13. CULTURAL RESOURCES

13.1. Introduction

AEA is undertaking studies addressing the effects of the proposed Project on cultural resources. Information from these studies will be used to assist in identifying appropriate protection, mitigation, and enhancement measures that will be proposed in the AEA license application.

This study plan outlines the purpose and framework for evaluating the potential effects of the Project on "historic properties." Section 106 of the National Historic Preservation Act (NHPA) requires the Federal Energy Regulatory Commission (FERC) to take into account the effects of licensing a hydropower project on any historic properties in the Project's Area of Potential Effect (APE). Historic properties are those included in or eligible for inclusion in the National Register of Historic Places (National Register). Under Section 106, moreover, FERC must provide the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on the project's effects on cultural resources. To help ensure compliance with Section 106, FERC requires license applications to include a report discussing cultural resources in the proposed Project's APE that may be affected by the proposed Project.

A cultural resource study plan typically investigates sites and objects from the past that may lie within the proposed study area. Material cultural resources such as stone tool artifacts are used to identify and evaluate sites. Non-material cultural resources such as traditional place names and ethnogeography are important for identifying sites and especially for evaluating site significance. Non-material evidence of past human activity are now unattainable in vast regions of Alaska, but in the Susitna Project study area Alaska Native entities still have strong contemporary and traditional ties to the land. As shown in Figure 13.1-1, Cook Inlet Region, Inc. (CIRI) has extensive holdings in the vicinity of the impoundment and the Chulitna and Gold Creek corridors. Ahtna, Incorporated (Ahtna) holds land along the northern portion of the Denali corridor near Cantwell. Much of the proposed Project area is located in the western portion of the traditional territory of the Ahtna Athabascans, which included the upper Susitna River drainage upstream from Talkeetna and the upper Nenana River. The study area also encompasses the periphery of the traditional territory of the Dena'ina Athabascans, including part of the Talkeetna Mountains and middle Susitna River (Kari and Fall 2003; de Laguna and McClellan 1981; Kari 2008). As addressed further in the discussion of ethnogeographic resources (Section 13.5.2.2), linguistic data from this area has been accumulating for over 30 years and will be incorporated into this cultural resource study plan.

This cultural resources study plan proposes to inventory, document, record, identify, and evaluate cultural resources within the proposed APE. The plan begins with a discussion of the nexus between cultural resources and FERC's licensing of the Project (Section 13.2), continues with statements of goals and objectives and identifies laws, regulations, and policies that may apply to the cultural resource investigations (Section 11.3), and states how the proposed work is embedded within accepted archaeological and anthropological perspectives and practices (Section 13.5.5). The record of consultation in the preparation of this study plan is summarized (Section 13.4) and also appended (Attachment 13-1). The plan for cultural resource investigations in 2013 and 2014 is discussed in detail in Section 13.5.

13.2. Nexus Between Project Construction / Existence / Operations and Effects on Resources to be Studied

NHPA Section 106 requires FERC to take into account the effect that licensing a hydropower project may have on any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. These historic properties can include archaeological sites and isolated finds (both precontact/prehistoric and post-contact/historic); properties of religious and cultural significance to an Indian tribe (as defined at 36 CFR § 800.16(m)), including traditional cultural properties (TCPs); and built environment resources (material resources of an architectural or engineering nature). Because FERC's licensing of a hydroelectric project is an undertaking that may have an effect on historic properties, and because it is not always possible to identify all project-related effects that may occur over the long term of a license, FERC typically requires license applicants to develop and implement a Historic Properties Management Plan (HPMP) to guide the consideration and management of effects on historic properties during the term of the license. The Alaska Historic Preservation Act requires similar considerations for historic properties on state land.

The construction and operation of the Project is expected to generate both direct and indirect effects on cultural resources. Changes to the character or use of such resources may occur through ground disturbance associated with construction of the dam and associated linear facilities (e.g., roads and transmission lines); through inundation within the impoundment; and (over the license term) potentially through reservoir shoreline erosion and gradual development of recreational trails. In addition, downstream impacts to historic properties are possible due to Project-induced stream-flow variation. Changing patterns of subsistence and recreational land use brought about by the Project also have the potential to affect historic properties.

Determining whether construction and operation of the proposed Project will affect any historic properties requires: systematic inventory of cultural resources within the APE for the Project; National Register eligibility determinations on cultural resources that may be affected by the Project; and assessment of potential Project-related effects on all National Register-eligible cultural resources. The 2013 and 2014 cultural resource investigations will continue the inventory and evaluation process beyond that of 1978-1985 to include the revised geography of the current Project's direct and indirect APEs. All inventoried cultural resources that may be affected by the proposed Project will be evaluated for National Register eligibility. Eligible historic properties will be analyzed for potential Project-related effects. These investigations will be conducted in consultation with the Alaska State Historic Preservation Officer (SHPO), ACHP, federal land management agencies, Alaska Native entities, local agencies, and landholders. Restricted consultation/distribution lists may be necessary to protect sensitive locational information on cultural resources.

13.3. Resource Management Goals and Objectives

Federal, state, and borough agencies, as well as Alaska Native entities, have formal laws, regulations, and/or policies which may be relevant to analysis of Project impacts on cultural resources and inform the development of a HPMP.

Federal Laws include:

- 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.)

Federal Regulations include:

- 18 CFR Part 5: FERC Integrated License Application Process
- 18 CFR Part 380: Regulations Implementing the National Environmental Policy Act
- 36 CFR Part 60: National Register of Historic Places
- 36 CFR Part 79: Curation of Federally-Owned and Administered Archaeological Collections
- 36 CFR Part 800: Protection of Historic Properties
- 43 CFR Part 7: Protection of Archaeological Resources
- 43 CFR Part 10: Native American Graves Protection and Repatriation Act

Federal Executive Orders (E.O.) include:

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

State Laws include:

- AS 41.35: Alaska Historic Preservation Act

13.4. Summary of Consultation with Agencies, Alaska Native Entities and Other Licensing Participants

A summary of consultation with interested parties (received after the release of the PSP) was used to develop the cultural resources study plan and is provided in Table 13.4-1. The Proposed Study Plan (PSP) was posted to the AEA website for comment from agencies and stakeholders. The table shown below documents the comments in chronological order provided to AEA during public technical work group (TWG) meetings. Attachment 13.7-2 provides documentation of consultation.

Table 13.4-1. Summary of consultation on Cultural and Paleontological Resources study plans.

Comment Format	Comment Date	Licensing Participant Name	Licensing Participant Affiliation	Comment	Response
Cultural Resources Study (Section 13.5)					
TWG notes	8/12/2012 & 9/7/2012	Lisa Wade & Angela Wade	Chickaloon Native Village	Request made for consideration of culturally modified trees (CMTs)	Section 13.5.4.3 has been added to the RSP to define CMTs (e.g. scar, plank removal, bark removal, burn) and methods for field discovery.
TWG notes	8/12/2012	Frank Winchell	FERC	Would Alaska Native representatives be able to participate or monitor field studies?	The draft RSP has been updated to include an internship program to incorporate one or more Native interns in field and monitoring efforts to help inform stakeholders and develop shared perspectives on cultural resource inventory and evaluation.
TWG notes	8/12/2012	Frank Winchell	FERC	Request made for more refined definition of indirect APE	Section 13.5.3 of the draft RSP has been updated to describe the indirect APE which includes Project-induced dispersed recreation, and other areas adjacent to Project facilities including potential visual impact areas. The indirect APE is depicted in Figure 13.5-2.
TWG notes	8/12/2012	Frank Winchell	FERC	Request made for better definition of areas surveyed in 1980s and their intensity	Section 13.5.2 of the draft RSP describes the 1980s era survey data. .Figures 13.5-3 and 13.5-4 have been added to the draft RSP to identify survey coverage and intensity of these prior surveys. Sections 13.5.4.1 and 13.5.4.2 of the draft RSP have been updated to describe how these data are used in the development of the probabilistic model and sampling strategies.

Comment Format	Comment Date	Licensing Participant Name	Licensing Participant Affiliation	Comment	Response
TWG notes	9/7/2012	Richard VanderHoek	AOHA/ SHPO	Will reservoir direct effects APE include a margin around the normal high water pool elevation of 2,050 to account for landslides and permafrost areas affected by the reservoir filling (and to accommodate possible future reservoir recreation facilities along the shoreline like possible boat-in campgrounds found at other reservoirs)?	Figure 13.5.2 defining the direct APE for study area accommodates potential landslide zone and potential shoreline recreation by using the 2,075-foot elevation boundary. The direct APE may be modified based on the results of mass wasting and erosion studies.
TWG notes	9/7/2012	John Jangala & Dara Glass	BLM & CIRI	The plans need to consider any 14(h)(1) ANCSA selections in the study area and identify the current status of those (including information on BIA surveys of those areas)	The cultural resources study team has identified one 14(h)(1) site within the study area. The 14(h)(1) sites had been excluded from the scope for the prior Data Gap Analysis; but arrangements have been made to acquire data from BIA and incorporate into the 2013-14 survey inventory prior to finalization of the RSP.
TWG notes	9/7/2012	Frank Winchell and others	FERC	Need discussion of how the locational model developed in 2012 will be used in the study methodology.	Section 13.5.4.2, supplemented by Tables 13.5-1 and 13.5-2, has been added to the RSP to explain details of the site location model.
TWG notes	9/7/2012	Fran Seager-Boss	Matanuska-Susitna Borough	Request made for inclusion of Matsu Borough archaeologists in field program	Agreement was reached to incorporate Matsu Borough archaeologists, as available, in the 2013-14 field effort and the draft RSP has been updated in Section 13.5.4 to reflect this.
TWG notes	9/7/2012	Frank Winchell & others	FERC	Recommends describing how ethnogeography work will be analyzed or focused to areas that might be affected by the Project since the language area map encompasses such a large area.	Figure 13.5-1 has been added to the RSP to show Native language boundaries, with explanatory text in Section 13.5.2.2.
TWG notes	9/7/2012	Frank Winchell & others	FERC	Request made for map of Native land ownership in study area	Figure 13.5.2 has been added to the RSP to show Native land ownership in the study area.

Comment Format	Comment Date	Licensing Participant Name	Licensing Participant Affiliation	Comment	Response
TWG notes	9/24/2012	Dara Glass & Becky Long	CIRI & Coalition for Susitna Dam Alternatives	Adding trails that extend to the reservoir was considered appropriate for indirect effects analysis area but need to be clear of what sources are used to map the trails, or even segments of trails and indicate any designation or official status of trail, or whether the appear to be user-made trails. Note that the mapping of trails is to now way indicate that use of these trails is authorized.	Map legends have been updated to indicate that the mapping of the trails does not mean they are open or designated for public use.
TWG notes	9/24/2012	John Jangala	BLM	Add Raptor Trail to indirect effects APE map as it does lead toward Watana Creek (which would be Watana Arm of the reservoir)	Figure 13.5.2 showing the indirect APE has been revised to include the Raptor Trail.
TWG notes	9/24/2012	Dara Glass	CIRI	Recommend adding ANSCA Corporation boundaries to a map in cultural resources study plan to show current use areas in relation to historic language areas in particular.	Figure 13.1.1 has been added to the RSP to show Native land ownership in the study area.
TWG notes	9/24/2012	Rich VanderHoek & various	SHPO/ AOHA & various	Provide additional details of survey methods, both qualitative and quantitative where possible.	Qualitative and quantitative details of the proposed survey methods have been added to the RSP in Sections 15.5.4.1, 15.5.4.2, and 15.5.4.3.
TWG notes	9/24/2012	Richard VanderHoek	SHPO/ AOHA	Request for clarity in applying trail information to both reconstruction of historic use versus defining potential impacts.	Agreement to develop data on three types of trails: BLM layer, field observation layer, and historic foot trail layer, as stated in Section 13.5.4.6 of the RSP.

13.5. Cultural Resources Study

13.5.1. General Description of the Proposed Study

The study area proposed herein consists of both a direct and indirect APE. The direct APE includes areas of anticipated direct effects, particularly areas subject to ground disturbance from Project construction. The direct APE encompasses the reservoir impoundment area, construction camp, and three access corridors (Figure 13.2-1). The impoundment area represents a 23,835-acre area below the 2,075 ft. contour. The three proposed access corridors differ in length and area. The *Chulitna Corridor* is 51.8 miles long and 36,107 acres in area; the *Denali Corridor* is 62 miles long and 45,097 acres in area; and the *Gold Creek Corridor* is 54.7 miles long and 59,750 acres in area.

The indirect APE consists of those areas outside of the direct APE that may experience Project-induced activity, particularly dispersed recreation. These areas include: the Upper Susitna River corridor up to the Denali Highway Bridge, Fog Lakes, areas around the inundation zone that are within local drainages that would flow into the reservoir, existing trails and camps, and BIA ANSCA 14(h)(1) sites (in addition to those within the direct APE). In consultation with interested parties during summer and fall 2012, the direct and indirect APEs were refined based on: a recalculation of the impoundment area using the 2,075-foot elevation (25 feet above proposed normal maximum pool level to account for potential shoreline changes caused by the reservoir filling and operation), reconsideration of watersheds and topographic features as natural boundaries to new human travel beyond the direct APE, preliminary results of the 2012 archeological field reconnaissance and consequent modeling of likely areas for cultural resources, and identification of known trails where uses may increase as an indirect result of the Project. The APE as updated for this revised study plan combines the current definitions of the direct and indirect APE to design the sampling strategies and priorities of the 2013-2014 field studies. The APE may be further adapted based on results from AEA's ongoing environmental and engineering studies.

A total of 90 known cultural resource sites (80 prehistoric, four Euroamerican historic, and two Alaska Native historic) are currently identified within the Susitna-Watana impoundment area as part of the direct APE (Figure 13.5-2). The proposed corridors have a combined total of 29 previously-documented sites (all precontact/prehistoric except for one historic). Additional sites likely exist in unsurveyed areas within the APE. The known sites will be relocated in 2013 and 2014 and coordinates will be recorded with a survey-grade, handheld GPS unit. Other standard site data will be recorded and the previously described site conditions will be verified.

Phase I (Inventory) surveys will be conducted in areas of the direct and indirect APEs not previously surveyed or in areas within the APE that the 2012 locational model identifies as high potential for the occurrence of cultural resources. A combination of low and slow aerial reconnaissance from a helicopter and systematic pedestrian transect survey will be employed during Phase I surveys. Phase II (Evaluation) studies will be conducted in portions of the direct APE based on the conclusions of the Phase I surveys, to assess eligibility and to analyze the effects to eligible historic properties that might be adversely affected by the Project. Both Identification and Evaluation Phase surveys will follow established professional guidelines, including the Alaska Office of History and Archaeology Historic Preservation Series No. 11 (OHA 2003).

As noted above, the direct APE may include TCPs. As described in National Register Bulletin #38 a TCP is a property, i.e., a place, that is eligible for inclusion in the National Register because of its association 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. Determining whether a property qualifies as a TCP requires systematic review and evaluation similar to that devoted to archaeological properties, with additional considerations.

The ethnogeographic portion of the study includes working with Ahtna and Dena'ina elders to integrate Alaska Native perspectives on historical land use and cultural values into the cultural resource investigation. Through a partnership with Ahtna, Inc., the regional corporation for the Ahtna people, the ethnogeographic component of the 2013-2014 Cultural Resources Study Plan will document Ahtna perspectives and ethnographic context for significance of the cultural resources sites potentially affected by the Project. Included will be traditional Ahtna land use and settlement patterns, seasonal migrations, religious and sacred sites, and traditional foot trail systems. Ahtna language place name records on file (Kari 2008, 2012) will be consulted, and linguistic analysis of Ahtna place names, including archival taped sources and confirmation interviews with Ahtna Elders, will provide insight into the geographic information (notably hydrology) encoded in the Ahtna terms and narratives for important places. For the Dena'ina communities of Chickaloon and Knik, the study team will build on existing Upper Cook Inlet Dena'ina places names work (Kari and Fall 1987), supplementing with additional interviews with knowledgeable Dena'ina elders. In consultation with Doyon, Limited and other tribal officials, similar interviewing may be used to record historic use in the project area by Doyon region residents, particularly those from Nenana,

13.5.1.1. Study Goals and Objectives

The goals of the 2013-2014 cultural resources study plan are to systematically inventory cultural resources within the APE (36CFR 800.4(b)), evaluate inventoried cultural resources that may be affected by the Project for National Register eligibility (36 CFR § 800.4(c)), and determine Project-related adverse effects on National Register-eligible historic properties within the APE (36 CFR § 800.5).

Specific objectives are to:

- consult with the SHPO and Alaska Native entities throughout implementation of the 2013-14 cultural resources survey;
- inventory cultural resources within the APE;
- evaluate National Register eligibility of cultural resources within the APE that may be affected by the Project;
- determine the potential Project-related effects on National Register-eligible historic properties within the APE; and
- develop information needed to prepare a HPMP for the Project.

The TCP study will be informed through the ethnogeographic study, which has as its goals the identification, inventory, and evaluation of landscape features and resources within the APE that have been and continue to be important to the Ahtna people. The objective is to use

ethnographic landscape and place name data to help identify TCPs according to procedures set forth under 36 CFR Part 800, and determine their significance according to National Register criteria (36 CFR § 60.4). Traditional land use patterns of the study area by the Ahtna were based on a migratory cycle that followed the fish, game, and plant harvesting opportunities. A complex system of travel and trapping cabins, trails, fish camps, trade routes, portage areas, trap lines, hunting ranges, seasonal camps, and winter villages has been in use for many generations. Some of these use patterns continue today, incorporating modern subsistence harvest technologies and transportation while maintaining traditional use areas by family and clan. Subsistence activity and land use have also been affected in modern times by regulations on subsistence, aboriginal land title changes (ANCSA and the Alaska National Interest Lands Conservation Act [ANILCA]), schooling, child protection, and medical care laws and regulations. The ethnogeographic study addresses the following topics, with emphasis on Ahtna tribal practices, supplemented by information on Dena'ina and Tanana tribal practices as appropriate:

- land use patterns in the study area, including the seasonal migration patterns of the late 19th and early 20th centuries, and how they relate to the system of trails, trap lines, hunting and fishing sites, winter villages, and religious sites
- types of wild resources exploited and traditional ecological knowledge about historic animal and fish populations in the area
- traditional stewardship (i.e., traditional management practices)
- contemporary values associated with the landscape
- transcription and translation of language texts that pertain to the Project APE
- hydrological concepts embedded in place names, directional system, and landscape narratives

13.5.2. Existing Information and Need for Additional Information

Cultural resource investigations conducted within the study area between 1978 and 1985 for prior project designs (referred to as "early 1980s-era") documented almost 300 cultural properties believed to span the last 11, 000 years. Site types in the inventory include historic and precontact archaeological sites, historic buildings and ruins, and other cultural features. About one-third of the sites are in or near the location of the proposed Watana Dam and impoundment. Approximately 90 percent have stone tools and other prehistoric artifacts, about 10 percent are historic sites consisting of building ruins and/or scatters of commercially manufactured items (metal cans, bottles, etc.), and less than 1 percent are fossils of animals or plants. The more recent Native sites are from the Athabascan Indians who inhabited the area historically and hold the majority of the area's Alaska Native place names in their linguistic dialect (Ahtna); the older sites fade into a more generalized adaptation shared by Alaska's ancient interior peoples. Historic sites in the Susitna-Watana area reflect mining, prospecting, hunting, trapping, fishing, and recreational pursuits, as well as simply remote Alaska living.

13.5.2.1. Archaeological Resources

Between 1978 and 1985, archaeologists conducted cultural resources surveys, testing, and site excavations for the proposed APA Susitna Hydroelectric Project and ancillary facilities (construction camps, transmission lines, and access roads). Although the project proposed in the 1980s had a different footprint than the currently proposed Project, there is considerable overlap. For the 1980s project, annual and summary reports from the early 1980s-era described over 270 sites that required some form of analysis and curation of associated artifacts (e.g., Dixon 1985; Dixon et al. 1985; Greiser et al. 1985, 1986). Another 22 previously known sites were revisited and documented. Of the sites found, 111 were discovered through subsurface testing (amounting to approximately 28,000 shovel tests). Of those known sites, 87 percent have prehistoric/precontact remains, 2 percent have postcontact/protohistoric remains, 10 percent have historic and modern remains, and one site has paleontological remains. Advances in geoarchaeological techniques and modeling the region's stratigraphy in the last 30 years, especially those focusing on volcanic ash or tephra deposits, prompts re-examination of the conclusions reached in the 1980s. Revisions are anticipated in the understanding of site locations and distributions through time and space and how they relate to historic Native land use, the Project area's cultural chronology from a regional perspective, and its place in the greater scheme of North American prehistory.

More than a quarter-century of modern archaeological research has been carried out in Alaska since the original Susitna work, aided by new methods and technology including GPS and GIS, geoarchaeology, geochronology, stratigraphic analysis, lithic and faunal analysis, and ice patch research. Research in south-central and interior Alaska river drainages has demonstrated that the prehistoric cultural chronology and dynamics are far more complex than was previously believed (i.e., Dixon 1985). Modern advances in radiometric dating techniques in particular require re-examination of the radiocarbon dates from the Project area. Accurate dating is essential to determine site significance -- which can depend on cultural affiliation, archaeological tradition, and microstratigraphic layers that may represent multiple occupations and/or components spanning hundreds or thousands of years. A sample of sites will be prioritized for radiometric dating. Conditions that allow preservation of organic archaeological materials are relatively rare in the study area. Those sites that do contain well-preserved materials (such as animal bone or charcoal) and especially sites that have multiple occupations are typically a higher priority to date than sites such as small flake scatters. Sites that have well-preserved organic features such as buried hearths or buried soils and tephra would also be given higher priority for dating. Sites that represent a culture, archaeological tradition, and/or period in prehistory that is poorly understood would also be given a higher priority. Age determination can be helpful in evaluating a site's eligibility for listing in the National Register.

The cultural resources data gap report (Bowers et al. 2012) reviewed and summarized the cultural resource literature for the Project area prepared during the 1978 to 1985 environmental studies. Data gaps identified include inadequacies in the locational information for sites due largely to limitations in field and mapping methods of the time. The cultural chronology within the APE warrants re-examination due to more modern dating techniques (e.g., accelerated mass spectrometry [AMS] radiocarbon [^{14}C], optically stimulated luminescence [OSL]) and newer geoarchaeology (in this case tephra) studies. Investigations of prehistoric land use patterns in interior Alaska have progressed to the testing of more sophisticated locational models applicable to the Project's cultural resources field studies. Partial inventories of Alaska Native place names

exist that were not available during the early 1980s-era studies and they, too, can now be incorporated into locational models and field survey strategies.

13.5.2.2. Ethnogeographic Resources

The Project area includes land important to CIRI and the Dena'ina tribal communities, Ahtna, Inc., and the Ahtna tribal communities, and potentially the Tanana-speaking tribal community in Nenana. Based on linguistic data the Ahtna traditional use area included the Susitna-Watana Project impoundment and lands to the west (Figure 13.5-2) -- further west than the Ahtna regional corporation boundary (Figure 13.1-1). Alaska Native regional corporation boundaries established by the Alaska Native Claims Settlement Act (ANCSA) in 1971 drew the CIRI boundary east into the area historically used by the Ahtna. Recognizing the interconnections of corporations and tribes, the ethnogeographic study will concentrate on the Ahtna traditional use area, supplemented by interviews with knowledgeable Dena'ina elders (particularly from Chickaloon and Knik), and as appropriate with Tanana elders from Nenana.

The early 1980s-era studies in the Project area did not recognize Traditional Cultural Properties (TCPs) because the concept did not exist as a formal concept within historic preservation law or regulation. Now, investigation addressing TCPs is required for compliance with Section 106 of the National Historic Preservation Act. There were little data collected about Alaska Native place names in the prior studies (e.g., Dixon et al.1985; Greiser et al. 1985, 1986), and the information that was collected does not meet current standards nor is it in modern geospatial format (see Bowers et al. 2012; Simeone et al. 2011). However, during the years since the early 1980s-era studies Ahtna place names data have been collected by James Kari, William Simeone, and others (e.g., Kari 1983, 1999, 2008, 2010, 2011, 2012).

Ethnographic data – in the form of interviews, archival documents, and linguistic data (place names) – can help define the value or cultural significance of a site to the Ahtna, Dena'ina, and Tanana peoples, which in turn will help determine whether TCPs exist in the Project area. The data will also contribute to the locational model for identifying potential archaeological sites. For example, ethnographic data documenting annual or seasonal activity (including the type of resource used, where harvested, method of harvest, and season of harvest) may help in detecting archaeological sites. Ethnographic data also better enables development of historical and cultural context for a site, which is necessary to determine its significance and possible eligibility for the National Register. Ethnographic data aides in the interpretation of sites and artifacts on a variety of levels, addressing such topics as: (1) how a site or artifact was used; (2) how a site fits into Alaska Native and non-Native history; (3) whether a site's content can be applied to the explanation of the area's cultural history; and (4) if a site has religious or other significance not apparent from its physical attributes.

The ethnogeographic study builds on previous research by principal investigators Dr. William Simeone and Dr. James Kari, and will be modeled after the approaches of Simeone and Kari (2002, 2004) and Simeone and Valentine (2007). As with both those studies, the ethnogeographic study for the Project will combine ethnographic, historical, and linguistic research to document traditional Ahtna land use patterns, stewardship practices, and Ahtna traditional knowledge for use by state and federal agencies to make management decisions. The approach to be taken in applying the Susitna data to TCPs parallels aspects of a similar effort addressing Ahtna TCPs sponsored by the Bureau of Land Management (BLM) as part of the East Alaska Resource Management Plan (Kari and Tuttle 2005).

13.5.3. Study Area

The study area or Area of Potential Effect (APE) for the Project is composed of an area of direct effect and an area of indirect effect – the geographic region in which the character or use of historic properties may be affected directly or indirectly by construction and operation of the Project. The APE for both direct and indirect effects is identified using several types of information, including Project engineering (transportation corridors and potential visitor infrastructure), known or likely human use patterns, and topographic features that may act as boundaries to visitor travel beyond the project footprint. The study area -- particularly the indirect APE – may undergo revisions in size through the consultation process with interested parties, based on the results of other licensing studies. Currently, the total area within the study area is 164,791 acres.

13.5.3.1. Area of Potential Direct Effects

Direct effects to cultural resources are those consequences directly attributable to construction and operation of the Project, including inundation and disturbance through construction. The APE for direct effects encompasses the Watana Reservoir, a buffer around the reservoir footprint up to the 2,075-foot contour, Watana construction site, and three potential road and transmission alignments (Chulitna, Denali, and Gold Creek corridors). The proposed direct APE, developed in consultation with the SHPO, federal and municipal agencies, Alaska Native entities, and other interested parties, is depicted in Figure 13.5-2.

13.5.3.2. Area of Potential Indirect Effects

Indirect effects to cultural resources are those that occur beyond the direct effects from implementing the Project, such as looting of archaeological sites and damage from off-road vehicle use after the Project has been completed. The proposed indirect APE, developed in consultation with the SHPO, federal and municipal agencies, Alaska Native entities, and other interested parties, is depicted in Figure 13.5-2. As proposed, the Project would inundate the middle Susitna with water upriver of the dam site to the 2,050' contour. This would create an approximately 39-mile long lake which will be accessible to the general public. In addition, it is expected that overland use via existing trails by hunters, fisherman, trappers, and recreationists will likely increase as an indirect effect of the proposed Project since access and other developed facilities available for public use will likely be constructed in the immediate Project area. AEA plans to study possible indirect effects that may ensure from the construction and operation of the proposed Project. The indirect APE is comprised of:

1) areas likely to be affected by induced dispersed recreational activity extending from existing trails, including ATV trails and recent campsites observed during the 2012 field investigations;
2) areas near or related to known sites in the statewide AHRS inventory, BIA's ANCSA 14(h)(1) site inventory, and recent use-areas like airstrips, bridges, mines, and cabins that are adjacent to APE mapped trails and recreation use areas, based on the premise that these areas may also be locations where future increased human travel may occur; and
3) areas adjacent to APE-mapped trails and recreation areas with known high cultural resource potential as determined by the site locational modeling and 2012 aerial and pedestrian

reconnaissance, based on the premise that these areas may also be locations where future increased human travel may occur.

13.5.4. Study Methods

13.5.4.1. Previous Survey Strategies, Methods, and Definitions

As mentioned, cultural resource investigations conducted within the study area between 1978 and 1985 documented almost 300 cultural properties spanning the last 11,000 years. Site types in the inventory include historic and protohistoric archaeological sites, historic buildings and ruins, and other cultural features. Many of these sites are within the proposed Watana Reservoir and would be inundated by the reservoir. Subsequent archaeological investigations following the initial surveys have located and recorded additional cultural resources and expanded our knowledge of known sites (cf. Betts 1987; Blong 2011; Dilley 1988; Wygal 2009; VanderHoek et al. 2007).

The information collected in the late 1970s and early to mid-1980s—the "early 1980s-era" data—forms the bulk of the spatial data within the study area and resulted from two separate projects: the first by Dixon et al. (1980, 1985); and the second by Greiser et al. (1985, 1986). Methods used in the 1979 to 1984 fieldwork by Dixon et al. (Figure 13.5-3) included the delineation of "survey locales" by close examination of USGS topographic maps in combination with a survey strategy using additional environmental and artifact variables as analytical units. These variables were defined within a framework of research questions addressing the cultural historical sequence of this region. The survey locales were visited and the terrain within them that was judged higher in site potential was examined by pedestrian survey. In some places along these areas, shovel tests were placed in areas deemed of higher site potential. If sites were located either by observation of surface artifacts or by subsurface discovery, concentrated testing took place. Areas considered of lesser site potential (determined by examination of maps and by on-the-ground judgments) were not surveyed or tested. Concentrated testing meant that the archaeologists set up a grid at a point of site discovery, and then dug shovel tests along transects at specified intervals outward from the discovery point (Figure 13.5-4). Thus systematic grids of shovel tests (round holes approximately 12 inches in diameter) and at least one square 16-inch or 36-inch test unit was excavated for each artifact discovery. Locations at which concentrated testing occurred were: variable within a survey locale, mainly within the impoundment, and occurred only at sites; major portions of survey locales were not subjected to concentrated testing and in some cases were not walked because terrain was deemed unsuitable.

Methods used in 1985 in the second of the two projects (Figure 13.5-3) included delineation of survey "units" by a random sampling method that was more explicitly predictive (Greiser et al. 1985). Two major variables, terrain and vegetation—each of which had numerous subgroups, were statistically assessed for associations with known sites across the project area; results were used to stratify areas into lesser or greater degrees of site probability. The 160-acre units to be surveyed were randomly chosen from within a sample of the population of units defined by a grid of the project area. The pedestrian survey across the 160-acre units consisted of linear transects spaced at predetermined intervals that were walked regardless of topography. This method was systematic, but few sites were located using this approach. Topographic features of

higher site potential within the project area but outside a randomly selected survey unit were not surveyed.

Both the methods described above have merit, and current survey strategies typically use aspects of both. Advanced GIS tools and the cumulative archaeological experience in field survey methods over the last 30 years contribute to today's methods. GIS-based models provide a more effective means of spatially stratifying the Project area, enabling archaeologists to determine which areas appear to have lower or higher site potential; both types of areas should be tested to verify the assumptions on which models are based. The 1980s-era work used similar approaches but did not have the benefit of modern GIS or GPS technology.

The early 1980s-era datasets represent a significant amount of field effort and thought, and it is especially useful for refining expectations about site discovery, artifact preservation, and stratigraphic contexts. Site discovery is one of the more straightforward processes in cultural resource management. Evaluating a site and determining whether it is eligible to the National Register, however, is often not straightforward, and may require revisiting and reassessing other sites within the APE that may be affected by the Project. Because of major differences in how site locations were recorded and the resulting variations in accuracy (GPS versus a pencil point on a paper map), as well as the effects of change from nearly 30 years since site discovery, matching site data collected during early 1980s-era work and current field observations can be difficult. The cultural resource investigations for the Project will be accomplished using best practices for modern archaeology; the usefulness of the early 1980s-era data will depend in large part on how accurately the old sites can be matched to current field observations.

13.5.4.2. Locational Model and Survey Strategy

Archaeological survey strategy development typically begins with two things: 1) a review of relevant literature and previous archaeological work in the study area, often performed in an office, museum or archive setting; and 2) a close examination of the topography and other environmental variables, done by observations collected in the field and by using geographic information systems, or GIS techniques in the office. These sources of information work in concert to help define expectations with regard to cultural resources within a study area (Figure 15.5-5).

This is a holistic pursuit and requires looking both broadly, over a regional scale, at factors such as climate or ecoregions, for example, as well as by looking more closely at site and artifact level details. Details such as elevations at which sites typically occur, or resources closely associated with sites, as evidenced by organic remains (bones, for example), may indicate why people chose to dwell at a particular location. The general goal of a survey strategy is to locate archaeological sites; thus, an understanding of why an area is more desirable than another is important. However, determining those factors that make a location more desirable are complex. Models help to explore this complexity.

Survey strategies today often employ models to assist in defining locations that may have a greater potential for site discovery. The treatment of these cultural resources is governed by federal and state law; Section 106 of the National Historic Preservation Act of 1966 (as amended) is the most commonly cited statute, but other directives are also in place to help guide

those who deal with cultural resources. The larger goal for those tasked with cultural resource management is to locate and evaluate resources to determine if they are eligible for inclusion on the National Register of Historic Places (NRHP).

Survey types consist of either aerial or pedestrian transects. Given the remoteness of the study area, aerial surveys are conducted by helicopter at low airspeed and altitude across large expanses of land. Areas of high potential within these expanses are recorded by GPS and camera and are returned to later for ground survey and testing. Aerial surveys are also necessary in areas where geographic boundaries prohibit access by survey crews. Examples in the study area include steep valleys and river crossings, high elevations, and barrier waterfalls. Ground surveys are conducted in areas having a high potential for cultural resources. Methods used to optimally cover large areas of land (e.g., 40 acres) typically involve a crew of 6 people in a line 10 to 15 m apart. The crew transects (walks) in a parallel line over the land inspecting the ground surface, trees, understory vegetation, and microtopography. Testing can either occur during ground surveys or later during a testing phase. Any resources encountered are recorded in field books, on forms, in GPS units, and are photo-documented.

Survey strategy development is part of most field archaeology, and spatial modeling utilizing GIS techniques provides a flexible means of combining a large number of spatially defined variables onto one surface. The surface illustrates the combined variables with quantitative measures, which can be used to stratify or characterize a study area in a number of ways. Models are not snapshots of reality, but rather a process which explores one of a number of possible scenarios. Models are considered one of several techniques from a larger toolbox used to develop survey strategies. Specifically, that toolbox should also include the examination of available satellite imagery, existing USGS maps, and information on known cultural resources, as well as fieldwork performed by those with professional archaeological experience.

The 2012 model used in developing a survey strategy for the Project was derived from available digital datasets of varying spatial and chronological scales from several sources which are listed in Table 13.5-1 below. Datasets in many cases provide multiple variables for creating the model surface. For example, DEM data (elevation) are used to derive slope and aspect within the model area, and precipitation and temperature datasets provide monthly averages useful for creating variables of summer and winter extremes. The Source column in Table 13.5-1 lists agencies mainly responsible for collecting data and producing rasters or shapefiles; there is an increasing number of excellent web sites specifically tailored for the distribution of downloadable data, such as the Statewide Digital Mapping Initiative (SDMI) based at University of Alaska Fairbanks, the US Geological Survey's Alaska Geospatial Data Clearinghouse, and the State of Alaska Department of Natural Resources' own Alaska State Geo-Spatial Data Clearinghouse. Table 13.5-2 lists the variables examined in the modeling process.

Table 13.5-1. Datasets used in Project Model 1

Dataset	Source	Access
Archaeological site type and location	Alaska Heritage Resources Survey (AHRS)- Alaska Office of History and Archaeology	Permit
Revised Statute 2477 Historic Trails	Alaska Dept. of Natural Resources	Public
Digital elevation models (DEM)	United States Geological Survey	Public
Surface geology, lode deposits, sediment basins	United States Geological Survey, Alaska Dept. of Natural Resources	Public
Ecoregion	United States Geological Survey	Public
Hydrography	United States Geological Survey, Alaska Dept. of Natural Resources	Public
Vegetation	U of California, Berkeley, Ducks Unlimited	Public
Wetlands	United States Fish and Wildlife Service	
Wildlife (fowl, fish, mammals)	Alaska Department of Fish and Game & Alaska Department of Natural Resources	Public
Permafrost	National Snow and Ice Data Center	Public
Temperature and Precipitation	National Snow and Ice Data Center	Public

Table 13.5-2. Classified variables examined in Project locational modeling.

Variables	Classes
Site type	classes 1 through 4 (Random, Prehistoric, Native Historic, Euro-American Historic)
DEM	classes 1 through 23 (100 m increments)
Slope	classes 1 through 9 (5 degree increments)
Aspect	classes 1 through 9 (45 degree increments)
Surficial geology	16 classes (dataset codes)
Possible tool-stone location	presence/absence (1, 0)
Coal deposits	presence/absence (1, 0)
Metalliferous-lode deposits	presence/absence (1, 0)
Vegetation	classes 0 through 23 (dataset codes)
Distance to lake	classes 1 through 4 (within 100, 500, 1000 m, & > 1000 m)
Distance to stream	classes 1 through 4 (within 100, 500, 1000 m, & > 1000 m)
Distance to anadromous waters	classes 1 through 4 (within 100, 500, 1000 m, & > 1000 m)
Caribou ranges	presence/absence (1, 0 - summer, winter, calving, migration routes)
Moose ranges	presence/absence (1, 0 - summer, winter, calving, rutting)
Dall sheep ranges	presence/absence (1, 0 - summer, winter)
Dall sheep licks	presence/absence (1, 0)
Ducks & geese ranges	presence/absence (1, 0 - nesting, molting, summer, winter, migration routes)
Swan ranges	presence/absence (1, 0 - nesting, molting, summer, winter, migration routes)
Seabird colonies	presence/absence (1, 0)
Eagle/raptor concentrations	presence/absence (1, 0)
Precipitation	classes 1 through 6, January (20 mm increments) & July (30 mm increments)
Temperature	classes 1 through 5, January (3 degree C increments) & July (1 degree C increments)
Permafrost	classes 1 through 8 (dataset codes)

In general, the modeling process for a locational model (designed to assist archaeologists in site discovery) can be broken into 10 steps. These steps are described using vocabulary developed for GIS analysis:

STEP 1. Gather data (downloadable, in most cases) for creating layers of geospatial and other information; these will be independent variables (i.e., vegetation, elevation, wildlife presence, etc.), and dependent variables (i.e., known archaeological site types and locations).

STEP 2. Determine the spatial extent of the model area based on an APE (ideally encompassing as many representative ecosystems as possible) and create a *model polygon*. *Clip* all layers to this area, and *buffer* lines, points or polygons to desired sizes.

STEP 3. Polygons with variables having dichotomous information (presence/absence) should be reclassified as 1 for presence, 0 for absence; values will be numerical. Rasters with continuous variables need to be grouped using Layer Properties>Symbology with Manual grouping. *Merge* the vector datasets with the model area poly to get total coverage of the model area.

STEP 4. Rasterize all layers. Create two rasters of the model polygon (usually 30 m size grids), one with values of 0, and one with values of 1 across the whole grid (these are used later in the process). The idea is to standardize the grid structure for future calculations.

STEP 5. Extract all raster values of the dependent data points (sample of known sites, usually AHRS data) by using Spatial Analyst>Generalize>Extract Values to Points in ArcMap Toolbox. Generate a sample random point dataset of suitable size for statistical purposes and extract all raster values for that dataset as was done for the known dataset.

STEP 6. Copy the extracted values into Excel spreadsheets and code the data; categorize values to reduce numbers (i.e., group elevation values by 100 m intervals and identify with a code number). Place coded data into statistical software such as Statistical Package for the Social Sciences (SPSS) as data tables.

STEP 7. Run frequencies and cross tabulations. It is easiest to split types of sites (historic, prehistoric) into separate tables accompanied by a comparable number of random sites (i.e., prehistoric sites and similar number of random sites in a table, historic sites and random sites in another table, etc.) prior to calculating frequencies and cross tabulations. Examine results of variable association with the dependent data, and compare variable associations with results for random points (this is best done using Pearson chi-square tests).

STEP 8. Weight (reclassify) the rasters using the results of the statistical runs. Make sure "no data" is equal to zero and the area of the model is covered completely when reclassifying rasters (use 16 bit or higher signed raster types). For rasters which do not cover the whole model use *mosaic to new raster*, combining the variable raster with the model raster in Map Algebra>Raster Calculator (either multiply using the model raster with values of 1 or add using the model raster with values of 0). Generally, a reclassification requires recalculation.

STEP 9. Combine the rasters in Raster Calculator to produce a final model surface.

STEP 10. Examine the surface; use the results to assist in survey design or other analysis, in understanding the area in general, and to address research questions.

The purpose of a locational model of the type produced for the Project is to use a sample of known site distributions to inform archaeologists about site potential in areas nearby that have not been previously examined for cultural resources. The method is probability based, in that statistically significant relationships between variables form the basis for placing importance on those variables. The experience and judgment of archaeologists involved in the modeling process is an important component since decisions regarding how to spatially define the model area, which variables to include, and how to categorize and apply model results are the responsibility of the modeler. The Project model has been applied to survey planning through the stratification of the modeled surface into higher and lower areas of site.

The type model generated for the Project is most effectively used in surveys designed for locating buried (subsurface) protohistoric or prehistoric cultural resources, since land use after Euro-American contact in many areas of Alaska shifted, and many historic era resources such as collapsed cabins, mining tailings, etc., are more readily identifiable through aerial survey or historic records.

Problems with locational models are related to the resolution of datasets; fine-grained data are not always available for meaningfully characterizing an area. The Project model has a visualized resolution of 30 m, but a number of the datasets are based on coarser grids (rasters), such as temperature and precipitation data. In addition, variables are based on modern datasets, which can only partially characterize prehistoric environments, especially those with considerable time depth. However, the environmental parameters associated with the known archaeological sites, regardless of the actual chronological age of the site, are defined in modern terms, making locations across a region comparable. Difficulties most likely would occur at sites with locations associated with extinct resources (bison, for example), or with locations considered desirable for invisible socio-cultural reasons, such as spiritual ties to a place or other reasons not associated with quantifiable variables. However, ethnogeographic datasets can be incorporated into models when these are available in coded form.

13.5.4.3. Culturally Modified Trees

Culturally modified trees (CMTs) are quantifiable data that can only be detected from ground surveys, though ethnogeographic studies can identify where CMTs might be found and help interpret their meaning. In Alaska's interior traditional Native tree modification typically takes the form of blazing, bark removal, and occasionally weaving or braiding of branches. Sometimes CMTs mark a trail, route direction, or fork, but more often tree bark was harvested for uses such as canoe manufacture, basketry, house construction, and cache pit lining. Typically the location, number of CMTs, modification type (e.g., scar, plank removal, bark removal, burn), dimensions, aspect, sketch, and a description of the CMT are recorded on a field form. Since 2001, in consultation with the Alaska State Historic Preservation Officer (SHPO), groves with 25 or more CMTs are recorded in the AHRS inventory.

13.5.4.4. Survey Strategy and Phasing of Field Investigations

The study methods to be implemented in 2013 and 2014 focus on cultural resource identification (inventory) and evaluation (OHA 2003). Described here are the accepted professional practices commonly applied in contemporary archaeological and broader cultural resource investigations. The known historic properties within the APE to be evaluated include precontact/prehistoric archaeological sites including isolated finds, TCPs, historic sites, and any other buildings, structures, objects or districts of architectural nature that may be eligible for listing on the National Register. Discrimination of TCPs requires historic and ethnohistoric interviews, translation, and field investigation. Surveys may also be needed in areas where access was denied to archaeological crews in 1978-1985; and subsurface testing may be required at high-potential areas that were identified but not tested during previous fieldwork.

An aerial survey will be conducted prior to full field crew deployment in 2013 and in 2014. Aerial survey in this case will be used to verify proposed survey segments (Figure 13.5-5),

examine helicopter landing zones, examine the indirect APE as defined in this document, and provide planning data for the 2013-2014 field seasons.

The field investigations will be executed in two phases. Phase I (identification) surveys in 2013 and 2014 will address the direct APE including the camp, corridors, and impoundment area (Figure 13.5-2). The Alaska OHA and SHPO have defined standards and guidelines for these surveys. The Identification Phase is defined as, "reconnaissance level surveys…in the planning stages of a project. They are used to determine if an intensive survey or testing is warranted, but alone cannot normally be used to satisfy complete compliance. These studies entail development of research designs, archival and background research, field survey, analysis, and reporting. All surveys should include pedestrian (walkover) examinations of the ground surface and might include subsurface testing" (OHA 2003).

Phase I survey in the direct APE may differ in coverage, intensity, and access in comparison to Phase I surveys in the indirect APE. Survey in the direct APE will consist of pedestrian transects (described below) which record high potential areas; these areas are tested as conditions and logistics allow (e.g., helicopter access, daylight/weather, size of landform, etc.). Phase I survey in the indirect APE will mainly be conducted by aerial survey. Pedestrian survey will also be necessary in the indirect APE where the Project has been determined to have a potential effect on cultural resources. Making this determination will require supplemental engineering and geotechnical Project data such as proposed locations of ancillary facilities, centerlines of road corridors, airstrips, construction camps, borrow pits, power lines, etc. The indirect APE addresses the impacts of activity in proximity to the impoundment but outside the direct APE. These indirect areas include trails and navigable waters into the direct APE. The majority of work and effort in 2013 and 2014 will be devoted to the direct APE.

Two types of survey will be conducted on the direct APE: aerial (Type A) and pedestrian (Type B). Aerial surveys are conducted by helicopter at low airspeed and altitude across large expanses of land. Areas of high potential within these vast expanses are recorded by GPS and camera and returned to later for pedestrian survey and testing. Aerial surveys are also necessary in areas where geographic boundaries prohibit access by survey crews. Examples in the study area include steep valleys and river crossings, high elevations, and barrier waterfalls. Pedestrian surveys are conducted in areas that have a high potential for cultural resources to be present. Methods used to optimally cover large areas of land (e.g., 40 acres) are to space a crew of 6 people 10 to 15 m apart in a line. The crew transects in a parallel line over the land inspecting the ground surface, trees, understory vegetation, and micro-topography for cultural resources.

Testing within a designated test area consists of at least six, 50 x 50 cm test pits dug to a maximum of one-meter depth below ground surface. Tests are hand excavated using a shovel and trowel and screened through ¼ in. or 1/8 in. mesh. Tests are spaced 5 to 10 meters apart based on the size of the landform. Tests are aligned in a grid pattern that is systematically oriented, recorded, and replicable. Grid size, number of tests, grid spacing, and grid orientation are all dictated by the size and shape of the landform being investigated. If cultural resources are encountered during Phase I they will be recorded as AHRS sites; restricted site information will be reported in the summary field report.

Phase II Evaluation surveys will be initiated on sites recommended in the Phase I assessment for further work in 2013 and 2014. These will include returning to selected identified sites for data collection to evaluate National Register eligibility of sites potentially affected by the Project. Evaluation of known sites requires intensive survey, delineation, establishment, and mapping of site boundary, artifact analysis, and recommendations. Sites within the Project's proposed 2,075 ft. elevation inundation zone will be affected, especially the upper 100 ft. of the impoundment area, where sites may be affected by shoreline erosion, scouring, sedimentation and seasonal flow variations. OHA (2003) defines the Evaluation Phase as requiring; "evaluation of historic buildings and structures and/or investigation of adequate portions of archaeological sites to evaluated the significance of the property. These studies entail development of research designs, archival and background research, field studies, analysis, and reporting. When there are three or more buildings or structures, it should be determined if the resources constitute an historic district. Archaeological evaluation projects must include excavation as a major component of field sampling." Sampling theory is composed of a number of contrasting or complimentary methodologies used to yield results from a subset of a greater whole. The goal is to achieve an accurate result from the subset or sample that can be used to infer the same result from the larger whole. "Adaptive sampling" allows the possibility of the sample design or strategy to be modified during the Evaluation Phase based on positive or negative results (Orton 2000:34). For instance, a number of sites with the selected criteria (listed below) will be selected as our sample.

The sample will be selected out of the total number of sites recorded during the Identification Phase. This sample will be fully evaluated to determine eligibility during the Evaluation Phase. The sample size is unknown until all of the sites have been identified. The eligibility of a site's inclusion to the NRHP is based on four criteria: A) sites that are associated with events that have made a significant contribution to the broad patterns of our history; or B) sites that are associated with the lives of significant persons in our past; or C) sites that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or D) sites that have yielded or may be likely to yield, information important in history or prehistory (NPS 2012). The sample will also be based on the following site-specific criteria (e.g., within the direct APE, multicomponent, contain human remains, has organic preservation, intact tephra deposits, etc.).

Many of the sites in areas to be affected by the Project, such as the proposed inundation zone, will need Phase II surveys. Some affected site would meet more than one of the criteria listed above, thus reducing the sample size. The greatest amount of effort will be focused on the impoundment area. Phase II will not be conducted in the indirect APE in 2013 and 2014.

Results of the inventory survey will be presented in a Phase I report with recommendations for the Evaluation Phase II site testing and analysis. The Project team will immediately begin processing site evaluation data as they are gathered. Lab analysis and report writing will be conducted concurrent with execution of the field survey. The required Phase II evaluation report will be prepared in 2014 for submittal by AEA to SHPO, BLM, and FERC. The results of this survey will help inform preparation of the HPMP. As is common after the application has been obtained, subsequent seasons will be reserved to developing and implementing strategies for

completing evaluations, as necessary, as well as developing management measures for historic properties within the APE, which will be described in the HPMP (see FERC 2002).

13.5.4.5. Mapping-Related Activities

- Map recently identified prehistoric resource locations. Sites will be relocated and mapped with a survey-grade Trimble GeoXT 6000 Series in North American Datum of 1983 (NAD83) with real-time accuracy of 50 centimeters (scheduled for completion in 2013-2014).
- Add to or adjust locational data on prehistoric settlement patterns and land use (scheduled for completion in 2013-2014).
- Add to or adjust locational data on historic settlement patterns and transportation routes (scheduled for completion in 2013-2014).
- Compile additional relevant environmental datasets from the 2012 field season for use in future locational model (scheduled throughout 2013-2014).
- Map TCPs within the APE, creating a geodatabase with TCP/sacred sites locations and place names. Locations will be depicted based on historical and cultural information. Depending on the nature of some of the resources, special restrictions may need to be placed on access to information to protect data pertaining to sacred or religious significance (scheduled throughout 2013-2014).
- Prepare maps using the latest GIS files with Ahtna place names (Kari 2012) and expanding and annotating the current Ahtna/Dena'ina place name corpus into the geodatabase currently being developed for cultural resources sites (scheduled throughout 2013-2014).

13.5.4.6. Ethnogeography-Related Activities

- Hold a regional elders conference to provide a venue to inform the communities of the upcoming research work, including information on other AEA sponsored research, such as fisheries and wildlife studies, subsistence studies, etc. (scheduled throughout 2013-2014).
- Identify, inventory, and compile archival data sources of the Ahtna language, with particular focus on the Jake Tansy recordings on land use and travel, some of which appear in Kari (2010). Recorded stories pertinent to the upper Susitna River from other Ahtna narrators, including Jim Tyone, Jack Tyone, John Shaginoff, Henry Peters, and Fred John will be evaluated, along with the few known Shem Pete recordings and narrative segments that pertain to the Talkeetna Mountains and the upper Susitna River (scheduled throughout 2013-2014).
- Identify and inventory additional data from collections of tapes and transcripts recorded in the English language by the Bureau of Indian Affairs (BIA), the Institute for Social and Economic research (ISER), Ahtna, Inc., and other researchers, including Frederica de Laguna and Constance West. Much of this material has never been analyzed with regard to the study area (scheduled throughout 2013-2014).

- Identify knowledgeable Ahtna individuals to interview for current ethnographic information on potential TCPs in the study area (scheduled throughout 2013-2014).
- Collect interview data on contemporary land use and the cultural landscape (scheduled throughout 2013-2014).
- Develop interview protocol with the assistance of knowledgeable Ahtna individuals in order to guide effective interviewing (scheduled throughout 2013-2014).
- Interview between 30 and 50 Ahtna persons of different ages (estimate 2 hours per interview (scheduled throughout 2013-2014).
- Document the results of interviews, and transcribe tapes. (Scheduled throughout 2013-2014).
- Develop data on three types of trails: BLM layer, field observation layer, and historic foot trail layer.

13.5.4.7. Synthesis and Analysis Activities

- Develop historic contexts. This task that will be largely dependent on the outcome of 2012 planning studies, fieldwork, analysis, and agency consultation. This task will be implemented in 2013.
- Update cultural chronology. This task will be largely dependent on the outcome of 2012 planning studies and 2013-2014 fieldwork and analysis. For this reason, this work will be deferred until after field studies are complete. This will require collecting and analyzing samples at a number of sites for archaeometric analysis, radiocarbon dating, OSL dating, and tephrochronology (see Bowers et al. 2012).
- Develop archaeological locational model prior to fieldwork. Compiled digital data will be examined statistically to assess strength of associations between known dependent variables (site locations) and independent variables, such as elevation and other environmental variables (15 to 20 or more variables can be assessed). The derived model output is a map of the study area with negative to positive values depicted in 30 meter (98 feet) by 30 meter (98 feet) units that grade from dark to light; areas with negative or lower values are least likely to hold sites, and areas with higher, positive values are most likely to hold sites. The information generated is instructive for developing survey strategies across the APE prior to fieldwork, particularly for areas previously not surveyed, but also for areas surveyed in the past that appear to need further exploration.
- Transcribe and translate place name terms and narratives, with initial translation performed by Dr. Kari (scheduled throughout 2013-2014).
- Proof-read and correct initial and secondary translations by language specialists or Ahtna Elders (scheduled throughout 2013-2014).
- Synthesize data sets in order to prepare an Interim Study Report at the end of 2013 and a final comprehensive report to be submitted as the Updated Study Report at the end of 2014. Combine the archaeological results; locational model; historic and contemporary land use patterns; Ahtna perspectives on the land and resources; Ahtna-language place

names; and narratives about important locations. Identify additional studies and reports if needed (scheduled for 2014).

13.5.4.8. Inadvertent Discoveries

Protocols for the inadvertent discovery of human remains, graves, and/or burial items are described in full detail in the attached Unanticipated Discovery Document. This document outlines the methods, requirements, and contact information of affected Alaska Native entities.

13.5.5. Archaeological Internship and Additional Workforce

AEA's cultural resources study will include an internship program to provide an opportunity for Native entities to monitor the fieldwork, and to work alongside registered professional archaeologists for the 2013 and 2014 seasons. A list of duties, previous employment and educational history as well as skills and abilities are provided below.

Primary Responsibilities:

- Conducting Phase I reconnaissance survey
- Conducting Phase II site evaluations
- Using standard archaeological field techniques, these include-
    - Walking transects (up to 5 miles per day, possibly more)
    - Taking notes and photographs
    - Digging shovel and trowel test pits
    - Screening sediments
    - Carrying a pack an equipment (weighing up to 35 lbs.)
    - 6-12 hours per day in the boreal forest , over mosquito infested, uneven /rough terrain
    - Other duties as assigned

Knowledge and Skill Requirements:

- Course work in history, social sciences and earth sciences
- Experience/training in specialized areas is preferred (e.g., anthropology, geology, ecology)

NLUR also plans to include Matanuska-Susitna Borough archaeologists, when available, to work with the archaeological crews in the field.

13.5.6. Consistency with Generally Accepted Scientific Practice

The research methods discussed in the proposed Cultural Resources Study (Section 13.5) are consistent with professional practices and FERC's study requirements under the Integrated Licensing Process (ILP). Inventory, evaluation, and determination of adverse effect are well-established steps under NHPA Section 106 and the ACHP's implementing regulations at 36 CFR Part 800. Additionally, the quality of work and qualifications of workers will adhere to the

Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation (48 FR 44716).

The Cultural Resources Study for licensing of the proposed Project, as described in this study plan, will be undertaken in accordance with the implementing regulations of NHPA Section 106, FERC's ILP regulations, the Secretary of the Interior's (Secretary) Standards and Guidelines for Archeology and Historic Preservation (48 FR 44716), the Secretary's Professional Qualification Standards (48 FR 22716), and the ACHP's general guidelines for identification and testing procedures as set forth in *Treatment of Archeological Properties, A Handbook*. Unless otherwise specified, field notes, samples, artifacts, and other collected data will be curated with the University of Alaska Museum in Fairbanks in accordance with the requirements set forth in 36 CFR Part 79. Site information, other than the site's Alaska Heritage Resources Survey (AHRS) number and National Register eligibility, will be maintained as confidential as provided for under NHPA Section 304, as amended (16 U.S.C. § 470w-3).

13.5.7. Schedule

Fieldwork performed in 2013-2014 (Table 13.5-3) will include the following components:

- Site Surveys (Inventory Phase). Applying the GIS-based locational model developed early in the study, the 2013-2014 field efforts will begin within the Watana impoundment area. The survey will take place in the proposed Gold Creek, Chulitna, and Denali Corridors. To the extent possible, the study will make use of the 1978-1985 Phase I survey data (e.g., Bowers et al. 2012; Dixon et al. 1985; Greiser et al. 1985, 1986).
- Site Testing (Evaluation Phase). The 2013-14 field efforts will initiate systematic site testing, with the goal of developing Recommendations of Eligibility to the National Register for each site within direct APE. This will primarily include the Watana impoundment zone, and to a lesser extent the proposed Gold Creek, Chulitna, and Denali Corridors.

Table 13.5-3. Schedule for implementation of the cultural resource study.

Activity	2012				2013				2014			
	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q
Reconnaissance level field study			—									
Modeling and sample design development from 2012 field reconnaissance				——	——							
Pre-field preparation (logistics, equipment, maps, safety, training and aerial reconnaissance of direct and indirect APEs)					—	—						
Archeological Field studies –Inventory (priority on the impoundment, followed by corridors)						—	——	——				
Archeological Field studies – Initiation of Evaluation (priority on the impoundment, followed by corridors)							—	——				
Ethnogeographic Study, planning, coordination with tribes, Elders conference					——	——						
Ethnogeographic Field work						—	——	——				
Draft Ethnogeographic study report, circulated for community review, Elders conference								—				
Initial Study Report								——	Δ			
Additional modeling from 2013 field study results, integrate results from ethnogeographic study, develop sample design for 2014								——	——			
Pre-field preparation (logistics, equipment, maps, safety training)									—	—		
Field studies –Inventory (corridors and trails)										—	——	
Field studies – Evaluation (all project components)											—	
Updated Study Report											——	▲

- Legend:
- —— Planned Activity
- ----- Follow up activity (as needed)
- Δ Initial Study Report (ILP due date 2-3-2014)
- ▲ Updated Study Report (ILP due date 2-2-2015; not shown on chart)

Study products to be delivered in 2013-15 will include:

- Interim Reporting. The progress of the cultural resource investigations will be summarized and presented to the Work Group on a regular basis. This reporting will include up-to-date compilation and analysis of the data and ArcGIS spatial data products. Reporting schedules will be determined by the AEA and FERC.
- ArcGIS Spatial Products. Shapefiles of the 1980s and current cultural resources data will be compiled into a geodatabase for the study area. All map and spatial data products will be delivered in the two-dimensional Alaska Albers Conical Equal Area projection, and NAD 83 horizontal datum consistent with ADNR standards. Naming conventions of files and data fields; spatial resolution; and metadata descriptions must meet the ADNR standards established for the Project.
- Final Reports. Reports completed at the beginning of 2014 and 2015 will summarize the results of each field season and will be submitted to resource agency personnel and other licensing participants along with spatial data products. This will include recommendations for additional study in subsequent field seasons and will cover Identification and Evaluation Phases of the Project studies. Reports will follow FERC and SHPO protocols (36 CFR Part 800); will follow professionally-accepted standards; and will include site descriptions, site evaluations (Recommendations of Eligibility), and Determinations of Effect. The reports will be filed with FERC to fulfill the study report requirements of 18 CFR section 5.15(c) and (f) of the ILP regulations.

The cultural resource investigations will produce data sets including information on site nature and location, so reports are expected to be of limited distribution and largely not shared with other study groups (Figure 13.5-6). Native parties have requested that a non-technical volume summarizing the cultural resource investigation results be produced for public distribution.

13.5.8. Level of Effort and Cost

The work described above will take place during the 2013 and 2014 field seasons, with initiation of evaluations of National Register eligibility in 2013-2014. Costs proposed here are in addition to the 2012 reconnaissance effort. For the combined 2013 and 2014 effort, the costs of cultural resource investigations (including field studies, data collection and mapping, analysis, and reporting) have been estimated to cost $7-$8 million.

13.5.9. Literature Cited

Ahtna, Inc. 2012. Land and Resource Group: Mission Statement. Web. Accessed 2012 <http://www.ahtna-inc.com/land_department.html>

Alaska Energy Authority (AEA). 2011. Pre-Application Document: Susitna-Watana Hydroelectric Project FERC Project No. 14241. December 2011. Prepared for the Federal Energy Regulatory Commission by the Alaska Energy Authority, Anchorage, Alaska.

Alaska Office of History and Archaeology. 2011. Alaska Historic Resources Survey database. Web. Accessed September 2011 <http://dnr.alaska.gov/parks/oha/ahrs/ahrs.htm>

Alaska Office of History and Archaeology (OHA) 2003. *Standards and Guidelines for Investigating and Reporting Archaeological Historic Properties in Alaska*. History Preservation Series No. 11. Alaska Department of Natural Resources, Anchorage.

Betts, R. C., 1987 *Archaeological Investigations at Butte Lake, Alaska: An Inquiry into Alaskan Notched Point-Microblade Assemblages*. University of Alaska, Department of Anthropology, Geist Fund Report 91. Fairbanks.

Bowers, Peter (editor), Joshua D. Reuther, Richard O. Stern, Carol Gelvin-Reymiller, Dale C. Slaughter, Jill Baxter-McIntosh, Haley Brown, and Sarah McGowan. 2012. *Susitna-Watana Hydroelectric Project Cultural Resources Data Gap Analysis*. Report prepared for the Alaska Energy Authority, Anchorage. Report prepared by Northern Land Use Research, Inc., Fairbanks.

Blong, John. 2011. *Preliminary Summary on 2010-2011 Field Research in the Upper Susitna Basin*. Unpublished manuscript. Northern Land Use Research, Inc., Fairbanks.

de Laguna, Frederica and Catharine McClellan 1981. Ahtna. In *Subarctic*, edited by J. Helm, pp. 641-663. Handbook of North American Indians, Volume 6, W. C. Sturdevant, general editor. 20 vols. Smithsonian Institution Press, Washington, DC.

Dilley, Thomas E. 1988. *Holocene Tephra Stratigraphy and Pedogenesis in the Middle Susitna River Valley, Alaska*. Unpublished Master of Science thesis, Department of Geology, University of Alaska, Fairbanks.

Dixon, E. James Jr. 1985. Cultural Chronology of Central Interior Alaska. *Arctic Anthropology* 22(1):47-66.

Dixon, E. James, Jr., George S. Smith, and David C. Plaskett. 1980. Environmental Studies *Procedures Manual/Research Design: Subtask 7.06 Cultural Resources Investigation for the Susitna Hydropower Project.* Alaska Power Authority, Susitna Hydroelectric Project, submitted to Acres American, Inc. by Terrestrial Environmental Specialists, Inc., and University of Alaska Museum, Fairbanks.

Dixon, E. James Jr., George S. Smith, William Andrefsky, Becky M. Saleeby, and Charles J. Utermohle. 1985. *Susitna Hydroelectric Project, Cultural Resources Investigations, 1979-1985*. Alaska Power Authority, Susitna Hydroelectric Project, Federal Energy Regulatory Commission Project No. 7114 Volume VI, Appendices E and F. University of Alaska Museum, Fairbanks, Alaska (APA document no. 2718).

Federal Energy Regulatory Commission (FERC) 2002. *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects*. Washington D.C.

Greiser, T. Weber, Sally T. Greiser, Glenn H. Bacon, Thomas A. Foor, Priscilla Russell Kari, James Kari, David F. Gallacher, and Janene M. Caywood. 1985. *Phase I Report: Background Research and Predictive Model for Cultural Resources Located Along the Susitna Hydroelectric Project's Linear Features Volume I.* Report by Historical Research Associates, Missoula, Montana, with contributions from Alaska Heritage Research Group, Inc. through Harza-Ebasco Susitna Joint Venture for Alaska Power Authority, Anchorage, Alaska (APA document no. 2865).

Greiser, T. Weber, Sally T. Greiser, Glenn H. Bacon, David F. Gallacher, Thomas A. Foor, and James A. Fall. 1986. *Susitna Hydroelectric Project Phase II Final Report. Sample Survey and Predictive Model Refinement for Cultural Resources Located along the Susitna Hydroelectric Project Linear Features Volumes 1 and 2*. Report to Harza-Ebasco Susitna Joint Venture and Alaska Power Authority by Historical Research Associates, Missoula.

Kari, James (editor). 1983. *Ahtna Place Names Lists, Preliminary Edition*. A Joint Publication of the Copper River Native Association and the Alaska Native Language Center, Copper Center and Fairbanks, Alaska.

Kari, James. 1999 Draft Final Report: *Native Place Names Mapping in Denali National Park and Preserve*. National Park Service**.**

Kari, James. 2008. *Ahtna Place Names Lists*. 2nd ed. revised. Fairbanks: Alaska Native Language Center.

Kari, James. 2010. *Ahtna Travel Narratives - A Demonstration of Shared Geographic Knowledge Among Alaskan Athabascans*. Fairbanks: Alaska Native Language Center.

Kari, James. 2011. A Case Study in Ahtna Athabascan Geographic Knowledge. IN *Landscape in Language, Transdisciplinary Perspectives*, ed. by D.M. Mark, A.G. Turk, N. Burenhult & D. Stea. Amsterdam: John Benjamins, pp. 239-260.

Kari, James. 2012. *Place Names Maps for Ahtna Inc*. Fairbanks: Alaska Native Language Center. CD with 17 pdf files.

Kari, James and James A. Fall. 2003. *Shem Pete's Alaska. The Territory of the Upper Cook Inlet Dena'ina*. 2nd ed. University of Alaska, Fairbanks, Fairbanks Alaska.

Kari, James and Siri Tuttle. 2005. *Copper River Native Places: A Report on Culturally Important Places to Alaska Native Tribes in Southcentral Alaska*. BLM Alaska Technical Report No. 56. USDOI, Bureau of Land Management, Anchorage, Alaska.

Krauss, Michael, Gary Holton, Jim Kerr, and Colin T. West. 2011. *Indigenous Peoples and Languages of Alaska*. Map. Fairbanks and Anchorage: Alaska Native Language Center and UAA Institute of Social and Economic Research (Updated Version of map originally by Krauss 1974).

National Park Service 2012. National Register Bulletin. How to Apply the National Register Criteria for Evaluation. www.nps.gov/nr/publications/bulletins/nrb15/nrb15_2.htm Accessed on October 19, 2012.

Orton, Clive. 2000. *Sampling in Archaeology*. Cambridge University Press, Cambridge.

Simeone, William E. and James Kari . 2002**.** *Traditional Knowledge and Fishing Practices of the Ahtna of Copper River, Alaska.* Alaska Department of Fish and Game, Division of Subsistence, Technical Paper No. 270.

Simeone, William E. and James Kari. 2004. *The Harvest and Use of Non-salmon Fish Species in the Copper River Basin* Office of Subsistence Management Fisheries Resource Monitoring Program. Alaska Department of Fish and Game, Division of Subsistence. Technical Paper No. 292.

Simeone, William E., Adam Russell and Richard O. Stern. 2011. *Watana Hydroelectric Project Subsistence Data Gap Analysis*. Report prepared for ABR, Inc., and the Alaska Energy Authority by Northern Land Use Research, Inc., Anchorage, Alaska.

VanderHoek, Richard. 2011. *Cultural Resource Management Plan for the Denali Highway Lands, Central Alaska*. Draft manuscript. Alaska Office of History and Archaeology Report Number 112. Alaska Office of History and Archaeology, Division of Parks and Outdoor Recreation, Anchorage.

VanderHoek, Richard, Randolph M. Tedor and J. David McMahan. 2007. Cultural Materials Recovered from Ice Patches in the Denali Highway Region, Central Alaska, 2003-2005. *Alaska Journal of Anthropology* 5(2): 185-199.

Wygal, Bryan. 2009. *Prehistoric Colonization of Southcentral Alaska: Human Adaptations in a Post Glacial World*. Dissertation. Department of Anthropology, University of Nevada, Reno.

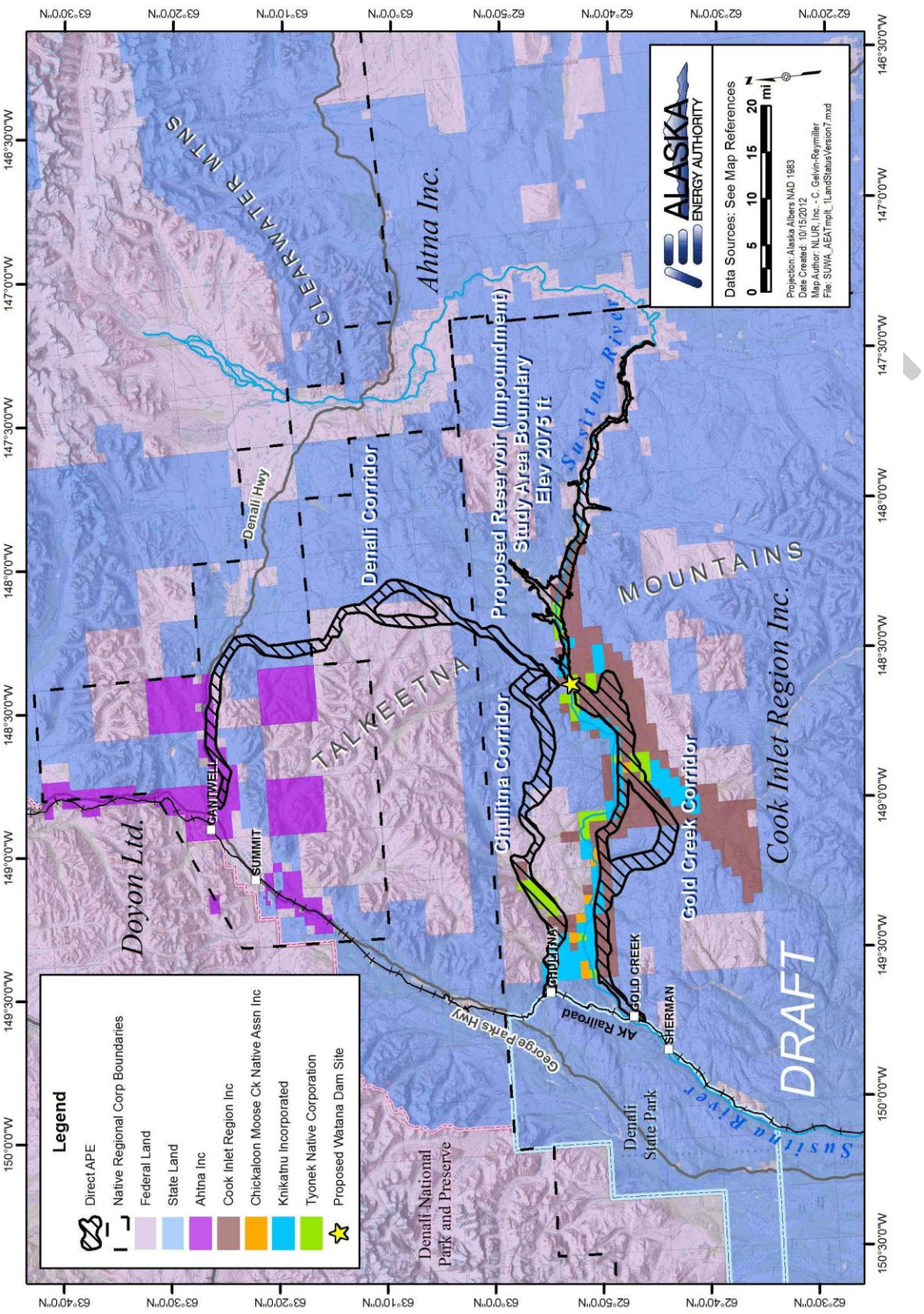

Figure 13.1-1. Property ownership in the vicinity of the study area.

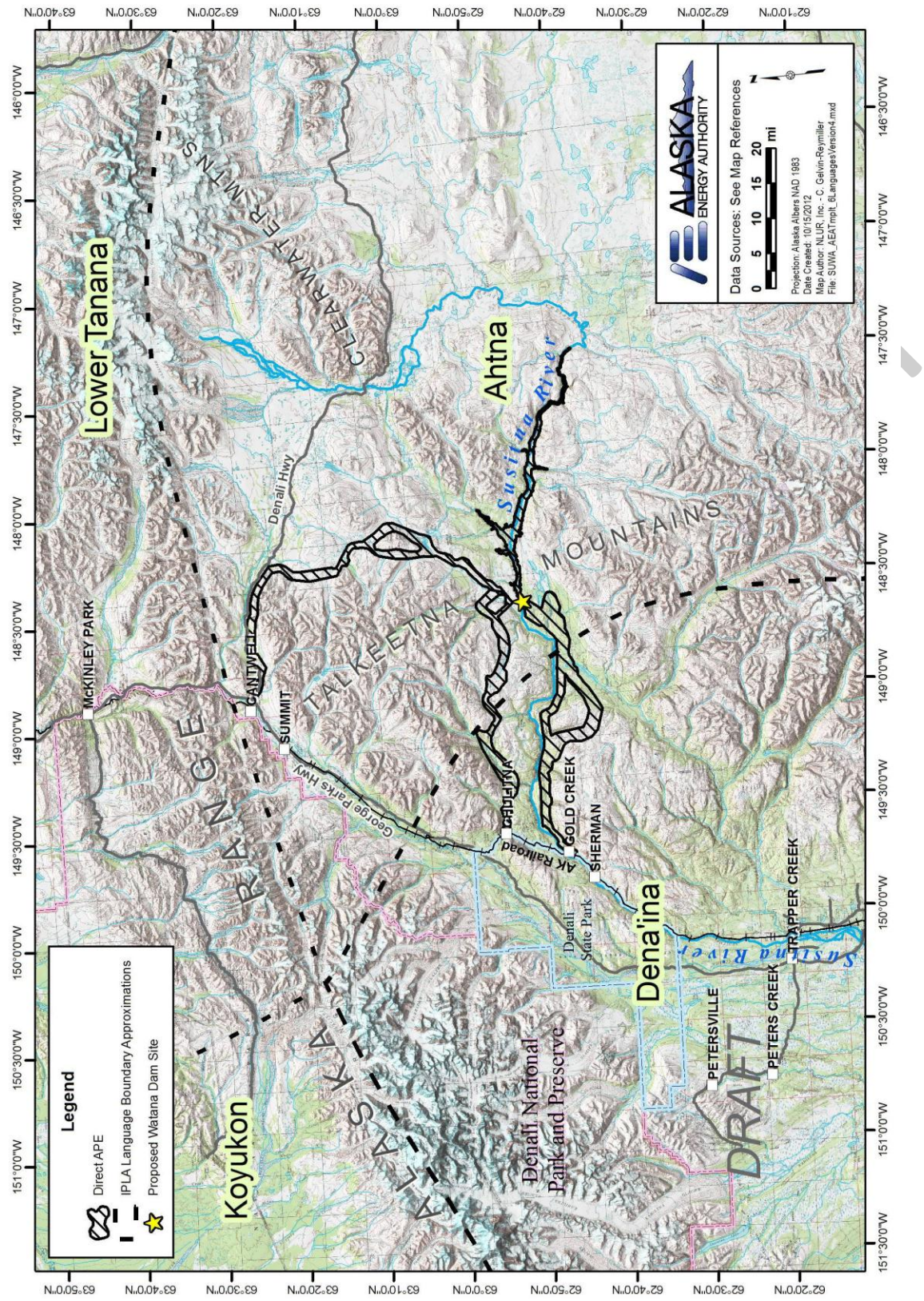

Figure 13.5-1. Traditional Native language areas in the vicinity of the study area.

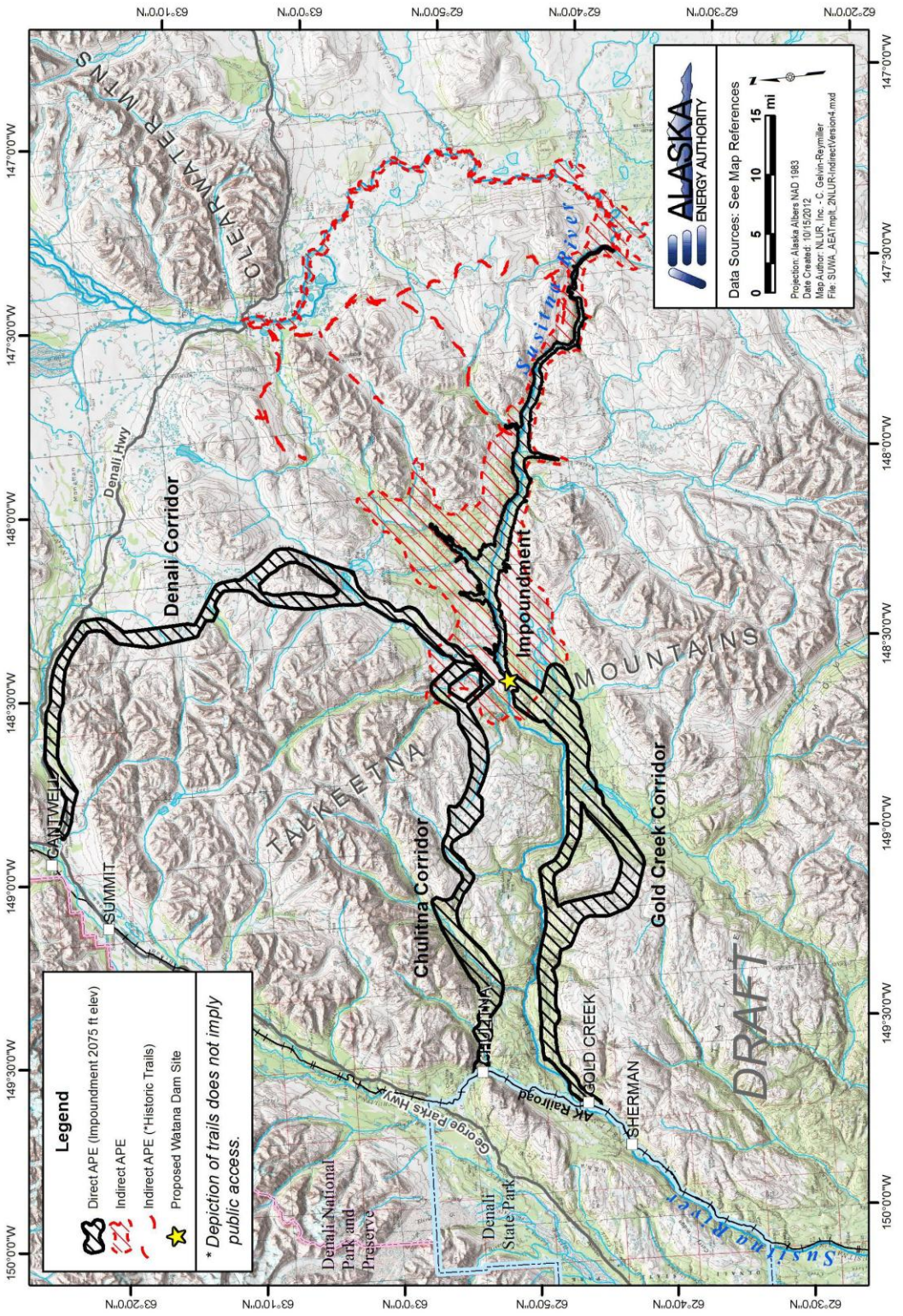

Figure 13.5-2. Direct and indirect APEs for the cultural resource study.

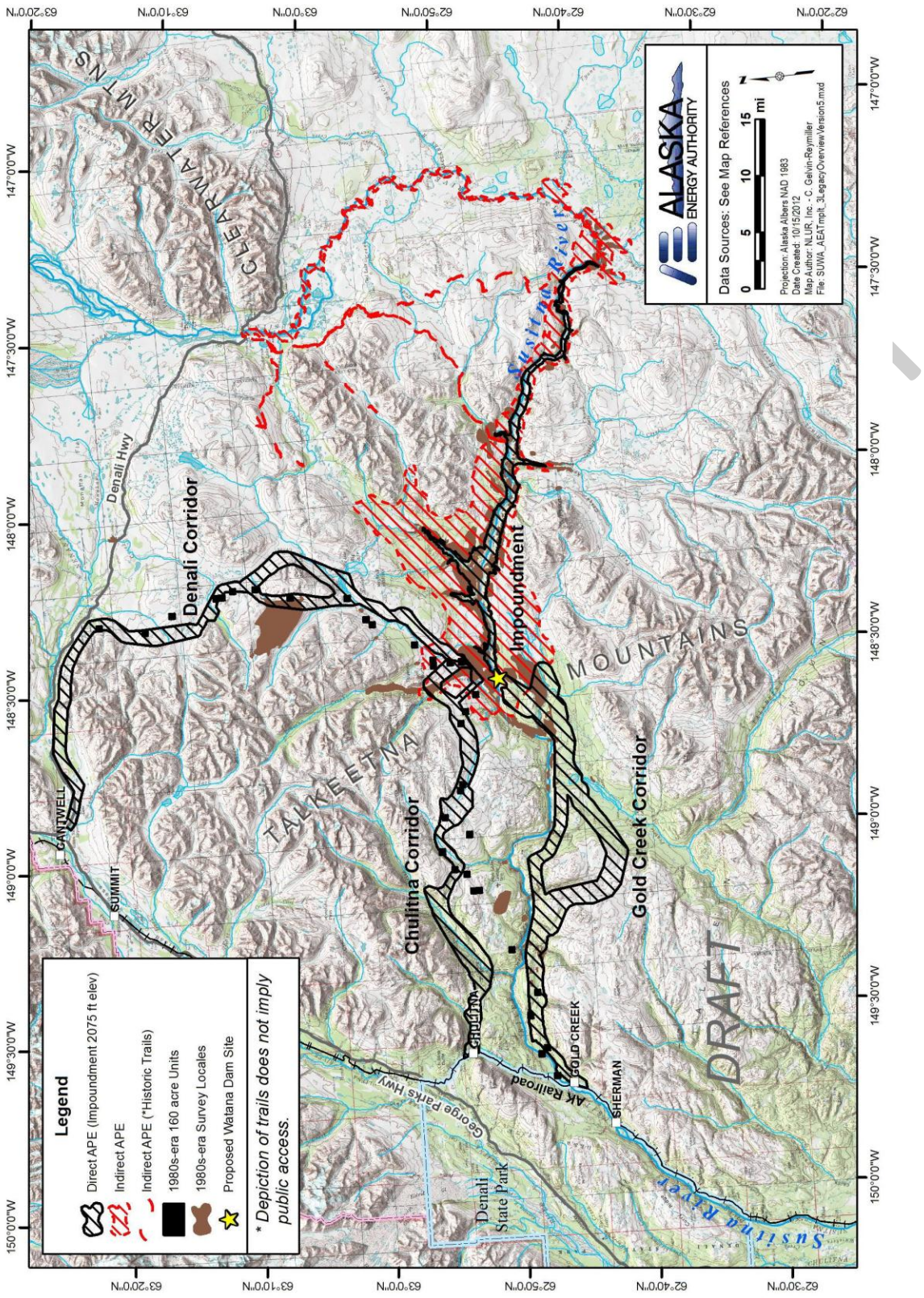

Figure 13.5-3. Survey coverage accomplished in the late 1970s and early 1980s.

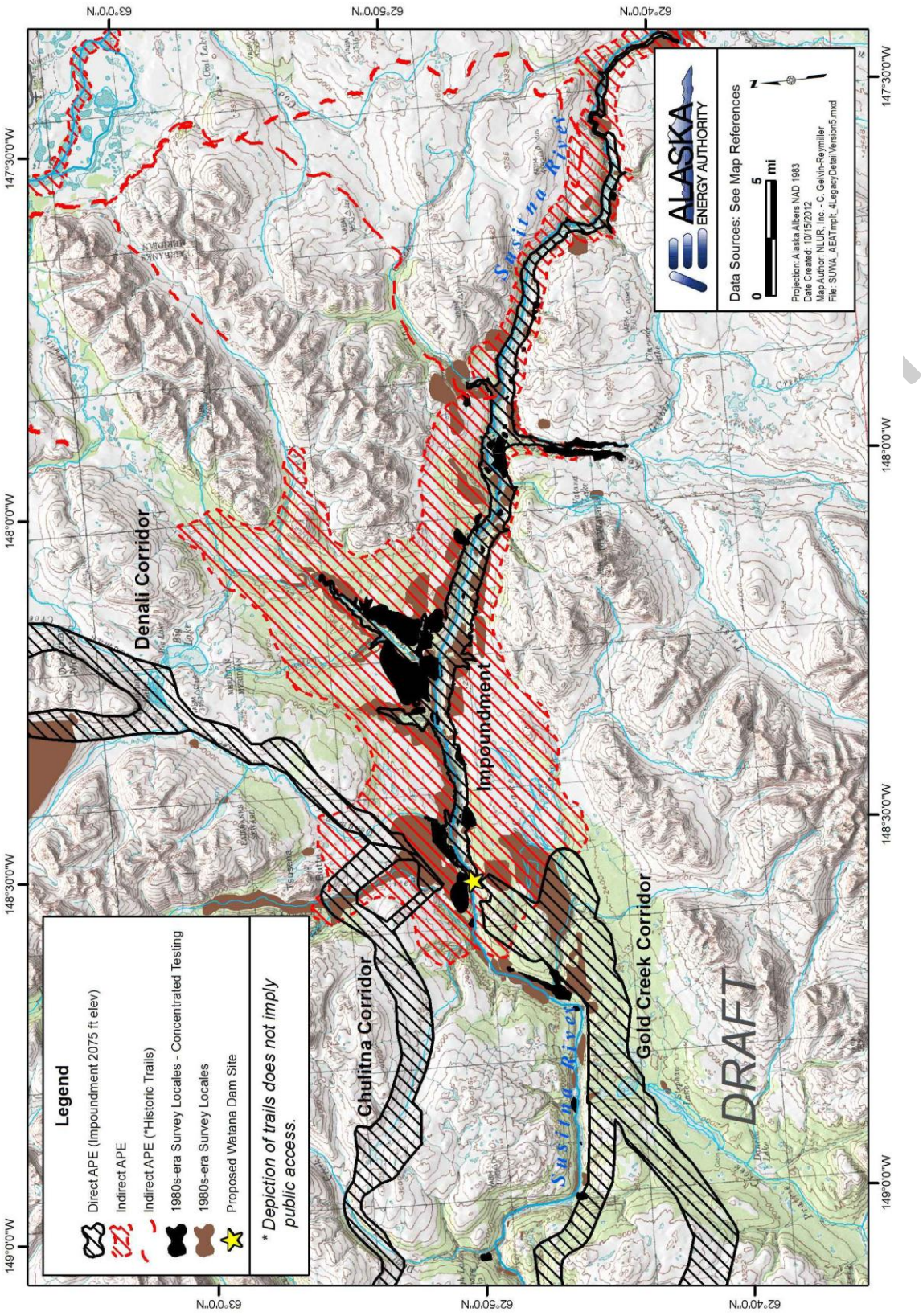

Figure 13.5-4. Detail of testing accomplished in the late 1970s and early 1980s.

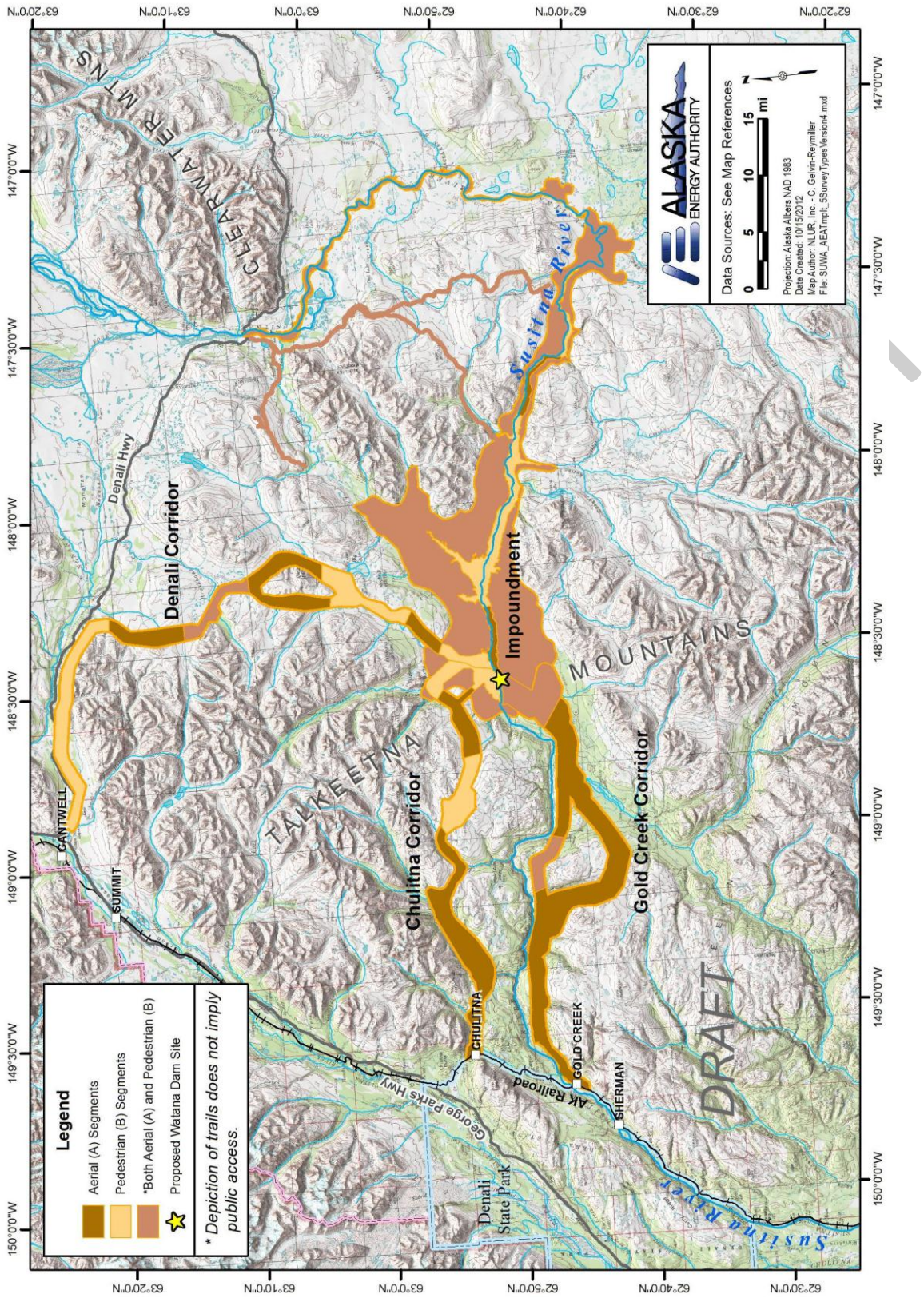

Figure 13.5-5. Proposed survey methods in the direct and indirect APEs.

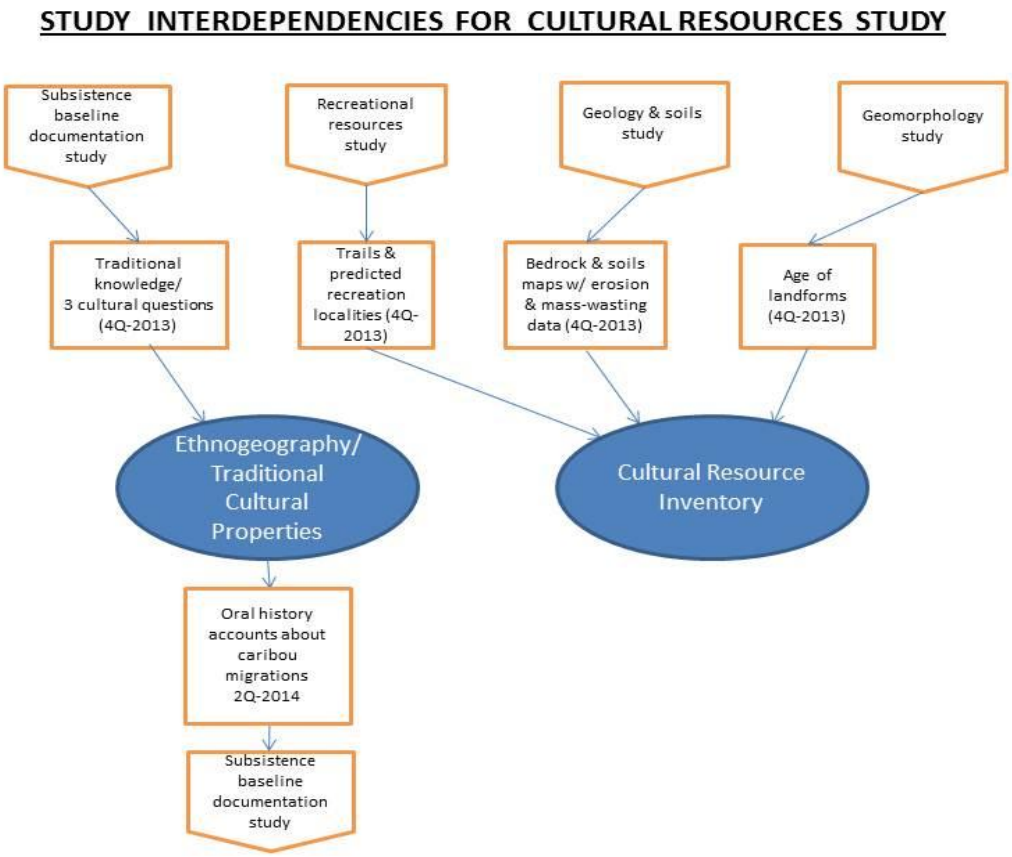

Figure 13.5-6. Study interdependencies for the cultural resources study.

13.6. Attachments

ATTACHMENT 13-1. PLAN FOR UNANTICIPATED DISCOVERIES OF CULTURAL RESOURCES AND HUMAN REMAINS

ATTACHMENT 13-2. DOCUMENTATION OF CONSULTATION ON CULTURAL STUDY PLANS