



THE STATE  
of **ALASKA**  
GOVERNOR SEAN PARNELL

**Department of  
Fish and Game**

DIVISION OF SPORT FISH  
Research & Technical Services

333 Raspberry Road  
Anchorage, Alaska 99518-1565  
Main: 907.267.2294  
Fax: 907.267.2422

January 20, 2014

Ms. Kimberly Bose, Secretary  
Federal Energy Regulatory Commission  
888 First Street  
Washington D.C. 20426

Subject: Sweetheart Lake Hydroelectric Project, FERC No. 13563  
ADF&G Comments on DLA, PDEA, with Preliminary Terms and Conditions

Dear Ms. Bose:

On October 22, 2013, the Federal Energy Regulatory Commission (FERC, or the Commission) published notice of receipt of Juneau Hydropower, Inc.'s (JHI) Sweetheart Lake Hydroelectric Project (No. 13563) Subsequent Draft License Application (DLA) and Preliminary Draft Environmental Assessment (PDEA), and issued a request for comments and preliminary terms and conditions. The Alaska Department of Fish and Game (ADF&G) has reviewed these documents and submits comments and recommended preliminary terms and conditions.

Thank you for your consideration.

Sincerely,

A handwritten signature in blue ink that reads "Monte D. Miller".

Monte D. Miller  
Statewide FERC Project Hydropower Coordinator  
Alaska Department of Fish and Game  
Division of Sport Fish/RTS  
333 Raspberry Road  
Anchorage, Alaska 99518-1565  
907 267-2312

Copy: Duff Mitchell, JHI  
J. Klein, ADF&G/SF-RTS, Anchorage

Comments on DLA and PDEA, with Preliminary Terms and Conditions,  
Sweetheart Lake Hydroelectric Project, FERC No. 13563

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S. Johnson, ADF&G/SF-RTS  
D. Teske, ADF&G/SF/  
B. Frenette, ADF&G/SF/  
S. Kelley, ADF&G/CF/  
R. Harding, ADF&G/SF/  
D. Harris, ADF&G/CF/  
J. Timothy, ADF&G/H  
M. Kern, ADF&G/H  
R. Scott, ADF&G/WC  
C. Reese, ADNR/MLW  
C. Gundelfinger, ADNR/MLW  
K. Sager, ADNR/MLW  
E. Rothwell, NOAA/NMFS, Anchorage  
S. Walker, NOAA/NMFS, Juneau  
C. Thomas, NPS, Anchorage  
S. Brockman, USFWS  
M. Dinsmore, USDA/FS

## COMMENTS

### ADF&G Comments on the Draft License Application (DLA)

### ADF&G Comments on the Preliminary Draft Environmental Assessment (PDEA)

Sweetheart Lake Hydroelectric Project, No. 13563

January 17, 2014

#### Initial Comments

The Alaska Department of Fish and Game (ADF&G) has reviewed the DLA and PDEA filings of Juneau Hydropower, Inc. for a proposed hydroelectric development to be located at Sweetheart Lake and Sweetheart Creek in Southeastern Alaska. While the applicant has provided a large quantity of information across a wide range of topics in the PDEA, in many cases specific topics are poorly identified and misplaced under incorrect headers. There is redundancy in Figures and text, information in appendices which is not discussed in the PDEA, and information presented in the PDEA which is not germane to the issues identified in the PDEA. This has caused difficulty in evaluation of the PDEA and comment development. Additionally, some needed information has not been provided which affects our ability to develop complete preliminary recommended Terms and Conditions (T&C) for this project.

Because of the identified formatting issues present in the PDEA and necessary information being scattered throughout the PDEA, presenting comments by section and page number is generally problematic. We will instead attempt to provide comments by major topics and resource areas. We will identify missing or insufficient information within each comment area and/or T&C as necessary. We reserve the opportunity to adjust comments and T&C's as, or when, additional information is provided.

#### ADF&G Authorities

As the State of Alaska's principal manager of fish and wildlife resources and their habitats, ADF&G is mandated under state law to "manage, protect, maintain, improve, and extend the fish, game, and aquatic plant resources of the state in the interest of the economy and general well-being of the state" (AS 16.05.020) and to "assist the United States Fish and Wildlife Service in the enforcement of federal laws and regulations pertaining to fish and game" (AS 16.05.050). Section §10(j) of the Federal Power Act authorizes ADF&G to recommend license conditions necessary to protect, mitigate damage to, and enhance fish and wildlife habitat affected by the project.

Sweetheart Creek has been specified as important for the spawning, rearing, or migration of anadromous fishes under AS 16.05.871 as Anadromous Waters Catalog number 111-35-10200. Pursuant to AS 16.05.841 (Fishway Act) and AS 16.05.871 (Anadromous Fish Act), ADF&G requires permits for any work that may affect anadromous fish habitat or fish passage including any instream work in catalogued anadromous fish streams.

#### Project Description

The proposed project is located on Sweetheart Lake and Sweetheart Creek, which flows into Gilbert Bay approximately 30 miles southeast of Juneau, Alaska. As proposed in the DLA, the project consists of:

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(1) the existing Lower Sweetheart Lake, raised from a surface water elevation of 551 feet (MLLW) and a surface area of 1,414 acres to a new minimum surface water elevation of 576 feet (MLLW) and a new surface area of 1,449 acres and a maximum water surface elevation of 636 feet (MLLW) with a surface area of 1,702 acres; (2) a new, roller compact concrete dam 111-foot-high (from the downstream toe to the top of dam) 280-foot-long, 100-foot-thickness at the base constructed at the outlet of Lower Sweetheart Lake; (3) an intake on the dam connecting to a 15 X 15 foot straight leg horse shoe, 9,625-foot-long unlined tunnel; (4) a 9-foot-diameter, approximately 870-foot-long penstock installed within the lower portion of the tunnel, with approximately another 150 feet of buried 7-foot diameter penstock and manifold connecting to the powerhouse; (5) a powerhouse containing three new Francis generating units (6.6 MW each) with a total installed capacity of 19.8 MW; (6) a new natural appearing tailrace discharging flows to Sweetheart Creek; (7) a switchyard with a salmon smolt re-entry pool located adjacent to the powerhouse; (8) a new approximately 4,400-foot-long road from the powerhouse to the dock/landing site; (9) a new dock/landing site for boat, seaplane, barge/landing craft ramp and/or helicopter access, located on the east shore of Gilbert Bay; (10) a quarry adjacent to the marine facilities that will be refilled with tunnel spoils and provide a base for a caretaker facility and a proposed US Forest Service cabin; (11) a new 138-kilovolt transmission line that would be a total of 45,900 feet long (25,700 feet of submarine cable in two segments; 15,400 feet of overhead transmission line on Snettisham Peninsula; and 4,800 feet of buried transmission line in two segments); (12) a new 10,400 foot 12.47 kV service transmission line extending from the dam site to the marine facility; and (13) appurtenant facilities.

## **ADF&G COMMENTS ON THE DRAFT LICENSE APPLICATION (DLA)**

### **OTHER INFORMATION**

Page IS-10

*“There are no federal, state, local political entities and facilities identified, or Indian tribes affected by this project.”*

The Alaska Department of Fish and Game manages a Personal Use Fishery, with harvest of sockeye salmon by permit to Alaska residents, on lower Sweetheart Creek. Negative project effects could include a reduction of salmon available for harvest, or a total collapse of this fishery in the worst case. The location of this project could potentially affect public access to the harvest area of Sweetheart Creek.

### **DLA Exhibit A**

#### **1. Project Structures**

Not identified under project structures is the instream flow release mechanism required for release of instream flows to the bypass reach of Sweetheart Creek. Not discussed is how the project will release required flows or how the release mechanism will be protected from weather effects.

Page A-4

(v) Fish Collection and Transportation

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A ramp with a winch to remove the collection barge from the lake is mentioned. The barge collection system will be of substantial size, yet no mention is made of how the barge will be returned to the water each year.

Page A-6

(x) Power Tunnel and Penstock

This section discusses spoils from the main tunnel being utilized for surfacing “access roads,” the aesthetic mound at the powerhouse and as aggregate for dam construction. It is not disclosed how the spoils will be moved to the dam site and stored prior to use. Also the plural nature of “access roads” is confusing in that only one road is proposed.

Page A-7

(xii) Smolt Re-entry Pool

The smolt re-entry pool is only identified as 2100 square feet. No linear dimensions or depth of pool is given. There has been no pool features identifies such as water flow, screening for holding or an actual diagram of pool features provided.

#### 4. PRIMARY TRANSMISSION LINE

Page A-9

This section defines the structures to be installed for transmission of electricity from this project to a connection with the existing transmission line carrying power from the Snettisham and Lake Dorothy Hydroelectric Projects (aka Snettisham Line) to the Juneau area. Identified are marine facilities which largely lack descriptions and identification of what would seem to be a necessary intertie facility at the connection point with the Snettisham Line. In a meeting held in Juneau on December 11, 2013, the applicant stated that description of such intertie by this project was not necessary, since it would occur in the right-of-way of the Snettisham Line and would be, technically, outside the Sweetheart Hydroelectric Project boundary. They also stated that the marine facilities were simply a small vault, a few feet square to hold a transition to and from the marine cable. These facilities need greater description to fully assess the impact on visual and aesthetic values. For example, should these marine facilities be screened from view from the water, with a tree buffer left intact?

### DLA EXHIBIT B

Page B-1

Juneau Hydropower Inc. states: “Aside from natural accretion of 3% the project will release 3 cfs for instream flow releases.”

It is unclear, in this text, how the applicant has developed the value given for natural accretion, or the science behind their determination that a 3 cfs release from the dam will be adequate. The identification of accretion is not discussed until page B-22 where the applicant states that a lake gage was installed on September 24, 2011, and comparison with the streamgage located below the falls near tidewater indicated a 3% accretion rate. Not discussed is the time period studied, season differences etc. Since this Exhibit B was prepared prior to October 2013, at most, 2 years of data could have been collected for comparison.

## (1) ALTERNATIVE SITES

## (ii) Alternative Sites in and around the Sweetheart Lake Hydroelectric Development

Discussion is provided regarding previous investigations of this site by others which identified a powerhouse located at a lower elevation, and closer to Gilbert Bay. This discussion seems somewhat out of place in that it discusses project features, not alternative sites. This would seem to be better placed in the next section (2) (i).

## (2) ALTERNATIVE DESIGNS AND OPERATIONS

## Page B-3

## (i) Alternative Reservoir Characteristics, Power Plant Hydraulic Capacities, and Operations

This section describes the determination of the proposed operation of this facility as for baseload power. The applicant assumes several things which may or may not have an effect on this project. These include:

1. the need for the quantity of power JHI proposes to produce;
2. that the capacity of the Snettisham Line would not be exceeded; and
3. how the electrical service provider for the Juneau area can integrate this power, should they choose to do so by purchasing power from JHI.

Operation of this project will definitely change the natural flow regime of Sweetheart Creek which may affect outmigration of salmon fry. Lake level changes will be extremely variable, due to water withdraw for power production exceeding natural inflows. This will have undetermined effects on resident fish, including Dolly Varden.

## Page B-4

There is discussion of consideration of environmental consequences while making effective use of the hydropower resource while mitigating adverse environmental impacts. Small consideration appears to have been given to the fish resources in Sweetheart Lake. Rainbow trout spawning habitat will be lost with the statement that new habitat will be created. The effectiveness of any created habitat will be affected by the reservoir surface level variability.

## Page B-6

## (iv) Alternative Access Road Alignments

The applicant states that the proposed coastal road is engineered and surveyed to be built at or below the mean high tide. Does this mean that this road will be subjected to overtopping and erosion from tide/wave/storm actions? How will this impact the transmission lines buried beneath the road? Will the development of this road in tidelands affect currents resulting in shoreline impacts in other areas away from the road (will the road defer wave energy to other unprotected areas).

## Page B-12

Discussion of the advantages of the coastal road option over a forest road option includes:

4. *Less impact on wetlands.*

This is disputable since there would be a total loss of several acres of state tidelands. These lands are important to marine resources.

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6. *Less impact on intermittent streams along Gilbert Bay and less soil and runoff caused by erosion.*

The same small streams will have to be dealt with for the coastal road. The difference is that any fish access to small streams will be virtually eliminated at tidewater. These streams have not been studied to determine if there are fish resources present. The coastal road will need to have the same number of culverts installed. Erosion issues with the road will still be present, and could be worse since the proposal calls for the road to be slanted toward the beach causing all runoff from the road to impact the shore side of the road. The natural exit locations for runoff will become the culverts for the small streams, with sedimentation becoming a factor at those points.

Page B-13

Table B1 is provided for comparison of the road alternatives. We question that the listing of only .25 acres of intertidal affected by the coastal alternative. Also, if the transmission line can be buried under the coastal road surface, why is overhead proposed for the forest road option? This would reduce the clearing width substantially, as well as length of impacted streams. While the actual length of streams impacted may remain small under the coastal road proposal, the actual impacts may be greater. Not discussed are the intertidal areas fed by these streams which will cease to exist. It is unknown if salmon resources may be present in this intertidal area. The road may displace outmigrant salmon fry and smolts which use nearshore and intertidal areas as nursery areas to feed and grow. How was density of yellow cedar determined? We have not seen any study or study results defining presence of yellow cedar or how density was determined. The use of terms "Low and High" are subjective, without definition. We question the accuracy of this table and the information it presents. Table B-1 is not referenced in the text.

Page B-15

Figure B-4 and B-5 have no tie into the text.

Page B-18

Figure B-6 has no tie to the text.

Page B-20

Figure B-7 claims to show reservoir levels based on a 1921-1930 hydraulic record. This would be more correctly identified as lake surface elevations since there was no dam present. Identification of the source of the hydraulic data is missing, as is the gage identification and location. Can these estimates be derived accurately using hydraulic data over 90 years old? I suppose by using worst case scenarios (the 1922 record) a claim of approximation may be made. The headwaters of the Sweetheart drainage may have been more glacier impacted ninety plus years ago. Over the past 80 years many glaciers throughout Southeast Alaska have been receding. How comparable is the 1921-1939 hydraulic record to a current record? Is it appropriate to develop a capacity estimate based on those ancient records?

(i) Estimated Dependable Capacity

This text references Table B-1, which is incorrect.

## Page B-23

The applicant states: *“The applicant plans to release 3 cfs either through quantifiable seepage or through dedicated release to ensure the bypass reach maintains a flow from the toe of the dam to downstream. This 3 cfs release would be additional to the natural 3% accretion that naturally exists. An allowance for 3 cfs was made for 1) evaporation, assumed to be minimal because the area around Sweetheart Creek is cool and wet and 2) seepage through the dam.”*

Quantifiable seepage....how do you quantify seepage from a multitude of locations at a dam? A dam is not supposed to leak...leaks at a dam are usually considered a bad thing. To depend on seepage for instream flow release is not rational. To release 3 cfs to replace evaporation of accretion flows is speculation on previous speculation. The 3 cfs value is arbitrary and without any scientific merit.

The Alaska Department of Fish and Game filed an instream flow reservation application on Sweetheart Creek prior to this project beginning. More discussion is necessary before instream flow releases can be determined. Additionally, some form of instream flow release system needs to be proposed and described by the applicant.

## Page B-26

## Reservoir Characteristics

*“The project will not be operated on a rule curve, but rather on a firm energy delivery schedule. Therefore, a rule curve is not provided.”*

Most service areas with multiple producers meet and negotiate power production on a regular basis. Without these agreements and negotiations a utility providing service to the public could not regulate energy based on the service need. It is unlikely that this project would become the project providing the energy base for the Juneau area. If a power sales agreement is negotiated, the most likely scenario is one of power ramping. This may affect the feasibility of this project. We question the lack of providing a rule curve. Power ramping will also make Sweetheart Lake surface levels fluctuate more rapidly and without regard to resident fish habitat needs.

## Page B-28

## Table B-5

There is no text introducing or discussing Table B-5. The table presents information for one and three turbines operating. In the document it has been stated that two turbines will generally operate with the third turbine as a backup for maintenance or occasionally for peak production if there is a demand for more power. This Table would benefit from explanation and from inclusion of two turbine operation information since that is the stated preferred operation mode.

## Page B-29 and B-30

## Figure B-13 and Table B-6

With little flows relegated to the bypass reach, the majority of flows reaching the streamgage below the tailrace will flow through the powerhouse. Figure B-13 shows a power plant discharge for three operating units, of just less than 500 cfs. This results in a tailwater elevation of more than 39.5 feet (MLLW) on Figure B-13. Table B-6 shows a discharge of 500 cfs being equivalent to an elevation of 30.9 feet (MLLW). The first paragraph of this section on page B-

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29 identifies the pool where the gage is located as the start of the tailwater area. Table B-6 and Figure B-13 are not consistent with each other.

### **DLA EXHIBIT C**

The schedule presented is outdated. It is now past mid-January 2014, and we are working on the DLA and PDEA with requests for additional information yet to be handled. The schedule anticipates a FLA and FEA being filed now. They are several months to a year off pace. This schedule does not represent reality and needs serious work. Figure C-1 indicates license and permitting by the end of June 2014 with construction starting two weeks later on July 15, 2014. After FERC licensing is obtained, there are many plans to review and authorize before construction authorization is given by FERC. The schedule shown on the Figure C-1 Gant chart is unrealistic.

### **DLA EXHIBIT D**

Page D-2

The costs of the fish collection and transport system have not been included in Table D-1 Estimated Construction and Capital Requirements. We do not necessarily agree that certain items identified as “Environmental Measures” by the applicant qualify as such.

Page D-6

Of concern is that the capital costs shown on Table D-2 are not included in Table D-1. There is no disclosure of methods used for development of the costs for environmental measures. The estimated costs seem generalized, rounded and non-specific.

Page D-7

Table D-2 (the second table so labeled) also contains items which do not seem appropriate as environmental costs. This includes BMP's, prevention of severe erosion, and restoration of temporary access route disturbed areas. It is unclear what stream gage activity would require \$200, 000 in capital costs. This table is titled capital costs but lists maintenance and monitoring costs as well. It is not clear if these costs are one time or annual costs.

All tables in EXHIBIT D are poorly identified, poorly referenced, and difficult to determine their context.

Page D-14 and D-15

Table D-7 lists Greenhouse Gas Emissions and Criteria Pollutants reduced by a Sweetheart Lake Hydroelectric Project. These appear to be maximum reductions based on complete project capacity output. The project has stated that generally only two units would be operating at any given time. This Table assumes that maximum production would be maintained, something not likely to happen. The table is an over-estimation by 1/3 of the stated total or 50% of the two unit projections.

**DLA EXHIBIT F**

This exhibit has been filed as CEII sensitive material. We are not clear why JHI has identified this exhibit as CEII when that identification is usually made by FERC.

**DLA EXHIBIT G**

No Comments.

## **ADF&G COMMENTS ON THE PRELIMINARY DRAFT ENVIRONMENTAL ASSESSMENT (PDEA)**

### **General Comments**

As stated in the initial comments on page 3 of this filing, because of the identified formatting issues present in the PDEA and necessary information being scattered throughout the PDEA, presenting comments by section and page number is generally problematic. We instead provide comments by major topics and resource areas.

Information is difficult to track in the PDEA. For example, under section heading **3.3.3.7 Temperature in the Outlet of Sweetheart Creek** (starting on page 224), there's a brief discussion of water temperatures in the anadromous reach, followed by discussions of the following topics (in the order discussed in the PDEA): factors influencing pink salmon production, project effects on sockeye fry rearing in Sweetheart Lake and sockeye returns, project effects on Gilbert Bay, construction impacts on sedimentation in Sweetheart Creek and ways to reduce construction impacts, potential impacts of the proposed submarine cable (particularly EMFs), project impacts on rainbow trout and Dolly Varden in Sweetheart Lake, results of the instream flow study, and finally more discussion of project effects on Gilbert Bay. All of these topics were under the heading **Temperature in the Outlet of Sweetheart Creek**. None of the topics discussed were listed in the table of contents.

Table 16 and Table 17 (page 131) are both unreadable.

Figures 38 and 39 (Page 135) are repeated as Figure 50 (two figures are both labeled figure 50; page 156).

The PDEA did not bring forth any information about potential new rainbow trout spawning habitat from the various appendices.

Most of appendix O was cut and pasted into the PDEA. Much of this information was not needed in the PDEA.

### **Sweetheart Lake and its Inlet Streams**

The PDEA does not describe how the lake raise and the estimated timing, frequency, and magnitude of proposed reservoir fluctuations will affect the fish species and life stages inhabiting Sweetheart Lake and its inlet streams. The potential effects of reservoir fluctuations on fish and their spawning and rearing habitats needs to be further evaluated and discussed.

#### ***Rainbow Trout Spawning Habitat***

Applicant studies indicate that all known rainbow trout spawning habitat in Sweetheart Lake and its inlet streams will be eliminated with the damming and raising of the lake. The only new

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potential spawning habitat identified under post-project reservoir levels was in Inlet 1 at the head of the lake. This potential spawning habitat is currently inaccessible due to a barrier.

Page 22: *“Existing rainbow trout spawning habitat will certainly be lost as the surface elevation of the lake rises in response to the dam; however, currently inaccessible habitat suitable for spawning will become available and should increase over time.”*

The PDEA does not describe the potential new spawning habitat or at what reservoir levels it will become accessible or inundated. And no information is provided to support the conclusion that suitable spawning habitat should increase over time. While some information is provided in appendices D and G concerning potential new spawning habitat in Inlet 1, a more thorough analysis and discussion is needed and brought forth in the PDEA. The discussion of potential new spawning habitat (PNSH) in Inlet 1 should:

- 1) describe the physical characteristics of the PNSH;
- 2) identify reservoir levels and times of year when the barrier will be inundated and the PNSH accessible (but not inundated, once the PNSH is inundated, it is no longer accessible), and when the PNSH will be inundated;
- 3) describe reservoir levels and times of year when the PNSH will be accessible and inundated in relation to the known spawning season of rainbow trout; and
- 4) describe reservoir surface water temperatures and Inlet 1 water temperatures during rainbow trout spawning and incubation periods in relation to temperatures needed for successful spawning, incubation, and emergence.

The above should be discussed for dry, normal, and wet year reservoir operational scenarios. And the applicant should discuss why new spawning habitat “should increase over time”.

Page 221: The applicant concludes *“Rainbow trout are very opportunistic regarding spawning sites and it is very likely that rainbow will continue to proliferate based on similar instances where rainbow trout were historically planted in other Southeast Alaska subalpine lakes”*.

This conclusion is not substantiated by information presented in the PDEA and is premature. At this time, there is no information or analysis to suggest rainbow trout will proliferate post-project. We continue to have concerns that the proposed project could have a significant adverse impact on the rainbow trout population in Sweetheart Lake.

Page 231: *“Additionally, removal of barrier falls at the lower levels of Inlet 1 could open spawning reach for rainbow trout”*.

Is this statement referring to the physical removal of a barrier falls or the inundation of a barrier falls from rising lake levels? Please clarify.

Page 231: *“There is a possibility that new spawning habitat will be created and or used in the eastern portions of the lake.”*

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There is no further discussion of this new spawning habitat or how it will be created in the eastern portion of the lake. Please explain.

***Dolly Varden***

Page 30: *“The naturally occurring Sweetheart Lake Dolly Varden and stocked rainbow trout are expected to have less spawning and rearing habitat due to lake level fluctuations and flooding of existing habitat.”*

Page 231: *“Increasing the level of Sweetheart Lake is expected to impact the introduced rainbow trout and resident Dolly Varden by altering current spawning habitat.”*

These are the only statements in the PDEA addressing the potential project effects on Dolly Varden in Sweetheart Lake and its inlet streams. Potential project effects of raising the lake and fluctuating reservoir levels on Dolly Varden and their habitats needs further discussion.

***Sockeye Fry***

Page 231: *“The increased lake area should allow for a larger number of sockeye fry to rear in the lake (up to 33% increase based on projected lake area).”*

No information or discussion is provided to support this claim. Nor is there any other discussion about project effects on sockeye fry in Sweetheart Lake. Potential project effects of raising the lake surface level and fluctuating reservoir levels on sockeye fry and their food sources need further discussion.

**Sweetheart Creek Bypass Reach**

The applicant is proposing to release 3 cfs year round from the dam into the bypass reach of Sweetheart Creek. Three cfs represents a 99% reduction in the average annual flow draining from the lake into the bypass reach. The PDEA doesn't explain how this 3 cfs was derived or how this flow release would impact the aquatic resources of the bypass reach or the transport of sediment (particularly spawning gravels) from the bypass reach into the anadromous reach. These issues need further discussion.

***Fish in the Bypass***

The bypass reach is high gradient, turbulent habitat dominated by cascades and waterfalls. Low densities of rainbow trout and Dolly Varden were captured in the bypass reach just above the anadromous barrier. The applicant conducted genetic studies on these captured fish as described below:

Page 179: *“The genetics study conducted in 2012 confirmed that both Dolly Varden and rainbow trout found in the Sweetheart Creek were of the same genetic and ancestral stock as those in the lake (Therion International, 2012). The observed heterozygosity for the creek Dolly Varden (0.5119) was slightly lower than the lake Dolly Varden (0.5907), which is consistent with the hypothesis that the creek population has been derived from the lake population (Therion*

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*International, 2012). The heterozygosity for creek and lake rainbow trout were almost identical (0.5433 and 0.5333 respectively). Nei's index of genetic distance was close to zero (0.0733 for Dolly Varden samples and 0.0650 for rainbow samples) indicating very little difference between the populations, while gene flow between the lake and creek populations appeared high ( $Nm = 6.3957$  for Dolly Varden;  $5.9555$  for rainbows)".*

Based on the results of the genetic studies, the applicant states:

Page 179: *"It was theorized that resident rainbow trout (introduced) and Dolly Varden (native) found in Sweetheart Creek above the barrier falls (bypass reach) must have originated in the lake and could be a result of high water events that could flush lake individuals into the bypass reach."*

Page 180: *"It is assumed, therefore, that fish in the bypass reach have originated in the lake and that residence time in this reach is short with fish swept downstream below barriers at high flow. The few pools present appear to offer little protection from high flows. High velocities likely also transport substrate of suitable size for spawning downstream though some pockets of smaller gravel may be present behind obstructions."*

Page 223: *"The fish present were shown to be of the same genetic stock as those in the lake and may only have limited residence time in the bypass reach. Potential spawning habitat could exist in pockets behind large boulders; however, fry and juveniles are likely swept downstream by high flows. Fish present may not be true residents, but transients from the lake."*

Similar genetics between the fish in the lake and fish in the bypass reach does not preclude the possibility that the bypass reach supports resident populations of rainbow trout and/or Dolly Varden. One would expect similar genetics given that fish from the lake probably routinely drop down into the bypass reach, adding to the gene pool of fish in the bypass reach. The proposed project would forever prevent fish from the lake accessing the bypass reach.

### ***Sediment Transport***

Page 223: *"The bypass reach likely plays a role in transporting sediment downstream and replenishing spawning gravels in the anadromous reach. High-flow events can scour gravel away, but also replenish gravel beds. High-flow events will be controlled by the dam and intake structure; however, gravel quantity and quality can be monitored to ensure the percentage of fines in the gravel is not impaired over time."*

High flow events will indeed be controlled by the dam in that, as proposed, the dam and project operations would eliminate high flow events. Eliminating high flows in the bypass reach would severely reduce the recruitment and movement of sediment (including spawning gravels) from the bypass reach into the anadromous reach.

The applicant states that the quality and quantity of gravel in the anadromous reach "can be monitored to ensure the percentage of fines in the gravel is not impaired over time". Monitoring will not ensure the percentage of fines in the gravel is not impaired over time, rather, it will just

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detect whether or not impairment occurs. In addition to fines, the concern is the loss of gravel recruitment from the bypass reach into the anadromous reach. No plan is provided describing what would be done if impairment or loss of spawning gravel occurs. Potential project effects on sediment transport in Sweetheart Creek need further discussion.

### **Sweetheart Creek Anadromous Reach**

#### ***Tailrace Discharges and Instream Flows***

The proposed year round operational flow releases from the powerhouse into the tailrace mentioned in the PDEA includes 300 cfs, 335 cfs, 300-325 cfs, and 300-486 cfs. Proposed operational flow releases needs to be clarified. Given that there are three proposed turbines, each with a capacity of 158 cfs, should the proposed flow releases be 316-474 cfs?

Page 232: *“Develop and implement a Water Management Plan, including consistent in-stream flow releases between 300 and 486 cfs to Sweetheart Creek below Sweetheart Lake to include leeway for small “pulsing” of stream flows during spawning season per Alaska DFG request”.*

The statement “below Sweetheart Lake” should be changed to “at the base of the barrier falls”.

With respect to the statement about “pulsing of stream flows during the spawning season”, spawning salmon will often migrate upstream in response to increasing flows or freshets (a rapid temporary increase in stream flow due to heavy rains). Adults will congregate at the mouth of a creek, wait for a freshet or pulse of water, and then migrate upstream. As such, we are concerned that salmon may not migrate up Sweetheart Creek due to the proposed steady operational release of 300 cfs from two turbines. This may not be an issue for pink and chum salmon in that much of their spawning occurs in the intertidal reach, but it is a concern for returning adult sockeye. The personal use fishery for sockeye occurs in the series of pools upstream of the intertidal reach: it is therefore important that sockeye migrate up into these pools.

In response to our concern, the applicant has agreed to evaluate the need for pulsing flows to stimulate salmon to migrate upstream using the third proposed turbine, which would allow the release of up to 486 cfs (474 cfs?) into the anadromous reach. We appreciate the applicant for addressing this concern.

Based on the natural hydrology of the anadromous reach and applicant conducted instream flow studies, we believe the proposed operational flows should not have an adverse impact on salmon spawning, incubation, and emergence in the anadromous reach.

Page 70: *“Implement a Water Management Plan (WMP) that provides a minimum flow of at least 300 cfs from the powerhouse tailrace to Sweetheart Creek and includes late July-early August periodic pulse flows from the powerhouse tailrace to Sweetheart Creek for stream channel maintenance”.*

The late July-early August pulsing flows are intended to stimulate salmon to migrate upstream: these pulsing flows are not intended as “stream channel maintenance” flows.

***Water Temperature***

Water temperatures in the anadromous reach could be altered post-project depending on the depth of the project intake in Sweetheart Lake. The PDEA makes several general statements about potential changes in water temperature post-project but provides no analyses or discussion to explain or support the general statements. The PDEA and appendices do not evaluate water temperatures at the project intake in relation to reservoir stage and time of year. This evaluation is needed to assess potential impacts of altered stream temperatures on salmon spawning, incubation, and emergence timing in the anadromous reach downstream from the project tailrace.

Page 224: *“Data gathered to date indicates that the annual average temperature of the water flowing out of the penstock and into Sweetheart Creek will be within a tenth of a degree of existing temperature values and the winter stream temperatures may be as much as .4°C warmer.”*

Where did “tenth of a degree” and “0.4° C warmer” come from? There is absolutely no data, analysis, or discussion provided to indicate how these conclusions were derived.

The above statement does not seem to make sense given that penstock water will be drawn from depths ranging from 29 to 89 feet below the reservoir water surface. How could water temperatures at these depths be the same as existing surface water temperatures? Existing daily water temperatures in the anadromous reach need to be evaluated in relation to daily water temperatures at the project intake under fluctuating reservoir elevations over the course of a year.

Page 150: *“The Power Intake will be between 25 feet to 85 feet below the Sweetheart Lake surface depending on the time of the year and meteorological and climatic factors for a given year. Data collected from the 2011-2013 season demonstrates that water taken at lower depths is warmer than the near-surface water by up to 2.5°C (Figure 39). The possible effect this temperature change could have on aquatic life in Project waters is discussed in the aquatics section (4.3.3) of this document.”*

Page 136: *“It should be noted that the water was warmer at deeper depths from November to May (see Figure 40 – should refer to figure 39).”*

While it’s true that Figure 39 indicates that water was warmer at 40 and 60 feet than at 15 feet below the surface from November to May, the important and missing information is the expected water temperature at the project intake from November to May. Reservoir levels, and consequently intake depths, will fluctuate considerably during this period, so one would expect water temperatures at the intake to vary as well.

Given that the proposed maximum reservoir elevation will be 636 feet, the minimum elevation 576 feet, and the power intake depth 547 feet, shouldn’t the depth of the intake range from 29-89 feet below the water surface?

The correct section on temperature effects is 3.3.3.7, not 4.3.3.

Page 224: *“The effect of the relatively consistently warmer (.3-.4 C) water throughout the winter may be enough to cause marginally earlier emigration of pink salmon fry from the stream; however, the year-to-year variation of the winter temperature is not known.”*

Until water temperatures at the project intake are evaluated in relation to reservoir stage and time of year, and then compared to existing water temperatures in the anadromous reach, the potential impacts of altered stream temperatures on salmon spawning, incubation, and emergence timing in the anadromous reach downstream from the project tailrace cannot be assessed. The applicant should use information from the 1989-1993 temperature isopleths (figures 48 and 49, page 154) to get a better understanding of year to year variation in water temperatures and expected temperatures at the intake over the range of operational reservoir elevations.

#### ***Sediment Recruitment***

See “Sweetheart Creek Bypass Reach” above for discussion of recruitment of sediment and spawning gravels into the anadromous reach from the bypass reach.

#### **Tailrace Design**

Page 58: *“A velocity barrier would be installed at the upper end of the 30-foot-wide channel to prevent fish from reaching the powerhouse. The velocity barrier would be a standard NMFS design with a sloping concrete ramp and a short overflow weir with a crest length of 50 feet.”*

A more detailed description, along with design drawings, is needed for the proposed fish velocity barrier at the powerhouse.

Page 70: *“Design the tailrace to appear natural like and provide additional spawning area for pink and chum salmon”.*

The PDEA provides only a general description of the tailrace design. A more detailed description, along with drawings, is needed.

We do not want the tailrace designed to provide additional spawning habitat for pink and chums. As is, pink and chum salmon primarily spawn in the intertidal reach below the series of pools; few migrate up to the pool where the tailrace will discharge. This pool provides no spawning habitat. Allowing those few hardy pinks and chums that make it up to this pool to successfully spawn in the tailrace could cause unwanted changes in the genetic makeup of these salmon runs. Furthermore, increasing the number of pinks and chums migrating up to this pool would adversely impact the personal use sockeye fishery that occurs in this pool.

#### **Project Intake Screening**

Page 209: The PDEA provides an illustration of the project intake screening but provides no details. Information is needed on screen type, mesh size, approach velocities, cleaning and maintenance procedures, and how the effectiveness of the screening at protecting fish from

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entrainment and impingement injury and mortality will be evaluated given the depths at which the various fish species and life stages would be located relative to the intake depths under fluctuating reservoir levels.

### **Sockeye Smolt Collection and Transfer System**

Sweetheart Lake is stocked annually with 500,000 sockeye fry from the 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 Alaskan residents. These adult sockeye do not migrate up to Sweetheart Lake because of barrier falls and consequently do not reproduce. DIPAC carries out this stocking program as a public service to the community of Juneau and plans to continue to do so post-project.

The proposed dam would prevent sockeye smolts from outmigrating down Sweetheart Creek to Gilbert Bay. As such, JHI has proposed a sockeye smolt collection and transfer system to move sockeye smolts from the lake down to the anadromous reach of Sweetheart Creek (see section 3.3.3.5 Sockeye Smolt Passage, pages 207-220). We understand that JHI has been discussing and developing this system in consultation with DIPAC. We recommend JHI continue working with DIPAC and the agencies in developing this system. ADF&G supports and appreciates the applicant's and DIPAC's efforts in ensuring this personal use fishery continues post project.

Throughout the PDEA, the applicant states that the smolt collection and transfer system should drastically increase the estimated survival rate of 47% for smolts currently outmigrating from Sweetheart Lake, down Sweetheart Creek, and into Gilbert Bay. And consequently, the applicant states this collection system should result in higher adult returns to Sweetheart Creek. While it may be true that smolts captured in this collection system may experience nearly 100% survival while being transferred to the holding pond and eventually being released down the tailrace, the unknown and essential factor is how the number of smolts currently outmigrating from the lake compares to the number of smolts that will be captured in the collection system.

Personnel from DIPAC provided an educated guess that 20-60,000 smolts successfully outmigrate to Gilbert Bay annually under current conditions. Given that the applicant's minimum goal is 21,000 and maximum goal is 50,000 smolts successfully released to Gilbert Bay, this collection and transfer system will just be maintaining the status quo, rather than significantly increasing the number of smolts reaching Gilbert Bay.

It is our understanding that JHI and DIPAC have developed an agreement for culture of 20,000 sockeye fry to smolt size for release at the powerhouse holding facility in the event that the smolt collection system is a failure. We have not seen any details of this apparent backup plan to determine its adequacy.

**Wildlife Resources**

There has been concern raised by ADF&G that the dam area at Sweetheart Lake may be close to mountain goat kidding areas. This is based on the habitat type found in this area. ADF&G is planning on initiating studies in spring of 2014 to identify use of this area by mountain goats. These are side studies negotiated with JHI by ADF&G. Standard goat protocols will be identified in the recommended Terms and Conditions.

**Tidewater / Marine Resources**

Impacts to several small streams which will be impacted by the coastal road have not been discussed in the PDEA. The impacts to tidelands, which are important to juvenile salmon rearing after migration, have not been discussed. There will be a loss of tideland habitat due to the coastal road. The importance of this tidewater habitat has not been studied.

**RECOMMENDATIONS**  
**Alaska Department of Fish and Game**  
**Federal Power Act §10(j) Recommendations**  
**Preliminary Terms and Conditions**  
**Sweetheart Lake Hydroelectric Project No. 13563**

**January 20, 2014**

The Alaska Department of Fish and Game recommends the following preliminary terms and conditions pursuant to §10(j) of the Federal Power Act.

**Articles:**

**1. Instream Flows Bypass Reach:**

The licensee has proposed to release 3 cfs from the dam into the bypass reach reportedly to compensate for evaporation of accretion flows, preferably through seepage from the dam. There has been no science presented to determine an instream flow requirement and no proposed release mechanism identified. Seepage would also be subject to leeching from the concrete affecting water quality, and would likely freeze during winter periods. Measurement of seepage would be difficult to impossible. There would be no control of bypass flows afforded by the applicant proposal. ADF&G does not support this proposal. As such discussions are necessary prior to development of instream flow articles for the bypass reach of Sweetheart Creek. **At this time ADF&G can't specify a recommended T&C for instream flow in the bypass reach, based on aquatic resource needs.**

Standard language follows once a T&C is developed:

This flow may be temporarily modified if required by operating emergencies beyond the control of the licensee, or for short periods upon agreement between the licensee, ADF&G, and other requesting agencies. If the flow is so modified, the licensee shall notify the Commission, ADF&G, and other requesting agencies as soon as possible, but no later than 10 days after the modification.

*Rationale: Bypass flows are necessary to maintain ecological functions, processes, and connectivity important for sustaining aquatic resources in the bypass reach. It is unknown if the bypass reach supports a spawning population of resident fish. Although rainbow trout and Dolly Varden were captured just above the anadromous barrier, based on their genetic studies, JHI believes these fish likely washed down from Sweetheart Lake. If the project is built, fish from the lake would no longer have access to the bypass reach.*

**2. Instream Flows Anadromous Reach:**

The licensee shall operate the project to maintain instantaneous instream flows in the anadromous reach of Sweetheart Creek, as measured at the streamgage required by article 4, pursuant to the following schedule:

| <u>Dates</u>      | <u>minimum flow (cfs) measured at gage</u> |
|-------------------|--|
| January-February  | 40   |
| March             | 45   |
| April             | 119  |
| May-September     | 330  |
| October           | 324  |
| November-December | 117  |

The licensee has agreed to evaluate the need for releasing pulsing flows from the powerhouse into the anadromous reach of Sweetheart Creek, therefore a plan needs to be developed to define the methods for evaluation, and how to interpret results of the evaluation. ADF&G will continue to work with the applicant to develop such an evaluation plan and determine how results will direct pulse flows, if pulse flows are found to be necessary. Pulse flows stimulate adult salmon to migrate upstream during July and August (spawning salmon will often wait to migrate upstream until they detect increasing flows). These pulsing flows would be short term (probably well less than a day) in duration and would involve increasing flows from the proposed operational flow of 335 up to 486 cfs by opening up the third proposed turbine. If the evaluation of pulsing flows indicates they are needed to stimulate salmon to migrate upstream, particularly for sockeye to migrate upstream into the series of pools above the intertidal reach, then these instream flow provisions may be modified accordingly.

These instream flow provisions may be temporarily modified if required by operating emergencies beyond the control of the licensee, or for short periods upon agreement between the licensee, ADF&G, and other requesting agencies. If the flow is so modified, the licensee shall notify the Commission, ADF&G, and other requesting agencies as soon as possible, but no later than 10 days after the modification.

***Rationale:*** Seasonal instream flows are necessary to maintain usable habitat and passage for the fish species and life stages (listed in Table 30, page 184 of the PDEA) using the anadromous reach of Sweetheart Creek. Flow recommendations from October through April are based on the flows requested by ADF&G in their Reservation of Water (ROW) Application on file with the Alaska Department of Natural Resources (see appendix I of the PDEA). The purpose of ADF&G's ROW is to protect fish habitat, migration, and propagation in the anadromous reach. From May through September, the recommended flow of 330 cfs is the proposed operational flow of the project. Based on the hydrology of the system, and the results of JHI's instream flow studies, we believe that 330 cfs during this time period will protect fish habitat, migration, and propagation in the anadromous reach.

### **3. Ramping Rates:**

Project operations shall not alter stream stage in the anadromous reach, as measured in the riffle section below the series of pools, by more than one inch per hour from March 15 to June 15, and two inches per hour at all other times. These ramping rates may be temporarily modified if required by

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operating emergencies beyond the control of the licensee, or for short periods upon agreement between the licensee, ADF&G and other requesting agencies. If the rate is so modified, the licensee shall notify the Commission, ADF&G, and other requesting agencies as soon as possible, but no later than 10 days after the modification.

***Rationale:*** *Ramping rates are intended to protect emergent pink and chum salmon fry and out-migrating sockeye smolts from March 15 to June 15, and fish and invertebrates utilizing the anadromous reach the rest of the year. These rates are based on State of Washington Department of Fisheries analyses of hydropower flow fluctuations on salmonids (Hunter 1992<sup>1</sup>). If desired, the applicant can perform site-specific studies in consultation with resource agencies to refine these ramping rates.*

*Rapid flow fluctuations can adversely impact fish and other aquatic organisms. Potential impacts include stranding of fish and aquatic invertebrates (causing reduced fitness and mortality), increased predation, dewatering of redds, restricted fish passage, and reduced prey availability. Tidal influences could help reduce impacts of fluctuating flows in the anadromous reach.*

#### **4. Stream Gaging and Instream Flow Compliance:**

The licensee shall continue to operate and maintain the existing streamgage in the anadromous reach. The gage shall be operated and maintained according to U.S. Geological Survey standards. All data shall be recorded at a frequency of not greater than 15-minute intervals and filed with the Commission by April 1st of each year, documenting the previous water year. Copies of the data shall be provided upon request to interested parties.

At least 6 months before the start of any land-disturbing or land-clearing activities, the licensee shall consult with resource agencies regarding the licensee's final plan describing how the licensee will monitor and ensure compliance with the instream flow provisions of the license (articles 1, 2, and 3).

Resource agencies shall be allowed 30 days to review the plan and provide comments and recommendations. The final plan shall be submitted to FERC for written approval at least 30 days before the scheduled date to initiate activities related to the plan. Along with the plan, the licensee shall document agency consultation, provide copies of agency comments and recommendations, and describe how the agencies' recommendations were addressed in the plan. If the licensee does not accept an agency recommendation, the filing shall include the licensee's reasons for doing so.

***Rationale:*** *Instream flow provisions are needed to protect both resident and anadromous fish in Sweetheart Creek. These instream flow provisions need to be monitored to ensure that the project is operating in compliance with these provisions. Quality continuous stream gage data are necessary for these monitoring purposes.*

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<sup>1</sup> 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. September 1992.

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**5. Instream Flow Fail-Safe Provisions:**

Fail-safe provisions shall be provided in project design and operation to ensure that instream flows are provided continuously to the bypass and anadromous reaches of Sweetheart Creek during routine maintenance periods, emergency project shutdowns, and interruptions to the power grid.

***Rationale:** Instream flow provisions are needed to protect both resident and anadromous fish in Sweetheart Creek. If licensed instream flow provisions are maintained during maintenance, emergency shutdowns, and interruptions to the grid, there will be no issue.*

**6. Fish Exclusion and Tailrace Design:**

The powerhouse tailrace shall be designed and constructed to avoid or minimize the potential for fish injury or mortality. At least 6 months before the start of any land-disturbing or land-clearing activities, the licensee shall consult with resource agencies regarding the licensee's final Fish Exclusion Plan and tailrace design. The plan shall describe how the tailrace will be designed and constructed to avoid or reduce the potential for attracting and harming fish.

Resource agencies shall be allowed 30 days to review the plan and provide comments and recommendations. The final plan shall be submitted to FERC for written approval at least 30 days before the scheduled date to initiate activities related to the plan. Along with the plan, the licensee shall document agency consultation, provide copies of agency comments and recommendations, and describe how the agencies' recommendations were addressed in the plan. If the licensee does not accept an agency recommendation, the filing shall include the licensee's reasons for doing so.

***Rationale:** Tailrace discharges have the potential to attract and subsequently injure or kill fish, particularly migrating adult salmonids: the tailrace must be designed to reduce this potential. Impacts to fish at hydroelectric plant tailraces are documented in "Impacts of Hydroelectric Plant Tailraces on Fish Passage: A Report on Effects of Tailraces on Migratory Fish and Use of Barriers, Modified Project Operations, and Spills for Reducing Impacts. Paper No. DPR-9, June, 1995. Federal Energy Regulatory Commission. 1995.*

**7. Intake Screening:**

The licensee shall install a fish screen in front of the power tunnel intake structure in Sweetheart Lake to exclude the entrainment and impingement of fry salmonids. The screen shall be designed to have an approach velocity of no more than 0.4 feet per second and screen mesh shall not exceed 3/32 inch. The licensee has proposed an intake screen in the PDEA, however, no details were provided on approach velocity, mesh size, method for keeping the screen clear of debris, or how the effectiveness of the screening will be evaluated. This information is needed before ADF&G and other agencies can approve of the proposed intake screen.

***Rationale:** Intake screening is needed to protect the 500,000 sockeye fry that are stocked annually in Sweetheart Lake. These fry rear in the lake for one year (sometimes two) before outmigrating into Gilbert Bay. As adults, they return to Sweetheart Creek, providing a popular personal use fishery for Alaskan residents. Screening criteria should be based on NMFS fish screening criteria.*

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**8. Sockeye Smolt Collection and Transport Plan:**

At least 6 months before the start of any land-disturbing or land-clearing activities, the licensee shall consult with resource agencies regarding the licensee's final Sockeye Smolt Collection and Transport Plan. The plan shall address how sockeye smolts will be captured, held, transported, and released into Sweetheart Creek. The plan shall describe how the survival rate of smolts will be monitored at each step in the process. The plan shall also include provisions to ensure that sockeye smolts are successfully released and imprinted to Sweetheart Creek in situations where the collection and transfer system fails.

Resource agencies shall be allowed 30 days to review the plan and provide comments and recommendations. The final plan shall be submitted to FERC for written approval at least 30 days before the scheduled date to initiate activities related to the plan. Along with the plan, the licensee shall document agency consultation, provide copies of agency comments and recommendations, and describe how the agencies' recommendations were addressed in the plan. If the licensee does not accept an agency recommendation, the filing shall include the licensee's reasons for doing so.

***Rationale:** Sockeye smolts currently outmigrate from Sweetheart Lake down Sweetheart Creek and into Gilbert Bay. These smolts return as adults, providing a popular personal use fishery in Sweetheart Creek. As proposed, the project would prevent smolts from outmigrating down Sweetheart Creek. As such, a smolt collection and transport system needs to be implemented to maintain this personal use fishery. Given that this system would be untested, it is essential that its effectiveness at collecting, holding, transferring, and releasing smolts is monitored at every step in the process.*

**9. Biotic Monitoring Plan**

At least 6 months before the start of any land-disturbing or land-clearing activities, the licensee shall consult with resource agencies regarding the licensee's final Biotic Monitoring Plan. The plan shall address monitoring salmon escapement and spawning in the anadromous reach of Sweetheart Creek, and monitoring Dolly Varden and rainbow trout spawning and recruitment in Sweetheart Lake and its inlet streams. The plan shall include defined sampling protocols, schedules, and effort, as well as evaluation metrics.

Resource agencies shall be allowed 30 days to review the plan and provide comments and recommendations. The final plan shall be submitted to FERC for written approval at least 30 days before the scheduled date to initiate activities related to the plan. Along with the plan, the licensee shall document agency consultation, provide copies of agency comments and recommendations, and describe how the agencies' recommendations were addressed in the plan. If the licensee does not accept an agency recommendation, the filing shall include the licensee's reasons for doing so.

Monitoring shall continue for 5 years, or less if ADF&G and other requesting agencies determine that project operations have not been shown to adversely impact aquatic resources.

***Rationale:** Post-licensing monitoring of fisheries resources is needed to ensure that the regulated instream flow regime is sufficient to support salmon use of habitat in the anadromous reach of*

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*Sweetheart Creek, and that Dolly Varden and rainbow trout are successfully spawning and recruiting in Sweetheart Lake and its inlet streams post-project.*

**10. Timing of Instream Activities:**

Timing windows for instream construction activities and stream crossings shall be established by the ADF&G Habitat Biologist assigned to the project. Timing windows will be conditioned in the ADF&G issued Title 16 permit.

*Rationale: Timing windows are needed to ensure that instream construction activities do not adversely impact aquatic resources.*

**11. Stream Buffers and Location of Facilities:**

Clearings and road/trail corridors shall be sited a minimum of 100 feet, measured horizontally, away from ordinary high water of Sweetheart Creek and its tributaries. Clearings and road/trail corridors for the powerhouse and appurtenant facilities, penstock, and tailrace are excluded from this requirement. Except for stream crossings, the transmission line corridor and clearing shall be sited a minimum of 100 feet, measured horizontally, away from ordinary high water of all streams identified in the latest (2011) edition of ADF&G's Catalog of Waters Important for Spawning, Rearing or Migration of Anadromous Fishes.

*Rationale: Stream buffers protect fish habitat and water quality and serve as habitat and transportation corridors for wildlife.*

**12. Avian Electrocution:**

Transmission line power poles shall conform to guidelines accepted by the USFWS and described in "Suggested Practices for Avian Protection on Power Lines— State of the Art in 2006"<sup>2</sup> See also, "Avian Protection Plan (APP) Guidelines, a joint document prepared by Avian Powerline Interaction Committee (APLIC) and the U.S. Fish and Wildlife Service, April 2005.

*Rationale: Designs identified by the APLIC and USFWS are necessary to avoid the electrocution of raptors and other birds.*

**13. Bear Safety Plan:**

At least 6 months before the start of any land-disturbing or land-clearing activities, the licensee shall consult with resource agencies regarding the licensee's final Bear Safety Plan to minimize bear-human conflicts. At a minimum, the plan shall provide instructions for:

- Operating practices when in bear country that minimize possible conflict;
- Minimizing encounters and avoid areas often used by bears, if possible;
- Keeping construction sites and refuse areas clean of substances that attract bears;

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<sup>2</sup> Avian Power Line Interaction Committee (APLIC). 2006. Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006. Edison Electric Institute and the California Energy Commission, Washington, D.C.

- Installing bear-proof garbage receptacles and other measures during construction to prevent bears from obtaining food or garbage;
- Dealing with problem bears; and
- Notifying ADF&G of any bear-human conflicts.

The licensee filed a Bear Safety Plan along with the PDEA. ADF&G will review this plan after issuance of the license. Resource agencies shall be allowed 30 days to review the plan and provide comments and recommendations. The final plan shall be submitted to FERC for written approval at least 30 days before the scheduled date to initiate activities related to the plan. Along with the plan, the licensee shall document agency consultation, provide copies of agency comments and recommendations, and describe how the agencies' recommendations were addressed in the plan. If the licensee does not accept an agency recommendation, the filing shall include the licensee's reasons for doing so.

***Rationale:** Bears are common in the project area. The proposed plan will minimize the potential for human/bear interactions.*

#### **14. Helicopter and Plane Controls to Minimize Impacts to Mountain Goats:**

Aircraft shall maximize their distance away from mountain goat habitat and observed mountain goats. A 1500 foot vertical or horizontal clearance shall be maintained from mountain goat habitat and observed mountain goats;. Of particular concern is use of kidding habitat between May 15 and June 15. Winter and kidding habitat has been identified near the dam site and near the location of the smolt transfer barge (the applicant is proposing to use a helicopter to transport sockeye smolt from the smolt transfer barge to a tailrace holding pond, most likely during the kidding period), making it difficult to maintain a 1500 foot clearance during dam construction and smolt transfer. Use of identified habitat areas by mountain goats has not yet been studied. ADF&G plans on surveying this area during the spring/early summer of 2014 to document mountain goat presence and use. The licensee is expected to work closely with the agencies to address this issue as the project moves forward.

***Rationale:** Mountain goats typically elicit strong negative responses to close range aircraft disturbance. Disturbance can cause mountain goat groups to splinter and individuals to panic, resulting in injuries and/or mortality. After being disturbed, goats may stay alert without foraging for several hours, resulting in increased energy expenditures, reduced fat accumulation, and adverse physiological changes.*

#### **15. Penstock Burial to Maintain Wildlife Migration Corridor:**

The licensee has proposed no above ground penstock in the DLA. If an above penstock is proposed in the future, the licensee shall consult with ADF&G and other agencies on a Penstock Location and Grade Plan.

***Rationale:** Bears are common in the project area. An above ground penstock would impede normal movements. Burial or elevation of the penstock in a sufficient number of places should ensure that wildlife movement is minimally affected.*

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**16. Restricting Road Access and Land Use to Minimize Fish and Wildlife Impacts:**

Because of restricted access of the public to project property, the applicant has agreed that employees, contractors, and subcontractors of the licensee will be restricted from hunting, fishing, and trapping within ½ mile of project features during construction of the project.

*Rationale: ADF&G harvest regulations are not specified for each specific water body or area. A dramatic increase in harvest rate could result in closure by Emergency Order. However, this is an undesirable approach to management because it would restrict harvest in the area for all users.*

**17. Erosion and Sediment Control Plan (ESCP):**

At least six months before the start of any land disturbance or land clearing activities, the licensee shall file with the Commission for approval, a Final Erosion and Sediment Control Plan. The plan shall provide specific descriptions of features incorporated into the final project design and measures that would be employed during construction to limit project effects on environmental resources, and shall include, at a minimum, descriptions of the following:

1. A description of site characteristics to include: soils, landscape, vegetation, topography, nearby waters including springs and seeps;
2. Preventative measures based on site-specific conditions;
3. Location of areas for storage or deposition of removed overburden including erosion control to be utilized in those areas;
4. Detailed descriptions, functional design drawings, and specific topographic locations of all control measures, including:
  - Rip-rap placement;
  - Stream set back and proposed stabilization measures for spoil material;
5. Prescriptions for revegetation of all disturbed areas including:
  - Treatment of overburden deposition sites;
  - Plant species and methods to be used.

The licensee shall prepare the plan after consultation with ADF&G and other requesting agencies. The licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the plans with the Commission. The licensee shall include with the plan, documentation of consultation and copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments have been accommodated by the plan. If the licensee does not accept a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The licensee filed an ESCP along with the PDEA. ADF&G will review this plan after issuance of the license. Resource agencies shall be allowed 30 days to review the plan and provide comments and recommendations. The final plan shall be submitted to FERC for written approval at least 30 days before the scheduled date to initiate activities related to the plan. Along with the plan, the licensee shall document agency consultation, provide copies of agency comments and recommendations, and describe how the agencies' recommendations were addressed in the plan. If the licensee does not accept an agency recommendation, the filing shall include the licensee's reasons for doing so.

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***Rationale:*** *The potential for erosion and sediment deposition in aquatic habitat is great if an erosion and sediment control plan is not implemented. Construction activities and the failure of preventative constructed structures during project construction and operation could have severe adverse impacts to the watershed's water quality and aquatic habitat. Therefore, a detailed and thorough erosion and sediment control plan is needed to reduce soil disturbances and the potential for mass wasting events that could adversely impact aquatic resources.*

### **18. Turbidity Monitoring:**

The effectiveness of the erosion and sediment control measures identified in Article 17, the Sediment and Erosion Control Plan, shall be monitored by the ECM through water quality sampling. From the initiation of construction, water samples shall be taken daily in Sweetheart Creek, both upstream and downstream of all construction activities and discharge points for overland flows that cross construction areas and discharge into Sweetheart Creek. Water samples shall be analyzed for turbidity as soon as possible, or daily. Measurements may be taken using a portable turbidimeter if such can be shown to have the appropriate resolving power. If turbidity 100 feet downstream of the construction area exceeds Alaska water quality standards then related construction activities shall cease immediately, sediment sources shall be located, and appropriate sediment control measures shall be implemented.

***Rationale:*** *Monitoring turbidity is essential to ensure that Alaska water quality standards are not exceeded and to protect aquatic resources in Sweetheart Creek.*

### **19. Fuel and Hazardous Substance Spill Plan:**

At least 6 months before the start of any land-disturbing or land-clearing activities, the licensee shall consult with resource agencies regarding the licensee's final Fuel and Hazardous Substance Spill Plan. The plan shall be designed to help prevent and minimize any impacts associated with the handling of hazardous substances during project construction and operation.

The licensee filed a Hazard Substance Plan along with the PDEA. ADF&G will review this plan after issuance of the license. Resource agencies shall be allowed 30 days to review the plan and provide comments and recommendations. The final plan shall be submitted to FERC for written approval at least 30 days before the scheduled date to initiate activities related to the plan. Along with the plan, the licensee shall document agency consultation, provide copies of agency comments and recommendations, and describe how the agencies' recommendations were addressed in the plan. If the licensee does not accept an agency recommendation, the filing shall include the licensee's reasons for doing so.

***Rationale:*** *Petroleum products can have a significant adverse impact on aquatic resources. This plan will help to ensure that Best Management Practices are observed for their use and help to prevent accidents.*

### **20. Environmental Compliance Monitor (ECM):**

At least thirty days before the start of any land disturbance or land clearing activities, the licensee shall employ a qualified environmental compliance monitor (ECM). The ECM shall:

- be employed through the duration of project construction;
- have the authority to issue cease work orders in the field as deemed necessary;

- document compliance of the licensee with the conditions of the license; and
- be responsible for preparation of weekly construction reports to be filed with FERC, ADF&G, and other requesting agencies.

The ECM should have a background in the biological sciences with experience in water quality monitoring and erosion/sediment control measures. The licensee shall allow a minimum of 30 days for the agencies to comment and to make recommendations. Since the US Forest Service has placed a 4e condition on the ECM, ADF&G will defer to them on approval of the ECM, qualifications etc.

***Rationale:** This project is located at a remote location with access being only by boat, helicopter, or fixed wing aircraft. A full time, on site, ECM is necessary to monitor activities during project construction to ensure compliance with environmental measures. Additionally, an ECM will help to ensure that the erosion and sediment control plans and fuel and hazardous substance spill plans are effective, and that all other environmental plans are being followed by the licensee and contractors. This may also include human/bear interactions and observations of construction activity impact on mountain goats. The ECM shall assist the licensee to obtain additional permits when design or construction plans need to be modified.*

#### **21. Notification of Non-Compliance Event:**

Within 10 days of detecting events that are out-of-compliance with license requirements, the licensee shall notify the Commission, ADF&G, and other requesting agencies that the event occurred. The licensee shall take immediate steps to correct the out-of-compliance event including causes of such events so that they do not recur, and shall document those steps in a detailed description of the event to be filed with FERC and requesting agencies, no later than 30 days following detection of the event. Consultation with agencies and FERC on correction strategies for events is encouraged.

***Rationale:** Notification of non-compliance events that affect fish and wildlife resources is necessary to monitor project operations and to assess and respond to potential impacts of the event. Notification and consultation is important to address issues and reduce reoccurrences of non-compliance events which may impact fish and wildlife resources.*

#### **22. Access to Site by ADF&G Employees:**

The licensee shall provide representatives of ADF&G free and unrestricted access to, through and across project lands and waters, and project works, in the performance of their official duties upon appropriate advance notification.

***Rationale:** ADF&G must be allowed access to the project area in order to evaluate and manage fish and wildlife resources in the Sweetheart Creek watershed.*