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1.1. Riparian Study

1.2. Requestor of Proposed Study

Alaska Energy Authority (AEA) anticipates a resource agency will request this study.

1.3. Responses to Study Request Criteria (18 CFR 5.9(b))

1.3.1. Describe the goals and objectives of each study proposal and the information to be obtained.

The goals and objectives of the multi-year Riparian Study are to:

- Identify and map riparian plant communities and characterize riparian physical and ecological processes in the Project area downstream from the Watana Dam site;
- Quantify the potential loss of riparian habitats from Project construction;
- Assess potential changes to the riparian habitats, riparian processes, wetland functions, and plant successional pathways from Project operations; and
- Develop [a factual basis for any](#) protection, mitigation, and enhancement measures [needed](#) to address project-related impacts to riparian habitats, riparian processes, wetland functions, and successional pathways.

In 2012, the intermediate study objective is to develop a map of riparian habitats downstream from the dam site using existing wetland and vegetation mapping, current aerial imagery, current fine-scale topography from Light Detection and Ranging (LiDAR), and field verification of riparian habitats. In 2013 and 2014, a complete assessment of riparian habitats and physical and ecological processes in the Project area will be completed as current aerial imagery becomes available and the Project area is further defined (e.g., extent of the downstream and floodplain areas to be included in the Project area).

1.3.2. If applicable, explain the relevant resource management goals of the agencies or Indian tribes with jurisdiction over the resource to be studied. [Please include any regulatory citations and references that will assist in understanding the management goals.]

The Riparian Study is being conducted to satisfy Environmental Protection agency (EPA) 40 CFR Part 230 Section 404(b)(1) and Section 10 of the Rivers and Harbors Act of 1899 33 U.S.C. 403 regulations under the Clean Water Act. These regulations were developed "...to restore and maintain the chemical, physical, and biological integrity of waters of the United States through the control of discharges of dredged or fill material." The Section 404 program is designed to minimize the loss or negative impact to the nation's waters and wetlands.

1.3.3. If the requestor is a not resource agency, explain any relevant public interest considerations in regard to the proposed study.

Alaska Energy Authority (AEA), as the license applicant, assumes that this study will be recommended by resource management agencies during the study plan development process. Additionally, there are likely to be public concerns over possible alterations of riparian habitats downstream of the proposed dam site, especially as those alterations relate to changes in habitats for anadromous fishes and wildlife.

1.3.4. Describe existing information concerning the subject of the study proposal, and the need for additional information.

Descriptions of floodplain vegetation types and riparian physical and ecological processes were developed in the 1980s as part of the original Susitna Hydroelectric Project (SHP) Phase I vegetation mapping studies conducted along the Susitna River from Devils Canyon to Talkeetna, and the vegetation succession studies conducted in the Susitna River floodplain between Gold Creek, and the Deshka River (McKendrick et al. 1982, UAFAFES 1985). The riparian sites visited in those studies were resampled in 1992–1993 (Collins and Helm 1997, Helm and Collins 1997). Because the SHP riparian studies were conducted over 25 years ago and were performed based on a different project and dam design, new riparian studies will be needed that are specific to the current riparian conditions and design parameters for the Susitna-Watana Hydroelectric Project. For example, since the 1980s, it is likely that riparian habitat conditions have changed in specific sites downstream of the proposed dam site as the Susitna River has changed its course (channel migration on a local scale) because of large and influential flooding and ice-scour events.

1.3.5. Explain any nexus between project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied, and how the study results would inform the development of license requirements.

Project operations will affect riparian habitats downstream from the proposed Watana Dam site and will include direct, indirect, and cumulative effects to riparian habitats. These effects on riparian habitats will occur primarily through changes in flow regimes and ice processes in the Susitna River. In this study, ABR vegetation ecologists will identify and map riparian habitats and successional vegetation stages downstream from the dam site, and will evaluate the expected direct, indirect, and cumulative effects of Project operations on riparian habitats due to alterations in physical and ecological riparian processes. Following the mapping and characterization of riparian habitats in the Project area, mitigation measures will be developed to address any adverse Project-induced impacts that are likely to occur.

The riparian study addresses the following issues identified in the PAD (AEA 2011):

- losses of vegetation and wetland communities and productivity from reservoir inundation and the development of other Project facilities (direct effects).
- changes to vegetation and wetland communities along access roads, transmission corridors, and reservoir edges due to alteration of solar radiation, temperature moderation, erosion and dust deposition, reservoir fluctuation, pathogen dispersal and abundance; and
- potential changes in wetlands, wetland functions, riparian vegetation, and riparian succession patterns related to altered hydrologic regimes below the dam.

In the riparian study, ABR vegetation ecologists will determine analysis of the number of acres and distribution of riparian habitat types to provide a basis for riparian habitat and wetland function analyses, and the development of mitigation measures. Wildlife use and riparian habitat functions are related to the types and successional stages of riparian vegetation communities; therefore results of this study will be necessary to evaluate baseline and post-construction wildlife use and wetland functions in areas downstream of the proposed dam. Results of this study will also be used to augment information obtained in the instream flow, ice processes,

riverine geomorphology, vegetation and wildlife habitat mapping, wetland mapping, rare plant and invasive plant studies.

1.3.6. Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate field season(s) and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant tribal values and knowledge.

The study area for the mapping of successional vegetation in the riparian study will be formally defined in consultation with management agency personnel over the course of developing the 2013–2014 study plan, but a working study area for the 2012 season includes those riparian areas downstream of the proposed dam site to a point at which the effects of altered flow regimes expected in the Susitna River would not be measureable or would be overridden by the effects of tidal fluctuations from Cook Inlet. This downstream location will be determined following analysis of the results of the 2012 instream flow studies. (In 2012, the riparian study will focus on those downstream areas in which altered flow regimes are most likely to occur.) The width of the study area for the mapping of successional vegetation in the riparian study will cover all riverine areas in the active floodplain of the Susitna River out to the estimated limits of 100-year flood events (plus a buffer area of at least 800 meters, pending input from management agency personnel). The estimated limits of 100-year flood events will be determined in analyses of data from the 2012 instream flow studies.

Riparian habitats in this study will be mapped to the Level IV of the Alaska Vegetation Classification (Vioreck, et al. 1992) with adjustments, as needed, for early successional riparian stages following Helm and Collins (1997). An Integrated Terrain Unit (ITU) mapping approach will be used. The ITU approach is based on methodology developed for various Ecological Land Surveys (ELS) studies done throughout the state of Alaska over the past 15 years (e.g. Jorgenson et. al. 2003) and has been used to develop risk assessments, monitoring plans, and wildlife habitat analyses. The ITU approach involves on-screen digitizing in GIS to delineate map polygons for vegetation, geomorphology, and surface form types. ITU map polygons are attributed with geomorphology (e.g. Braided Active Overbank Deposit), surface form (e.g. Mid-channel Bar), and vegetation classes (e.g., Low Willow Scrub; from Vioreck et al. 1992). Additional parameters can be added to meet the objectives of a particular mapping project. These parameters are displayed on maps individually to produce distinct geomorphology, surface form, and vegetation maps. The ITU codes are then aggregated into ecotypes (local-scale ecosystems) and wildlife habitat types based on classification systems designed by ABR's wildlife scientists specifically for Alaska. The multi-parameter, aggregative approach, combined with the flexibility of working across disciplines makes the ITU approach a powerful mapping tool for multidisciplinary projects like the Susitna-Watana Hydroelectric Project.

A preliminary riparian habitat map will be prepared before ground-truth field surveys are initiated in summer 2012. We will use the preliminary mapping to design a stratified sampling scheme and select potential study sites, including at least one representative site for each riparian habitat type. In the selection of study sites, we also will coordinate with researchers conducting the instream flow, ice processes, and riverine geomorphology studies so that the riparian habitat parameters can be directly related to predicted changes in instream flow, ice processes, and geomorphology. Both reconnaissance-level and intensive sampling will be initiated in 2012, and the intensive sampling will be continued in 2013 and 2014. All sampling will occur in the growing season months of June, July, and August. The sampling of preselected study sites also will be conducted in conjunction with the wildlife habitat mapping studies so that riparian wildlife habitat

types can be mapped and integrated into the project-wide wildlife habitat map. Data will be recorded digitally in the field using a standardized data entry form designed to link directly to a relational database (*Microsoft Access*). Study sites will be at a minimum 500 m² (forested) and 50 m² (non-forest) circular plots, although shape may vary depending on the shape of the vegetation stand being sampled. We will follow the riparian habitat sampling methods of McKendrick et al. (1982), Collins and Helm (1997), and Helm and Collins (1997).

1.3.7. Describe considerations of level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

An alternative to a riparian mapping effort supported by field verification would be an office-based classification and mapping effort. The ability to accurately classify and map riparian vegetation is greatly diminished, however, without a field survey to obtain ground data on plant community composition, geomorphology, surface forms, hydrology, and soils. In addition, some plant communities (e.g., young-growth cottonwood and alder) have similar photosignatures and are difficult to distinguish without ground data. Thus, field data will be needed to better differentiate such habitats. Ground data will also be required for developing linkages with study elements of both the instream flow and geomorphology studies.

One alternative mapping technique to the ITU approach for creating a riparian map would be a raster-based spectral classification of satellite imagery. Spectral image classifications, however, typically are not prepared at a scale fine enough to accurately differentiate small linear features on the landscape such as patches of riparian habitat in various stages of succession (i.e., the raster cell sizes are often larger than the width of riparian features). For this reason alone, an on-screen digitizing approach will be necessary to accurately map riparian habitats. ABR biologists have successfully used ITU on-screen mapping methods throughout Alaska to map a total of ~3200 km² (approximately the size of Rhode Island). The ITU approach is based on methodology developed for various Ecological Land Surveys (ELS) studies conducted in Alaska over the past 15 years (e.g., Jorgenson et. al. 2003), and the approach has been used to develop risk assessments, monitoring plans, and wildlife habitat analyses.

The riparian study is planned as a 3-year effort, with field sampling conducted each year by 4 observers (2 crews of 2 each) during the summers of 2012, 2013, and 2014. Surveys would be conducted for 14 to 18 days in each year, depending on the needs for additional ground-verification data (less extensive field surveys may be needed in 2014 as the mapping of the study area progresses). The riparian study will involve extensive, office-based activities to delineate riparian habitat boundaries in a GIS and to prepare study reports. The approximate projected cost for this study over the course of all three years is \$1,200,000.

1.3.8. Literature Cited

- AEA (Alaska Energy Authority). 2011. Pre-Application Document: Susitna-Watana Hydroelectric Project FERC Project No. 14241. December 2011. Prepared for the Federal Energy Regulatory Commission by the Alaska Energy Authority, Anchorage, Alaska.
- Collins, W.B., and D.J. Helm. 1997. Moose, *Alces alces*, habitat relative to riparian succession in the boreal forest, Susitna River, Alaska. *Canadian Field-Naturalist* 111: 567–574.
- Helm, D.J., and W.B. Collins. 1997. Vegetation succession and disturbance on a boreal forest floodplain, Susitna River, Alaska. *Canadian Field-Naturalist* 111: 553–566.

- Jorgenson, M. T., J.E. Roth, M. Emers, S.F. Schlentner, D.K. Swanson, E.R. Pullman, J.S. Mitchell, and A.A. Stickney. 2003. An ecological land survey in the Northeast Planning Area of the National Petroleum Reserve—Alaska, 2002. ABR, Inc., Fairbanks, AK. 128 pp.
- McKendrick, J.D., W. Collins, D. Helm, J. McMullen, and J. Koranda. 1982. Susitna Hydroelectric Project environmental studies, Phase I final report, Subtask 7.12—Plant ecology studies. Report by University of Alaska, Agricultural Experiment Station, Palmer, for Alaska Power Authority, Anchorage. 124 pp. + appendix.
- UAFAFES (University of Alaska Fairbanks Agricultural and Forestry Experiment Station). 1985. Susitna Hydroelectric Project, riparian vegetation succession report. Draft report by University of Alaska—Fairbanks Agricultural and Forestry Experiment Pre-Application Document Susitna-Watana Hydroelectric Project Alaska Energy Authority FERC Project No. 14241 Page 4-263 December 2011 Station, Palmer, for Harza—Ebasco Susitna Joint Venture and Alaska Power Authority, Anchorage. 169 pp.
- Viereck, L.A., C.T. Dyrness, A.R. Batten, and K.J. Wenzlick. 1992. The Alaska Vegetation Classification. Pacific Northwest Research Station, U.S. Forest Service, Portland, OR. Gen. Tech. Rep. PNW-GTR-286. 278 pp.