# comprehensive Data delivery README FILE

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| **Study Section** | Study 9.9: Characterization and Mapping of Aquatic Habitat |
| **Study Component** | Aerial Video Habitat Mapping of Middle and Upper River Tributaries |
| **Field Date Range** | September 7, 2012 - September 11, 2012 |

**Introduction:** The overall goal of this study is to characterize the aquatic habitats of the Susitna River using a specific hierarchical and nested classification system based on historic and current data. Study 9.9 is focused on aquatic habitats with the potential to be affected by construction and operation of the proposed Susitna-Watana Hydroelectric Project (Project) in Alaska.

Study 9.9 accomplished five specific study objectives for the Upper, Middle, and Lower Susitna River a few of which include multiple tasks. Aerial video data were collected in support of Upper and Middle River Objectives.

**Upper River:**

* 1. Characterize and map Upper River tributary and lake habitats for the purpose of evaluating the potential loss or gain in available fluvial and lacustrine habitat that may result from dam construction and inundation by the reservoir.
	2. Characterize and map Upper River tributary and lake habitats for the purposes of informing other studies including Fish Distribution and Abundance in the Upper Susitna River (Study 9.5) and River Productivity (Study 9.8).
	3. Characterize and map the Upper River mainstem (understood hereafter to encompass both main channel and off-channel habitats) upstream from the Watana dam site to the confluence with the Oshetna River:
1. To provide baseline data for the purpose of evaluating the potential loss or gain in accessible available fluvial and lacustrine habitat that may result from dam construction and inundation by the reservoir.
2. To inform other studies including Fish Distribution and Abundance in the Upper Susitna River (Study 9.5), River Productivity (Study 9.8), and Future Watana Reservoir Fish Community and Risk of Entrainment (Study 9.10).

**Middle River:**

1. Characterize and map the Middle River mainstem from the Chulitna River confluence to the proposed Watana Dam site, including tributaries within the zone of hydrologic influence (ZHI) and the Focus Areas:
2. To provide baseline data for the purpose of evaluating the potential loss or gain in accessible available fluvial habitat that may result from flow regulation below the proposed Watana Dam.
3. To inform other studies including Fish Distribution and Abundance in the Middle and Lower Susitna River (Study 9.6), River Productivity (Study 9.8), and Instream Flow (Study 8.5).

**Data Summary:** This multi-year study was initiated in 2012 with remote and ground mapping in the Middle and Upper River. In September, 2012, aerial videography was collected in the Middle and Upper River mainstem and select Middle and Upper River tributaries upstream of Devils Canyon. Videography of the mainstem Susitna River was primarily used to inform other studies and to quality check habitat characterizations from remote mapping. Remote habitat mapping of mainstem habitats was primarily completed in GIS using aerial imagery and LIDAR. Field-based data collection, to ground-truth the remote map was conducted in 2013 and 2014. This data was used along with hydrology to review remote mapping in 2013 and 2014.

Aerial video review and habitat characterization was completed for 16 tributaries upstream of Impediment 1 in Devils Canyon up to and including the Oshetna River. All tributaries above Impediment 1 with documented Chinook salmon presence at the time of data collection were included. Review was completed for twelve primary tributaries and four secondary tributaries.

The aerial video data structure consists of a single spreadsheet file with tributary information (name, geomorphic reach), video information (Date and time stamp) and habitat typing. Habitat typing was completed by stopping the video every five seconds and making a determination on type of macro-habitat, meso-habitat and meso-habitat sub-type present at that point in the video. Tributary geomorphic reaches are described by river mile in a separate lookup table. No coordinates are provided, although GPS coordinates are recorded within the video if needed.

Aerial video was collected and reviewed in accordance with the methods outlined in the 2012 Upper Susitna River Fish Distribution and Habitat Study Plan with the exception of the variances identified in the ISR Part D (November 2015). Data management followed the QA/QC protocol described in the 2012 Upper Susitna River Fish Distribution and Habitat Study Technical Memorandum (Feb 2013).

Data have undergone 5 levels of data quality control (QC), named QC1 to QC5. The QC levels, briefly, are as follows:

* QC1–Field Review: Review of field forms before leaving the field, or the QC level of raw data collected via field equipment such as thermistors, cameras, GPS units, etc.;
* QC2–Data Entry: Data from paper forms are entered into an electronic format and verified;
* QC3–Senior Review: Final review by senior professional before submitting field data to AEA, or the QC level of raw data cleaned up for delivery to AEA;
* QC4–Database Validation: Tabular data files are verified to meet Project database standards;
* QC5–Technical Review: Data revision or qualification by senior professionals when analyzing data for reports.

**Data Organization:**  Aerial video mapping data are organized as an MS Excel workbook, accompanied by a data dictionary of table and attribute descriptions.

There is also a GIS shapefile of the 2012-2014 remote line mapping aquatic macrohabitat and mesohabitat types.

Videos are available from AEA upon request.

**Software Considerations:** MS Excel or compatible software and ESRI ArcGIS 9x-10x.

**Online Data Link:** Folder Remote Mapping at <http://gis.suhydro.org/SuWa/09-FISH/9.09-AQHAB/>

File 9\_FAQ\_Database\_Data\_Dictionary\_20170630.pdf at <http://gis.suhydro.org/SuWa/09-FISH/00/FAQ_Data_Documentation/>

**Online Report Link:** AEA has prepared several documents with data pertaining to this study component. However, because database QC is an ongoing process, the most recent version of the data found through the hyperlink above may supersede the results reported in study documents. Copies of the datasets used for analysis in the ISR and SIR are available through the hyperlink found at the beginning of the results section (Section 5). To aid review, study documents using this study component are listed below. Each of these documents is accessible on AEA’s Project licensing website (<http://www.susitna-watanahydro.org/type/documents/>) or through FERC’s eLibrary system (<http://www.ferc.gov/docs-filing/elibrary.asp>), in Docket No. P-14241.

| **Title** | **Date** | **Description** | **Link** |
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| Draft Susitna River Fish Distribution and Abundance Implementation Plan: Appendix 2, Initial Results Aerial Video Habitat Mapping of Susitna River Tributaries from the Upper Extent of Devils Canyon to the Oshetna River | 1/31/2013 | This appendix filed by AEA presents 2012 aerial video data and analyses in support of sampling fish in in select tributaries from the upper extent of Devils Canyon to the Oshetna River. | [Draft IP for Study 9.5](http://www.susitna-watanahydro.org/wp-content/uploads/2013/02/Att-C-FDA-IP-FINAL.pdf) |
| Middle Susitna River Segment Remote Line Habitat Mapping Technical Memorandum | 1/31/2013 | AEA filed a technical memorandum characterizing Middle River habitats using a spatial database developed using aerial imagery and videography. The composition and frequency of mainstem aquatic habitats was summarized to support study site selection for the instream flow and fish distribution studies. | [Jan. 2013 TM for Study 9.9](http://www.susitna-watanahydro.org/wp-content/uploads/2013/02/Att-B-Habitat-Mapping-Report.pdf) |
| Susitna River Fish Distribution and Abundance Implementation Plan: Appendix 2, Initial Results Aerial Video Habitat Mapping of Susitna River Tributaries from the Upper Extent of Devils Canyon to the Oshetna River | 3/1/2013 | This appendix filed by AEA presents 2012 aerial video data and analyses in support of sampling fish in in select tributaries from the upper extent of Devils Canyon to the Oshetna River. | [Mar. 2013 TM for Study 9.9](http://www.susitna-watanahydro.org/wp-content/uploads/2013/03/Attachment-A.pdf) |
| 2012 Technical Memorandum, Synthesis of the 1980s Lower Susitna River Segment Aquatic Habitat Information | 3/25/2013 | This AEA technical memorandum presents and effort to identify whether potential Project effects on aquatic habitat and tributary access in the Lower River warranted additional study and, if necessary, help in planning those studies. | [Mar. 2013 TM for Study 9.9 (File 1)](http://www.susitna-watanahydro.org/wp-content/uploads/2013/03/SynthesisGeomorph_2012SR.pdf)[Mar. 2013 TM for Study 9.9 (File 2)](http://www.susitna-watanahydro.org/wp-content/uploads/2013/03/SynthesisGeomorph_2012SR_Appendices.pdf) |
| Mapping of Aquatic Macrohabitat Types at Selected Sites in the Middle and Lower Susitna River Segments from 1980s and 2012 Aerials | 3/25/2013 | The overall purpose of the work presented in this AEA TM was to quantify aquatic macrohabitat types at selected sites in the Middle and Lower Susitna River Segments, compare the resulting areas, and determine the applicability of the 1980s information to current conditions. | [Mar. 2013 TM for Study 9.9 (File 1)](http://www.susitna-watanahydro.org/wp-content/uploads/2013/03/SuWa-2012-Aq-Habitat-Mapping-TM-02212013.pdf)[Mar. 2013 TM for Study 9.9 (File 2)](http://www.susitna-watanahydro.org/wp-content/uploads/2013/03/SuWa-2012-Aq-Habitat-Mapping-TM-Appendices-1-to-4-02212013.pdf)[Mar. 2013 TM for Study 9.9 (File 3)](http://www.susitna-watanahydro.org/wp-content/uploads/2013/03/SuWa-2012-Aq-Habitat-Mapping-TM-Appendices-5-to-8-02212013.pdf) |
| 2012 Habitat Videography Information | 4/1/2013 | AEA recorded low altitude video of tributaries and mainstem reaches in the Middle and Upper segments of the Susitna River. The videos are provided by AEA for technical use by Project scientists and Licensing Participants and for use by the general public to gain a better understanding of the Susitna River and the Project environment. | [Apr. 2013 TM for Study 9.9](http://www.susitna-watanahydro.org/wp-content/uploads/2013/04/2012HabitatVideographyInformation.pdf) |
| 2012 Habitat Videography Map Book | 4/1/2013 | AEA provided this map book of both orthophotos and USGS topographic maps of the stream reaches characterized by the videography. | [Apr. 2014 TM fro Study 9.9](http://www.susitna-watanahydro.org/wp-content/uploads/2013/04/Habitat_Mapbook.pdf) |
| 2012 Upper River Susitna River Fish Distribution and Habitat Study – Habitat Report | 5/30/2013 | AEA filed this report summarizing the results of 2012 habitat surveys including both aerial and ground-based aquatic mesohabitat mapping methodologies.  | [May 2014 TM for Study 9.9](http://www.susitna-watanahydro.org/wp-content/uploads/2013/05/2012-Habitat-and-Barriers-Report-Tech-memo.pdf) |
| Characterization and Mapping of Aquatic Habitats Technical Memorandum | 7/15/2013 | This AEA memo provides a detailed description of the methodology for selecting a representative sample of small primary tributaries and low-order (secondary and tertiary) tributaries within the proposed inundation zone of the Upper River as recommended by FERC’s SPD. | [July 2014 TM for Study 9.9](http://www.susitna-watanahydro.org/wp-content/uploads/2013/07/FERC_SPD_RSP9.9_HabitatTM_Draft.pdf) |
| Draft Initial Study Report for Study 9.9 | 2/3/2014 | This draft of the ISR summarized the study methods and variances during the 2013 study season, and presented preliminary data collected for Study 9.9. This draft ISR was later republished as Part A of the final ISR. | [Draft ISR for Study 9.9 (File 1)](http://www.susitna-watanahydro.org/wp-content/uploads/2014/01/09.09_AQHAB_ISR_Draft_1_of_4.pdf)[Draft ISR for Study 9.9 (File 2)](http://www.susitna-watanahydro.org/wp-content/uploads/2014/01/09.09_AQHAB_ISR_Draft_2_of_4_App_A.pdf)[Draft ISR for Study 9.9 (File 3)](http://www.susitna-watanahydro.org/wp-content/uploads/2014/01/09.09_AQHAB_ISR_Draft_3_of_4_App_B-C.pdf)[Draft ISR for Study 9.9 (File 4)](http://www.susitna-watanahydro.org/wp-content/uploads/2014/01/09.09_AQHAB_ISR_Draft_4_of_4_App_D.pdf) |
| Initial Study Report for Study 9.9 | 6/3/2014 | This document is the Initial Study Report (Parts A, B and C) for Study 9.9. Part A republishes the Draft ISR. Part B identifies supplemental information and errata in Part A. Part C presents study modifications and plans for completing the study. | [ISR Part A for Study 9.9 (File 1)](http://www.susitna-watanahydro.org/wp-content/uploads/2014/05/09.09_AQHAB_ISR_PartA_1_of_4.pdf)[ISR Part A for Study 9.9 (File 2)](http://www.susitna-watanahydro.org/wp-content/uploads/2014/05/09.09_AQHAB_ISR_PartA_2_of_4_App_A.pdf)[ISR Part A for Study 9.9 (File 3)](http://www.susitna-watanahydro.org/wp-content/uploads/2014/05/09.09_AQHAB_ISR_PartA_3_of_4_Apps_B-C.pdf)[ISR Part A for Study 9.9 (File 4)](http://www.susitna-watanahydro.org/wp-content/uploads/2014/05/09.09_AQHAB_ISR_PartA_4_of_4_App_D.pdf)[ISR Part B for Study 9.9](http://www.susitna-watanahydro.org/wp-content/uploads/2014/05/09.09_AQHAB_ISR_PartB.pdf) [ISR Part C for Study 9.9](http://www.susitna-watanahydro.org/wp-content/uploads/2014/05/09.09_AQHAB_ISR_PartC.pdf)  |
| 2013 and 2014 Aquatic Habitat Mapping Field Season Completion Progress Technical Memorandum. | 9/17/2014 | This AEA TM summarizes progress in 2013 and 2014 with respect to the study objectives and methods outlined in the RSP, as modified by FERC’s SPD. | [Sept. 2014 TM for Study 9.9](http://www.susitna-watanahydro.org/wp-content/uploads/2014/09/9.09-AQHAB-TM.pdf) |
| Errata to Initial Study Report Part A - Appendix A, Remote Line Mapping, 2012 | 11/14/2014 | AEA filed these errata to summarize the changes contained in the associated map book filed to correct an error in Appendix A of Part A of the ISR. | [Nov. 2014 TM for Study 9.9](http://www.susitna-watanahydro.org/wp-content/uploads/2014/11/9_9_AQHAB_ISR_APXA_ERRATA_FINAL.pdf) |
| Revised Map Book for 2012 Remote Line Mapping | 11/14/2014 | AEA filed this updated map book to correct an error in Appendix A of the ISR Part A | [Nov. 2014 TM for Study 9.9](http://www.susitna-watanahydro.org/wp-content/uploads/2014/11/9-9_AQHAB_MacroMesoRemoteLineMapping2012_FINAL.pdf) |
| Initial Study Report Meetings, October 15, 2014 | 11/14/2014 | Transcripts and AEA’s agenda and PowerPoint presentations for the ISR meeting for Fish and Aquatic Studies | [Transcripts from ISR Meeting](http://www.susitna-watanahydro.org/wp-content/uploads/2014/11/Oct15_ISR_Meeting_PartA_Transcripts.pdf)[Materials from ISR Meeting](http://www.susitna-watanahydro.org/wp-content/uploads/2014/11/Oct15_ISR_Meeting_PartB_Agenda_Presentations.pdf) |
| Study Completion Report for Study 9.9 | 11/4/2015 | AEA filed this report to summarize cumulative study activities including field efforts in 2012, 2013, and 2014. | [SCR for Study 9.9 (File 1)](http://www.susitna-watanahydro.org/wp-content/uploads/2015/10/09.09_AQHAB_SIR_SCR.pdf)[SCR for Study 9.9 (File 2)](http://www.susitna-watanahydro.org/wp-content/uploads/2015/10/09.09_AQHAB_SCR_AppendixA_pt1of2.pdf)[SCR for Study 9.9 (File 3)](http://www.susitna-watanahydro.org/wp-content/uploads/2015/10/09.09_AQHAB_SCR_AppendixA_pt2of2.pdf)[SCR for Study 9.9 (File 4)](http://www.susitna-watanahydro.org/wp-content/uploads/2015/10/09.09_AQHAB_SCR_AppendixB_pt1of2.pdf)[SCR for Study 9.9 (File 5)](http://www.susitna-watanahydro.org/wp-content/uploads/2015/10/09.09_AQHAB_SCR_AppendixB_pt2of2.pdf) |
| [Response of the Alaska Energy Authority to Comments on the Initial Study Report](http://www.susitna-watanahydro.org/wp-content/uploads/2016/11/ISR_Response_OCT_2016.pdf) | 10/24/2016 | This document provides a technical response to stakeholder comments on the Initial Study Report.  | [Oct. 2016 Response](http://www.susitna-watanahydro.org/wp-content/uploads/2016/11/ISR_Response_OCT_2016.pdf) |
| Supplement to Study Completion Report | 10/24/2016 | AEA provided supplemental materials to respond to comments from FERC, NMFS, and USFWS on the ISR and SCR for Study 9.9 Characterization and Mapping of Aquatic Habitats. | [Supplement to Study Completion Report](http://www.susitna-watanahydro.org/wp-content/uploads/2016/11/Att_9_Study_09.09_TableUpdates.pdf) |

**[[1]](#endnote-1)**

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