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

**Fish and Aquatic Resources
Study Plan Section 9 Introduction**

Final Study Plan

Alaska Energy Authority



July 2013

9 FISH AND AQUATIC RESOURCES

9.1 Introduction

Susitna-Watana Hydroelectric Project (Project) construction and operation will affect flow, water depth, surface water elevation, and sediment regimes in the mainstem channel as well as at tributary confluences, side channels, and sloughs, both in the area of the inundation upstream from the proposed dam site and downstream in the potential zone of Project hydrologic influence. Such modifications may have an adverse effect upon the aquatic communities and fish populations residing in the river; the degree of this effect will ultimately depend on final Project design and operating characteristics.

The potential effects of the Project on fish and aquatic resources will need to be carefully evaluated as part of the licensing process. This study plan describes the Susitna-Watana Fish and Aquatic Resources Study that will be conducted to characterize and evaluate these effects. The overall objectives of this study are (1) to provide a baseline characterization of existing resources, and (2) to collect information that will support the evaluation of potential resource impacts of the proposed Project that were identified during development of the Pre-Application Document (PAD), public comment, and Federal Energy Regulatory Commission (FERC) scoping for the License Application. The impact assessments will inform development of any necessary protection, mitigation, and enhancement measures to be presented in the draft and final License Applications.

Alaska Energy Authority (AEA) is committed to conducting a thorough evaluation of the aquatic resources that could be affected by the Susitna-Watana Hydroelectric Project. AEA recognizes that the Susitna River supports a diverse assemblage of fish and aquatic biota and provided a detailed description of these resources in the PAD; however, AEA acknowledges that more information is needed to provide a better understanding of the species interaction with and dependencies on the river. To this end, AEA has initiated baseline studies on hydrology and fish resources in the Lower, Middle, and Upper Susitna River in 2012. These 2012 studies will be carried forward in the formal FERC ILP study program in 2013 and 2014. In addition, AEA is proposing to implement 15 additional fish and aquatic studies in 2013 and 2014 that will further document current conditions and provide information that will support the assessment of potential Project impacts.

The actual assessment of potential impacts will rely on information provided by the fish resources studies (see Sections 9.5 through 9.17), the instream flow study (surface water flow routing, habitat suitability criteria, and riparian floodplain vegetation surveys; see Section 8), the geomorphology study (sediment supply/transport regime and channel morphology; see Section 6), the ice processes study (surface water flow routing during the winter, ice growth and break-up; see Section 7.6), the groundwater study (surface water/groundwater interactions; see Section 7.5), and the water quality study (see Section 5). These studies will result in development of a series of flow-sensitive models (e.g., models of selected anadromous and resident fish habitats by species and life stage, models to assess connectivity and passage conditions provided into side channel and slough habitats, models to describe invertebrate habitats, temperature model, ice model, sediment transport model, turbidity model, large woody debris (LWD) recruitment

model) that will be able to translate effects of alternative Project operations on the respective processes and biological resources. Because alternative Project operational scenarios will likely affect different habitats and processes differently, both spatially and temporally, the habitat and process models will be spatially discrete (e.g., by site, segment, and reach) and yet able to be integrated to allow for a holistic evaluation of each alternative operational scenario. This will allow for an Integrated Resource Analysis of separate operational scenarios that includes each resource element, the results of which can serve in a feedback capacity leading to new or modifications of existing operations scenarios.

One of the key benefits to this approach is that AEA will be able to evaluate the potential effects of Project operations under different hydrologic conditions (e.g., wet, normal, and dry year) and for varying time steps (e.g., hourly, daily, monthly etc.). This will allow for assessments of a wide range of operational characteristics including load following, base load operations, and others. These types of analysis can be extended over variable time intervals that can be used to assess Project effects over a life cycle of a given species. For example, Project operational effects could be evaluated over 5-year (or other specified interval) increments of time as a means to estimate how Chinook salmon (or other species) habitats might vary over that period (taking into consideration all of the flow-sensitive parameters noted above). These types of analyses could be done both retrospectively as a means to consider influences of existing and historic flow conditions, as well as prospectively as a means to evaluate effects of future project operations.

The information that will be collected and the models developed will be relied upon by FERC for completing a thorough environmental impact assessment and for establishing appropriate protection, mitigation, and enhancement measures for inclusion in the Project license necessary for avoiding, reducing, or mitigating for Project effects.

AEA has carefully considered the importance of the Susitna River and its resources, and while working diligently with licensing participants and technical consultants, has identified and designed the studies presented herein the Final Study Plan (FSP). All of the studies are planned to be completed in a timely fashion to support the license application, and AEA is confident the information generated will provide FERC with sufficient information to complete its analysis. AEA's confidence in this matter is strengthened substantially owing to the extensive amounts of data and information that were collected on the Susitna River during the 1980s that formed much of the basis for the PAD. AEA has acquired the majority of the data and information collected during those studies and in 2012 has sanctioned the technical review and compilation of the information so it will be available for use during the 2013–2014 studies and for impact analysis. The results of the 2 years of intensive study as described in this FSP, coupled with the extensive amount of pre-existing, relevant information collected during the 1980s and ongoing efforts in 2012 will provide FERC the information and analysis needed to complete a sound, scientific assessment of the baseline conditions and potential Project.

9.2 Nexus Between Project Construction / Existence / Operations and Effects on Resources to be Studied

As described above, the construction and operational strategy of the Project will create a reservoir; modify the flow, thermal, gravel recruitment, and sediment regimes; and may alter connectivity of aquatic habitats in the Susitna River basin. These potential ecosystem changes

will alter the composition and distribution of fish habitat and may have effects on fish and aquatic productivity. The proposed hydropower operations for the Project may influence the abundance and distribution of one or more of the resident and anadromous fish populations. The degree of impact will vary depending on the magnitude, frequency, duration, and timing of flows as well as on potential Project-related changes in temperature and turbidity. Baseline information on existing conditions will be needed to predict the likely extent and nature of potential changes that will occur due to Project construction and operations.

9.3 Agency and Alaska Native Entities Resource Management Goals and Objectives

Aquatic resources including fish and their habitats are generally protected by a variety of state and federal mandates. In addition, various land management agencies, local jurisdictions, and non-governmental interest groups have specific goals related to their land management responsibilities or special interests. These goals are expressed in various statutes, plans, and directives, as described below.

Alaska Statute 41.14.170 provides the authority for state regulations to protect the spawning, rearing, or migration of anadromous fish. Alaska Statute 41.14.840 addresses the construction of fishways and dams. State regulations relating to fish resources are generally administered by the Alaska Department of Fish and Game (ADF&G). ADF&G is responsible for the management, protection, maintenance, and improvement of Alaska's fish and game resources in the interest of the economy and general well-being of the state (AS 16.05.020). ADF&G monitors fish populations and manages subsistence, sport, and commercial uses of fish through regulations set by the Board of Fisheries (AS 16.05.221). The *Policy for Management of Sustainable Salmon Fisheries* (SSFP; 5 AAC 39.222) sets guidelines for ADF&G's management of state salmon resources. The statewide *Policy for the Management of Sustainable Wild Trout Fisheries* (PMSWTF; 5 AAC 75.222) currently guides wild rainbow trout regulatory changes. Cook Inlet Rainbow Trout/Steelhead Management Policy (CIRTMP; ADF&G 1987) provides further guidelines specific to rainbow trout in the Northern Cook Inlet Management Area (NCIMA). ADF&G's authority for protection of fish resources and habitat is further established through the Anadromous Fish Act (AS 16.05.871 – 901) and the Fishway Act (AS 16.05.841).

In addition to the state statutes, the following resource management plans and directives provide guidance and direction for protection of fish resources and aquatic habitats on lands within or adjacent to the Project area:

- Title VIII of the Alaska National Interest Lands Conservation Act (ANILCA) passed in 1980 set forth a subsistence use priority for the taking of fish and wildlife on public lands.
- The Federal Subsistence Board, which is comprised of representatives of the U.S. Fish and Wildlife Service, National Park Service, Bureau of Land Management, Bureau of Indian Affairs, and U.S. Forest Service, oversees the Federal Subsistence Management Program (57 FR 22940; 36 CFR Parts 242.1–28; 50 CFR Parts 100.1–28), with responsibility for managing subsistence resources on federal public lands for rural residents.

- The Magnuson-Stevens Fishery Conservation and Management Act (PL 104-267) provides federal protection for Essential Fish Habitat (EFH) defined as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” NOAA’s National Marine Fisheries Service (NMFS) is responsible for designating EFH. In the case of anadromous fish streams (principally salmon), NOAA Fisheries has designated the Anadromous Waters Catalog (AWC) prepared by ADF&G (Johnson and Klein 2009) as the definition of EFH within freshwater habitats.
- *Aquatic Resources Implementation Plan for Alaska’s Comprehensive Wildlife Conservation Strategy*, September 2006. Prepared by ADF&G, Division of Sport Fish.
- *Our Wealth Maintained: A Strategy for Conserving Alaska’s Diverse Wildlife and Fish Resources*. Prepared by ADF&G, Juneau, Alaska. xviii+824 pp.

Management and land use plans relevant to the Fish and Aquatic Resources Study components include the following:

- The role of state land use plans, generally administered by Alaska Department of Natural Resources (ADNR), was established by state statute (AS 38.04.005). The Susitna-Matanuska Area Plan (SMAP) and the Southeast Susitna Area Plan (SSAP) direct how the ADNR will manage general state uplands and shorelands within the planning boundaries.
- The Susitna Basin Recreation Rivers Management Plan describes how the ADNR will manage state land and water along six rivers including: the Little Susitna River, Deshka River, Talkeetna River, Lake Creek, Talachulitna River, and Alexander Creek. The plan determines how these six rivers will be managed over the long term including providing management intent for each river segment, new regulations for recreation and commercial use, and guidelines for leases and permits on state land.
- The Susitna Flats Game Refuge Management Plan provides ADF&G guidance to manage the refuge to protect fish and wildlife populations, including salmon spawning and rearing habitats.
- Chickaloon Native Village is an Ahtna Athabascan Indian Tribe and is a federally recognized Alaska Native tribe. The Chickaloon Village Traditional Council strives to increase traditional Ahtna Dene’ practices for the betterment of all residents in the area. The Tribe envisions a future with functioning ecosystems, flourishing fish and wildlife populations, and a healthy, prosperous community.

9.4 Summary of Consultation with Agencies, Alaska Native Entities and Other Licensing Participants Regarding Revised Study Plan Development

Input regarding the issues to be addressed in the Fish and Aquatic Resources Study has been provided by licensing participants during workgroup meetings commencing in late 2011. During 2012, workgroup meetings were held in January, February, April, June, August, September, October, and November, during which resource issues were identified and discussed and objectives were defined. Various agencies (USFWS, NMFS, ADF&G, etc.) provided written

comments specific to fish and aquatic studies, which have been considered and will be addressed as part of these study plans.

Summary tables of comments and responses from formal comment letters filed with FERC through November 14, 2012, were provided in Revised Study Plan (RSP) Appendix 1 filed December 14, 2012. Copies of the formal FERC-filed comment letters were included in RSP Appendix 2. In addition, a single comprehensive summary table of comments and responses from consultation, dated from Proposed Study Plan (PSP) filing (July 16, 2012) through release of Interim Draft RSPs, was provided in RSP Appendix 3. Copies of meeting summaries from release of the PSP through the interim draft RSP were included in RSP Appendix 4, organized chronologically.

Consultation subsequent to the filing of the RSP is described within each Final Study Plan (FSP).