Susitna-Watana Hydroelectric Project
(FERC No. 14241)

Riparian Vegetation Study Downstream of the Proposed Susitna-Watana Dam

Study Plan Section 11.6

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

ABR, Inc.—Environmental Research & Services

June 2014

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Riparian Vegetation Study Downstream of the Proposed Susitna-Watana Dam 11.6	
Purpose	The primary objectives are to (1) classify and map local-scale riparian ecosystems (riparian ecotypes), wetlands, and wildlife habitats in the Middle and Lower Susitna River downstream of the Watana Dam site, (2) characterize the roles of erosion and sediment deposition in the formation of floodplain surfaces in the same areas, and (3) model natural riparian vegetation succession pathways in the Susitna River floodplain. The data will be used to support the modeling of changes in riparian areas from alterations in river flows associated with development of the proposed Project.
Status	This is an ongoing, multi-year study that was initiated in 2012 and continued during 2013.
Study Components	The study is composed of the following components: (1) vegetation and soil sampling in the field; (2) laboratory analyses for sediment aging; (3) Integrated Terrain Unit (ITU) mapping of ecosystem components; (4) derivation of riparian ecotypes, wetlands, and wildlife habitats from the field and ITU mapping data; and (5) modeling of natural (pre-development) successional pathways for riparian vegetation.
2013 Variances	(1) As agreed to through consultation with the Technical Workgroup, the allocation of Ecological Land Survey (ELS) plots in Focus Areas (FAs) was changed from that described in the RSP (Section 11.6.4.2.1) so that both the size of FAs and the number of ecotypes in each FA are incorporated into the stratified random plot-allocation process. Additionally, directed sampling in Satellite Areas was used to target those ecotypes under-represented in FAs (RSP Section 11.6.4.2.1). The effect of this variance is that more intensive sampling occurred (a greater number of ELS plots was surveyed in more ecotypes), which will result in a better understanding of riparian vegetation and soils in the study area. (2) The sampling interval along vegetation sampling lines on ELS plots was doubled from 0.5 m (1.6 ft), as described in the RSP (Section 11.6.4.2.4), to 1.0 m (3.3 ft). This modification served to improve the accuracy of the sampling for vegetation cover by minimizing the recording of the same plants at different sample points. (3) The groundwater instrumentation was placed just outside of ELS plots instead of in the plot centers as described in the RSP (Section 11.6.4.2.4). This modification was implemented because installing the large groundwater instrumentation in the ELS plot centers would have resulted in excessive disturbance of vegetation. Moving the groundwater instrumentation to the ELS plot boundaries preserved the plots' utility for possible long-term monitoring studies and still allowed for co-located collection of field data on

Riparian Vegetation Study Downstream of the Proposed Susitna-Watana Dam 11.6	
	vegetation, soils, and groundwater. In combination, the implementation of these three variances served to increase the quantity or improve the quality (accuracy) of the field data and/or facilitate possible long-term monitoring of riparian vegetation in the Susitna River floodplain; hence, these variances served to improve the achievement of the study objectives.
Steps to Complete the Study	The plans for completing this study include implementing the study components listed above in 2014 and 2015 (ITU mapping and sediment aging will occur in 2014 and 2015; the final field surveys, the derivation of riparian ecotypes, wetlands, and wildlife habitats, and the modeling of riparian successional pathways will be conducted in 2015). AEA will implement three modifications to the Study Plan field methods. The modifications were implemented in 2013 and are described in Section 4 of this ISR as 2013 variances. Because the modifications serve to improve either the quantity or quality of the data collected and/or facilitate the option of long-term monitoring of riparian vegetation, they will be carried forward during the final year of field sampling in 2015. No other modifications to the Study Plan are needed to achieve the study objectives.
Highlighted Results and Achievements	Substantial progress has been achieved in the classification and mapping of riparian ecotypes in the Middle River portion of the study area. Twenty-nine preliminary riparian ecotypes have been classified based on five ITU attributes (geomorphic unit, surface form, vegetation type, poplar size class [when applicable], and disturbance class). These ecotypes will be confirmed and expanded upon with further work in 2014 and 2015, which will include field surveys and mapping upstream to the Project dam site and downstream in the Lower River to encompass the full study area. Soil stratigraphy work was accomplished in the Middle River and soil cores for sediment aging were collected. With the additional work in 2014 and 2015, to include the derivation of wetland and wildlife habitats, sediment aging, and the modeling of riparian vegetation succession, the study is on track to meet its objectives.

7. COMPLETING THE STUDY

7.1. Proposed Methodologies and Modifications

To complete this study, the study team will implement the methods in the Study Plan except as described in Section 7.1.2. These activities include:

- Sediment samples collected in 2013 and 2014 will be aged by laboratory analysis (RSP 11.6.4.2.5); this work will be conducted by staff at the University of Exeter.
- Field data from 2013 will be combined with the 2012 field data and analyzed to update the current ecotype classification and refine the list of acceptable ITU component classes for mapping (RSP Section 11.6.4.3).
- ITU mapping will continue for areas upstream of the existing mapping to the proposed Project dam site and downstream in the Lower River portion of the study area (RSP Section 11.6.4.3).
- The existing mapping will be reviewed for consistency with the field data from all study years and revised as necessary; coordination with the other botanical resources mapping teams will be ongoing for this task (RSP Section 11.6.4.3).
- Field plot selection and implementation of field surveys for portions of the study area not yet sampled (RSP Section 11.6.4.2).
- Final ITU map revisions will be completed and coordinated with the other botanical mapping teams; wildlife habitat types and wetland types will be derived from the ITU map data in coordination with the study teams for the Vegetation and Habitat Mapping Study in the Upper and Middle Susitna Basin (Study 11.5) and the Wetland Mapping Study in the Upper and Middle Susitna Basin (Study 11.7) (RSP Section 11.6.4.3).
- Natural riparian vegetation successional models will be prepared for use in the modeling of post-development changes in riparian vegetation (RSP Sections 11.6.4.4 and 11.6.7).

7.1.1. Decision Points from Study Plan

There were no decision points in the FERC-approved Study Plan to be evaluated for this study following the completion of 2013 work.

7.1.2. Modifications to Study Plan

In 2014 and 2015, AEA will carry forward three alterations to the field methods that were implemented in 2013 as variances:

(1) The original plot-allocation procedure described in the Study Plan specified the sampling of ELS plots in FAs based on the size of the FAs alone (a sampling rate of 1 ELS plot per 10 acres for FAs up to 200 acres in size, and a maximum of 20 plots for FAs > 200 acres) (RSP Section 11.6.4.2.1). This procedure had to be modified in 2013 (see Section 4.2.1.3 above) because the

Study Plan was completed before the boundaries of the FAs were fully defined, and, upon finalization of the FA boundaries, it was determined that all FAs were > 250 acres. As agreed to with the TWG on June 6, 2013 (meeting notes available on SharePoint site at /Shared Documents/TWGmtgs and WorkSessions/2013/2013-06-06_TWG_RIFS_GW), the plot-allocation procedure was modified to adjust for this, and ELS plots were allocated based both upon the size of each FA and the number of ecotypes in each FA as described above. This revised procedure provides for a higher number of plots being assigned to each FA than would have occurred under the original sampling scheme. Additionally, those ecotypes that were under sampled in FAs were sampled with additional ELS plots in Satellite Areas to increase the sampling of underrepresented ecotypes. The sampling of each FA (and the Satellite Areas) now is more intensive, which will result in more accurate information on vegetation structure and composition in each FA and throughout the study area. Additional field data also will be available to use to describe each ecotype in the study area. The increased sampling resulting from this modification to the ELS plot-allocation process increases the rigor of the study and the achievement of the study objectives.

(2) In the RSP (Section 11.6.4.2.4), the interval for point-intercept sampling along the vegetation sampling lines on ELS plots was 0.5 m (1.6 ft). In 2013, this sampling interval was increased to 1.0-m (3.3 ft) (see Section 4.2.5.1 above). This modification facilitated more accurate and representative data collection because with an increased sampling interval there were fewer instances in which the same plants were recorded at different sample points in the typically dense, multi-canopied vegetation in the Susitna River floodplain. The larger sampling interval necessitated a larger sampling radius for the ELS plots (23 m [75 ft]) instead of the 16.25 m [53 ft] specified in the Study Plan), but the larger plot radius did not inhibit the placement of the ELS plots in areas of homogeneous microtopography and vegetation. The increased accuracy in the sampling for vegetation cover because of this modification serves to improve the data quality and the achievement of the study objectives.

(3) At those ELS plots along groundwater transects, the groundwater instrumentation was not co-located with the ELS plot centers as described in the RSP (Section 11.6.4.2.4). Instead, because the large size of the groundwater instrumentation relative to the 3-m (10 ft) radius ELS plot centers risked excessive disturbance of vegetation disturbance within the plot boundaries, the instrumentation was placed adjacent to the plot just outside the 23 m (75 ft) outer boundary of each ELS plot (see Section 4.2.5.1 above). The location of groundwater instrumentation outside of the ELS plots reduced vegetation disturbance on the ELS plots (preserving the plots utility for possible long-term monitoring studies) and still allowed for co-located collection of field data on vegetation, soils, and groundwater; hence, this modification facilitated a better achievement of the study objectives.

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 (USR) by February 1, 2016, in accordance with the ILP schedule issued by FERC on January 28, 2014.

With regard to this specific study, no field work will be conducted in 2014. The study team plans to complete field data collection in the 2015 study season. The ITU mapping, however, will be continued in 2014 and will be completed in 2015. The derivation of riparian ecotypes, wildlife habitats, and wetland types from the ITU mapping data, and the modeling of natural successional pathways for riparian vegetation will be accomplished in 2015 after the completion of the ITU mapping. The results of each component of this study will be reported in the USR.

7.3. Conclusion

In combination, the ITU mapping work in 2014 and 2015, the final year of field surveys planned for 2015 (including the modifications in the field methods described above in Section 7.1.2), the derivation of riparian ecotypes, wildlife habitats, and wetland types, and the modeling of riparian successional pathways will be adequate to meet the Study Plan objectives. Substantial progress was made in 2013 in characterizing and mapping ITU variables and deriving a preliminary set of riparian ecotypes for the study area. The ITU mapping work will be expanded in 2014 and 2015 to encompass those portions of the study area that have not yet been mapped. As described above, once the field work and ITU mapping is completed in 2015, the final elements of the study can be performed and the USR can be prepared.

Several modifications have been proposed for the Study Plans for the set of four riparian/riverine studies related to this study: Geomorphology Study (Study 6.5), Groundwater Study (Study 7.5), Ice Processes in the Susitna River Study (Studies 7.6), and Riparian IFS (Study 8.6). The modifications involved alterations in the details or expansions of the field survey methods, alternative field methods, or alterations in the study schedules. None of the modifications will negatively affect the collaboration between those studies, and this one and will serve to improve the achievement of the Study Plan objectives (i.e., the modifications will result in more and/or better quality data, which will be used when interpreting how groundwater, instream flow, ice processes, and geomorphology influence natural vegetation succession pathways). Lastly, modifications to the study area for the Vegetation and Wildlife Habitat Mapping Study in the Upper and Middle Susitna Basin (Study 11.5) will not affect the coordination between that study and this one when deriving wildlife habitat types for this study.