



**UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration**

National Marine Fisheries Service

P.O. Box 21668

Juneau, Alaska 99802-1668

May 17, 2012

Duff Mitchell
Business Manager
Juneau Hydropower, Inc.
P.O. Box 22775
Juneau, AK 99802

Re: Sweetheart Lake Hydroelectric Project
FERC No. 13563, Comments on Draft
Aquatic Resources Study Plan

Dear Mr. Mitchell:

The National Marine Fisheries Service (NMFS) has reviewed the Sweetheart Lake Hydroelectric Project Draft Aquatic Resources Study Plan, dated April 2012. NMFS is entrusted with federal jurisdiction over marine, estuarine, and anadromous fishery resources under multiple statutory authorities including Magnuson-Stevens Fishery Conservation and Management Act (MSA), and the Federal Power Act (FPA). Section 305(b) of the MSA requires federal agencies to consult with NMFS on all actions that may adversely affect Essential Fish Habitat (EFH). Section 10(q) of the Federal Power Act (FPA) authorizes NMFS to recommend license conditions necessary to protect, mitigate damage to, and enhance fish and wildlife habitat affected by the project. In addition, NMFS has responsibilities related to the Federal Energy Regulatory Commission (FERC) proceedings derived from the Fish and Wildlife Coordination Act, the Clean Water Act, the Endangered Species Act (ESA) and the Marine Mammal Protection Act (MMPA).

The proposed project consists of a 500 foot long and 90 foot high dam at Lower Sweetheart Lake, an intake in the lake, low flow control device, and spillway. Total installed generating capacity is estimated to be 30 megawatts. A steel penstock would lead to a buried or partially buried powerhouse located above or adjacent to a barrier falls at Sweetheart Creek. The tailrace would be located near the powerhouse, returning water to lower Sweetheart Creek.

Transmission of electricity would occur either by a mix of submarine and overhead transmission traversing the west side of Gilbert Bay or through a submarine cable across Gilbert Bay to a Snettisham transmission line interconnection. The operational proposal will increase storage capacity of Sweetheart Lake. The current proposal is to draw water from Sweetheart Lake with lake level fluctuations up to 60 feet annually. Seasonal and daily operations were not described.

The Anadromous and Tidewater Resource Study has two components: Anadromous resource assessment, evaluation, analysis, and protection, mitigation and enhancement (PM&E); and Tidewater resource assessment, evaluation, analysis, and PM&E.

In review of the four study component of the Aquatic Resource Study Plan we found that the plan identifies the resources issues and study needs from the scoping process, but is not complete



and detailed enough to be a useful study plan. The goals and methods of the proposed study components are relevant but need clarification and the sampling design for each study should be clearly described and linked to the specific objectives of each study and include descriptions of the following:

- Protocols for selecting specific sampling locations within each water body/habitat type
- Sampling design, sample methods and gear types for each study
- A sampling schedule for each study (including timing, frequency, duration, etc.) describing each type of sampling gear and sample location, rather than just start and end dates and general listings of possible sampling methods
- Data collection techniques, methods of data analysis and study reporting procedures

In order for NMFS to understand the potential effects of this project on anadromous and marine habitat more detail is needed about proposed study plans and about the proposed operations of this project. Juneau Hydropower or its contractors should work together with NMFS and other agency staff to develop useful and detailed study plans. We also recommend using a technical editor to write the study plans and study reports appropriately.

Although there is an important personal use stocked sockeye fishery that uses lower Sweetheart Lake as rearing habitat for stocked fry, we focus on the lower Sweetheart Creek as the natural anadromous resources that would most likely be affected by project operations. In order to adequately assess anadromous resources we suggest development of detailed study plans for each study component. General methods and suggestions are provided below.

Anadromous Fish Presence and Habitat Use

Describe sample designs and methods for the fish studies in detail. The plan implies that foot surveys would be conducted to supplement existing data from existing escapement surveys. Additional survey methods will be needed to determine run timing and escapement of pink and chum salmon; escapement data is not suitable for use in determining run timing, habitat use or abundance.

Aquatic Habitat Mapping

The specific method that will be used to classify and quantify stream habitat of the project site for inventory and mapping needs to be identified and adequately described. Aquatic habitat maps should be generated for the major stream sections of the study reaches in Sweetheart Creek. Key stream sections should be characterized as to their proportional habitat types, gradients, and fish utilization. Waterfalls and potential obstructions to fish passage should be documented and geo-referenced. Best available aerial base map imagery should be used by an experienced aquatic scientist to create an initial meso-habitat map (USFS 2001¹). Ground verification should be provided by site visits at a minimum two flows, representing a low base

¹ U.S. Forest Service. 2001. Fish and Aquatic Stream Habitat Survey, FSH 2090.21_20. Chapter 20 in *Aquatic Habitat Management Handbook, FSH 2090.21*. 11-16-2001.

flow period and a higher flow period. Site visits should be coordinated with other study objectives. This study component will result in a meso-habitat base map, from which proportions of each meso-habitat unit within a stream reach can be calculated from polygon area data. Additionally, gradient profiles should be generated from the best topographic data available. The gradient profile should correlate stream reach descriptions with habitat classifications. The profiles should be depicted on the map along with key landmarks, fish distribution data and the locations of key sampling sites.

Fish Passage Barriers

A barrier to anadromous fish passage is believed to be located below the extent of anadromy in the Alaska Department of Fish and Game's Anadromous Water Catalog. This barrier must be accurately located and described. The barrier description should include information about the type of barrier, including if it is ephemeral or permanent, height, maximum depth of the plunge pool, gradient, and any additional observations that would characterize and describe this possible fish barrier.

Stream Channel Characterization

Because the anadromous reach is relatively short, we suggest at least four characterization sites be established and measured on Sweetheart Creek. Sites should be located between tidewater and the anadromous barrier. Sites must be representative of the habitat units available in the creek, emphasizing spawning areas, and include key habitats such as undercut banks and side channel areas. At a minimum, three sites should be located on riffles to be used in the instream flow analysis. An additional site may be selected to represent an important habitat feature such as a pool with undercut banks or an area with side channels. Site selection should be coordinated with NMFS and other resource agencies.

Site characterization should include a cross-sectional and longitudinal stream profile. Basic field survey methods should be used to survey the bathymetry of the cross-sectional and point of bankfull flow and the longitudinal profiles. The survey should begin and close with a local benchmark that should be created to monument each cross-section. All surveying that involves leveling is done in a loop, which ends at the same point where the survey began to allow for a comparison of starting and ending elevations and provide a way to calculate error. No survey is complete until it has been closed within acceptable levels of error. The cross-section should include pins above ordinary highwater, surveyed to the datum of the benchmark. The cross-section survey should be related to the meso-habitat map and capture cross-section features that are important to anadromous fish. These features should include undercut banks, side-channels, pools, riffles, bars, etc. In addition to the detailed cross-section survey, a longitudinal profile should be surveyed sufficiently long enough to capture local gradient, including water surface gradient. Flow measurements should be recorded at each transect, in conjunction with the water surface elevations. Stage measurements should be recorded at each of the four sites during three different flow periods. The stage to flow relationship at each of these cross-sections will allow for a thorough analysis of the relationship between discharge and available habitat.

Instream Flow Analysis

A summary of stream gaging records, including the number, timing and quality of rating measurements should be provided as a baseline understanding of the Sweetheart Creek hydrology. Meso-habitat mapping and related cross-sections from the stream channel characterization should be provided as a map. Summaries of the habitat should also be provided as tabular quantification of habitat types.

We propose using a simple analysis of the flow to wetted perimeter method in combination with an analysis of flow needed to access spawning/rearing habitat. The premise for using cross-sections on riffles in this simple analysis is that a flow that covers a reasonable proportion of the bed area of riffles with flowing water should be adequate as a minimum flow for riffle, pool and run habitat². The cross-sectional information should be analyzed for habitat flow relationships, including a flow to wetted perimeter relationship in graphical and table form at each cross-section. Access flows will be determined for each species and life stage. Access flows will be assessed by considering timing of access to spawning and rearing habitats and need for adequate flows and associated depths. The wetted perimeter analysis combined with access flow analysis should provide the necessary information to develop environmental flow recommendations. If variables other than flows allowing access and adequate depth are determined to control habitat suitability then the study should be modified to accommodate those variables. The detailed instream flow analysis plan should be presented to agencies for review.

Water Quality

Stream temperature measurements should be made at the outlet of the lake, at the top of the anadromous reach of Sweetheart Creek, and in Sweetheart Creek above tidewater. Additionally, in-situ turbidity measurements should be taken during site visits, allowing for a quantification and relative timing of turbidity.

Tidewater Resource Assessment, Evaluation, Analysis and Possible PM&E Measures

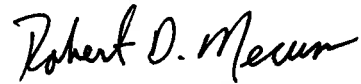
The plan describes how changes in timing, quantity and temperature of freshwater inputs from Sweetheart Creek into Gilbert Bay will be evaluated under proposed project operations. What is needed is a description of methods that will be used to determine the potential for these changes to affect marine resources in Gilbert Bay and how the extent of any changes would be measured.

Addressing these information needs would result in a more comprehensive detailed study plan, and would provide necessary information for NMFS to make effective conservation recommendations relative to the protection, mitigation, and enhancement of fish and wildlife resources that may be impacted by the project.

² Gippel, C.J. and M.J. Stewardson. 1998. Use of Wetted Perimeter in defining minimum environmental flows. *Regulated Rivers: Research and Management*. 14: 57-67.

Please contact Eric Rothwell at (907) 271-1937 (eric.rothwell@noaa.gov), or Susan Walker at (907) 586-7646 (susan.walker@noaa.gov) with any questions regarding this project review.

Sincerely,



James W. Balsiger, Ph.D.
Administrator, Alaska Region

for

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