SUSITNA-WATANA HYDROELECTRIC PROJECT CULTURAL RESOURCES DATA GAP ANALYSIS

PUBLIC REVIEW DRAFT
SITE INFORMATION REDACTED

Report prepared for:
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Acronyms and Abbreviations

ABR, Inc.	Alaska Biological Research, Inc.
ACHP	Advisory Council on Historic Preservation
ADF&G	Alaska Department of Fish and Game
AEA	Alaska Energy Authority
AHRS	Alaska Heritage Resource Survey
AMS	Accelerator Mass Spectrometry
ANCSA	Alaska Native Claims Settlement Act
ANGTS	Alaska Natural Gas Transportation System
ANILCA	Alaska National Interest Lands Conservation Act
ANOVA	Analysis of Variance
APA	Alaska Power Authority
APE	Area of Potential Effect
ARC	Alaska Road Commission
ARLIS	Alaska Resources Library & Information Service
BIA	Bureau of Indian Affairs
BLM	Bureau of Land Management
BOR	Bureau of Outdoor Recreation
CA	Commonwealth Associates
CAA	Civil Aeronautics Administration
DOE	Determination of Eligibility
EIS	Environmental Impact Statement
FAI	Fairbanks
FERC	Federal Energy Regulatory Commission
GIS	Geographical Information System
GPS	Global Positioning Systems
HRA	Historical Research Associates
ICP-MS	Inductively Coupled Plasma Mass Spectrometry
IRP	Railbelt Integrated Resource Plan
ISL	Infrared Stimulated Luminescence
NAGPRA	Native American Graves Protection and Repatriation Act
NHPA	National Historic Preservation Act
NLUR	Northern Land Use Research, Inc.
NPS	National Park Service
NRHP	National Register of Historic Places
OHA	State of Alaska Office of History and Archaeology
OSL	Optically Stimulated Luminescence
PA	Programmatic Agreement
SHPO	Alaska State Historic Preservation Office
TAPS	Trans Alaskan Pipeline System
TCP	Traditional Cultural Property
TES	Terrestrial Environmental Specialists, Inc.
UAF	University of Alaska Fairbanks
UAM	University of Alaska Museum
UAMN	University of Alaska Museum of the North

UCM	Usibelli Coal Mine
USACE	U.S. Army Corps of Engineers
USGS	United States Geological Survey
WAMCATS	Washington Alaska Military Communication and Transportation System

Executive Summary

Between 1978 and 1985, investigators conducted cultural resources surveys, testing, and site excavations for the proposed Susitna Hydroelectric project and ancillary facilities (construction camps, transmission lines, access roads, etc.). Annual and summary reports and more than 50 professional papers and journal articles described over 270 sites which required some form of analysis and curation of associated artifacts. Another 22 previously known sites were revisited and documented. Of the sites found, 111 were located through subsurface testing (about 28,000 shovel tests). Some 99% of the known cultural resources have not been evaluated for their eligibility for listing on the National Register of Historic Places, a necessary step in the Section 106 process required by the National Historic Preservation Act (36 CFR 800). Of the known sites, 87% have prehistoric remains, 2% have protohistoric remains, 10% have historic and modern remains and one site has paleontological remains. Advances in our understanding of the geoarchaeology of the region's stratigraphy, especially tephra deposits, requires a re-examination of the conclusions reached in the 1980s regarding site locations and distributions in time and space, and of the project area's cultural chronology from a predictive modeling perspective.

This data gap report summarizes the available literature about cultural resources in the project area, and reviews the cultural resources reports prepared during the 1978 to 1985 environmental studies. Data gaps identified include inadequacies in the location information of sites due largely to improvements in field and mapping methods since the 1980s (GIS, portable GPS units, better topographic maps), and advances with survey methodologies compared to those employed during the earlier research. The cultural chronology of the project area needs re-examination due to more modern dating techniques (e.g., AMS radiocarbon [^{14}C], optically stimulated luminescence [OSL]) and newer geoarchaeology (tephra) studies. Our understanding of prehistoric land use patterns has advanced through development of more sophisticated predictive models, which can be deployed for Susitna-Watana cultural resources field studies. Research documenting Native Alaskan placenames now exists, which was not generally available during the "legacy" studies of 1978-1985, and can be incorporated into predictive models and field survey strategies. Traditional Cultural Places (TCPs) were not identified in the earlier studies, but are now considered a required element of any cultural resources research program. Some paleontological resources are legally afforded the same protection as cultural resources. In addition, recommendations for the development of a research program for cultural resources includes consultation with agencies, tribes, and interested parties, the development of protocols for unanticipated discoveries of cultural resources and/or human remains, paleontological resources, and artifact and records preservation, curation, and public education. Appendix A lists the extensive materials housed at the University of Alaska Museum of the North (UAMN) from the 1978-1985 work. Appendix B and maps list the known cultural resources from the Alaska Heritage Resources Survey (AHRS) maintained by the Alaska Office of History and Archaeology (deleted in this redacted document). A table presents information about potential data gap topics for desk-top and field investigations to advance the permitting process.

Table 1. Susitna-Watana Hydroelectric Project Cultural Resources Data Gaps

Potential Data Gap Topics	**Specific Information Needed**
SITE LOCATION DATA	
SL-1: Synthesis of existing location data information for known sites	• Compilation of existing site location data • Quality Control/editing of existing location data imagery • GIS layers of known sites with ability to sort by site type, age, size, and associated environmental variables • Geodatabase with site location data plus aerial imagery • Digitized field map records identified in LRAC-1
SL-2: Mapped site location data and environmental variables	• 1980s and current digitized/orthorectified imagery of the middle Susitna • Geodatabase of habitat types based on historic and current aerial imagery • Coded environmental variables
SL-3: Compilation of existing shapefiles (GIS) of environmental variables	• Available environmental variables shapefiles • GIS layers and georectify shapefiles to existing aerial photography
SL-4: Field verification of existing site location data	• Modern GPS technology in the field to verify/update existing site location information • Updated AHRS database
SURVEY COVERAGE	
SC-1: Synthesis of 1978-1985 survey coverage information	• Geodatabase with 1978-1985 survey coverage information plotted • Cross-reference lists between 1978-1985 surveys and survey report information • GIS layers with survey coverage data: locations, test pit locations, level of effort, survey report information
SC-2: 1978-1985 excluded survey coverage areas data	• Geodatabase of 1978-1985 geographic areas within study area excluded from CR surveys • GIS layers from 1978-1985 reports showing areas excluded from 1978-1985 CR surveys
SC-3: Adequacy of horizontal and vertical subsurface testing strategy in 1978-1985 field research	• SC-1 geodatabase to assess adequacy of previous survey methods compared with contemporary standards and requirements • Data on size, depth, and results of each 1978-1985 shovel test pit abstracted from reports and field notes
SC-4: Relation of 1978-1985 project components (dam site, access corridors, camp location, and indirect impact areas such as roads, recreation areas, etc.) to 2011 Wa-Su Hydro Power project.	• GIS layers of 1978-1985 project components • GIS layers of 2011 Wa-Su Hydro Power project • Comparison of two project component footprints to evaluate relevance of 1978-1985 CR survey data to present project

Potential Data Gap Topics	Specific Information Needed
SITE LOCATION MODELING	
SLM-1: Identification of variables used to develop site location models used for 1978-1985 field research	• List of environmental variables used in 1978-1985 modeling • Update data for legacy variables with more recent information • GIS layers
SLM-2: Refine 1978-1985 models with current modeling applications	• Information gathered during SLM-1, SC-1 through SC-4, SL-1 through SL-4, CC-1 through CC-4, LRAC-1 through LRAC-4, LU-1 through LU-4, PN-1 and PN-2, and TCP-1 and TCP-2
CULTURAL CHRONOLOGY	
CC-1: Radiocarbon dates obtained from 1979-1985 research	• Lists of radiocarbon dates in unpublished and published reports • GIS layers showing distribution of radiocarbon dates by age, cultural affiliation, and laboratory • Compilation and evaluation of dates are critical, especially as many dates are from the now defunct Dicarb Laboratory.
CC-2: Tephra dating samples	• Lists of tephra (volcanic ash) samples collected during 1978-1985 field studies • GIS layers showing distribution of tephra samples • Analysis of tephras by contemporary geochemical standards and laboratory techniques
CC-3: Update of tephra dating studies since 1985	• Geodatabase of tephra dated sites • List of tephra samples, dates, analysis since 1985 adjacent to and in the project area
CC-4: Update of radiocarbon dates since 1985	• List of radiocarbon dates, sample locations, and associated data for cultural resource and geological studies • Geodatabase of radiocarbon dates in and adjacent to project area
CC-5: Update cultural chronology with modern radiocarbon testing (e.g. AMS) dating analytical techniques and tephro-chronology techniques (e.g. geochemical)	• Identification of available samples from 1978-1985 research for modern dating • Application of modern dating techniques to bone, and other materials (collagen samples) • Application of OSL dating to tephra deposits
CC-6: Synthesize southcentral and interior Alaska cultural chronology by updating 1985 cultural chronology with current cultural-historical frameworks	• Cultural resource literature developed since 1985 • Professional literature in books, journal articles, reports, and professional papers • Research of museum collections of artifacts
LAND USE	
LU-1: Identification of prehistoric resource locations	• Identification of available raw materials such as lithics, fresh water, springs, salt licks, etc. • GIS layers depicting raw material locations
LU-2: Prehistoric settlement patterns in different prehistoric cultural periods	• Identification of prehistoric cultural periods • GIS layers showing time-space distribution of cultural resources and site types (some data from

Potential Data Gap Topics	Specific Information Needed
	LRAC-1) • Updated Susitna data in light of more recent research on Glacial Lake Atna and Susitna, Holocene sand sheets, ice patches and rock blinds, traditional trails, regional pollen studies, tec.
LU-3: Historic land use	• Identification of sources available for research • Data from source materials (homestead records, cabins, mining claims, etc.)
LU-4: Prehistoric subsistence practices and seasonal round	• Identification of prehistoric harvests of wildlife resources • Analyses of seasonal patterns of resource harvests • Analysis of faunal remains and plant macrofossils from 1978-1985 research
LU-5: Effects of environmental and ecological changes on land use patterns	• Identification of hiatuses in the cultural chronological record in CC-5 and CC-6 • Identification of changes in land use patterns in LU-1 through LU-4 • Review of existing pertinent local and regional environmental data • Use of tephra data in CC-2 and CC-3
PLACE NAMES	
PN-1: Synthesis of existing place names information	• Lists of published/unpublished Native place names • Place names' translations and associated historic land use and cultural information • Geodatabase place names location data
PN-2: Update baseline place names information to account for unknown place names	• Oral interviews • Place names' translations and associated historic land use and cultural information
TRADITIONAL CULTURAL PLACES/TRIBAL SACRED SITES	
TCP-1: Synthesis of traditional cultural places (TCPs)	• Lists of unpublished TCPs • Associated historical and cultural information • Geodatabase with TCP/sacred sites location data
TCP-2: Update baseline TCPs information to account for unknown TCPs	• Identification of sources available for research • Use information gathered in PN-1 and PN-2 • Review of ethnographic and historic literature • Oral interviews • Informal and formal consultation with agencies, Tribes and interested parties
LEGACY RECORDS AND ARTIFACT COLLECTIONS	
LRAC-1: Finding Aids to Accession Records of 1978-1985 UAM data	• Names, locations, descriptions of 1978-1985 records (fieldnotes, maps, artifact inventories, etc.) • Database of UAM accession records
LRAC-2: Inventory of 1978-1985 faunal remains and geoarchaeology samples	• Database of UAM accessioned items for redating and comparative use • Descriptions of 1978-1985 samples
LRAC-3: Inventory of 1978-1985 field records at state, federal agencies, and public libraries	• Names, locations, descriptions of 1978-1985 records • Database of state and federal agency records
LRAC-4: Oral history interviews with 1978-1985 field	• Oral interviews with principal investigators and

Potential Data Gap Topics	**Specific Information Needed**
research principals	researchers in 1978-1985 SHP cultural resources research • Photographs and field information about previously researched locations
HISTORIC CONTEXTS/EVALUATION CRITERIA	
HC-1: Develop historic contexts for the project area	• Review current federal and state legislation, regulations and guidelines • Review existing management plans and historic contexts for areas adjacent to the project area • Synthesis of pertinent data sources and results from CC-1 through CC-6, SLM-2, LU-1 through LU-4, LRAC-1 through LRAC-4, PN-1 and PN-2, and TCP-1 and TCP-2 • Informal and formal consultation with agencies, Tribes and interested parties • OHA criteria and historic contexts.
HC-2: Develop project specific significance standards to evaluate a property's potential eligibility to the National Register of Historic Places (NRHP)	• Review current Federal and State legislation, regulations and guidelines • Review existing management plans and historic contexts for areas adjacent to the project area • Use historic contexts from HC-1 • Synthesize pertinent data sources and results from CC-1 through CC-6, SLM-2, LU-1 through LU-4, LRAC-1 through LRAC-4, PN-1 and PN-2, and TCP-1 and TCP-2 • Informal and formal consultation with agencies, Tribes and interested parties
PALEONTOLOGY	
PAL-1: Synthesis of paleontology data	• Paleontology site location data • Geodatabase of paleontological sites
PAL-2: Paleontology site location model	• Surficial geology and bedrock geology type information • GIS layers of surficial geology and bedrock lithology • Data on locations of rock outcrops
Plans for Unanticipated Discoveries	
PUD-1: Develop plan for unanticipated discovery of cultural resources and human remains	• Review current Federal and State legislation, regulations and guidelines • Review existing management plans for areas adjacent to the project area • Informal and formal consultation with agencies, Tribes and interested parties
PUD-2: Develop plan for unanticipated discovery of paleontological resources	• Review current Federal and State legislation, regulations and guidelines • Review existing management plans for areas adjacent to the project area • Informal and formal consultation with agencies, Tribes and interested parties

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1. INTRODUCTION

1.1 Background

The Susitna-Watana Hydroelectric Project as being planned by the Alaska Energy Authority (AEA) is located in south central Alaska, approximately halfway between Anchorage and Fairbanks in the upper Susitna River basin (Figure 1). It would include a single dam on the Susitna River at river mile (RM) 184 in the vicinity of Watana canyon. A planned 700-foot-high dam would have an approximate 557-foot difference between tail water and maximum pond elevation, with a maximum pond approximately at the 2,000-foot elevation. The Watana Reservoir would be approximately 39 miles long and a maximum of 2 miles wide. The dam's installed capacity would be in the range of 500 to 700 megawatts (MW), with the average annual generation estimated to be around 2,600 gigawatt hours (GWh). The AEA has not made its final decision regarding the type of dam or powerhouse (underground or surface) that would be used or the final maximum reservoir level. The project would operate in a load following mode, with portions of the high summer flows being stored for use in generating additional power in winter. The instream flow releases are being determined at this time, however the flows proposed in the Exhibit E of the 1985 draft amendment application provide a temporary "go-by" schedule for possible instream flow releases. Project plans also include potential transmission lines and road and rail access corridors to the reservoir area (Chulitna, Denali, and Gold Creek corridors), a construction camp, material sources, and other ancillary facilities.

The State of Alaska has studied the feasibility of a hydroelectric project on the Susitna River for more than 50 years. The Alaska Power Authority (APA) conducted feasibility and environmental impacts studies in the 1970s and 1980s, and a license application was submitted to the Federal Energy Regulatory Commission (FERC). The project was cancelled in 1986.

The Project is again being considered by the State of Alaska as a long term source of energy. In 2008, the Alaska State Legislature authorized the AEA to perform an update of the project. Hydroelectric power is of particular interest to the Railbelt's Integrated Resource Plan (IRP) because it provides stable electricity rates due to renewable river flow, rather than the fluctuating rates of fossil fuel-generated electricity. Between 1979 and 1985, the APA and its contractors investigated geological, geotechnical, engineering, and environmental topics. Cultural resources investigations were one element of the environmental investigations (Dixon et al. 1985). The AEA, the successor agency to the APA, is studying the Watana Hydro Project.

Northern Land Use Research, Inc. (NLUR) is subcontracted to ABR, Inc., one of several prime contractors to AEA, to prepare several documents for use in the FERC licensing process: (1) the cultural resources data gap report, (2) cultural resources Preliminary Application Document (PAD) section, (3) subsistence data gap report, and, (4) the subsistence PAD section. This report is the draft cultural resources data gap report; the two PAD sections and the subsistence data gap reports have already been submitted to AEA.

The purpose of the data gap analysis is to compile existing available cultural resource information about the project area, and evaluate it for its completeness and accuracy to inform the preparation of environmental documents to support the Watana Hydro Project. This document presents the results of NLUR's work to locate, identify, abstract, and evaluate the cultural resource studies conducted in connection with the 1978-1985 research. The evaluation entails reviewing the earlier work and comparing it with contemporary laws, regulations, standards, and the many advances in various disciplines, such as large-project archaeological survey modeling. In Alaska, NLUR has developed many of the models for the largest gas line, mining, and railroad surveys (Bowers, et al. 2008; Potter 2005; Potter, et al. 2001, 2002; Potter, et al. 2006). The adequacy of the earlier efforts is assessed and compared with modern, more sophisticated GIS-based modeling methods in section 5.

More than a quarter century of modern archaeological research, aided by new methods and technology in Global Positioning Systems (GPS) and Geographic Information Systems (GIS), geoarchaeology, geochronology, stratigraphic analysis, lithic and faunal analysis, and ice patch research, have taken place in Alaska since the original Susitna work. Research in Southcentral and Interior Alaskan river drainages has demonstrated that the prehistoric cultural chronology and dynamics are far more complex than was believed in 1985. In some respects, the Susitna data provided for years the basic underpinning for the chronological framework for interior Alaskan prehistory (Dixon 1985) (although some archaeologists critiqued that work and its underlying assumptions; e.g., Betts and Bacon 1986; Bacon 1986). Of major pertinence, modern advances in radiometric dating techniques require a review of the radiocarbon dates from the Susitna Hydroelectric project (see section 4).

The purpose of the data gap analysis is to assess the existing cultural resources data and previous surveys in terms of adequacy to meet various legal and regulatory requirements of FERC, federal, and state laws and regulations (e.g., 36 CFR 800). To meet these objectives, we addressed the following subtasks:

- locate relevant cultural resources documents and maps
- review history of cultural resource investigations in the project area
- assess the adequacy of prior cultural resources work
- identify and map previously reported cultural resources
- assess problems with the quality of site data
- to the extent possible, reconstruct past survey coverage and compare with current site locations recorded in the Alaska Heritage Resource Survey (AHRS) database
- assess methodologies of previous work compared to current standards
- identify sites that have been reported since 1985
- identify problems in site location and site identification
- identify data gaps, data limitations, and problematic survey areas
- identify potential issues relating to cultural resources

1.2 Cultural Resources—Applicable Laws and Regulations

The term “cultural resources” is often used as a synonym for the legal term “historic properties” defined in the National Historic Preservation Act (NHPA) and its accompanying regulations (36 CFR 800). Historic properties include prehistoric or historic sites, buildings, structures, objects or districts eligible for listing on the National Register of Historic Places (NRHP) (36 CFR 800, 36 CFR 60). These may be resources such as archaeological sites (e.g., open-air campsites, stone chipping localities, game kill sites, and butchering sites), cultural landscapes, traditional cultural properties (TCPs), sacred sites, and paleontological sites. In the study area, the vast majority of cultural resources are prehistoric archaeological sites; the few known historic sites are mainly cabins. A number of laws and regulations apply to the treatment of historic properties in the vicinity of the Susitna-Watana Project.

Section 106 of the National Historic Preservation Act (16 USC § 470), as amended, requires that any federally funded, licensed, or permitted project consider the undertaking's effects on cultural resources. The implementing regulations in 36 CFR 800 require that the lead federal agency consult with the State Historic Preservation Office (SHPO), Native American groups, local governments, and the public. The Section 106 process provides for identification and evaluation of historic properties, determination of effect, and a mechanism for resolution of any adverse effects (mitigation). In the case of prehistoric sites such as those found in the Project area, data recovery (limited excavation) and avoidance (if feasible) are the most likely approaches to mitigation (Smith and Dixon 1985).

The National Register of Historic Places is the nation's inventory of historic properties that meet specific criteria of local, state, or national importance. In order for a property to be eligible for the National Register, it must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and significance under one or more criteria:

A. be associated with events that have made a significant contribution to the broad patterns of our history; or
B. be associated with the lives of persons significant in our past; or
C. embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or posses high artistic values, or represent a significant and distinguishable entity whose components may lack individual distinction; or
D. have yielded, or may be likely to yield, information important in prehistory or history.

There are some exceptions to these four criteria such as properties achieving significance in the last fifty years, certain cemeteries or religious properties and other property types. Traditional cultural properties (TCPs) are places that are eligible for inclusion on the NHRP because of their association with the cultural practices and beliefs that are (1) rooted in the history of a community, and (2) are important for maintaining the continuity of that community's traditional beliefs and practices (Parker 1993).

Federal legislation includes:

- Historic Sites Act of 1935 (16 U.S.C. § 1982)
- National Historic Preservation Act of 1966 (as amended in 2006) (16 U.S.C. § 470)
- National Environmental Policy Act of 1969 (42 U.S.C. § 4321-4347)
- Archaeological Data Preservation Act of 1974 (16 U.S.C. § 469)
- American Indian Religious Freedom Act of 1978 (42 U.S.C. § 1996)
- Archaeological Resources Protection Act of 1979 (16 U.S.C. § 470aa-470ll)
- Native American Graves Protection and Repatriation Act of 1990 (25 U.S.C. § 3001 et seq.)

- Paleontological Resources Preservation Act of 2009 (16 U.S.C § 470aaa)

Federal regulations include:

- 18 CFR 4: FERC Licensing, Permits, Exemptions, and Determination of Project Costs
- 18 CFR 380: Regulations Implementing the National Environmental Policy Act
- 36 CFR 60: National Register of Historic Places
- 36 CFR 79: Curation of Federally Owned and Administered Archaeological Collections
- 36 CFR 800: Protection of Historic Properties
- 43 CFR 7: Protection of Archaeological Resources
- 43 CFR 10: Native American Graves and Repatriation Act

Federal Executive Orders (E.O.) include:

- E.O. 11593: Protection and Enhancement of the Cultural Environment (1971)
- E.O. 12898: Environmental Justice
- E.O. 13007: Indian Sacred Sites (1996)

State legislation includes:

- Alaska Historic Preservation Act (Alaska Statute 41.35)

A number of ordinances, resolutions, and preservation plans may affect cultural resources at the local level, including Matanuska-Susitna Borough Ordinance 87-007 and Historic Preservation Plan (adopted 1987) and the State's Cultural Resource Management Plan for the Denali Highway Lands (VanderHoek 2011). This review does not include individual tribal or village council resolutions that may exist in the records of various Native organizations. Private lands are directly affected by federal cultural resources legislation, especially the National Historic Preservation Act and implementing regulations (36 CFR 800), as long as any aspect of the proposed action has federal involvement. Thus the Susitna-Watana Project will fall under the Section 106 review process regardless of land status within the Project area (federal, state, municipal, or private). If any aspect of a project is affected by a federal undertaking (permit, license, or funding), then the federal review process applies to the entire Project area.

Several publications provide guidance on cultural resources investigations, in relation to federal and state laws and regulations including:

- Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects. Federal Energy Regulatory Commission, Washington D.C. (2002)
- National Register Bulletin Series, National Park Service, U.S. Department of Interior. Website at: http://www.nps.gov/history/nr/publications/#bulletins
- Historic Preservation Series, Alaska Office of History and Archaeology, Division of Parks and Outdoor Recreation, Alaska Department of Natural Resources. Website at: http://dnr.alaska.gov/parks/oha/hpseries/hpseries.htm

- Human Remains and Cultural Resource Management in Alaska: State Laws and Guidelines (Dale and McMahan 2007).

1.3 Consultation Under Section 106

The process of Section 106 consultation with Native Tribes, SHPO, and other federal and state agencies, and the discrete tasks associated with lead federal agency government-to-government consultations and coordination of consultation with the State of Alaska will naturally overlap. The communities potentially affected by the project have different histories and cultures, but are characterized by ties (past and present) to the land and its resources. The successful completion of the consultation and coordination phase of the Section 106 process will require the development of an efficient and effective consultation process that addresses the letter of the laws and regulations within the context of local custom and practice.

Consultation is essential for completing the Section 106 review process. Consultation is required by the NHPA, as amended, and implementing regulations for the Advisory Council on Historic Preservation (ACHP), 36 CFR 800. Tribal consultation is required in all steps of the Section 106 process when a federal agency undertaking may affect historic properties that are located on tribal lands, or when any tribe attaches religious or cultural significance to the historic property, regardless of the property's location.

In Alaska, consultation occurs with the 229 federally recognized tribes the thirteen Alaska Native Regional Corporations and some 200 Alaska Native Village Corporations created by ANCSA. (The Regional and Village Corporations are recognized as "Indian tribes" for NHPA purposes).

Consultation can be informal or formal. Informal consultation is information gathering and exchange at any time in the process, while the latter usually takes the form of an Agreement document (step 4 of the 106 process). Consultation is required between the lead federal agency (technically, the agency, not the applicant), and the SHPO.

Formal section 106 tribal consultation generally involves federal agencies providing the tribe or organization with a reasonable opportunity to identify its concerns about historic properties, advise on the identification and evaluation of historic properties, communicate its views on the undertaking's effects on the historic properties that might be affected, and participate in the resolution of adverse effects. Formal Section 106/government to government consultation can only occur between the federally recognized tribes and the lead federal agency (FERC). In addition to these mandated consultations, the SHPO and agency may agree that anyone else with an interest on the project may participate. These decisions, as in the case of all consultation efforts, must be documented in writing.

Consultation must be a genuine dialog involving the actual exchange of viewpoints and soliciting input. Simply discussing with people what you are planning or doing will not be enough to satisfy the consultation requirements, although this is an important first step, and one which is being done under the "informal consultation" heading through initial meetings about access, local hire protocols, and cultural resource survey strategies. Sending form letters, while one solution to mass communication among various parties, is not sufficient consultation in and of itself (e.g., Pueblo Sandia v. United States, 50F.3d 856 [10th Cir. 1995].

Much of what constitutes consultation involves data gathering. Especially in the case of Indian tribes, oral history may be the only way certain information about site locations and significance can be obtained. Some information about sacred or religious sites may be considered confidential. Standard archaeological site location data may not be obtainable using these techniques so care must be given to treat such discussions with sensitivity to these local concerns.

2. METHODS

2.1 Research Methods

Compiling the history of archaeological research in the Watana Project area was essential for the completion of all other tasks pursuant to this analysis. Seven years of archaeological survey and testing (1978-1985) took place during the early study years. That research documented some 270 sites within the study area (as the project area was then defined, see Dixon et al. 1985:viii). NLUR's 2011 efforts involved locating, copying, abstracting, and analyzing the information contained in tens of thousands of pages of text, maps, figures, and tables from the 1978-1985 Susitna Project Cultural Resources Investigations and related FERC documents.

NLUR developed the bibliography in this report by consulting the following sources of information:

- Electronic card catalog holdings at all Libraries included in the ARLIS system
    - Alaska Resources Library & Information Service (ARLIS)
    - UAA Libraries
    - Anchorage Museum at Rasmuson Center
    - Anchorage Public Library system

- Electronic card catalog holdings at
  University of Alaska Fairbanks (GOLDMINE)

- NLUR's in-house library and card catalog system (EndNote™)

- Review of the APA cross-reference documents listed on the AEA website.

All citations located for the Susitna dam project were entered into the NLUR EndNote™ catalog. Each citation was key worded as "Susitna Dam, cultural resources." If it had previously been assigned an APA document number, the number was noted as well.

The Notes field in EndNote™ is used to record the location of a paper or electronic copy of the document, and whether or not NLUR has a copy. The Abstract field in EndNote™ is used to record an abstract or executive summary from the document, if the original document included one. For many documents, we entered the abstract prepared by Maschner (1987) in his review and monitoring of the Susitna Hydroelectric Project's records management system. When the document was used only as background material for the cultural resources reporting, we noted that, and either did not prepare an abstract, or prepared a very abbreviated synopsis.

NLUR inventoried the voluminous field documents from the original Susitna research in the 1970s and 1980s housed at University of Alaska Museum (UAM), facilitating both location and retrieval of pertinent cultural resources documents (see Appendix A).

NLUR compiled AHRS site locations on GIS map layers of the proposed project area. The site database used for this assessment was constructed from AHRS data, information obtained from

NLUR library files, and original documents housed at the University of Alaska Museum of the North (UAMN). Because several key federal and state statutes and regulations protecting cultural resources had not been enacted or were markedly different from current regulations, there are numerous archaeological sites that will eventually need to be evaluated for inclusion in the National Register of Historic Places (NRHP). Basic information on these sites was summarized in order to facilitate an awareness of potentially eligible NRHP sites. Site location, site structure, report reliability, and condition are among the key criteria for archaeological significance. Part of our goal was to identify sites that lack this basic information.

The need for this level of effort is obvious when considering the history of archaeological research in the study area. Information for the sites listed in the AHRS that are within five miles of the project features varies in its completeness. These sites and their identification process are summarized in Sections 3 and 4, and presented more fully in Appendix B (deleted from this redacted version).

2.2 Data Limitations

Specific limitations relating to the various tasks are addressed in each section. It is important to note that both general and specific limitations of the data reflect changes in regulations and their interpretations, and changes in general archaeological inquiry over the last quarter century.

The data used to compile this report have several overall limitations. The use of Global Positioning Systems (GPS) and Geographic Information System (GIS) analyses in current use were unavailable for most of the previous archaeological work in the project area. Earlier researchers were limited to triangulation, compass/tape, or other methods of locating sites. Therefore, site location in the ANRS for many sites is imprecise, ambiguous, and/or inaccurate.

We use the terms ‘precision’ and ‘accuracy’ in very specific ways through this report. ‘Precision’ refers to measurement scale only, and is defined as “the refinement used in taking a measurement, the quality of an instrument, the repeatability of the measurement, and the finest or least count of the measuring device” (Moffit and Bouchard 1975:11). For instance, a site location at a certain coordinate is more ‘precise’ than the same site located at ‘near the junction of the X and Y rivers.’ ‘Accuracy’ refers to the real versus the documented location, and is defined as “an indication of how close [a measurement] is to the true value of the quantity that has been measured” (Moffit and Bouchard 1975:11). A position nearer to the actual location of the site is considered more accurate. For our purposes, this accuracy can only be assessed and analyzed using primary documents such as field notes, original survey maps, and the like. Truly accurate site locations require precise field measurements with calibrated instruments.

Given many variables, especially given the preliminary nature of the engineering design, we limited this initial cultural resource evaluation to an area 5 miles laterally from each project feature. For the Watana Reservoir (Figure 2; redacted), we compiled sites at a scale of both 5 miles and 1 mile from the reservoir edge, and sites within the reservoir itself, using digital elevation data provided by ABR, Inc. Additional potential project features we examined include the Watana construction camp (Figure 3; redacted), Chulitna Corridor (Figure 4; redacted), Denali Corridor (Figure 5; redacted), and Gold Creek Corridor (Figure 6; redacted). For the purposes of this report, these areas correspond to the approximate Area of Potential Effect (APE).

2.3 Known Additional Materials

At the beginning of this research effort, it was known that there were additional materials relevant to this data gap analysis at the University of Alaska Museum of the North (UAMN), Fairbanks, Alaska. We anticipated finding the following types of materials:

- UAMN fieldnotes
- Maps
- Photographs
- Radiocarbon dating laboratory report forms

NLUR staff prepared an inventory of the materials located at UAMN, presented as Appendix A to this report, however, the project scope did not allow for a detailed analysis of the UAMN materials. Those voluminous materials are considered here as the core of the Susitna cultural resources raw data; these will need to be reviewed in greater detail prior to preparation of any fieldwork plans, site models, or other cultural resources research.

2.4 Other Literature Sources of Possible Relevance

Several organizations participated in the 1978-1985 cultural resources efforts. In addition to UAMN (then called the University of Alaska Museum, Fairbanks), these include Terrestrial Environmental Specialists, Inc. (TES), Harza-Ebasco Susitna Joint Venture, Commonwealth Associates (CA), Alaska Heritage Research Group, Inc., Historical Research Associates, Inc., and Acres American, Inc.

Some of these organizations were the primary contractors with APA for various environmental investigations, while others were subcontracted to the prime contractors. It still needs to be determined if all of the cultural resource reports, and associated archival materials (fieldnotes, field maps, etc.) were deposited with the UAMN. Inquiries may need to be pursued with these organizations (or their successors) to identify any 1978-1985 Susitna Dam cultural resource materials that they might still hold.

Federal and state agencies were involved in permitting the 1978-1985 cultural resources research. One APA document (no. 649) identifies the Bureau of Land Management (BLM), U.S. Army Corps of Engineers (USACE), and the Alaska Department of Fish and Game (ADF&G). Those agencies, and others as yet unidentified, may have holdings related to cultural resources.

2.5 Next Steps

2.5.1 Editorial Cleanup

The NLUR staff assigned to work on this project reviewed the preliminary listing of cultural resources references. Errors, omissions, typographic mistakes, and other editorial items were identified and corrected. After that review, the listings were used during the data gap research. Through our internal discussions and analysis, NLUR evaluated the keywords and use of EndNote™ as the citation database management software for this project.

2.5.2 Identify Locations of and Obtain Paper/Scanned Copies

Based on the two APA (1988a, 1988b) cross-reference documents, it appears that AEA staff have scanned a large number of the cultural resource reports. NLUR researchers contacted AEA to obtain those scanned documents for NLUR's use for this data gap analysis. They are coded in the EndNote database as "APA-copy (scanned)." AEA staff posted the documents to an ftp site, where NLUR downloaded them for analysis.

NLUR requested paper and/or electronic copies from AEA of relevant APA documents which the 1988 cross-reference lists indicated had not yet been scanned. AEA noted that it would take four to six weeks or more to make copies of those documents from microfiche, and send them outside of Alaska for electronic processing. Due to these constraints, those documents were not reviewed for this data gap analysis. To assure complete review of all relevant legacy (1978-1985) documents, AEA should pursue obtaining scans of all cultural resources documents from the previous research even after this initial data gap effort is complete.

2.5.3 Review Documents, Develop Abstracts, Assess Utility for 2011-2017 Program

NLUR archaeologists reviewed the documents and created abstracts. If an abstract, or executive summary already existed, that language was entered into the EndNote™ citation for the document.

The utility of the information in the documents needs to be assessed against contemporary cultural resource research and management practices. That assessment of the cultural resources information is included in sections 3 and 4 of this cultural resource data gap report.

2.5.4 Conduct Research at UAMN

UAMN is the archival repository for materials collected during the 1978-1985 Susitna Hydroelectric project research. The archived field notebooks, maps, stratigraphic profiles, and other text materials still need to be cataloged in EndNote for rapid access, analysis, and future cultural resources modeling and field research. NLUR-FAI staff are quite familiar with these materials and should undertake this task under a separate contract with AEA. We presume that the excellent working relationship with UAMN staff will continue, and they will assist in locating the materials, and arranging for their temporary loan to the AEA project for copying and scanning.

2.6 Known and Potential Problems with These Citations

2.6.1 Duplicate Reports or Report Sections Listed under Different Authors

Many of the relevant citations come from NLUR's EndNote™ database with the original source coming from West and Stern (1987). Research into other sources identified other citations with similar or identical titles, but different authors. For example, reports prepared by the University of Alaska Museum are variously described as being authored by UAM in Alaska Power Authority sources. Other sources list the author as TES, or the individual researchers from the 1978-1985 period such as E. James Dixon, Jr., George S. Smith, T. Weber Greiser, and others. Rather than delete a citation from consideration, we retained both forms of the citation in the list presented in this report. Where the citation lists a corporate author, we note in the abstract that the same document is abstracted under the authors' name.

2.6.2 Draft and Final Versions of the Same Report Title

Whenever a source document listed a citation as a draft or final version, that information was retained in the NLUR EndNote™ entry.

2.6.3 Different Alaska Power Authority Document Numbers for the Same Report

This problem most likely originates from having the same report listed variously as authored by different entities (discussed above). Where the report listed a person (or persons) as the authors of that specific chapter, both the entire report and the individual chapters will include a reference to the APA document number in the EndNote™ citation.

3. CULTURAL RESOURCES IN THE WATANA STUDY AREA

3.1 Cultural Resources within the Area of Potential Effect

The study area currently encompasses the Areas of Potential Effect (APEs) that include the Watana Reservoir, Watana Construction site, and three potential road and transmission corridors (Chulitna, Denali, and Gold Creek corridors) (Figures 2-6; redacted in this version). A total of 260 cultural resources sites presently recorded in the Alaska Heritage Resources Survey (SHPO 2011) database are situated in the Project area. Many of these sites were documented during the 1978–1985 surveys associated with the Susitna Hydroelectric Project. Two hundred and twenty six of these sites (86.9%) have prehistoric remains present. Four sites (1.5%) have protohistoric remains, 27 sites (10.4%) have historic and modern remains, and one site (0.4%) has paleontological remains. Two sites (0.8%) do not have an accompanying description to the AHRS database entry.

Two hundred and fifty seven (98.8%) of these 260 cultural resources sites have not been evaluated for their eligibility for listing on the NRHP, an essential step in the Section 106 process (AHRS 2011). This includes all of the prehistoric sites. The Susitna River Railroad Bridge (49-TLM-00006), located near the proposed Gold Creek Corridor, is listed on the NRHP. The Alaska Railroad Corporation Timber Bridge at MP-267.7 (49-TLM-00265) of the Alaska Railroad, located within 5 miles of the proposed Chulitna and Gold Creek corridors, was determined eligible for listing on the NRHP, but has yet to be listed. The Seattle Creek Bridge (49-HEA-00353), located at MP112.2 of the Denali Highway and within 5 miles of the proposed Denali Corridor, was determined not eligible for inclusion on the NRHP. Table 1 summarizes the known cultural resources within each of the Project's potential areas of impact by the period of remains present and status of eligibility to the NRHP as designated in the AHRS (2011) database.

Our review of source material reveals some discrepancies in site numbers and totals. This is most likely due to different geographic coverages and descriptions of the APE (e.g., whether or not the Watana and Devil canyon reservoirs are lumped together, which material sites and ancillary facilities are included, whether or not site information is actually recorded in the AHRS, whether or not UAMN and HRA sites are combined or separated). John Hoffecker, the author of the EIS sections on cultural resources (1984) states that there are 122 archaeological sites and 4 historic sites within the Watana impoundment and associated facilities, and that 22 have been assessed for National Register significance. For the entire middle and upper Susitna, he lists 209 sites, 68% (n=142) of which produced subsurface remains (Hoffecker 1984:0-9). Dixon et al., in their final May 1985 summary report (1985:2-1), give a total of 248 sites discovered between 1979-1985, and another 22 that were already listed in the AHRS. Of these, 73 lie within the Watana reservoir, with an additional 47 adjacent to it. Thirty-two sites are noted by Dixon et al. as being within material sites (designated as A-L), and another 15 are adjacent to these areas. Citing UAMN reports, documents in the 1984 APA license application to FERC give a total of 319 sites within the combined impoundment areas and ancillary facilities. Of these, 67 lie within 500 feet of the Stage I Watana impoundment area, and 101 lie within 500 feet of the Stage III Watana impoundment area (Dixon et al. 1984).

Ahtna and Dena'ina place names also have been recorded in and near the Project area; these provide valuable sources of geographic information pertaining to past human land use. Simeone et al. (2011) note that over 350 Athna and 50 Dena'ina place names occur within or near the Project area. Ahtna place names are more prevalent toward the northern portion of the Project area, north of Devils Canyon, the traditional boundary of the Ahtna and Dena'ina people. Devils Canyon has both Ahtna and Dena'ina place names, and Dena'ina place names are more prevalent to the south of the canyon. Lower Tanana place names are less well-documented than Athna and Dena'ina place names, but also may be present in the northern portion of the Project area. Traditional Cultural Properties (TCPs) have not yet been identified within the Project area. However, the identification of TCPs within the NRHP framework began after the 1978–1985 Susitna Hydroelectric Project and these property types may be identified through further cultural resources investigations.

Potential impacts of the Susitna-Watana Project to historic properties may include disturbance during construction of the Watana Dam and associated facilities, access routes, and transmission lines, and inundation of sites by rising water levels at the reservoir (cf. Smith and Dixon 1985). Erosion of sites could occur as a result of exposure or stripping of surface vegetation. Inadvertent disturbance or vandalism to historic properties could occur due to increased land-based access for recreational activities. Aesthetic changes to a surrounding historic landscape may also affect the historic and cultural significance of a property.

3.2 Cultural Resources—History of Research[1]

Cultural resources investigations associated with the Project area have been conducted periodically conducted since 1953. With increased understanding of the prehistory of interior Alaska, the methods used to identify and evaluate resources have changed over this nearly six decade period. Cultural resources field surveys in Alaska commonly employ site location models to stratify the study area into field survey segments. Within the survey segments, researchers identify higher and lower potential areas for the presence of prehistoric, protohistoric, and early historic (before A.D. 1880) cultural resources (Dixon et al. 1985; Gerlach et al. 1996; Greiser et al. 1985; Mason and Bowers 1994; Potter et al. 2008b; Potter 2005; Reuther et al. 2010, 2011). These models vary in approach and relative success in site discovery; they can be judgmental and intuitive-based or more statistically oriented and less subjective. The basic premise behind many of the site location models is that prehistoric, protohistoric, and early historic land use patterns are highly dependent on local natural resources, such as subsistence resources and raw materials for making tools, equipment, housing, and clothing. The distributions of many of these resources are constrained by environmental variables such as topography, elevation, vegetation, and surficial geology.

The 1953 field study methods consisted of an initial aerial and pedestrian reconnaissance of the then proposed Devils Canyon Dam site area to demarcate areas with a high likelihood for the

[1] Radiocarbon (14C) dates reported here are expressed as "radiocarbon years before present" or simply, "B.P.". Due to a variety of factors that cause fluctuations in amount of radiocarbon at any given time, radiocarbon dates -- especially those from the late Pleistocene epoch -- may differ from actual calendrical (cal AD/BC) equivalents by hundreds or even several thousand years. Calibrated BP (cal BP) ages and calendrical equivalents may be calculated using a calibration program, such as CALIB 5.0 program (Stuiver et al. 2005; see also Reimer et al. 2004).

location of archaeological remains (Skarland 1953). Intensive on-the-ground survey was conducted along the shores of Lake Susitna, Tyone Lake and the Tyone River, and the hills on the southwest side of Lake Louise (Irving 1953). This intensive on-the-ground survey consisted of subsurface testing at high potential landforms and documentation of the cultural resources that were identified. Details of the methods, depth, and specific locations of subsurface testing during the 1953 survey are minimal (Skarland and Irving 1953).

The majority of the previous cultural resources investigations took place between 1978 and 1985. In 1978, Bacon (1978a, 1978b) developed an initial site location model for the Devils Canyon and Watana Dam site areas. Bacon (1978a) conducted an aerial reconnaissance to refine the model with field data from the Project area, prior to on-the-ground survey. The majority of the 1978 on-the-ground surveys concentrated on an area between Tsusena and Deadman creeks, north of the Susitna River (Bacon 1978a, 1978b). On-the-ground survey was also conducted at the then-proposed locations for the left and right abutments and spillway for the Watana Dam, along with proposed locations for an airstrip, camp pad, two material sites, access roads, and a portion of a the proposed dam site at Devils Canyon (Bacon 1978a, 1978b). This survey consisted of subsurface testing and the documentation of identified cultural resources. Subsurface testing consisted of small tests dug with entrenching tools and hand trowels. The test locations were placed throughout high potential areas at non-systematic intervals. The subsurface tests were not mapped.

The 1980–1984 field studies led by the University of Alaska Museum provide the vast majority of data pertaining to the Project area. This research focused on the Watana and Devils Canyon Dam sites and associated ancillary impacts (Dixon et al. 1985). The ancillary impacts surveyed and tested during the 1980–1984 field studies include three transmission corridors (Healy-to-Fairbanks, Healy-to-Willow, and Willow-to-Anchorage) and 12 borrow pits (Borrows A–L) that were designated as potential material sources. Alternative access routes (Corridor 1 North, Corridor 2 South, and Corridor 3 Denali-North) were preliminarily surveyed. Researchers developed a site location model primarily based on environmental variables including the local geomorphology, elevation, and vegetation (see review in section 5 of this report). Landforms such as overlooks, lake margins, stream/river margins, quarry sites; caves and rock shelters, natural topographic constrictions, and mineral licks were considered to have a high potential for association with archaeological sites. Localized survey segments that were considered to have a high potential for sites were designated as “survey locales” (Dixon et al. 1985). One-hundred eighty two survey locales were intensively surveyed and subsurface tested during the 1980–1984 field studies, covering some 13,354 ha (33,000 ac) (Dixon, et al. 1984; 1985). The locations of these survey locales and sites were mapped on 1:63,360 scale USGS topographic maps (Dixon et al. 1985: 6–10). Survey locales appear to have been walked over (Dixon, et al. 1984); however, written details in survey reports are minimal pertaining to the methods employed during the surface reconnaissance. Areas of lower archaeological potential, (up to 62% of the study locale areas), included steep slopes exceeding 15 degrees, areas of standing water, active gravel and sand bars within streams, and active channels of rivers and streams (Dixon et al. 1985:vi).

The distance between subsurface tests at each survey locale was discretionary; that is, left to the discretion of individual field crew leaders. Subsurface tests at survey locales and sites that were not chosen for systematic testing typically consisted of round shovel tests approximately 30 cm in diameter (12 in) and not deeper than 50 cm (20 in) (Dixon et al. 1985: 6–10). If artifacts were found in a buried context, at least one 40 cm × 40 cm (16 in × 16 in) square test pit was excavated to acquire additional information on the stratigraphy and number of cultural components present at the locality. Tests excavated at survey locales and sites were plotted on sketch maps.

A total of 248 archaeological sites, covering an area broader than the present study area, were documented during the 1980–1984 field studies; an additional 22 were already listed in the AHRS (Dixon et al. 1985:viii). Sixty-three of these sites were chosen for systematic testing to determine the size of each site, and gather additional field data on the types of and relative density of artifacts and features, number and age of components, and physical integrity of the archaeological context of cultural deposits at each site. Systematic testing consisted of excavating subsurface tests along grids that were placed at the periphery of and excavated towards the observed cultural materials. Systematically tested sites were mapped using a transit and stadia rod. Sediment was screened through 1/4 in to 1/8 in mesh screens. The provenience of artifacts was recorded according to their association with natural stratigraphic units or by 5 cm (2 in) arbitrary levels. Site sizes at systematically tested sites were determined by the observed horizontal distribution of cultural remains, while sizes of non-systematically tested sites were estimated based on the local topography of landforms on which the sites were located. A site tag with AHRS number was reportedly placed at sites. It is unclear how many sites have had enough information collected from which a determination of eligibility to the NRHP could be made (a part of the Section 106 process and a necessary step in site evaluation; 36 CR 800), although the 2011 AHRS reports only 3 have been so evaluated.

An important part of the Susitna studies was the application of a variety of geoarchaeological techniques. In addition to studies of regional sediment stratigraphy, 83 radiocarbon dates were obtained in an attempt to place archaeological discoveries in chronological context. Tephrochronology (using petrographic and other methods to characterize and compare the widespread volcanic ash layers in the area) was used to provide relative dating of some sites (Dixon and Smith 1990). Sixteen major stratigraphic units were identified in the project area, and one lacustrine sediment core was collected (Dixon et al. 1985:ix-x).

In addition to field studies, laboratory analysis was carried out of artifacts and faunal remains. A total of 137,835 lithic artifacts were analyzed. A total of 142,835 faunal specimens from 78 sites were studied (Dixon et al. 1985:x).

In 1985, the APA contracted with HRA to develop a predictive site location model and survey strategy for several proposed linear features including transmission lines, access roads, and railroad corridors (Greiser et al. 1985; see also section 5 of this report). Three transmission lines were designated as the Gold Creek–Watana (36.2 mi in length), Healy–Fairbanks (94.4 mi in length), and Willow–Anchorage (64.4 mi in length) lines which tied into existing transmission lines along the railbelt. The proposed railroad access consisted of 10.2 miles of rail from Gold Creek to Devils Canyon. Approximately 76 mi of access road was proposed between the Denali Highway and the construction site for the Watana Dam site and Devils Canyon.

The Greiser et al. (1985) survey model assessed potential relationships between known archaeological site locations from all time periods and the characteristics of the vegetation and terrain in the Project area. About 450.6 km (280 linear mi) of survey area were gridded into about 550 square plots, each 1.3 km (one-half square mile) in size, superimposed over the linear survey path of the proposed transmission lines and road and railroad access corridors. Eighty-nine (16%) of these plots were completely surveyed and five (0.9%) plots were partially surveyed (Greiser et al. 1986: 2–4). The survey plots were chosen to represent the variation in vegetation and terrain across the survey area.

The field survey method used during 1985 was for one or more archaeologist(s) to walk transects across each selected plot with transects spaced 30 m (98 ft) apart (Greiser et al. 1986: 2–14). Subsurface tests were systematically placed every 20 cm (8 in) to 50 m (164 ft) along each transect in a given square survey plot. Additional tests were placed at the field archaeologist's discretion on higher potential landforms. The depth of the subsurface testing varied between 30 cm (12 in) to not more than 50 cm (20 in) below the surface and sediments were screened through 1/4 in mesh screens.

A total of 40 cultural resources were documented during the 1985 season, including seven prehistoric, two ethnohistoric, 15 historic, and 16 recent sites (Greiser et al. 1986: 3–16, 3–22). Prehistoric site sizes were determined by systematic shovel testing along grids that radiated from the observed cultural materials. Tests were excavated at variable intervals along these grids. The protocols used to record sites closely followed those of Dixon et al. (1985).

Since the 1980s, there has been very little cultural resources work done in the project area. In 2011, using a helicopter-carried drill rig in the vicinity of the proposed Watana dam site, the AEA drilled four geotechnical boreholes within an area designated as Material Site "A" during the 1978–1985 Susitna studies program. A cultural resources field survey was carried out by NLUR in June 2011. Based on the NLUR survey, no cultural resources were encountered at any of the four localities, nor were cultural materials reported for this general area by previous investigators (Dixon et al. 1985: E-273). NLUR did document tephra in several test pits, and recommended a finding of no historic properties affected (36 CFR 800.4(d)(1)) (Bowers 2011).

On-going academic research in the upper Susitna has resulted in significant discoveries of prehistoric sites in deeply buried, dateable contexts, some within ancient dune deposits (Blong 2011). Nineteen sites were recorded in 2010-2011, one of which resulted in a radiocarbon date of 9630+/-50 C14 years BP (11,180-10,750 cal. BP; Beta-284748). Although these sites appear to lie outside of the present study area, they have an important bearing on our understanding of the regional prehistory.

Alaska Native place names have been documented in the Project area at least since 1953 (Irving 1953; Greiser et al. 1986; Kari 2008; Kari and Fall 2003). These names often document aspects of the way people view, use, and relate to a particular landscape. Ahtna, Dena'ina, and Lower Tanana place names often relate to the surrounding natural environment such as description of landforms, hydrology, vegetation, fauna, and aspects of the local weather. Place names can also refer to past human history and activities such as gathering places, areas of trading, territorial boundaries, and spiritual places. Thus, place names can be very useful in archaeological studies.

The understanding of how people relate and use local landscapes and resources can provide a framework to understand continuity and change in past land use systems in the archaeological record. Place names and the archaeological record can often provide information pertinent to the identification and understanding of the potential significance of TCPs. Place names and TCPs are often identified and documented through archival research and oral interviews.

3.3 Geochronology and Prehistory of the Middle Susitna Region

The prehistoric chronology of the Middle Susitna region is primarily defined by radiocarbon dates on archaeological features, relative ages based on stratigraphic dates, and relative ages based on tephras that have date ranges for the deposition of known ashfalls. Dixon and Smith (1990:388) note that 83 radiocarbon determinations were acquired from archaeological features and geological sections during the Susitna Hydroelectric Project between 1980-1984. It is not explicitly stated whether the materials dated are charcoal, however this does seem to be implied in Dilley (1988) and Dixon and Smith (1990). Radiocarbon dating of pollen, plant materials, bulk soil and charcoal samples in the region has been hampered by problems of contamination by younger soil-derived carbon in terrestrial settings and older carbon of microscopic airborne coal particles (lignite) and Tertiary-aged pollen (Dilley 1988; Dixon and Smith 1990).

Two laboratories performed most of the radiocarbon assays for the Susitna Hydroelectric Project: Beta Analytic, Inc., and the Dicarb Radioisotope Isotope Company. These companies employed radiometric assaying techniques that were standard during the 1980s. Only a handful of accelerator mass spectrometry (AMS) radiocarbon dates were run in the 1990s on charcoal collected from sites, in particular the Jay Creek Ridge site, during the Susitna Hydroelectric Project (Dixon 1999; Reuther 2000).

The tephrochronology of the Middle Susitna River region stands as a unique chronological sequence to apply relative stratigraphic ages to archaeological components in interior Alaska. Tephras (airborne volcanic ash deposits) that have known ashfall ages and can be differentiated geochemically also may be used to developed relative stratigraphic ages for archaeological components (Steen-McIntyre 1985). The use of tephras as chronostratigraphic markers is termed *tephrostratigraphy* (often referred to as tephrochronology; Alloway et al. 2007). Tephra characterization can be achieved by petrographic description (Steen-McIntyre 1979, 1985) or by the measurement of major and trace elements abundances within a particular sample (Alloway et al. 2007). Each of these methods relies on the comparison to known petrographic and geochemical signatures of other dated tephras.

The river basin has a relatively close proximity to volcanic eruptions in southcentral Alaska, such as those from Mount Spurr and the Mount Hayes vent in the upper Cook Inlet, thus allowing for thicker deposits in the region. Riehle (1985) and Riehle et al. (1990) note that there are over 70 Holocene tephras identified in southcentral Alaska. Tephra deposit preservation in terrestrial geomorphic settings is promoted in the basin at geomorphic settings that are high in potential for the location of archaeological sites. The locations of archaeological sites tend to be on landforms that are <15 degrees in slope angle and many of the sites in the Susitna are less than 1,500 (4,921 feet) meters above sea level (Dixon and Smith 1990:388). Tephra deposit preservation decreases as the slope angles increase beyond 15 degrees as the potential for downslope erosion of sediment increases. Areas in elevation above 1,500 meters (4,921 feet) above sea level tend to be more wind-swept and have less vegetation and, thus, smaller particle sizes are subject to remobilization and secondary deposition by wind.

The numerical age ranges assigned to the Susitna tephrochronology are primarily based on radiocarbon ages derived from archaeological components and buried soils situated above and below each tephra deposit. These ages provide bracketing ages (minimum and maximum ages) for tephra deposition. In rare instances, organic materials, such as wood charcoal and plant remains, are found buried in the primary tephra deposits and may provide a more accurate radiocarbon age on the volcanic ashfall event. Dixon and Smith (1990) developed a tephrochronology for the Middle Susitna region based on 42 radiocarbon dates (50.6%) of the total 83 dates from the Susitna Hydroelectric Project. The description of each of the radiocarbon dates used in the tephrochronology appear in Dixon et al. (1985) and Dilley (1988:33-36).

In addition, Dilley (1988:22-23) and Dixon and Smith (1990) acquired radiocarbon data and tephra samples from a stratigraphic sequence recovered from two bog cores on the west side of Watana Creek, and a lacustrine core removed from a pond near the mouth of Watana Creek. Dixon and Smith (1990) provided a tentative correlation of the tephras observed in terrestrial stratigraphic settings to a sequence derived from the lacustrine core. Dilley (1988) provided a correlation between tephras identified at archaeological sites and in the bog and lacustrine core stratigraphy. The correlation of dated and undated tephra deposits between terrestrial stratigraphic sequences and the lacustrine core were achieved by the comparison of the position of a tephra in a stratigraphic sequence, visual characteristics of a deposit in the field, and petrographic characteristics of each tephra. Geochemical correlation of the tephras was not performed during this analysis.

At least four unique tephra deposits have been dated in the region and are identified in the Dixon and Smith (1990) tephrochronolgical sequence. These deposits are the Devil tephra, the Upper and Lower Watana tephras that compose the Watana tephra set, and the Oshetna Tephra. These tephras are described below from the oldest to the youngest. Dilley’s (1988) sequence primarily follows Dixon and Smith’s sequence with some expectations noted below. Several of the Sustina tephras likely relate to the volcanic ejections from the Hayes vent (Beget et al. 1991; Dilley 1988; Dixon and Smith 1990; Riehle 1994; Riehle et al. 1990; Romick and Thorson 1983).

As stated above, more than 70 different tephras identified in southcentral Alaska were noted by Riehle (1985). In addition, geological works since 1985 in adjacent regions to the Susitna River, such as Wonder Lake in the Denali National Park (Child et al. 1998), have reported tephra deposits that date back to 10,000 B.P. and may be identified in the project area as further archaeological work increases.

3.3.1 Devil Tephra

The Devil tephra appears to have been deposited between 1,400 and 1,500 B.P. based on radiocarbon assays and stratigraphic position to other dated deposits (Dilley 1988; Dixon and Smith 1990). Dixon and Smith (1990:393) constrained the age range of the Devil Tephra deposition with a total of 21 radiocarbon dates recovered from terrestrial geomorphic settings: five radiocarbon ages from below (contact between the Devil and Watana tephras), one date within, and 10 above Devil Tephra deposits. The upper limiting dates (n=5) and the radiocarbon age on a sample recovered within the tephra cited by Dixon and Smith (1990:394) were all produced by the Dicarb Radioisotope Company (Dicarb) (see section 4.4). The lower limiting dates (n=3) cited by Dixon and Smith (1990:394) were produced by Beta Analytic, Inc. (Beta). Dixon and Smith (1990:391-393) correlated the Devil Tephra with Tephra A in a lascustrine core sequence that has radiocarbon date of 2940+/-110 B.P. (Beta-10780) stratigraphically above the deposit. However, Dixon and Smith (1990:393) rejected this radiocarbon date as in error as it does not fit with the terrestrial stratigraphic sequence.

The Devil tephra appears petrographically similar to tephras derived from the Hayes vent (Romick and Thorson 1983; Dilley 1988; see description of Hayes tephra set below). Riehle (1985:62) recognized a series of tephras that were carried in a northerly direction from the Hayes vent and tentatively estimated the age of deposition between 500 and 1000 years ago based on radiocarbon dating. Riehle et al. (1990:281) have suggested that there is a correlation between these Devil tephra and 500 and 1000-year-old Hayes vent tephra deposits based on similar chemical and mineral compositions and age estimates. Based on the work described above, the distribution of the Devil Tephra is limited to the upper Cook Inlet and the Susitna River drainage.

3.3.2 Watana Tephra Set

The Watana tephra set– Upper and Lower Watana– is separated by a thin buried soil or eolian sediments at a few terrestrial locations (Romick and Thorson 1983; Dilley 1988:15). The two Watana deposits and the Devil tephra are indistinguishable by their physical, chemical and mineral compositions (Dilley 1988; Dixon and Smith 1990; Romick and Thorson 1983). However, the Watana and Devil tephras are separated in stratigraphic sequences observed in terrestrial and lacustrine settings (Dilley 1988; Dixon et al. 1985). Field recognition of the two Watana deposits is based on coloration and weathering characteristics (Dilley 1988:15).

The timing of the deposition of the Watana tephra set is less well defined than that of the Devil ashfall event. Dixon and Smith (1990:394) provide a suggested age range of the deposition of the Watana Tephra between 1850-2700 B.P. based on a suite of 28 radiocarbon dates from terrestrial stratigraphic sequences: 23 radiocarbon ages from below (contact between the Watana and Oshetna Tephras), and five above (contact with Devil and Watana Tephras) the Watana deposits. Dixon and Smith (1990:394) cite two radiocarbon ages as the upper and lower limiting ages for this tephra: 1880+/-50 B.P. (Beta-9892; upper limiting age) and 2690+/-170 B.P. (Beta-7301; lower limiting age).

Dilley (1988) suggests that the Watana Tephra appears to be about 3,000 B.P. based on a suite of upper and lower limiting radiocarbon dates from lacustrine and terrestrial deposits. The lacustrine core cited in Dilley (1988) and Dixon and Smith (1990) provides bracketing ages for Tephras B and C as 2940+/-110 B.P. (Beta-10780; upper limiting) and 5130+/-120 B.P. (Beta-10782) and 5200+/-70 B.P. (Beta-10781). Dilley (1988) provides mineralogical and geochemical data that Tephras D and E from the lacustrine core are likely similar to the Lower

Watana tephra. The ages for the deposition of Tephras D and E in the lacustrine sequence is around 5,000 B.P. (Dilley 1988; Dixon and Smith 1990:392).

As noted above, Dixon and Smith (1990:394) reject as in error the 2940+/-110 B.P. (Beta-10780) date in the lacustrine core that is stratigraphically above the Watana tephra. Therefore, the difference in the interpretations of the timing in the Watana deposition between Dilley (1988) and Dixon and Smith (1990) is primarily due to a difference in the interpretation of the stratigraphy of a lacustrine core. The Watana tephra has been tentatively correlated to the Hayes tephra set (Dilley 1988; Riehle et al. 1990:281). If the Watana set was deposited around ≥3,000 BP, it is quite likely part of the Hayes tephra set H (Riehle 1994).

3.3.3 Oshetna Tephra

The Oshetna Tephra has been found in terrestrial and lacustrine stratigraphic sequences consistently below the Devil and Watana deposits (Dilley 1988; Dixon et al. 1985; Dixon and Smith 1990), which are typically separated by a buried soil (Dilley 1988:16). The Oshetna Tephra is mineralogically and geochemically distinct from the Devil and Watana tephras (Dilley 1988:16-17; Romick and Thorson 1983). Dixon and Smith (1990:392-393) note that Tephras D and E identified in the lacustrine core may be "poorly represented or mixed with the Oshetna Tephra in terrestrial settings, and consequently appear as a single unit identified by the distinctive Oshetna Tephra."

The age of the Oshetna Tephra deposition is constrained by 26 radiocarbon dates derived from terrestrial and lacustrine stratigraphic sequences in Dixon and Smith (1990:394): 23 dates above (contact between the Watana and Oshetna Tephras) and three dates below the Oshetna Tephra. Dixon and Smith (1990:394) cited two specific radiocarbon dates as providing the most accurate upper and lower limiting ages for the Oshetna deposition: 5130+/120 B.P. (Beta-10782; upper limiting age) and 5900+/-135 B.P. (Beta-10786; lower limiting age). The lacustrine core in Dixon and Smith (1990:391-393) also provides a lower limiting date of 9140+/-100 B.P. on the Oshetna deposition. AMS radiocarbon dating of charcoal recovered from the buried soil and lowest component below the Oshetna Tephra at the Jay Creek Ridge site also provide lower limiting ages of ca. 9,500 BP (Dixon 1999; Reuther 2000). Radiocarbon ages from recent work on lacustrine cores recovered from Wonder Lake provide more constrained bracketing ages for the Oshetna deposition between 5,850 and 6,060 B.P. (Child et al. 1998:93).

3.4 Cultural History[2]

3.4.1 Prehistory

A generalized regional prehistory for the interior regions of Southcentral Alaska can be divided into four broad archaeological culture traditions: the Paleoarctic Tradition, Northern Paleoindian Tradition, Northern Archaic Tradition, and Athabascan Tradition. These traditions are general designations for what are believed to be interior Alaskan prehistoric cultures represented by recognizable differences in technologies and time of occurrence (for more information, see

[2] The cultural history summary section relies to a large extent on previous NLUR reports (Reuther et al. 2010; Potter 2006; Potter et al. 2007).

Bacon 1987; Bever 2001; Cook 1969; Dixon 1985; Mason et al. 2001; Potter 2008a; West 1967, 1975, 1996). Much of the known prehistory in interior Southcentral Alaska has been derived from the 1978-1985 Susitna Project cultural resources surveys, as described within this document.

3.4.1.1 American Paleoarctic Tradition (12,000 to 7000 B.P.)

Several sites in the region have American Paleoarctic Tradition components that date 12,000 to 7000 B.P. The American Paleoarctic Tradition, as proposed by Anderson (1970), relates stone tool technologies observed from Alaskan sites to stone technologies from Northeast Eurasia (Rainey 1939). Dixon (2001:282) expands Anderson's 1970 heuristic construction to include three regional variants: (1) American Paleo Arctic Tradition, (2) Denali Complex and (3) Northwest Coast Microblade Tradition. The Paleoarctic Tradition identified type artifacts such as microblades, bifacial points, large bifacial cores and tools, burins made on flakes, endscrapers, and other expedient tools made on macroblades. West (1981) later attributed what he originally defined (West 1967) as the Denali Complex (12,500 to 9,500 years ago) as a regional variant of the Paleoarctic Tradition based on artifacts from four Tanana region sites (see discussion of Denali Complex in Mason et al. 2001). Many of the sites which characterize the Denali complex are located in the Nenana River Valley, including Dry Creek, Component II (Thorson and Hamilton 1977; Powers et al. 1983), Eroadaway (Holmes 1988; Holmes et al. 2010), Panguingue Creek, Component II (Powers and Maxwell 1986), Little Panguingue Creek, Component II (Powers and Hoffecker 1989), Carlo Creek (Bowers 1980; Bowers and Reuther 2008), Moose Creek, Component II and III (Pearson 1999), and the Dragonfly Creek site (Bowers 1979). Several components at sites within the Susitna River Basin and uplands date to this period including component I at the Jay Creek Ridge site (Dixon 1993, 1999) and Bull River II site (Wygal 2009, 2010).

Early interior populations were terrestrial foragers, exploiting both upland and lowland areas, focusing on bison, wapiti (elk) and sheep, but exploiting a broad range of animals including other large and small mammals, fish, and birds, especially waterfowl (Bowers 1980; Holmes 1996; Potter 2008a, 2008b; Potter et al. 2011; Powers et al. 1983; Yesner 1994, 1996). This economic pattern continued even after the expansion of the boreal forest into the Tanana, Nenana and Susitna River valleys after 9500 BP (Ager and Brubaker 1985; Potter 2008a, 2008c).

In the Nenana River valley, the Dry Creek, Walker Road and Moose Creek sites also have components that fall within the 11,000-11,800 year age range (Goebel et al. 1996; Pearson 1999; Powers and Hoffecker 1989). Stone artifacts from these three sites include large uniface chopper-like artifacts and flake tools, and bifacially-worked projectile points or pointed-tools, but they lack evidence of a microblade technology (i.e. microblade cores/blades) or burins. Powers and Hoffecker (1989) initially proposed that the "Nenana Complex" was a precursor to the microblade-defined Denali Complex, however, a 12,000 year old microcore-bearing component at the Swan Point site in the Middle Tanana Valley now casts doubt on the exclusivity of the Nenana and Denali complexes (Hoffecker et al. 1993; Holmes 1988; Holmes and VanderHoek 1994; Holmes et al. 1996). Some archaeologists consider the Nenana Complex to be the technological precursor to the Clovis Complex of mid-latitude North America (Goebel et al. 1992; Powers and Hoffecker 1989).

In the middle Tanana River basin, "Chindadn" triangular points have been found at the Healy Lake sites (Cook 1969; Holmes and Cook 1999), Broken Mammoth (Holmes 1996; Yesner 1994), Swan Point (Holmes et al. 1996), and Chugwater (Lively 1988; Maitland 1986). These bifacially worked points are dated to 12,000 to 10,000 years ago at Broken Mammoth, and Swan Point sites and somewhat earlier in the nearby Nenana basin (~13,300 years ago). Cook (1969) and Holmes and Cook (1999) associate the Chindadn points with a microblade technology based on observations at the Healy Lake and Chugwater sites. While clear artifact associations with the radiocarbon samples from the relatively shallow Healy Lake and Chugwater sites are problematic (Erlandson et al. 1991), they have been found associated with dated hearths at Swan Point and Broken Mammoth (Holmes 1996). Some researchers (Hoffecker et al. 1993) propose that an earlier non-microblade complex existed in the adjacent Nenana valley in the terminal Pleistocene, however association with microblades at Swan Point, Broken Mammoth, and probably Healy Lake suggests the Nenana valley sites represent a regional variation of the Paleoarctic Tradition (Potter 2005:71; 2008b). Recent intrasite and intersite work (Potter 2005, 2008a, 2008b) suggests that microblade technology and bifacial projectile point use is related to economic and seasonal variables rather than with specific cultures or populations. Microblade technology persists through the earliest occupations in interior Alaska and into the later Holocene, possibly as late as 1000 B.P. (Potter 2008a, 2008b), suggesting a conservative technology (Potter et al. 2007). Therefore, variable presence or absence of microblade technology does not necessarily reflect dichotomous cultural systems.

Organic tools from this early period are rare, but are found primarily in the lowest artifact levels at the Broken Mammoth and Swan Point sites and Gerstle River in the Middle Tanana Valley. At Broken Mammoth, these include worked mammoth ivory pieces and an eyed bone needle was recovered near a hearth dated 10,300 B.P. (Holmes 1996:313).

3.4.1.2 Northern Paleoindian Tradition

The Northern Paleoindian Tradition is one of the newest archaeological traditions to be proposed, and is not yet clearly defined in interior Alaska prehistory. Most of the data on occupations that have been attributed to this tradition come from sites located in northern Alaska. These Northern Paleoindian sites are some of the oldest well-documented sites in northern Alaska dating as old as 11,600-11,200 B.P., with most ages clustering around 10,000 B.P. (Bever 2001; Rasic 2000). The oldest sites in the Brooks Range region include the Tuluaq site (Rasic 2000) and the Mesa site (Bever 2001; Kunz et al. 2003; Kunz and Reanier 1994). The assemblages from Northern Paleoindian sites show similarities in artifact forms, especially between large lanceolate projectile points, end and thumbnail scrapers, and spurred gravers. Several sites with fluted points have been attributed to this tradition, including Putu, Lisburne, and Teshekpuk Lake sites (Alexander 1987; Bowers 1982; Davis et al. 1981; Reanier 1995). The unique characteristics of the Northern Paleoindian lithic assemblages have been construed by some archaeologists to imply temporal and cultural connections with early sites in more temperate latitudes such as the Great Plains and the American Southwest (Hoffecker 2005, 2008; Kunz and Reanier 1995). Organic remains are not well preserved in these sites, forcing comparisons and interpretations to be made mostly from lithic artifacts. However, Reanier (2003) reported on a 10,000 year-old antler or bone artifact with morphology similar to beveled shafts from the continental United States recovered from Clovis sites. Subsistence likely focused on big game such as bison, musk ox, sheep, caribou and moose (Hedman 2010; Kunz et al. 2003; Loy and Dixon 1998; Reuther et al. 2009a). Hoffecker (2005, 2008) views the Mesa Complex of the Northern Paleoindian Tradition as primarily focused on bison hunting.

Only a handful of sites located south of the Brooks Range in Interior Alaska have components designated as belonging to the Northern Paleoindian Tradition. Dixon (1999:181-187) tentatively assigned several components from interior central Alaskan sites to this tradition, including Broken Mammoth Component III, Carlo Creek Component I, Eroadaway, Jay Creek Ridge Component I, Owl Ridge, Swan Point Component III, and Panguingue Creek Component II. Hoffecker (2005, 2008) has assigned the bifacial assemblages in Dry Creek Component II and Moose Creek Component I to the Mesa Complex, which is effectively in the Northern Paleoindian Tradition.

3.4.1.3 Northern Archaic Tradition (6000 to 2000 B.P.)

There is a curious dearth of interior archaeological sites or components dating within the time period of 7,000 to 6,000 years ago. After ~6,000 years ago, new technologies, including side-notched projectile point/biface forms, begin to appear in Interior Alaska archaeological assemblages. Several archaeologists have designated these side-notched biface assemblages as part of the Northern Archaic Tradition (e.g., Anderson 1968; Workman 1978; see Esdale 2008 for a current synthesis on archaeological research pertaining to the Northern Archaic Tradition). While some have argued that the broad occurrence of the point type throughout interior Alaska and southwestern Yukon possibly represents the spread of a new boreal forest-oriented cultural tradition (Anderson 1968; Dixon 1985), the presence of numerous sites in tundra areas may negate this interpretation (Darwent and Darwent 2005; Lobdell 1981, 1986; Schoenberg 1985).

Some archaeologists question whether the possible diffusion of a trait or type, such as the side notched point, represents an archaeological tradition (Cook and Gillispie 1986), and the continuity of microblade and other technologies through this period suggests that the Paleoarctic and Northern Archaic Traditions may be related. Utilization of microblade and core, and burin technologies appear to continue into or side-by-side with the Northern Archaic tradition, leading some archaeologists to suggest a later phase of a Denali Complex (Holmes 1975). The so-called "Late Denali Complex" is poorly understood at this stage of research in interior Alaska (Dixon 1985).

Sites with Northern Archaic components in interior Southcentral Alaska include Fog Creek site (Dixon 1985), Jay Creek Mineral Lick site (Dixon 1985), and the Dry Creek site (Component III; Dixon 1985; Powers et al. 1983), the Ratekin site (Skarland and Keim 1958), and several sites in the Tangle Lakes region (Skarland and Keim 1958; Bowers 1987; Vanderhoek 2011).

Regardless of the differing interpretations of the cultural history of this period, the middle Holocene saw a general shift in foraging economies of the region, from broad-based exploitation of both lowland and upland fauna to more pronounced hunting of caribou in upland areas. However, a broad-spectrum of animals was acquired, including large and small game, birds, and fish (Potter 2008a-c). Bison hunting still occurred in lowland settings, though apparently bison were taken at lesser frequencies, along with lesser frequencies of birds (Potter 2008a-c).

3.4.1.4 Athabascan Tradition (2000 B.P. to present)

The Athabascan Tradition is a prehistoric culture attributed to ancestors of northern Athabascan Indians of Alaska. It is important to note that the term "Athabascan Tradition," in its archaeological denotation, refers to the archaeological culture. Aspects of this tradition continue into the historic period in the late nineteenth century up to the present time. Early prehistoric Athabascan tradition sites are characterized by housepit and subsurface cache features associated with a variety of flaked and ground stone, bone, and antler artifacts. Proto-historic (or late prehistoric) Athabascan sites include those artifact assemblages predominately characterized by Native-made items (with an increased occurrence of organic and copper tools), with a smaller amount of non-Native trade goods (e.g., iron and glass beads) obtained through indirect contact, but datable to Hudson's Bay Company and Russian American Company fur trade and to prospector and missionary influence (A.D. 1740-1850).

Much of the work at Athabascan tradition sites in Alaska come from excavations outside of the Susitna Valley such as those at Dixthada and Dakah' Denin's Village (Shinkwin 1979), Eagle (Andrews 1987), Hayfield (Lefbre 1956; Proue et al. 2011), Lake Minchumina, and Nenana Dune Site (Potter et al. 2007). Faunal materials found at Athabascan tradition sites include a broad spectrum of interior wildlife. Rainey (1939: 365) identified moose, caribou, beaver, hare, small rodents, fish, and bird faunal materials from Dixthada. Plaskett (1977:123) adds black bear, Dall sheep, and marmot from the Nenana Gorge encampment to the list (see also Reuther et al. 2009b).

3.4.2 Ethnohistory

The project area lies in part near the traditional boundary of the Dena'ina (previously called the Tanaina) and Ahtna Athabascans (de Laguna and McClellan 1981). Before contact, both groups had semi permanent winter villages comprised of groups of between one and ten semi-subterranean, multi-family log houses. Customarily, these houses had a main communal living area with a central fireplace and sleeping platforms located along the walls, and also had smaller attached rooms that were used as sleeping compartments or sweat baths (Osgood 1937; Townsend 1981). Villages and/or larger settlements have been reported in areas adjacent to the Watana project area, e.g., Valdez Creek, Lake Louise, Tyone Lake, Clarence Lake, and Stephan Lake (Dixon et al. 1985:v).

Four distinct dialects of the Dena'ina language have been identified (Kari 1975; Kari and Fall 1987, 2003) corresponding to different geographical areas, with a primary dialectical boundary delineating the Upper and Lower Inlet Dena'ina. Townsend (1981) distinguishes three separate societies of the Dena'ina, each of which roughly correspond to Kari's (1975) linguistic data, based on societal differences such as marriage patterns, subsistence strategies, the degree of interaction between the groups, and other sociocultural elements.

The Ahtna are divided into four dialects, each corresponding to distinct geographical areas (Buck and Kari 1975), and identified by Reckord (1983) based on oral histories, language, subsistence patterns and social organization. Of these four, the project area falls into the region occupied by the Western Ahtna.

The project area enters the traditional lands of the Tanana people to the north of the Ahtna. The Tanana people inhabit the watershed of the Tanana River from Scottie Creek to the Tolovana drainage. Three languages are associated with the Tanana people: Upper Tanana, Tanacross and Tanana. Within the study area, Tanana was spoken. There are three dialects of the Tanana language, one emanating from the Salcha-Goodpaster band, one from the Chena band and the other from bands at Wood River, Nenana-Toklat and Minto (McKennan 1981).

Social organization in the area was limited by environmental factors, which influenced land use. Local bands ranged in size from 20-75 people, who traveled extensively, coming together in summer for fishing and in winter for hunting (Shinkwin et al. 1980). Kinship was based on cross-sex sibling exchange marriages, and settlement is based on affinal relationships to one or both of each couple.

Place names often document aspects of the way people view, use and relate to a particular landscape. Ahtna and Dena'ina place names often relate to the surrounding natural environment such as description of landforms, hydrology, vegetation, fauna, and aspects of the local weather. Place names can also refer to past human history and activities such as gathering places, areas of trading, territorial boundaries, and spiritual places. Thus, place names can be very useful in archaeological studies. The understanding of how people relate and use local landscapes and resources can provide a framework to understand continuity and change in past land use systems in the archaeological record.

Linguists recorded Ahtna and Dena'ina place names in and near the project area (for a summary, see Simeone et al. 2011). Simeone et al. (2011) note that over 350 Ahtna place names occur in the vicinity of the project area. Ahtna place names are more prevalent toward the northern portion of the project area, north of Devil's Canyon, the traditional boundary of the Ahtna and Dena'ina people. Devil's Canyon has both Ahtna and Dena'ina place names, and Dena'ina place names are more prevalent to the south of the canyon. Little research on Tanana place names is available. However, a database of Tanana place names is currently under development at the Alaska Native Language Center at the University of Alaska Fairbanks (Gary Holton, personal communication, September 2011).

3.4.3 History

The broader regional history is diverse, although documented Euro-American exploration and occupation of the Watana project area itself is limited. In order to understand the history of the regions relevant to the project area, an expanse of Alaska from the upper regions of the Cook Inlet to the Tanana Valley is pertinent. The first documented European presence in southern Alaska was 1741-1742 Russian expeditions lead by Bering and Chirikov, during which they mapped the Alaskan coastlines (Black 2004). Their initial settlement and exploration focused on coastal zones, but later moved into the interior regions along the easiest transportation routes; wide rivers and valleys. Further European and American expeditions into first the coastal regions and then the interior soon followed the Russian example. Over the next several decades Spain, Britain, and America sent forth expeditions into Alaska in pursuit of its abundant natural resources (Mangusso and Haycox 1989; Olsen 2002). Through summaries of exploration, mining, transportation, agriculture, and the development of parks, the history of Cook Inlet, Susitna River, Denali, and the Tanana Valley can be put into context.

3.4.3.1 Exploration

3.4.3.1.1 Cook Inlet

Recorded contact was first made with the Dena'ina of Cook Inlet in 1778, the year that English explorer James Cook sailed into the area in search of a Northwest Passage (Fall 1981:45; Kari and Fall 1987:16; Townsend 1981:635). However, Cook reported that the inhabitants already possessed items of European manufacture and assumed that they were indirectly trading with the Russians, who had established trading posts on Kodiak Island and the Alaska Peninsula (Fall 1981:55). Soon after, the Russians extended their direct influence into Cook Inlet, establishing forts at English Bay (the Aleksandrovsk fort), near present-day Kenai (Nikolaevski Fort), and at Iliamna and Tyonek (Fall 1981:62-65). In 1794, the Cook Inlet region was visited by Captain George Vancouver, who reported that many of the Natives who approached his ship were familiar with the Russian language and appeared to be on friendly terms with the Russian traders (Vancouver 1798). However, this was apparently not always the case as both the Tyonek and Iliamna outposts were destroyed by the Dena'ina in 1797 (Fall 1981:68).

In 1799, the Tsar of Russia granted the Russian American Company exclusive possession of the established trading posts in Alaska. From this time forward, the Dena'ina mainly served as middlemen between the Russians and interior groups, such as the Ahtna (Fall 1981:71). The Dena'ina population was estimated at 3,000 for the year 1805 (Osgood 1937:19), a number that was greatly reduced during the smallpox epidemic between 1836-1840 (Townsend 1981:636). Intensive missionization by the Russian Orthodox Church occurred shortly after the epidemic. However conversion of the people from the Upper Cook Inlet region did not occur until the 1870s due to the great distance from established Russian settlements. In 1891, the St. Nicholas Russian Orthodox Church was built in Tyonek on the western shore of Upper Cook Inlet.

3.4.3.1.2 Susitna River

It wasn't until 1834 that the Russian explorer Malakoff first navigated the Susitna River. Little is known about the extent of the Russians exploration of the Susitna, however by 1845 it was certain that they had a better knowledge of the waters of the Upper Susitna than they could have obtained through maps drawn by the Natives (Bacon 1975; Brooks 1973; Cole 1979). After the Russians' initial exploration, outsiders did not return to the Upper Susitna River until the 1896 gold rush when hundreds of prospectors flocked to the Knik and Susitna River Valleys. A hundred parties were reported to have entered the Susitna River that summer, but only five achieved any substantial distance. Among these five was William Dickey's party, one of the first well documented trips up the Susitna. Dickey and his men made it up to what is now known as Devils Canyon where they were forced to turn back, being unable to portage their boats around the canyon and continue on (Cole 1979; Marsh 2002). Very little was known about the Upper Susitna, above Devils Canyon, until the summer of 1897 when a party of nine men traveling in small boats made the first recorded trip to the headwaters of the river, reaching them on July 29, 1897 (Bacon 1975; Cole 1979; Eldridge 1900). The Upper Susitna River was much more isolated than it would have been had boats been able to navigate through Devils Canyon.

Military and scientific parties began to come into the region in 1898 to explore mineral deposits and to scout routes to the interior. One such party was headed by W. J. Jack, who guided George Eldridge and his team of geologists up the Susitna to Indian Creek and then up the creek and through Broad Pass to the Nenana River (Bacon 1975; Cole 1979). The route up Indian Creek was used later by other scientists, geologists, prospectors, and military explorers and was eventually chosen as the route for the Alaskan Railroad.

3.4.3.1.3 Denali

Exploration into the Denali Region of Alaska began around the 1830s with the Russians pursuing the fur trade. Their penetration into the Interior came with posts set up along the lower and middle regions of the Kuskokwim and Yukon Rivers. Contact between the Russian traders and the Denali-region Native people was limited and their participation in trade was primarily indirect, through middle-men based closer to the trading posts and along the coast (Brown 1991; Dixon et al. 1980). After Russia sold Alaska to the United States in 1867, American traders took over many of the trading posts along the various waterways and coastal regions of the territory. There was no economic motivation to move inland away from the major waterways until prospectors began to explore the area skirting Denali. The first documented reports of the mountains were made by a group surveying for the Western Union Telegraph Expedition in 1865-1867 where the head of the expedition’s Scientific Corps, William H. Dall, viewed the mountains from the Yukon River and named them the “Alaskan Range,” also given that name by local usage (Brown 1991). In 1898, the U.S. Government designated the United States Geological Survey (USGS) to become the primary trailblazers in Alaska by providing the public with accurate maps and information about goldfields and natural resources in the Interior. Several expeditions were launched in 1898, two of which would, in congruence with the U.S. Army, map the unexplored Denali region. Both parties were tasked with finding transportation routes through the Alaska Range; the USGS party, headed by George H. Eldridge, mapped a route suitable for a railroad or wagon from the Cook Inlet to the Tanana Valley. Captain E. F. Glenn of the U.S. Army found a route through the range to the interior gold fields (Brown 1991).

3.4.3.1.4 Tanana Valley

Documented Euro-American presence in the Tanana Valley started with Yukon traders Harper and Mayo (Robe 1943). They began exploration of the greater Tanana Valley in 1878 when they traveled up the Tanana River from the Yukon River and established a trading post on the Tanana north of present-day Fairbanks. The U.S. government was also curious about the Tanana region and its Native inhabitants, and began sending small geological and military teams on reconnaissance missions. In 1885, Army Lieutenant Henry Allen explored the Tanana River during a remarkable expedition that began in the Copper River Valley and ended on the Koyukuk River (Allen 1900). By 1890, E. H. Wells had become the first recorded non-Native to cross from the Fortymile gold country to the Tanana River (Robe 1943).

In 1896, a U.S. Geological Survey exploration party under the leadership of Josiah E. Spurr (1900) examined gold fields in Interior Alaska. Within two years of Spurr's report, numerous prospectors were combing the hills north of present-day Fairbanks (Robe 1943). Alfred Brooks undertook an 1898 geological exploration within the gold-rich area that became the Fairbanks Mining District (Prindle 1913). At the same time, Mendenhall's (1900) geological expedition reached the Tanana Valley via the Copper and Delta Rivers, and another military reconnaissance lead by Lieutenant Castner passed through the Delta area in an attempt to reach Circle by traveling up the Goodpaster River. As he traveled, he documented Athabascan encampments (Robe 1943).

Alfred Brooks recounted his 1902 expedition, providing the first written account of a traverse from the Pacific drainage to the Tanana-Yukon drainage (Brooks 1911). Several non-government expeditions also passed through the Nenana Valley area, and as early as 1902-1903 an expedition assessing the feasibility of a railroad route was undertaken (Moffitt 1915).

3.4.3.2 Gold Rush and Mining

3.4.3.2.1 Cook Inlet

Gold prospecting began in the Susitna River drainage and the upper inlet in the late nineteenth century, resulting in the establishment of the Willow Creek and Turnagain Arm mining districts. Knik boomed into a regional supply center, eventually becoming the starting point for miners heading into the Interior to the Iditarod-Innoko district (L. Potter 1967:23). Those miners used the trail system now known as the Iditarod Trail. By this time many of the Dena'ina had abandoned their smaller winter villages, preferring to live year-round in the larger communities of Knik, Eklutna, and Tyonek--which was designated an Indian reserve in 1915 (Fall 1987:22).

3.4.3.2.2 Susitna River

Though gold fever hit the Cook Inlet in 1896 and the prospectors swarmed the major rivers around the area, the Upper Susitna River remained fairly quiet until the early 1900s. In 1903, while men from Dawson and the Yukon rushed to the Tanana Valley, a group of men headed out from Valdez toward the Upper Susitna. In late summer of that year, after prospecting every tributary along the Upper Susitna, gold was struck along Valdez Creek (Bacon 1975; Cole 1979). The next spring a larger outfit went out to Valdez Creek and discovered the "Tammy Bench" and "No. 2 Above" claims, bringing in nearly $30,000 by the end of the season. Miners flocked to Valdez Creek and put in claims over every area available on the creek and its tributaries, from the Susitna to Grogg Creek; by the mid-1930s an estimated $700,000 in gold was produced from the claims that were worked in the Upper Susitna (Bacon 1975). Valdez Creek became a prominent mining district in Alaska; however access continued to be a problem. When miners were getting ready to leave the district in the fall of 1904 a Native guide showed them an alternative route, which became known as the Gulkana Trail. This became the primary route for freight and supplies to be hauled into the district (Cole 1979).

3.4.3.2.3 Tanana Valley

Perhaps the most notable event in the history of the Interior was the gold rush that occurred at the beginning of the twentieth century. In 1902, a prospector named Felix Pedro, who had prospected the rushes to the Klondike and Fortymile regions, struck gold northeast of present-day Fairbanks. With this strike, the rush began as prospectors and other settlers entered the Tanana Valley in force. At the same time, the Nenana River region was being explored for its potential to yield mineral resources. United States Geological Survey (USGS) geologists examined the Bonnifield Region for extensive sources of coal, finding the best and most easily accessible exposures along Healy, Lignite, and California Creeks.

Settlement of the Healy area began in 1903, with coal mining beginning its heyday on Healy Creek in 1920 when the Alaska Railroad was completed up to that point. The presence of commercially viable coal deposits influenced the placement of the Alaska Railroad though this area. Suntrana supplied the bulk of coal to Fairbanks and nearby military installations until 1943, when the Usibelli Coal Mine (UCM) was founded by Emil Usibelli under contract to the military as a secondary supplier (Usibelli Coal Miner 1993:1). UCM purchased Suntrana in 1961. Today, UCM is the major coal producing company on both Healy and Lignite creeks.

Placer mining began on Moose Creek in 1909, and at other places along the western edge of the Bonnifield Mining District after 1915, as the new Alaska Railroad improved transportation into the region (Brooks 1923). Gold Lode prospecting in the Bonnifield district started in 1908 along bedrock exposures on tributaries of the Wood River. Prospects in 1916 centered around Eva Creek, however, lode deposits in the district did not yield noteworthy amounts of gold until 1931. The principal producer was the Liberty Bell mine on Eva Creek, located east of the Ferry railroad station (Moffit 1933). The Liberty Bell Mine is a historic mine that was built in 1915 with its highest use occurring during the 1930s (Athey 2006).

3.4.3.3 Alaska Railroad

The discovery of major coalfields in the Matanuska Valley were in part responsible for the construction of the Alaska Central Railroad, later renamed the Alaska Railroad, which began in Seward in 1903 (Fall 1987:22). In 1914, a railroad camp was established at Ship Creek, a Dena'ina fish camp on the eastern shore of Cook Inlet that is now the city of Anchorage. By 1917, the town of Knik was abandoned, with most of its residents relocating to the new railroad town named Wasilla. As railroad construction progressed construction camps sprung up along the way and were generally abandoned after use. However, towns that were established at major river crossings such as Nenana and Talkeetna, at division or section points (Curry and Cantwell), and at coal mining centers (Healy) survived the construction era (Brown 1991). The railroad was completed in 1923, with the driving of a golden spike at Nenana by President Warren Harding. Despite the need for constant repair and reconstruction due to hasty assembly and extreme weather and natural conditions, the Alaska Railroad achieved what it set out to do; connecting Alaska's Interior with the ice-free port at Seward, and by ship to Seattle and the rest of the world. It became an invaluable resource to the territory by generating new towns and agricultural enterprise, providing low cost freighting for mining and construction operations, and revolutionizing river transportations (Brown 1991).

3.4.3.4 Highway System

The U.S. Army was responsible for the construction of the Washington Alaska Military Communication and Transportation system (WAMCATS). This was constructed during the first years of the twentieth century and included the construction of a telegraph system in parts of Interior Alaska (Blanchard 2010). The discovery of gold in the foothills of the Alaska Range prompted the establishment of marked trails and roadhouses by the Alaska Road Commission (ARC) to serve travelers. These trails, many of which followed established Native trails, served subsistence hunters and trappers, prospectors, miners, market meat hunters and mail delivery men.

Construction of a road connecting Anchorage and Valdez gained the backing of the War Department when World War II (WWII) broke out in 1939. The U.S. saw the potential for modern warplanes to cross over the North Pole to Alaska, and responded with a series of national defense measures including the construction of Fort Richardson in Anchorage (Naske 1986). Initially the only means of supplying that base was via the Alaska Railroad from the deep water port in Seward. Should either the port or railroad be damaged or destroyed, the fort would be cut off. In response, two new means of reaching Anchorage were built. One was a 14-mile railroad spur line from Portage on Turnagain Arm to Whittier on Prince William Sound.

The other was the Glenn Highway, which created an overland route between Fort Richardson and the port of Valdez. As many as 300 men worked on its construction. The pioneer road opened late in 1942, with additional improvements continuing thereafter (Clayton 1967). At the same time, the Richardson Highway was upgraded to accommodate military traffic from Fort Wainwright in Fairbanks. The ARC also took over the old military telegraph lines and used them to operate a telephone system between Fairbanks and Valdez (Naske 1986).

After the Alaska Railroad was completed in 1923, Cantwell became the center for the resupply route to Valdez Creek. In the early 1920s a sled road was blazed by the ARC to provide a route between Cantwell and the mining district at Valdez Creek. By the mid 1930s the ARC improved this trail and turned it into an established dirt road. This road would later become the Denali Highway, which would follow the old routes to Valdez Creek from Paxson to the east and Cantwell to the west (Bacon 1975; VanderHoek 2011).

The George Parks Highway was completed in 1971 between Willow and Cantwell. This provided a much shorter road route between Anchorage and Fairbanks and to Denali National Park.

3.4.3.5 Agriculture

3.4.3.5.1 Tanana Valley

Gold was not the only thing that brought settlers to the Tanana Valley. Agriculture provided an additional viable occupation for people living in the region (Monahan 1959). In 1898, the Homestead Act passed by congress in 1862 was extended to include Alaska. The Act was amended for Alaska, limiting land parcels to 80 acres (in the contiguous U.S. land parcels were set at 160 acres) and making no provision for surveys. In 1903, amendments were made to allow 320 acre claims. This led to the growth of agriculture in the region. By 1905, 82 homestead entries had been filed in the valley, and by 1911 there were over 200. Soon, the Tanana Valley became the center of farming in the territory of Alaska, as farmers sold their produce to miners and other businesses in the region. After the arrival of the railroad, farmers were forced to compete with outside producers. At this point, the Matanuska Valley became the new center of commercial agriculture in Alaska (Price 2002).

3.4.3.5.2 Cook Inlet

In 1935, the federal government created the Alaska Rural Rehabilitation Corporation, and began an agricultural community in the Susitna Valley that was populated by relocated families from the Midwest (L. Potter 1963:16). In the early 1940s, construction began on Fort Richardson/Elmendorf Air Field as well as other roads, harbors and airports necessary for the war effort. These activities led to the growth of Anchorage and secured its place as a major city (ADCED 2000) as well as provided a market for the agriculture communities of the Matanuska Valley.

During World War II, Wasilla and surrounding communities suffered a decline in population. Gold mines were closed and many of the men joined the armed forces. However, the establishment of Fort Richardson/Elmendorf Air Field gave the farmers in the Matanuska-Susitna region a ready market for their fresh produce, supporting the remaining residents through this period (L. Potter 1963:18). After the war, the government once again reopened the area to homesteading, hoping to provide veterans with land and an income.

3.4.3.6 Development of Denali Park

The journey of the Denali region to becoming a national park started with Charles Sheldon, a man who traveled to Alaska to study the sheep of the Alaska Range. Greatly respected by his associates as a competent woodsman and hunter, Sheldon came to the idea of establishing game refuges in Alaska while working in the range. With the help of his fellow Boon and Crockett Club members, Sheldon led the surge forward in establishing a park preserve for Denali's wildlife (Brown 1991).

Congress passed the Mount McKinley National Park Act in 1917, reserving roughly 2,200 square miles of land northwest of the Susitna basin. Laid out in a parallelogram, the park extended from the southwest to the northeast with the upper end reaching to the north to include the mountainous habitat of sheep and caribou around Toklat and Teklanika drainages. Boundaries excluded Kantishna mining district and the forested moose country to the northwest where miners wintered and hunted (Brown 1991). Despite the official status as a National Park, the wildlife of the region continued to be illegally hunted until 1921, when funds were distributed for National Park Service support.

After the establishment of Mount McKinley National Park, proposals began to circulate through the government to expand the borders to the north and south. In the spring of 1970, the Alaska State Legislature established Denali State Park, located to the south of Mount McKinley National Park and west of Susitna (Norris 2006). Denali State Park expanded to the east in 1976, adding 66 square miles (42,240 acres), an area near the Tokositna Glacier that provided a great view of Mt. McKinley. The final expansion of the national park occurred in 1980, when President Carter signed the Alaska National Interest Lands Conservation Act (ANILCA). Among its many revisions, ANILCA changed the name of the park from Mount McKinley National Park to

Denali, adding a 2,547,147-acre expansion, establishing the Denali National Preserve, and adding a 1,900,000-acre wilderness within the boundaries of the original Mount McKinley Park. The final revisions of the boundaries for the Denali National Park and Preserve resulted in a 6,075,000 acre reserve (Norris 2006).

3.5 Cultural Resources—Affected Tribes

The communities potentially affected by the project have different histories and cultures, but are characterized by strong ties to the land and its resources, and in some cases, through strong kinship connections. The successful completion of the Consultation and Coordination phase of the Section 106 process will require the development of an efficient and effective consultation process that addresses the letter of the laws and regulations within the context of local custom and practice. Several Alaska tribal entities recognized by the U.S. Department of Interior are broadly located near the study area. In Alaska, consultation typically occurs with the 229 federally-recognized tribes, the 13 Alaska Native Regional Corporations, and some 200 Alaska Native Village Corporations created by the ANCSA. (The Regional and Village Corporations are recognized as “Indians tribes” for NHPA purposes.)

Twenty-two tribes recognized by the Bureau of Indian Affairs under 25 CFR 83.6(b) are located within or near the study area. They are:

- Cheesh-Na Tribal Council
- Chickaloon Village Traditional Council
- Chitina Traditional Village Indian Council
- Gulkana Village
- Healy Lake Village
- Kenaitze Indian Tribe
- Knik Tribal Council
- Mentasta Traditional Council
- Native Village of Cantwell
- Native Village of Eklutna
- Native Village of Gakona
- Native Village of Kluti-Kaah
- Native Village of Tazlina
- Native Village of Tetlin
- Native Village of Tyonek
- Nenana Native Association
- Ninilchik Traditional Council
- Northway Village
- Seldovia Village Tribe
- Tanacross Village Council
- Village of Dot Lake
- Village of Salamatkof

Regional Native Alaskan corporations that have interests within or near the Project area include:

- Ahtna, Incorporated (Ahtna)
- Cook Inlet Region Incorporated (CIRI)
- Doyon, Ltd. (Doyon)

Several ANCSA recognized and non-recognized villages, groups and urban corporations, and village organizations are located near and/or may have interests near the Project area. These entities include:

- Alexander Creek, Incorporated
- Caswell Native Association
- Chitna Native Corporation
- Chickaloon Moose Creek Native Association
- Dot Lake Native Corporation
- Eklutna, Incorporated
- Gold Creek-Susitna NCI
- Knikatnu, Incorporated
- Little Lake Louise Corporation
- Lower Tonsina Corporation
- Kenai Natives Association, Inc.
- Nebesna Native Group, Inc.
- Menda Cha-ag Native Corporation
- Montana Creek Native Association
- Ninilchik Natives Association, Incorporated
- Northway Natives, Incorporated
- Point Possession, Incorporated
- Salamatkof Native Association, Incorporated
- Slana Native Corporation
- Seldovia Native Association, Incorporated
- Tanacross, Incorporated
- Tetlin Native Corporation
- Toghotthele Corporation
- Twin Lake Native Group, Incorporated
- Tyonek Native Corporation

4. DATA GAPS

In this section, we discuss Watana Project cultural resources related issues and data gaps derived from background research of the study area. These issues relate to a number of variables, such as uncertainty regarding accuracy and precision of site locations, availability of more modern techniques and methodologies, site condition, possible current and future impacts to sites, incompleteness of the Section 106 process (especially, lack of determinations of eligibility to the NRHP). Data gaps are summarized in Table 1.

4.1 SITE LOCATION DATA

4.1.1 Synthesis of existing location data information for known sites

The AHRS data alone are inadequate for characterizing the “affected environment.” Because sites from 1978-1985 were recorded without the benefit of modern GPS and GIS, the paper records and survey data need to be brought up to modern GPS and GIS standards. There is no simple, inclusive approach to compiling Susitna-Watana Project cultural resources data merely by using the existing AHRS data.

AHRS site records do not necessarily include sites in BIA and individual Alaska Native corporation files, especially cemetery and grave sites inventoried under Section 14(h)(1) of the ANCSA. Native Allotments are another type of site record (often in confidential files) that may need to be evaluated in detail in order to characterize the affected environment. Some Native Allotments include older historical or prehistoric sites.

In order to fully compile and synthesize site data prior to completing the Section 106 process, a number of interrelated tasks need to be completed. Existing site location data from AHRS and all other sources needs to be compiled, including quality control/editing of existing location data imagery from various sources. GIS layers need to be created for known sites, with the ability to sort by site type, age, size, and associated environmental variables. A geodatabase needs to be created with site location data plus aerial imagery. The key to bringing records up to modern day standards is to digitize field map records identified in the extensive and detailed records held by the University of Alaska Museum of the North (see Appendix A).

There is the potential for certain types of sites within the project area to be unreported. For example, “isolated finds” may have not always been consistently treated as “sites”. However, at the very least, isolated finds can inform the archaeologist: (1) that the artifact was deposited at that spot by humans (unless taphonomic or topographic features indicate tertiary deposition); (2) if diagnostic, it can be used describe type distributions; and (3) if the artifact is a tool, it can be used with other isolated finds to identify patterns of past human use within a particular region. Arguably, an isolated lithic artifact is a type of site. Abstract types of sites constitute the empirical entities archaeologists use to explain or integrate into a settlement/subsistence system. Because isolated finds may not be reported, an important data set may not be recoverable.

4.1.2 Mapped site location data and environmental variables

Imagery from the 1980s and current digitized/orthorectified imagery of the middle Susitna needs to be compiled and compared. The 1980s aerial photography should be compared to current photography to understand potential discrepancies between site location data and to assess changes in the landscape that may have affected site preservation. The aerial imagery will need to be digitized and orthorectified to use in a GIS based format. The digitization and orthorectification of historic and current aerial imagery should be used to assess the current habitat types that are spread through the project area and are an important variable in site location modeling, the construction of historic contexts and assess site significance. Understanding the changes in habitat types over time is useful to assess changes in landscape use through time.

Coded environmental variables should be used to standardize baseline environmental datasets (current habitat types, faunal and floral communities, surficial geology, bedrock geology, etc.) to be used in a GIS format. These data sets are important to site location modeling, assessing potential changes in land use, and the development of historic contexts to be used in assessing site significance.

4.1.3 Compilation of existing shapefiles (GIS) of environmental variables

Environmental datasets are a major component of GIS site location modeling, assessing changes in land use patterns, building historic contexts, and assessing site significance. All available GIS shapefiles and datasets containing environmental datasets that pertain to the above-mentioned efforts in 4.1.2 should be compiled.

4.1.4 Field verification of existing site location data

Modern sub-meter accuracy GPS technology should be used in the field to verify and update existing site location information within the project area. Site location information collected prior to about 2000, compared with modern precise and accurate GPS location coordinates, has been shown to be up to several hundred meters in error (Bowers, unpublished data). The descriptions of sites, site maps, and historic aerial and ground photography can all be used to assess the accuracy of site location data. Each site in the APE should be visited in the field and high precision GPS technology should be used to obtain an accurate location. The AHRS should be updated with site location data obtained with precise and accurate GPS technology mentioned above.

4.2 SURVEY COVERAGE

Cultural resources surveys within and adjacent to the current Susitna-Watana Project site have been conducted since 1978. In 1978, Bacon (1978a) surveyed the proposed locations for left and right abutments and the spillway for the Watana dam site. In addition, the 1978 field studies also surveyed proposed locations for an airstrip, camp pad, two material sites, access roads, and a portion of the proposed Devil's Canyon dam site (Bacon 1978a, 1978b).

The 1980-1984 field studies chiefly lead by the UAM also focused on the Watana and Devil's Canyon dam sites and associated ancillary impacts (Dixon et al. 1985). The ancillary impacts surveyed and tested included three transmission corridors (Healy-to-Fairbanks, Healy-to-Willow, and Willow-to-Anchorage) and 12 borrow pits (Borrows A-L) that were designated as potential material sources. Alternative access routes (Corridor 1 North, Corridor 2 South, and Corridor 3 Denali-North) were preliminarily surveyed. In the draft EIS (Environmental Impact Statement), Hoffecker (1984) provides a synopsis of the number of survey locales and test areas and sites found between 1980-1984 in each of the proposed dam sites, access routes, transmission lines, and other potential project wide impacts.

In 1985, Historical Research Associates was contracted by the Alaska Power Authority to develop a predictive site locational model and survey strategy for several proposed linear features including transmission lines, access roads and railroad corridors (Greiser et al. 1985). Three transmission lines were designated as the Gold Creek-Watana (36.2 mi. in length), Healy-Fairbanks (94.4 mi. in length), and Willow-Anchorage (64.4 mi. in length) lines and tied into exiting lines along the railbelt. The proposed railroad access consisted of 10.2 mi. of rail between Gold Creek to Devil Canyon. Approximately 76 mi. of access road was proposed between the Denali Highway and the construction site for the Watana dam site and Devil's Canyon (Greiser et al. 1986). The predictive model, survey and sampling strategy, and coverage of the linear features are discussed in section 5.2.

A number of the survey locales from these previous surveys need to be digitized from paper maps in field survey reports into a GIS compatible format. The areas surveyed in the 1970s and 1980s should be revisited to acquire accurate field locations using GPS technology and to assess their location relationship to and adequacy of survey coverage of the currently proposed project APEs.

4.2.1 Synthesis of 1978-1985 survey coverage information

There needs to be a geodatabase with 1978-1985 survey coverage information plotted, along with cross-referenced lists between 1978-1985 surveys and survey report information. GIS layers need to be created with survey coverage data: locations, test pit locations, level of effort, survey report information.

4.2.2 1978-1985 excluded survey coverage areas data

The modern geodatabase showing1978-1985 survey coverage areas within the current study area needs to define areas excluded from past cultural resource surveys. Much of this data is obtainable only by going through primary site records and field notes housed in the UAM. GIS layers from 1978-1985, showing areas excluded from 1978-1985 surveys, need to be developed.

4.2.3 Adequacy of horizontal and vertical subsurface testing strategy in 1978-1985 field research

The modern geodatabase needs to include an assessment of the adequacy of previous survey methods compared with contemporary standards and requirements. This would include data on size, depth, and results of each 1978-1985 shovel test pit abstracted from reports and field notes in the UAM.

4.2.4 Relation of 1978-1985 project components (dam site, access corridors, camp location, and indirect impact areas such as roads, recreation areas, etc.) to 2011 Wa-Su Hydro Power project.

GIS layers of 1978-1985 project components should be compared with GIS layers of the Susitna-Watana Project. Comparisons of the two project component footprints can be used to effectively evaluate the relevance of 1978-1985 cultural resource survey data compared to the present project.

4.3 SITE LOCATION MODELING

4.3.1 Identification of variables used to develop site location models used for 1978-1985 field research

As detailed in section 5, environmental variables used in 1978-1985 modeling should be updated with information that is more recent. A current, state of the art survey model needs to be developed to guide additional survey, testing, and mitigation required under the NHPA and 36 CR 800 (e.g., compare with Potter 2006; Potter 2008b).

4.3.2 Refine 1978-1985 models with current modeling applications

[See above section 4.3.1]

4.4 CULTURAL CHRONOLOGY

The earlier radiocarbon dates from the Susitna Hydroelectric project were assayed using standard radiometric techniques in the early 1980s. These techniques required larger sample sizes that can be fraught with problems when trying to acquire an accurate radiocarbon date on an archaeology site and a geological deposit. Many times researchers had to combine several small samples to increase their sample size and samples of potentially different ages were mixed together with the resulting date reflecting more the average of the different aged materials and not the actual age of the archaeology, deposition of a tephra deposition, or development of a buried soil. In addition, larger sample sizes tend to yield younger dates due to an increased potential for soil-derived carbon contamination that is not removed during the pretreatment process. The Middle Susitna region also may have an additional problem of older airborne coal particles and Tertiary pollen incorporated into larger bulk samples, which could create anomalously older radiocarbon ages. Many of the Susitna dates appear to have been on combined samples of charcoal, larger woody peat deposits, and bulk sediment samples (Dixon et al. 1985; Dilley 1988). Dixon (1999), Reuther (2000), and Child et al. (1998) have shown that ages on archaeological occupations (in this case, the lower component at Jay Creek Ridge), and the tephra deposition (Oshetna tephra) in the Middle Susitna region can be further refined with the use of AMS radiocarbon dating.

A major problem with the earlier data is that radiocarbon dates produced at the Dicarb Radioisotope Company in the late 1970s and 1980s, a highly-used contractor of the USGS, are highly unreliable and tend to be younger than the actual ages of the materials (Reuther and Gerlach 2005). This company was used to produce many dates for the Susitna Hydroelectric project (~30% of the total dates run for the project and ~26% for the tephrochronology [Dilley 1988]). Current pretreatment processes and AMS radiocarbon dating have aided in providing more accurate chronologies by reducing sample size and contamination, and allowing for the dating of a variety of organic materials including bone, wood, and charcoal (Jull 2007; see case study from the Carlo Creek Site; Bowers 1980; Bowers and Reuther 2008). AMS radiocarbon dating of multiple materials can provide several types of radiocarbon dating data sets to interpret regional archaeological and geochronological records. In many archaeological contexts when features such as hearths are not present at sites, the dating of collagen extracted from bone and antler may provide the most accurate age on an occupation (Potter and Reuther 2011). Even in archaeological contexts with hearth features present, the dating of bone collagen may also provide the most accurate date if the site's occupants used larger pieces of wood as fuel. Small bits of charred short-lived shrubbery can provide more accurate dates on archaeological and geological events than larger pieces of charred wood due to the longer life-span of tree than shrubs and the potential for humans to curate older wood (Schiffer 1986).

Optically and infrared stimulated luminescence (OSL and IRSL) and tephrostratigraphy also add to more precise and accurate stratigraphic and archaeological chronologies. OSL and IRSL dating of quartz and feldspar grains allow researchers to place an age on the last time sediment was exposed to light during depositional transport (Grün 2001). Sediment deposits that have very little to no organic remains available for radiocarbon dating can currently be dated. Thus, the deposition of tephra sediments can be directly dated and provide a more accurate age on the deposition of an eruptive event. OSL and IRSL dates can be produced on deposits within which artifacts are lying, above and underneath to provide relative stratigraphic dates and minimum and maximum ages for the archaeological components.

Geochemical characterization of sediments, in particular glass sherds in tephra deposits, using modern techniques used in analytical chemistry can increase the potential for correlation between tephra deposits spread across differing geomorphic settings. Analytical techniques such as microprobe and inductively coupled plasma mass spectrometry (ICP-MS) have provided trace element characteristics of a tephra sample, even down to single shards. The combination of multiple analytical chemistry techniques, along with petrographic characteristics, have the potential to contribute tephra identifications that will refine he Susitna tephrochronology, the overall stratigraphic sequence, and the chronology of the archaeology and prehistory of the region.

4.4.1 Radiocarbon dates obtained from 1978-1985 research

Radiocarbon dates in unpublished and published reports should be incorporated into GIS layers, showing distribution of radiocarbon dates by age, cultural affiliation, and laboratory. Compilation and evaluation of dates are critical to updating the prehistory of the area, especially as many dates are from the now defunct Dicarb (see above).

4.4.2 Tephra dating samples

Lists of tephra (volcanic ash) samples collected during 1978-1985 field studies need to be assembled on GIS layers showing distribution of tephra samples. Analysis of tephras needs to be conducted by contemporary geochemical standards and laboratory techniques (cf. Riehle 1985; 1994; Riehle et al. 1990).

4.4.3 Update of tephra dating studies since 1985

A geodatabase of tephra dated archaeological sites should be created, listing tephra samples, dates, analysis since 1985 adjacent to and within the Project area.

4.4.4 Update of radiocarbon dates since 1985

Radiocarbon dates, sample locations, and associated data for cultural resource and geological studies needs to be compiled, and organized in a geodatabase of radiocarbon dates within and adjacent to project area.

4.4.5 Update cultural chronology with modern radiocarbon testing (e.g., AMS) dating analytical techniques and tephrochronology techniques (e.g., geochemical)

The available samples from 1978-1985 research need to be identified at UAMN for modern analysis. This would include an application of modern dating techniques to bone, and other materials (collagen samples). There needs to be an application of OSL dating to tephra deposits, techniques not previously available.

4.4.6 Synthesize southcentral and interior Alaska cultural chronology by updating 1985 cultural chronology with current cultural-historical frameworks

The cultural resource literature developed since 1985 should be examined to update the cultural chronology of the Susitna region (primarily Dixon 1985). This would include a review of professional literature in books, journal articles, reports, and professional papers, and research of museum collections of artifacts.

4.5 LAND USE

4.5.1 Identification of prehistoric resource locations

Identification of raw materials available to prehistoric inhabitants, such as lithic quarry sites, fresh water, springs, salt licks, etc. needs to be combined with GIS layers depicting raw material locations. This is especially relevant in light of advances in geochemical tracing of obsidian from archaeological sites (Reuther 2011) and increased knowledge of lithic site locations (Bowers et al. 1983; West 1981).

4.5.2 Prehistoric settlement patterns in different prehistoric cultural periods

Identification of prehistoric cultural periods, updated from some of the above research, needs to be established on GIS layers, showing time-space distribution of cultural resources and site types. The historic Susitna data should be updated in light of more recent archaeological, geological and paleoecological research on Glacial Lake Atna and Susitna (VanderHoek 2011), Holocene sand sheets (Blong 2011), ice patches and rock blinds (Dixon et al. 2005), traditional trails, regional pollen studies, etc.

4.5.3 Historic land use

Following identification of sources available for research, data should be compiled from source materials (homestead records, cabins, mining claims, etc.). This could be combined with other lands records research. In addition, there may be historic trails within the greater Project area. According to RS-2477 (enacted in 1866), the trails used for commerce or transport are rights-of way under State authority. The Alaska Department of Natural Resources (DNR) developed a database documenting these historic rights of way. The existence of a documented easement does not directly equate with the existence of a historic property under 36 CFR 800 and 36 CFR 60, since the features on the ground may have changed substantially over time. However, some trails may meet the criteria necessary to be considered as historic sites if they are found to possess integrity. As many of these trails are not included in the AHRS database, evaluations will need to be performed in cases where field survey indicates road/trail features corresponding to documented RS 2477 locations.

4.5.4 Prehistoric subsistence practices and seasonal round

Identification of prehistoric harvests of wildlife resources, analyses of seasonal patterns of resource harvests, and analysis of faunal remains and plant macrofossils from 1978-1985 research need to be brought up to date using modern techniques.

4.4.5 Effects of environmental and ecological changes on land use patterns

This would be accomplished by refinement of the cultural chronological record, identification of changes in land use patterns, and reviewing pertinent local and regional environmental data collected since the 1980s.

4.6 PLACE NAMES

4.6.1 Synthesis of existing place names information

A geodatabase of place names locations should be created from published/unpublished Native place names, place name translations and associated historic land use and cultural information (Simeone et al. 2011; Kari and Fall 1987, 2003). Oral interviews may provide useful information.

4.6.2 Update baseline place names information to account for unknown place names

[See above section 4.6.1.]

4.7 TRADITIONAL CULTURAL PLACES/ TRIBAL SACRED SITES

4.7.1 Synthesis of traditional cultural places (TCPs)

A geodatabase with TCP/sacred sites location data should be created based on refined research and associated historical and cultural information. TCPs are historical properties related to traditional uses or practices that are integral to the life of a community. The NHPA amendments of 1992 added Section 101(d)(6)(a) which stated that:

> Properties of traditional religious and cultural importance to an Indian tribe [or Native Hawaiian organization] may be determined to be eligible for inclusion in the National Register. In carrying out its responsibilities under Section 106 of this Act, a Federal agency shall consult with any Indian tribe [or Native Hawaiian organization] that attaches religious and cultural significance to properties (of religious and cultural importance).

TCPs are associated with "cultural practices or beliefs of a living community that (a) are rooted in that community's history, and (b) are important in maintaining the continuing cultural identity of the community" (Parker and King 1990). TCPs are identified according to procedures set forth under 36 CFR 800, and their significance is determined according to NRHP criteria (36 CFR 60.4). A TCP must be a tangible place or location with a history of use or association of at least 50 years, and which retains integrity of association and condition within the community.

One of the results in changes in regulatory and political climate over the years has been an increased awareness by Native American groups of sacred sites and other ancestral lands. This has resulted both from burgeoning nativistic and revitalization movements, but also from legislative mandates such as Native American Graves Protection and Repatriation Act (NAGPRA), Executive Order 13007 "Accommodation of Sacred Sites", and the increasingly-common application of the concept of TCPs in assessing site significance (Parker and King 1998, National Register Bulletin 38).

Based on our preliminary review, we have not identified known Native American sacred sites[3] within the Watana Project area. However, our review did not include consultation with Native groups. Some adjacent localities may be considered sacred by local residents, for example, because of the birth of ancestral tribal chiefs and other important tribal leaders.

[3] "Sacred site" is defined in Executive Order 13007, May 24, 1996.

4.8 LEGACY RECORDS AND ARTIFACT COLLECTIONS

4.8.1 Finding Aids to Accession Records of 1978-1985 UAMN Data

Names, locations, descriptions of 1978-1985 records (field notes, maps, artifact inventories, etc.) have been inventoried as part of this analysis (Appendix A). However, an electronic database of UAMN accession records should be created once detailed annotation of field books and primary data sources is completed.

4.8.2 Inventory of 1978-1985 faunal remains and geoarchaeology samples

A database of faunal and geoarchaeology samples accessioned at UAMN should be created to facilitate re-dating and comparative uses, including descriptions of 1978-1985 samples.

4.8.4 Oral history interviews with 1978-1985 field research principals

Oral interviews with principal investigators and researchers involved with the 1978-1985 cultural resources research would prove beneficial (E. James Dixon Jr., George Smith, Robert Thorson and others).

4.9 Historic Contexts/Evaluation Criteria

4.9.1 Develop historic contexts for the project area

As part of the Section 106 process, AEA's cultural resource contractor may need to develop historic contexts for the project area, reviewing current federal and state legislation, regulations and guidelines, taking into consideration existing management plans and historic contexts for areas adjacent to the project area (VanderHoek 2011). This should include consultation with agencies, Tribes and interested parties, and follow OHA criteria for developing historic contexts.

4.9.2 Develop project specific significance standards to evaluate a property's potential eligibility to the National Register of Historic Places (NRHP)

This task would involve a review of the past documents evaluating Susitna-area site significance (Saleeby et al. 1985), comparing with current Federal and State legislation, regulations and guidelines, applying the latest versions of National Register Criteria for Evaluation (36 CFR 60; 36 CR 800).

4.10 PALEONTOLOGY

4.10.1 Synthesis of paleontology data

Evaluation of paleontological sites and associated location data needs to be undertaken and a geodatabase of paleontological sites should be developed. The potential for Pleistocene faunal remains needs to be considered, given that Thorson et al. (1981) found approximately 29,000 year old mammoth remains at the confluence of the Susitna and Tyone Rivers, and that significant occurrences of dinosaur (Hadrosaur) fossils have been reported from the Talkeetna Mountains (Pasch and May 1997).

4.10.2 Paleontology site location model

Surficial geology and bedrock geology information needs to be developed along with creating GIS layers of surficial geology and bedrock lithology, and recording data on locations of rock outcrops within the study area. Both hard rock paleontological sites and Pleistocene faunal remains need to be considered in light of current regulations.

4.11 Plans for Unanticipated Discoveries

4.11.1 Develop plan for unanticipated discovery of cultural resources and human remains

Prior to initiating ground disturbing activities, a Plan for Unanticipated Discoveries of Cultural Resources and Human Remains will be required (see Dale and McMahan 2007). This will necessitate a review of current Federal and State legislation, regulations and guidelines, a review of existing management plans for areas adjacent to the project area, and consultation with agencies, Tribes and interested parties.

4.11.2 Develop plan for unanticipated discovery of paleontological resources

Prior to initiating ground disturbing activities, a Plan for Unanticipated Discoveries of Paleontological Resources will be required. This will necessitate a review of current Federal and State legislation, regulations and guidelines, a review of existing management plans for areas adjacent to the project area, and consultation with agencies, Tribes and interested parties.

5. SITE LOCATION MODELS

This section provides a review of the main site location models used for the 1979-1985 Susitna Studies. The first review is a review of Dixon et al. (1980 and 1985).

5.1 Review of Dixon et al. (1980 and 1985)

The goals of Dixon et al. (1980 and 1985) were to locate and document cultural resources, address their significance and assess the impact of the proposed Susitna Hydroelectric project (centered on two reservoirs and "associated facilities and features" [1980: iii]), recommend mitigation, and curate artifacts. This was to be achieved by systematic testing through archaeological survey followed by analysis, reporting, and curation. Assessments for significance were facilitated by determining site extent through grid shovel testing and recording a number of variables at sites to be impacted by the project. Mitigation recommendations focused on important themes, especially those relevant to research questions which would flesh out the area culture history (Smith and Dixon 1985).

The 1985 document (Dixon et al. 1985) is interesting for its inclusion of changes in subcontractors, revisions of study objectives, and other information not necessarily normally included in formal reports, but very relevant at a practical level to attainment of goals. This was a large project; with over 270 sites located which required some form of analysis and curation of associated artifacts. Another 22 previously known sites were revisited and documented. Of the sites found, 111 were located through subsurface testing (about 28,000 shovel tests). The 1985 document states that its conclusions supersedes those written in earlier documents, thus a review of the original (1980) document was necessary to note changes and understand the basis for alterations of strategies, especially from a "predictive" modeling perspective.

Variables are categorized as chronological and environmental/other, as well as artifactual. Chronological variables were recorded as terrain units keyed to surficial geology, stratigraphic characteristics (including tephras), site maps (on an intra-site level), and radiocarbon dates (paleosols and organics associated with artifacts or levels of occupations). Tephrochronology was a significant help in determining regional chronology (one lake core with associated tephras was also included). Apparently, topographic variables were defined by R&M Consultants in 1981 using aerial photographs, and the 25 terrain units described were used to define both chronological and environmental variables.

Environmental variables or ecological settings were basically defined based on topographic characteristics, including uniformity or variability of topography. Variables were overlooks, lake margins, stream/river margins, quarry sites, caves and rock shelters, constrictions, and mineral licks, vegetation, and landform types (18 possible). Other variables are mentioned as being recorded during systematic surveying, such as elevation.

Artifact variables are material type (lithic, faunal, floral), technology (separated as lithic and non lithic), and features. Part of the objective of setting up the variables in this way was to identify what research question could potentially be addressed by particular sites or groups of sites.

At the outset of the study in 1979, the authors acknowledged that only a "speculative cultural chronological framework" and a "tentative cultural historical sequence" (1980: v) for the Middle Susitna River was possible, based on the limited prior work relevant to cultural resources of the area. The Western Ahtna and Upper Dena'ina Athabascan speakers were the primary inhabitants of the region under review. These groups were believed to be highly mobile hunter-gatherers, and it was suggested that few archaeological sites would exist in the study area. This assumption was subsequently proven to be incorrect, and strategies were adjusted basically on an as-needed basis.

A number of assumptions are imbedded into the "survey locales" concerning areas of low and high potential for cultural resources. Fieldwork was performed from 1980 to 1984, with 2 to 3 month field seasons and crews ranging in size between 7 to 24 people. Survey shovel tests were round and "generally not exceeding 50 cm in depth." Sites were shovel tested with 4 m grids to discover site extent (enlarged when necessary). Sites determined to be within areas of impact were "systematically tested," mapped with transit control and tested with 1 m x 1 m units. The average tested area at these systematically tested sites was 3 m^2.

Thorson (Susitna project surficial geologist) initially defined 11 "terrain units" (basically a desktop survey which reviewed aerial photographs and literature) but difficulties in correlating geomorphology units and chronology on a fine enough scale prompted abandonment of stratified random sampling. This was justified basically because of the complexity of deglaciation sequences and other difficulties, including logistical and technical ones. Terrain unit maps (25 defined terrain units) created by R&M Consultants through aerial photo interpretation were subsequently used as geomorphological variables.

Site discovery is within ½ mile of all the project area boundaries, which was the emphasis, though 3 km was the stated survey extent for beyond the proposed reservoirs, and 16 km was the extent on either side of the Susitna River (from the Maclaren River to Portage Creek). The 1985 report notes there are sites beyond ½ mile of project boundaries found by various means. The authors also noted the fluctuation of boundaries, a common issue, and strategies obviously need to have a way to accommodate engineering adjustments.

There are several differences which are very relevant to work then and similar work now. The Dixon et al. study was considered "pioneering research" by the authors as the area was basically *terra incognita* prior to 1980. We have the benefit of over 25 years of interior Alaskan research, which includes the results of a large areal study (Greiser et al. 1985) in addition to Dixon et al.

Dixon et al. attempted geomorphological studies in the beginning to help define significant landscape elements for cultural resources and had difficulties in doing so. The importance of glacial histories was recognized as significant for linkages to environmental variables; geomorphological understanding has also developed substantially since the mid-1980s.
Dixon et al. identified four major occupational episodes from lithic analysis based on changes in frequency and diversity of lithic artifacts (exotic vs. local and technological changes). This gave a basis, which had not existed, for developing an understanding at a finer scale to the Susitna area chronology. In addition, the necessity for an organized, accessible statewide database of

sites for regional studies was reinforced. We have that system now in a much more user friendly form (AHRS dataset), which allows for the creation of models based on known site locations.

The authors state (1985:3-46) that social organization and ritual data (such as was available) has "limited application…in interpreting the function and patterning of archaeological data," which is an interesting comment. The authors also note, during a review of ethnography, that the basis of chief or "dene" power is essentially economic. However, the authors do not incorporate the import of this social relationship in discussions, for example, on possible effects on trade (relatable to lithic variability or changes in lithic technology, the basis for the occupational episodes). These issues were apparently seen as fodder for future research, and time to fully develop some of the analysis of what was found during the survey was apparently not available.

Eventually, 16 stratigraphic regional units were identified in the project area. The authors noted an increased numbers of subsurface sites located in later field seasons after familiarity with likely areas of buried cultural remains, while the first two seasons located more surface sites. This may have created issues of spurious differences or similarities between site strata through initial unfamiliarity with regional stratigraphy (this may be an issue with all regional surveys), calling into question comparability between earlier and later work. Collation of information may also have been cumbersome, in contrast to what we have available today by way of personal computers.

Dixon et al. is the study of a region but does not really feel as if it takes a regional approach. This is due to a lack of spatial visualization which became more common in ensuing years. GIS visualization was not available, and though analyses on regional scales had been done elsewhere by the 1950s in Viru Valley (Willey 1953) and 1960s in the Southwest U.S. and in the Oaxaca Valley (Flannery 2009), this was a less common approach. The approach here is distinctly site centered, with a chronological focus as opposed to a spatial focus. Following this study, more was known about timing of occupations, but not necessarily about intersite settlement patterns or reasons for variability of the datasets. The attempt to place all sites into broader traditions, phases, etc. required radiocarbon dating and understanding tephra, and this first pass over the area garnered a lot of useful chronological data.

Based on various parts the APE, survey locales were identified and geomorphological traits were recorded during field observation (and compared to terrain units produced by R&M Consultants). Based on objective decisions, areas within the survey locale were effectively stratified as either having high or low cultural resource potential. The method of stratification is based on general site locations and experience in areas outside the region of study, and thus falls in to the category of deductively derived data. This approach is not necessarily an inferior approach, but any unique characteristics of topography, etc. within the region not present in the area from which search criteria are borrowed may be missed (criteria not necessarily transferable wholesale between regions).

In addition, the bias incorporated into the area from which ideas of site potential were borrowed will potentially remain imbedded. This is relevant because large percentages (up to 62%) of study locale areas in the Susitna project were eliminated from field survey based on topographic and practical criteria, which were essentially: 1) "extreme unlikelihood of specific types of environments to contain archaeological sites" which were defined as slopes >15 degrees, standing water, active gravels, sand bars and river channels; and 2) "the difficulty of testing specific types of environments…based on practical limitations of contemporary archaeological survey techniques" (1979:5-10). According to the authors, during one season, testing of these eliminated areas was performed to explore the veracity of these decisions. Apparently, no chi-square or similar statistical analyses were applied to the data to explore significance of associations of variables. This could be done (and has been done to some degree by Potter (2008b) to explore associations of sites and variables within the region, which might address how relevant to the Susitna project were the outside derived variables.

The change from the first document (Environmental Studies Procedures Manual [1980]) and the second (Cultural Resources Investigations 1979-1985 [1985]) is reflected in the revision of the objectives. The more explicitly stated research design in the 1980 document proposed "a research strategy that is structured to gather data necessary to predict site locations in relation to physical and topographic features in the project area" using a "stratified random sampling procedure" (1980:1). The latter document instead acknowledges this design was untenable (the random part of that plan), and describes procedures actually implemented as employment of objective criteria to define high and low potential areas for cultural resources. This is essentially judgmental stratification of the study area, which is currently employed in various studies, but in Dixon et al., (1985) few field checks on these judgments were made, and those that were done were early in the project when the area was less well understood. No statistical tests were used as a basis for judgments either. As most who do archaeological survey modeling today understand, there are seldom clear cut boundaries in reality between high and low potential areas…shades of gray exist and those areas are ones which deserve our attention in order to more closely define what we think we are observing in site patterning or site selection (and which potentially influence survey strategy).

The strength of the Dixon et al. (1980 and 1985) work is the large amount of data compiled (some of which may be useful in GIS modeling applications, and which we assume exists in some form, (such as on computer spreadsheets). In addition, the acknowledgment that research designs need to remain flexible, incorporating data back into the design to make it more robust for understanding site locations is essentially the iterative process frequently advocated today. The evaluation of the design is missing, but, as stated above, for a first pass at data collection, the effort was a good one, though the general depth of shovel test pits to no more than 50 cm could be problematic in areas with considerable sediment deposition. Most intensively surveyed were those areas which would be directly impacted by the project facilities.

Areas that fall within places of certain impact which were not intensively surveyed in the past and considered higher in site potential would of course have to be dealt with; for this reason, any modeling should also include a check on the Dixon et al. areas deemed higher in site potential. Alternatively, if low potential areas (by Dixon et al. standards) hold sites located after the 1980s (found during subsequent surveys) all areas defined as low in site potential would require incorporation into a new site location model (or some type strategy). Areas of high potential should also be redressed and possibly resurveyed, since assumptions driving the first survey may be lacking in some way, which would result in missing certain types of areas of high potential across the survey area.

5.2 Review of Greiser et al. (1985)

The stated goal of the study by Greiser et al. (1985) is to predict the occurrence and density of archaeological sites by chronology, cultural affiliation, and site type within the Susitna Hydroelectric Project's linear features. This goal is adjusted somewhat in the course of the document in regard to density of sites because general site density is too low within the sampled area's identifiable "terrain units." Known archaeological site locations from all time periods and their associated attributes are assessed for relationships to vegetation and terrain (the two environmental factors, each of which has numerous "units"); these assessments are the basis for model scenarios.

About 280 linear miles of survey area were gridded into one-half square mile plots (about 550 plots of 160 acres each) which overlies the linear survey path; of those plots or quadrants, 110 (20%) were chosen for analysis. The quadrants were not chosen randomly, but rather from across the survey area as representative of (in relative proportion to) the variation in vegetation and terrain, the environmental variables. The sites within these quadrants are considered randomly chosen and representative of the possible archaeological sites in the APE.

Based on the results of the sampled area, the authors aim to predict where sites may be located for the total linear survey area of the project. The authors use prior information (from various authors including Dixon, Powers, Hoffecker, Bacon, and Holmes) developed from surveys in similar environments to create their categories for analysis. There is a fairly thorough background discussion of what has been done in this general area of Alaska, how culture chronologies (mainly based on artifact typology) have been defined up to 1985, general subsistence and seasonal rounds within language territories in the APE and general habitat variation within the study area.

Variables include: terrain units (28 classes such as kame deposits, granular alluvial fans, flood plain deposits, terraces, etc.); vegetation units (over 30 classes, but combined into 8 groups for expediency); distance to water (from 10 to 2,500 meters); site type or function (19 types such as kill sites, lithic sources, villages, etc.); site size; period of occupancy (7 periods or traditions); and location (x-y points from AHRS database). Basically, site frequencies by type, chronology and cultural affiliation are counted within the various terrain and vegetation classes. Archaeological sites are implied as dependent variables, though this is not stated perhaps due to the authors' choice of factor analysis, which does not require variables to be categorized as such and no prior assumptions of independence are required. The point of factor analysis, as described by the authors, is to explore the "relative worth" of a number of variables, and to support predictions about the relationships among variables which may indicate consistent associations or "basic patterns" in the data.

Assumptions are (stated and unstated) that ethnographic information is pertinent to prehistory as far as site patterning, that faunal distributions mimic habitat distributions (for considering site type, behavior, and subsistence), and that sites will be non-randomly distributed within specific geographic settings. The null is the opposite, that is, sites would be randomly distributed across the landscape. The stated question is whether "there are vegetation and topographic units that can be used to predict the presence or absence of a particular site type. "

After defining the sites by chronology, site type, and affiliation, counts were made and the frequencies of each as they occur within each terrain unit and vegetation type were recorded for each research quadrant (the 20% of the project area). Cross tabs describe the data and chi-square tests between site characteristics and the two environmental factors tested for independence. Factor analysis was used to score (weight) terrain units and vegetation type associations with site characteristics. These scores were grouped in binomial fashion as indicating either strongly positive or strongly negative associations and listed as such. One can immediately see the classification (categories) by which sites are defined (by type or function especially) are critical to the outcome. In and of itself this issue is not problematic; however, this presumes adequate testing/excavation of sites *prior* to modeling in order to fully understand the nature of a site (necessary for getting at explanation of site patterning).

To determine if sampled units were relevant to the larger survey area, Spearman rank correlation coefficients were used to evaluate the degree of association between two "series" (proportion of acres in sample, proportion of acres in survey area for vegetative and terrain units). An association between the two proportions does exist statistically, which is seen by the authors as validation of the effectiveness of the model. Analysis of variance (ANOVA) performed on site size and other site characteristics and the two environmental variables revealed no significant correlations were found when very large sites were removed from the dataset (these always had a significant relationship to historic period of occupation). Not surprisingly, site size was a problematic variable, and adjustments in transect spacing were discussed in an attempt to address this during survey (possibility of missing small surface scatters). Other tests were significantly correlated, such as campsites and terrain with slight to pronounced topographic relief. In many cases, the authors statistically support patterns of site locations noted by previous researchers. They also support their hypothesis in most cases, that sites are non-randomly distributed across the landscape.

Field work parameters proposed by Greiser et al. (1985) begin with sample quadrants, which were to be subsurface tested and other information was to be very briefly recorded (including "testability" of the area) unless sites were found, in which case more detailed information would be gathered. Spacing of crew members was recommended at 20 to 50 m (*a distance today regarded as inadequate*), and spacing of test pits was 20 to 50 m (*inadequate as shown in more recent survey results*). Excavation of test pits to depths of 30 to 50 cm was also inadequate as deeply buried sites would obviously be missed). The whole 160 acre quadrant was meant to be shoveled tested in this manner. If this was the case, many negative tests would have shown up (many, many more than positive, probably). This would no doubt confirm the non-random hypothesis. Site forms proposed by the authors are thorough and appear similar to those used today in recording sites.

The spatial modeling section of the Greiser et al. (1985) study is well thought out, given available methods and data at the time, but several issues need consideration. The biased nature of the dataset of known sites is noteworthy (the authors admit to the tentative and confusing nature of their dataset, especially in regard to chronology). Thus, the prefield data manipulation is interesting, but is difficult to connect to actual field results. The narrow corridor from which the dataset was chosen and the model built appears to be based on the assumption that site characteristics (connected explicitly to behaviors by the authors) are influenced (strongly positive or strongly negative) by immediate and constrained vegetation and terrain, without regard to the broader surrounding environment beyond 0.5 miles. This may not be the case, especially if sites are associated with trade or other social functions, as well as sites associated with migratory game routes.

In addition, the possibility (very likely) of change in vegetation over time is not addressed. The focus on terrain units (basically topography and surface geology) is useful. Issues with the size of the research quadrant is closely related to the “modifiable area unit problem” where different results are obtained from simply changing the size of the spatial unit of observation; this has implications for understanding site variability across a study area. The attempt at randomizing the survey area by gridding and choosing plots is useful only if the several ecoregions across which this project lay are well understood, which means being inclusive of all the specifics from each ecoregions (specifics of vegetation, topography, hydrography). Systematic gridding, with the purpose of being able to project to non-surveyed areas, would only seem useful if a very close match exists between all variables in the surveyed and non-surveyed areas. This is highly unlikely in the Alaskan boreal environment where there is too much heterogeneity.

The issue of removing some areal extents from the survey area due to nearly zero likelihood of sites was effectively supported in this study though the archaeologists involved in the systematic test pitting definitely would have rather found sites instead of confirming non-existence of sites. This was important, however, because later studies have greater confidence in removing areas of lowest potential from planned survey areas. The shallow depth of test pits to 50 cm is a real problem for discovery of deeply buried sites. Spacing of tests and crew members was too wide, as noted above. Spatial associations of sites within the study area are also not well addressed. No mention of taphonomic issues keyed to terrain or vegetation is included, aside from a general statement of greater preservation in later Athabascan sites (which may or may not be the case dependent on several factors not discussed, including sediment characteristics). This is relevant for considering site chronology and the likelihood of site destruction.

A number of methods used by Greiser et al. (1985) are completely relevant and are still part of modeling in Alaska today. Their stratification of an APE by environmental variables (now commonly also elevation or derived slope and aspect), their use of known archaeological sites and attributes as the dataset, and statistically measuring the significance of associations between sites and variables are basically the same methods employed by many of today’s predictive models.

Differences relate to how we define the environment (how we categorize variables and the placement of importance); this is a moving target, in a sense, since categories can nearly always be defined (and reclassified) differently. Even more numerous variables, if anything, are considered relevant today. Theoretical concepts of how humans interact with their environment and with one another have also developed since the Greiser et al. report, and these developments affect how we define and categorize site types, chronologies and cultural affiliations. Presumably, we are still searching for patterns useful for detecting areas with greater and lesser potential for sites; Greiser et al. (1985) were aware that the patterns seen by using previously identified sites may or may not be a true picture of the pattern of “all” sites.

Because the level of survey coverage to date in many places of Alaska is still a slim proportion of actual acreage, models based on known sites, often called deductive models, are problematic (but expansion of datasets can only improve conditions for modelers and everyone else). How many sites are enough is difficult to say; there is always a chance that a particular site type is not in the known dataset (for a variety of reasons), which effectively skews models based on known datasets. So-called inductive models, in which data is gathered from outside the area of study, are also problematic, especially when considering the heterogeneous nature of boreal landscapes and the importance of microtopography. Models with broad areal extent then, appear to be most useful because some of these issues are reduced by including a wider variety of sites. This may change, however, as numbers of known sites within a region increase; surveys targeting highly associated variables (especially topographic) with closely spaced, judgmentally placed test pits will likely locate more sites and regional patterns may be seen. Models could be created for more constrained areal extents.

Other approaches, especially those using GIS, which can include layers of important information relevant to the prehistoric "agent" such as resource habitat and proximity, distances and costs of travel, can assist the modeler in refining the importance of variables. One of the best parts of the Greiser et al. (1985) report is the *Summary and Future Research Considerations* which touches on several of these options (e.g., development of models of hunter-gatherer behavior based on reconstructed resources), The level of detail required of environmental and cultural data increase for these type models, however. Again, meaningful categorization is required, which is necessarily based on informed understanding of all the (numerous) model components, including human behavior, since essentially we are attempting to recreate realities from other places and times (no easy feat, also noted by Greiser et al.) to winnow down possibilities. However, as Potter (2005, 2006, 2008a, 2008b, 2008c) has pointed out, because we can graphically or statistically illustrate an area of higher site potential in a predictive model, this does not mean the areas of lower potential for sites are actually devoid of sites (a premise not requiring a model to understand, but a good cautionary statement).

Like archaeological survey models today (now more often referred to as "site location" models), Greiser et al. (1985) attempted to create a model useful for predicting site presence by examining particular variables and their association to known sites, mainly for the purpose of reducing the area over which survey was necessary. The Greiser et al. (1985) report furthered efforts in this regard, though some associations, particularly in relation to historic sites, are intuitively obvious statements not requiring advanced study to determine (such as historic structures are associated with the railroad bed, which is on terrain with less relief). The authors may have included some of the overly obvious historic results because the perception was at that time (and still is in many circles) to be scientific we need statistical measures. As with recent modeling efforts, prehistoric and historic variables require separate treatment because the reasons for choosing a site location were different in many cases (if we consider the "agent" making the choices for site location). Likewise, with greater understanding of prehistoric goals, based on greater understanding of paleoenvironments and resources, we may be able to model more effectively for *specific* types of prehistoric sites. In some circles, efforts to reduce the area over which surveys are required, a main focus of predictive models, is considered undesirable and in disagreement with archaeological goals; this is seen most commonly as conflict between cultural resource management and academic archaeologists. This needn't be the case; particularly, GIS can be extremely flexible for changing model parameters and useful for testing associations of variables, which ultimately expands the possibilities of understanding a particular geographic area from whatever research/question/viewpoint you take, cost effectively. This would seem desirable in any circle, and minimizing field survey can also be defined more closely. The topography is made more visible, variables are better understood, and the area can be carefully examined prior to going into the field. If done with a maximum of informed data and by informed archaeologists, predictive modeling is a useful tool; as with any tool, its specific use and purpose requires careful thought and rechecking of results.

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1996 Human Adaptation at the Pleistocene-Holocene Boundary (Circa 13,000 to 8,000 BP) in Eastern Beringia. In *Humans at the End of the Ice Age: The Archaeology of the Pleistocene-Holocene Transition*, edited by L.G. Straus, B.V. Eriksen, J.M. Erlandson, and D. R. Yesner, pp. 255-276. Plenum Press, New York.

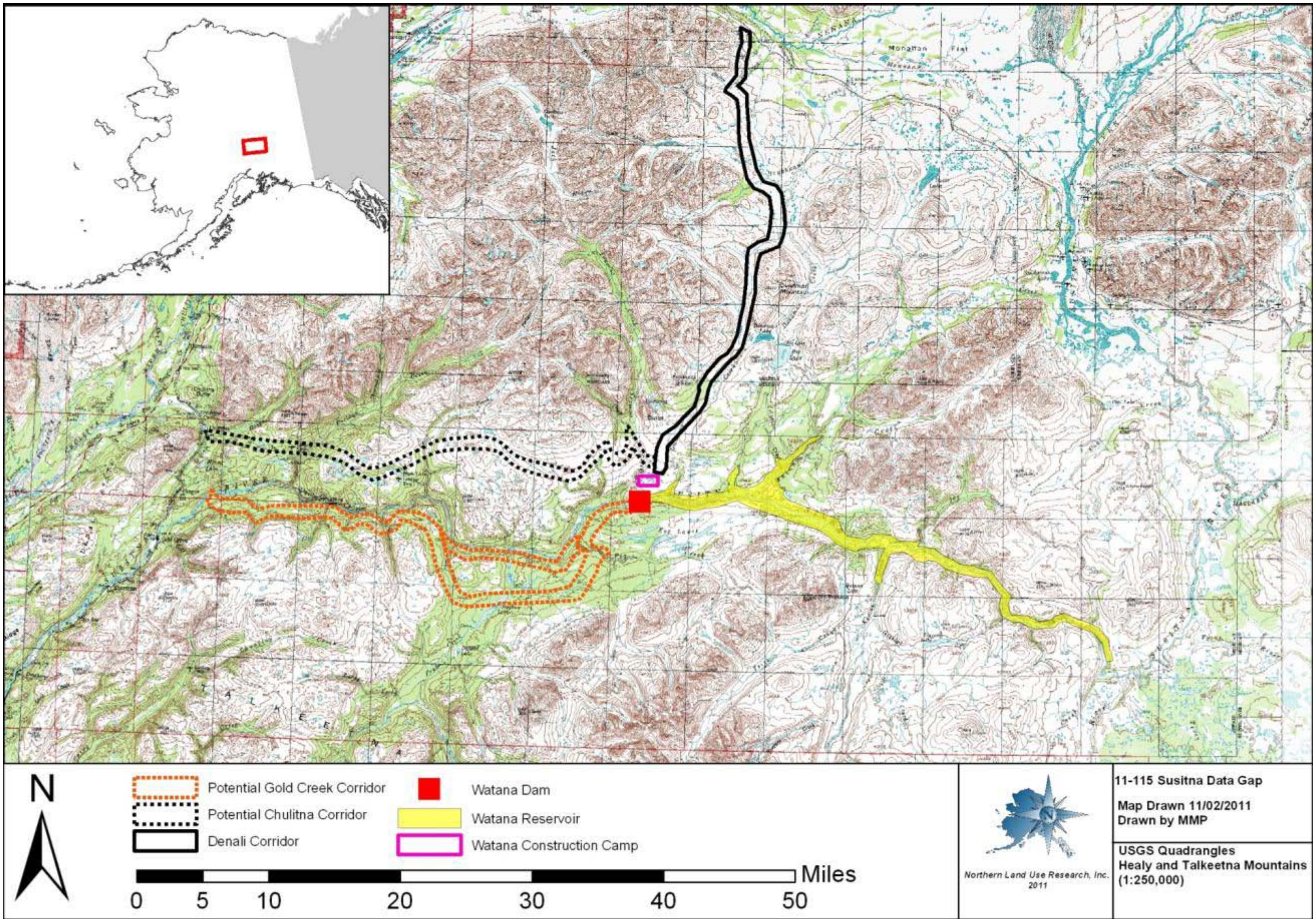

Figure 1. Project location map.

Table 2 Summary of the number of known cultural resources and NRHP eligible sites within 5 miles of each Area of Potential Effect. (Note: because of overlap, some sites appear on more than one construction feature).

AHRS Site Totals	NRHP Eligibility Status
Watana Dam Site	
Total # of Known Cultural Resources: 177 ▪ Prehistoric – 160 ▪ Historic – 9 ▪ Prehistoric/Historic – 2 ▪ Historic/Modern – 1 ▪ Protohistoric – 4 ▪ Paleontological – 1	Number of Resources with Evaluations of NRHP Eligibility Incomplete – 177
Watana Construction Camp	
Total # of Known Cultural Resources: 40 ▪ Prehistoric – 38 ▪ Historic – 2	Number of Resources with Evaluations of NRHP Eligibility Incomplete – 40
Proposed Chulitna Corridor	
Total # of Known Cultural Resources: 82 ▪ Prehistoric – 71 ▪ Historic – 7 ▪ Historic/Modern – 4	Number of Resources with Evaluations of NRHP Eligibility Incomplete – 81 Number of Resources Determined Eligible for Inclusion to the NRHP, But Not Currently Listed – 1
Proposed Denali Corridor	
Total # of Known Cultural Resources: 86 ▪ Prehistoric – 77 ▪ Historic – 7 ▪ Undefined – 2	Number of Resources with Evaluations of NRHP Eligibility Incomplete – 85 Number of Resources Determined Not Eligible for Inclusion on the NRHP – 1
Proposed Gold Creek Corridor	
Total # of Known Cultural Resources: 50 ▪ Prehistoric – 39 ▪ Historic – 8 ▪ Historic/Modern – 3	Number of Resources with Evaluations of NRHP Eligibility Incomplete – 48 Number of Resources Listed on NRHP – 1 Number of Resources Determined Eligible for Inclusion to the NRHP, But Not Currently Listed – 1

APPENDIX A – UAMN INVENTORY OF SUSITNA PROJECT MATERIALS

Susitna
Susitna Hydroelectric Project Documentation
UA Museum – Range 80

Box 1

37 hard-cover yellow "Rite in the Rain" Ring Binders

- All notebooks are labeled as follows:

Reconnaissance 1984 Book I		TLM-216 thru TLM-221	
Reconnaissance 1984 Book IV		TLM-227 thru TLM-231	
Reconnaissance 1984 Book V		TLM-232	
Grid Shovel Testing		TLM-065 – TLM-088	
Grid Shovel Testing		TLM-042 – TLM-062	
Project Journal – Susitna 1984 Book 2			
Susitna Hydroelectric 1984 Indices R- Z			
Altimeter Study – Susitna 1984			
TLM-040	Crew 2	Maureen King Book 1 of 2	Tephra Site
TLM-040	Crew 2	Maureen King Book 2 of 2	Tephra Site
TLM-173	Crew 2	Maureen King	
TLM-174	Crew 2	Maureen King	
TLM-175	Crew 2	Maureen King	
TLM-216	Crew 2	Maureen King Book 1 of 1	
TLM-034	Crew 4	David Rhode	
TLM-060	Crew 4	David Rhode	
TLM-063	Crew 4	David Rhode	
TLM-073	Crew 4	David Rhode	
TLM-119	Crew 4	David Rhode	
TLM-217	Crew 4	David Rhode	
TLM-229	Crew 4	David Rhode	
TLM-029	Crew 5	C.M. Hoffman	

TLM-184	Crew 5	C.M. Hoffman	Book 2
TLM-207	Crew 5	C.M. Hoffman	
TLM-215	Crew 6	Bruce Ream	Book 1
TLM-215	Crew 6	Bruce Ream	Book 2
TLM-220	Crew 6	Bruce Ream	Book 1
TLM-220	Crew 6	Bruce Ream	Book 2
TLM-017	Crew 7	Nena Powell	
TLM-061	Crew 7	Nena Powell	
TLM-064	Crew 7	Nena Powell	
TLM-077	Crew 7	Nena Powell	
TLM-102	Crew 7	Nena Powell	
TLM-104	Crew 7	Nena Powell	Book 1
TLM-104	Crew 7	Nena Powell	Book 2
TLM-171	Crew 7	Nena Powell	
TLM-230	Crew 7	Nena Powell	Book II

Box 2

3 manila envelopes, 3 green hanging file folders, 2 loose file folders (separate from green hanging files), and Appendix D of the report

<u>Three manila envelopes:</u>
Artifact Plates (Appendix D)
Appendix E
Appendix F

<u>Two loose file folders:</u>
Extra Figures – All chapters
Susitna 85 Appendix B (a-b) and Appendix C

<u>Three green hanging file folders:</u>
Impact Assessment Draft Final 1985
Significance 1985
Impact 1985

<u>Loose pages:</u>
Appendix D – Historic and Archaeological Sites Documented as Part of the Cultural Resources Survey
    1,874 pages

Box 3

1 box of aerial photographs (10" x 10") – 17 photos and 3 transparencies
45 folders containing aerial photos and photo logs for several sites
1 bundle of digitized site maps
~140 folders of varying contents. The majority of them contain site location maps

Box 4
Several bound and unbound documents; subjects are as follows:

TLM -128 Diagnostics Flakes > 1.0 gr. with platform
Alaska Power Authority Susitna Hydroelectric Project Environmental Studies Procedures Manual
Phase I Environmental Studies Final Report *draft*
Interim Report on Seismic Studies for Susitna Hydroelectric Project – Dec. 1980
Susitna Hydroelectric Project Plant Ecology Studies – Semiannual Report (Jan – June 1980)
Susitna Hydroelectric Project FERC License Application Exhibit E – Chapters 7, 8, and 9

- 2 copies

Susitna Hydroelectric Project Development Selection Report Appendices A through J
Susitna Hydroelectric Project Newsletter – Sept. 1983
Susitna Hydroelectric Project Social Science Workshop 2: Cultural Resources Research Priorities
Alaska Power Authority *looks to be a paper copy from slides from a presentation*
Exhibit E: Schedules, Outlines and Guidelines – September 21, 1982
Environmental Studies Annual Report 1980: Subtask 7.12 Plant Ecology Studies - May 1981
Environmental Studies Annual Report: Subtask 7.11 Big Game – July 1981
U of A Museum Susitna Hydroelectric Project 1981 Photo Log
TLM-128 1982 Flakes < 1.0 gr. > 1.0 (no platform)
TLM-128 1983 Flakes < 1.0 gr. > 1.0 (no platform)
Environmental Studies First Semi-Annual Report: Subtasks 7.05 Socioeconomic Analysis

Procedures Manual/Research Design: Subtask 7.06 Cultural Resources Investigation
Task 7 Environmental Studies Summary Annual Report 1980 – May 1981
Susitna 1982 Photo Log
Susitna 1983 Photo Log
Un-labeled record book
Environmental Studies Procedures Manual: Subtask 7.12 Plant Ecology
Susitna Hydroelectric Project FERC License Application Exhibit E (unbound copy) – Chapters 4, 5, and 6
Susitna Hydroelectric Project: A Detailed Plan of Study, Task Descriptions – September 1979

Box 5

2 boxes of Kodak color slides
1 binder of black and white slides
3 binders of black and white negatives
1 bound report:

Final Report 1982 Field Season, Sub-task 7.06 Cultural Resources Investigation for the Susitna Hydroelectric Project

Box 6

Final Report 1982 Field Season, Sub-task 7.06 Cultural Resources Investigation for the Susitna Hydroelectric Project
Semi-Annual Report: Subtask 7.06 Cultural Resources Investigation for the Susitna Hydroelectric Project

- 2 copies

"4- Geoarchaeology, Tephrochoronology"
Antiquities Permit Report (1982)

- 3 copies

Antiquities Permit Report (1983)

- 2 copies

Susitna Hydroelectric Project Semi-Annual Report: Subtask 7.07 Land Use Analysis
Quarterly Report: Brown/Black Bear Studies
Susitna Hydroelectric Project Furbearer Studies
Environmental Studies Procedures Manual Subtask 7.06: Cultural Resources Investigation
"3.6 – Systematic Testing"
Preparation of Exhibit E

Environmental Studies Annual Report 1980: Appendix E - Maps of Site Locations and Survey Locales
Environmental Studies Annual Report 1980: Subtask 7.11 Wildlife Ecology Birds & Non-game Mammals
Environmental Studies Annual Report 1980: Subtask 7.11 Wildlife Ecology Furbearers
Environmental Studies Annual Report 1980: Subtask7.07 Land Use
U of A Museum Susitna Hydroelectric Project 1981 Photo Log
Museum: Artifact Plates 1985 Report - Paste-Ups (envelope)
4 sheets of slides depicting artifact plates
Museum: Artifact Plates 1985 Report – Originals (envelope)
1 binder of slides

Box 7

43 hard-cover yellow “Rite in the Rain” Ring Binders
1 paper-back “Rite in the Rain” cross section notebook
1 spiral bound “handi notes” notebook

- All notebooks are labeled as follows:

Missing Artifacts from Collections
Transmission Corridor Notes
Susitna Hydroelectric 1984 Indices A-H
Susitna Hydroelectric 1984 Indices J-P
Project Journal – Susitna 1984

TLM-115	Crew 2	Maureen King	
TLM-251	Crew 2	C.C. Maxwell King	
TLM-182	Crew 2	Maureen King	
TLM-177	Crew 2	Maureen King	
TLM-169	Crew 4	David Rhode	
TLM-217	Crew 4	David Rhode Book 1	
TLM-221	Crew 4	David Rhode	
TLM-126	Crew 4	David Rhode	
TLM-200	Crew 4	David Rhode	
TLM-184	Crew 5	C.M. Hoffman	Book 1
TLM-225	Crew 5	C.M. Hoffman	

TLM-226	Crew 6	Bruce Ream	Book 1	
TLM-226	Crew 6	Bruce Ream	Book 2	
TLM-058	Crew 6	Bruce Ream	Systematic Testing	UA84-95
TLM-199	Crew 7	Nena Powell		
TLM-230	Crew 7	Nena Powell	Book I	
TLM-206	Crew 7	Nena Powell		
TLM-194	Crew 7	Nena Powell		
TLM-222		Reconnaissance 1984	Book II	
TLM-223 thru TLM-226		Reconnaissance 1984	Book III	
TLM-233 thru TLM-234		Reconnaissance 1984	Book VI	
TLM-235 thru TLM-237		Reconnaissance 1984	Book VII	
TLM-238 thru TLM-241		Reconnaissance 1984	Book VIII	
TLM-242 thru TLM-246		Reconnaissance 1984	Book IX	
TLM-247		Reconnaissance 1984	Book X	
TLM-248 thru TLM-250		Reconnaissance 1984	Book XI	
TLM-251 thru TLM-259		Reconnaissance 1984	Book XII	
Survey Locales		1984	#7 thru 27	
Survey Locales		1984 BK	33-133	
Survey Locales			138	
Survey Locales		1984	143 and 144	
Survey Locales		1984	161-167	
Survey Locales		1984	168-179	
TLM-009 thru TLM-039		Grid Shovel Testing		
TLM-094 thru TLM-107		Grid Shovel Testing		
TLM-108 thru TLM-167		Grid Shovel Testing		
TLM-172 thru TLM-214		Grid Shovel Testing		
HEA Sites		Grid Shovel Testing		
Photo Log	B/W			
Photo Log	Color			

Box 8

Several loose paper maps
19 folders of maps
SimCo Cabin TLM-071 1988 Correspondence and Pictures (envelope)
Draft – Site Significance: A Framework for Evaluating Cultural Resources Associated with the Susitna Hydroelectric Project in Central Interior Alaska May 1984
Archaeological Survey and Site Distribution in Relation to Terrain Units 1985
Susitna Hydroelectric Project – Social Science Workshop 2: Cultural Resources Research Priorities
Summary of Susitna Hydroelectric Project Cultural Resources Investigations
Susitna Hydroelectric Project Subcontract for Cultural Resource Services – June 1983
Susitna Hydroelectric Project Cultural Resources – Mitigation Recommendations 1985
-Preliminary Report on the Archaeological Survey of the Upper Susitna River Valley, Alaska in Connection with the Susitna Hydropower Project, 1980
15 folders of Reports

Box 9

102 folders all pertaining to a different sampling locale
6 manila envelopes labeled as follows:
- Survey Locale Map Template
- Template for Site Location Maps
- Reconnaissance Test Profile Template
- Latitude/Longitude Template
- Template for Site Map
- Enlargement Grids for 1:2000 R&M Terrain Unit Maps (1:24,000)

Precision Altimeter Survey Procedures
Bundle of maps labeled as follows:
- Devil Canyon Reservoir Index Map
- Devil Canyon Slope Stability Map (8 different maps)
- Watana Reservoir Index Map
- Watana Slope Stability Map (15 different maps)

46 folders containing misc. information and maps

Box 10

Susitna Hydroelectric Project Environmental Studies: Subtask 7.06 Cultural Resources Investigation Phase 1 Report – April 1982
Susitna Hydroelectric Project Final Report 1982 – Chapter 3 pgs. 3-1 to 3-139: Site Reports
Susitna Hydroelectric Project 1982 Cultural Resources Survey – Final Report March 1983
3 binders black and white negatives
Susitna 1981 – Figures
Susitna 82 – Systematic testing
Susitna 81 – Graphics
Susitna Hydroelectric Project Final Report April 1982 – Chapter 3 pgs. 3-140 to 3-272: Site Reports
Susitna Hydroelectric Project Final Report April 1982

Chapter 5 – pgs. 5-1 to 5-35	Geoarchaeology
Chapter 6 – pgs. 6-1 to 6-5	Paleontology
Chapter 7 – pgs. 7-1 to 7-20	History and Prehistory
Chapter 10 – pgs. 10-1 to 10-18	References

Susitna – Figures

Box 11

Susitna Hydroelectric Project Environmental Studies: Subtask 7.07 Land Use Analysis – Phase 1 Report
Proposal for continued Cultural Resource Studies for the Susitna Hydroelectric Project, 1983-1984
Susitna Hydroelectric Project FERC License Application Exhibit E – Chapter 4 (draft)
Susitna Hydropower Plan of Study
Susitna Hydroelectric Project No. 7114 Supplemental Responses for October 1, 1983
Susitna Hydroelectric Project Volume 8 Exhibit E – Chapters 7, 8, and 9 February 1983
Susitna Hydroelectric Project Plan of Study February 1980
Exhibit A – Project Description
Proposal for Cultural Resource Inventory and Mitigation for the Susitna Hydroelectric Project
Susitna Project Site Maps and Profiles
Site Significance: Evaluating Cultural Resources Associated with the Susitna Hydroelectric Project in
Central Interior Alaska – Draft - (red binder)
Cultural Resources Impacts and recommended Mitigation Measures for the Susitna Hydroelectric Project, Central Interior Alaska – Draft – (black binder)

Box 12

217 folders, each dedicated to an individual site. Documents in each folder are mostly maps - hand drawn and digitized

Box 13

Antiquities Permit Report
Susitna Hydroelectric Project Final Report April 1982
    Table of Contents – pgs. vii – xxix
    Summary i – xxxv
    Chapter 1 – pgs. 1-1 to 1-9
    Chapter 2 – pgs. 2-1 to 2-25
1 binder of black and white negatives
3 binders of slides
Susitna Hydroelectric Project Environmental Studies Subtask 7.06 – Cultural Resources Investigation Appendix E
Susitna Hydroelectric Project Final Report April 1982: Chapter 3 – pgs. 3-273 to 3-424 Site Reports
1983 Field Season Cultural Resources Investigation Volume II
Susitna 82 – Site Reports
Susitna Hydroelectric Project Cultural Resources Impact Statement

Box 14

Appendix D (1,834 loose pages)
Appendix E (box)
Appendix F (box)

Box 15

Several large folders labeled as follows:

Coding Forms Fall 1984 1-99
Coding Forms Fall 1984 100-199
Coding Forms Fall 1984 200-259

Data Files
Data Files
(unlabeled)
Susitna Lithic Tables – By tradition and summary table
Susitna Hearth Features
Susitna Lithic Artifact summary printout
Susitna Athapaskan Tradition Miscellaneous Summary Tables
(unlabeled)
Susitna Sites by tradition printout and tables by tradition
Susitna Fauna Tables

Box 16

193 folders; each dedicated to a different locale. Some are specified as survey locales
1983 Field Season Cultural Resources Investigation Volume I

- 2 copies

1983 Field Season Cultural Resources Investigation Volume II

- 4 copies

Box 17

Susitna Hydroelectric Project Environmental Studies: Subtask 7.06 Cultural Resources Investigation Appendix E
6- Geological and Soil Resources
Susitna Hydroelectric Project Settlement Process: Social Science Workshop 1
1983 Field Season Cultural Resources Investigation Volume III

- 5 copies

1983 Field Season Cultural Resources Investigation Volume II

- 3 copies

Susitna Hydroelectric Project: A Detailed Plan of Study – September 1979

Box 18

Site Location Maps
TLM-184 Summary
1983 Systematic Testing TLM-016
1983 Systematic Testing TLM-030 – Site/Lab Data
1983 Systematic Testing TLM-030 – Samples; Profiles
1983 Systematic Testing TLM-069
1983 Systematic Testing TLM-097
1983 Systematic Testing TLM-184

Box 19

Folders of varying contents, card boxes, loose cards, bound reports, and loose papers

<u>Folders:</u>

- Impact analysis 1983
- Research – Climap
- Artifact Transfer Susitna Lab
- Susitna Field Strategy 1984
- Susitna Historic Sites
- Field Season Index 1983
- Susitna Field Season 1983
- 1984 Research Coding Forms
- Systematic Testing Procedures
- Scope of Work 83-84
- Procedures/Quality Assurance Manual – May 1984
- Report on 1982 Field Season
- Final Artifact Plates Systematic Testing 1983
- Artifact Plates
- Susitna Camera
- Hiring Procedures
- Field Procedures

Susitna 1983 Photo Plates
Susitna 183 Population Report
Sensitivity Maps 1983 T. Lines
T-Lines, Access, & Recreation w/out Sensitivity
T-Lines, Access, & Recreation w/ Sensitivity
Susitna Sensitivity Testing Program
Site Significance
Map Photos Susitna
Appendix Maps Quad Photos
USGS Map Photos 1982
Artifact Photos 1982
Photo Proof Sheets
Tables 4.1 - 4.5
Impact Assessment
Construction Planning Maps
Susitna Project Sampling Locales
Graphics Clean Copy Impact Assessment
Final Report 1981 – Methodology

Reports:
Work Scope for Continued Cultural Resource Studies for the Susitna Hydroelectric Project
Revised: Work Scope for Continued Cultural Resource Studies for the Susitna Hydroelectric Project

- 2 copies

Boxes:
Susitna C14 and Tephra Cards
Photos
Index of Pulled Artifacts: Fog Creek Site TLM-030

Loose cards:
Stratigraphic Profile Descriptions
Specimen Removal Forms
Photo Logs

Box 20 1981 Systematic Testing (just box 20 labeled as such)

7 red binders labeled as follows:

Systematic Testing 1981	HEA-175
Systematic Testing 1981	TLM-022
Systematic Testing 1981	TLM-043
Systematic Testing 1981	TLM-046
Systematic Testing 1981	TLM-050
Systematic Testing 1981	TLM-059
Systematic Testing 1981	TLM-097

Box 21

1 rolled up paper map
1 box of aerial photographs (10”x 10”)
19 folders of “Systematic Testing Sites”
<u>Several Articles:</u>

The Achievement and Early Consequences of Food-Production: A Consideration of the Archaeological and Natural-Historical Evidence
Iron Deficiency in Alaskan Eskimos
Sea Otters: Their Role in Structuring Nearshore Communities
The Athapaskan-Environment System in Diachronic Perspective
Aleuts: Ecosystem, Holocene History, and Siberian Origin
The Nature and Age of the Contact between the Laurentide and Cordilleran Ice Sheets in the Western Interior of North America
Early Man in the New World: Problems of Migration
The Gallagher Flint Station, an Early Man Site on the North Slope, Arctic Alaska, and its Role in Relation to the Bering Land Bridge
The Agricultural Revolution
Examination of a 16,000 year old Frozen Tattoo Body from St. Lawrence Island, Alaska
The Discovery of America: The first Americans may have swept the Western Hemisphere and decimated its fauna within 1000 years

Cultural Chronology of Central interior Alaska
Broken Canines from Alaskan Cave Deposits: Re-Evaluating Evidence for Domesticated Dog and Early Humans in Alaska
A Reported Early-Man Site Adjacent to Southern Alaska's Continental Shelf: A Geologic Solution to an Archaeological Enigma
Tephra Falls in the Middle Susitna River Valley: Implications for Prehistoric Human Ecology

2 File Folders:
Prince of Wales Island Prints/Slides
The Archaeology of Northern Prince of Wales Island
14 folders with varying contents, ie: C14 dating and Faunal Analysis

Box 22

1 box with a report inside
4 green hanging files with varying content

Box 23

1983 Field Season Cultural Resources Investigation Volume I
- 5 copies

1983 Field Season Cultural Resources Investigation Volume II
1983 Field Season Cultural Resources Investigation Volume III
Susitna Hydroelectric Project Horizontal and Vertical Control Surveys – March 1981
Susitna Hydroelectric Project Environmental Studies: Subtask 7.06 Cultural Resources Investigation Appendix E
Phase II Final Report: Sample Survey and Predictive Model Refinement for Cultural Resources Located Along the Susitna Hydroelectric Project Linear Features Volume I
Cultural Resources Investigations 1979-1985 Volume VII, Appendix E, Figures E1-E24
Cultural Resources Investigations 1979-1985 Volume VII, Appendix E, Figures E25-E47

Box 24

21 yellow paper-back “Rite in the Rain” field notebooks
2 yellow hard-cover “Rite in the Rain” ring binders
2 orange hard-cover “level book” field notebooks
3 yellow hard-back “Lietz Engineers’ Field Book” notebooks
18 ‘notebooks’ made of loose leaf “Rite in the Rain” paper
1 small artifact bag of Kodak slides (14 slides)

Box 25

Several folders with some of the following contents:

Site Maps
Land Status Maps
Survey Corridor Maps
Auger Holes
Trails
Access Corridor Maps
Sensitivity Maps
C14 dating documents

Box 26

Folders with the following Categories:

Monthly Report – July 1983
Susitna Correspondence 1984
Susitna Correspondence 1985
Internal
Internal Misc.
1984 CRM Meetings
Review Letters 1982 – 1985

AHRS
1985 Budget
1984 Land Status
1985 CORR
Facilities and Features
1984 Schedule
Site Size
Sensitivity
Tephrachronology/Geoarchaeology
Final Report Lithic Analysis
Cultural Chronology
Site Components
Site Evaluation
Paleontology

Box 27

Site Significance: A Framework for Evaluating Cultural Resources Associated with the Susitna Hydroelectric Project in Central Interior Alaska – Draft
Interim Report on Research Conducted for the University of Alaska Museum Susitna Hydroelectric Project 6-1—5-83 to 11-7-83
Several report drafts
Artifact Photos (in a folder)
HRA Susitna Hydroelectric Linear Features Sample Survey – Phase II. B&W negatives, contact sheets, and photo logs (envelope)
EERC License Application – Exhibit E
1 binder full of slides

Box 28

6 binders labeled as follows:

Duplicate Photo Logs – incomplete
Appendix D 1
Soil Profiles – Susitna

Susitna Faunal Material
Susitna Hydroelectric Project Site Size Delineation
Faunal Sheets – TLM-016 and TLM-077

Box 29 1981 Systematic Testing (just box 29 labeled as such)

8 binders with the following labels:

Systematic Testing 1981	TLM-018
Systematic Testing 1981	TLM-033
Systematic Testing 1981	TLM-038
Systematic Testing 1981	TLM-039
Systematic Testing 1981	TLM-040
Systematic Testing 1981	TLM-042 A
Systematic Testing 1981	TLM-042 B
Systematic Testing 1981	TLM-069

Box 30

47 loose IBM Displaywriter Diskettes (2D)
8 boxes of IBM Displaywriter Diskettes (2D) with the following labels:

ARCS 1 – ARCS 10 (Duplicate)
ARCS 11 – ARCS 20 (Duplicate)
ARCS 21 – ARCS 30 (Duplicate)
ARCS 31 – ARCS 41 (Duplicate)
ARCS 1 – ARCS 14
ARCS 15 – ARCS 27
ARCS 28 – ARCS 41
Susitna Disc

Box 31

109 folders containing documents pertaining to "Survey Locales"
46 folders containing documents pertaining to AHRS sites

Box 32

5 binders with the following labels:

Appendix D 2
1984 Susitna Report Draft Final
1984 Susitna Report Draft Final
Disk Index "84"
Faunal Data Sheets – Susitna 1984 Book III (TLM-222 thru TLM-256)

Box 33

3 boxes containing a combined copy of the Final Report:
    Final Report 1982 Field Season: Subtask 7.06 Cultural Resources Investigation for the Susitna Hydroelectric Project
1 box containing the final Annual Report 1980:
    Annual Report: Sub-Task 7.06 Cultural Resources Investigation for the Susitna Hydroelectric Project
Draft – Environmental Impact Statement: LPK Timber Sale Plan for the 1984-89 Operating Period, Tongass National Forest, Alaska
Several loose pages, copies of portions of the final report

Box 34

4 red binders
25 hard-bound yellow notebooks
3 paper-back notebooks
1 spiral-bound orange notebook

- All notebooks are labeled as follows:

“81” Case Susitna Hydro Feasibility Study		U of AK Museum Archaeology	I
“1981” Case Susitna Hydro Feasibility Study		U of AK Museum Archaeology	II
Susitna Project 1981		U of AK Museum Journal	I
Susitna Hydro-power Project “81”	Anderson	Univ. of Alaska Museum	I
Susitna 1981	Anderson	Univ. of AK Museum	II
Susitna Project 1981	Lester W. Baxter	U of A Museum	I
Susitna Hydropower Project 1981	Betts	Univ. of Alaska Museum	I
Susitna Project	Betts	Univ. of AK Museum	II
Susitna Arch. Clearance	Betts		
Susitna Hydro Project	V. Butler	U of AK Museum	I
Susitna Hydro Project	V. Butler	U of AK Museum	II
Susitna Hypo Project 1981	Jim Kurtz	Univ. of Alaska Museum	1
Susitna Project 7/7/81 – 7/9/81	E.J. Dixon		
Susitna Archaeological Project	Richard Gilaser		
Susitna Project 1981	Jordan	U of AK Museum	II
Susitna Hydro-power Project 1981	J. Jorgensen	U of AK Museum Fairbanks AK	III
Susitna River Archaeology Project	Maureen King	Univ. of Alaska Museum 1981	Book I
Susitna River Project 1981	Maureen King		Book II
1981 Susitna Hydro-power Project	Lisa Kritsis	Univ. of Alaska Museum	I
1981 Susitna Hydro-power Project	Lisa Kritsis	U of AK Museum	II
Susitna Hydro Project 1981	Jim Kurtz	Univ. of Alaska Museum	Book 2
1981 Susitna	Mercotte		
Susitna Hydro-power Project 1981	Peter Phippen	Univ. of Alaska Museum	I
Susitna Hydropower Project 1981	C. Utermohle	Univ. of Alaska Museum	I
Susitna Hydropower Project 1981	C. Utermohle	Univ. of Alaska Museum	II
Susitna Hydropower Project 1981	David Rhode	Univ. of Alaska Museum	I
Susitna Hydro 1981	D. Rhode	Univ. of Alaska Museum	II
Susitna 1981	G. Smith		
Susitna 1981 Soil Stratigraphy			

Binders are labeled as follows:

Systematic Testing 1981	TLM-027

Systematic Testing 1981	TLM-048
Systematic Testing 1981	TLM-062
Systematic Testing 1981	TLM-065

Box 35

3 binders
19 hard-bound yellow field notebooks
6 paper-back yellow field notebooks

- All notebooks are labeled as follows:

Color & B/W Photo Log – Susitna Project June-August 1980
Susitna Bore holes 5/6 – 5/8 1980

Susitna Hydropower Project "1980"	Lester Baxter			
Susitna Hydropower Project "80"	Lester Baxter II			
Susitna Hydropower Project "1980"	Betts #1			
Susitna Hydropower Project "80"	Betts #2			
Susitna Hydropower Project "1980"	Martha Case I			
Susitna Hydropower Project: 1980	Martha Case II			
1980 Susitna Hydropower Survey	James Dixon Jr			
Susitna 1982	J. Dixon			
Susitna Archaeology Project	Maureen King #1	1982		
Susitna Archaeology Project	Maureen King #2	1982		
Susitna Hydropower Archaeology	Lisa Kritsis #1	1982		
Susitna Hydropower Project	Ray Medlock	8/8/80 – 8/27/80		Subtask 7.06
Susitna Hydropower Archaeology	D. Rhode	1982	Notebook #1	
Susitna Hydro Archaeology 1982	David Rhode		Notebook #2	
Susitna Hydro Project "82"	Sattler			
Susitna 1982	Sims			
Susitna Project	G. Smith			
Susitna 1982	G. Smith			
Susitna 1980	G. Smith			
Susitna Hydropower Project: 1980	C. Utermohle I			

Susitna Hydropower Project: 1980	C. Utermohle II
Susitna Hydropower Project "80"	C. Utermohle III
Susitna Hydropower Project: 1980	Ziff

Binders are labeled as follows:

Systematic Testing 1982	TLM-128
Systematic Testing 1982	TLM-130
Systematic Testing 1982	TLM-143

Box 36

Box is full of Ziploc artifact bags…all empty but labeled with provenience information

Box 37

Susitna Hydroelectric Project Final Report April 1982: Chapter 4, pgs: 4-1 to 4-199 – Systematic Testing Discussion and Evaluation
Susitna Hydroelectric Project Environmental Studies Appendix E
Susitna Hydroelectric Project Phase I Report – Chapter 4: Systematic Testing Discussion and Evaluation
Cultural Resources Investigations 1979-1985:

Volume I – Chapters 1-10 Appendix A
Volume II – Appendices B and C
Volume III – Appendix D (Part 1)
Volume IV – Appendix D (Part 2)
Volume V – Appendix D (Part 3)
Volume VI – Appendices E and F
Volume VII – Appendix E (full-scale maps) Figures E1-E24
Volume VII – Appendix E (full-scale maps) Figures E25-E47

Box 38

Site Report Progress Inventory
Mitigation A.C.

1983/1985 Contract
Susitna Hydroelectric Project: Transmission Line Selected Route – Final Draft March 1982 Figures
Before the federal Energy Regulatory Commission Application for License for Major Project: Susitna Hydroelectric Project
Volume 4: Exhibit G February 1983
Volume 6B: Exhibit E – Chapter 3 (figures) February 1983
Volume 6A: Exhibit E – Chapter 3 February 1983
Susitna Hydroelectric Project Phase I Report – Chapter 3: Site Descriptions; 1980 and 1981 Reconnaissance level Testing
Susitna Hydroelectric Project Final Report:

Appendix A – pgs. A-1 to A-20	Literature Review: Archaeology, Ethnology: History
Appendix B – pgs. B-1 to B-13	Literature Review: Geoarchaeology
Appendix C – pgs. C-1 to C-14	Forms
Appendix D – pgs. D-1 to D-3	Correspondence

Box 39

3 binders of B&W negatives
3 binders of color slides
1 bundle of papers:
1984-1985 Susitna Hydropower Project Computer Programs and Data File Examples

Box 40

Cultural Resources Investigations 1979-1985: Volume IV – Appendix D (Part 2)
Susitna hydroelectric Project Volume VII: Exhibit E – Chapter 4 Historic and Archaeological Resources
1983 Field Season Subtask 7.06 Cultural Resources Investigation for the Susitna Hydroelectric Project I
1983 Field Season Subtask 7.06 Cultural Resources Investigations for the Susitna Hydroelectric Project II

Box 41

<u>2 binders:</u>
1980 Susitna Report
Appendix E & F

Box 42

<u>3 binders:</u>

Black & White Photos 1982
Black & White Photos 1981 Roll: 21-46
Color Slides 1980 and 1981

1 folder of color slides and B&W photos and artifact plates 1982

Box 43

1 folder – Susitna 1980
6 binders with the following labels:

Final Report 1982 Field Season Subtask 7.06 Cultural Resources Investigations for the Susitna Hydroelectric Project, J. Dixon et al. – December 1982
Susitna Hydropower Project Faunal Sheets TLM-089 thru TLM-221 1983-1984
Susitna Report 1984/1985
1982 Faunal Remains Survey
Reading File – Susitna Lab 1983/1984
Susitna Hydropower Project Faunal Sheets 1981

Box 44

4 binders
1 bunch of index cards with provenience information on them for C14 samples taken in the field
33 hard-cover yellow field notebooks
8 paper-back yellow field notebooks

- All notebooks are labeled as follows:

Susitna Archaeology 1983	Mapping Book I	TLM-016, TLM-017, TLM-030, TLM-180
Susitna Archaeology "83"	Mapping Book II	TLM-030
Susitna Archaeology 1983	Mapping Book III	TLM-097, TLM-184
Susitna Photograph Record "83"		TLM-030

Systematic Testing Photo Record "83"		TLM-184, UA83_110	
Grid Shovel Testing "83"		TLM-030	
Susitna Project	W. Andrefsky		U of A Museum
Susitna Project 1983 Crew 4	Paul Buck	I	UAF Museum
Susitna 1983	R.J Dale		
Susitna Project 1983	Gillispie	I	UA-F Museum
Susitna 1983	Gillispie	II	
Susitna 1983	P. Haessig	Book 1 of 2	
Susitna1983	P. Haessig	Book 2 of 2	
Susitna Project Crew 4 1983	Hemphill		University of Alaska Museum
Susitna 1983	Chuck Hoffman		
Susitna 1983	Beth Horvath	I	
Susitna 1983	Beth Horvath	II	
Susitna Hydro Project 1983	Anne M. Jensen	I	U of A Museum
Susitna 1983	Bill Johnson	Book 1 of 2	
Susitna 1983	Bill Johnson	Book 2 of 2	
Susitna Hydro Project	Jordan	Hammer Drill Holes Clearance	
Susitna1983	Jordan		U of A Museum
Susitna 1983	Maureen King	Notebook I	U of A Museum
Susitna 1983	Maureen King	Notebook II	U of A Museum
Susitna Hydro Project 1983	S. Ludwig		
Susitna Project Crew 4	Herbert Maschner		UAF Museum
Susitna 1983	Owen Mason	I and II (stuck together)	
Susitna 1983	Nijhowne	I	
Susitna 1983	Nena Powell	Book 1	
Susitna Project	Ream		UAF Museum
Susitna 1983	Saleeby	Vol. I	
Susitna 1983	Saleeby	Vol. II	
Susitna 1983	Sattler	Vol. I	
Susitna Hydropower Project	Sattler	Vol. III	Univ. of Alaska Museum
Susitna 1983	S. Shelley		
Susitna 1983	Dixon Sims	Book II	
Susitna 1983	Dixon Sims		

Susitna 1983	G.S. Smith		
Susitna 1983	C.J. Utermohle		U of A Museum
Susitna 1983	Allison Young	I	

Binders are labeled as follows:

1983 Systematic Testing	TLM-030	Square Summaries
1983 Systematic Testing	TLM-180	
1983 Systematic Testing	TLM-128	
1983 Systematic Testing	TLM-215	