

STATE OF ALASKA

DEPARTMENT OF FISH AND GAME

DIVISION OF SPORT FISH

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January 12, 2011

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

Re: Sweetheart Lake Hydroelectric Project, FERC No. 13563
Comments on Pre-Application Document

Dear Mr. Mitchell:

The Alaska Department of Fish and Game (ADF&G) has reviewed the Pre-Application Document (PAD) prepared by Juneau Hydropower Inc. (JHI) for the proposed Sweetheart Lake Hydroelectric Project (FERC No. 13563). The proposed project would be located on Lower Sweetheart Lake and Sweetheart Creek, about 30-35 miles southeast of Juneau, Alaska. As proposed, the project consists of a 1) concrete and rock face dam (500 feet long and 90 feet high) at the outlet of Lower Sweetheart Lake, 2) 1650 foot long penstock running from the lake to a powerhouse located approximately 2000 feet east of the outlet of Sweetheart Creek in Gilbert Bay, 3) tailrace returning flows to Sweetheart Creek, and 4) new 138-kv transmission line traversing Gilbert Bay and Port Snettisham that would be either 8.9 miles overhead, or 8.0 miles buried and 0.4 miles overhead.

ADF&G offers the following comments on the PAD, resource issues, and studies needed to address resource issues in the project area to help 1) establish baseline resource conditions, 2) identify potential resource impacts of project development, 3) determine measures to avoid or mitigate impacts to and/or enhance resources, 4) develop recommendations pursuant to §10(j) of the Federal Power Act, 5) assess project consistency with the Alaska Coastal Management Program (11 AAC 110), and 6) develop AS 16.05.841 and 16.05.871 permit stipulations.

Once JHI distributes Scoping Document One for comments, ADF&G will provide formal study requests and will work with JHI to develop study plans.

AQUATIC RESOURCE ISSUES

Potentially Affected Waterbodies

Upper Sweetheart Lake. Upper Sweetheart Lake is located at an elevation of 1865 feet (relative to low mean sea level), 1321 feet higher than Lower Sweetheart Lake (the two lakes are connected by a stream). The raising of Lower Sweetheart Lake by 85 feet should not affect Upper Sweetheart Lake; consequently, ADF&G is not providing comments on potential impacts and study needs for Upper Sweetheart Lake.

Lower Sweetheart Lake. Lower Sweetheart Lake (herein referred to as Sweetheart Lake) supports Dolly Varden (assumed to be native) and a self-sustaining population of rainbow trout (presumably stocked in the 1950's). Sweetheart Lake is stocked annually with sockeye fry from Douglas Island Pink and Chum (DIPAC) hatchery at Port Snettisham. These fish rear in the lake for one year (sometimes two) before outmigrating down Sweetheart Creek into Gilbert Bay. As adults, they return to Sweetheart Creek, providing a very popular personal use fishery for Juneau residents. These adult sockeye do not migrate to Sweetheart Lake because of barrier falls and do not reproduce.

Sweetheart Creek. Sweetheart Creek has been specified as important to anadromous fish under AS 41.14.870 as stream number 111-35-10200 and is catalogued for pink salmon and chum salmon. This anadromous reach is also known to support Dolly Varden and cutthroat trout. We understand that the anadromous reach may not extend upstream as far as indicated in the Anadromous Waters Catalog due to a barrier falls. ADF&G will work with JHI to identify the upper extent of the anadromous reach. It is unknown whether Sweetheart Creek supports resident fish in the stream reach between this barrier falls and Sweetheart Lake.

Gilbert Bay and Port Snettisham. Gilbert Bay and Port Snettisham provide sport, personal use, and commercial fishing opportunities for salmonids, groundfish, and shellfish. This area also provides recreational opportunities such as wildlife viewing (e.g., humpback whales and bears), and Gilbert Bay is used as an anchorage for vessels traveling in Stephens Passage.

Potential Impacts

Sweetheart Lake. The proposed project would raise the natural elevation of Sweetheart Lake from 544 feet to 629 feet by damming the outlet to Sweetheart Creek. This dam would block resident fish from accessing the outlet stream and prevent sockeye smolts from outmigrating down Sweetheart Creek to Gilbert Bay. Outlet streams can provide important spawning, rearing, and feeding habitats. Rainbow trout have been observed spawning in the outlet to Sweetheart Creek. Raising Sweetheart Lake 85 feet would inundate existing littoral zone and inlet stream habitats. Entrainment and impingement at the penstock intake could cause fish mortality.

Proposed project operations would fluctuate the elevation of the newly impounded reservoir 60 feet annually. Unnaturally large and unseasonal fluctuations in reservoir levels can 1) impact the ability of fish to access inlet stream habitats used for spawning, rearing, and feeding during low reservoir levels, 2) inundate these habitats during high reservoir levels, 3) alter the morphology and habitat conditions (e.g., substrate composition) of inlet streams, 4) alter littoral, shoreline,

and riparian zone habitats within the zone of inundation, and 5) impact recreational and aesthetic values.

Sweetheart Creek Bypass Reach. For the purpose of these comments, it is assumed that the tailrace will discharge at the base of the downstream most barrier falls (i.e. at the upper extent of the anadromous reach). If this turns out not to be the case, then the impacts and study needs of the anadromous reach upstream of the tailrace will be discussed in future comments on this project. Proposed project operations would significantly reduce flows in the bypass reach. Stream temperatures could also be impacted depending on the depth in the reservoir from which flows are released downstream. Because of the dam and reduced flows, the recruitment and movement of sediment and woody debris could be reduced; potentially impacting channel morphology and instream habitat conditions of the bypass reach. As mentioned, it is not known if the bypass reach supports resident fish. As such, potential impacts on fish in the bypass reach will not be discussed at this time.

Sweetheart Creek Anadromous Reach. Proposed project operations would alter instream flows and stream temperatures in the anadromous reach, potentially impacting spawning, rearing, and incubation of anadromous fish. Altered flows could also impact recreational uses of the anadromous reach; in this case, the sockeye personal use fishery (e.g., high flows could prevent access for fishing). Because of the dam and reduced flows in the bypass reach, the recruitment and movement of sediment and woody debris could be reduced, potentially impacting channel morphology and instream habitat conditions of the anadromous reach.

Unnaturally rapid changes in flow resulting from project operations (tailrace discharges) could create unstable instream habitat conditions and impact fish populations and other aquatic organisms. Examples of impacts include stranding of fry, juvenile and adult fishes, dewatering of redds, and changes in fish passage and movements. Rapid changes in flow could also impact the sockeye personal use fishery. False attraction of fish to the project tailrace could cause mortality and/or migration delay.

Gilbert Bay and Port Snettisham. The installation, operation, and maintenance of the proposed submarine transmission cable could impact salmonids, groundfish, and shellfish resources in Gilbert Bay and Port Snettisham, and the sport, personal use, and commercial fisheries targeting these marine resources. For example, the submarine cable could interfere with fishing gear and could pose hazards for vessels anchoring in the vicinity. Construction, operation, and maintenance of proposed or potential project access facilities (roads, docks, helicopter landing areas, and transshipment centers) could affect water quality and sedimentation in Gilbert Bay.

As proposed, the project would significantly alter the timing, quantity, and temperature of freshwater inputs from Sweetheart Creek into Gilbert Bay, potentially impacting marine resources in the area. For example, changes in the timing and quantity of freshwater inputs could affect water column stratification and the spring phytoplankton bloom, potentially impacting the survival of rearing crab and shrimp (the spring phytoplankton bloom provides the important first feeding for newly hatching crab and shrimp).

Study Needs

Sweetheart Lake.

- Document baseline population characteristics, seasonal movements, and seasonal habitat use for Dolly Varden and rainbow trout in Sweetheart Lake and its inlet and outlet streams.
- Identify important spawning habitats and spawn timing for resident rainbow trout and Dolly Varden.
- Quantify and describe existing littoral zone and inlet stream habitats that would be inundated with the proposed increase in reservoir stage.
- Assess the potential impacts of project-induced seasonal reservoir fluctuations on spawning and rearing habitats in inlet streams, including impacts on channel morphology and substrate conditions.
- Assess the ability of fish to access inlet streams in relation to reservoir stage, particularly during spawning periods.
- Evaluate water temperatures at the proposed project intake in relation to reservoir stage.
- Evaluate the potential for fish entrainment and impingement at the project intake. A fish screen system will most likely be required to prevent entrainment (for guidance on fish screens, see *Designing Fish Screens for Fish Protection at Water Diversions*, National Marine Fisheries Service, Bryan Nordlund, June 10, 1996).
- Design and evaluate downstream passage facilities for sockeye smolt. JHI proposes to install a “smolt line” similar to the one used at Deer Lake Hatchery by Northern Southeast Regional Aquaculture Association to deliver coho smolts from Deer Lake to saltwater. The PAD states that this downstream fish passage method should substantially decrease mortality of outmigrating sockeye smolts and thereby increase the number of adult sockeye returning to Sweetheart Creek. It should be noted that the coho smolt at Deer Lake migrate to the outlet stream where they are intercepted by the smolt line. Sockeye smolt in Sweetheart Lake won’t have access to the outlet stream once the project is built. Consequently, the sockeye smolt line will have to originate in the lake, necessitating a different design for attracting and intercepting the smolts than that used at Deer Lake. It should also be noted that coho smolts are hardier than sockeye smolts. For these reasons, it is unknown at this time if the downstream passage facility will increase or decrease the number of smolts reaching saltwater.

Sweetheart Creek Bypass Reach. As mentioned, it is not known if the bypass reach supports resident fish. Seasonal attempts should be made to verify the presence/absence of resident fish. Given the terrain and stream gradients, ADF&G understands that sampling this reach could be extremely difficult. Environmental and channel maintenance flows for the bypass reach should be identified and provisions developed to release these flows from the dam.

Sweetheart Creek Anadromous Reach.

- Assess baseline relative abundance, distribution, and periodicity (seasonal use of habitat for spawning, incubation, rearing, and passage) by species and life stage.
- Inventory and map existing stream habitat.
- Develop relations between seasonal instream flows, stream temperatures, and habitat quantity and quality (for spawning, incubation, rearing, and migration).
- Evaluate the potential for false attraction of fish to the project tailrace and develop plans to mitigate.
- Determine if ramping rates are needed for tailrace discharges. Generally, if no site specific studies are conducted, ADF&G recommends ramping rates to protect anadromous fishes that have been developed by the Washington Department of Fish and Wildlife (WDFW) (Hunter 1992)¹.
- Develop plans for protecting instream flows for fish during emergency and routine maintenance shutdowns of project operations.

Hydrology and Water Temperature. Baseline hydrology and water temperature information is needed for all potentially affected waterbodies in order to assess the potential impacts discussed above. We recommend that continuous recording stream gages be installed at the outlet of Sweetheart Lake and in the anadromous reach of Sweetheart Creek. We also recommend that continuous recording water temperature loggers be installed in Sweetheart Creek and a vertical array of temperature loggers be installed in Sweetheart Lake. We recommend that stream gages and temperature loggers be installed as soon as possible and operated during and following construction phases for the life of the project.

Stream gages must comply with standards established by the USGS and should record stage at 15-minute intervals. Similarly, discharge measurements and rating curves must comply with USGS standards. These data will be used to estimate mean daily, monthly, and annual flows, as well as monthly duration flows in Sweetheart Creek and seasonal stage elevations of Sweetheart Lake.

Gilbert Bay and Port Snettisham.

- Evaluate the potential impacts of installing, operating, and maintaining the proposed submarine transmission cable on 1) salmonids, groundfish, and shellfish resources in Gilbert Bay and Port Snettisham, and 2) the sport, personal use, and commercial fisheries targeting these marine resources.

¹ Hunter, M. A. 1992. Hydropower flow fluctuations and salmonids: A review of the biological effects, mechanical causes, and options for mitigation. State of Washington Department of Fisheries, Technical Report Number 119. 46 pp.

- Evaluate the potential impacts of constructing, operating, and maintaining the proposed or potential project access facilities (roads, docks, helicopter landing areas, and transshipment centers) on water quality and sedimentation in Gilbert Bay.
- Evaluate how the timing, quantity, and temperature of freshwater inputs from Sweetheart Creek into Gilbert Bay will change under proposed project operations.
- Evaluate the potential impacts of altering the timing, quantity, and temperature of freshwater inputs from Sweetheart Creek into Gilbert Bay on marine resources in the area.

WILDLIFE RESOURCE ISSUES

The proposed project area supports diverse wildlife resources, including small and large mammals, furbearers, waterfowl, shorebirds, and raptors. The project area also provides hunting, trapping, and wildlife viewing opportunities. Existing information on wildlife using the project area is limited or lacking.

Potential Impacts

The proposed project would raise the natural elevation of Sweetheart Lake 85 feet (from 544 feet to 629 feet) by damming the outlet to Sweetheart Creek. This would inundate existing shoreline, riparian, wetland, and inlet stream habitats. Proposed project operations would fluctuate the elevation of the newly impounded reservoir 60 feet annually. Unnaturally large and unseasonal fluctuations in reservoir levels can chronically impact shoreline, wetland, and riparian habitats within the zone of inundation. Changes in the natural flow regime of Sweetheart Creek could also impact wildlife and their habitats. The potentially impacted habitats noted above are typically productive and important for wildlife as feeding areas, travel corridors, nesting areas, etc.

Project construction, infrastructure (e.g., powerhouse, transmission corridors, roads, and docks), and operation could alter or displace wildlife habitat, block migration corridors, create disturbance (such as blasting and noise), and affect hunting and trapping access and pressure. For example, project construction and operation could lead to changes in goat behavior, movement, and habitat use patterns.

Study Needs

- Assemble existing information on the distribution, abundance, and seasonal habitat use and movement patterns of wildlife in the proposed project area.
- Conduct aerial and ground reconnaissance surveys to determine the feasibility of doing baseline field surveys (access and terrain are expected to limit survey areas).
- Conduct baseline field surveys on the distribution, abundance, and seasonal habitat use and movement patterns of wildlife in the proposed project area, particularly around Sweetheart Lake, along Sweetheart Creek, and areas potentially affected by project

construction and operation (aerial surveys to assess mountain goat and moose numbers and ground surveys to assess additional mammal use).

- Areas adjacent to the project may also need to be surveyed as wildlife may move to/from/through the project area. For example, the southeast boundary of the project area is adjacent to an area with one of the highest mountain goat densities in Southeast, AK.
- Quantify and describe existing habitats in the project area, particularly 1) the area around Sweetheart Lake that would be inundated by the proposed project, 2) along Sweetheart Creek, and 3) habitats that would be displaced by the construction of the project and associated infrastructure.
- Evaluate how project construction, operation, and infrastructure may impact the distribution, abundance, and seasonal habitat use and movement patterns of wildlife.
- Evaluate how the proposed 60 foot annual fluctuation in reservoir stage fluctuations may affect wildlife using shoreline and riparian habitats.
- Evaluate how changes in access by project roads, docks, and power line right-of-ways may affect hunting and trapping access and pressure on various wildlife species in the area.
- Evaluate how changes in access by project roads, docks, and power line right-of-ways may influence changes in wildlife (particularly goats and bears) behavior, movement, and habitat use patterns.

Thank you for the opportunity to provide comments. Please contact me if you have any questions.

Sincerely,

/S/ Shawn Johnson

Shawn Johnson
Region I Instream Flow Coordinator
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