

# Susitna-Watana Hydroelectric Project Document

## ARLIS Uniform Cover Page

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November 14, 2014

Ms. Kimberly D. Bose  
Secretary  
Federal Energy Regulatory Commission  
888 First Street, N.E.  
Washington, D.C. 20426

**Re: Susitna-Watana Hydroelectric Project, Project No. 14241-000**

**Filing of Initial Study Plan Meetings Transcripts and Additional Information in  
Response to October 2014 Initial Study Plan Meetings**

Dear Secretary Bose:

By letter dated January 28, 2014, the Federal Energy Regulatory Commission (Commission or FERC) modified the procedural schedule for the preparation and review of the Initial Study Report (ISR) for the proposed Susitna-Watana Hydroelectric Project, FERC Project No. 14241 (Project).<sup>1</sup> As required by the Commission's January 28 letter, the Alaska Energy Authority (AEA) filed the ISR with the Commission on June 3, 2014 and conducted ISR meetings on October 15, 16, 17, 21, 22, and 23, 2014. Attached as Attachments A-1 through F-2 are the written transcripts (along with the agenda and PowerPoint presentations) for these ISR meetings.

During the October ISR meetings, AEA and licensing participants identified certain technical memoranda and other information that AEA would file with the Commission by November 15, 2014. In accordance, AEA is filing and distributing the following technical memoranda and other information:

- Attachment G: *Glacier and Runoff Changes (Study 7.7) and Fluvial Geomorphology (Study 6.5) - Assessment of the Potential for Changes in Sediment Delivery to Watana Reservoir Due to Glacial Surges Technical Memorandum*. This technical memorandum documents AEA's analysis of the potential changes to sediment delivery from the upper Susitna watershed into the Project's reservoir from glacial surges.
- Attachment H: *Riparian Instream Flow (Study 8.6) and Fluvial Geomorphology (Study 6.6) - Dam Effects on Downstream Channel and Floodplain Geomorphology and Riparian Plant Communities and Ecosystems – Literature Review Technical Memorandum*. This literature review technical

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<sup>1</sup> Letter from Jeff Wright, FERC Office of Energy Projects, to Wayne Dyok, Alaska Energy Authority, Project No. 14241-000 (issued Jan. 28, 2014).

memorandum synthesizes historic physical and biologic data for the Susitna River floodplain vegetation (including 1980s studies), studies of hydro project impacts on downstream floodplain plant communities, and studies of un-impacted floodplain plant community successional processes.

- Attachment I: *Susitna River Fish Distribution and Abundance Implementation Plan, Appendix 3. Protocol for Site-Specific Gear Type Selection, Version 5.* In accordance with the fish distribution and abundance studies, as described in Revised Study Plan (RSP) Sections 9.5 and 9.6 and in the Fish Distribution and Abundance Implementation Plan, this appendix establishes the protocol for site-specific gear type selection for fish surveys. Throughout study plan implementation, AEA has updated this appendix as needed to provide consistent direction to all field teams. Version 1 of Appendix 3 was originally filed with the Fish Distribution and Abundance Implementation Plan in March 2013. That version was updated twice (Versions 2 and 3) during the 2013 field season to accommodate protocol changes that related to FERC's April 1, 2013 Study Plan Determination, field permits, and lessons learned during study implementation. Version 4 was the protocol used for the 2014 field season and was updated with respect to the prioritization of gear use and based on 2013 data collected. This version herein, Version 5, will be followed during the 2015 field season.
- Attachment J: *Fish Distribution and Abundance in the Upper and Middle/Lower Susitna River (Studies 9.5 and 9.6): Draft Chinook and Coho Salmon Identification Protocol.* This document established a Chinook and coho salmon identification protocol to support accurate and consistent field identification across field teams. It will allow for additional quality control and assurance of field identification calls and for estimation and reporting of any field identification error that may occur in future sampling efforts.
- Attachment K: *Characterization and Mapping of Aquatic Habitats (9.9), Errata to Initial Study Report Part A - Appendix A, Remote Line Mapping, 2012.* This errata provides a corrected version of map book for Remote Line Mapping, 2012. The version filed with the ISR (June 3, 2014) used a data query to build the maps in geomorphic reaches MR-1 to UR-5 that mistakenly did not include side slough habitat, so that no side sloughs were depicted on the Appendix A maps 1 through 21. This version was corrected by including side slough habitat in the data query for geomorphic reaches MR-1 to UR-5. This version now includes side sloughs.
- Attachment L: *Characterization and Mapping of Aquatic Habitats Study 9.9, Revised Map Book for 2012 Remote Line Mapping.* This map book represents an update to the version published on June 3, 2014 with the Study 9.9 Initial Study Report and the errata provided concurrently with this filing (see Attachment K). The maps presented include all macrohabitat and mesohabitat line identifications available in the 2012 Remote Line Mapping ArcGIS

shapefile. This map book should be considered a full replacement for previous versions and represents the final product for the 2012 remote line habitat mapping effort.

- Attachment M: *Study of Fish Passage Barriers in the Middle and Upper Susitna River and Susitna Tributaries (Study 9.12), Fish Passage Criteria Technical Memorandum*. This technical memorandum presents a proposed final list of fish species that will be included in the fish barrier analysis as well as depth, leaping and velocity passage criteria for selected fish species. AEA previously consulted with the federal agencies and other licensing participants regarding the information within the technical memorandum during a March 19, 2014 Fisheries Technical Meeting.

In addition to the technical memoranda and other information identified above, AEA is filing a short errata (Attachment N) to the *Mercury Assessment and Potential for Bioaccumulation Study (Study 5.7), Evaluation of Continued Mercury Monitoring Beyond 2014 Technical Memorandum*. This technical memorandum, which was originally filed on September 30, 2014, evaluates the need for continued monitoring of mercury data beyond 2014 and whether the existing data collection efforts are sufficient to satisfy objectives for characterizing baseline mercury conditions in the Susitna River and tributaries (RSP Section 5.7.1). Since the filing of this TM and based upon the ongoing QA/QC of the data reported in that TM, AEA discovered errors in the TM. The attached TM corrects those errors. Additionally, the errata corrects corresponding errors in the Mercury Assessment and Potential for Bioaccumulation presentation presented during the October 16, 2014 ISR meeting.

Finally, AEA notes that data collected during the Study Plan implementation, to the extent they have been verified through AEA's quality assurance and quality control (QAQC) procedures and are publicly available, can be accessed at [http://gis.suhydro.org/isr\\_mtg](http://gis.suhydro.org/isr_mtg). On November 14, 2014, AEA posted the following data to this website:

- *Baseline Water Quality Data (Study 5.5)*, 2013 QAQC water quality data and DVRs per the Quality Assurance Project Plan.
- *Breeding Survey Study of Landbirds and Shorebirds (Study 10.16)*, cumulative 2013-2014 data.
- *Characterization and Mapping of Aquatic Habitats (Study 9.9)*, ArcGIS shapefile "ISR\_9\_9\_AQHAB\_RemoteLineMapping\_2012.shp" used to generate the maps in Attachment L.

AEA appreciates the opportunity to provide this additional information to the Commission and licensing participants, which it believes will be helpful in determining the appropriate development of the 2015 study plan as set forth in the ISR. If you have questions concerning this submission please contact me at wdyok@aidea.org or (907) 771-3955.

Sincerely,



Wayne Dyok  
Project Manager  
Alaska Energy Authority

Attachments

cc: Distribution List (w/o Attachments)

**Susitna-Watana Hydroelectric Project  
(FERC No. 14241)**

**Fish Distribution and Abundance in the Upper and  
Middle/Lower Susitna River (Studies 9.5 and 9.6):  
Draft Chinook and Coho Salmon Identification  
Protocol**

Prepared for

Alaska Energy Authority



**SUSITNA-WATANA HYDRO**

*Clean, reliable energy for the next 100 years.*

Prepared by

R2 Resource Consultants, Inc.

November 2014

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**LIST OF ACRONYMS AND SCIENTIFIC LABELS**

Abbreviation	Definition
ADF&G	Alaska Department of Fish and Game
AEA	Alaska Energy Authority
FDA	Fish distribution and abundance
GRTS	Generalized Random Tessellation Stratified
IP	Implementation Plan
ISR	Interim Study Report
PIT	Passive integrative transponder
PRM	Project river mile
QAQC	Quality assurance quality control



## 1. INTRODUCTION

During the first study year of the Susitna-Watana Hydro Fish Distribution and Abundance Studies, sampling occurred along over 200 miles of the Susitna River including many salmon-bearing tributaries. As in other larger glacial river systems in Alaska, Chinook and coho salmon in the Susitna River exhibit a wide variety of phenotypic variation and can appear very different among reaches, rearing habitats (e.g., turbid mainstem vs. tannic upland slough), and stages of smoltification. There is little data available regarding the accuracy of field identification of juvenile salmonids as most field biologists do not collect voucher specimen or samples with which they could verify field identifications and/or estimate a rate of error associated with their field identification, yet differentiating between these two species in some Alaska rivers can be challenging. This issue has been noted both historically in the Taku River (Meehan and Vania 1961) and, more recently, in the Copper River (Phil Joy, ADF&G, personal communication, October, 2014) and in the Susitna River where AEA field crews, including ADF&G Chinook salmon experts, incorrectly identified coho salmon when collecting Chinook salmon genetic samples in 2013 (Chris Habicht, ADF&G, personal communication, August, 2014). A QAQC review of the Chinook and coho salmon field calls from the 2013 Susitna River data set indicates that the primary phenotypic characteristics that are used to distinguish between the two species (e.g., anal fin shape and coloration, adipose fin pigmentation, parr mark shape/width, etc.) are highly variable across sub-populations of juveniles within each species and that the range of variation overlaps across species making field identification of juveniles of these two species more challenging.

In light of this, AEA has enhanced the ongoing fish sampling under the Susitna-Watana Hydroelectric Project's Study Program by developing a protocol and accompanying Susitna River specific field identification guide that will be used by all field crews. This standardized protocol will support accurate and consistent field identification across field teams. It will allow for additional quality control and assurance of field identification calls and for estimation and reporting of any field identification error that may occur in future studies. In addition, for the fish that were sampled for genetics, it will be possible to correct any erroneous field identification in the database. Furthermore, if systematic error is evident from the genetics analysis, for example all samples collected from salmon at one location or within a specific size category are identified as one species, it may be possible to make species identification adjustments to the data base for non-sampled individuals from that same group. Such corrections would be done by adding a genetic identification to the database to preserve the original field data.

## 2. FIELD TRAINING

The pre-sampling orientation of field crews will be expanded to include site specific information of phenotypic variation in juvenile Chinook and coho salmon. During orientation and training of field staff, Susitna-experienced Senior Fish Scientists will review with field crew a Susitna-specific identification guide that is developed in collaboration with ADF&G as well as the other field identification guides provided in Section 5.1.4 of the Implementation Plan (R2 Resource Consultants 2013). Field teams, led by senior staff, will then visit locations where both Chinook

and coho salmon phenotypic overlap has been found in the past and will use the field guide to identify individual fish.

### **3. GENETIC VERIFICATION**

AEA will standardize the collection of genetic samples across habitats and sampling events. Field crews will be instructed to collect genetic samples on all Chinook salmon collected upstream of Impediment 1 in Devils Canyon (PRM 154.8) and to subsample for genetics downstream of Impediment 1. To determine the appropriate sample size for genetics subsampling, a power analyses will be conducted using the 2012 and 2013 data. Genetic identification data will be used to estimate the variation in field identification error rate across species and habitats. The power analysis will be used to estimate the appropriate sample size necessary to ensure that the fish identification error is within +/-5% of the true error rate. This analysis will be conducted in the spring of 2015.

Once the total sample size is determined, the first X Chinook and coho salmon collected at each site (GRTS or transect macrohabitat or check of a rotary screw trap) will be sampled for genetics using the omniswab technique. After that, one out of every Y individuals identified will be swabbed for genetics in order to meet pre-determined sample sizes in a way that is representative across habitats and time. The number of genetic samples collected will be tracked during the study season and the number of samples collected at each site may be adjusted as necessary to meet our desired sample size.

### **4. MERISTIC ANALYSIS**

Because of the time required for transfer and analysis of genetics samples, it may be weeks or months until the samples are analyzed. To help improve field identification, more rapid and direct feedback to field crews is needed. Thus, vouchers will be taken for quick meristic analysis and specimens will be used as a teaching tool. Up to 20 juvenile Chinook, coho, and undifferentiated Pacific salmon may be taken as voucher specimens from each hydrologic segment: Lower and Middle. No meristics are needed in the Upper River as 100 % of all juvenile salmon collected are sampled for genetics analysis. Dissection and meristic analysis of pyloric caeca and branchiostegal counts will occur after collection, and specimens will be kept in viewable containers at a central location (field camp) for staff to review. Voucher specimens will focus on those individuals that are especially difficult to identify in the field or have unique characteristics leading to uncertainty in identification.

### **5. PHOTOGRAPH QUALITY CONTROL**

In the next study year, undifferentiated Pacific salmon that are handled, fish used for genetic analysis, PIT-tagged fish, and PIT-tag recaptures will be photographed. Based on data from 2013 and 2014, there is photo documentation of approximately 4,000 PIT-tagged Chinook and coho salmon as well as undifferentiated fish and those selected for genetic samples but not PIT-tagged.

A Senior Fish Biologist with experience identifying Susitna River juvenile salmon will review photographs of all Chinook, coho, and undifferentiated Pacific salmon as a part of the AEA's data QAQC process. The reviewer will have the option to 1) confirm species call made in the field, 2) override the species call made in the field by assigning a new species and providing justification, or 3) determine that neither confirmation nor reassignment can be made based on photograph. Results from meristic and genetic analysis may also be used to establish a photo review error rate for those individuals for which species calls are confirmed or reassigned. Photographic reviews will be conducted as soon as possible after field data is collected and during the sampling season to provide feedback to field crews. A final review will be done and at the culmination of the field season prior to data analysis.

## 6. REFERENCES

- McConnel, R.J. and G.R. Snyder. 1972. Key to Field Identification of Anadromous Juveniles Salmonids in the Pacific Northwest. NOAA Technical Report NMFS CIRC-366. 8 pp.
- Meehan, W.R. and J.S. Vania. 1961. An external characteristic to differentiate between King and Silver Salmon juveniles in Alaska. Informational Leaflet 1. Alaska Department of Fish and Game. 9 pp.
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- Pollard, W.R., G.F. Hartman, C. Groot, and P. Edgell. 1997. Field Identification of Coastal Juvenile Salmonids. Harbor Publishing, Madeira Park, BC Canada. 32 pp.
- R2 Resource Consultants, Inc. 2013. Susitna River Fish Distribution and Abundance Implementation Plan: Susitna-Watana Hydroelectric Project FERC Project No. 14241. March 31, 2013 including HDR prepared Appendix 2, Initial Results Aerial Video Habitat Mapping of Susitna River Tributaries from the Upper Extent of Devils Canyon to the Oshetna River, January 2013. <http://www.susitna-watanahydro.org/wp-content/uploads/2013/09/SuWa-FSP-2013-Section-09.05-FDAUP.pdf>
- Weiss, E. 2003. Juvenile and Small Fish Identification Aid. Alaska Department of Fish and Game Habitat and Restoration Division.