

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

**Characterization and Mapping of Aquatic Habitats
Study Plan Section 9.9**

**Initial Study Report
Part C: Executive Summary and Section 7**

Prepared for

Alaska Energy Authority



SUSITNA-WATANA HYDRO

Clean, reliable energy for the next 100 years.

Prepared by

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EXECUTIVE SUMMARY

Characterization and Mapping of Aquatic Habitats Study 9.9	
Purpose	This study maps and characterizes habitat at multiple scales across both the Susitna River mainstem and tributaries. These data provide baseline habitat characterization that, along with data from other studies, will support assessment of potential impacts of the proposed Project.
Status	Complete coverage by remote line mapping in the Susitna River mainstem and tributaries was completed in 2012. In 2013, ground truthing of the remote mapping effort was initiated in both the mainstem and tributaries as well as mesohabitat mapping in areas not amenable to remote line mapping. Field data collection will be completed during 2014.
Study Components	<p>Remote line mapping consisted of data from aerial imagery supplemented with information from videography to generate a geospatial database.</p> <p>Ground truthing surveys were conducted in a subset of mesohabitat and macrohabitat segments in 2013 and will continue in 2014.</p> <p>Focus areas will be 100 percent ground-surveyed to the level of mesohabitat to provide detailed information for the Instream Flow Study (Study 8.5) needs.</p> <p>Mesohabitat characterization in a random subset of habitat units using a modified USFS stream survey protocol (USFS 2001) will allow comparisons among habitat types along the river continuum.</p>
Variations in 2013	<p>AEA implemented the methods as described in the Study Plan with the exception of the following variances. The significance of these variances is discussed within the ISR.</p> <p>Physical access limitations and safety concerns restricted the scope of random sampling (RSP Sections 9.9.5.3.2 and 9.9.5.4) to habitat units (ISR Sections 4.2.4.1 and 4.3.3.1).</p> <p>Special habitat features were expanded from the Study Plan (SPD B-210) to include backwaters, beaver complexes and clearwater plumes (ISR Sections 4.2.4.2 and 4.3.3.2).</p> <p>Ground survey flow conditions were more variable than anticipated (RSP Section 9.9.5.3.2) due to unexpected late summer high flows, this affected a small number of habitat units that were surveyed at flows higher than those under which the reference imagery was obtained (ISR Sections 4.2.4.3 and 4.3.3.3). Careful preplanning largely limited these habitats to those where habitat calls were least likely to be altered by variation in flow conditions. An</p>

Characterization and Mapping of Aquatic Habitats Study 9.9	
	assessment of any resulting discrepancies between remote mapped and ground-truthed habitat classifications will be presented in the Updated Study Report.
Steps to Complete the Study	<p>AEA will conduct ground-truthing surveys in a select number of Upper River mainstem and tributary habitats, Middle River tributary and mainstem habitats and identified Upper River lakes within the inundation zone to complete the survey design as described in RSP 9.9.5. These surveys will continue to follow the modified USFS protocols described in the study plan (RSP 9.9.5) modified to expand the definition of special habitat features to include backwaters, beaver complexes and clearwater plumes as in 2013 (ISR Sections 4.2.4.2 and 4.3.3.2).</p> <p>AEA expects to complete all remaining data collection during the 2014 study season, which will be reported in the USR.</p>
Highlighted Results and Achievements	<p>Remote imagery (aerial photography, aerial videography, and LiDAR) were used to complete the aquatic habitat mapping of the entire Upper and Middle Susitna River. All habitats were mapped to the macrohabitat level (side slough, side channel) and the Upper and Middle River main channel habitats were mapped to the mesohabitat level (pool, riffle, run) within a macrohabitat type.</p> <p>Field surveys were conducted to ground-truth the mapping from remote imagery and to provide further characterization of aquatic habitats. The field effort covered 40,241 m (25 mi) of tributary habitat in 19 tributaries and 42,554 m (26.4 mi) of mainstem aquatic habitat and characterized these habitats using a modified USFS survey protocol.</p>

7. COMPLETING THE STUDY

7.1. Proposed Methodologies and Modifications

To complete this study, AEA will implement the methods in the Study Plan with the single modification described in Section 7.1.1 and Section 7.1.2.

The activities include: (1) ground-truthing surveys by macrohabitat type in the Upper River mainstem (RSP Section 9.9.5.4.1); (2) ground-truthing surveys by macrohabitat type in the Middle River mainstem (RSP Section 9.9.5.4.2), (3) ground surveys of select Upper River tributaries (RSP Section 9.9.5.3.2), (4) ground surveys of select Middle River tributaries (RSP Section 9.9.5.3.2 and RSP section 9.9.5.4.2), (5) ground-truthing surveys to complete 100 percent coverage of mesohabitat mapping within Focus Areas (RSP Section 9.9.5.4.2 and (6) collecting 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).

Following field activities in 2014, data analysis will include a comparison of the remote line mapping GIS and field surveys for areas of overlap to ensure the two methods can be used in combination to develop a more detailed description of the habitat present than either method alone would support (RSP Section 9.9.5.4.). These results will be presented in the Updated Study Report (USR). Analyses will also include a review of additional information pertinent to tributary reach designations, (e.g., aerial photos, habitat mapping photos, and data collected during 2013 and further fisheries studies and ground-truthing habitat surveys) to be used where appropriate in the final designation of the reach types to be reported in the USR.

7.1.1. Decision Points from Study Plan

RSP section 9.9.5.4.3 states:

[T]his study will rely on Geomorphic Mapping Study to map the Lower River to Level 3. Development of mapping methods beyond Level 3 will wait until results of the 2012 interim studies, particularly the hydrologic study are reviewed and analyzed. The habitat characterization objective for the Lower River will then be more clearly identified and defined.

Based on the results of the 2012 data collection, AEA will not conduct video mapping or field-surveys for mesohabitats in the Lower River. Instead AEA will use the mapping conducted in ISR studies 6.5 and 6.6 to map Lower River habitats to Level 3 macrohabitat. AEA reviewed the results from 2012 video imagery obtained for a test segment of the Lower River and confirmed that mesohabitat in the Lower River consists of only two mesohabitat types (glides and riffles; Table 4.4-3 in R2 Resource Consultants, Inc. 2013b) although additional mesohabits may have been present in very low numbers. AEA concluded that aerial videotaping was not a practical method for habitat mapping in the Lower River (R2 Resource Consultants, Inc. 2013b) and that field surveys in this area would be both prohibitively costly and logistically complex.

7.1.2. Modifications to Study Plan

AEA implemented the methods as described in the Study Plan with the exception of the following variance from 2013.

The special habitat features will be expanded from the Study Plan (SPD B-210) to include backwaters, beaver complexes and clearwater plumes as in 2013 (ISR Sections 4.2.4.2 and 4.3.3.2). This change is in response to a FERC recommendation (April 1 SPD) that these habitats receive “special consideration.” Implementation of this change is largely procedural – by identifying these habitats as special, in addition to their common mesohabitat (Level 4) status, they can be more logically grouped and highlighted for analyses to be presented in the USR. This modification will allow AEA to more specifically meet the objective of providing special consideration to these habitats of particular interest.

7.2. Schedule

In general, the schedule for completing the FERC-approved Study Plan is dependent upon several factors, including Project funding levels authorized by the Alaska State Legislature, availability of required data inputs from one individual study to another, unexpected weather delays, the short duration of the summer field season in Alaska, and other events outside the reasonable control of AEA. For these reasons, the Study Plan implementation schedule is subject to change, although at this time AEA expects to complete the FERC-approved Study Plan through the filing of the Updated Study Report by February 1, 2016, in accordance with the ILP schedule issued by FERC on January 28, 2014.

The activities to be completed in 2014 include:

- Ground-truthing surveys by macrohabitat type in the Upper River mainstem (RSP Section 9.9.5.4.1).
- Ground-truthing surveys by macrohabitat type in the Middle River mainstem (RSP Section 9.9.5.4.2).
- Ground surveys of select Upper River tributaries (RSP Section 9.9.5.3.2).
- Ground surveys of select Middle River tributaries (RSP Section 9.9.5.3.2 and RSP section 9.9.5.4.2).
- Ground-truthing surveys to complete 100 percent coverage of mesohabitat mapping within Focus Areas (RSP Section 9.9.5.4.2).
- Collecting 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).

With regard to this specific study, AEA expects to complete all remaining data collection during the 2014 study season, which will be reported in the USR.

7.3. Conclusion

Based on the data and information collected by this study, AEA expects to study objectives as described in the Study Plan. Habitat mapping surveys began in 2012 and will continue through 2014. Aerial video data collection is complete. Habitat characterization of the Upper and

Middle River began in 2012 and will be completed in 2014. The USR will be filed in February 2016 and will contain a comparison of habitat classification from remote line mapping and ground-surveys; characterization of macro- and mesohabitats using measured habitat metrics; and a complete and updated set of photographic base maps delineating macrohabitats (Level 3) and mesohabitats (Level 4) for all mapped locations.

7.4. Literature Cited

U.S. Forest Service (USFS). 2001. Chapter 20 – Fish and Aquatic Stream Habitat Survey. FSH 2090-Aquatic Habitat Management Handbook (R-10 Amendment 2090.21-2001-1).