Susitna-Watana Hydroelectric Project (FERC No. 14241)

Initial Study Report Overview

Prepared by

Alaska Energy Authority

SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

June 2014

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1. INTRODUCTION TO ISR

This document provides the Alaska Energy Authority's (AEA) Initial Study Report (ISR) for the original licensing of the proposed Susitna-Watana Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC or Commission) Project No. 14241. This ISR is provided in accordance with the Commission's Integrated Licensing Process (ILP) regulations, 18 C.F.R. § 5.15(c), which require an applicant to "describ[e] its overall progress in implementing the study plan and schedule and the data collected, including an explanation of any variance from the study plan and schedule." Under the Commission's ILP regulations, the ISR also is to "include any modifications to ongoing studies proposed by the potential applicant."

This ISR provides a detailed status report of AEA's progress in implementing the suite of 58 individual studies for the Project set forth in the December 2012 Revised Study Plan (RSP), as approved by Commission staff in the study plan determinations issued February 1, 2013, April 1, 2013, and April 26, 2013 (collectively referred to as the Study Plan). For each individual study, AEA reports on its progress in implementing the study through the 2013 season, including variances from the Study Plan and schedule approved by staff, as well as all modifications AEA plans to implement when completing the Study Plan during the 2014 and 2015 study seasons. A complete list of all components for each individual study appears in Table 1.

Data collected during the Study Plan implementation, to the extent they have been verified through AEA's quality assurance and quality control procedures and are publicly available, can be accessed at http://gis.suhydro.org/reports/isr.

1.1. Background of ISR Development

This ISR is the product of over two and one-half years of intense work and consultation among AEA, federal and state resource agencies, Alaska Native entities, and other licensing participants. Since the filing of AEA's Notice of Intent and Pre-Application Document in December 2011, AEA and licensing participants have consulted closely in the development and implementation of the Study Plan. Such efforts have included:

- *Environmental Scoping*: Pursuant to the National Environmental Policy Act, the Commission issued its Scoping Document 1 in February 2012. In March 2012, the Commission held a series of environmental scoping meetings in Anchorage, Wasilla, Glennallen, Sunshine, Cantwell, and Fairbanks. In response, licensing participants filed nearly 170 comment letters, and the Commission issued Scoping Document 2 in July 2012.

- *Data Gap Analyses and Baseline Studies*: In 2011 AEA conducted and reported on numerous Data Gap Analyses focused on compiling existing resource information related to the Susitna River that helped identify gaps in baseline information for wildlife, water quality/sediment, subsistence, socioeconomics, recreation, air quality, transportation, cultural, aquatic and Alaska Native resources. During the 2012 study season, AEA implemented a suite of 18 baseline studies of the Susitna River and the Project area,

developed in consultation with licensing participants. These studies helped inform the study planning process and provided updated information that supplemented existing information. The results of these studies were reported in a set of over 30 technical memoranda, map books, and study reports, all of which were publicized on AEA's website for the Project, http://www.susitna-watanahydro.org/type/documents/.

- *Proposed Study Plan:* Beginning in early 2012, AEA developed its Proposed Study Plan (PSP). In an effort to assist licensing participants in preparing for what AEA expected to be a large number of study requests and an extensive study program, AEA took several steps—beyond the requirements of the Commission's ILP regulations—to facilitate consultation and assist licensing participants. For instance, AEA took the initiative to prepare and distribute 46 preliminary model draft study requests that participants could use in preparing their study requests. Starting with the development of the PSP, AEA also agreed to provide funding—through an innovative agreement between AEA, Alaska Department of Natural Resources Office of Project Management and Permitting, and federal resource agencies—to help support federal resource agencies' participation in the Project licensing. AEA filed its PSP in July 2012.

- *Revised Study Plan:* Following its filing and distribution of the PSP, AEA continued its approach of engaging licensing participants beyond the requirements of the Commission's ILP regulations in development of the RSP. Shortly after its release of the PSP, AEA held a series of Technical Work Group (TWG) meetings in August 2012 to review each of the 58 proposed studies. Following these initial meetings, AEA held monthly TWG meetings, as well as numerous individual and focused outreach meetings and teleconferences with licensing participants, to solicit comments on AEA's PSP and resolve concerns and differences of opinion related to study objectives, methodologies, scopes, and levels of effort. In an effort to incorporate participants' comments and memorialize progress in resolving participants' concerns related to the PSP, AEA agreed to prepare an interim draft RSP, and engage in another iteration of review and comment with licensing participants. AEA distributed the interim RSP in October 2012. Following additional opportunity for comment and consultation, AEA filed the final RSP with the Commission in December 2012.

- *Technical Work Group Meetings:* Following Commission staff's study plan determinations, the hallmark of AEA's consultative effort in implementing the Study Plan has been a series of regular TWG meetings for each of the 58 studies. These TWG meetings—typically held on a quarterly basis for each study—have provided a venue for licensing participants to receive regular status updates of AEA's progress in meeting study objectives, identify challenges and adaptations required to implement the studies effectively, and discuss early results of data collected. A full listing of these TWG meetings, together with the agendas, presentations and meeting notes, appears on AEA's website for the Project, http://www.susitna-watanahydro.org/meetings/past-meetings/.

As a result of these efforts, the 2013 study season was a busy and productive year for the Project. Supported by additional appropriations for the Project by the State of Alaska (surpassing $172 million through 2013), AEA and its study team conducted extensive field work during the season

and amassed a tremendous amount of data in implementing the individual studies in the Study Plan. In light of the immensity of information to be detailed in the ISR, together with some uncertainty regarding additional appropriations for the Project as the Alaska State Legislature commenced its annual session in early 2014, AEA requested a 120-day extension of time to prepare the ISR from the Commission on January 6, 2014.

In its extension request, AEA proposed to circulate a draft ISR by the original February 3, 2014 ISR filing deadline. To provide 2013 study results to licensing participants as quickly as possible and maximize their opportunity for review, AEA proposed that this draft ISR would contain a full progress report of the 2013 study season for each of the 58 studies, including all variances from the Study Plan implemented during 2013. Although AEA recognized that this extension of time would limit the 2014 study season, AEA explained that a draft ISR would allow AEA to disseminate 2013 study results as quickly as possible and afford an opportunity for AEA and licensing participants to continue consultation and work together to prioritize 2014 work and develop an approach for completing the Study Plan in 2015.

On January 28, 2014, the Commission approved AEA's extension request and established an updated licensing schedule, which appears in Table 2. While the Commission observed that circulating a draft ISR and holding additional consultation are not required elements of the ILP, it extended the ISR filing deadline until June 3, 2014, and allowed an additional 120 days for licensing participants to review the ISR.

On February 3, 2014, AEA filed a draft ISR with the Commission and made it available for review by all licensing participants. Acknowledging the concerns raised by some licensing participants that circulating a draft ISR could require a duplication of effort, AEA assured licensing participants that it did not anticipate significant changes to the information contained in the draft ISR. Rather, AEA explained that the final ISR to be filed on June 3 would be additive—containing new material not included in the draft ISR, such as AEA's plans for completing the Study Plan, including any proposed modifications.

Following distribution of the draft ISR, AEA held additional meetings and outreach with licensing participants, in an effort to resolve ongoing issues, review 2013 preliminary study results, and focus AEA's limited study program in 2014. During these meetings and outreach, AEA received many constructive comments related to both the draft ISR, as well as its proposed plans for the limited 2014 study season. Based on these comments, AEA has refined this final ISR and developed a precise 2014 and 2015 scope of work for each of the 58 individual studies in the Study Plan. In addition, during this period AEA worked very closely with the Cook Inlet Region Working Group (CIRWG) to resolve issues related to land access. AEA is pleased to report that this effort successfully led to a land access agreement between AEA and CIRWG.

1.2. Structure of ISR

Consistent with its earlier assurances to licensing participants and Commission staff, AEA has taken great care to structure this ISR in a manner that preserves the content of the draft ISR filed

with the Commission on February 3. For each individual study in the Study Plan,[1] this ISR is structured as follows:

- *Part A:* This segment of each individual study report reproduces the draft ISR filed with the Commission on February 3. Part A details AEA's progress with each of the 58 individual studies by reporting on the methodologies employed and the results achieved through the 2013 study season. Part A also identifies any variances in methodologies from the Study Plan, discusses how AEA is meeting study objectives in light of such variances, and in many instances evaluates how the data collected through the 2013 study season compare to historical scientific data in the Project area.

  Other than removing the executive summary (which has been updated for each study), removing the prior "draft" designation, and other administerial updates, Part A remains unchanged from the draft ISR.

- *Part B:* This segment of each study report contains any new supplemental information or errata with respect to Part A. The information in Part B derives from either comments received during technical meetings following AEA's distribution of the draft ISR, or AEA's internal review of the document following its February 3 submittal.

- *Part C:* This segment of each study report includes new material not included in the February 3 draft ISR, as well as an updated executive summary for each individual study. This new material details AEA's plans for completing the Study Plan, including modifications. It also includes AEA's specific proposal for 2014 and 2015 work and explains how the modifications will meet Study Plan objectives.

1.3. Limited Study Plans for 2014

AEA is pleased to report that the recently adjourned 2014 Alaska State Legislature approved an additional $20 million appropriation for the Project—double the amount proposed at the beginning of the legislative session. This amount provides sufficient resources for AEA to implement a targeted study program in 2014.

Since the February 3 draft ISR, AEA convened several well-attended technical meetings that, together, amounted to 12 full days during the period from early March to early May. The purpose of these meetings was to discuss 2013 study results and AEA's approach for completing the Study Plan in 2014 and 2015. During these meetings, which included a three-day session focused exclusively on the riverine modeling proof of concept, AEA received constructive feedback related to the draft ISR, and meeting participants discussed different strategies and methods for meeting Study Plan objectives in 2014 and 2015.

AEA appreciates the additional support, participation, and feedback of federal and state resource agencies and other licensing participants. This feedback has helped shape this ISR. Now that the State has appropriated additional funds for the Project, AEA has prepared its plans for the limited

[1] The only exception to this structure is the Glacial and Runoff Changes Study (Study 7.7), which is now a completed study report.

2014 study season. For each individual study, the ISR details the planned work for 2014, recognizing that the remainder of the data collection, analysis and reporting will occur in 2015. For convenience, a summary of the planned work for 2014 appears in Table 3.

1.4. Proposed Changes to Transmission and Access Corridors

Throughout this licensing process, AEA continues to evaluate and refine its Project proposal and explore various options for its licensing and development. This effort has led AEA to pursue the study of an additional alternative north-south corridor alignment for transmission and access from the dam site to the Denali Highway (and the existing transmission line), as depicted in Figure 1. AEA believes that this new alignment—referred to as the "Denali East Option"—could have advantages over other alternatives, as it would encumber only State-owned lands and traverse generally lower-elevation areas (and possibly avoid some of the icing problems typically encountered at higher elevations) than the original north-south alignment—now referred to as the "Denali West Option."

Because AEA decided to pursue study of the Denali East Option since the filing of the draft ISR in February 2014, the Part A segment for each study refers only to the "Denali Corridor." Such references now apply to the Denali West Option—although the two options are co-terminus near the dam site at the south end for both transmission and access and along Denali Highway to the north for transmission.

In addition to the inclusion of the Denali East Option, AEA is investigating the possibility of eliminating the Chulitna Corridor from further study. AEA is in the process of analyzing this corridor and consulting with federal and state resource agencies, Alaska Native entities, and other licensing participants regarding some of the environmental and other challenges associated with this corridor. In the event AEA proposes to eliminate the Chulitna Corridor from further study, it will provide a written analysis for review and comment by licensing participants.

1.5. Conclusion and Next Steps

During the 2013 study season, an estimated 350 scientists, archaeologists, biologists, and other specialists worked in the field, collecting water samples, radio tagging fish, studying cultural resources, investigating terrestrial and botanical resources, surveying the recreating public, among other field activities. Additional scientists and researchers conducted literature reviews, analyzed data, and commenced several complex, analytical modeling efforts. While on-the-ground adjustments and other circumstances led to variances of the Commission-approved Study Plan in some instances, these variances—as explained in each individual report below—did not compromise overall study objectives. In many instances, in fact, variances implemented in 2013 will be carried forward in 2014 and/or 2015, as they improve data collection efforts and enhance study results.

As provided by the Commission's ILP schedule, licensing participants now have until November 30, 2014 to review this ISR and submit any comments or proposed modifications. Near the end

of this extended 120-day period, AEA will convene a series of meetings on the ISR beginning the week of October 13. The schedule for these ISR meetings is as follows:

- October 15: Fish and Aquatics
- October 16: Glacial, Geomorphology, Water Quality, Groundwater
- October 17: Ice, Instream Flow, Riparian Instream Flow, Riparian Vegetation
- October 21: Botanical and Wildlife
- October 22: Geology and Soils, Engineering, Subsistence, Cultural Resources, and Paleontology
- October 23: Socioeconomics, Air Quality, Transportation, Health Impact Assessment, and Recreation Resources

1.6. Tables

Table 1. Individual Study Report Components

Study	Title
4 GEOLOGY AND SOILS	
4.5 Geology and Soils Characterization Study	
	• Part A: Sections 1-6, 8-9 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
5 WATER QUALITY	
5.5 Baseline Water Quality Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: Continuous Temperature Monitoring o Appendix B: Thermistor Figures o Appendix C: Water Quality Meteorological Station Data o Appendix D: Baseline Water Quality Data o Appendix E: Baseline Water Quality Chlorophyll Data o Appendix F: Focus Area Location Maps o Appendix G: Focus Area Water Quality Data o Appendix H: Focus Area Water Quality Chlorophyll Data o Appendix I: Interim Study Report Water Quality Photographs o Appendix J: TIR Images • Part B: Supplemental Information (and Errata) to Part A o Attachment 1, Final Quality Assurance Project Plan for Water Quality and Mercury Assessment for the Susitna-Watana Hydroelectric Project, Susitna River, Southcentral Alaska ▪ Appendix A: State and Federal Water Quality Criteria and Thresholds ▪ Appendix B: Analytical Data Validation Checklist ▪ Appendix C: Field and Data Calibration Forms ▪ Appendix D: Field Activities Standard Operating Procedures (SOPs) ▪ Appendix E: Example Chain of Custody (COC) ▪ Appendix F: Field Data Collection, Processing, and Delivery Standards • Part C: Executive Summary and Section 7
5.6 Water Quality Modeling Study	
	• Part A: Sections 1-6, 8-10 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
5.7 Mercury Assessment and Potential for Bioaccumulation Study	
	• Part A: Sections 1-6, 8-10 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
6 GEOMORPHOLOGY	
6.5 Geomorphology Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: Study Component 1: ▪ Appendix A.1: Surficial Geology Mapping in the Lower and Middle Susitna River Segments ▪ Appendix A.2: Geomorphic Surface Mapping in 7 Focus Areas ▪ Appendix A.3: Ratings Curves for 7 Focus Areas ▪ Appendix A.4: Recurrence Interval Plots for 7 Focus Areas o Appendix B: Study Component 3 – Initial Effective Discharge Analysis for the Mainstem Susitna River and Tributaries o Appendix C: Study Component 6 - Compilation of References from Literature Search on the

Study	Title
	Downstream Effects of Dams o Appendix D: Study Component 9: ▪ Appendix D.1: Large Woody Debris Aerial Photograph Digitizing ▪ Appendix D.2: Large Woody Debris Field Inventory Protocol ▪ Appendix D.3: Large Woody Debris Study Area Maps o Attachment A: Susitna River Flow Aerotriangulation Summary • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
6.6 Fluvial Geomorphology Modeling below Watana Dam Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: Bed-material Samples o Appendix B: Bed-material Sample Locations in Focus Areas o Appendix C: Bank-material Samples o Appendix D: Water Surface Measurements o Appendix E: Evaluation of 50-Year Simulation Period, Pacific Decadal Oscillation, and Selection of Representative Annual Hydrographs o Attachment A: Field Report, Field Assessment of Underwater Camera Pilot Test for Sediment Grain Size Distribution • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
7 WATER RESOURCES	
7.5 Groundwater Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: Example 1970 and 2011 Focus Area Aerial Imagery o Appendix B: Data-Collection Station Metadata Examples o Appendix C: Data-Collection Station Programs and Wiring Diagram Examples o Appendix D: Selected Focus Area Time-Lapse Photo Examples o Appendix E: Level-Loop Survey and Survey Control Points Examples • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
7.6 Ice Processes in the Susitna River Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: Detailed Ice Observations and Lower River HEC-RAS Modeling o Appendix B: 2013 Ice Field Measurements • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7 o Appendix C: White Paper: Review and Compilation of Existing Cold Regions Hydropower Project Operations and Effects o Appendix D: Technical Memorandum: Proof of Concept Modeling Demonstration
7.7 Glacier and Runoff Changes Study	
	• Part A: Sections 1-11 • Part B: Supplemental Information (and Errata) to Part A
8 INSTREAM FLOW	
8.5 Fish and Aquatics Instream Flow Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: Hydrologic Methods o Appendix B: Biological Cues Study o Appendix C: Moving Boat ADCP Measurements o Appendix D: GINA Initial Study Report 8.5 Data Files o Appendix E: Tributary Gaging Site Schematics o Appendix F: Tributary Gaging Representative Site Photos o Appendix G: HSC Histogram Plots

Study	Title
	o Appendix H: Periodicity Tables o Appendix I: Lower River Hydraulic Model Calibration • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7 o Appendix J: Representative Years o Appendix K: Hydrology and Version 2 Open-water Flow Routing Model o Appendix L: 2012-2013 Instream Flow Winter Pilot Studies o Appendix M: Habitat Suitability Curve Development o Appendix N: Middle River Fish Habitat and Riverine Modeling: Proof of Concept o Appendix O: Fish Habtat Modeling in Lower River
8.6 Riparian Instream Flow Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: Riparian Focus Area Selection: Response to Agency Comments Regarding Herbaceous Vegetation • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
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9.5 Study of Fish Distribution and Abundance in the Upper Susitna River	
	• Part A: Sections 1-6, 8-10 o Appendix A: Distribution of Fish Radio-Tagged in the Upper Susitna River, 2013 o Appendix B: Fish Distribution Maps for the Upper Susitna River 2012 and 2013 o Appendix C: Seasonal Fish Distribution, Upper Susitna River 2012 and 2013 o Appendix D: Upper River Fish Observations and Relative Abundance, 2013 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
9.6 Study of Fish Distribution and Abundance in the Middle and Lower Susitna River	
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9.7 Salmon Escapement Study	
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Study	Title
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	• Part A: Sections 1-6, 8-10 o Appendix A: Records of Consultation with USFWS and USGS Regarding Sampling Protocol and Analytical Method for Amphibian Chytrid Fungus o Appendix B: Photographs from Field Surveys in 2013 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7 o Appendix C: Record of consultation with USGS regarding sampling for the presence of amphibian chytrid fungus
10.19 Evaluation of Wildlife Habitat Use	
	• Part A: Sections 1-6, 8-9 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
10.20 Wildlife Harvest Analysis	
	• Part A: Sections 1-6, 8-9 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7

Study	Title
11 BOTANICAL RESOURCES	
11.5 Vegetation and Wildlife Habitat Mapping Study in the Upper and Middle Susitna Basin	
	• Part A: Sections 1-6, 8-10 o Appendix A: Commonly Sampled Wildlife Habitat Types • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
11.6 Riparian Vegetation Study Downstream of the Proposed Susitna-Watana Dam	
	• Part A: Sections 1-6, 8-10 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
11.7 Wetland Mapping Study in the Upper and Middle Susitna Basin	
	• Part A: Sections 1-6, 8-10 o Appendix A: Photographs of Representative Wetland Types Sampled in the Vegetation and Wildlife Habitat Mapping Study Area, Susitna-Watana Hydroelectric Project, 2013 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
11.8 Rare Plant Study	
	• Part A: Sections 1-6, 8-10 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
11.9 Invasive Plant Study	
	• Part A: Sections 1-6, 8-10 o Appendix A. Photos of Selected Invasive Species, 2013 Field Survey, Susitna-Watana Hydropower Project • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
12 RECREATION RESOURCES	
12.5 Recreation Resources Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: Comprehensive Plan Review o Appendix B: Trails Inventory o Appendix C: Winter Trails o Appendix D: Summer Trails o Appendix E: ADF&G Fish Harvest Data o Appendix F: Facility Inventory o Appendix G: Facilities Figures o Appendix H: Dispersed Recreation Inventory o Appendix I: Access Inventory o Appendix J: Access Figures o Appendix K: Photographs o Appendix L: Mail Survey o Appendix M: Intercept Survey o Appendix N: Intercept Observation Tally o Appendix O: Nonresponse Bias Telephone Survey • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
12.6 Aesthetics Resources Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: Aesthetics Analysis Location Map Set o Appendix B: Analysis Locations Narratives • Part B: Supplemental Information (and Errata) to Part A

Study	Title
	• Part C: Executive Summary and Section 7
12.7 Recreation River Flow and Access Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: River Recreation and Access Internet Survey o Appendix B: River Recreation Executive Interview Questions o Appendix C: Winter River Recreation and Transportation Executive Interview Questions • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
13 CULTURAL AND PALEONTOLOGICAL RESOURCES	
13.5 Cultural Resources Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: Plan for Unanticipated Discoveries o Appendix B: Susitna-Watana Hydroelectric Project Interview Questions Protocol o Appendix C: Letter from Ahtna, Inc. to the Members of the Ahtna Lands Committee, June 14, 2013 o Appendix D: Summary of Known Cultural Resources o Appendix E: Western Ahtna Land Use 1880 to 2013 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
13.6 Paleontological Resources Study	
	• Part A: Sections 1-6, 8-9 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
14 SUBSISTENCE	
14.5 Subsistence Resources	
	• Part A: Sections 1-6, 8-9 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
15 SOCIOECONOMICS, AIR AND TRANSPORTATION	
15.5 Regional Economic Evaluation Study	
	• Part A: Sections 1-6, 8-10 o Appendix A: Technical Memorandum on Long-Term Modeling Assumptions • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
15.6 Social Conditions and Public Goods and Services Study	
	• Part A: Sections 1-6, 8-9 o Appendix A: Random Utility Model Methodology o Appendix B: Technical Memorandum on Long-Term Model Assumptions • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
15.7 Transportation Resources Study	
	• Part A: Sections 1-6, 8-9 o Appendix A: Bibliography o Appendix B: Asset Inventory o Appendix C: Highway Data for Future Traffic, Funded Projects, and Planned Projects o Appendix D: Aviation Data for Future Operations, Funded Projects and Planned Projects o Appendix E: Rail Data for Future Traffic, Funded Projects, and Planned Projects o Appendix F: Port Data for Future Operations, Funded Projects and Planned Projects o Appendix G: Interview Summaries o Appendix H: Commercial Vehicle Size, Weight & Permit Regulations (17 AAC 25) o Appendix I: Municipality of Anchorage Truck Routes

Study	Title
	o Appendix J: Alaska Department of Transportation and Public Facilities Seasonal Weight Restrictions • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
15.8 Health Impact Assessment Study	
	• Part A: Sections 1-6, 8-10 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
15.9 Air Quality Study	
	• Part A: Sections 1-6, 8-10 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7
16 PROJECT SAFETY	
16.5 Probable Maximum Flood (PMF) Study	
	• Part A: Sections 1-6, 8-10 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7 o Attachment 1: Final Draft Probable Maximum Flood Study Report
16.6 Site-Specific Seismic Hazard Study	
	• Part A: Sections 1-6, 8-9 • Part B: Supplemental Information (and Errata) to Part A • Part C: Executive Summary and Section 7

Table 2. Revised Susitna Project Process Plan and Schedule (from FERC January 28, 2014 letter to AEA)

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
AEA	File Initial Study Report	June 3, 2014	5.15(c)(1) waived
AEA	Hold Initial Study Report Meeting	October 16, 2014	5.15(c)(2) waived
AEA	File Initial Study Report Meeting Summary	October 31, 2014	5.15(c)(3)
All Stakeholders	File disagreements with Meeting Summary and recommendations for modified or new studies	November 30, 2014	5.15(c)(4)
All Stakeholders	File responses to meeting summary disagreements and recommendations for modified or new studies	December 30, 2014	5.15(c)(5)
FERC	Issue Director Determination on meeting summary disagreements and recommendations for modified or new studies	January 29, 2015	5.15(c)(6)
AEA	Second Study Season	2015	5.15(a)
AEA	File Updated Study Report	February 1, 2016	5.15(f) waived

Responsible Party	Pre-Filing Milestone	Date	FERC Regulation
AEA	Hold Updated Study Report Meeting	February 16, 2016	5.15(f)
AEA	File Updated Study Report Meeting Summary	March 2, 2016	5.15(f)
All Stakeholders	File disagreements with Meeting Summary and recommendations for modified or new studies	April 1, 2016	5.15(f)
All Stakeholders	File responses to meeting summary disagreements and recommendations for modified or new studies	May 1, 2016	5.15(f)
FERC	Issue Director Determination on meeting summary disagreements and recommendations for modified or new studies	May 31, 2016	5.15(f)
AEA	Third Study Season (if required)	2016	5.15(a)
AEA	File Preliminary Licensing Proposal or Draft License Application	July 5, 2016	5.16(a)
All Stakeholders	File comments on Preliminary Licensing Proposal or Draft License Application	October 3, 2016	5.16(e) waived
AEA	File License Application	December 1, 2016	5.17

Table 3. Summary of Susitna-Watana Study Activities Planned for 2014

Study	2014 Study Plan Activities
4 GEOLOGY AND SOILS	
4.5 Geology and Soils Characterization Study	
	• Geologic Mapping: Summer mapping to be scheduled prior to leaf-out and after leaves have fallen (May and September) for geologic mapping on the abutments at the dam site. Focus is lineaments and geologic features (potential fracture and shear zones) and potential of rock displacement or rupture in the dam site area. • Geophysical Surveys: Surface geophysical surveys to identify top of rock surface and to characterize the general soil and rock conditions; optimize locations of borings where possible. • Drilling at Dam Site: Core drilling, water pressure testing, downhole televiewer (COBOL), installation of geotechnical instrumentation; select rock core samples for testing. Four core holes totaling approximately 1,750 LF of drilling (Figure 7.2-1). • Geotechnical instrumentation: Monitoring will continue with re-installation of data loggers for resuming the data collection for groundwater and ground temperature. • Seismic hazard study: Continuation of the lineament mapping and analysis related to the crustal seismic source evaluation and data collection efforts for seismic events (see ISR 16.6).
5 WATER QUALITY	
5.5 Baseline Water Quality Study	
	• Water Temperature Data Collection: Continuous temperature loggers will be deployed at 38 sites; loggers will be installed by the end of June 2014, with monthly downloads of all sites to follow; and logging interval will be changed for all loggers in September 2014 from 15 minutes to 30 minutes due to data storage limitations over winter months, allowing for temperature data collection from September 2014 through June 2015. • Meteorological Data Collection: MET Stations EMS-1, EMS-2, and EMS-3 will continue to be maintained through the 2014 field season; and meteorological data will continue to be downloaded from the three MET stations established between PRM 142.2 to PRM 235.2, as well from the 3 existing MET stations located between Willow Creek and the Talkeetna Airport. • Baseline Water Quality Monitoring: Baseline water quality monitoring samples will be collected at 18 sites from PRM 29.9 to PRM 235.2 each month from June 2014 through September 2014; In-situ field measurements will be taken at each location using a Hydrolab® datasonde (MS5); and a single grab sample will be taken monthly at each location and be analyzed for all total metals (except Ca & Mg) and dissolved Al, TP, TKN, & nitrate+nitrite-nitrogen. • Focus Area Water Quality: Focus Areas (in coordination with Study Plan 8.5, Instream Flow) will be sampled in 2014 to obtain results for water quality parameters that did not meet data quality objectives (Section A.7.1. of the QAPP) in 2013; in-situ field measurements will be taken at each point sample location and at the center of each transect using a Hydrolab® datasonde (MS5); and a single grab sample will be taken at each point sample location at the center of each transect once in July and once in August, and will be analyzed for all total metals (except Ca & Mg) and dissolved Al, TP, TKN, & nitrate+nitrite-nitrogen. • Sediment and Porewater Sampling: Sediment and porewater samples will be collected at the 6 sampling sites that were not visited in 2013 (Susitna Above Watana Dam, Susitna Below Watana Dam, Fog, Deadman, Watana, and Tsusena) once in August or September 2014. • Thermal Infrared Remote Sensing: The remaining portions of the Lower River that were not surveyed during the 2013 field season (approximately 27% of the total) due to adverse weather conditions will be surveyed during the 2014 field season.
5.6 Water Quality Modeling Study	
	Modeling efforts (parameterization, calibration, validation, POC, and initial model runs) will continue.
5.7 Mercury Assessment and Potential for Bioaccumulation Study	
	• Collection of the six remaining sediment samples (RSP Section 5.7.4.2.4). • Limited winter water quality sampling will occur in January and March of 2014 (RSP Section 5.7.4.2.3). • Summer monthly water sampling from June to September (see ISR Study 5.5 for details). • Completion of the Predictive Risk Analyses (RSP Section 5.7.4.6) and mercury modeling (RSP Sections 5.7.4.7 and 5.7.4.8).
6 GEOMORPHOLOGY	
6.5 Geomorphology Study	
	• Continue characterization of the Susitna River geomorphology including refinement of the processes that form and maintain the features and surfaces in the Middle and Lower River. The role of ice processes is an important aspect of this effort (Section 7.2.1.1.3). • USGS will perform mainstem and major tributary sediment transport measurements (ISR 6.5 Section 7.2.1.3). • Update of sediment balance, bed-material mobilization and effective discharge calculation as 1-D Bed Evolution Model results from Study 6.6 become available (ISR 6.5 Section 7.2.1.3). • Update channel change analysis, complete floodplain turnover analysis and document them in a Technical Memorandum to be developed in 2014 (ISR 6.5 Section 7.2.1.4) • Update aquatic macrohabitat type mapping from current aerials based on coordination with Studies 9.9 and 8.5 (ISR 6.5 Section 7.2.1.5). Revised Technical Memorandum to be developed in 2014. • Develop literature review on downstream effects of dams (ISR 6.5 Section 7.2.1.6). • Refinement of the reconnaissance level assessment of Project effects as 1-D modeling results for scenarios become available (ISR 6.5 Section 7.2.1.6). • Coordination with Water Quality Modeling Study 5.6 on reservoir sediment trapping efficiency and provide sediment outflows from Watana Dam for 1-D Bed Evolution Modeling in Study 6.6 (ISR 6.5 Section 7.2.1.8). • Complete digitizing of LWD from current and historical aerials in portions of the Middle and Upper Susitna River (ISR 6.5 Section 7.2.1.9). • Complete LWD field inventory in remaining Middle and Lower River sample areas (ISR 6.5 Section 7.2.1.9). • Continue activities associate with the integration of the Fluvial Geomorphology Modeling (Study 6.6) and the Geomorphology Study including review and interpretation of scenario runs from the 1-D Bed Evolution Model and refinement of conceptual geomorphic process models (ISR 6.5 Section 7.2.11).
6.6 Fluvial Geomorphology Modeling below Watana Dam Study	

	• 1-D model field data collection
	  o Observations of bed roughness PRM 147 to PRM 187
	  o Water surface elevation measurements in the Middle and Lower River
	  o Bed and bank sampling PRM 147 to PRM 187
	• 2-D model field data collection

Study	2014 Study Plan Activities
	o Geomorphic mapping in remaining 3 Focus Areas (FA-151 [Portage Creek], FA-173 [Stephan Lake Complex] and FA-184 [Watana Dam]) o Bed and bank material sampling in remaining 3 Focus Areas o Level logger installation in selected Focus Areas to provide water surface elevations for model calibration/validation o Spot water surface elevations for model calibration/validation o Roughness observations in the remaining 3 Focus Areas o Support Groundwater (Study 7.5) and Fish and Aquatics Instream Flow (IFS) (Study 8.5) in characterization of groundwater inflows to lateral habitats • Tributary delta (fan) field data collection o Cross section surveys, bed material sampling and fan profiles at 10 Middle River tributaries (Tsusena, Fog, Unnamed 174.3, Unnamed 173.8, Chinook (if safe access is possible), Portage, 4th of July, Sherman, 5th of July and Deadhorse creeks) o Cross section surveys and bed material samples for 3 Lower River tributaries (Birch [or alternate if not accessible], Sheep and Caswell creeks) • LiDAR data o Collect high-density LiDAR for Middle River floodplain, PRM 107 to PRM 187 o Process LiDAR and perform verification of accuracy • 1-D modeling o Complete calibration and validation of 1-D model (PRM 30 to PRM 187) o Complete initial estimates of tributary water and sediment inflows o Initial 50-year 1-D model runs for existing-conditions and maximum load-following scenario o Perform demonstration run of 1-D model with width adjustment for maximum load-following scenario o Make decision on potential 1-D model extension below PRM 30 based on results of initial 50-year model runs o Prepare Technical Memorandum on 1-D model development • 2-D Modeling o Complete initial hydraulic model calibration for FA-113 (Oxbow 1) and FA-115 (Slough 6A) o Perform demonstration representative wet year runs of the 2-D Bed Evolution Model for FA-128 (Slough 8A) with geometry adjustment for year 25 and year 50 (if 1-D model results indicate adjustment is necessary) • Model integration o Collaborate with Riparian IFS (Study 8.6) on floodplain sediment accretion rates o Collaborate with Fish and Aquatics IFS (Study 8.5) on hydraulic parameters to provide for determination of habitat metrics and incorporation of groundwater into 2-D model lateral habitats o Collaborate with Groundwater (Study 7.5) on incorporation of groundwater into 2-D hydraulic model lateral habitats o Collaborate with Ice Processes (Study 7.6) on sediment transport and hydraulic modeling during break up jam conditions o Collaborate with Water Quality Modeling (Study 5.6) on reservoir trap efficiency and sediment outflow from Watana Dam o Collaborate with Fish Barriers (Study 9.12) on tributary delta modeling and assessment
7 WATER RESOURCES	
7.5 Groundwater Study	
	• Completion of the annotated bibliography and literature review. • Completion of the mapping of geohydrologic units and associated analysis. • Data collection networks will be maintained in FA-138 (Gold Creek), FA-128 (Slough 8A), FA-115 (Slough 6A), FA-113 (Oxbow 1), FA-104 (Whiskers Slough) in 2014. This will include measurement of water levels and water quality to verify data collected from continuous data-collection stations (see ISR 7.5 Tables 4.5-1 through Table 4.6). Parameters being measured include groundwater and surface-water levels and temperature, specific conductivity, streambed temperature profiles, and photographic images. Field efforts will include repairs of any damaged sensors from spring breakup, flooding, or other sources of sensor damage or malfunction. • Manual water level measurement stations will be established in FA-141 (Indian River) and FA-144 (Slough 21) and FA-173 (Stephan Lake Complex). FA-173 (Stephan Lake Complex) will also have at least three groundwater wells installed and self-logging pressure transducers installed in at least three wells and four surface-water measurement locations. • The data collection stations in the Focus Areas (see ISR 7.5 Tables 4.5-1 through Table 4.6) will be maintained through the winter of 2014/15 and summer of 2015 to support the analysis objectives of the Groundwater Study and also modeling and analysis objectives of the IFS (Study 8.5), Riparian IFS (Study 8.6), Fluvial Geomorphology Modeling (Study 6.6), Ice Processes (Study 7.6), Water Quality (Study 5.5), and Fish Distribution and Abundance (Study 9.6) studies. • Groundwater analysis will continue, including development of approaches and estimates of flow in lateral habitats in the Focus Areas that have study activities taking place. Approaches will be developed and validated for input between the 1D flow routing modeling and groundwater modeling and approaches to estimate groundwater conditions outside the Focus Areas.
7.7 Ice Processes in the Susitna River Study	
	• Develop a summary of the 2014 ice break-up observations. • Continue development and calibration of the River1D and River2D models with appropriate updates to geometry as new field data becomes available.
7.7 Glacier and Runoff Changes Study	
	Data collection for the FERC-approved study is complete.
8 INSTREAM FLOW	
8.5 Fish and Aquatics Instream Flow Study	
	• Conduct sampling in representative habitat types in the Lower River Segment of the Susitna River in association with Trapper, Birch, Sheep, and Caswell creeks. • Conduct sampling in FA-151 (Portage Creek), FA-173 (Stephan Lake Complex), and FA-184 (Watana Dam). • Conduct sampling in the Middle River Segment in areas with known fish use.

Study	2014 Study Plan Activities
	• Conduct opportunistic aquatic biota stranding and trapping surveys. • Continue development of site-specific HSC preference curves. • Complete exploratory analysis of relationships between microhabitat use and fish abundance utilizing data from FDA (Study 9.6), Water Quality (Study 5.5), and Groundwater (Study 7.5) studies. • Distribute draft species and life stage specific periodicity tables for the high and moderate priority fish species. • Finalize list of species and life stages for which HSC curves will be developed and the types of curves (preference, utilization, bianary) needed for each. • Distribute draft findings from 2014 Winter Studies. • Distribute draft HSC/HSI curves for macroinvertebrates and algae. • In preparation for 2015 Winter Studies, install continuous stage and water quality (temperature and dissolved oxygen) monitoring sensors in FA-104 (Whisker Slough), FA-128 (Slough 8A) and FA-138 (Gold Creek).
8.6 Riparian Instream Flow Study	
	• Conduct two, late July/early August and late August/early September, 2nd year seedling establishment survival surveys at all 2013 seedling transects (FA-104 (Whisker Slough), FA-113 (Oxbow I), FA-128 (Slough 8A), FA-138 (Gold Creek) and FA-144 (Slough 21)). • Complete tree ice scar surveying, mapping and sampling within the Middle River. • Complete floodplain sediment core sampling at select Focus Areas. • Monitor (and remove October 2014) installed tree sap-flow sensors at FA-104 (Whisker Slough) and FA-128 (Slough 8A). • Set-up initial 1-D surface water model for floodplain inundation frequency modeling throughout the study area. • Continue statistical analyses of seedling establishment and groundwater/ surface water isotope laboratory data. • Complete laboratory measurements of 2013 tree ice scar samples. • Develop final ice floodplain vegetation effects modeling approach with ice processes modeling team. • Develop a combined Riparian and Fluvial Geomorphology Technical Memorandum literature review with the bibliography.
9 FISH AND AQUATIC RESOURCES	
9.5 Study of Fish Distribution and Abundance in the Upper Susitna River	

	• Fish distribution and abundance sampling activities will occur in the mainstem Susitna River and select tributaries in the Study Area. Sampling will include three seasonal sampling events in the following locations:
	  o Under-represented mainstem habitats in Susitna River (ISR 9.5 Section 7.1.2.5)
	  o Three mainstem transect locations to facilitate comparison of 2014 data with 2013 and 2015 sampling
	  o Tributaries on CIRWG lands that were not sampled in 2013 including Deadman Creek and Unnamed Tributaries 197.7, 204.5, and 206.3
	  o Rare habitats in the Black River to evaluate the tributary sampling modification detailed in ISR 9.5 Section 7.1.2.4.
	• Rotary screw traps: AEA will continue to operate two rotary screw traps in the Upper River Study Area with additional migrant monitoring using a fyke net in Kosina Creek as described in ISR 9.5 Section 7.1.2.2.
	• Biotelemetry: Radio-tagging, maintenance of fixed radio telemetry sites, and aerial surveys will continue.
	• Collect tissue samples to support the Fish Genetic Baseline Study (Study 9.14; RSP Section 9.7.4.7).

9.6 Study of Fish Distribution and Abundance in the Middle and Lower Susitna River	

	• Salmon Early Life History sampling will continue (ISR 9.6 Section 7.1.2.1).
	• Fish distribution and abundance sampling activities will occur in the mainstem Susitna River and select tributaries in the Study Area. Sampling will include three seasonal sampling events in the following locations not sampled in 2013 (ISR 9.6 Section 7.1.2.2):
	  o Susitna River habitats that were inaccessible in 2013, and
	  o Tributaries on CIRWG lands that were not sampled in 2013 including Devil and Cheechako creeks and Unnamed Tributary 184.
	• Biotelemetry: A single fixed radio telemetry site at Devils Island Station (PRM 166.9) will be monitored for resident fishes and aerial surveys will be conducted.
	• Fish tissue collection will continue (RSP Section 9.6.4.3.7).
	• Winter Sampling will continue (ISR 9.6 Section 7.1.2.5).

9.7 Salmon Escapement Study	
	• Capture, radio-tag, and track adults of five species of Pacific salmon in the Middle and Upper Susitna River in proportion to their abundance. Capture and tag Chinook, coho and pink salmon in the Lower Susitna River (RSP Section 9.7.4.1). • Characterize the migration behavior and spawning locations of radio-tagged fish in the Lower, Middle, and Upper Susitna River (RSP Section 9.7.4.2). • Characterize adult salmon migration behavior and timing within and above Devils Canyon (RSP Section 9.7.4.3). • If shown to be an effective sampling method, and where feasible, use sonar to aid in documenting salmon spawning locations in turbid water (RSP Section 9.7.4.4). • Compare historical and current data on run timing, distribution, relative abundance, and specific locations of spawning and holding salmon (RSP Section 9.7.4.5). • Generate counts of adult Chinook salmon spawning in the Susitna River and its tributaries to estimate the proportions of fish with tags for populations in the watershed (RSP Section 9.7.4.6). • Collect tissue samples to support the Fish Genetic Baseline Study (Study 9.14; RSP Section 9.7.4.7). • Estimate the system-wide Chinook salmon escapement to the entire Susitna River, the coho salmon escapement to the Susitna River above its confluence with the Yentna River, and the distribution of Chinook, coho, and pink salmon among tributaries of the Susitna River (upstream of Yentna River confluence; RSP Section 9.7.4.8).
9.8 River Productivity Study	
	• Estimate drift of invertebrates (RSP Section 9.8.4.5). • Conduct trophic modeling and stable isotope analysis (RSP Section 9.8.4.7) and add Arctic grayling juveniles and adults as target species/lifestages. • Analyze fish diet (RSP Section 9.8.4.11) and add Arctic grayling juveniles and adults as target species/lifestages. • Characterize river productivity in selected Susitna River tributaries and lakes above Devils Canyon as an addition to the FERC-approved Study Plan. (ISR 9.8 Section 7.1.2.7). AEA will collect samples in riffle habitats within nine tributaries in the Middle and Upper

Study	2014 Study Plan Activities
	Susitna River basin, and from three lakes above Devils Canyon to characterize the pre-Project benthic macroinvertebrate communities and algal production.
9.9 Characterization and Mapping of Aquatic Habitats	
	• Conduct habitat surveys by macrohabitat type in the Upper River mainstem (RSP Section 9.9.5.4.1), Middle River mainstem (RSP Section 9.9.5.4.2), select Upper River tributaries (RSP Section 9.9.5.3.2), and select Middle River tributaries (RSP Section 9.9.5.3.2 and RSP section 9.9.5.4.2). • Conduct habitat surveys to complete 100 percent coverage of mesohabitat mapping within Focus Areas (RSP Section 9.9.5.4.2). • Collect relevant additional habitat information on a lake-by-lake basis for the 12 lakes identified within the potential reservoir inundation zone (RSP Section 9.9.5.5).
9.10 The Future Watana Reservoir Fish Community and Risk of Entrainment Study	
	AEA is not planning any efforts under this study in 2014.
9.11 Study of Fish Passage Feasibility at Watana Dam	
	Work planned for 2014 includes Task 4 activities (RSP Section 9.11.4): • Preparation for Workshop #2, including continued development of the draft evaluation criteria and evaluation matrix, and necessary background information based on meetings and discussions during the site reconnaissance meeting. • Conduct Workshop #2, planned for a 3-day brainstorming meeting in Seattle, Washington in late summer/fall of 2014 and distribute meeting notes. • Organize and clarify fish passage concepts with drawing sketches and text descriptions. • Update the draft evaluation criteria and the evaluation matrix based on comments received during Workshop #2. • Continue development and perform initial runs of the Biological Performance Tool. • Prepare an interim package for the FPTWG for Meeting #5, conduct Meeting #5, and distribute meeting notes. • Begin compilation and development of fish passage alternatives.
9.12 Study of Fish Passage Barriers in the Middle and Upper Susitna River and Susitna Tributaries	
	AEA expects to complete all remaining data collection during the 2014 study season, including surveys of vertical barriers in tributaries, beaver dams in Focus Areas, and tributary mouths in the Middle River and Lower River segments.
9.13 Aquatic Resources Study within the Access Alignment, Transmission Alignment, and Construction Area	
	AEA is not planning any efforts under this study in 2014.
9.14 Genetic Baseline Study for Selected Fish Species	
	• Collect juvenile and adult Chinook salmon from above Devils Canyon. • Collect adult Chinook salmon from upper Cook Inlet tributaries. • Opportunistically collect other salmon and non-salmon species from the Susitna River. • Genotype Chinook salmon for Single nucleotide polymorphism (SNPs) and microsatellite (µSAT).
9.15 Analysis of Fish Harvest in and Downstream of the Susitna-Watana Hydroelectric Project Area	
	AEA is not planning any efforts under this study in 2014.
9.16 Eulachon Run Timing, Distribution, and Spawning in the Susitna River	
	AEA is not planning any efforts under this study in 2014.
9.17 Cook Inlet Beluga Whale Study	
	• Conduct limited vessel-based surveys for CIBW and their prey in the Susitna River delta (MRSP Section 9.17.6). • Develop a 2015 Implementation Plan including evaluation of modeling results from the Water Quality Modeling Study 5.6 and Fluvial Geomorphology Modeling below Watana Dam Study 6.6 (MRSP Section 9.17.1).
10 WILDLIFE RESOURCES	
10.5 Moose Distribution, Abundance, Movements, Productivity, and Survival	
	Second year of field data collection of radio and GPS-collared animals will be completed.
10.6 Caribou Distribution, Abundance, Movements, Productivity, and Survival	
	Second year of field data collection of radio and GPS-collared animals will be completed. GPS/satellite collars will be retrieved for data download, refurbished and redeployed as appropriate.
10.7 Dall's Sheep Distribution and Abundance	
	Second year of field data collection, including aerial surveys and assessment of mineral licks, and data analysis will be completed.
10.8 Distribution, Abundance, and Habitat Use by Large Carnivores	
	No additional efforts will occur in 2014. Bear density modeling has been completed and analysis of bear hair samples from 2013 has been concluded.
10.9 Wolverine Distribution, Abundance, and Habitat Occupancy	
	Weather conditions in winter 2014 were not suitable for either a SUPE survey or occupancy surveys. No additional efforts will occur in 2014.
10.10 Terrestrial Furbearer Abundance and Habitat Use	
	The second year of field surveys is currently in progress. AEA plans to complete all remaining data collection during the 2014 study season, which consists of: (1) the second winter season of field sampling to collect genetic samples and conduct track surveys (which was conducted during January–March 2014); (2) genetic analysis; and (3) snowshoe hare pellet counts and vole density estimates.
10.11 Aquatic Furbearer Abundance and Habitat Use	
	• Survey river otter and mink tracks in the Project area and along streams and transects in the stream survey area in late winter and early winter (pending suitable conditions). • Survey beaver colonies (classified as active in October 2013) in spring 2014 to assess overwinter survival (this survey was conducted on May 2).

Study	2014 Study Plan Activities
	• Survey beaver colonies in the Project area and the downstream survey area in late September/early October to quantify the proportions of active and inactive colonies.
10.12 Small Mammal Species Composition and Habitat Use	
	AEA is not planning any efforts under this study in 2014.
10.13 Bat Distribution and Habitat Use	
	AEA plans to complete all remaining data collection in 2014. The acoustic monitoring effort will extend from mid-May to early October 2014. Two distinct sessions (14 days each) are planned for bat capture with mist nets, radio-tagging, and radio-tracking in mid/late July and late September/early October 2014 to cover the periods of maternity colony and hibernacula use, respectively.
10.14 Surveys of Eagles and Other Raptors	
	AEA will conduct two nest occupancy surveys in May and two productivity surveys in July.
10.15 Waterbird Migration, Breeding, and Habitat Use	
	AEA will implement the following study components: • surveys during spring and fall migration; • surveys of breeding populations; • Harlequin Duck surveys during pre-nesting and brood-rearing; and • brood surveys.
10.16 Landbird and Shorebird Migration, Breeding, and Habitat Use	
	• The stratified systematic/random plot-allocation methods will be used in 2014 to determine the locations of point-count survey sites. • The point-count surveys for landbirds and shorebirds will be repeated in 2014 following the same field methods used in 2013 (RSP Section 10.16.4.1.2). • The riverine- and lacustrine-focused surveys will be repeated in 2014 following the same survey methods used during the 2013 field season (RSP Section 10.16.4.2), except that the point-counts in riverine areas will be omitted (see ISR 10.16 Section 7.1.2 above).
10.17 Population Ecology of Willow Ptarmigan in Game Management Unit 13	
	AEA plans to complete data collection in the 2014 study season. These efforts will include capture and radio-tagging at four sites (Denali Highway, Upper Busch Creek, Upper Fog Creek, and Upper Butte Creek). Aerial radio-tracking surveys will be flown to relocate tagged ptarmigan at least six times throughout the year: two in late summer, two in midwinter, and two in early spring.
10.18 Wood Frog Occupancy and Habitat Use	
	AEA will conduct auditory field surveys for habitat occupancy modeling (RSP Section 10.18.4.1, incorporating variances described in Section 4.1.1), focusing on areas not sampled in 2013, including CIRWG lands, the new Denali East Option (see ISR 10.18 Section 7.1.2), and areas at higher elevations (above 2,500 ft), some of which were still frozen at the time of sampling in 2013. AEA will also deploy acoustic monitors at five sites where frogs are detected on the first visit, to provide additional data on the frequency and duration of calling (RSP Section 10.18.4.1).
10.19 Evaluation of Wildlife Habitat Use	
	AEA is not planning any efforts under this study in 2014.
10.20 Wildlife Harvest Analysis	
	AEA is not planning any efforts under this study in 2014.
11 BOTANICAL RESOURCES	
11.5 Vegetation and Wildlife Habitat Mapping Study in the Upper and Middle Susitna Basin	
	• Continue ITU mapping. Acquire imagery for the new Denali East Option corridor either with existing, archived satellite imagery or a new digital aerial photography.
11.6 Riparian Vegetation Study Downstream of the Proposed Susitna-Watana Dam	
	Continue ITU mapping.
11.7 Wetland Mapping Study in the Upper and Middle Susitna Basin	
	Continue wetland mapping.
11.8 Rare Plant Study	
	AEA is not planning any efforts under this study in 2014.
11.9 Invasive Plant Study	
	AEA is not planning any efforts under this study in 2014.
12 RECREATION RESOURCES	
12.5 Recreation Resources Study	
	AEA plans to complete the collection and processing of recreation use and demand data collected through the secondary data sources, incidental observation surveys, observation tallies, intercept surveys, and the regional resident household mail surveys.
12.6 Aesthetics Resources Study	
	AEA is not proposing any field work in 2014. Efforts in 2014 will be limited to preparing visual simulations depicting post-Project conditions and further processing and refinement of soundscape data collected in 2013.
12.7 Recreation River Flow and Access Study	
	• Complete the River Recreation and Access Internet Survey. • Complete executive interviews.
13 CULTURAL AND PALEONTOLOGICAL RESOURCES	

Study	2014 Study Plan Activities
13.5 Cultural Resources Study	
	• Complete field investigations for the paleoenvironmental component of the study. • Begin enthnogeographic study of Dena'ina and complete the ethnogeography investigation of Ahtna use of the study area. • Conduct archaeological fieldwork, limited to recording known sites on CIRWG, Ahtna, and Alaska Railroad Corporation (ARRC) lands; surveying for historic period sites on state and federal land; surveying lands within the Denali East Option; and visiting one or more snow patches.
13.6 Paleontological Resources Study	
	AEA is not planning any efforts under this study in 2014.
14 SUBSISTENCE	
14.5 Subsistence Resources	
	AEA plans to conduct household harvest surveys in the communities of Copperville, Glennallen, Gulkana, Lake Louise, Mendeltna, Nelchina, Paxson, Tazlina, Tolsona, and Tonsina.
15 SOCIOECONOMICS, AIR AND TRANSPORTATION	
15.5 Regional Economic Evaluation Study	
	AEA will continue to implement this study in 2014 and 2015, with no modifications to the FERC-approved Study Plan. Such efforts will include completing the REMI modeling exercise and conducting associated executive interviews with business interests in the Railbelt region. In 2014 additional executive interviews will be undertaken the REMI model will be further developed.
15.6 Social Conditions and Public Goods and Services Study	
	The plans for completing this study include further developing the Random Utility Model and working with Study 5.5 on the REMI model in 2014. Additional recreation utility functions and demographic data will be updated in the model in 2014. AEA will continue to implement all study components in 2015, with no modifications to the FERC-approved Study Plan. Such efforts will include completing the Random Utility Model (RUM) modeling exercise and associated key informant interviews.
15.7 Transportation Resources Study	
	• Document current river transportation using existing published data and interviews with various agencies and user groups to determine frequency and type of non-recreational river travel. • Future river use levels will be discussed based on data collected and consultation with knowledgeable individuals. • Project-related transportation facilities, such as proposed corridors and modal connections, and uses will be documented in 2014.
15.8 Health Impact Assessment Study	
	Conduct community health interviews during ADF&G household harvest surveys.
15.9 Air Quality Study	
	Incorporate Project-specific information necessary to refine the emissions comparison.
16 PROJECT SAFETY	
16.5 Probable Maximum Flood (PMF) Study	
	All data collection and analyses are complete.
16.6 Site-Specific Seismic Hazard Study	
	Seismic study field efforts in 2014 will focus on conducting field reconnaissance and mapping of lineaments and features on lands that were inaccessible in 2013 and completing the crustal seismic source evaluation that may require trenching (2015) and age dating of suspect faults. Plans for 2014 also include: • Continued review and analysis of geospatial data within the Project area, review and interpretation of the planned expansion of the LiDAR coverage (e.g., Stephan Lake area and upper Watana Creek), • Continued field geologic reconnaissance, mapping, and sampling in selected areas, including the dam site that were inaccessible in 2013 for crustal seismic source evaluation, • Continued development of a refined seismic source model, and • Review of earthquake event data including preparation of an annual Seismic Monitoring Summary Report

1.7. Figures

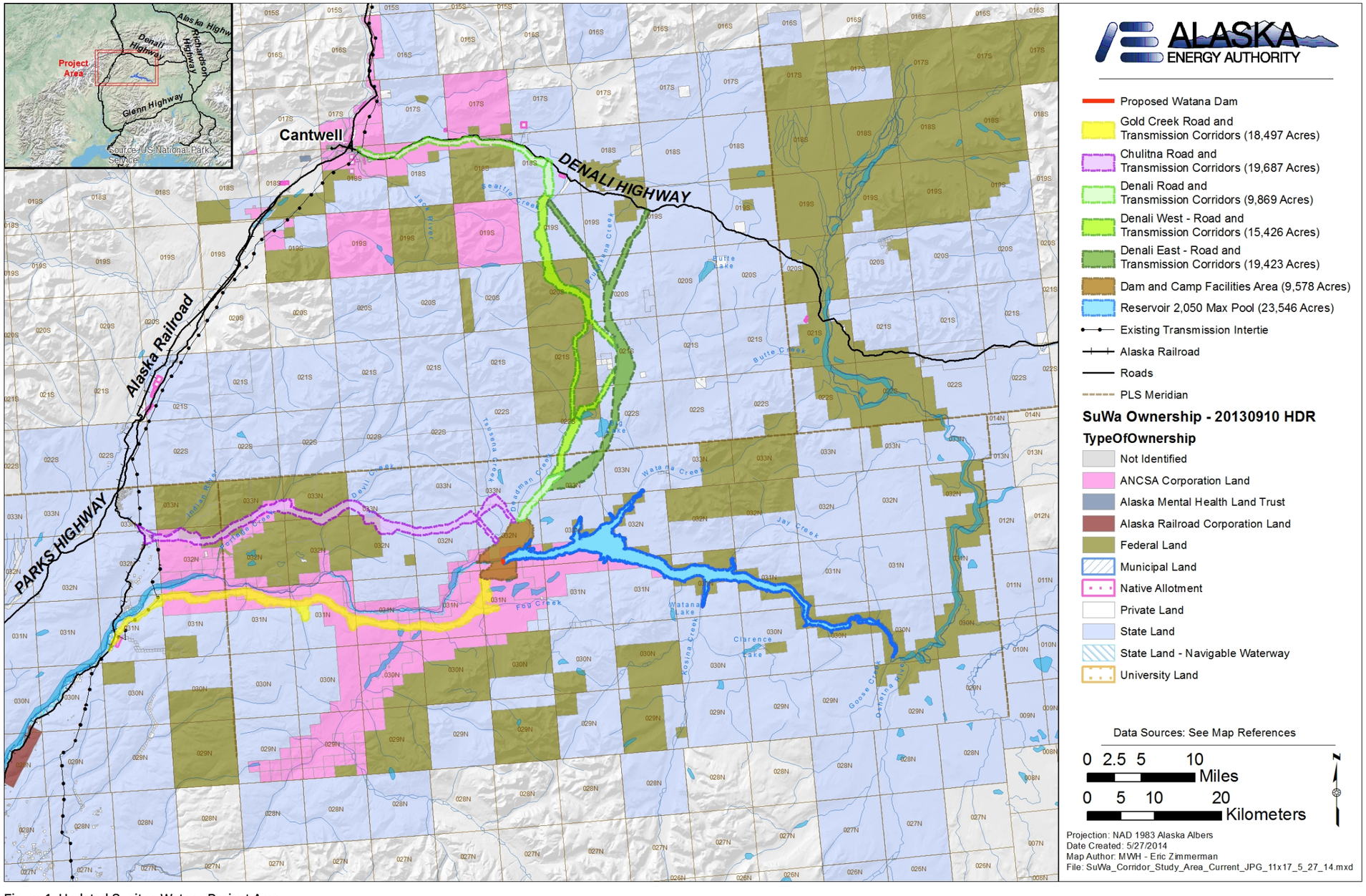

Figure 1. Updated Susitna-Watana Project Area