC-083 Historic camp. The site consists of a collapsed log cabin, a cold cellar, a cache, and a can-and-cookware scatter. Tebay River (Figure 36).

XMC-084 Lode mining camp. The site consists of a single cabin, with collapsed roof, and a few associated artifacts. White River (Figure 31).

XMC-085 Lode mining camp and operation. Jumbo Mine. The site consists of a tram station, bunker, breakover station, three bunkhouses, a blacksmith workshop, three avalanche barriers, a powerhouse and steam plant, a tramway tower, an outhouse, and two structural ruins. Bonanza Ridge (Figure 29).

XMC-086 Lode mining operation. Jumbo Mine tram. The site is composed of a linear arrangement of tramway features, including a breakover station, an anchor-tension station, and six tramway towers. Bonanza Ridge (Figure 29).

XMC-087 Lode mining camp and operation. Jumbo/Glacier tramway station. The site consists of the junction station, a transformer tower, an operator's house, a collapsed bunkhouse, an outhouse, and a possible shed. Bonanza Ridge (Figure 29).

XMC-088 Lode mining camp and operation. North Midas Mine. The site features include an adit, tram, bunker, compressor shed with compressor, renovated log cabin and bunkhouse, a collapsed cabin, and two tent depressions. Berg Creek (Figure 28).

XMC-089 Lode mining camp and operation. North Midas Mill. The mill building, com plete with ore-processing equipment is the major feature at the site. There is also a tram, collapsed barn, small shed, ruins of a blacksmith shop, workshop, five cabins, a tent platform, and two tent depressions. Berg Creek (Figure 28).

XMC-090 Lode mining camp. Nugget Creek Camp. The site consists of a two-story bunk house; three standing log cabins; the ruins of seven tent platforms; the trace

of a tent frame; a one-and-a-half story log barn; a storage cache; a small shed; a three-room log garage or tool shed; various piles of wood, pipe and logs; trash pits; a freight sled; and a horse-drawn wagon. Nugget Creek (Figure 28).

XMC-091 Lode mining camp and operation. Nugget Creek Mine. The site consists of two adits, a deteriorated three-level mill building, a collapsed log workshop, a collapsed tent frame, trash and wood scatters, hand-forged dump buckets, piles of pipe, an ore-cart, remnants of a narrow-gauge rail track, and a remnant of a horse-drawn freight sled. Nugget Creek (Figure 28).

XMC-092 Historic camp. A standing log cabin with a collapsed roof make up this site. Nugget Creek (Figure 28).

XMC-093 Lode mining camp and operation. Features at the site include a collapsed board and batten cabin, an outhouse, a possible machine shed, the remains of a barn, and a stack of logs. Clear Creek (Figure 28).

XMC-094 Lode mining camp. The site consists of two tent depressions, a small barrel cache, two scatters of machinery parts and a scatter of cans. Clear Creek (Figure 28).

XMC-095 Lode mining camp and operation. The site consists of a mine adit associated with tailings, rail and an ore cart, along with several leveled areas thought to be tent platforms and the remains of eight collapsed outbuildings. Clear Creek (Figure 28).

XMC-096 Lode mining camp and operation. Green Butte Mine. Two loci. The mine adits, upper tramway terminal, a bunkhouse, and a variety of outbuildings comprise the upper camp. The lower camp is composed of a log bunkhouse, log residence, a woodshed, the ruins of four outbuildings, log stables and five wagons, a sawmill, a shed, lower tramway terminal, three doghouses, and the ruins of a log warehouse. McCarthy Creek (Figure 29).

XMC-097 Prehistoric. Two rock cairns that may have functioned as hunting blinds and a chert manuport were recorded at this site. MacColl Ridge (Figure 40).

XMC-098 Prehistoric. The site consists of six depressions and a single copper tool. MacColl Ridge (Figure 40).

XMC-099 Lode mining operation. The site consists of three adits as well as various scat ters and caches of mining tools and equipment. Nizina River (Figure 29).

XMC-100 Lode mining camp. The site contains a collapsed log cabin, can dump, sledges, and the remains of a recent hunting camp. Kuskulana Glacier (Figure 28).

XMC-101 Lode mining camp and operation. The site consists of remnants of a machine shop, a collapsed adit, a cable transmission line, the remains of three wood plank floors, and the debris from unidentified structures. MacDougall Creek (Figure 28).

XMC-102 Historic camp. This site consists of a partially collapsed tent frame with asso ciated doghouses. McCarthy Creek (Figure 36).

XMC-103 Historic camp. This site comprises two standing log cabins, an elevated cache, an outhouse, a dump, two freight sledges, a sled, and the ruins of possibly four other structures. Chitina River (Figure 36).

XMC-104 Lode mining operation. Lucky Girl Mine and Mill. The site consists of the ruins of the mill, four adits, a compressor shed/assay office, and a water tank foun dation. Golconda Creek (Figure 29).

XMC-105 Lode mining camp and operation. Bremner-Yellowband Camp. The features at the site include a cookhouse/bunkhouse, a storage building, a screened meat cache, an office/assay lab, a blacksmith shop and adjoining mechanic shop, a hydroelectric plant and aqueduct, a building foundation, an outhouse, a saw-mill, and a tent frame. Golconda Creek (Figure 29). The aqueduct at the site has been assigned the AHRS number XMC-177.

XMC-106 Lode mining camp and operation. Sheriff Mine. There are three adits at the site, along with a cookhouse/bunkhouse, machine shop, blacksmith shop, out-house, and other mining equipment. Golconda Creek (Figure 29). The following AHRS numbers have been assigned to individual structures at the site: XMC-152, -153, and -154.

XMC-107 Lode mining camp and operation. Yellowband Mine. The site consists of a camp, the mine workings - an open-cut and adit, and a lower tram terminal. The camp buildings include a tent frame, a shop, adjacent terraces, an out-house, and a dump. Golconda Creek (Figure 29). The AHRS number XMC-151 has been assigned to the ore bin at the site.

XMC-108 Historic operation. The site features include a cribbed log structure, a lumber milling area, and an historic trash dump. Nizina River (Figure 36).

XMC-109 Historic camp. The site consists of the ruins of a small log cabin. Nizina River (Figure 36).

XMC-110 Historic camp and operation. The site consists of an Alaska Road Commission maintenance shed, a cabin, and associated artifacts. Nizina River (Figure 36). The cabin and shed at the site have been assigned the AHRS numbers XMC-164 and XMC-165.

XMC-111 Lode mining camp and operation. The original Bremner Camp. The site consists of the remains of 14 features defined by rock foundation, depressions, trenches or berms, structural debris, and traces in the vegetation. There are no standing structures. Golconda Creek (Figure 29).

XMC-112 Lode mining camp and operation. Westover Prospect. The site consists of a collapsed log cabin, the floor of a "bunk tent," the ruins of two tent frames, remains of a stable, remains of a blacksmith shop, artifact scatters, and four adits. Boulder Creek (Figure 29).

XMC-113 Lode mining camp. Nikolai City. The site consists of a clearing where Nikolai City was once located, as well as more recent features that include a cabin, sled, forge, some barrels, and a scatter of artifacts. Nikolai Creek (Figure 29).

XMC-115 Lode mining camp and operation. Grand Prize Mine. The site consists of a mine adit with collapsed portal, a workshop, living quarters, a tramway loading station, and a waste rock pile. Bremner Pass (Figure 29).

XMC-116 Lode mining camp. The site consists of the foundations of two cabins and a cache, along with a modern cabin and cache. Nugget Creek (Figure 28).

XMC-117 Historic camp and operation. The site is composed of a milled lumber cabin containing some domestic artifacts and two freight sleds. Monahan Creek (Figure 36).

XMC-118 Lode mining camp. The only standing structure at the site is a poorly constructed cabin of poles and tin. The other site features include structure foundations, waste scatters, two outhouses, and sled remains. Golconda Creek (Figure 29).

XMC-119 Placer mining camp and operation. The Maze site. Three loci are included in the site: one is a complex, maze-like distribution of tailings; the second is a less extensive tailings group; and the third is the remains of a camp, composed of a tent platform, outhouse and associated artifacts. Golconda Creek (Figure 19).

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CHR-029 Placer mining camp. Alfred Johnson cabin. The site consists only of the cabin ruins. Ben and Sam Creeks (Figure 21).

CHR-032 Placer mining operation. Six prospect pits with surrounding berms compose this site. Fourth of July Creek (Figure 21).

CHR-033 Placer mining operation. The site consists of four pits with surrounding berms and a ditch. Fourth of July Creek (Figure 21).

CHR-034 Placer mining camp and operation. The site consists of a standing, wood frame cabin on skids and a system of hydraulic pipes. Fourth of July Creek (Figure 21).

CHR-040 Placer mining operation. The site features include a steam point boiler, bucket winch structures, and a mine shaft. Fourth of July Creek (Figure 21).

CHR-041 Placer mining operation. A metal and wood dam is the primary feature at this site. Fourth of July Creek (Figure 21).

CHR-042 Placer mining operation. A water diversion system, consisting of a waterway formed from 55-gallon drums welded together and two ditches, are at this site. Fourth of July Creek (Figure 21).

CHR-043 Placer mining operation. A portable steam boiler is at this site. Fourth of July Creek (Figure 21).

CHR-044 Placer mining operation. The site consists of a scatter of heavy equipment parts, probably used in earth moving, two large scoop buckets, plus miscella neous tools and domestic artifacts. Fourth of July Creek (Figure 21).

CHR-045 Placer mining operation. The site consists of hydraulic pipe and monitor parts, plus a few empty, 55-gallon drums. Fourth of July Creek (Figure 21).

CHR-046 Placer mining operation. The site consists of a diversion tunnel, constructed of 55-gallon drums, and a ditch system. Fourth of July Creek (Figure 21).

CHR-047 Placer mining operation. The site comprises several features associated with hydraulic mining, including ditches, a flume, monitors and pipe, a sluice box, a rocker, and mining tools and equipment. Boulder Creek (Figure 21).

CHR-048 Placer mining operation. Hydraulic pipe and a nozzle, three rectangular pits, and a storage area of mining tools and parts are at this site. Boulder Creek (Figure 21).

CHR-049 Placer mining operation. The site is composed of a wooden dam remnant and the origin of a pipeline and ditch system. Boulder Creek (Figure 21).

CHR-050 Placer mining operation. A penstock regulator and hydraulic pipe are at this site. Ben Creek (Figure 21).

CHR-051 Placer mining operation. The site consists of an earth-filled crib dam, con structed of logs and poles. Ben Creek (Figure 21).

CHR-052 Placer mining camp. A collapsed cabin, footbridge, and can scatter compose the site. Ben Creek (Figure 21).

CHR-053 Placer mining operation. A portable steam boiler, cribbed drift mining shaft, and associated artifacts are at this site. Ben Creek (Figure 21).

CHR-054 Placer mining camp and operation. The ruins of a log structure, possibly a cabin, and a cribbed, drift-mining shaft compose this site. Ben Creek (Figure 21).

CHR-055 Placer mining operation. The site consists of two depressions that may be related to prospecting. Sam Creek (Figure 21).

CHR-056 Placer mining camp and operation. The ruins of a cabin, a shed, a log superstructure over a drift-mining shaft, and several other mining pits are the major site features. Iron Creek (Figure 21).

CHR-057 Placer mining camp. The site consists of a tent frame depression and associated artifacts. Iron Creek (Figure 21).

CHR-058 Historic camp. The site consists of a partially collapsed log cabin. Caribou Creek (Figure 37).

CHR-059 Placer mining camp and operation. The features include a log cabin, a two-room doghouse, a small structure of unknown function, and a depression that is 3.4 m in diameter. Caribou Creek (Figure 21).

CHR-063 Placer mining camp and operation. The site consists of a standing log cabin, a drift pit, other depressions, and the beginning of an extensive ditch system (recorded as CHR-065). Woodchopper Creek (Figure 21).

CHR-064 Placer mining camp and operation. The site comprises two log cabins, each in a state of collapse, a drift-mining pit, a windlass, and other associated features and artifacts. Woodchopper Creek (Figure 21).

CHR-065 Placer mining camp and operation. The Woodchopper Creek ditch system, extending approximately 6.4 km, is the primary feature of this site. Several dams, water regulators and turnouts, piles of penstock, flumes, pipeline, a tent frame, a tent platform, a lean-to, and other features are also associated with this linear site. Woodchopper Creek (Figure 21).

CHR-066 Placer mining camp and operation. The site consists of a collapsed log cabin, a low log enclosure, two trenches, and a windlass. Woodchopper Creek (Figure 21).

CHR-067 Placer mining operation. The site consists of a cribbed drift-mining shaft, a heavy iron rectangular haul bucket, a possible windlass, a heavy-gauge barrel stove (or boiler), and associated artifacts. Woodchopper Creek (Figure 21).

CHR-068 Placer mining operation. A drift-mining pit; the remains of a cribbed, earth-filled dam; a mechanical winch; several parts to a steam boiler; pipe-fitting tools; and other artifacts compose this site. Mineral Creek (Figure 21).

CHR-069 Placer mining camp and operation. The site consists of the remains of six possible tent platforms, a dog house, ca. 30 mining pits, three mining shafts, a boiler with various scattered parts, a steam drive train with attached saw blade, and other associated features and artifact scatters. Mineral Creek/ Alice Gulch (Figure 21).

CHR-070 Placer mining camp and operation. The site comprises a partially collapsed log cabin, two drift pits, two caches, a wood and metal sledge, and four birdhouses. Woodchopper Creek (Figure 21).

CHR-071 Placer mining camp. The site consists of a single, collapsed log cabin. Wood chopper Creek (Figure 21).

CHR-072 Historic operation. The site consists of an underground storeroom with an aboveground arctic entry constructed of logs and wood planking. Woodchopper Creek (Figure 37).

CHR-073 Placer mining camp. A collapsed cabin and a doghouse were recorded at this site. Coal Creek (Figure 21).

CHR-074 Prehistoric. The site consists of lithic scatter, represented by a wide range of raw material types and several tool types. Birch Creek Ridge (Figure 41).

CHR-075 Placer mining camp. The site features include a cabin, a workshed, and four doghouses. Coal Creek (Figure 21).

CHR-076 Prehistoric. The site consists of a flake scatter and a biface fragment. Eureka Creek (Figure 41).

CHR-077 Prehistoric. This site is an extensive lithic scatter. Several material types and tool types are represented at the site. Fisher Creek (Figure 41).

CHR-078 Placer mining camp and operation. The site consists of a collapsed log cabin adjacent to bulldozer cuts. Coal Creek (Figure 21).

CHR-079 Historic camp. The site consists of a semi-subterranean cabin; a cache, a com bined shed and dog kennel, and two collapsed wooden structures. Woodchopper Creek (Figure 37).

CHR-080 Placer mining camp and operation. Fourth of July Mine. The site consists of a standing log cabin and cache, a collapsed cabin, a structure foundation, dog

houses, outhouse, a sledge made on a truck bed, two boilers, and a rich assortment of mining equipment and artifacts. Fourth of July Creek (Figure 21).

CHR-081 Placer mining camp. Cap Reynolds's cabin. The site consists of a log cabin, with a collapsed roof, three collapsed pole and bark structures, doghouses, trash scatters, a sled, a toboggan, and associated artifacts. Sam Creek (Figure 21).

CHR-082 Placer mining camp and operation. Ben Creek Mine. This is an extensive site consisting of two loci. The mining features, including an impoundment area, pipeline, sluices, hydraulic nozzle, stacked riffles, John Deere backhoe, tailings, and a variety of pieces of equipment compose Locus A. Locus B comprises the domestic features: a cabin, cache, outhouse, workshed, root cellar, and an assortment of equipment, including boilers, portable sawmill, and blacksmith forge. Ben Creek (Figure 21).

CHR-083 Placer mining camp. The camp contains a log cabin, a greenhouse frame, a root cellar, a drying rack, an outhouse, and a new cabin under construction. Boulder Creek (Figure 21).

CHR-084 Placer mining camp. The site consists of two log cabins with collapsed roofs. Mineral Creek (Figure 21).

CHR-085 Placer mining camp. The site comprises a collapsed milled lumber cabin and an assortment of artifacts. Iron Creek (Figure 21).

CHR-086 Placer mining camp. Woodchopper Creek Camp. This is an extensive camp consisting of 22 structures, some in ruins. They include a house, workshop, sheds, mess hall, meat processing shop, recreation hall, outhouses, cabins, several frame structures, and a house depression. Dredge buckets and a D-3 caterpillar tractor are also at the site. Woodchopper Creek (Figure 21).

CHR-089 Coal Creek Mining District. See CHR-102 for Coal Creek Mining Camp.

CHR-090 Coal mining camp. Nation Coal Mine. The site consists of the ruins of a cabin and cribbed-log retaining walls. Nation River (Figure 37).

CHR-091 Historic operation. The site is composed of two log and pole features, possibly related to trapping. Nation River (Figure 37).

CHR-092 Historic camp. Nation Bluff cabin or Nelson's cabin. The features include an historic public-use cabin, a standing cache, a modern cache, two doghouses, a coal pile, a root cellar or structure foundation, a trash pile, and a garden area. Yukon River (Figure 37).

CHR-094 Placer mining camp and operation. Cheese Creek Camp. Three standing buildings, a warehouse, a blacksmith shop, and a small shed are the primary features remaining at this site. A burned foundation and scattered machinery and equipment are also located here. Coal Creek (Figure 21).

CHR-095 Placer mining camp. The site consists of two wooden decks that may have served as platforms for habitation structures, a possible cabin depression, and a scatter of poles and cans. Coal Creek/Cheese Creek (Figure 21).

CHR-096 Placer mining camp and operation. The site consists of a well-made cabin and a large well-made cache, both of which are still standing. Sam Creek (Figure 21).

CHR-097 Placer mining operation. Artifacts at the site include an iron mining bucket, cut logs, pipe fittings for a boiler, and miscellaneous other artifacts. Sam Creek (Figure 21).

CHR-098 Placer mining camp. Phil Berail Cabin. The site consists of the ruins of a log cabin. Colorado Creek (Figure 21).

CHR-099 Placer mining operation. A boiler and a mining equipment scatter are located at the site. Colorado Creek (Figure 21).

CHR-100 Historic operation. Ben Creek Airstrip. Along with the airstrip, the site features include two vehicles, an International TD-14 bulldozer, and a wannigan. Ben Creek (Figure 37).

CHR-102 Placer mining camp. Coal Creek Camp. The camp consists of 22 historic buildings, including bunkhouses, outhouses, a mess hall, a recreation hall, an assay office, generator shed, storage buildings, bathhouse, and a machine shop, all built on skids. There are also some modern structures at the camp. Beaton Pup (Figure 21).

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WIS-045 Placer mining camp. A collapsed log cabin, toppled platform cache, and three depressions compose this site. Alder Creek (Figure 22).

WIS-046 Prehistoric. A single chert flake composes this site. Alder Creek (Figure 42).

WIS-047 Placer mining camp. The site consists of a collapsed log cabin and can dump. Middle Fork Koyukuk River (Figure 22).

WIS-048 Placer mining camp. This is a ditch system that originates at a dam remnant on a small, unnamed creek. A large prospect pit with wood reinforcement is also at the site. Middle Fork Koyukuk River (Figure 22).

WIS-049 Historic operation. The site consists of the remnant of a historic road and associated abutment or support. Snowshoe Creek (Figure 38).

WIS-212 Historic camp. The site contains a remnant tent frame and can scatter. Wiseman Creek (Figure 38).

WIS-213 Prehistoric. The site consists of a single obsidian flake. Wiseman Creek (Figure 42).

WIS-214 Historic camp. A collapsed log cabin associated with cut tree stumps was recorded at this site. Pasco Creek (Figure 42).

WIS-215 Historic camp. The site comprises the ruins of a trapper's small cabin. Sawyer Creek (Figure 42).

WIS-216 Placer mining camp and operation. The site consists of two standing cabins, a wooden rack, and a drift-mining shaft with associated tailings pile. Glacier River (Figure 22).

WIS-217 Placer mining camp and operation. The site consists of a collapsed log cabin and two drift shafts, each of which is associated with a large tailings pile. Glacier River (Figure 22).

WIS-218 Placer mining camp. Vincent Knorr Cabin. The site comprises a well-built, standing log cabin, a collapsing outhouse, the remains of a cache and a large inventory of historic and recent mining tools and equipment. Mascot Creek (Figure 22).

WIS-219 Placer mining camp. The ruins of a log cabin and a storage shed are at this site. Mascot Creek (Figure 22).

WIS-220 Placer mining camp. The site consists of the ruins of a one-room log cabin. Glacier River (Figure 22).

WIS-221 Placer mining camp. A one-room collapsed log cabin is at this site. Glacier River (Figure 22).

WIS-222 Placer mining camp and operation. The site consists of a partially collapsed "boiler" cabin, a drift-mine shaft and associated tailings pile, a log pile, and a depression of unknown function. Glacier River (Figure 22).

WIS-225 Placer mining camp. The site is composed of the ruins of a log cabin. Washington Creek (Figure 22).

WIS-226 Placer mining camp. The ruins of a log cabin and a log plank floor of another structure are at the site. Washington Creek (Figure 22).

WIS-227 Placer mining camp. The site includes an overgrown cabin ruin, a log floor foundation, a leveled depression, and associated artifacts. Washington Creek (Figure 22).

WIS-228 Placer mining camp. Austin Duffy Cabin. The site consists of a collapsed log cabin and the remains of two caches. Mascot Creek (Figure 22).

WIS-266 Placer mining camp. The site feature is a collapsed and badly deteriorated cabin. Conglomerate Creek (Figure 22).

WIS-267 Placer mining camp. Cabin ruins and a possible outhouse or tent frame rem nant were recorded at the site. Conglomerate Creek (Figure 22)..

WIS-276 Placer mining camp. The site consists of the ruins of a cabin and three artifact clusters. Mascot Creek (Figure 22).

Bering Land Bridge National Preserve

BEN-071 Placer mining camp and operation. Portion of the Fairhaven Ditch. The site is composed of two loci. Locus 1 includes a standing cabin, and Locus 2 includes several components of a water control system. Kugruk River (Figure 23).

BEN-072 Placer mining camp and operation. Portion of the Fairhaven ditch. The site consists of an earthen dam and tent platform. Pinnell River (Figure 23).

BEN-093 Placer mining camp and operation. The site includes the historic remains of a ditch, dam, and sluice boxes along with a recent tent frame and equipment yard. Esperanza Creek (Figure 23).

BEN-131 Placer mining camp. The site consists of an historic cabin depression and asso ciated artifacts along with a more recent can and bottle dump. Humboldt Creek (Figure 23).

BEN-132 Placer mining camp. The site consists of scattered historic mining artifacts along with a cabin and other features that date to more-recent times. Humboldt Creek (Figure 23).

BEN-133 Placer mining camp. The site features include a standing cabin and the ruins of a meat cache, an outhouse, and a blacksmith shop. Humboldt Creek (Figure 23).

Kenai Fjords National Park

SEL-175 Lode mining camp and operation. Sonny Fox Mine. The site is composed of two loci that are connected by surface and aerial tramways. The main adit, a ma-

chine-and-tool scatter, ruins of a blacksmith shop, freight wagon, crawler, an outhouse, and four collapsed structures are at Locus I, along with a recent mill and assay lab. Locus II comprises the remains of a mill with most of its machinery. Babcock Creek, Surprise Bay (Figure 32).

SEL-177 Lode mining camp and operation. Nukalaska Mine. Locus I is composed of the ruins of an aerial tramway and terminal. The ruins of a mill with all its machinery, three collapsed frame cabins, a frame cookhouse, and a powerhouse/ blacksmith shop along with a great array of tools and equipment are at Locus II. Shelter Cove, Beauty Bay (Figure 32).

SEL-185 Lode mining camp and operation. Sather prospect. The site is composed of a collapsing cabin and some mining trenches. Yalik Bay (Figure 32).

SEL-212 Lode mining camp and operation. Earl Mount (Glass-Heifner) Mine. Historic features include an open-cut, a wooden track and mine car, a waste dump and old crusher, and a timbered portal to a mine adit. The numerous other features at the site probably date to the 1960s or later. Ferrum Creek, Beauty Bay (Figure 32).

SEL-213 Lode mining camp and operation. Charles Goyne Mine. The historic features at the site include two adits, a tramway terminal, a tugger, cabin remains, and a scatter of displaced equipment. Several other features at the site post-date World War II. Surprise Bay (Figure 32).

SEL-233 Lode mining operation. Nuka Bay Mine. The site consists of an adit, rail and spoil pile, a concentration of mining equipment and machinery, and two pros pect pits. Beauty Bay (Figure 32).

SEL-234 Lode mining camp and operation. Alaska Hills Mine. The site consists of the ruins of a mill building, aerial tramway, and log cabin. Nuka River (Figure 32).

SEL-235 Lode mining camp and operation. Workings associated with the Nukalaska Mine. The ruins of a bunkhouse and a pit or trench are at the site. The adit lies at some distance above. Shelter Cove, Beauty Bay (Figure 32).

SEL-236 Lode mining operation. A power plant and some milling equipment, along with three adits, a spoil pile, and a scatter of mining equipment are at the site. Rosness and Larson Mine. North Arm, Nuka Bay (Figure 32).

SEL-237 Lode mining camp. Nuka Bay Mine Camp. A log cabin ruins is the only feature at the site. Beauty Bay (Figure 32).

Katmai National Park and Preserve

ILI-059 Prehistoric. The site consists of a collapsed rock cairn with heavy lichen growth. Battle Lake vicinity (Figure 43).

ILI-060 Prehistoric. Two chert flakes compose this site. Battle Lake vicinity (Figure 43).

ILI-061 Prehistoric. The site consists of an extensive scatter of chert and quartz flakes. Battle Lake (Figure 43).

Lake Clark National Park and Preserve

XLC-089 Placer mining camp. Bowman Camp. This site is an extensive camp composed of a house, three cabins, and 14 various outbuildings. Portage Creek (Figure 24).

KEN-324 Prehistoric. The site consists of five surface depressions. Magnetic Island (Figure 44).

Glacier Bay National Park and Preserve

XMF-045 Lode mining camp and operation. LeRoy Mine. The site consists of two adits, a railway grade, a collapsed compressor shed, and the ruins or traces of a few other structures. Ptarmigan Creek, Reid Inlet (Figure 34).

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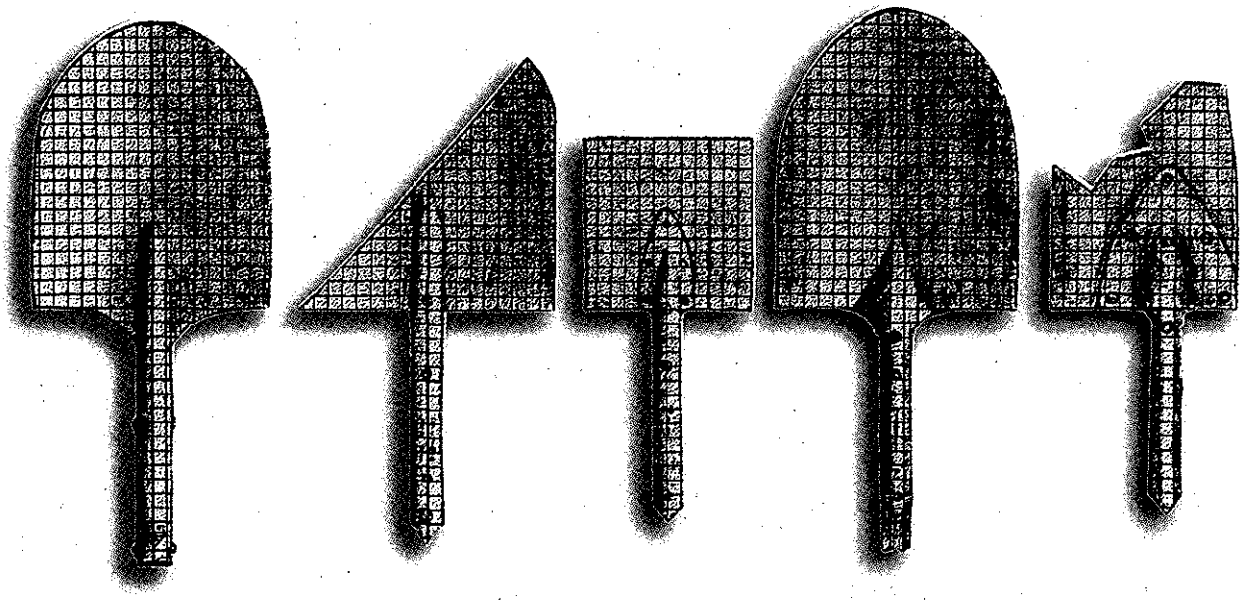
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Shovels altered for cleaning sluice box riffles, Denali NP & Preserve