FINAL DRAFT ENVIRONMENTAL ASSESSMENT

BLUE LAKE HYDROELECTRIC PROJECT

FERC No. 2230-000-Alaska

City and Borough of Sitka, Alaska

March, 2006

FEDERAL ENERGY REGULATORY COMMISSION

Office of Energy Projects

Division of Environmental and Engineering Assessment

EXECUTIVE SUMMARY

The City and Borough of Sitka, Alaska (City) holds a Federal Energy Regulatory Commission (FERC, Commission) license for the Blue Lake hydroelectric Project (Project), FERC No. 2230 that will expire on March 31, 2006. The Project is located approximately 5 miles southeast of Sitka, Alaska and impounds the waters of Sawmill Creek, formerly the Medvetche River. The 7.56 megawatt (MW) Project consists of three generating units, collectively capable of producing 7.5 MW of electrical power. Total average annual generation for the Project over the past four fiscal years has been 48,397 megawatt hours (MWH). The Project Boundary occupies 276 acres of land managed by the US Forest Service (USFS), Tongass National Forest, the City, the University of Alaska and several private land-owners.

On November 1, 2002, the City filed with the FERC a Notice of Intent to relicense the Blue Lake Project pursuant to 18 CFS, Section 16.6. On August 28, 2003, the City filed a request to use the Alternative Licensing Procedure (ALP) for relicensing the Blue Lake Project. The Commission granted this request on October 22, 2003.

On June 23, 2005, the City submitted a Draft License Application (DLA) to the FERC and to stakeholders including Alaska state and federal resource agencies and the Sitka Tribe of Alaska (STA). After incorporating comments on the DLA and further negotiating stakeholder relicensing recommendations, the City adopted the Preferred Alternative put forth in this Final Draft Environmental Assessment.

The Preferred Alternative includes the following measures:

1. **Implement the Preferred Instream Flow Alternative, as Follows:**

    - From April 15 through June 30, minimum instream flow, as assured by releases from the Fish Valve Unit (FVU), shall be 70 cubic feet per second (cfs) or maximum hydraulic capacity of the Fish Valve Unit, at the concurrent reservoir level, which- ever is less. During the remainder of the year (July 1-April 14) minimum instream flow, also assured by releases from the FVU, shall be 50 cfs.

2. **Remove Current FERC License Conditions Affecting Project Operations at Specified Blue Lake Reservoir Levels. Specifically:**

    - Remove the condition from original License Article 401 allowing instream flow to be reduced from 50 cfs to either 35 or 27 cfs when Blue Lake reservoir falls below specified elevations; and

    - Remove the condition from License Article 401 (as amended in 1991) restricting releases for bulk water export when Blue Lake reservoir falls below specified levels.

3. **Implement Ramping Rate Restrictions, as Follows:**

For instream flow changes caused by project operations, the Licensee shall observe specified ramping rate restrictions at all times. The ramping rate specifications and conditions will vary depending on whether normal or non-normal operating conditions, described below, apply.

- **Normal Operation**

Normal Operation is defined as operation during those periods when the Fish Valve Hydroelectric Generating Unit (FVU) is the sole source of controllable water discharge into the bypassed reach of Sawmill Creek. The FVU is normally operated to assure various instream flow rates. Normal Operation ramping conditions are intended to assure that changes in flow from the FVU to meet instream flow requirements do not exceed specified rates.

During Normal Operations, the Licensee shall operate the FVU to assure the following periodic up- and down-ramping conditions:

Time Period	Up-ramping Rate	Down-ramping Rate
April 1 – July 15	0.2 ft/hr	0.1 ft/hr
July 16 – Sept 30	0.1 ft/hr	0.1 ft/hr
Oct 1 – March 31	0.2 ft/hr	0.2 ft/hr

The ramping rate shall be measured as change in stage over a 1 hour period at the Upper Staff Gage which is installed at the Sawmill Creek Bridge near the US Forest Service campground at Sawmill Creek stream mile 1.57.

- **Non-normal Operations**

Non-normal Operations are defined as those outside the normal daily operation of the FVU, specifically, operation of the Howell-Bunger release valve in the Blue Lake dam and the FVU Bypass Valve. No ramping restriction will apply when these devices are in use. However, during non-normal operations the City will minimize ramping rates to the extent possible given equipment constraints and needs for worker safety.

4. **Reconstruct The Parking Lot at The Intersection Of Blue Lake Road and Sawmill Creek Road (Per APC Drawing G-176).**

- Remove trees and existing vegetation;
- Resurface parking lot;
- Replace Culverts;
- Provide parking bollards;
- Provide signage

5. Improve The Overlook of Blue Lake at the Terminus of the Blue Lake Road at Blue Lake.

- Resurface existing overlook area, retain existing dimensions;
- Assure wheelchair accessibility;
- Provide diagonal parking spaces and bollards;
- Install rock barrier at overlook;
- Signage restricting access on road to lake
- Install benches overlooking lake

6. Improve the Campground at Sawmill Creek.

- Install drainage channel through drive-around;
- Reconfigure campground drive-around;
- Relocating host site, evaluate power delivery to host site

7. Protect and Enhance Steelhead Habitat at Indian River.

- Remove abandoned heavy equipment (shown on Figure 10, Indian River Master Plan, IRMP),
- Remove car bodies Reach 3, IRMP;
- Evaluate paintball course and removal of associated debris;
- General trash removal to be determined by stream survey throughout Reaches 1-3, IRMP;
- Pave Indian River Road
- Work with the Alaska Coastal Management Program to establish and maintain a buffer zone on Indian River. The buffer zone proposed through the Coastal Zone Management Program is: "a buffer of a natural vegetation zone within a minimum of 25 feet along either side of the 100-year floodplain.

8. Install Parking and Safety Measures on Blue Lake Access Road.

- Resurface selected existing turnouts on the Blue Lake Road to accommodate safe stopping areas and temporary parking.
- Install selected sections of guardrail or other type of barriers on dangerous curves in the road, totaling approximately 600 lineal feet to assure driver safety.

This Final Draft Environmental Assessment analyzes the effects of the Proposed Action and various alternatives to the proposed action, including no-action. Issuing a new license for the Blue Lake Project would allow the City to continue to operate the Project as a beneficial and dependable source of power. Overall, the proposed measures would protect and enhance fisheries, recreation and aesthetic resources.

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ACRONYMS AND ABBREVIATIONS

ADEC	**Alaska Department of Environmental Conservation**
ADF&G	**Alaska Department of Fish and Game**
ADNR	**Alaska Department of Natural Resources**
af	**acre foot or feet**
ALP	**Alternative Licensing Process**
APC	**Alaska Pulp Company**
APE	**Area of Potential Effect (cultural resources)**
BLU	**Blue Lake (generating) Unit**
cfs	**Cubic foot or feet per second**
CMT	**Culturally-Modified tree**
CZMA	**Coastal Zone Management Act**
EA	**Environmental Assessment**
EIS	**Environmental Impact Statement**
FERC	**Federal Energy Regulatory Commission**
FPA	**Federal Power Act**
FVU	**Fish Valve Unit**
FWS	**United States Fish and Wildlife Service**
HPA	**Historic Preservation Act**
ICD	**Initial Consultation Document**
IFIM	**Instream Flow Incremental Methodology**
IFT	**Instream Flow Team**
kW	**kilowatt**
kWh	**kilowatt hour**
mgd	**Million gallons per day**
MW	**Megawatt**
MWh	**Megawatt hour**
NEPA	**National Environmental Policy Act**
NGO	**Non-governmental Organization**
NMFS	**National Marine Fisheries Service**
NOI	**Notice of Intent (to relicense)**
PDEA	**Preliminary Draft Environmental Assessment**
PMFU	**Pulp Mill Feeder Unit**
SCIP	**Sawmill Cove Industrial Park**
SD1	**Scoping Document 1**
SD2	**Scoping Document 2**
SHPO	**State Historic Preservation Officer**
SM	**Stream Mile**
STA	**Sitka Tribe of Alaska**
USFS	**United States Forest Service**
USGS	**United States Geological Survey**
WUA	**Weighted Usable Area**

FINAL DRAFT ENVIRONMENTAL ASSESSMENT

Blue Lake Hydroelectric Project
FERC No. 2230 Alaska

City and Borough of Sitka, Alaska Electric Department

APPLICATION

The City and Borough of Sitka ("City"), Alaska hereby applies to the Federal Energy Regulatory Commission (FERC or Commission) for a new license for the Blue Lake Hydroelectric Project (Project), FERC Project No. 2230, as described in Exhibits A-H. The Project is located on Sawmill Creek in Southeast Alaska, approximately 7 miles from the city of Sitka, Alaska (Figure 1). The location of Project facilities is shown on Figure 2. Project facilities, including transmission corridors, variously occupy state, federal and private lands, including those lands administered by the U.S. Forest Service(USFS) Tongass National Forest.

The Project is an existing combined-purpose facility operated by the City and Borough of Sitka Electric Department. The Project utilizes water stored in Blue Lake to generate electricity and to provide for municipal water supply and certain permitted industrial and commercial uses.

1.0 PURPOSE AND NEED FOR POWER

1.1 PURPOSE of ACTION

The Commission must decide whether to relicense the Project and what conditions should be placed on any license issued. In deciding whether to issue any license, the Commission must determine that the project would be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued, the Commission must give equal consideration to the purposes of energy conservation, enhancement of fish and wildlife (including related spawning grounds and habitat), the protection of recreational opportunities and the preservation of other aspects of environmental quality. This FDEA reflects the above considerations.

In this FDEA, we assess the environmental and economic effects of 1) operating the Project as proposed by the City and 2) the No Action Alternative. We also generally assess decommissioning of the Project, federal government takeover, and issuance of a non-power license.

1.2 NEED for POWER

The City of Sitka's primary electrical power concern is the ability of the existing generation system to meet future electrical loads. Load forecasting and generation analysis for Sitka's existing electrical generation system under moderate growth projections have been conducted as part of the Project relicensing. These evaluations have shown that, with no change in current installed generating components or electrical system operation, the City's future energy needs can be met only through increasing diesel generation, with attendant air quality, fuel handling and energy cost and stability disbenefits. In short, relicensing the Blue Lake Project represents a critical juncture in the City's overall future planning process, results of which will affect Sitka's economy into the future.

1.2.1 Sitka's Current Energy Needs

Concern for Sitka's energy future is heightened by several characteristics unique to the community:

- Sitka residents currently enjoy some of Alaska's lowest energy costs, particularly when compared to other southeast Alaska remote communities. Low energy costs encourage economic development in the area, and, to the extent that they may be depended upon, assure stability and quality of life in the community;

- Along with low cost, Sitka's total annual electrical generation, is comprised primarily of dependable and non-polluting hydroelectric generation. This largely avoids not only the pollution associated with diesel generation, but also the cost instability;

- Sitka is isolated from all other sources of energy such as natural gas or coal. Discovery of local reserves or development of delivery systems for these sources are not anticipated;

- Sitka's isolation from public utility interconnections makes purchasing or selling hydroelectric energy from other sources impossible. The City cannot simply flip a switch and tap energy from a local electrical grid. Future energy shortages can be met only through optimized operation of the existing generation system and/or installation of additional generation.

- The City and Borough of Sitka Electric Department is an independent, non-profit division of the City. Operation, maintenance, debt service and utility payroll are funded entirely through rate payer billing which is regulated by the Assembly of the City and Borough of Sitka. Rates are held at levels adequate to pay for expenses and a small margin to meet bond requirements.

1.2.2 Future Energy Concerns

Recent electrical load growth forecasts for the Sitka service area indicate a range of between 0.0 and 2.0 percent annual growth over a 30-year period (City of Sitka, 2005f). The current "Medium Case" or most likely growth rate is 0.8 percent. Even under this conservative load growth rate, diesel generation, if no operational or generation changes are made, becomes excessive about 20 years into the new license period. That is, significant additional diesel generation will be required both to meet load and to assure system frequency stability (due to low reservoir elevations resulting from excessive drafting to meet load). Under the 2.0% load growth scenario, substantial additional diesel generation would be required in less than 10 years.

As described below, however, there is considerable concern over increasing likelihood of a higher growth rate occurring much sooner than under the Medium Case.

The typical Sitka residence has electric baseboard heat supplemented with a high efficiency oil-fired space heater in the main living area. Currently, the oil-fired heater supplies most of the heating energy. The electric baseboard operates only when needed on cold winter days for comfort in the bedrooms or bathrooms.

Recent increases in fuel oil prices, however, may cause consumers to switch from fuel oil to electricity for space heating. Residential heating oil prices in the winter of 2004 peaked at $2.52 per gallon, which yields about the same heating energy bill for a residence as electric resistance heating.

If oil prices continue to escalate, it is likely that homeowners will select baseboard heating and use the oil stove as a back-up or supplementary heat source. The "high heat" case discussed in the load forecast represents estimated load growth rate in such a case. Under this scenario, critical generation shortages are predicted to occur within the first 5 to 8 years of the new license period.

If no action is taken to further optimize the Blue Lake Project's generation, diesel consumption will increase to a point at which it represents over a fourth of total energy generation. This would equate to roughly 40 tons of sulfur oxides, 35 tons of nitrous oxides and 9,000 tons of carbon dioxide emission per year.

Clearly, Sitka's energy future represents a planning challenge requiring informed decision-making and adequate lead times. Failure to address this challenge in the near future will leave the community excessively dependent on diesel, a costly and polluting energy source. Planning and development for Sitka's hydroelectric system is the key to Sitka's energy future.

1.3 BACKGROUND

1.3.1 Project History

The Federal Power Commission (FPC) Order issuing the original license is dated April 4, 1958. Construction began April 30, 1958 and commercial operation commenced July 23, 1961. In 1979, to meet increased electrical demands, the City obtained a license for the Green Lake project (FERC No. 2818), which was constructed in 1982 in the Vodopod River basin approximately 8 miles to the southeast of the Blue Lake project. The Blue Lake and Green Lake Projects operate conjunctively to supply the City's electrical needs.

The original Blue Lake license remains in effect, but with several amendments addressing various additions and upgrades to the original project design and/or operation. The following amendments are described relative to their provisions and respective issuance order dates:

- Due to increased loads and several dry years, an order amending the license to allow the current instream flow releases was issued on September 7, 1977, as described in subsequent sections;

- The construction of the Green Lake project necessitated upgrading of the Blue Lake transmission line capacity from 34.5 kV to 69 kV. The order amending the license for this change is dated June 12, 1980;

- An order was issued on November 15, 1983 to allow the 20 inch municipal water tap on the penstock.

- An amendment was ordered on September 6, 1991 to increase the Project nameplate capacity from 6000 kW to 7500 kW with the addition of the Fish Valve Unit and the Pulp Mill Feeder Unit (City and Borough of Sitka, 1990).

The Project maintains an excellent record of environmental license article compliance, dam safety and dependable generation. It's access roads and Blue Lake reservoir support excellent recreation opportunities for residents and visitors alike, and the reservoir is the primary source of Sitka's potable water. Sitka's predominantly hydroelectric generation base avoids use of approximately 7 million gallons of diesel fuel annually, significantly reducing air and noise pollution and fuel storage and transportation risks.

1.3.2 Agency Consultation

1.3.2.1 Alternative Licensing Procedure (ALP)

The City filed an initial request to use the ALP on May 1, 2003. After review of this request, FERC staff returned comments requiring additional information, including resource agency approval of a Communications Protocol (CP).

The Draft CP was submitted for agency review on August 12, 2003, and comments were received between August 13 and 23 from ADNR, ADF&G, FWS, NMFS and USFS. Comments included agency statements approving the use of ALP. After comment incorporation and additional consultation, the Final CP and revised request to use ALP was filed with the FERC Secretary on August 28, 2003.

Authorization of use of ALP was transmitted by FERC letter dated October 22, 2003.

1.3.2.2 Initial Consultation and Fish and Wildlife Study Planning

Preliminary consultation began prior to submission of the Notice of Intent (NOI) to relicense. City representatives conducted informational meetings and began early study planning for Sawmill Creek fisheries early 2002. The NOI was submitted to the FERC on November 11, 2002.

Initial consultation began with distribution of the Initial Consultation Document (ICD) in November, 2002. This represented initiation of the relicensing process 5 years and 6 months prior to license expiration.

Initial consultation meetings and a site visit, to discuss the project generally and to begin the study planning process, were held in Sitka on December 17, and December 18, 2002.

Based on comments from the November meeting(s), the City distributed a Draft Fish and Wildlife Study Plan on April 4, 2003. A fish and wildlife study planning meeting was held in Juneau on April 15, 2003. Based on comments on both the draft study plan and those received at the meeting, the City prepared a final Fish and Wildlife Study Plan on July 23, 2003. The instream flow component of fish and wildlife study planning was deferred to a later date.

1.3.2.3 Instream Flow Study Planning.

Instream flow study planning began at a meeting in Sitka on October 22, 2003 at which the City proposed to focus on high-value anadromous fish spawning sites using the detailed information available from the ongoing Sawmill Creek Fisheries Surveys (Wolfe 2002-2005). A sub-group called the Instream Flow Team (IFT) was informally established at that meeting.

The City held another instream flow meeting on December 8, 2003, in Juneau and discussed both Expert Habitat Mapping (EHM) and a hydraulic measurement-based methods similar to the Instream Flow Incremental Methodology (IFIM). Also at that meeting, the IFT discussed and preliminarily approved a list of target fish species and life stages.

After the December 8th meeting, Alaska Department of Fish and Game (ADF&G), and National Marine Fisheries Service (NMFS) commented on the draft instream flow study plan and requested additional information.

After further consultation, the IFT agreed upon use of the IFIM methodology.

A Supplement to the Instream Flow Study Plan was distributed by the City on April 9, 2003. The Supplement, after revisions according to IFT comments, was considered the final Instream Flow Study Plan.

1.3.2.4 Instream Flow Field Measurements and Computer Analysis

An instream flow site selection field trip, attended by some members of the IFT was held on April 20, 2004 at which IFIM cross-section locations were selected. The City and Miller Ecological Associates (MEC) of Ft. Collins, CO, conducted field measurements from April 20 through April 22, 2004.

On September 24 2004, MEC distributed a draft IFIM data report to the IFT (MEC, 2004).

On January 10 2005, the City distributed a draft Habitat Suitability Curve (HSC) paper to the IFT for review (City and Borough of Sitka 2005b).

On January 19, 2005, the IFT met in Juneau to discuss HSC's. Proposed changes to the various curves were offered, and the City distributed a revised draft HSC paper on February 15, 2005.

E-mail responses from four resource agencies indicated agreement with the changes in the revised draft HSC paper.

1.3.2.5 Instream Flow Negotiations

On April 22, 2005, the City held an instream flow negotiations meeting in Sitka to discuss the results of the IFIM work and updates to the Blue Lake system Operation Model. As noted below, the City's Preferred Alternative was presented in the Draft License Application (DLA) submitted on June 23, 2005.

On August 24, 2005, the City hosted an interagency meeting in Sitka to discuss the system operation model and the City's "third turbine" alternative from the DLA. The general consensus from the agencies was that the third turbine alternative was too significant a change from existing conditions to be evaluated using the current data base. The City took requests for additional instream flow and system modeling information.

Following this meeting, the City decided to remove the third turbine alternative from consideration during the relicensing process. On September 7, 2005, the City informed

the relicensing participants via email that the third turbine alternative was no longer the City's Preferred Alternative and that agency review and comment should be directed to the two-turbine alternative (2T60 0.8) outlined in the PDEA. Agency participants committed to providing the City with a formal instream flow recommendation based on two-turbine operations.

In September and October, 2005, by various communications, agency participants submitted their instream flow request, which was for a two-turbine arrangement and minimum flows of 70 cfs from April 15 through June 30 and 50 cfs for the remainder of the year. This proposal was agreed to in principle by the City.

On November 22, 2005, the City again met with members of the Instream Flow subgroup to discuss final language for the instream flow agreement, including consideration of the reservoir operations rule curve and restrictions on bulk water export. At this meeting, general agreement was reached on all language affecting the instream flow component of project operations.

On January 19, 2006, the City submitted final minutes of the November 22 meeting. These minutes contained final language for the instream flow recommendation, including agreement on FVU releases and elimination of the Adverse Condition and Bulk Water Export clauses from earlier licensing documents.

1.3.2.6 Study Planning for Other Resources

Recreation

After initial study planning with the USFS, the City distributed a Draft Recreation Study plan on September 9, 2004. Comments on this draft were submitted by USFS, and have been addressed by the City. The final Recreation study plan was approved in October, 2004.

Subsistence

The City distributed a Draft Subsistence Study Plan on June 8. 2004. Comments on this draft were received from Sitka Tribe of Alaska (STA), USFS ADF&G and FWS. The City addressed all comments and distributed the Final Subsistence Study Plan on September 23, 2004.

Cultural

The City submitted a Preliminary Draft Cultural Resources Study Plan in to USFS on May 14, 2004, and addressed comments through a series of revisions. A Draft Cultural Resource Study Plans was distributed for review on September 28. The final Cultural Resources study plan was distributed in November, 2004.

1.3.3 Scoping

Copies of Scoping Document 1 (SD1) were distributed electronically on September 17th, 2003, with a cover letter describing the review process and dates and places of the Scoping Meeting and Site Visit. After the meeting and site visit (held on October 28th and 29th, 2003, respectively) comments were received from ADF&G, NMFS, USFS and FWS. Copies of the comment letters and assigned comment numbers are in Attachment I of Scoping Document 2 (SD2).

A draft of SD2 was distributed on April 2, 2004, for final review. All comments were addressed either through changes in the SD1 text or by explanation in the Tables in Attachment II of SD2. In response, USFS, by letter dated May 7, 2004, commented that the draft SD2 had not addressed its earlier requests for three study plans, specifically those for cultural, recreation and subsistence resources. The City, through spring and summer, 2004, continued consultation with various agencies and prepared draft study plans for those three resources. At the time of this DEA, final versions of these three study plans have been developed.

1.3.4 Draft License Application

On June 23, 2005, the City distributed a Draft License Application (DLA) consisting of Exhibits A, B, C and D and a Preliminary Draft Environmental Assessment (PDEA) to the Project mailing list and the FERC.

1.3.4.1 Comments on Draft Application for License

Comments on the DLA were received from the following parties, dated as shown (images of original letters are in **Attachment I**):

- Northern Southeast Regional Aquaculture Association, Inc. (NSRAA), Sitka, September 23, 2005.
- Sitka Tribe of Alaska (STA), Sitka, September 26, 2005;
- National Marine Fisheries Service (NMFS), Juneau, September 26, 2005;
- Alaska Department of Fish and Game (ADF&G), Juneau, September 26, 2005;
- US Department of Agriculture Forest Service (USFS), Sitka, October 3, 2005.

Comments on the DLA generally fell into two categories: 1) those addressing instream flow and Project operations and 2) those addressing recreation, Project area access and aesthetics. Consultation on the instream flow and operations related issues is described above in Section 1.3.2.5. Consultation on recreation, access and aesthetics issues concerned STA and USFS, and separate meetings were held to address those issues.

1.3.4.2 Consultation meetings with USFS, STA

Meetings were held on the following dates with the entities shown:

December 8, 2005, STA;
December 9, 2005, USFS;
January 9, 2006, USFS;
January 10, 2006, USFS and STA;
January 10, 2006, STA only;
March 1, 2006, STA;
March 17, 2006, USFS.

Discussions in these meeting led to a list of measures on which the City and the two entities agreed to cooperate.

Initially, STA recommended improvements to Blue Lake road improving lake access and providing facilities for boat launching. The City explained that the drinking water standards for the lake discouraged increased access and use. STA agreed to accept current access and use conditions, but with improvements at other locations on the Blue Lake road and overlook.

STA also initially recommended installation of step-pools to allow anadromous fish access upstream of the Falls on Sawmill Creek. In a later meeting, however, STA representatives said that, in light of the NSRAA fish hatchery's potential effects on Sawmill Creek steelhead populations, the outcome of the fish passage measure would be uncertain. Discussions then led to possibilities for steelhead enhancement elsewhere within the local area, specifically on nearby Indian River.

STA submitted a list of improvements to Indian River which in most cases related to elements of the Indian River Master Plan (IRMP) and included the following:

- Remove abandoned heavy equipment (shown on Figure 10, IRMP);
- Remove car bodies Reach 3, IRMP;
- Evaluate paintball course and removal of associated debris;
- General trash removal to be determined by stream survey throughout Reaches 1-3, IRMP;
- Pave Indian River Road;
- Work with the Alaska Coastal Management Program to establish and maintain a buffer zone on Indian River. The buffer zone proposed through the Coastal Zone Management Program is: "a buffer of a natural vegetation zone within a minimum of 25 feet along either side of the 100-year floodplain.

In all, discussions with STA and USFS resulted in a list of related items described under "Applicant's Proposal", Section 2.2 of this document.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 PROJECT DESCRIPTION and OPERATION

2.1.1 Project Description

The Blue Lake Project is located approximately 5 miles east of the City of Sitka, Alaska, on Sawmill Creek, formerly the Medvetche River (Figure 1). The Project consists of ten major features: the dam; a submerged intake structure; a power conduit; three powerhouses; a switchyard and a primary and two secondary transmission lines (Figure 2). The detailed Project Boundary Map is in Exhibit G of this Application.

Throughout this document, the Project features are discussed relative to their Stream Mile (SM), or the centerline distance on Sawmill Creek upstream from the Creek's mouth at tidewater, as determined from the project map. Reservoir and stream or roadway directions (left or right) are looking downstream or down-road. Elevations are referenced as heights in feet above or below mean low sea level, denoted by the term "El".

2.1.2 Project Features

Names of project features are in bold type on first reference in this section to introduce project terminology which will be used throughout this document.

Dam

Located at SM 2.31 on Sawmill Creek, the concrete arch dam is 211 ft high with a base width of 25 ft and a crest width of 256 ft. The 140 ft wide spillway at El 342 is centrally located in the dam, and is sized to transport 14,000 cubic feet per second (cfs). A release valve, installed at the base of the dam, is used to release water when the reservoir is below the spillway elevation. The valve capacity is up to 500 cfs. A natural plunge pool is located downstream of the dam, to dissipate energy from the spillway discharge.

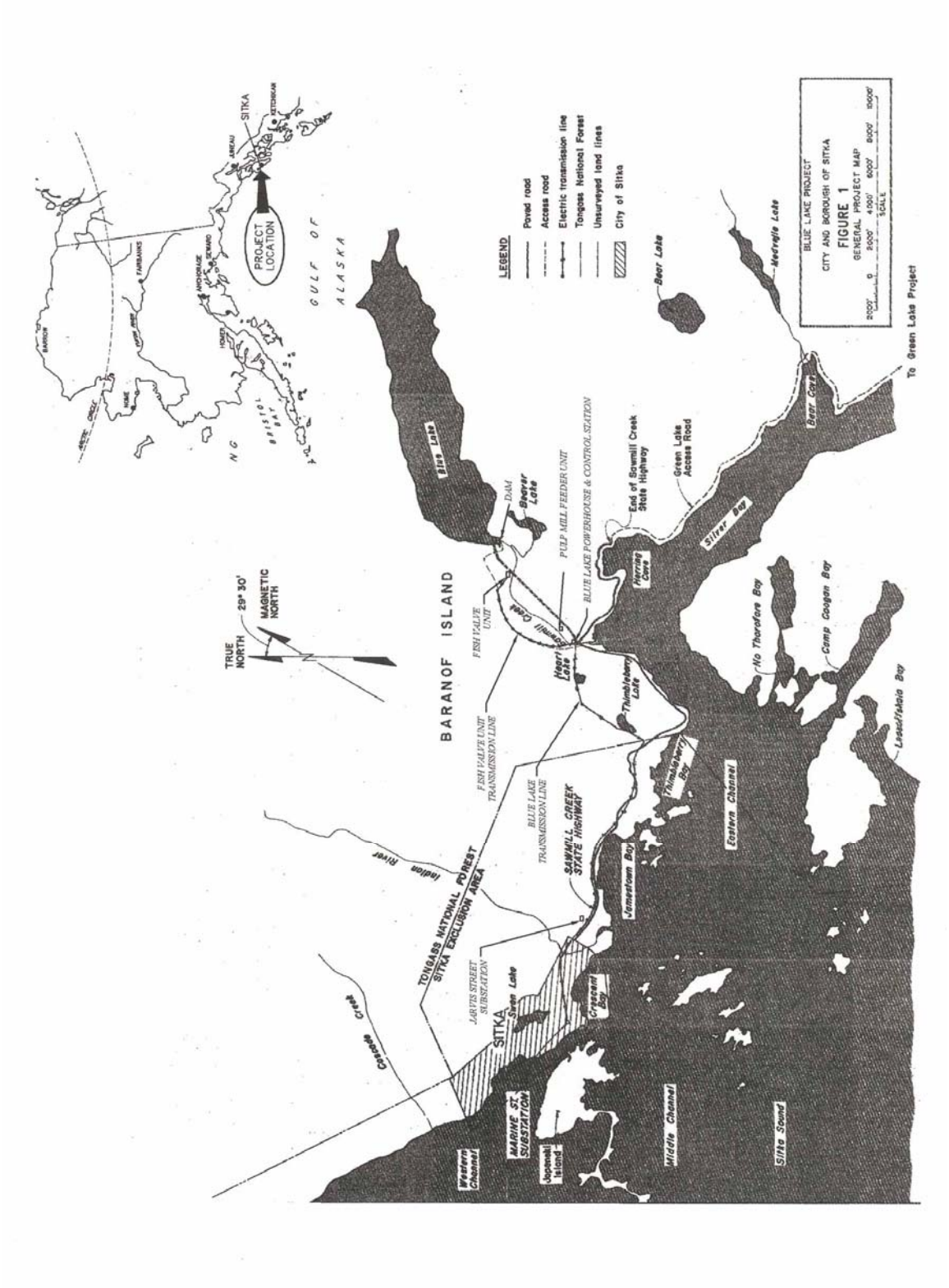

Figure 1. Blue Lake Project Area Map

Figure 2. Blue Lake Project Map Showing Project Features and Waterways.

Reservoir

A reservoir, known as Blue Lake Reservoir, was created when the dam raised the natural Blue Lake water surface from El 208 to El 342 and increased the lake surface area from 490 to 1,225 surface acres. Blue Lake is 3.25 mi long and 0.625 mi in average width. The deepest point is at El minus 126 at a depth of 468 feet below the lake surface at spill elevation. The reservoir has gross storage capacity of 145,200 acre/feet (af) and usable storage of 102,200 af at spill level. A submerged concrete intake structure is located approximately 400 feet north of the dam at El 210.

Power Conduit

A 7,110 ft. long power conduit extending from the intake structure to the Blue Lake powerhouse branches to provide water to the various powerhouses and other facilities described below. Figure 3 is a schematic representation of the Blue Lake Project power conduit system and associated taps and branches.

The power conduit consists of an upper tunnel with an unlined, 11.5 ft. diameter modified horseshoe cross-section extending 1,500 feet from the intake structure to the upper penstock on the right side of Sawmill Creek. The upper penstock, an 84 in. diameter, 460 ft. long, steel pipe crosses the stream supported on concrete piers and enters the lower tunnel on the left side of Sawmill Creek. The 4,650 ft. lower tunnel has an unlined, 10 ft. diameter modified horseshoe cross-section and extends to the lower penstock.

The lower penstock, an 84 in. diameter, 500 ft. long, steel pipe, has two taps immediately below the lower tunnel portal. A 36 in. tap supplies water to the Pulp Mill Feeder Unit and a 24 in. tap supplies water to the Sawmill Cove Industrial Park (SCIP), site of the former Alaska Pulp Company (APC) mill.

Approximately 90 feet below these two pipes is a 20 in. tap (the “water supply tap”) leading into the adjacent water treatment plant for municipal water supply. Approximately 50 feet below this tap is an 84 in. butterfly valve which allows shutdown of the main powerhouse and dewatering of the turbines while maintaining water to the Industrial Park and the Water Treatment Plant.

At the end of the lower penstock is a manually operated 24 in. conduit drain valve which discharges into Sawmill Creek.

Project Powerhouses

The project consists of three powerhouses, including the Blue Lake, Fish Valve Unit and Pulp Mill Feeder Unit powerhouses. The Blue Lake powerhouse is the primary

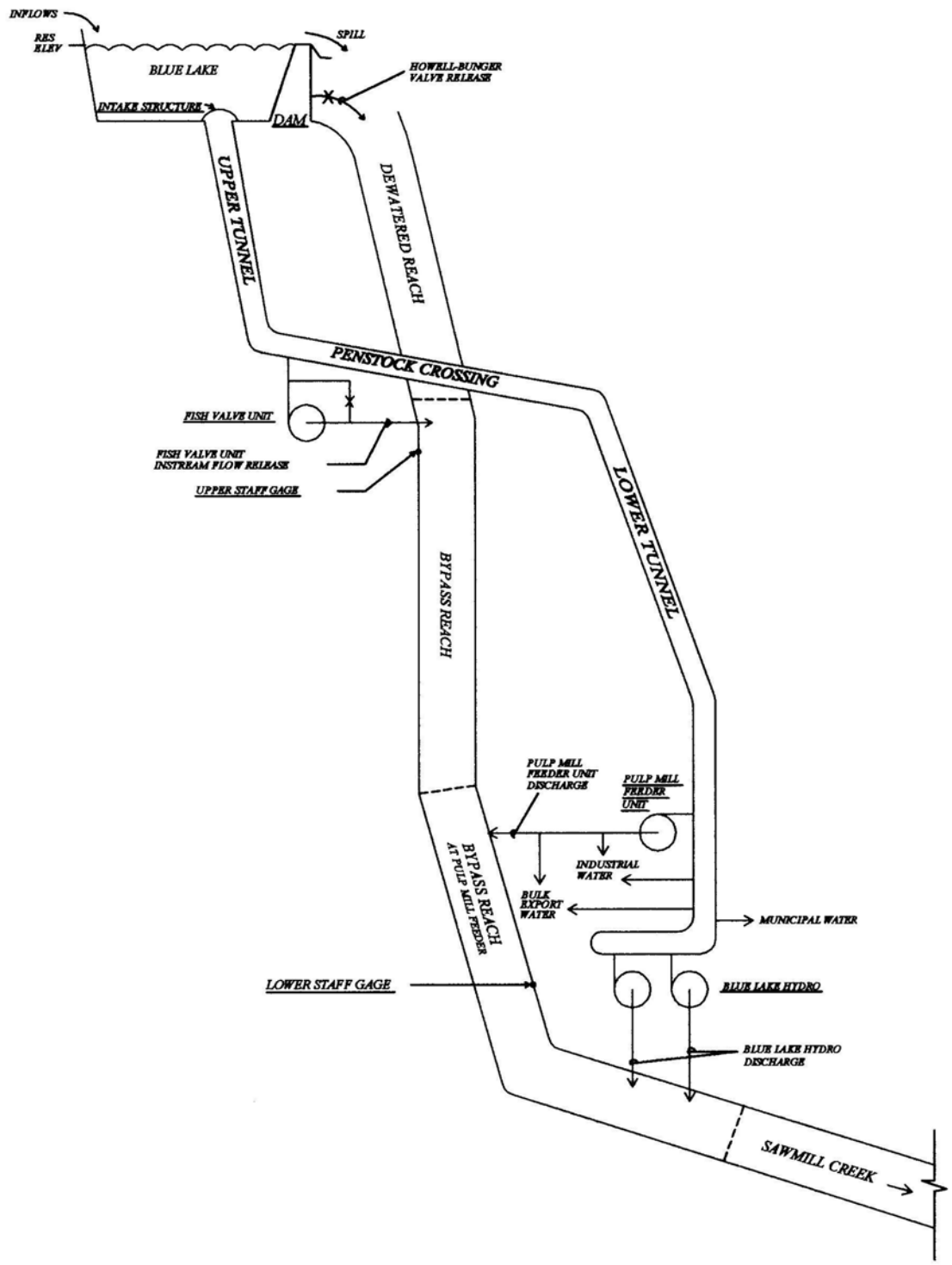

Figure 3. Schematic of Blue Lake Project Power Conduit System

generating unit, and the other two units provide additional generation capacity, as described in detail below.

Blue Lake Powerhouse

The Blue Lake Powerhouse houses the primary Project generating units. It is located on the left bank of Sawmill Creek at SM 0.32 and is a 35 ft. X 70 ft. steel superstructure, precast walls and concrete foundation structure housing two horizontal shaft Francis turbines each rated at 3000 kilowatt (kW) with provision for future installation of a third unit (Figure 4). The turbines discharge water into the approximately 150 ft long tailrace which carries water from the turbines to Sawmill Creek.

The Blue Lake Switchyard, located adjacent to the powerhouse, receives generation energy from the Blue Lake powerhouse, the Fish Valve Unit and the Pulp Mill Feeder Unit (described below). The switchyard includes 12.47/4.16 kV and a total of seven 2500 kVA single phase, 4.16/69 kV transformers, with associated bus-work and disconnect switches. This provides for redundant installed transformers and a total capacity of 15,000 kVA. Power from the Green Lake Project, FERC No. 2818, another hydroelectric facility owned by the City of Sitka, is also transmitted to the Blue Lake switchyard at 69 kV.

By FERC Order Amending License dated September 6, 1991, the Project was modified to include two additional generating units. These were:

Fish Valve Unit (FVU)

The FVU, located at SM 1.62, generates power from flows released for instream purposes through a valve located about 1900 ft. downstream of the dam (Figure 5). It is housed in a concrete powerhouse located approximately 175 feet below the upstream end of the upper penstock on the right side of the stream. A 36 in. diameter wye branch on the upper penstock supplies water to the FVU. An automatic bypass valve opens when the Fish Valve Unit is tripped off-line to maintain the required flow of 50 cfs in the stream at all times. A single Francis turbine spins a generator rated at 670 kW.

Pulp Mill Feeder Unit (PMFU)

The PMFU generates power from the water supply to the former Alaska Pulp Corporation (APC) filter plant. Since closure of the APC plant in 1993, the PMFU uses releases for bulk water export and other future uses. The PMFU consists of a 36 in. tee connected to the existing pulp mill feeder pipe and a 36 in. diameter, 24 ft. long penstock from the tee to the generating unit (Figure 6). The single horizontal shaft Francis turbine spins a generator rated at 870 kW.

Regular PMFU operation was discontinued in 1993 because of shutdown of the APC mill. The unit was returned to intermittent service in August, 2003.

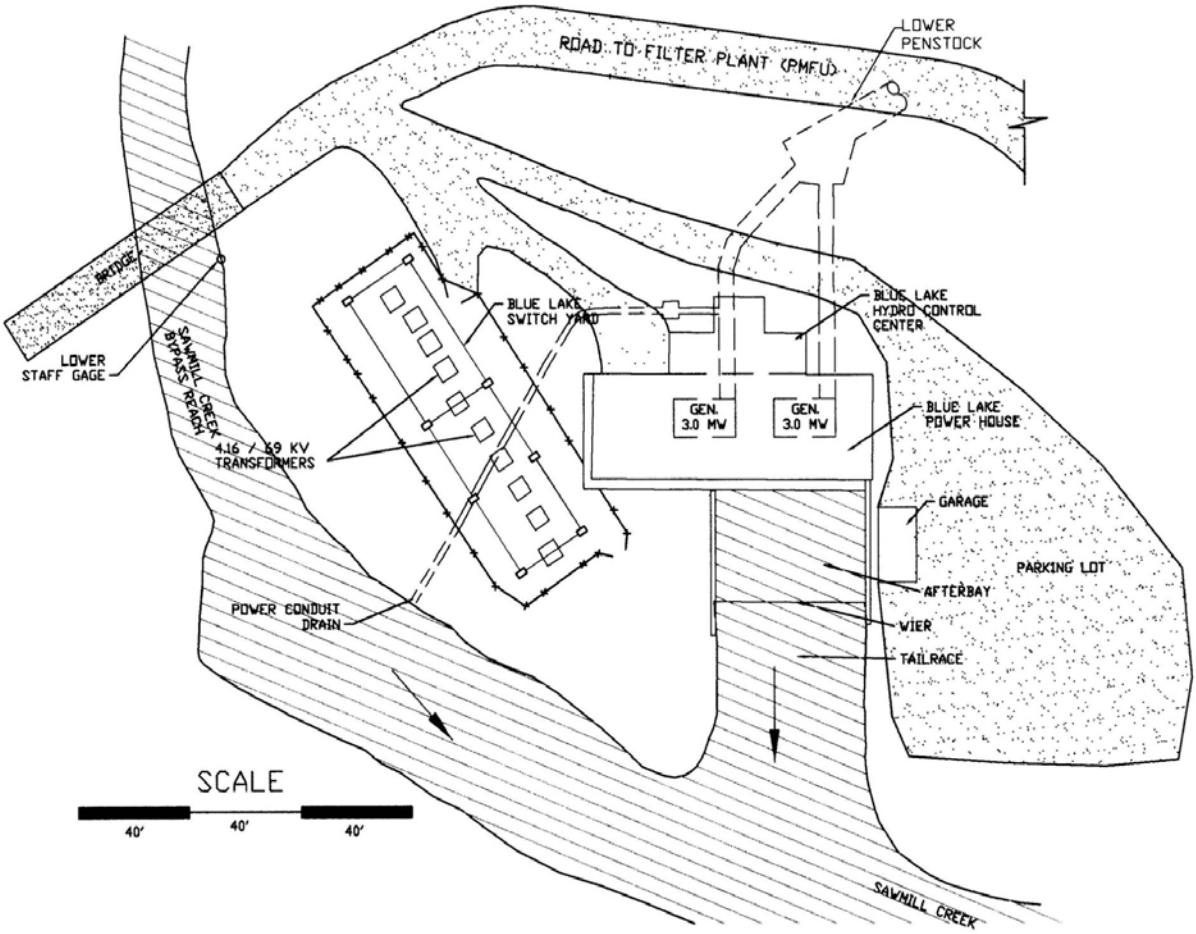

Figure 4. Blue Lake Generating Unit

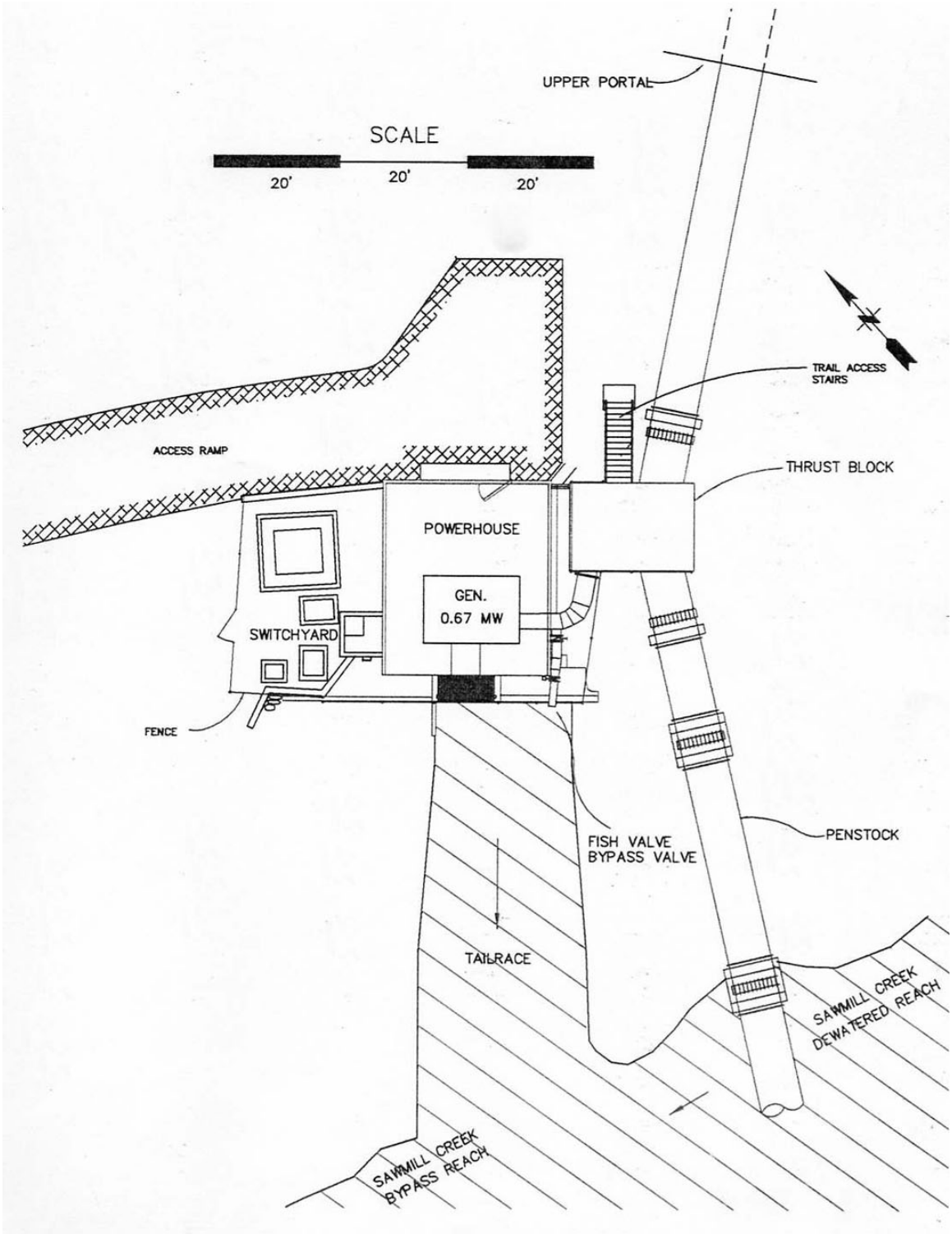

Figure 5. Fish Valve Unit Components

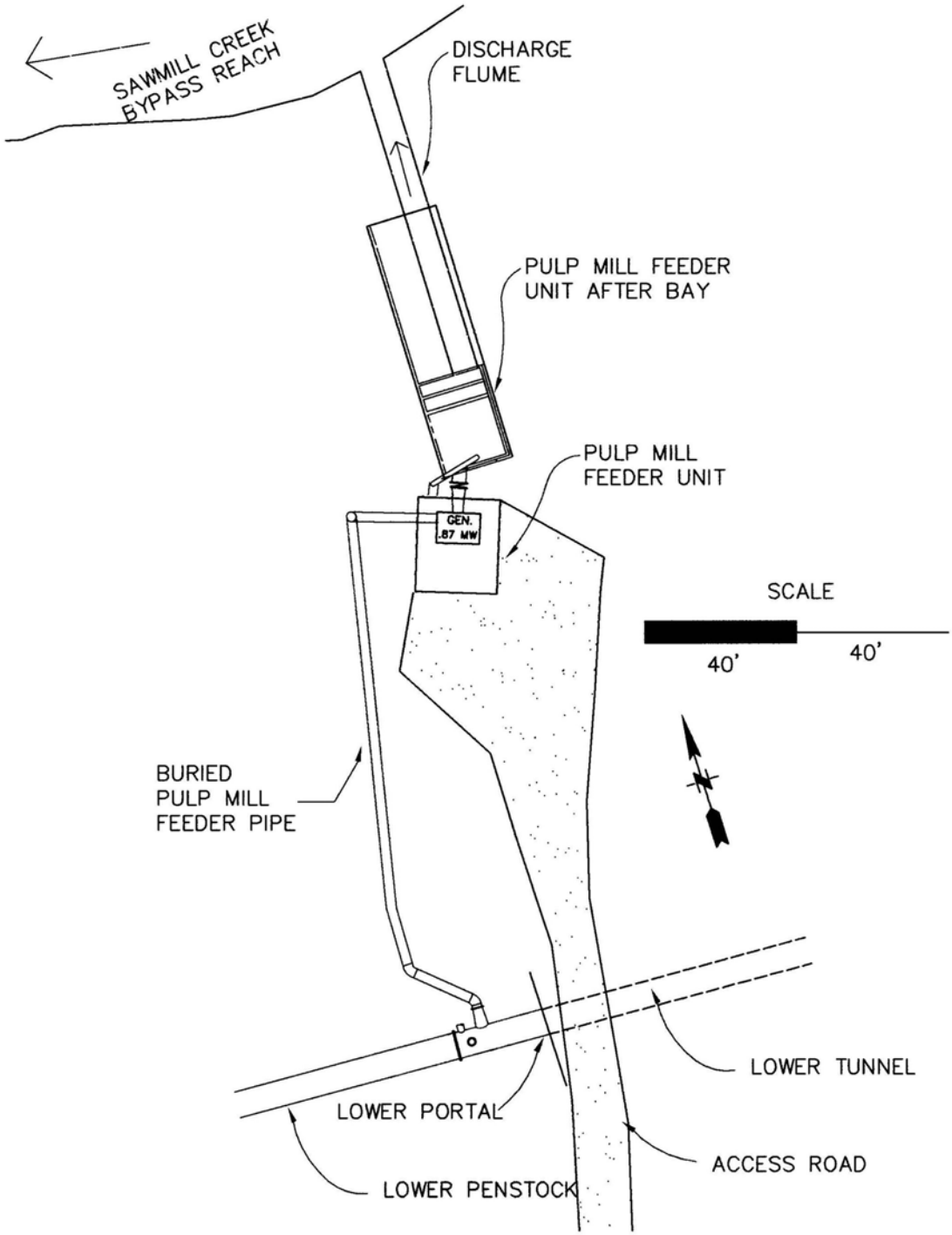

Figure 6. Pulp Mill Feeder Unit Components.

Transmission Lines

Blue Lake (Sitka) Transmission Line.

A 69 kV *Blue Lake (Sitka) transmission line* extends 5 mi. from the Blue Lake Switchyard to the Jarvis Street and Marine Street substations in Sitka. The line consists of both H-frame and single pole, wood structures. The transmission line right of way occupies 67.7 acres of land. 12.8 acres of this land is administered by the U.S. Forest Service. The remainder is administered by, the State of Alaska along the Sawmill Creek Highway right of way, the city of Sitka, and private land owners.

Pulp Mill Feeder Unit Transmission Line.

Power from the PMFU is transmitted at 4.16 kV over a 470 ft. long, underground transmission line to the Blue Lake Powerhouse and connected to the main generation bus.

Fish Valve Unit Transmission Line.

Power from the FVU is transmitted over a 12.47 kV, transmission line 7,700 ft. long to the Blue Lake switchyard where it is transformed to 4.16 kV and connected to the main generation bus. The first 1,400 feet of the transmission line through the U.S. Forest Service Sawmill Creek recreation area is underground. The remaining portion is overhead.

Access Roads.

The dam access road is the USFS road No. 5755 (Blue Lake Road) and extends 2.18 miles to the dam from Sawmill Creek Road. Just downstream of the FVU, a footbridge bridge crosses Sawmill Creek at SM 1.57. Access to the Blue Lake powerhouse and the PMFU is along a licensee owned road connected to Sawmill Creek Road at mile 5.5; access to the FVU is via USFS road No. 5755. At SM 0.38, the Blue Lake Powerhouse bridge crosses Sawmill Creek just upstream of the Blue Lake powerhouse.

2.1.3 Project Lands

The existing facilities of the Blue Lake Project occupy a total of 133.9 acres, consisting of 25.1 acres of U.S. lands administered by the Forest Service and 108.8 acres of non-federal lands.

The project lies within U.S. Geological Survey Sitka A-4 and A-5 Quadrangle maps, within the land descriptions presented in Table 1.

Table 1. Land Descriptions of Blue Lake Project Features.

Project Features	Map Locations
Dam, Spillway and Intake Structure	Section 35 of T55S, R64E, Copper River Meridian.
Power Conduit	Sections 34 and 35 of T55S, R64E, Copper River Meridian.
Fish Valve Unit	Section 34 of T55S, R64E, Copper River Meridian.
Pulp Mill Feeder Unit	Section 34 of T55S, R64E, Copper River Meridian.
Blue Lake Powerhouse	Section 34 of T55S, R64E, Copper River Meridian.
Primary Transmission Line	Section 33 & 34 of T55S, R64E, Copper River Meridian; Section 4, 5 and 6 of T56S, R64E, Copper River Meridian; Section 1 of T56S, R63E, Copper River Meridian; Section 35 & 36 of T55S, R63E, Copper River Meridian.

2.1.4 Project Operation

2.1.4.1 Project Role in Sitka's Electrical System

The Blue Lake Project is operated in conjunction with the Green Lake Project to meet the City's electric demand ("load"). The Blue Lake powerhouse is the control center for Sitka's entire electric system and is manned around the clock. Generally, the Blue Lake Project is operated as a "base-load" resource, that is, at a pre-set generation output. The Green Lake Project is used for "load-following" or at a continually changing generation output to meet the shifting load in addition to Blue Lake generation. Generation is also allocated between the Blue Lake and Green Lake Projects to manage storage levels in the reservoirs. Back-up generation for the hydroelectric system is supplied by four diesel powered electric generators totaling 11.9 MW nameplate capacity. The 2002 annual electric system load was 99024 Megawatt hours (MWh).

Blue Lake reservoir levels are determined by two major factors: 1) reservoir inflow, resulting from precipitation and/or snowmelt, and 2) water releases for hydroelectric generation, spill, instream flow needs, municipal water use and water sales.

Hydroelectric generation is the largest of these releases, and has the greatest effect on Blue Lake reservoir levels.

Reservoir inflow is highest in summer and fall due to snowmelt and rainfall. During mid-winter, inflow decreases because precipitation is stored as snowpack. Sitka's electrical loads vary during the year due primarily to energy needs for heating. Demand is highest in winter and lowest in summer (Figure 7).

Because electrical load is lowest in summer and early fall, when inflow is highest, reservoir levels generally rise during this period. During winter, increased loads and reduced inflow cause the reservoir level to fall. Often, in early fall during the highest period of precipitation, reservoir levels exceed the height of the dam and water is "spilled" over the spillway at EL 342. Spilling in particularly wet years may last for several months. The reservoir is operated to maintain the highest possible level to maximize generation unless lower levels are desired for maintenance operations. Typically the lowest normal operational level is about El 280 at current load and average precipitation.

2.1.4.2 Project Operation Criteria

The Project is operated according to conditions in the Original FPC License and certain license Amendments (described above) which specify Sawmill Creek streamflows. In addition, the City controls Blue Lake reservoir elevations on a monthly basis to assure adequate storage (in conjunction with the Green Lake Project), flood protection capacity, and maintenance access to the dam and intake, as required.

The City is required, under provisions of the Original license, to release flows for instream purposes ("instream flows") at the FVU, which generates power from these releases. From May through November, the minimum instream flow requirement is 50 (cfs), regardless of reservoir elevation. The license Amendment of 1977 provided that, from December through April, the 50 cfs flow could be reduced if the lake elevation

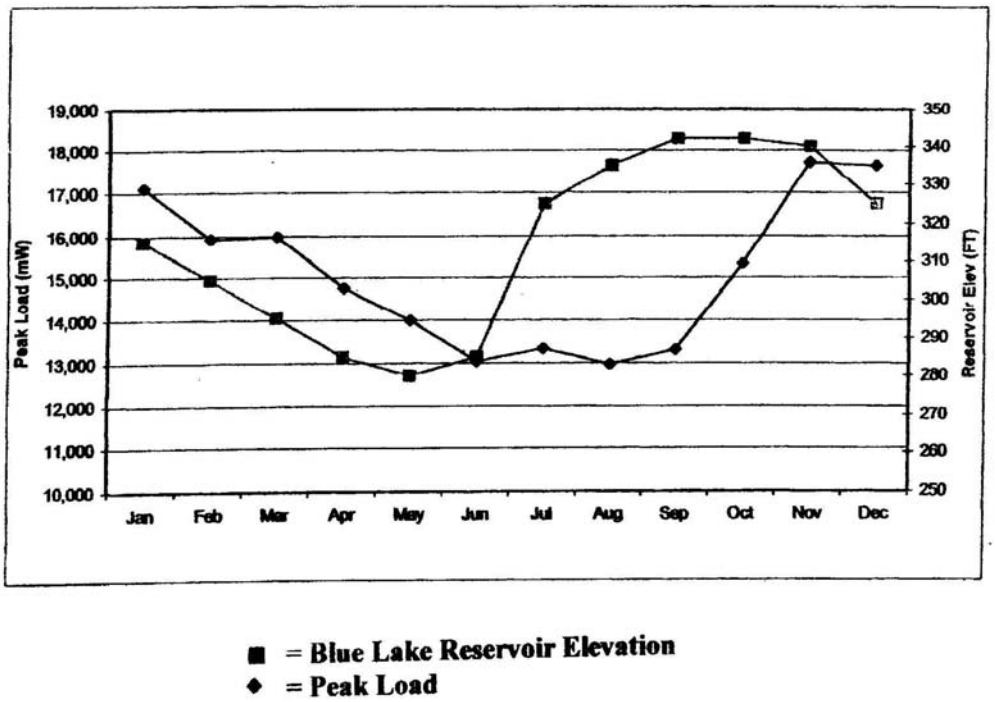

Figure 7. Typical Monthly Peak Loads and Reservoir Elevations, Blue Lake Project

dropped below certain critical levels (Table 2). Since the FVU was installed in 1992, the City has consistently exceeded the minimum Sawmill Creek instream flow requirements.

Table 2. Sawmill Creek Minimum Instream Flow Requirements Allowed at Various Blue Lake Levels (FERC Order Dated September 7, 1977).

Month	Lake Surface Elevation (feet)	Minimum Flow (cfs)
December	336	37
January	324	22
February	311	22
March	295	22
April	274	22

An automatic bypass valve opens when the FVU is not operating to maintain the required flow of 50 cfs in the stream. The reservoir release valve is used to maintain flow in the stream when the power conduit is out of service.

In addition to hydroelectric generation and instream flows, water is also released from Blue Lake reservoir to serve commercial interests, including bottled water and bulk water export operations located at or near the SCIP. The water rights for bulk water export, held by the City, require that withdrawals for this purpose cease when reservoir elevations fall below the elevations listed in Table 3. This is to assure priority for instream flow releases.

Table 3. Blue Lake Reservoir Elevations Below Which Bulk Water Export Must be Discontinued.

Month	Lake Surface Elevation (feet)
March	285
April	255
May	252
June	265
July	294
Aug-Feb	295

Pulp Mill Feeder Unit operation.

The PMFU was installed to generate power from process water for the APC mill. The mill was closed in 1993 and the PMFU operated only periodically. The PMFU was reactivated in August, 2003. This unit will be used to deliver water for bulk export and other potential uses. Water from the PMFU is discharged into Sawmill Creek when the water is not used concurrently for other uses.

2.2 APPLICANT'S PROPOSAL

2.2.1 Applicant's Proposal

The Applicant's Proposal at the time of the PDEA consisted of two primary measures, associated with fisheries and recreation issues evaluated in the Environmental Consequences sections, below. Based on comments on the PDEA and further consultation with resource agencies and the Sitka Tribe of Alaska, elements of the PDEA proposals have been refined and/or replaced, and new elements added, as described in the following section.

2.2.2 Proposed Environmental Measures

The Proposed Action includes the following measures to protect, mitigate and enhance resources:

1. **Implement the Preferred Instream Flow Alternative, as Follows:**

    - From April 15 through June 30, minimum instream flow, as assured by releases from the Fish Valve Unit (FVU), shall be 70 cubic feet per second (cfs) or maximum hydraulic capacity of the Fish Valve Unit, at the concurrent reservoir level, which- ever is less. During the remainder of the year (July 1-April 14) minimum instream flow, also assured by releases from the FVU, shall be 50 cfs.

2. **Remove Current FERC License Conditions Affecting Project Operations at Specified Blue Lake Reservoir Levels, shown in Tables 2 and 3. Specifically:**

    - Remove the condition from original License Article 401 allowing instream flow to be reduced from 50 cfs to either 35 or 27 cfs when Blue Lake reservoir falls below specified elevations; and

    - Remove the condition from License Article 401 (as amended in 1991) restricting releases for bulk water export when Blue Lake reservoir falls below specified levels.

3. **Implement Ramping Rate Restrictions, as Follows:**

    For instream flow changes caused by project operations, the Licensee shall observe specified ramping rate restrictions at all times. The ramping rate specifications and conditions will vary depending on whether normal or non-normal operating conditions, described below, apply.

    - **Normal Operation**

Normal Operation is defined as operation during those periods when the Fish Valve Hydroelectric Generating Unit (FVU) is the sole source of controllable water discharge into the bypassed reach of Sawmill Creek. The FVU is normally operated to assure various instream flow rates. Normal Operation ramping conditions are intended to assure that changes in flow from the FVU to meet instream flow requirements do not exceed specified rates.

During Normal Operations, the Licensee shall operate the FVU to assure the following periodic up- and down-ramping conditions:

Time Period	Up-ramping Rate	Down-ramping Rate
April 1 – July 15	0.2 ft/hr	0.1 ft/hr
July 16 – Sept 30	0.1 ft/hr	0.1 ft/hr
Oct 1 – March 31	0.2 ft/hr	0.2 ft/hr

The ramping rate shall be measured as change in stage over a 1 hour period at the Upper Staff Gage which is installed at the Sawmill Creek Bridge near the US Forest Service campground at Sawmill Creek SM 1.57.

- **Non-normal Operations**

Non-normal Operations are defined as those outside the normal daily operation of the FVU, specifically, operation of the Howell-Bunger release valve in the Blue Lake dam and the FVU Bypass Valve. No ramping restriction will apply when these devices are in use. However, during non-normal operations the City will minimize ramping rates to the extent possible given equipment constraints and needs for worker safety.

4. Reconstruct The Parking Lot at The Intersection Of Blue Lake Road and Sawmill Creek Road (Per APC Drawing G-176).

- Remove trees and existing vegetation;
- Resurface parking lot;
- Replace Culverts;
- Provide parking stops;
- Provide signage

5. Improve The Overlook of Blue Lake at the Terminus of the Blue Lake Road at Blue Lake.

- Resurface existing overlook area, retain existing dimensions;

- Assure wheelchair accessibility;
- Provide parking spaces and stops;
- Install rock barrier at overlook;
- Signage restricting access on road to lake
- Install seating overlooking lake

6. Improve the Campground at Sawmill Creek.

- Install drainage channel through drive-around;
- Reconfigure campground drive-around;
- Relocating host site, evaluate power delivery to host site

7. Protect and Enhance Steelhead Habitat at Indian River.

- Remove abandoned heavy equipment (shown on Figure 10, Indian River Master Plan, IRMP),
- Remove car bodies Reach 3, IRMP;
- Evaluate paintball course and removal of associated debris;
- General trash removal to be determined by stream survey throughout Reaches 1-3, IRMP;
- Pave Indian River Road
- Work with the Alaska Coastal Management Program to establish and maintain a buffer zone on Indian River. The buffer zone proposed through the Coastal Zone Management Program is: "a buffer of a natural vegetation zone within a minimum of 25 feet along either side of the 100-year floodplain.

8. Install Parking and Safety Measures on Blue Lake Access Road.

- Resurface selected existing turnouts on the Blue Lake Road to accommodate safe stopping areas and temporary parking.
- Install selected sections of guardrail or other type of barriers on dangerous curves in the road, totaling approximately 600 lineal feet to assure driver safety.

2.3 Agency and Interested Party Recommendations [Mandatory Conditions and 10(j)]

At the time of this document, no formal recommendations have been submitted by consulting agencies or the STA. We expect that, in response to the Applicant's Proposal, above, agencies and STA will issue written comment leading to negotiations and recommendations.

2.4 No Action Alternative

Under the no-action alternative, the Blue Lake Project would continue to operate as required by the existing Project license. No change to the current environmental setting the Project area

would occur. No alterations or enhancements to existing environmental conditions would occur. The no-action alternative is used to establish a baseline environmental conditions for comparison with the other alternatives.

2.5 Alternatives Considered but Eliminated from Detailed Study

2.5.1 Raising Blue Lake Dam Height.

During the Initial Consultation Stage, the City discussed an alternative to raise the height of the Project dam to increase generation and operational flexibility. After further consideration of that alternative, the City announced at a study planning meeting held with fish and wildlife agencies in April, 2003, that it was no longer considering raising the dam. All changes in downstream release and Blue Lake levels will be considered based on the current dam height.

2.5.2 Installation of Third Turbine

In the DLA, the City evaluated installation of a third turbine at the BLU, and preliminarily selected this as the Preferred Alternative. Subsequent agency review and comment led to the City's decision not to proceed with this alternative. The reasons for this were 1) the need for extensive additional study and consultation; and 2) the fact that the third turbine alternative would not be needed for several years, and would not be appropriate at the time of final application for license.

2.5.3 Issuance of a Nonpower License

Issuing a nonpower license would not provide long-term resolution of the issues presented. A nonpower license is a temporary license that the Commission would terminate whenever it determines that another government agency would assume regulatory authority and supervision over the lands and facilities covered by the nonpower license. In this case, no agency has suggested its willingness or ability to do so. No party has sought a nonpower license, and the applicant has no basis for concluding that the project should no longer be used to produce power. Thus, in these circumstances, a nonpower license is not a realistic alternative to relicensing.

2.5.4 Retiring the Project

Project retirement could be accomplished with or without dam removal. Either alternative would involve denial of a license application and surrender or termination f an existing license with appropriate conditions. Dam removal would not be appropriate in this case, and the City sees no basis for recommending it. The project provides many social and natural resource benefits that would not be available if the dam were removed.

The second decommissioning alternative would involve retaining the dam and disabling or removing equipment to generate power. Project works would remain in place and could be used for historic or other purposes. This would require identification of another government agency with authority to assume regulatory control and supervision of the remaining facilities. No

agency has stepped forward, and no participant has advocated this alternative. Because the power supplied by the project is needed, a source of replacement power would have to identified. In these circumstances, the City does not consider removal of the electric generating equipment to be a reasonable alternative

3.0 ENVIRONMENTAL CONSEQUENCES

3.1 Description of the Locale

3.1.1 Physiography

The Blue Lake Project area is on the west side of Baranof Island, a major component of the Alexander archipelago in southeast Alaska. Baranof Island, with an area of 1569 square miles, is generally characterized in its northern half by rugged mountainous terrain and by more gentle, but still mountainous topography in its southern half.

In the Project area, the Baranof Mountains rise to heights of over 4300 feet in the Blue Lake basin, and to over 5390 maximum on the island. The Blue Lake basin's topography is the product of both glacial and riverine erosion.

3.1.2 Climate

The climate is the Project area is characterized as marine, with heavy precipitation and mild temperatures. The Blue Lake Project area's temperature and precipitation differ significantly from data for those factors gathered at the Sitka airport. The airport NOAA weather station shows that Sitka receives 86 inches of precipitation per year. Temporary rainfall monitoring done in the mountains near the Project powerhouse shows over 105 inches of precipitation per year.

Average monthly temperature at the airport is 43F, and is expected to be somewhat higher than at the Project location. As with precipitation, temperature changes dramatically with elevation and is significantly lower in the mountains than at the elevations of both Blue Lake and Sawmill Creek. No long-term measured data are available for these areas.

3.2 Cumulatively Affected Resources

According to the CEQ regulations for implementing the National Environmental Policy Act (NEPA) (§1508.7), an action may cause cumulative impacts on the environment if its impacts overlap in space and/or time with the impacts of other past, present and reasonably foreseeable future actions, regardless of what agency or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time to include hydropower and other land and water development activities.

The primary development activity in the project area, in addition to relicensing of the Blue Lake Project, is a fish hatchery proposed by the Northern Southeast Regional Aquaculture Association

(NSRAA). At the time of this application, the hatchery is proposed to produce 200,000 coho salmon smolts per year, of which as many as 60,000 may return as adults. Run management in Sawmill Creek has not been finalized, but there is a proposal to install a weir to divert migrating fish to the hatchery. The timing and effectiveness of this weir will be important in determining overall impacts of the hatchery on potentially-affected resources in Sawmill Creek. Also unknown at this time is the commercial fish management expected when hatchery coho enter the fishery. Increased commercial fishing permits for the area could affect wild-stock Sawmill Mill Creek salmon and steelhead fisheries.

Based on the potential for significant hatchery-related changes in salmon escapement into Sawmill Creek, the following resources are listed as potentially cumulatively affected: 1) fisheries, 2) recreation (including aesthetics), and 3) wildlife. Fisheries effects would relate directly to the presence of a much larger population of coho salmon in Sawmill Creek and the potential for displacement of native stocks by hatchery stocks which pass the weir. Such changes could also affect sport fishing in Sawmill Creek and in the greater sport fishing management area discussed in Geographic Scope, below.

In addition, wildlife resources, such as aquatic mammals and certain birds would be affected if the Sawmill Creek fishery changed. In both cases, these changes could be positive, but could be significant.

Finally, recreation changes could result both in Sawmill Creek and in the greater fisheries management area. It is expected that the increased run of coho salmon would enhance sport fishing opportunities in Sitka Sound and Silver Bay, and could have effects ranging into other salt-water fishing areas on or near Baranof Island.

3.2.1 Geographic Scope

The geographic scope of analysis for the resources that could be cumulatively affected is defined by the physical limits or boundaries of: 1) the proposed action's effect on the resource; and 2) contributing effects from other hydropower and non-hydropower activities. Since the actions affect the resources differently, the geographic scope for each resource may vary.

For fisheries and recreation resources, the geographic scope of cumulative analysis encompasses the Blue Lake and Sawmill Creek watersheds. Based on recommendations from the Alaska Department of Fish and Game (ADF&G), the geographic scope of cumulative analysis for fisheries and recreation resources is the area associated with Game Management Unit 4 as defined by ADF&G. The boundaries of this Unit are defined and discussed in the Fisheries section of this document.

The geographic scope of cumulative analysis for wildlife species is the Sawmill Creek watershed area.

3.2.2 Temporal Scope

Cumulative analyses will include past, present, and reasonable foreseeable future actions and their effects on aesthetic, recreational, fisheries and wildlife resources. Based on a 30-year

relicense term for the Project, the temporal scope will look 30 years into the future, concentrating on environmental effects from reasonably foreseeable future actions. Temporal scope would increase if a longer license term was ordered.

3.3 Geology and Soils

3.3.1. Affected Environment

Geology in the Project area was documented in detail prior to construction of the original dam, tunnel and powerhouse (Athern, 1954). In that report, the authors presented results of both surface investigations and numerous drill holes in the Project area and evaluated subsurface conditions and rock competency.

No more recent geologic or soils information is available for the Project area. No additional geologic or soils surveys were conducted prior to construction of the small hydro features (FVU and PMFU) in the early 1990's. Therefore, information from the Athern report is used in this section.

The lowermost rocks in the Blue Lake area are a series of intricately folded, fractured, and recemented phyllite, graywacke, and argillite beds and lenses. These beds strike approximately North 60 degrees West and either dip very steeply to the southwest or stand vertically. They extend from approximately one mile below the lake outlet to some distance north and east from the inlet to the lake.

Exposed by roadcuts along the highway leading east from Sitka is a layer of volcanic ash that rests on the glaciated bedrock surface. It is dark, chocolate brown in color and varies in thickness from a few inches to about 2.5 ft.

Several light gray dioritic appearing dikes were mapped along the stream channel. Those observed ranged from 1 to 3 feet in width with exposures of limited later extent.

Recent alluvium covers the valley floors, both above the lake and below the outlet to the shore of Silver Bay. The mountain slopes are very steep and overlain by very little overburden of alluvium except where small talus slides will lesser drainage channels.

Considerable major and minor faulting has occurred in the Blue Lake–Sitka area. Two apparently major groups of faults trend northwesterly and easterly. One group of minor faults, no doubt associated with the major faulting, trending approximately east-west.

Geology in the Blue Lake powerhouse area was said to be underlain by the same general sedimentary series.

3.3.2 Environmental Effects and Recommendations

No issues relative to geology and soils were brought up during the Scoping process. The Preferred Alternative has no associated major construction; only surface level activities near parking lots and roads are expected, which would not significantly affect geologic or soils resources.

3.4 Water Resources

3.4.1 Affected Environment

3.4.1.1 Blue Lake

Blue Lake is a 1225 acre water body impounded by the Project dam. Maximum depth of Blue Lake is about 468 feet, placing the lake bottom about 126 feet below sea level. (The Blue Lake basin was carved by glacial activity, resulting in this very deep lakebed point). Blue Lake is generally deeper in the middle and lower (toward the Project dam) areas. Maximum depth at the dam face is 134 feet, but average depth in the upstream end of the lake is only about 20 feet. At maximum pool elevation of El 342, the capacity of Blue Lake is approximately 145,200 acre feet (af).

Clarity of Blue Lake water near the intake is very high, but, due to the glacial source of major inlet streams, is reduced in the upper end of the lake during periods of glacial melt. Most glacial material settles out in the upper areas of the lake.

The quality of Blue Lake water in terms of dissolved solids or pollutants is exceptionally high, as evidenced by the fact that it serves as the City of Sitka's drinking water supply and requires no additional filtration prior to consumption. The City and Borough of Sitka routinely monitors the quality of Blue Lake water. Typical monitoring results are presented in Table 4. Values for various inorganic, microbiological and volatile organic components are considered quite low.

Table 4. Representative Concentrations Of Various Blue Lake Organic And Inorganic Contaminants. (City and Borough of Sitka Water and Wastewater Department data for Calendar Year 2003).

MICROBIOLOGICAL CONTAMINANTS	
Contaminant	**Level Detected**
Total Coliform Bacteria	**None**
Turbidity	**None**
INORGANIC CONTAMINANTS	
Contaminant	**Level Detected**
Nitrate	**1.0 ppm**

Flouride	**4.0 ppm**
Arsenic	**NA**
Cyanide	**0.2 ppm**
VOLATILE ORGANIC CONTAMINANTS	
Contaminant	**Level Detected**
Total Trihalomethane	**80 ppb**
Bromodichloromethane	**NA**
Chloroform	**NA**
Total Haloacetic Acids	**60 ppb**

The temperature of Blue Lake water is somewhat variable, but generally reflects temperature regimes of other large lakes in Southeast Alaska. The City conducted temperature monitoring in Blue Lake and certain of its tributaries during 2002-2005 period (City and Borough of Sitka, 2005, 2006), resulting in data showing that that average surface temperatures vary between 2C and 12C (Figure 8). The 2005 studies indicated that Blue Lake stratified by late summer during the 2005 study season, and that water is uniform in temperature during the winter months.

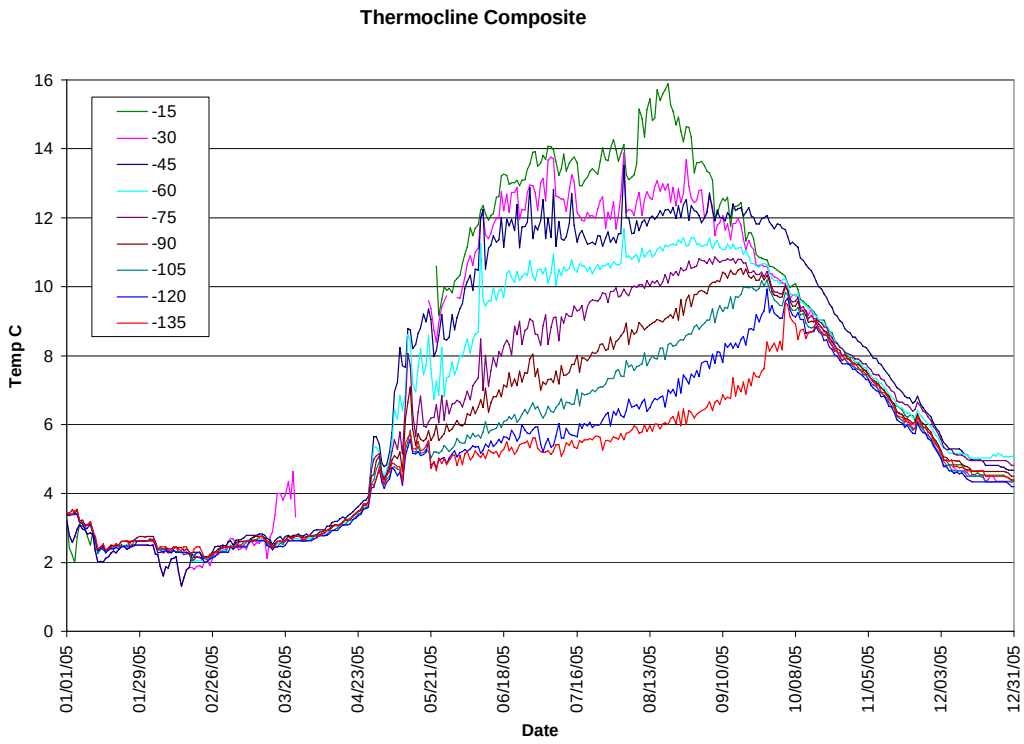

Figure 8. Composite temperatures and depth, 2005 Blue Lake Thermocline Array.

3.4.1.2 Sawmill Creek

Sawmill Creek is a moderately sized stream relative to others in Southeast Alaska.

Average annual flow is Sawmill Creek is 441 cfs, ranging from an average low of 11 cfs in March to an average high of 1690 cfs which may occur from June to October each year depending on rainfall and snowmelt (Table 5, Figures 9 and 10). Recorded maximum flow in Sawmill Creek was 12,000 cfs in 1992.

Table 5. Maximum and Minimum Average Daily Flows in Sawmill Creek, by Month, for 29-year Period of Record. Original USGS Gage 15088000.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Max	**2,270**	**2,410**	**1,250**	**1,050**	**1,640**	**1,780**	**2,170**	**4,940**	**4,980**	**5,500**	**4,430**	**3,770**
Min	**24**	**16**	**11**	**14**	**57**	**308**	**311**	**200**	**71**	**84**	**46**	**34**

Clarity of Sawmill Creek water is generally the same as for Blue Lake, particularly in the stream's upper reaches, before inflow from tributary sub-basins. Sawmill Creek may carry a moderate sediment load during high flows (greater than 500 cfs) and after major rainstorms. Because of the overall good condition of the watersheds both above and below the Project dam, however, sediment input is moderate.

The quality Sawmill Creek water is also considered to be quite high in terms of dissolved solids, pollutants, although there has been no long-term monitoring of Sawmill Creek water as there has been for Blue Lake. It is expected that Sawmill Creek becomes more turbid in a downstream direction after major rainstorms and that there may be in increase in certain organic solids related to inflow of leaf pack and other detritus.

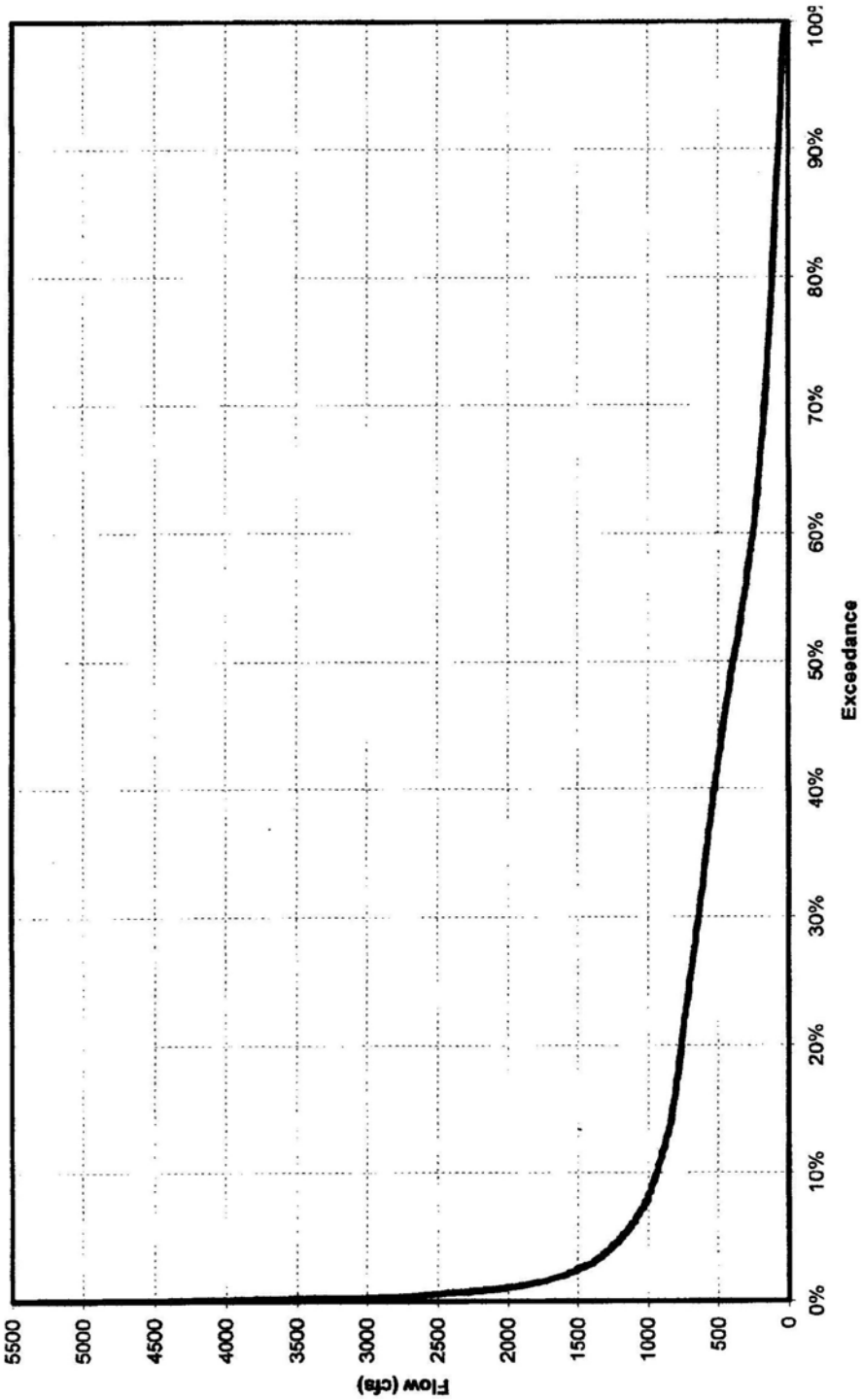

Figure 9. Sawmill Creek Flow Duration Curve.

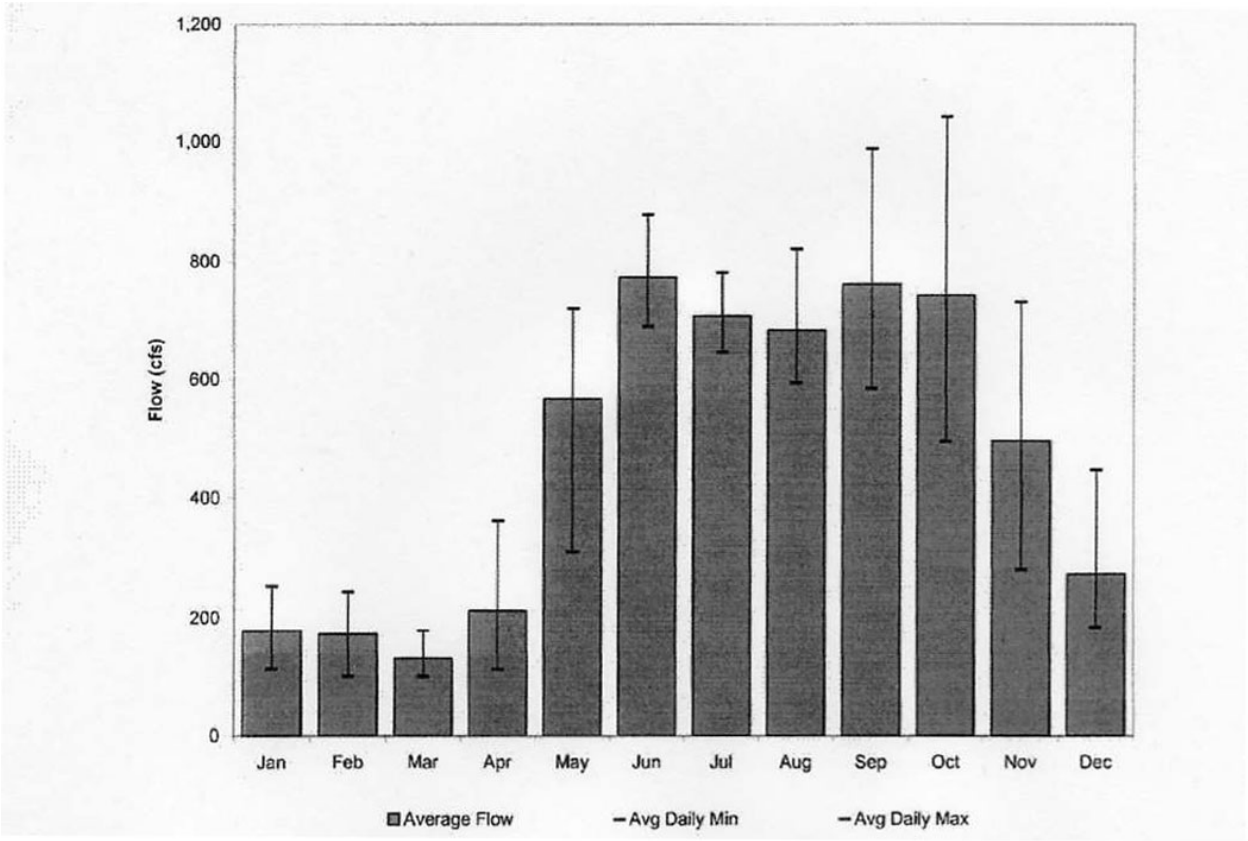

Figure 10. Average Monthly Sawmill Creek Discharge.

The City has monitored Sawmill Creek water temperature for approximately 2 years. Based on results of these studies, Sawmill Creek water temperatures range between 2C and 3C at the FVU and between 3C and 12C at the lower staff gage. This temperature regime characterizes Sawmill Creek as quite cold relative to other moderate-sized streams in Southeast Alaska, possibly because of the incised nature of the stream and resultant low solar insolation.

Sawmill Creek temperature is affected by releases from the Project powerhouses (City and Borough of Sitka, 2006b). During spill periods, Sawmill Creek temperature is close to that measured at the Blue Lake surface. During non-spill periods, Sawmill Creek temperature is about the same as that at the level of the Project intake (about 140 feet deep) in Blue Lake (Figure 11). In Figure 11, the term "boom" on the left side of the graph is the lake-surface temperature monitoring site; the other points are at the various monitoring sites at the designated number of miles downstream of the dam in Sawmill Creek.

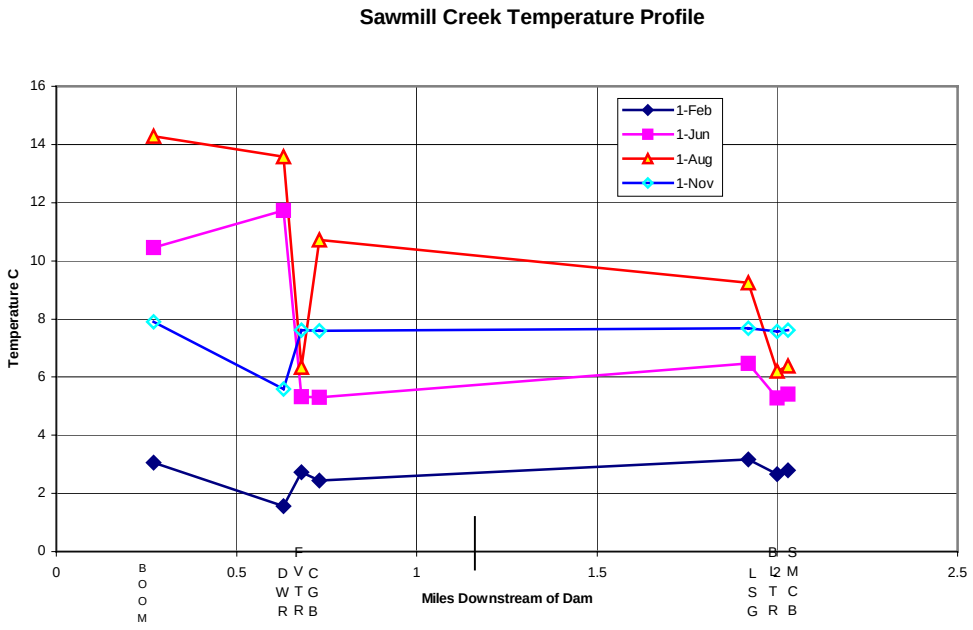

Figure 11. Sawmill Creek temperature vs. distance in miles.

3.4.2 Blue Lake and Sawmill Creek Water Rights

Following is a summary of the City & Borough of Sitka's water rights and allocations for the Blue Lake watershed (Table 6).

Table 6. Current water rights relating to Blue Lake Project

Water Right	Use	Amount	Cfs equiv.	MGD equiv.	Af/y equiv.	Status
ADL 51543	Hydro	191.4 mgd	296	191.4	214,343	Certificate
"	Drinking water	8.6 mgd	13.3	8.6	9,631	"
ADL 43826	Public industrial water supply	34,722 af/y	48	31	34,723	Certificate
LAS 19669	Bulk export/	14,000 af/yr	19.4	12.5	14,000	Certificate
"	Hydro	1,000 af/yr	1.4	0.9	1,000	"
LAS 11995	Fish habitat	Varies by month				Application
LAS 13236	FVU	36,190 af/yr	50	32.3	36,190	Permit
LAS 13237	PMFU	56,000 af/yr	77.4	50	56,000	Permit
LAS 20526	BL/SMC*					

* These water rights correspond to Blue Lake level and Sawmill Creek release restrictions described in the Project Operation Section.

The City recently submitted a request to ADNR to amend the language of the various water rights in terms and units consistent with current ADNR practice (acre-feet per year with a maximum diversion rate in cubic feet per second) and to better reflect the City's current use of Blue Lake water. At the time of this application, these requests are still pending for action at ADNR.

3.4.3 Environmental Effects and Recommendations

Issue WQ1. Effects of Blue Lake Water Temperature on Sawmill Creek Aquatic Resources.

Whether water temperature from Blue Lake releases might affect aquatic resources in Sawmill Creek. The releases draw water from a zone of the lake which is usually colder than it would be were it drawn from the lake surface, or from the surface of the pre-project lake. Under this issue, the City would evaluate Blue Lake dam release temperatures together with Sawmill Creek temperature regimes, and examine potentials for changes in release temperature regimes.

Response to Issue WQ1.

After discussions with resource agencies on the expense and environmental disturbance associated with installation of multi-level releases (considered the only way to affect the current effects of the Project on Sawmill Creek temperatures), no further comments on this issue were received during consultation. No further agency or City action on this Issue is expected at this time.

Issue WQ2. Effects of Relicensing on existing Sawmill Creek and Blue Lake Water Rights and Related Requirements.

Whether instream flow or Blue Lake level regimes adopted during relicensing would affect existing permanent and conditional water rights in the Blue Lake basin. The Project and its water distribution system are subject to several water rights issued by the Alaska Department of Natural Resources (ADNR), which relate to both Blue Lake reservoir levels or Sawmill Creek streamflows. The water rights address several important water uses. Adoption of different lake levels or streamflow requirements would entail changes in this water rights and use structure. Under this issue, the City would evaluate the extent to which these changes might affect water uses, and the necessity for ADNR to reapportion the Basin's water rights.

Response to Issue WQ2.

As discussed in the Affected Environment section, the City has requested that ADNR modify the language of certain state water rights. Depending on instream flow, project configuration and project operation conditions established in the new license, there may be needs to further modify the existing water rights structure. All changes in water rights language, amounts and other conditions will be afforded full review and comment by relicensing participants prior to adoption by ADNR and/or the FERC.

3.5 Fisheries Resources

3.5.1 Affected Environment

3.5.1.1 Sawmill Creek

Sawmill Creek supports a variety of salmonid and other fish species, including salmon, steelhead and char. Numbers of certain salmon produced in Sawmill Creek are great enough to define Sawmill Creek as a regionally-important base for commercial salmon fisheries. The importance of Sawmill Creek trout and char species to the regional and local sport fisheries is more speculative because Sawmill Creek is not heavily used as a sport fishery relative to other fishing destinations in the region.

Sources of information on Sawmill Creek fisheries distribution, abundance, habitat use and life history include the following:

- Reports by Karl Wolfe of Sitka, a contractor to the City, documenting fish observations and captures in Sawmill Creek during 2001-2004 (Wolfe, 2002-2005);

- A report by the City documenting fish life histories and time ("Periodicity") for use in the instream flow analyses related to relicensing (City and Borough of Sitka, 2004c);

- The Alaska State Fisheries "Atlas", a document, comprised of descriptive text and maps, which officially lists and shows the distribution the fish species which inhabit various streams and lakes in a region (ADF&G, 2005).

Information in this section is derived from these source reports and from communications with ADF&G personnel in Sitka regarding Sawmill Creek's contribution to the area's commercial and sport fisheries.

General Description of Sawmill Creek Fishery Habitats

Fish sampling was conducted within six stream reaches, established according to differences in fish habitat type, stream gradient or access considerations were developed (Table 7). Several project features referenced in this report are more fully described in the Initial Consultation Document (ICD, City and Borough of Sitka, 2002) and Scoping Document (SD1), City and Borough of Sitka, 2003.

The "Falls" referenced in the Reach designations is at Stream Mile (SM) 0.73 and is a major stream feature approximately 23 feet high. The "Slot", an area in which Sawmill Creek passes through an extremely narrow canyon constriction, is located from SM .95 to SM 1.06, and the FVU is the project powerhouse at SM 1.63 at which minimum stream flows are released into Sawmill Creek.

Table 7. Sawmill Creek Reach Numbering from Lower Powerhouse Bridge Upstream To Base Of Blue Lake Project Dam.

Stream Reach and Location (Name)	Identifying Aquatic Habitats and Stream Characteristics
Reach 1 (Index Survey Area)	**From Project tailrace-Sawmill Creek confluence (SM 0.32) upstream to top of Index Area. (SM 0.42)**

Reach 2	**Inlet of Index Pool to the Pulp Mill Feeder Pool (SM 0.53) (Includes Concrete Area)**
Reach 3	**Pulp Mill Feeder Outflow pool to the base of the Falls (SM 0.73)**
Reach 4	**From the top of the Falls to the Slot outflow (SM .95)**
Reach 5	**From Slot outflow to Fish Valve Unit (SM 1.63)**
Reach 6	**From the Fish Valve Unit to the base of the Project dam (SM 2.03)**

Sawmill Creek Fish Species

Results of the fisheries studies and reports cited above and accounts of local sport fishers and ADF&G personnel, indicate that six salmonid species utilize Sawmill Creek. Salmonid species listed as utilizing Sawmill Creek are:

Common Name	**Scientific Name**
Coho salmon	*Oncorhynchus kisutch*
King salmon	*O. tshawytscha*
Pink salmon	*O. gorbuscha, and*
Chum salmon	*O.* keta
Steelhead trout	*O. mykiss*;
Dolly Varden char	*Salvelinus* malma
Arctic grayling	*Thymallus arcticus*

The only other fish species found in Sawmill Creek were the staghorn sculpin (*Leptocottus armatus*) and prickly sculpin (*Cottus asper*).

No anadromous fish of any species were observed or captured upstream of the Falls at SM 0.73 in the Wolfe studies. The Anadromous Fish Atlas (ADF&G 2005) lists four anadromous fish species in Sawmill Creek: coho, pink and chinook salmon, and steelhead trout. The ADF&G Atlas shows the upstream range of these species in Sawmill Creek to be the vicinity of the Falls.

Sawmill Creek Salmon Stocks in Relation to Regional Salmon Management

Sawmill Creek is part of ADF&G's Sitka Management Area and in District 13, the geographical unit defined for management of commercial salmon fisheries in the region. District 13 consists of all outside waters between Cross Sound and Cape Ommaney as well as the waters of Peril Strait and Hoonah Sound. The District is further subdivided into three Sections (13-A, 13-B, and 13-C) with the waters of Sitka Sound part of Section 13-B. Smaller geographical units, called Subdistricts, are used for reporting of commercial salmon landings to ADF&G.

Sawmill Creek is also located in Subdistrict 113-35 which is the Subdistrict used to define the Silver Bay Special Harvest Area (SHA) for the Medvejie Hatchery (see following section). This Subdistrict includes all water of Silver Bay east of a line extending across the entrance of Silver Bay from Entry Point.

Of the various salmon stocks in the District, numbers of pink salmon are the largest, followed by chum salmon. Sockeye, coho and king salmon comprise the remainder of the salmon escapements in the District. Commercial fishing within the District is an important component of the regional and local economies, ranking high among Southeast and South-central Alaska's most extensive commercial fisheries.

Commercial seine fish management objectives within the District focus primarily on pink and secondarily on chum salmon.

Regional Salmon Hatcheries

Abundance and population characteristics of certain Sawmill Creek salmon stocks are affected by the presence of extensive fish hatchery and rearing facilities operated by the Northern Southeast Aquaculture Association (NSRAA). NSRAA is one of several privately-owned and operated, non-profit, Regional Aquaculture Associations in Southeast Alaska, authorized under special Alaska legislation to produce commercially important salmon species.

The primary hatchery operations which influence Sawmill Creek salmon stocks are the Medvejie hatchery and the Deep Inlet and Green Lake rearing areas, all of which are located in or near Silver Bay within 10 miles of the Project area.

Medvejie Hatchery is located 3 miles from Sawmill Creek's confluence with Silver Bay and produces chum, chinook and coho salmon.

Chum salmon returns to Medvejie have averaged 2.1 million fish over the last ten years, 1994-2003, with returns topping 3 million from 1998-2000. The commercial harvest has averaged 1.8 million fish over this same ten year period. A record 3.66 million chum returned in 1999. Most of the fish are harvested in the Deep Inlet harvest area located across Eastern Channel from Sitka by seiners and gillnetters. Trollers also harvest these

chum salmon, primarily just outside of the terminal harvest area. Over the past ten years the troll catch has averaged 205,000 chum per year.

In recent years, Medvejie has been the most successful chinook program in Southeast Alaska in terms of commercial and sport contribution. Returns have averaged 32,000 chinook over the past 10 years. These fish are primarily harvested during special May and June openings for trollers. Contribution to the troll fleet has averaged 8,060 chinook over the past 10 years (1994-2003). The sport catch of Medvejie chinook has averaged over 2,700 fish over this period. In some years, Medvejie chinook have represented 30% or more of the chinook entered in the Sitka Salmon Derby.

Medvejie began a major expansion of its chinook program in 1997. This expansion, which involves rearing fry in net pens in Green Lake, has doubled the hatchery's chinook production. This increased production is just now being realized in terms of adult returns: 2003 marks the first year with the Green Lake fish contributing to all major age classes.

NSRAA's coho program has two existing components: a smolt release program near Sitka and a fry stocking program at Deer Lake , which is located about 50 miles south of Sitka. The smolt program primarily benefits the troll fishery, but does contribute to sport and net fisheries as well.

In 2004, NSRAA proposed construction of a hatchery in the vicinity of the SCIP, primarily for production of coho salmon. This hatchery would be fed with water from the Project, estimated to be about 10-20 cfs continuously, year-round. The estimated production of the SCIP hatchery would be about 2,000,000 coho smolts released directly into tidewater, with returns expected to be about 50,000-60,000 adult coho.

In the following sections, general and site-specific life history information is presented for the anadromous salmonid species known to utilize Sawmill Creek.

Pink Salmon

Pink salmon are Sawmill Creek's most abundant species. Average annual pink salmon escapement numbers in Sawmill Creek are greater than 25,000 fish, reaching an observed maximum of over 36,000. Pink salmon have been observed throughout Sawmill Creek to the base of the Falls at SM 0.73 (Wolfe 2002-2005) but are typically most concentrated in the Sawmill Creek delta area downstream of the Blue Lake Powerhouse.

Generally, pink salmon in Southeast Alaska begin their spawning migration in July, and spawn in September. They typically prefer small to medium gravels as spawning habitat. Pink salmon spawning, particularly in tidewater, is highly dependent on upwelling of well-aerated fresh water.

Pink salmon eggs incubate in the spawning gravel until late March and April of the following year when they emerge and almost immediately move downstream to intertidal

areas where they rear as fry and juveniles. It is this immediate downstream movement which distinguishes the early life history of pink salmon from that coho and king salmon and steelhead. The juveniles slowly move into the open ocean, where they mature for one year before returning to fresh water to spawn.

Chum Salmon

Next in relative abundance among Sawmill Creek anadromous salmonids is the chum salmon. Estimated chum salmon numbers in Sawmill Creek have ranged from a low of about 250-300 chum in 2002 to a high of 8,000-9,000 chum in 2004 (Wolfe, 2003-2005). Chum salmon have become regionally important through production in local hatcheries, and increased use of their roe for salmon caviar.

Sawmill Creek chum salmon normally ascend the stream to spawn from to July to early October and reside in the river for about one to two weeks prior to spawning depending on condition upon arrival.

Spawning occurs between mid July and early October and eggs incubate in the gravel until emergence in late March through early June the following year. As with pink salmon, chum salmon fry move immediately after emergence to intertidal areas where they rear for several months. Unlike pink salmon, chum salmon may remain in salt water for three to five years before returning to spawn.

Chum salmon prefer medium gravel substrate for spawning, but will spawn in areas of finer or larger particles, depending on competition from other species. As with pink salmon, chum salmon fresh-water rearing habitat, because of the limited time they spend in fresh water as fry or juveniles, is not normally critical.

King Salmon

King salmon are usually the next most abundant species of anadromous salmonid in Sawmill Creek. Annual escapements have ranged from about 180 in 2004 to 575 in 2003 (Wolfe 2002-2005). It is generally thought that Sawmill Creek king salmon are strays from nearby hatcheries. Emergency order sport fish regulations encourage the taking of king salmon in Sawmill Creek because of this factor.

Sawmill Creek king salmon normally ascend the stream to spawn in early July through August and reside in the river for about two to three weeks prior to spawning.

Spawning occurs between mid July and late August and eggs are presumed to incubate in the gravel until emergence in March. King salmon fry mature in fresh water and , upon becoming juveniles, usually reside in their natal streams for one to two years.

In Sawmill Creek, it is believed that king salmon fry rearing is limited due to a general lack of rearing habitat. No king salmon fry have been observed during the five seasons of study (Wolfe, 2002-2005). King salmon may remain in salt water for as many as six years.

Coho Salmon

Although coho salmon have been observed throughout Sawmill Creek to the base of the Blue Lake Project dam at SM 2.03, no juveniles or adults were documented above the Falls at SM 0.73 during relicensing studies. Surveys from 2001-2004 indicated that Sawmill Creek coho numbers vary from a low of approximately 10 fish to possibly as many as 40 individuals during a typical escapement year (Wolfe 2002-2005).

Coho salmon in Sawmill Creek typically begin their spawning migration in late August or early September. Wolfe (2002-2005) found peak numbers of coho in Sawmill Creek from early October to early November. Spawning occurs from early October through mid November. Coho prefer small to medium gravel as spawning habitat and are not known to travel long distances up rivers to spawn, nor are they noted to ascend cascades or waterfalls greater than a few feet high.

Coho fry emerge from the gravel in late April or early May, and may rear in suitable stream areas, usually slow-moving sloughs or backwaters. They usually rear for two years before moving downstream to saltwater. They spend one, two, or three years in the ocean before reaching maturity and returning to fresh water to spawn.

Wolfe (2002-2005) found few juvenile coho in Sawmill Creek. He found relatively numerous juvenile rainbow trout and few Dolly Varden char in the same sampling areas. Sawmill Creek coho populations are probably limited by a lack of rearing habitat.

Steelhead Trout

Steelhead trout are anadromous (ocean-going) variant of rainbow trout. Sawmill Creek steelhead populations have ranged from about 30-40 fish in 2002 and 2004 to 40-50 fish in 2003.

Sawmill Creek steelhead spawning begins in late April and continues through early June (Wolfe 2003-2005). Steelhead prefer medium gravel as spawning habitat.

Steelhead fry emerge from the gravel in July and August. Steelhead normally rear for up to three years before moving downstream to saltwater. Juvenile steelhead habitat preferences mimic those of resident rainbow trout of the same size classes. They spend one, two, or three years in the ocean before reaching maturity and returning to fresh water to spawn.

Resident Rainbow Trout

Sawmill Creek fisheries surveys have consistently documented rainbow trout which could be either steelhead or residents. It is not possible, even with sophisticated genetic analyses, to distinguish between fish less than about 250mm. Larger rainbow trout (>250mm) observed in Sawmill Creek, however, are most likely resident. As discussed in the Blue Lake section below, rainbow trout have been introduced into Blue Lake on different occasions since the 1930's, and may have spilled over Blue Lake Project dam into Sawmill Creek.

Sawmill Creek resident rainbow trout are found throughout the stream but are concentrated in the reaches between the Project powerhouse and the base of the dam. Sawmill Creek rainbow trout populations support a moderate sport fishery.

Adult rainbow move to spawning areas in early spring and are through spawning by early summer. Eggs overwinter in the gravel and emerge as fry in September. Juveniles may remain in the creek for the remainder of their life, or become smolts and migrate to the ocean.

Larger resident rainbow trout prefer deeper water habitats in Sawmill Creek, especially those with access to more shallow swift water which provides a food source.

Dolly Varden Char

Wolfe (2002-2005) studies show that Sawmill Creek supports small populations of anadromous and resident Dolly Varden char.

Anadromous Dolly Varden in Sawmill Creek typically begin entering the stream in mid- to late July. Peak numbers of in-migrants were seen Wolfe (2002-2005) in early to late August. Anadromous Dolly Varden are known to follow salmon upstream and to consume salmon eggs shortly after deposition. Dolly Varden numbers tend to decline shortly after the end of the pink and chum salmon runs.

Dolly Varden prefer small to medium gravel for spawning. Incubation probably takes 5-6 months. Dolly Varden fry emerge from the gravel in April and May and are found near cover elements such as cobbles and boulders.

Sport fishing for Dolly Varden char in Sawmill Creek is mostly coincidental while angling for other species such as king salmon and rainbow trout.

3.5.1.2 Blue Lake

The primary fish species in Blue Lake is rainbow trout (*O*. mykiss). It is not known whether rainbow trout were native to the Sawmill Creek watershed prior to stocking by the U.S. Forest Service in 1938 and 1939. During this period 9,000 fry, 200 adult

rainbow trout, and 50,000 eggs from Sashin Lake were planted in Blue Lake (Der Hovanisian 1994) . After this initial planting, 8,800 rainbow trout from the Willamette River in Oregon were released in Blue Lake. It is assumed that fish from these plantings spilled over the dam creating resident rainbow trout populations in Sawmill Creek. (ADF&G Sitka Sport fish Summary).

The Blue Lake rainbow trout population has been estimated twice in recent years. Der Hovanisian (1994), using mark-recapture techniques, estimated the total Blue Lake rainbow trout population at 4708, ranging from 3197 and 7093 fish. The City and ADF&G conducted a similar mark-recapture study during summer, 2004, which resulted in an initial estimate of 3604, ranging between 2848 and 4361 fish (City and Borough of Sitka Electric Department, 2006a).

The relatively large size and abundance of Blue Lake rainbow make this sport fishery comparable to the best available in southeast Alaska. Access to some extent limits overall fishing effort, but this limitation appears to have a moderating effect on fish take, resulting in both population and sport catch stability.

Blue Lake rainbow trout spawn in lake tributaries and perhaps along shoreline areas with groundwater upwelling. Of Blue Lake's four primary inflow tributaries, the three at the upper (northeastern) end of the lake probably support the majority of rainbow trout spawning. Spawning occurs in late spring and early summer and is usually complete by the beginning of July. Seasonal Blue Lake level does not appear to affect access to spawning tributaries.

3.5.2 Environmental Effects and Recommendations

Issue F1. Sawmill Creek Instream Flow. Whether the project-related streamflow in Sawmill Creek affects populations of anadromous and resident fish in that waterway. Under this issue, the City would examine potentials for implementation of a new flow regime which might improve fish habitat, water storage needs, and electric generation.

Response to Issue F1.

The City and Alaska state and federal resource agencies and STA have worked cooperatively to complete an Instream Flow Incremental Methodology (IFIM) study on Sawmill Creek [Participants in the IFIM study, including agency and STA representatives, City personnel and contractors, are referred to as the Instream Flow Team (IFT)] (Miller, 2004, City of Sitka, 2005b).

The IFT has agreed that Issue F1 would be addressed by conjunctively using two primary components: Sawmill Creek discharge (Q) vs. Weighted Usable Area (WUA) relationships from the IFIM study for target fish species/life stages; and 2) Results of the Blue Lake System Operations Model (Operations Model, City of Sitka 2005d) in terms of

Sawmill Creek streamflow, Blue Lake elevation and electrical generation aspects of various alternative operations.

Methods, results and discussion of the process used to generate the Preferred Instream Flow and Generation Alternative are complex and extensive, and are presented in detail in Attachment II and City of Sitka 2005e. The Q vs. WUA relationships used in the analysis are in City of Sitka 2005c.

Instream Flow and Generation Analyses.

Three primary Q vs. WUA relationships were used to address Issue F1: 1) spawning for steelhead trout and coho salmon at the Falls Pool IFIM site; 2) rearing for steelhead and coho fry and juveniles at the Pulp Mill Outflow 2 (PMO2) site; and 3) for steelhead juveniles at the Index Pool 1 (IP1) site (Figures 12-14). These sites were selected as those representing the largest and most consistent fish utilization, as described in City and Borough of Sitka, 2005c. Spawning and rearing were observed only at these sites every year of the Wolfe surveys. Inclusion of other sites, we believe, would lead to the need for weighting of flow requirements, a complex and uncertain process.

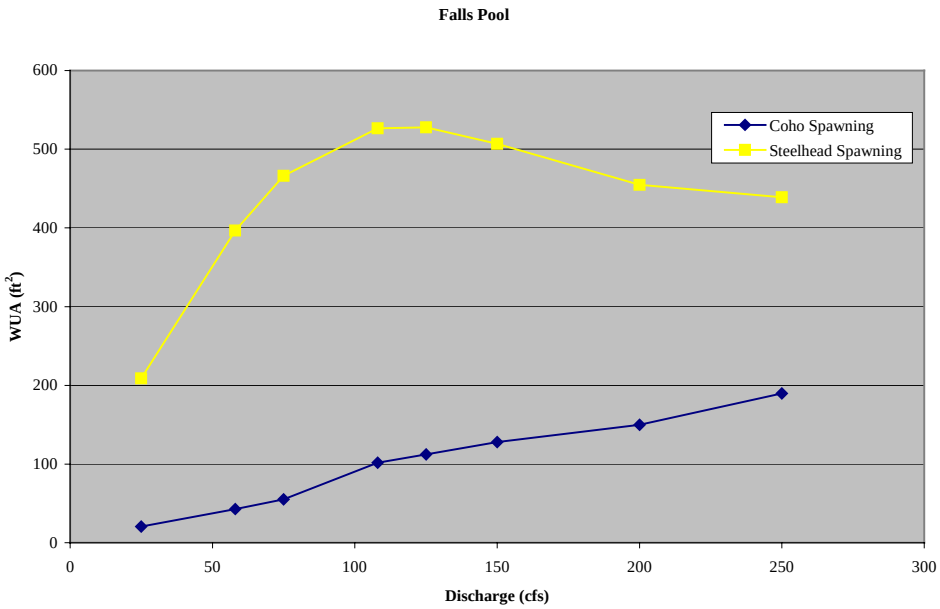

Figure 12. Q vs. WUA Relationships for coho and steelhead spawning at Falls Pool.

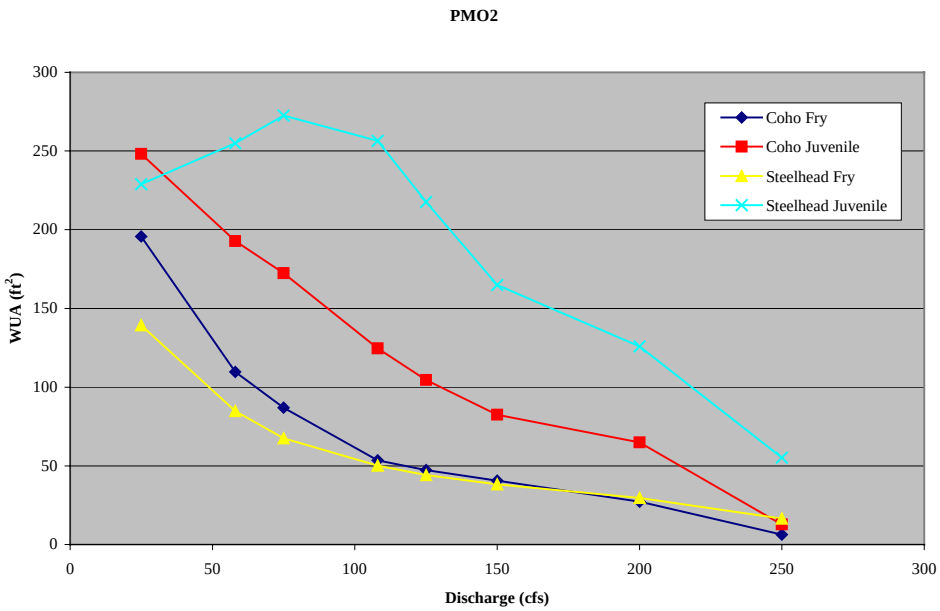

Figure 13. Q vs. WUA Relationship for coho and steelhead rearing at PMO2.

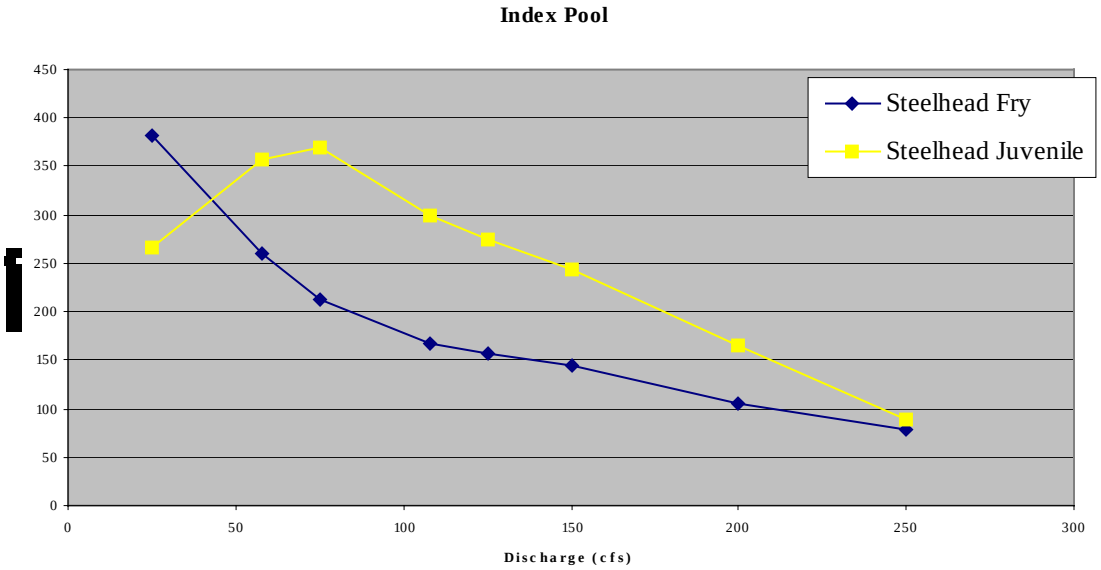

Figure 14. Q vs. WUA Relationship for coho and steelhead rearing at IP1.

For steelhead spawning, it can be seen that WUA peaks at about 100 cfs and then begins to decline for the remainder of the discharges. (Analysis of flows above 250 cfs showed that this relationship continued throughout the range of mean monthly flows (to 1700 cfs) although these values are not shown on the Figures in this document.)

For coho spawning at the Falls Pool, WUA, while lower overall than for steelhead, steadily increased with flow. This relationship trended downward as flow increased above 250 cfs.

Q vs. WUA relationships for fry of both species at both PMO2 and IP1 decreased rapidly with all increasing flows above 25 cfs. Steelhead juveniles WUA increased to about 100 cfs at both sites, then decreased steadily out to the limit of modeled flow (analyses were done to 1700 cfs).

Species/Life Stages/Periodicity

Based on results of all Sawmill Creek fisheries surveys to date relative to the IFIM cross-sections below the Falls at SM 0.73, the species/life-stage/cross-section combinations shown in Table 8 were used.

Table 8. Species/life stages, Cross sections and periodicity for Sawmill Creek Instream Flow analysis.

Species	Life-Stage	Cross-Section	Periodicity
Steelhead	Spawning	FP1-3	May, June
Steelhead	Fry Rearing	PMO2	August-May
Steelhead	Juvenile Rearing	PMO2, IP1	Year around
Coho	Spawning	FP1-3	October, November
Coho	Fry Rearing	PMO2	Year around
Coho	Juvenile Rearing	PMO2	Year around

Alternatives Evaluated

Alternatives evaluated in the PDEA included a three-turbine configuration with 60 cfs minimum releases during May and June as the Preferred Alternative (**3T 60a 0.8)**. Also included was a two-turbine alternative with 60 cfs release during May and June and 50 cfs for the remainder of the year (**2T 60 0.8)**. After agency review of the DLA, the three-turbine alternative was dropped and the **2T 60 0.8** alternative proposed as the City's Preferred Alternative. In response, the IFT requested analysis of a two-turbine alternative with 70 cfs release from April 15 to June 30, and 50 cfs for the remainder of the year. This alternative was called **2T 70 0.8**. After further consideration, the City selected this as its Preferred Alternative for the FLA. Alternatives evaluated in this document, then, are as follows:

NA 0.8 -- No Action Alternative, 0.8 percent load growth;

2T 60 0.8 --Two turbines, 60 cfs from May 1 through June 30, 0.8 percent load growth;

2T 60a 0.8 --Two turbines, 60 cfs released all year;

2T 70 0.8 --Two turbines, 70 cfs from April 15 through June 30, 0.8 percent load growth;

2T 75a 0.8 -- Two turbines, 75 cfs all year (this alternative was requested by agencies during consultation leading to adoption of the 2T 70 0.8 alternative).

NA 2.0 -- No Action Alternative, 2.0 percent load growth

Comparison of Alternatives

Under the 0.8 percent load growth projections, WUA for steelhead spawning showed the most consistent change relative to the different alternatives (Table 9). Relative to the NA 0.8 (the most foreseeable No Action condition), the Preferred Alterative (2T 70 0.8) increased steelhead spawning habitat by about 18%, while the 60 cfs alternative (2T 60 0.8) increased this habitat by on about 8%. The 2T 75a 0.8 alternative resulted in 22% habitat increase. The 75 cfs flow, however, was considered at the limit of the mechanical capabilities of the FVU turbine, however, and was not considered feasible. Costs comparisons between the 2T 60 0.8 and 2T 70 0.8 alternatives showed that the Preferred Alternative cost about $12,000 per year relative to the No Action alternative. The 2T 60 0.8 alternative cost about $5,000 per year more than No Action, or about $7,000 per year less than the 2T 70 0.8 operation. The increase in steelhead spawning habitat, however, outweighed the additional cost.

Coho spawning was remarkably stable under all alternatives, probably because coho spawning occurs later in summer after spill has begun in most years. Increases in minimum flow are not seen at this time of year because flows are typically much higher than minimum during the entire coho spawning season.

For fry and juvenile coho and steelhead, the Preferred Alternative caused little change relative to No Action. The 2T 60 and 75 “a” alternatives, with increase streamflow all year, resulted in lower habitat for both immature life stages in both species, probably because the Q vs. WUA curves for these species declined steeply with flow across most of the discharge range.

There was almost no difference between habitat values under the 0.8 and 2.0% load growth No Action alternatives.

Table 9. Comparisons Of Diesel Operation Cost And Median Time Series WUA for Various Blue Lake Project Alternatives (20th Percentile WUA Values in Parentheses).

Alternative	Steelhead Spawning FP1-3	Steelhead Fry PMO2	Steelhead Juvenile PMO2 / IP1	Coho Spawning FP1-3	Coho Fry PMO2	Coho Juvenile PMO2	Average Annual Cost (millions)
NA 0.8	386.8 (368.5)	88.3 (25.1)	251.1 / 232.0 (248.7 / 132.6)	94.1 (37.7)	115.2 (20.2)	196.3 (132.2)	$1.016
2T 60 0.8	431.5 (417.3)	88.0 (26.0)	251.2 / 228.9 (248.7 / 134.8)	94.1 (37.7)	110.0 (60.2)	193.0 (133.8)	$1.021
2T 70 0.8	457.9 (457.9)	88.3 (26.2)	253.4 / 227.3 248.7 / 137.7	94.1 (37.7)	108.6 (61.6	191.8 (135.8)	$1.028
2T 60a 0.8	417.3 (417.3)	77.0 (27.0)	260.0 / 216.4 (257.0 / 192.7)	91.9 (44.4)	99.2 (84.6)	183.1 (168.6)	$1.047
2T 70a 0.8	457.9 (457.9)	67.5 (27.8)	269.6 / 196.6 (267.0) / 186.1	92.2 (51.5)	86.0 (82.1)	170.6 (165.1)	$1.066
2T 75a 0.8	471.4 (471.4)	64.8 (33.3)	269.2 / 183.5 (267.3/173.1)	93.1 (55.0)	81.2 (77.3)	163.7 (158.2)	$1.121
NA 2.0	386.8 (368.5)	88.3 (28.4)	251.1/232.0 (248.7/225.8)	87.0 (37.7)	115.2 (107.3)	196.3 (190.5)	$4.326

Issue F2. Blue Lake Level. Whether Blue Lake surface elevation fluctuations and/or seasonal levels affect resident fish populations in that water body. Changes in lake level may be harmful to fish during certain life stages, such as spawning and rearing, causing stranding, migration impediment, and habitat loss. Under this issue, the City would examine Blue Lake water surface level fluctuations during certain yearly periods, and determine the potential for and costs of minimizing impacts.

Response to Issue F2.

Recent studies have shown that spawning behavior and requirements of Blue Lake rainbow trout are complex and difficult to reduce to simple relationships between reservoir elevation and predicted spawning success or suitability (City and Borough of Sitka 2005g). Generally, it is thought that the majority of rainbow spawning takes place in three or four tributaries, mostly in the upper end of the lake.

Historically, the lake begins filling in May, and spawning starts in late May and early June. By early May, the lowest reservoir elevation has been reached. Study results have shown that trout begin to migrate into spawning tributaries when water temperatures reach about 5C, with actual spawning usually starting at water temperatures of about 6C or 7C.

Surveys suggest that spawning is concentrated near tributary confluences with the lake margin, and is highly associated with areas of upwelling. Most of the earlier spawning locations are eventually inundated by rising lake levels. It is assumed, since the Lake's rainbow populations are self-sustaining and generally stable in number, that this spawning mechanism is successful. Therefore, it is further assumed that the only operation which might reduce spawning success would be one in which the lake level was drawn down after spawning, thereby exposing deposited eggs. This drawdown after spawning is not possible with existing Blue Lake Project equipment.

Issue F3. Habitat Potential of the "Dewatered" reach. Whether there is significant potential fish habitat in the "dewatered" reach directly downstream of Blue Lake dam, and the extent to which continuous streamflow from dam releases might improve existing fish habitat conditions. Under this issue, the City would examine potential benefits and costs associated with releasing water to the dewatered reach.

Response to Issue F3.

The Sawmill Creek area between Beaver Lake falls and the base of the dam is highly incised canyon with bedrock and boulder substrate. Although rainbow trout have access to this reach during normal reservoir spill periods, very few have been observed (Wolfe 2002-2004).

Downstream of the Beaver Lake falls confluence, studies have shown considerable use by rainbow trout, particularly rearing juveniles. This may be attributed to 1) the warming effect of Beaver Lake water and 2) additional nutrient input from the muskeg areas drained by Beaver Lake.

If reservoir water were input to increase dewatered reach flow, it would necessarily be released from the Howell-Bunger valve. Howell-Bunger valve releases are considered unfeasible at this time because of difficulty in regulating small flows with the valve**.** More importantly, releases at the valve's reservoir level (about 140 ft below maximum reservoir water elevation) would result in colder water in Sawmill Creek (City and Borough of Sitka 2006b), which would reduce benefits of warmer, more productive Beaver Lake water in the lower parts of the reach.

As discussed in the Water Quality section it is also unfeasible to install multi-level releases in the dam to access warmer release water.

Finally, flow releases from the Howell-Bunger valve would provide no economic return in terms of hydroelectric generation, and would deplete the reservoir more than with releases at current or projected levels.

During consultation (including review of the DLA) on Sawmill Creek fisheries issues, fish and wildlife agencies did not include instream flow effects in the dewatered reach when evaluating changes in streamflow. All flow control, therefore, was referenced to operation of the FVU which is downstream of the dewatered reach.

Issue F4. Fish Entrainment. Whether the existing Project intake in Blue Lake might be a source of fish mortality due to entrainment of fish during Project operations. Increased water velocities in the area of the active intake might draw fish, particularly those of smaller size, into the intake, causing impingement on the intake features and entrainment into the power conduit, with associated mortality passing through the turbines. Under this issue, the City would examine the likelihood of fish entrainment based on presence or absence of fish in the intake area and other estimates of entrainment likelihood.

Response to Issue F4.

To address this issue, the City initially proposed to conduct diving and electronic monitoring surveys of the intake to document fish utilization. For various safety and access reasons, these surveys were not conducted. However, the City did evaluate certain evidence for entrainment, to determine if the diving and instrumentation studies might be necessary.

It is believed that, if fish of any size were entrained at the intake, evidence of this would be found in various strainers installed in the water piping for the Project. Among these are the strainers in the cooling water piping for the Blue Lake unit and the basket on the release valve at the FVU. The bypass release valve basket is particularly good at detecting entrainment because it filters a large quantity of water (about 50 cfs) when in operation, and traps debris of all sizes. Observing the contents of both the cooling water strainers and the release valve basket over a period of several months during several years has yielded no evidence of fish or parts of fish.

In addition to this evidence, during the 2004 fish abundance estimates in Blue Lake, fish traps were set at all depths up to 150 feet to determine depths at which the traps should be set during the study. No rainbow trout of any size were found in the traps at depths greater than 120 feet.

Rainbow trout spawning surveys (City and Borough of Sitka, 2005g) have shown that most spawning takes place in the upper end of Blue Lake. Distances from these spawning locations to the intake are considered too great to be covered by a fish small enough to be entrained.

Finally, it is generally considered unlikely that fish of entrainable size would be found at depths as great as 140 ft, due simply to lack of food and light, and to buoyancy of the small fish.

In all, we generally find little evidence to indicate that fish of any size are entrained at the intake. This, coupled with the fact that the Blue Lake rainbow trout population is self-sustaining and stable, leads us to conclude that entrainment mortality is not significant, and that further entrainment studies are not necessary.

Issue F5. Reservoir Woody Debris Storage. Whether the existing dam and reservoir might block the downstream transport of woody debris, thereby depriving Sawmill Creek of stream habitat features. Woody debris is an important element of instream fish habitat and contributes to bank stability, shade and cover. Large dams and diversions often impede downstream contribution of LWD, affecting fish habitat. Under this issue, the City would examine existing throughput of LWD and the need for and costs of enhancement measures.

Issue F6. Reservoir Sediment Storage. Whether the existing dam and reservoir might block downstream transport of sediment, thereby depriving Sawmill Creek of a range of sediment sizes necessary and sufficient to maintain channel configuration and geomorphic process related to fish habitat retention. Under this issue, the City would examine sediment storage and transport potentials, and evaluate the need for and cost of enhancement measures.

Response to Issues F5 and F6.

The issue of whether Blue Lake reservoir impedes either sediment of large woody debris transport to Sawmill Creek is clarified by the fact that both sediment and LWD were probably retained in the reservoir prior to construction of the Blue Lake dam. Since the bottom of Blue Lake lies nearly 130 feet below sea level, it serves as a large sediment sink, and probably did so prior to impoundment. Blue Lake was probably not a good sediment provider at any point in its history.

Similarly, but to a lesser extent, the lake has probably also retained woody debris more than it would have if the lake were in a valley without a tightly constricted outlet.

Nonetheless, the US Forest Service Tier III survey (City and Borough of Sitka, 2004b) showed less woody debris and sediment in Sawmill Creek than in certain undammed streams in Southeast Alaska.

Small amounts of woody debris enter Sawmill Creek during spill events and can be seen deposited on the banks in reach 5.

Although Blue Lake contributes limited sediment to Sawmill Creek, considerable sediment is deposited into the dewatered reach from erosion of the dam construction road

in the dewatered reach. In 1999 it was necessary to dredge the first 100 yards of the bypass reach to remove this sediment. It is expected that the road will continue to contribute sediment to the bypass reach during the 30 year term of the new license.

It is generally thought that while spawning is not limiting for any anadromous species in Sawmill Creek, rearing is. For anadromous salmonids which reside as juveniles in a stream (such as steelhead and coho), side-channel and backwater habitats which offer a refuge from high flows and water velocities are indicators of good rearing habitat. Sawmill Creek below the Falls follows an incised canyon with little side- or backwater habitat, and is thought to offer very limited rearing habitat. Therefore, in evaluating both sediment and woody debris contribution of Blue Lake, the woody debris component would have more positive effect on rearing cover and habitat in Sawmill Creek. Large and small woody debris are deposited annually in Sawmill Creek during spill events, and remain in the stream for varying time periods.

Issue F7. Water Release Temperature. This issue is addressed under the Water Quality and Quantity Section, Issue WQ1, above.

Issue F8. Tailrace Attraction. Whether water velocity in the Project tailrace might serve to attract migrating anadromous fish, thereby delaying their upstream migration in Sawmill Creek. Experience has shown that differential water velocities offer various levels of attraction to migrating fish; increased velocities serve as "keys" to attract fish up one water course over another. Under this issue, the City would evaluate, through observations, whether anadromous fish concentrate in the tailrace and the effects such concentration might have on anadromous fish migration into Sawmill Creek.

Response to Issue F8.

Wolfe (2003-2005) began tailrace observations in 2002 by observing fish in various tailrace areas. (Below the powerhouse is an afterbay, extending about 40 feet to a weir, below which the tailrace extends to the tailrace's confluence with Sawmill Creek).

Anadromous fish were observed in the tailrace only, primarily steelhead and coho, which use this area as a resting area. As summer progresses, there have been some chum and pink salmon observed in the tailrace. Limited numbers of pink and chum salmon, relative to total escapement numbers, were observed spawning on a gravel bar at the downstream end of the tailrace at the Sawmill Creek confluence. No other species were observed spawning in the tailrace.

A few resident rainbow have been observed in the afterbay, particularly during low release periods. Dolly Varden have been observed in the tailrace in association with pink and chum salmon.

Based on these observations, it does not appear that tailrace attraction significantly affects upstream migration or spawning success, particularly for the target species (coho

and steelhead). As a result, the City did not address Issue F8 in the DLA. No comments on this decision were received on review of the DLA.

Issue F9. Ramping Rates. Whether short-term (over minutes or hours) fluctuations in streamflow and resulting water level might affect various life-stages of fish in Sawmill Creek. Rapid increases or reductions of water level or velocity have been shown to displace, strand or otherwise stress fish below hydroelectric dams. Under this issue, the City would examine ramping rates associated with current Project operations, determine whether they offer significant potential for improvements, and evaluate costs and benefits of improvement measures.

Response to Issue F9.

License conditions require a fixed flow released from the FVU at all times when the Project is not spilling. This fixed flow is not allowed to fluctuate relative to changes in load. Therefore, ramping impacts, normally associated with load following, do not occur in the bypassed reach.

During meetings to discuss comments on the DLA, the City and agencies considered various ramping rate proposals. In response to detailed recommendations from ADF&G, the City and consulting agencies have agreed to the following Ramping Rate restrictions:

For instream flow changes caused by project operations, the Licensee shall observe specified ramping rate restrictions at all times. The ramping rate specifications and conditions will vary depending on whether normal or non-normal operating conditions, described below, apply.

Normal Operation

Normal Operation is defined as operation during those periods when the Fish Valve Hydroelectric Generating Unit (FVU) is the sole source of controllable water discharge into the bypassed reach of Sawmill Creek. The FVU is normally operated to assure various instream flow rates. Normal Operation ramping conditions are intended to assure that changes in flow from the FVU to meet instream flow requirements do not exceed specified rates.

During Normal Operations, the Licensee shall operate the FVU to assure the following periodic up- and down-ramping conditions:

Time Period	Up-ramping Rate	Down-ramping Rate
April 1 – July 15	0.2 ft/hr	0.1 ft/hr
July 16 – Sept 30	0.1 ft/hr	0.1 ft/hr

Oct 1 – March 31	0.2 ft/hr	0.2 ft/hr

The ramping rate shall be measured as change in stage over a 1 hour period at the Upper Staff Gage which is installed at the Sawmill Creek Bridge near the US Forest Service campground at Sawmill Creek SM 1.57.

Non-normal Operations

Non-normal Operations are defined as those outside the normal daily operation of the FVU, specifically, operation of the Howell-Bunger release valve in the Blue Lake dam and the FVU Bypass Valve. No ramping restriction will apply when these devices are in use. The Howell-Bunger valve will be operated to minimize ramping rates to the extent that it is safe and practicable.

Issue F10. Draft Tube Injuries. Whether the Blue Lake Powerhouse draft tubes are situated in such a way as to allow for fish passage into the tubes when one or both generating units were shut down. On certain hydroelectric projects, fish have been able to swim up the tubes during shut-down, and were injured on start-up. The City believes that the vertical alignment of the Project draft tubes completely prevents access into the turbines during shut-down, and therefore has not addressed this issue in detail. No comments on this decision were received on review of the DLA.

Issue F11. Load Rejection. Whether, following a load-rejection, when the generating units trip off, there would be a period of dewatering in Sawmill Creek during the period when no water was flowing through the generators. On certain projects without by-pass valve provisions, short-term dewatering has caused fish mortality in both by-passed reaches and below project powerhouses. The Blue Lake Project is fitted with rejection valves at the powerhouse which preclude the effects of load rejection in terms of dewatering. The City has not addressed this issue in detail. No comments on this decision were received on review of the DLA.

Issue F12. Barrier Effects of Falls at SM 0.73. Whether, at various discharge rates implemented on relicensing, the Falls acts as more or less a barrier to fish migration than it does in the current situation. Documentation of the ability of fish to migrate across a range of flows will assist habitat analyses associated with Issues F1 and F3.

Response to Issue F12.

During 2002 and 2003, following requests for implementation of the Powers and Orsborn (P&O) fish passage evaluation technique, the City conducted quantitative studies of the Falls at SM 0.73. These studies led to preparation of a report (City and Borough of Sitka, 2005a) in which dimensional and hydraulic measurements at the falls at two separate flows were analyzed relative to the P&O upstream passage criteria. The report's conclusion was that the falls were not passable during flows between those measured in the study (approximately 70 cfs to 278 cfs). A question remains about the potential for

passage at higher flows, but it is not feasible, due to the safety concerns, to perform the necessary measurements at the falls to extend the range of the evaluations.

We generally conclude, based on the P&O study and the fact that the Wolfe surveys from 2001 through 2004 did not record a single anadromous fish upstream of the falls, that the falls are essentially impassable within the range of flows encountered during this study period. Since post-relicensing flows are not expected to change significantly from those at present, we conclude that passage at the falls will not change as a result of relicensing flow measures, and that the Falls will remain a barrier to upstream fish passage.

In their comments on DLA and recommendations, STA requested step-pools at the Falls to allow anadromous fish passage to the upstream reaches. In further consultation, STA stated that uncertainties about the effects of the proposed NSRAA hatchery on Sawmill Creek fish stocks had led them to conclude that Sawmill Creek measures such as the step pools would be inappropriate until hatchery effects were determined. As described in Section 1.3.4.2, p 9, STA instead proposed PM&E measures for steelhead in Indian River.

3.6 Wildlife and Botanical Resources

3.6.1 Affected Environment

3.6.1.1 Wildlife Resources

Wildlife in the Project area represent important resources to the local population in terms of hunting, trapping and wildlife viewing. Generally, the area supports the typical wildlife species seen in this part of Southeast Alaska. No Alaska federally threatened or endangered species have been sighted or reported in the Project land area, although one species, the marbled murrelet, occupies the area, and is listed variously as threatened or endangered in the lower 48.

Following are descriptions of the most abundant or environmentally important species within various wildlife groups. The sources of this information are Bovee (2005 and 2006), documenting wildlife and botanical studies done specifically for the Project relicensing.

In the Bovee reports, wildlife sighting locations were reported relative to the following Study Areas within the Project area: 1) Sawmill Creek; 2) Blue Lake Road; 3) Blue Lake; and 4) Transmission Lines and Corridors.

Wildlife resources in the Project area were described in seven major groups in Bovee (2005 and 2006):

- Large Mammals
- Small Mammals

- Furbearers
- Raptors
- Songbirds
- Shorebirds
- Waterfowl.

Large Mammals

Large mammal species observed in the Bovee study area were:

Sitka Black-tailed Deer	*Odocoileus hemionus sitkensis*
Mountain Goats	*Oreamnos americanus*
Brown Bear	*Ursus arctos*

Of these large mammals, the most commonly seen, in terms of sign if not actual sightings, was Sitka black-tailed deer. Deer sign was seen in all study areas. Black-tailed deer are known to use most areas adjacent to the lake, especially the forested areas.

Next most important among large mammals was mountain goat. Goats were observed in the slopes above Blue Lake where they find good escape cover and feeding conditions. Goat hunting in the Blue Lake area has been noted as good, but limited by access which is restricted by steep slopes around the lake. Most goat hunting is done using boat access.

Least observed among large mammals were brown bears. Only brown bears occupy the Project area. While rarely seen, they are considered to be relatively abundant in the Project area, particularly in the slopes above Blue Lake. There is limited brown bear hunting within the Project area.

None of the large mammals in the Project area are species of concern relative to abundance or habitat needs.

Small Mammals

Forest Deer Mouse	*Peromyscus keeni*
Common Shrew	*Sorex cinereus*

Both of these small mammal species are known to be common in southeast Alaska, although there is some confusion as to their status.

Furbearers

Four furbearer species were identified during the Bovee surveys. Red squirrel is included in this category, although they are not normally used for fur.

Red Squirrel	*Tamiasciurus hudsonicus*
Marten	*Martes americana*
Mink	*Mustela vison*
River Otter	*Lontra canadensis*

Among these species, the red squirrel was by far the most common. They were particularly abundant in forested areas and near Project roads. Next most abundant among furbearers was the marten. Sign from several martens were seen, primarily in forested areas in the Blue Lake study area. Mink sign was relatively rare in the study area, with most observations made near Sawmill Creek. Two river otters were seen, in the lower areas of Sawmill Creek.

Raptors

Bald Eagle	*Haliaeetus leucocephalus*
Northern Saw-whet Owl	*Aegolius acadicus*

The most abundant raptor was the bald eagle. Several sightings were made in the upper end of Blue Lake. Bald eagles are notably common throughout the Sitka area. The saw-whet owl was noted in response to an owl call; no individuals were sighted. Several unconfirmed sightings of raptors thought to be goshawks were made, but not entered because of a lack of assurance of identification.

Songbirds

A total of at least 22 songbird species were observed during the 2004-2005 wildlife surveys. More detailed descriptions of relative abundance and habitat use are in Bovee (2005 and 2006).

Songbird Common Name	**Scientific Name**
Wilson's warbler	*Wilsonia pusilla*
yellow-rumped warbler	*Denroica coronata*
black-capped Chickadee	*Poecile atricapilla*
common raven	*Corvus corax*
Steller's Jay	*Cyanocitta stelleri*
northwestern crow	*Corvus caurinus*
swallows of unknown species	
pine siskins	*Carduelis pinus*
common redpolls	*Carduelis flammea*
dark-eyed junco	*Junco hyemalis*
fox sparrows	*Passerella iliaca*
song sparrow	*Melospiza melodia*
Swainson's thrush	*Catharus ustulatus*

hermit thrush	*Catharus guttatus*
varied thrush	*Ixoreus naevius*
American robin	*Turdus migratorius*
winter wren	*Troglodytes troglodytes*
brown creeper	*Certhia americana*
cedar waxwing	*Bombycilla cedrorum*
golden-crowned kinglet	*Regulus satrapa*
red-breasted sapsucker	*Sphyrapicus ruber*
northern flicker	*Colaptes auratus*
rufous hummingbird	*Selasphorus rufus*

Among songbirds, warblers and chickadees were the most common. Exact species identification was difficult for most of these sightings. Next most common among songbirds were ravens, followed by swallows of undetermined species. The remaining songbirds on the list were either sighted infrequently, or identified by sign.

Shorebirds

American Dippers	*Cinclus mexicanus*
belted Kingfishers	*Ceryle alcyon*
common snipe	*Gallinago gallinas*
spotted sandpiper	*Actitis macularia*

All species of shorebirds observed, except for common snipe, appeared often in the surveys. Dippers were common along Sawmill Creek, as were kingfishers. Sandpipers were often seen near the Blue Lake shoreline.

Waterfowl

marbled murrelet	*Brachyramphus marmoratus*
trumpeter swan	*Cygnus buccinator*
ring-necked duck	*Aythya collaris*
Canada goose.	*Branta canadensis*
bufflehead	*Bucephala albeola*
glaucous-winged gull	*Larus glaucescens*
herring Gull	*L. argentatus*
mallard	*Anas platyrhynchos*
harlequin duck.	*Histrionicus histrionicus*
Barrow's goldeneye	*Bucephala islandica*
common mergansers	*Mergus merganser*

Among waterfowl species, trumpeter swans were the most common, seen regularly on or near Blue Lake in the winter months. Other species, including ducks and mergansers were seen frequently. The ring-necked duck and marbled murrelet are species of concern based on recent classifications of rarity.

3.6.1.2 Botanical Resources

Vegetation in the Project area is dominated by stands of western hemlock and Sitka spruce. Medium to high volume timber areas occur along some of the inlet streams and the southern shoreline. Most of the northern shoreline is very steep terrain, consisting of talus slopes with Sitka alder and cliff areas. Sitka spruce, western hemlock, and yellow cedar are found along Sawmill Creek, with Sitka alder growing on adjacent slide areas and Red alder along lower riparian areas. Hardwoods, mostly red alder and some cottonwood occur along Sawmill Creek and on adjacent slide areas.)

Understory vegetation is composed of blueberry, red huckleberry, bunchberry, rusty menziesia and devil's club. A variety of moss species form ground and exposed rock cover in most areas.

3.6.2 Environmental Effects and Recommendations

Issue W1. Blue Lake Nearshore Habitat Inundation. Whether habitat inundation related to water elevation increase might reduce habitat for such large mammals as Sitka black-tailed deer, goats and small mammals and birds. Several large and small mammal species are known to utilize Blue Lake's shoreline areas and areas along tributaries which feed the Lake. This issue was raised early in the relicensing process when the City had not decided on whether or not to raise the elevation of the Project dam. The City has decided not to raise the dam on relicensing, and changes which result from adoption of different Sawmill Creek streamflow regimes with the current dam height would be minimal and within the current reservoir high water mark. The City therefore does not propose to address this issue in detail.

Issue W2. Aquatic Mammal Effects of Flow Reduction. Whether existing instream flows in Sawmill Creek would effect life histories, movement or feeding of aquatic mammals known to utilize the near stream environments. Under this issue, the City would evaluate the extent to which streamflow may affect existing aquatic mammal populations, and, if there are significant effects, seek alternative instream flow regimes which might reduce these effects. Streamflow optimization would be necessary to ensure that impacts and benefits for both fish and wildlife were adequately addressed.

Response to Issue W2.

Based on Project-related wildlife surveys, the only potentially-affected aquatic mammals would be mink and river otter. No muskrat or beaver were documented. Both mink and river otter utilize Sawmill Creek fish resources as a food source, primarily seeking young salmon and to a lesser extent adult salmonids and spawned out salmon.

While no specific aquatic mammals' assessment was conducted as part of the IFIM study, we have evaluated the IFIM results in terms of effects on aquatic mammals, and

concluded that, by assuring fish populations equal to or exceeding those in the existing situation, there would be no food source effects on aquatic mammals.

Another factor which might affect aquatic mammals is stream level relative to dens and nursery areas. These factors are important to muskrat and beaver, which den or build lodges in contact with the water. River otter and mink, however, den upslope from water bodies or courses, and are not likely to be affected by changes in lake levels or stream elevations.

In any case, the instream flow and reservoir operations proposals reflect no significant change in either Sawmill Creek or Blue Lake elevations resulting from proposed operations.

Issue W3. Transmission Line Effects. Whether existing or new transmission lines pose the potential for raptor electrocution. Although no raptor interactions with existing Project-related electrical transmission lines or towers have been observed since original licensing or through the Amendment process, the City will evaluate all existing or new transmission facilities in the Application and related environmental documents.

Response to Issue W3. Minimum conductor spacing on the Project transmission line varies from 7 to 11.5 feet, which in either case is in excess of minimum requirements of avoid bird electrocutions. The City does not propose changes in the conductor arrangement of the Project transmission line. If new transmission facilities are developed, their design and construction will follow guidelines for prevention of raptor and other bird electrocutions.

3.7 Federally Listed Threatened and Endangered Species

3.7.1 Affected Environment

3.7.1.1 Fish and Wildlife

No federally-listed Proposed, Endangered or Threatened (PET) species were found in the Bovee study area during the 2004-2005 surveys, and none have been reported or noted by responsible agencies or other studies. Two species, humpback whale (*Megaptera novaeangliae)* and Steller sea lion (*Eumetopias jubata)*, are listed as respectively endangered and threatened in the marine environments of southeast Alaska. Although both species are commonly encountered in Silver Bay, they are generally not considered likely to be affected by any measures currently considered under the Project relicensing.

3.7.1.2 Botanical Resources

In his general survey of botanical resources in the Project area, Bovee (2005) did not note any T&E plants. However, his surveys were not meant to identify such plants in detail, and a thorough search of the area has not been performed. In consultation with the USFS and USFWS, the City intends to conduct a sensitive plant survey within various portions of the Project area during spring and summer, 2006.

3.7.2 Environmental Effects and Recommendations

Based on current information on T&E fish, wildlife and botanical resources, there are no such listed species in the potentially-affected Project areas.

3.8 Cultural Resources

3.8.1 Affected Environment

Three recent cultural resource investigations have been conducted in the Project Area: 1) The Blue Lake Road was surveyed by Charles Mobley (n.d.), 2) the campground area and site locations along the Sawmill Creek drainage were surveyed by Rabich Campbell (1989), and 3) cultural resources in the Project area were surveyed in 2005 by Paul Rushmore of Wrangell Associates, Wrangell Alaska, (Rushmore, 2005.) Mr. Rushmore's studies included a literature review (including the sources cited above), consultation with the STA, USFS and ADNR, State Historic Preservation Officer (SHPO) and field surveys within the Area of Potential Effect (APE), defined by the Project Boundary.

In addition, STA conducted interviews with tribal members. Results of the interviews indicated that certain traditional uses, primarily fishing and berry gathering, were impacted by construction of the APC mill and the Blue Lake Project. The interviews did not indicate Project-related impacts on or conflicts with known cultural sites, artifacts or other cultural/historical values known to the interviewees. None of the above surveys disclosed significant archaeological sites and all suggested that there is little potential for archaeological remains in the areas surveyed.

The following descriptions of cultural resources in the APE are from Rushmore, 2005, with modifications.

Alaska Native History

Information collected from Goldschmidt and Haas (1946) and STA suggests that at the time of European contact members of the Kiks'adi clan of the Sitka Tribe had possession of Silver Bay and surrounding drainage systems, though no village sites are reported in the Project area.

With European contact in the late 1700s came the introduction of metal, guns, and contagious diseases, all of which had a significant effect on Native Alaskans. Smallpox was the greatest killer, first brought to the Tlingit by the Spanish in 1775. The greatest epidemic in Southeast Alaska was that of 1835-38, the disease spreading northward from California along the Northwest Coast affecting Alaska Natives well into the interior, on the Aleutians, and on the Arctic coast (de Laguna, 1991:361). Typhoid fever raged in 1819, 1848, and 1855 (Krause 1956:103). Smallpox was reintroduced in 1862 to the Tlingit as the miners began to move through their traditional territories.

As a result of European contact and rapid population decline from introduced diseases, traditional Tlingit settlement patterns and culture underwent fundamental change in the early 19th Century. Tlingit groups abandoned many traditional village and subsistence sites in favor of locations where trade goods were more available after the establishment of Russian forts and trading posts at Sitka in 1799 and at Wrangell in 1834. After destroying the Russian fort at Saint Archangel Michael in 1802, the Sitka Tribe was forced by the Russians to leave the area in 1804. The tribe was invited to resettle near New Archangel (Sitka) in 1822 (Krause 1956).

After the purchase of Alaska by the United States in 1867, a dramatic change occurred again in the lives of the Sitka Tlingit with the nonnative development of a substantial mining effort around Indian River and Silver Bay, followed closely by the fishing and timber industry (Selkregg 1976). As these industries developed, clan and tribal rights to their traditional territories became tenuous at best.

Mining History

Mining activity in the Silver Bay area includes historic mines, prospects, and mineral occurrences around Silver Bay itself, as well as properties east of Sitka in the Indian River basin. Prospecting for gold in the area began around 1871 and continued on a sporadic basis well into the 1990s.

The nearest mining claim to the APE is called Pande Basin, also known as Glacier Lake Placer, which is owned by Pande Basin Gold Mining Company. The claim itself is outside of the APE; though a partially intact corduroy road built to access the mine is located near the confluence of Blue Lake Creek and Blue Lake and is included in the SOW. This road (AHRS SIT-007-07) was surveyed and photographed by Mr. Rushmore as part of his Project-related surveys, and survey data are available at the City offices.

3.8.2 Environmental Effects and Recommendations

The report by Rushmore, 2005, recommended cultural resources clearance. Because of the scarcity of cultural and historic sites in the APE, and because the City does not propose significant construction activities related to relicensing, no cultural resources impacts are expected. As with recreation resources, there may be a positive effects on cultural values associated with improved fishing in Sawmill Creek.

3.9 Recreation

3.9.1 Affected Environment

Recreation resources in the Blue Lake Project area are diverse, but, at present, not well documented. The major recreation activities are hiking, hunting, fishing and camping during the spring, summer and fall months.

3.9.1.1 Sport Fishing

Sport fishing is popular on both Blue Lake and Sawmill Creek, with Blue Lake offering the greater recreational opportunity. The Blue Lake/Sawmill Creek system offers perhaps the most accessible fresh water sport fishery to Sitka area residents, although access difficulties probably reduce overall recreational use of these areas. Fresh-water sport fishing in the Project area is primarily done by local area residents; the area is not known to attract large numbers of out-or-region anglers, as does the Sitka area marine king salmon fishery.

Blue Lake reservoir offers excellent rainbow trout fishing, primarily by boat access. The Sport Fish Division of ADF&G conducts post-season surveys of area anglers. Blue Lake surveys from 1984 through 2003 that numbers of Blue Lake anglers ranged from 48 to about 536 per year. Rainbow trout harvest during these years ranged from 47 to 1116. Blue Lake rainbow trout populations, as discussed in the Fish Resources section, above, have remained relatively stable over the past ten years.

Rainbow trout fishing on Blue Lake is to some extent restricted by the lack of easy access, but, since Blue Lake is the City of Sitka's domestic water supply source, heavy recreational use is not encouraged through maintenance of access and boat launch facilities.

Sawmill Creek sport fishing effort is focused on steelhead in spring and early summer and king salmon in mid to late summer. Low steelhead populations in Sawmill Creek and difficult access to the most productive fishing areas limit the catch of this species. Only steelhead greater than 36 inches may be kept. Although no formal numbers are available, it is estimated (from BLU operator angler observations) that approximately 40 to 50 anglers harvest fewer than ten steelhead annually.

Sawmill Creek king salmon fishing has improved recently, due to liberalized early season fisheries for this species. As discussed in the Fish Resources section, above, Sawmill Creek king salmon populations are thought to be largely of hatchery origin and are not likely to spawn in Sawmill Creek, making them favored sport fishing target species.

Fishing for chum and pink salmon, while these species are periodically quite numerous, is not so intense as that for steelhead and king salmon.

Small numbers of local anglers take Dolly Varden char in Sawmill Creek, but numbers and effort are largely unknown.

3.9.1.2 Hunting

Sport hunting in the Project area is popular with Sitka area residents. Hunting for Sitka black-tailed deer is probably the most popular pursuit, although numbers of hunters for all big- and small-game and birds in the Project area are poorly known. Hunters use the Blue Lake road to provide access to black-tailed deer hunting, most frequently near the US Forest Service campground and Beaver Lake.

Deer hunting is also facilitated by the road to Blue Lake, the Blue Lake boat launch and subsequent access to shoreline areas. The area surrounding Blue Lake Creek, the primary inflow to Blue Lake in its extreme eastern end is good overwintering habitat for black-tailed deer, but hunting effort in the area is not well documented.

Deer hunting in the Project area is done under both sport and subsistence regulations (subsistence hunting numbers are discussed the section on that resource topic.)

Goat hunting is done primarily by accessing Blue Lake by boat and subsequent hiking to upslope areas of good goat habitat. Goat hunting, like black-tailed deer hunting, is done under both sport hunting and subsistence regulations.

Hunting for small game and birds, primarily snowshoe hare and ptarmigan, is also done in the Project area. Steep terrain and limited access restrict these activities which are done by more hunters in other areas.

3.9.1.3 Camping

Camping in the Project area is limited to the USFS campground (called “Sawmill Creek Campground”) near the FVU. This area offers 11 campsites, restrooms and a parking lot. No RV hookups or other amenities are offered. The approximately 1 acre parking lot adjacent to the campground provides parking for day users and hikers.

While USFS does not keep detailed records of campground use at this location, it is estimated that approximately 1000 people per year use the campground. General usership consists of overnight campers using primarily tents, and to a lesser extent RV’s, and day users seeking to picnic, hike nearby trails, or fish in Sawmill Creek or Beaver Lake.

Significant vehicular travel in the area appears to result from visitors simply driving to and from the campground without leaving their cars. This use may relate to sightseeing along the Blue Lake road which offers dramatic canyon views, and, at the Blue Lake overlook, an expansive view of the lake itself.

Within the area accessible to Sitka area residents and visitors, one other campground, the Starrigavin campground, which offers relatively easy road access. The Starrigavin campground provides for greater annual usership because of its easier access from the main Sitka road system.

3.9.1.4 Hiking

The USFS administers the Beaver Lake hiking trail which begins across the Sawmill Creek bridge from the Sawmill Creek campground. This 2 mile trail to Beaver Lake is a popular hiking destination.

During 2004, the City and USFS began a use survey for the trail. Recording traffic counters were installed near the trailhead with the objective of determining number of hikers using the trail by season. Results of this monitoring survey will be available in fall, 2006.

In addition to the Beaver Lake traffic counters, the City also installed counters on the Blue Lake road to determine the number of hikers which use the road year around. As with the Beaver Lake counters, data from this study will be available in fall, 2006.

3.9.2 Environmental Effects and Recommendations

Issue R1. Whether or not current and/or proposed project operations will affect recreational activities and opportunities within or adjacent to the project area. The USFS operates the Sawmill Creek campground and administers the Beaver Lake hiking trail. Additionally, initial planning has begun for the reconstruction of the trail between Heart and Thimbleberry Lakes that lies within the transmission line corridor (Sitka Trail Plan 2003). Other recreational activities such as fishing on Blue Lake and Sawmill Creek, and hunting (goats and Sitka black-tailed deer), are known to take place on national forest lands accessed from the Blue Lake road and by boat from Blue Lake.

Response to Issue R1.

No direct recreation impacts are expected as a result of relicensing because no new construction is proposed. Indirect effects of relicensing, however, may affect recreation, primarily through possible improvements in Sawmill Creek steelhead and coho salmon populations (and resultant sport fishing opportunities) resulting from proposed instream flow measures.

The USFS and STA have suggested several recreation and access - related measures which might be applied as Project-related enhancements. The City, in consultation with STA and USFS has included the following as components of the Preferred Alternative:

1. Reconstruct The Parking Lot at The Intersection Of Blue Lake Road and Sawmill Creek Road (Per APC Drawing G-176).

- Remove trees and existing vegetation;
- Resurface parking lot;
- Replace Culverts;
- Provide parking stops;
- Provide signage.

2. Improve The Overlook of Blue Lake at the Terminus of the Blue Lake Road at Blue Lake.

- Resurface existing overlook area, retain existing dimensions;
- Assure wheelchair accessibility;
- Provide parking spaces and stops;
- Install rock barrier at overlook;
- Signage restricting access on road to lake;
- Install seating overlooking lake.

3. Improve the Sawmill Creek Campground.

- Install drainage channel through drive-around;
- Reconfigure campground drive-around;
- Relocating host site, evaluate power delivery to host site;
- Further consultation with USFS and other agencies will lead to formal proposals and detailed plans which will be included in the final application for new license.

4. Install Parking and Safety Measures on Blue Lake Access Road.

- Resurface selected existing turnouts on the Blue Lake Road to accommodate safe stopping areas and temporary parking.
- Install selected sections of guardrail or other type of barriers on dangerous curves in the road, totaling approximately 600 lineal feet to assure driver safety.

3.10 Land Use and Land Management

3.10.1 Affected Environment

Land ownership and management within the Project area is complex, particularly in or near the primary transmission line route as it nears the community of Sitka. Generally, however, land ownership in the Project area falls within three major categories: 1) US Forest Service, Tongass National Forest lands; 2) City and Borough of Sitka lands, 3) University of Alaska and Sheldon Jackson University lands, and 4) lands in private ownership (Figure 15). In the SCIP, various land parcels are leased to industries

operating in the Park, including, at the time of this draft document, the True Bottling Company, The Boat Company, Baranof Frozen Foods, Fortress of the Bears, and Theobroma Chocolate Company.

Land use in the Project area generally follows the major ownership categories listed above. Tongass National Forest lands are managed under the Tongass Land Use Plan (TLMP) noted in Section 5, Consistency with Comprehensive Plans. Lands under City ownership are used for power generation, water supply and commercial and industrial purposes, each administered by various City offices and departments. Among land use changes which might affect the Project relicensing is the NSRAA fish hatchery proposed for development and operation within the SCIP. This facility would use Blue Lake water and would release and retrieve a significant number of coho salmon each year. Exact location, size and operation of the hatchery are not known at the time of this draft document, but will be the subject of analysis is several areas in successive draft and final relicense application material.

3.10.2 Environmental Effects and Recommendations

No land ownership or use transfers or other changes are currently proposed relative to relicensing the Project. However, development of the NSRAA hatchery at the SCIP would result in significant change in industrial use within the Project Boundary, and could be the subject of review by the City and FERC.

3.11 Aesthetic Resources

3.11.1 Affected Environment

The Blue Lake Project area offers a variety of scenic and aesthetic opportunities. From the Blue Lake access road turnoff to the Sawmill Creek campground, the drive along the access road offers dramatic situations often characterized by exposure above the Sawmill Creek canyon and partial vistas of the surrounding mountains. At the Blue Lake overlook at road's end there is an expansive view of Blue Lake itself and the surrounding mountains. As discussed in the recreation section, it is estimated that considerable visitation in this area is occurs solely for the purpose of sightseeing.

Access on the Blue Lake road is often a factor limiting sightseeing. The road is generally maintained in good condition but may be made impassable by rock fall after landslides or downed trees after windstorms. The road is closed to vehicular traffic each winter due to avalanche dangers but the road is accessible to cross-country skiers, hikers and sledders. The parking area at the lake overlook is small.

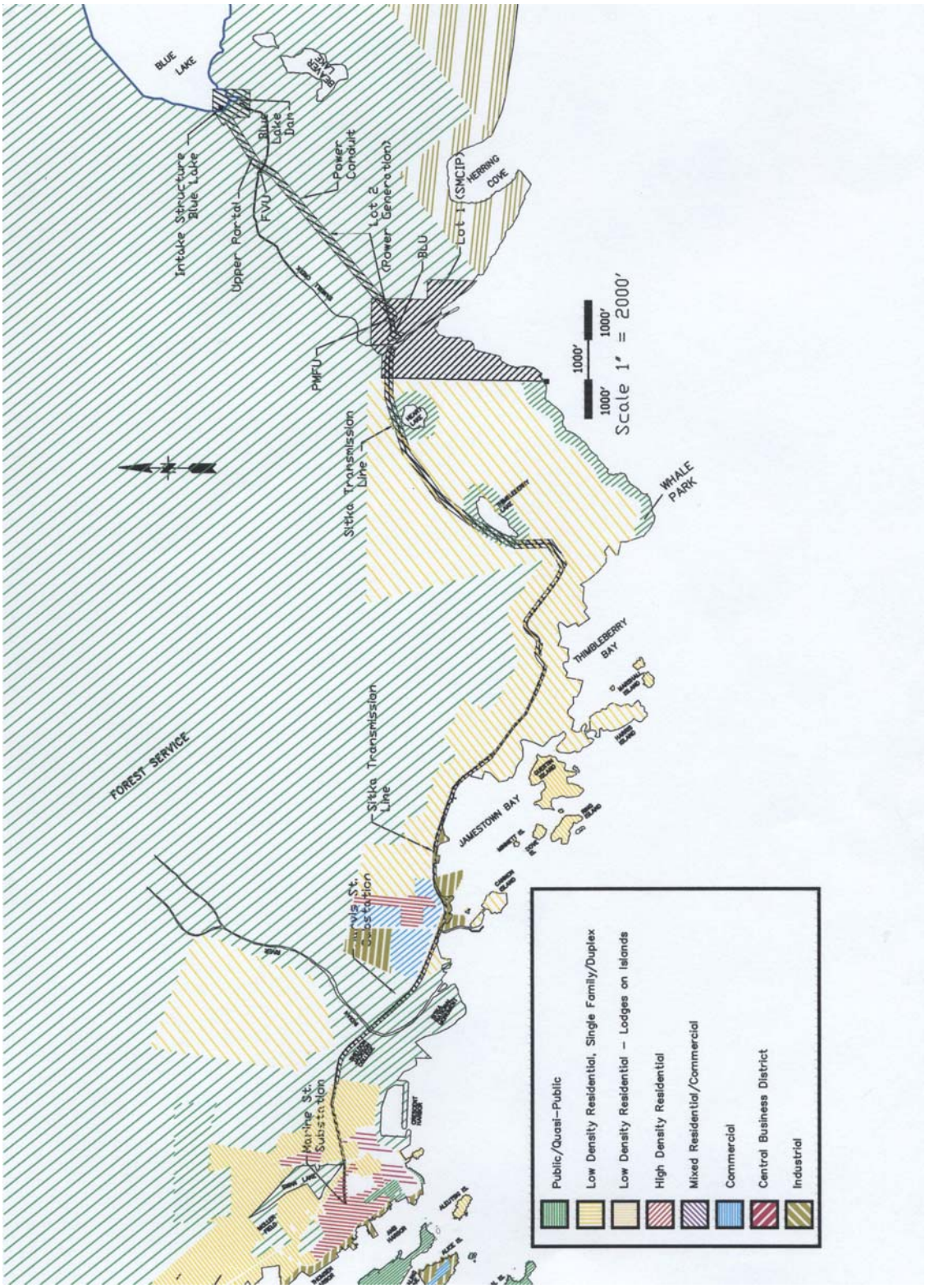

Figure 15. Land Use Map, Blue Lake Project Area

3.11.2 Environmental Effects and Recommendations

While no specific aesthetics issues were raised during the scoping process, the City has considered aesthetics resources in its overall Project proposals for relicensing. Generally, we expect no aesthetics impacts of the proposed measures because no significant new construction is planned. The enhancement measures associated with recreation which would improve 1) the parking lot near SCIP, 2) the Blue Lake overlook are considered to promote the aesthetics aspects of, respectively, hiking the Blue Lake road in winter and viewing Blue Lake from the overlook at the end of the Blue Lake road.

3.12 Subsistence Resources

3.12.1 Affected Environment

Section 810 of the Alaska National Interest Lands Conservation Act (ANILCA) of 1980 requires an evaluation of effects to subsistence hunting, fishing, and gathering resources and the subsistence lifestyle for any project that uses federal public lands. Subsistence uses in the Project area include hunting, fishing, berry and other botanical gathering, and taking of certain shellfish.

3.12.1.1 Subsistence Status of the General Area

ANILCA created a preference for rural Alaska residents who use subsistence resources on federal public lands. Within the Blue Lake Project area, the USFS, ADF&G and USFWS regulate various aspects of subsistence hunting, fishing and gathering, depending upon the resource and location.

The USFS controls subsistence hunts on its lands and is the only federal land manager involved in the project area. The Alaska Department of Fish and Game (ADF&G) controls hunting by urban, non-resident, and other non-rural hunters on these same lands and on any other land where hunting is allowed.

3.12.1.2 Federal Public Land Affected

Federal public land is land owned by the federal government that is open to the public and unencumbered by overlying selection by the State of Alaska or by Native corporations formed under ANILCA. All lands owned or operated by the federal government in the Blue Lake Project area are administered by USFS, Sitka Ranger District, Tongass National Forest. The total area of federal public land within the Project Boundary is about 812 acres.

3.12.1.3 Subsistence Communities and Their Resource Use Areas

The nearest community, Sitka, is approximately 5 miles north of the Project Area. Sitka is a traditional subsistence community as defined by ANILCA or designated by the

ADF&G, Board of Fisheries or Board of Game. This classification is currently being reviewed because Sitka's population may increase beyond the level specified in ANILCA.

In 1996, the ADF&G Division of Subsistence, in cooperation with STA, conducted a household subsistence survey in Sitka (among other southeast communities) to determine the fish, game and other resources used by subsistence users in the community (ADF&G, 1997). The survey showed that almost every Sitka household (97 percent) used at least one species of subsistence resources.

Based on the sample, it is estimated that more than 1,746,463 pounds of wild resources were harvested by Sitka households from February 1, 1996 through January 31, 1997. Overall, the average Sitka household used 572 pounds of wild resources in the survey year, or about 205 pounds per person.

Fish contributed the major portion of the usable weight harvested (55 percent), while land mammals contributed almost 25 percent, marine invertebrates contributed 13 percent and vegetation contributed 3 percent (Table 10).

Table 10. Estimated Total Subsistence Harvests of Wild Resources, Sitka, by Resource Category, February 1996 - January 1997 (Pounds of Usable Weight)

Subsistence Resource	Total Pounds Harvested	Mean Pounds Per Household	Pounds Per Person
Fish	953,206	312	112
Land Mammals	434,971	142	51
Birds and Eggs	5,068	1	0.6
Marine Invertebrates	234,496	76	27
Marine Mammals	62,358	20	7
Vegetation	56,362	18	6

3.12.2 Environmental Effects and Recommendations

Issue Sub1. Effects of relicensing on subsistence related resources. Generally, the City believes that Project relicensing will not affect existing or future subsistence uses in the Project area, but will discuss existing uses and their related entitlements in all subsequent environmental and licensing documents.

Relevant sections of ANILCA require assessment of subsistence impacts according to the specific items below:

3.13.2.1 Changes in Resources, Habitat, or Competition for Resources

Because no physical changes are proposed on relicensing, no impacts on resources, habitat or competition for resources are expected. Depending on the City's final proposals for Project operation and/or access improvements, populations of fish in Sawmill Creek and Blue Lake may be improved, but it is unknown how that improvement might affect subsistence harvest.

The same is true for hunting. The City's final proposals are expected to result either in improvement of access for these activities, or in no predictable change from current conditions.

3.13.2.2 Changes in Resource Availability due to Alteration in Migration Pattern or Location

There is no known major migration pattern in the area for terrestrial wildlife. Relicensing the Project should have no measurable effect on location of deer, bears, goats, or any other wildlife species that could be important to subsistence hunters or gatherers.

3.13.2.3 Physical or Legal Barriers to Accessing Resources

Depending on the City's final proposal for recreational improvements, it is expected that access for subsistence uses would not be affected, or would be improved by measures associated with relicensing the Project. An objective of improving facilities associated with the USFS campground as a proposed relicensing measure is to improve access for both recreational and subsistence-related uses.

3.13.2.4 Cumulative Impacts on Federal Land

Cumulative impacts of relicensing on subsistence activities would be the same as impacts described in the Cumulative Impacts Section. Generally, if the City's final recommendations improve access or usability of locations in which hunting, fishing and gathering are done, it is expected that relicensing will offer an overall improvement to subsistence users. No individual or cumulative impacts are expected.

3.13 No Action Alternative

3.14 Irreversible and Irretrievable Commitment of Resources

At the time of this DEA, no Irreversible and Irretrievable Commitment of Resources for any of the resources evaluation are expected. No significant impact to any resource has been demonstrated, based on studies and evaluation methods approved by Alaska state and federal resource agencies and STA.

4.0 DEVELOPMENTAL ANALYSIS

4.1 Power and Economic Benefits of the Project

The Sitka electric system is an isolated electric utility with no interconnection to any other electric utilities. As such, Sitka must use its own generating resources to supply the total power needs of the residential and commercial customers in the community. Further, the lack of a regional transmission grid in Southeast Alaska means that Sitka has no ability to sell power it generates outside its own system.

The Project provides a significant portion of Sitka's overall power and energy requirement. Without the Project, diesel generators would need to be used to generate the power currently supplied by the Project. There is no natural gas or coal in Southeast Alaska and diesel fuel used in Sitka must be transported by sea-going barge and stored locally. To replace the energy generation capability of the Project would require an estimated 4.4 million gallons of diesel fuel per year. In addition to the risks associated with transporting, handling and storing such a large quantity of fuel, it is estimated that using diesel generation to supplant the generation capability of the Project would result in annual pollutant emissions of 126 tons of sulfur oxides, 110 tons of nitrous oxides and over 26,700 tons of carbon dioxide.

It is also important to note that as a municipal electric system, Sitka's electric rates are cost-based. The benefits of the Project, when compared to the much higher cost of diesel generation, are passed on directly to the end consumer. From the other perspective, any additional cost burden placed on the Project must be recovered through electric rates charged to the residents and businesses of Sitka. The Sitka electric system has no revenue source other than the revenues received from sales of electricity to its customers.

The value of the Project generation is best estimated according to the only feasible replacement energy source, diesel generation. If the energy produced by the Blue Lake Project were to be replaced by diesel at 18 cents per kWh, the value would be over $10 million per year.

4.2 Cost of PM&E Measures

The measures proposed in this DEA for mitigation, protection and enhancement of environmental resources potentially-affected by the project are in four main categories: 1) Instream flow; 2) Ramping rate restrictions; 3) Recreation measures and 4) Indian River enhancement measures. The effects and costs of these measures are discussed below.

- **Instream Flow**. The proposal to release a minimum of 70 cfs from April 15 through June 30 causes a revenue loss to the City of about $12,400/yr due to diesel operation under a 0.8% load growth scenario.

Over a thirty-year license period, this would relate to a simple loss of $372,000 or about 0.2 % of the total estimated project generation revenue. If 70 cfs instream flow were required 12 months, instead of 2.5 months per year, the cost of minimum flow would be about $50,000/yr, using the same cost calculation described above. Generally 1 cfs /yr costs about $2500 /yr.

- **Ramping Rates Restrictions.** Annual costs of the restrictions on ramping rates during normal and non-normal conditions are expected to be minimal.

- **Blue Lake Road and Campground Improvements**. Total costs for these measures would be as follows:

- Blue Lake road maintenance	$10,000/yr
- Parking Lot near SCIP	$35,000
- Blue Lake Overlook	$7,000
- Campground Improvements	$100,000
- Blue lake road improvements	$35,000
Total	**$177,000**

- **Indian River Measures. Total costs for Indian River measures would be as follows:**

- Remove abandoned heavy equipment	$50,000
- Remove car bodies Reach 3, IRMP	$20,000
- Evaluate paintball course	$10,000
- General trash removal	$43,000
- Pave Indian River Road	$2,500,000 previously funded
- Buffer Zone Establishment	$0
Total	**$123,000**

Grand Total PM&E Measures Costs (Instream flow, Ramping, Recreation and Indian River Measures)	**$300,000**

Annual costs for the list of PM&E measures: (See Table D-3, Exhibit D) :

Blue Lake Road Annual Maintenance:	$10,000
Instream Flow	$12,400
Amortization Costs:	
- Blue Lake Road	$13,300 (on $177,000)
- Indian River Improvements	$9,300 (on $123,000)
Total:	**$45,000/yr**

5.0 COMPREHENSIVE DEVELOPMENT AND RECOMMENDATIONS

5.1 Comparison of Proposed Action and Alternatives

Table 9 (Section 3.5.2) shows a comparison among the various alternatives evaluated for instream flow habitat benefits and generation economics. The table demonstrates the instream flow benefits of Alternative 2T70 0.8 relative to the No Action alternative and to other instream flow alternatives and No Action under a 2.0 percent load growth rate. Although the instream flow benefits are not large, they represent habitat increases for most species/life stages evaluated, and substantial benefits to steelhead spawning, which was the objective of the adopted instream flow regime.

5.2 Comprehensive Development and Recommended Alternative

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When the Commission reviews a proposed project, they equally consider the environment, recreation, fish and wildlife , and other non-developmental values of the project as well as power and other developmental values. Accordingly, any license issued shall be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses.

Based on the City's review of the environmental and economic effects the City has developed the Preferred Alternative described in previous sections. Further refinement and evaluation of this alternative will be done in consultation with resource agencies, during the remainder of the relicensing period.

We believe that the City's Preferred Alternative would be best adapted to the comprehensive development of Blue Lake Project for beneficial public uses.

5.3 Cumulative Effects Summary

Under evaluations conducted to date, we do not foresee cumulative impacts which might result from implementation of the Preferred Alternative. However, the development of the NSRAA hatchery at the SCIP might introduce factors influencing effectiveness of the instream flow regime for steelhead and other target species. As information on the hatchery becomes available, the City will address it in terms of cumulative impacts and proposed relicensing measures.

5.4 Fish and Wildlife Agency Recommendations

At this time, no formal fish and wildlife recommendations have been made. The Preferred Alternative described in this document has been generally accepted by consulting agencies and STA, and is expected to be generally in accord with STA and agency preliminary recommendations submitted in response to an FERC request. We

expect to conduct further negotiations on these recommendations leading to settlement agreement with all or a subset of the consulting agencies prior to licensing.

5.5 Consistency with Comprehensive Plans

Six comprehensive state and federal management plans were identified during scoping and through agency comment as having relevance to the Project relicensing. These plans, with their applicable state or federal agencies, are the:

1. City of Sitka Comprehensive Plan (CSCP), City and Borough of Sitka;

2. Sitka Coastal Management Plan, Alaska Department of Natural Resources;

3. Tongass Land Use Management Plan, United States Forest Service, Tongass National Forest, Juneau; and

4. Northern Southeast Area Plan, Alaska Department of Natural Resources.

5. Sitka Trail Plan, US Forest Service.

6. Sawmill Cove Industrial Park Plan. City and Borough of Sitka Water Front Development Plan.

7. Alaska Department of Natural Resources, State Comprehensive Outdoor Recreation Plan (SCORP) 2004-2009.

In addition, the City has added the Indian River Management Plan discussed in the fisheries section because of its relevance to PM&E measures for steelhead recommended by STA.

The City has evaluated these plans for elements which directly affect the Project area, features or operation. This review has shown no conflicts with conditions in any of these plans. Conditions of the IRMP, to the extent that they apply to the steelhead PM&E measures on Indian River, will be directly adhered to as the enhancement project proceeds.

The City has also evaluated a list of comprehensive plans for Alaska in terms of their applicability to Project relicensing. While there are some area-wide and regional plans in this list, none was considered directly applicable to these proceedings.

5.6 Relationships of License Process to Laws and Policies

5.6.1 Water Quality Certification

Application for Water Quality Certification will be part of the Coastal Zone Consistency Certification process described below. Alaska procedures for Water Quality Certification are currently in a state of flux. At the time of this application, the State of Alaska has waived Water Quality Certification procedures. If certification again applies during the licensing process, it would be automatically incorporated in the process through application to ADNR under the Coastal Project Review process described in the following section.

It is the City's belief that no element of the Preferred Alternative or resulting operation would adversely affect current water quality conditions in Blue Lake or Sawmill Creek.

5.6.2 Coastal Zone Consistency Certification

Our preliminary review indicates no conflicts with Project relicensing proposals relative to the Sitka Coastal Management Plan. Normally, Coastal Project Review (by ADNR) does not begin until the application for license or relicense is accepted by the FERC and noticed in the Federal Register with requests for interventions and preliminary recommendations. A decision will be made within the coming months as to the future of Coastal Zone Planning statewide, which may result in elimination of the review process entirely.

5.6.3 FPA Section 18

No Section 18 proposals which would be in the form of fish passage prescriptions, have been made at this time.

5.6.4 Endangered Species Act

Review at the time of this document did not disclose presence of any endangered species in the area potentially-affected by the Project relicensing. A Biological Evaluation (BE) is being prepared by the City, in association with the USFS, concluding that no threatened or endangered species, as currently recognized by USFS or USFWS, are known to exist in the Project area.

6.0 LITERATURE CITED

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9.0 ATTACHMENT I

Comment Letters on Draft License Application

NORTHERN SOUTHEAST REGIONAL AQUACULTURE ASSOCIATION, INC.

(907) 747-6850
FAX (907) 747-1470
EMAIL steve_reifenstuhl@nsraa.org

1308 Sawmill Creek Road Sitka, Alaska 99835

September 23, 2005

To: Charlie Walls
Utility Director
City & Borough of Sitka
105 Jarvis Street
Sitka, Alaska 99835

CC: Email Distribution, electronic
FERC Secretary, paper

Subject: Review of Draft License Application, Blue Lake Hydroelectric Project (Project), FERC No. 2230.

Dear Mr. Walls:

As you know, Northern Southeast Regional Aquaculture Association (NSRAA) has been involved with the relicensing process for subject Project, leading to our recent review of the Draft License Application (DLA) and Preliminary Draft Environmental Assessment (PDEA) distributed on or about June 26, 2005. This letter forwards to the City and Borough of Sitka Electric Department (CBS) our comments on those documents and other issues under consideration for the relicensing.

Generally, NSRAA has no substantive comments on the DLA and PDEA. We expect to be involved in the development of alternatives and measures to protect, mitigate and enhance resources which will be reflected in the Final License Application, due in March, 2006.

With regard to the preferred alternative, we note that in the PDEA, CBS supports a three turbine configuration and associated operational conditions. On September 7, 2005, we were informed by CBS that it had selected a two turbine alternative (2T 60 0.8) reflecting two turbines, 60 cfs during May and June and 0.8 percent load growth. NSRAA wishes to state its support for this alternative.

We believe that the 60 cfs release at the fish valve is adequate to protect spawning and rearing area for rainbow/steelhead in May and June, while 50 cfs for the remainder of the calendar year is a biologically defensible volume for resident rainbow trout and coho, pink, and chum salmon spawners.

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Additionally, on the issue of Sawmill Creek steelhead, we believe that the current stocks of Sawmill Creek steelhead are quite likely to be supplemented by rainbow trout of Blue Lake origin. We offer this opinion to address the issue of the extent to which Sawmill Creek steelhead might depend on year around streamflow, particularly for fry and juvenile rearing.

Prior to the late 1930's few, if any, rainbow trout were produced in the watershed above the barrier falls, which is less than one mile upstream from tidewater. We believe that few steelhead would have been produced below the barrier falls due to poor quantity and quality of rearing habitat.

Biologists in the 1930's recognized that Blue Lake had the potential to support rainbow trout. (Presumably, the biologists would not have stocked the lake if steelhead production was abundant.) Therefore in 1938 and 1939, Blue Lake was planted with rainbow trout fry and adults. We believe that this not only produced rainbow in the lake but also steelhead in Sawmill Creek.

It is well known that a small component of resident coastal rainbow trout populations may emigrate from a lake or stream system and take on the anadromous steelhead life history pattern. Two examples of this are Sashin Lake, from which the parent stock of Blue Lake rainbow originated, and Deer Lake, on southern Baranof Island. Deer Lake rainbow/steelhead smolt successfully exit the lake over a 320 foot free fall, far higher than the fall over the Blue Lake dam spillway. The Deer Lake situation is also similar to Blue Lake in the lack of significant rearing habitat in their respective outlet streams. Yet both systems yield steelhead returns each year.

We hope that these observations are useful in the ongoing effort to develop operational conditions for the Blue Lake Project. If you have questions or concerns, don't hesitate to contact me at 907-747-6850, or via email at steve_reifenstuhl@nsraa.org.

Sincerely,

Steve Reifenstuhl,
Operations Manager, NSRAA

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Sitka Tribe of Alaska

Tribal Government for Sitka, Alaska

September 26, 2005

City and Borough of Sitka Electric Department
Attn: Charles Walls, Utility Director
105 Jarvis St.
Sitka, AK, 99835

SUBJECT: City and Borough if Sitka's Draft License Application, Blue Lake Project, FERC No. 2230

Dear Mr. Walls,

I write on behalf of Sitka Tribe of Alaska (STA), the tribal government for over 3,700 tribal citizens based in Sitka. STA is responsible to protect the health, safety, welfare and culture of our citizens. It is with this purpose in mind that I submit comments on the Sitka and Borough of Sitka's Draft License Application, Blue Lake Project, FERC No. 2230.

Since time immemorial, Gajook Héen Yak.áayi, Blue Lake and the surrounding area has been important to the Kik.śadi and other clans of the Tlingit people for customary and traditional use, primarily fishing, hunting and berry gathering. Mining, construction and operation of the pulp mill and the installation and operation of the Blue Lake hydroelectric dam have impacted this customary and traditional use.

COMMENTS

2.2.2 Proposed Environmental Measures
In addition to the recreation measures suggested from USFS on page 24 and the City on page 64, Sitka Tribe proposed the following enhancements for the Blue Lake project area:

- Improve access to boat launch at Blue Lake;
- Improve access to non-motorized recreation on Blue Lake, such as fishing piers and row boats, including improved access for person's with disabilities;
- Install guardrails along Blue Lake Road;
- Improve pull-offs along Blue Lake Road for improved access to resources;
- Study and develop step pools in "barrier" falls for steelhead passage. The fish may optimize better spawning and rearing habitat above the falls area. It is well documented that steelhead can jump more than 15 vertical feet. It is also well documented that the height the salmon can achieve depends on the depth

456 Katlian Street • Sitka, Alaska 99835 • (907) 747-3207 • Fax (907) 747-4915

of the water at the foot of the falls and the position of the standing wave. If the flows are there, the fish will jump;

- Place signage along access areas of Sawmill Creek to warn of the dangers of recreating in the creek,
- Off-site mitigation of steelhead, i.e. Indian River.

STA requests that the City conduct an in-depth study of the environmental effects of the proposed NSRAA hatchery and weir on Sawmill Creek steelhead and coho salmon, as well as the effects on sockeye salmon, coho salmon and steelhead at Salmon Lake due to cost recovery efforts. If the City proposes in the future to develop a deepwater dock in the Sawmill Cove Industrial Park, a logistical study of how large cruise ships will interact with hatchery operations such as the cost recovery effort, rearing and ponding salmon and saltwater use. Further, STA requests a 10-year review of the fish populations and habitat available in Sawmill Creek to account for foreseeable changes in the use of Sawmill Creek.

3.5.1.1 Sawmill Creek Fish Species

On page 37, the City lists the following salmonid species as utilizing Sawmill Creek: Coho salmon, king salmon, pink salmon, chum salmon, steelhead, Dolly Varden char, and Artic grayling. Resident rainbow trout should be included in this list since there is discussion of this species on page 41. Artic grayling are on the list on page 37, however this species is not included in any discussion. Artic grayling's association and utilization of Sawmill Creek needs to be discussed. Sawmill Creek already receives stray king salmon from the existing NSRAA hatchery at Medvejie. With another hatchery proposed for the same area, Sawmill Creek will receive stray hatchery coho salmon that will compete with the wild salmon for resources.

On page 41, the City states," They (steelhead) spend one, two, or three years in the ocean before reaching maturity and returning to freshwater to spawn." It should be noted that steelhead continue to spawn year after year, unlike other salmonids which die after spawning. Steelhead have a relatively long life for salmonids, and can live for more than eight years.

3.7.1.2 Botanical Resources

Sitka Tribe suggests the City include the well-established Kayaani Commission in any sensitive plant survey of the Blue Lake project area.

Preferred Alternative

Sitka Tribe supports the Blue Lake hydroelectric dam and the City's decision for their preferred alternative "2T 60 0.8" (two turbines and an in stream flow proposal for 60 cfs (cubic foot per second) during May and June (for steelhead spawning), and 50 cfs for the remaining month of the year) under the FERC relicensing.

Sitka Tribe appreciates this opportunity to comment on the City and Borough of Sitka Blue Lake hydroelectric project FERC relicensing draft. If you have any questions or

concerns please feel free to contact Jessica Perkins 907-747-7500 or Heather Woody 907-747-6506 at Sitka Tribe.

Sincerely,

Lawrence Widmark
Tribal Council Chairman

STATE OF ALASKA

FRANK MURKOWSKI, GOVERNOR

DEPARTMENT OF FISH AND GAME

DIVISION OF SPORT FISH / RTS

333 RASPBERRY ROAD
ANCHORAGE, ALASKA 99518-1599
PHONE: (907) 267-2369
FAX: (907) 267-2422

September 26, 2005

Honorable Magalie R. Salas, Secretary
Office of the Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, D.C. 20426

Dear Secretary Salas:

Subject: Blue Lake Hydroelectric Project (FERC No. 2230)
Draft License Application Comments

On June 23, 2005, the City and Borough of Sitka (CBS) issued the Draft License Application (DLA) and solicitation of comments for the proposed relicensing of the Blue Lake Hydroelectric Project (FERC No. 2230) in Sitka, Alaska. The Alaska Department of Fish and Game (ADF&G) provides the following comments based on review of the DLA and on meetings to develop instream flow recommendations for Sawmill Creek and operational procedures aimed at reducing potential impacts to fish resources in Blue Lake.

The proposed relicensing action will be subject to a review to ensure the project is consistent with standards of the Alaska Coastal Management Program (AS 46.39 and 46.40, 11 AAC 110, 112, and 114).

The project may also be subject to Fish Habitat Permit stipulations pursuant to AS 41.14.870 and 41.14.840. As a result of reorganization mandated by State of Alaska Executive Order 107, the authority for issuance of Fish Habitat permits was transferred to the Alaska Department of Natural Resources (ADNR), Office of Habitat Management and Permitting (OHMP). Pursuant to a Memorandum of Understanding (MOU) between ADF&G and ADNR, ADF& G serves as the lead on FERC actions.

Proposed Action

The proposed action no longer includes the installation of a third turbine (letter from Charlie Walls in email from Mike Prewitt, 9/7/05). Therefore, we are only evaluating data from model runs for the two-turbine alternatives. The proposed action also includes an instream flow release from the fish valve unit of 60 cfs in May and June, and 50 cfs in all other months.

Model Runs

We appreciate the detailed model runs submitted to us on 9/9/05. We now have fish habitat and lake level data for model runs assuming the following flow releases from the fish valve unit: 1) existing (50 cfs year round), 2) proposed (60 cfs May and June, 50 cfs other months), 3) 60 cfs year-round, and 4) 75 cfs year-round. We received this data late in the review process for the DLA, so our formal comments on these runs will be submitted at a later date. Our primary concerns are with maintaining habitat for all life stages of fish in Sawmill Creek and ensuring that lake level fluctuations do not adversely impact fish habitat in Blue Lake, including rainbow trout spawning along the margins of the lake and access into and out-of lake tributaries during late spring and early summer.

Offer of Settlement

We also have a proposal from CBS to initiate discussions toward reaching a settlement agreement with all interested parties (letter from Charlie Walls in email from Mike Prewitt, 9/21/05). ADF&G supports this approach for resolving issues associated with relicensing, and is committed to working towards a settlement agreement for Blue Lake. We expect CBS will continue to lead this effort and will coordinate information flow and meetings among participants.

The 9/21/05 letter includes a proposal to limit any instream flow releases from the fish valve unit to the range of flows that can currently be released (40-70 cfs). ADF&G will review the data provided by CBS and is open to further discuss this proposal with CBS and the other participants.

In particular, issues that ADF&G wishes to discuss in the settlement agreement process include:

1. Instream flow releases from the fish valve unit;
2. Operational changes, if any are needed, to protect rainbow trout habitat in Blue Lake;
3. Stream enhancement measures in Sawmill Creek to improve spawning and rearing habitat; and
4. Ramping rates during project maintenance or emergency shutdowns.

Thank you for the opportunity to comment. Please contact me at (907) 276-2312, or Kevin Brownlee (907) 465-4276 if you have any questions or need further information.

Sincerely,

/s/ Jim Ferguson

Jim Ferguson
Statewide Hydropower Coordinator

cc: W. Regelin, ADF&G HQ *
T. Cunning, ADF&G/WC HQ – Anchorage*
K. Hepler, ADF&G/SF HQ-Juneau *
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C. Walls, CBS *
D. Orbison, CBS*
M. Prewitt, CBS *
J. Konigsberg, TU *
A. Landau, SEACC *
K. Fields, SCS *

* e-mail

United States Department of Agriculture
Forest Service
Alaska Region
Tongass National Forest
Sitka Ranger District
204 Siginaka Way
Sitka, AK 99835
Phone: (907) 747-6671
Fax: (907) 747-4253

File Code: 2770
Date: October 3, 2005

Charles Walls
Utility Director
City and Borough of Sitka Electric Department
105 Jarvis Street
Sitka, AK 99835

RE: Blue Lake Hydroelectric Project FERC No. 2230, USDA Forest Service, Tongass National Forest, Sitka Ranger District, Comments on Draft License Application

Dear Mr. Walls:

We have reviewed the Subject Draft License Applications including the Preliminary Draft Environmental Assessment (PDEA) and Exhibits A-D and offer the following comments:

Instream Flow
On August 7, 2005, we received notification from the City and Borough of Sitka Electric Department ("City") of a change of Preferred Alternative. The City withdrew their proposal to install a third turbine. We are evaluating the Draft License Application and specifically the PDEA proposal based on two turbines and an instream flow proposal for 60 cfs during May and June and 50 cfs for the remaining months and assuming an annual load growth of 0.8 percent.

We are currently reviewing a proposal received from the City on September 21, 2005. This would limit releases from the fish valve unit between 40 and 70 cfs. We believe this shows an attempt on part of the City to maintain and/or enhance the fisheries resources of Blue Lake and Sawmill Creek. With this proposal in mind, the Forest Service will continue to work with other stakeholders during the next two months to develop an instream flow recommendation.

page 6, Section 1.3.2.3. - Study Planning for Other Resources Recreation
The Final Recreation Study Plan was approved in October 2004, and distributed on November 16, 2004. Melissa Dinsmore sent an email to Mr. Prewitt on November 24, 2004, with additional comments from the Forest Service. She asked what the process would be for comments submitted to a Final Study Plan. A response was never received. Again, I submit the enclosed comments and ask that they be considered (see November 24, 2004, email).

page 24, Section 2.2.2.2. - Recreation Measures
The proposed measures listed are acceptable in general principle. However, these items need further negotiation regarding the level of improvements. Using the list of projects submitted to the City on March 23, 2005, (copy enclosed) as a starting point, and recognizing certain projects have been discussed, I advocate beginning negotiation on the following prioritized Recreation Mitigation Measures:

1. Blue Lake Road, lower gate
    a. Place signage directing traffic to additional parking at Sawmill Cove Industrial Park (SCIP), cost estimate $800.
    b. Stipulation be included that should parking at SCIP become limited due to expansion of the property or other circumstance, the City will be required to create additional parking within reasonable walking distance of the Blue Lake Road and Sawmill Creek Road intersection.

2. Sawmill Creek Campground Survey and Design. Cost estimate $40,000.
    a. The City of Sitka would pay for a design package for the Sawmill Campground including the following features:
        i. Remedy drainage problems.
        ii. Develop turnaround area. Including areas for parking, restrooms, sheltered picnic/camping area.
        iii. Provide picnic and/or camping opportunities on south side of Sawmill Creek.
        iv. Improvements to existing campsites, signage.
        v. Provide escape route for campground occupants.

3. Beaver Lake Trail and bridge
    a. Bridge – provide reliable access across Sawmill Creek to the Beaver Lake Trail. Cost estimate $550,000.
    b. Reroute steep switchback area. Reroute and extend the upper switchbacks above Sawmill Creek that were cut off by the landslide in the 1990's. Cost estimate $42,000.

4. Blue Lake Reservoir Overlook. Cost estimate $5,000.
    a. Improve overlook/parking area above Blue Lake – to include a boulder barrier/seating area and gravel surfacing.

5. Herring Cove to Beaver Lake Trail. Cost estimate $225,000.
    a. Forest Service will fund survey and design, estimate $10,000.
    b. City of Sitka to provide matching funds for construction.

6. Sawmill Creek Campground to Blue Lake Dam Trail
    a. Construct trail from campground to dam via the old construction road on Sawmill Creek
    b. Cost Estimate: survey and design $15,000, construction $90,000.

<u>page 61, Section 3.8.1 - Affected Environment</u>

Mining History

The first paragraph speaks directly to the mining history of the Silver Bay area without reference to the source used, the source should be cited.

Second paragraph: An Alaska Heritage Resource Survey (AHRS) number should have been sought for the corduroy road Mr. Rushmore documented. The AHRS is a statewide database of archeological/historic resources maintained by the State Office of History and Archeology. This AHRS number should be referenced in this section. Part of the task of documenting an archeological site involves completing a Site Inventory Form, a site map, and photographs. A reference to this work and where copies of the work can be found should also be made, i.e. "on file at the City and Borough of Sitka office", although specific site location data should not be included in the EA..

page 61, Section 3.8.2 - Environmental Effects and Recommendations
A reference to Rushmore's determination of eligibility for the corduroy road as well as a reference to whether or not the State Historic Preservation Officer concurs should be included in this section.
Second Paragraph: The statement regarding Section 106 review for third turbine is appropriate. Federal reports and NEPA documents often include a stipulation in this section to the effect:

> "If cultural resources are inadvertently discovered during project implementation, the project will stop and the State Office of History and Archeology (or State Historic Preservation Officer) will be notified."

Thank you for the opportunity to comment, I look forward to continuing to work with the City of Sitka through the Alternative Licensing Process for this project.

Please contact Melissa Dinsmore, 747-4201 or mdinsmore@fs.fed.us if you have any questions.

Sincerely,

Carol A. Goularte

CAROL A. GOULARTE
District Ranger

Potential Recreation Enhancements/Improvements/Mitigation
Blue Lake Project FERC No. 2230
March 23, 2005

The Forest Service, Sitka Ranger District has developed a list of potential recreation enhancement/improvement/mitigation projects related to re-licensing of the Blue Lake hydroelectric project (FERC No. 2230). These projects cover a range of activities including improvements to the Sawmill Creek campground, trail improvements/construction and public access. Depending on future negotiations between the City and Borough of Sitka and the Forest Service, some or all of these projects may be included in the final license application, therefore, projects listed below are prioritized, with the highest priority ranked as #1.

1) **Sawmill Creek Campground**
   a. ***Remedy drainage problems.*** During dam construction, the area now known as Sawmill Creek Campground was used as a staging area. Since that time the staging area was converted to a USFS campground, but poor drainage within the campground limits use.
   b. ***Develop "turnaround" area.*** A large, undeveloped area exists within the campground that could be utilized for parking, restrooms, sheltered picnic/camping area.
   c. ***Provide picnic and/or camping opportunities on south side of Sawmill Creek.***
   d. ***Improvements to existing campsites, signage.***
   e. ***Provide escape route for campground occupants.***

2) **Beaver Lake Trail Bridge**
   a. ***Provide reliable access across Sawmill Creek to the Beaver Lake Trail.*** The existing bridge is old and in questionable condition. Replacement of this bridge or a retrofit of the penstock are possible options.

3) **Blue Lake Reservoir Overlook.**
   a. ***Improve parking area near dam.***

4) **Green Lake Road Vehicle Access.**
   a. ***Provide vehicle access to lake.***

5) **Beaver Lake Trail**
   a. ***Replacement of boardwalk on lower trail.***
   b. ***Reduce grade on portions of switchback construction.***

6) **Blue Lake Road – lower gate area.**
   a. ***Provide additional parking.***

7) **Herring Cove to Beaver Lake Trail.**
   a. ***Provide matching funds for construction***

8) **Sawmill Creek Campground to Blue Lake Dam Trail**
   a. ***Construct trail from campground to dam.***

9) **Blue Lake Access.**
   a. ***Improve vehicle access to Blue Lake.***

10.0 ATTACHMENT II

DEVELOPMENT OF PREFERRED INSTREAM FLOW and GENERATION ALTERNATIVE

Blue Lake Hydroelectric Project, FERC No. 2230

City and Borough of Sitka, Alaska, Electric Department

March, 2006

INTRODUCTION AND BACKGROUND

As part of the relicensing for the Subject Project, the City and Borough of Sitka Electric Department (City) has evaluated alternative Project operational scenarios in terms of their engineering, economic and environmental effects. The objective of these evaluations has been to develop an operating regime which best serves the City's needs for electrical generation while protecting environmental resources through the period of the new license.

Consultation with Alaska state and federal resource agencies and the Sitka Tribe of Alaska (STA) led to performance of an Instream Flow Incremental Methodology (IFIM) application on Sawmill Creek to quantify effects of streamflow changes on target anadromous fish species (City and Borough of Sitka, 2004a). In addition to fish habitat effects in Sawmill Creek, the City has also developed an information base suitable to evaluate changes in Blue Lake level, in terms of effects on the resident rainbow trout population in that water body. Consultation, Methods and Results of these studies are in several City and contractor prepared documents, cited in the References Section, and available on the City's Blue Lake Project relicensing website.

In addition to the IFIM studies, the City has developed and refined the Blue Lake Operational Model (Operations Model) to predict Sawmill Creek stream flows, generating economics and water use factors under a variety of operational alternatives. These Operations Model and IFIM outputs are the basis for economic and environmental assessment, as described in the sections below.

ALTERNATIVE EVALUATION METHODS

SAWMILL CREEK INSTREAM FLOW TIME SERIES ANALYSIS

Among other revisions, the Operations Model has been revised to predict Sawmill Creek streamflow on a mean monthly basis for a 28-year forecast period. Details of Model calculational logic, input and output are in City and Borough of Sitka 2005d. Flows predicted for the 28-year period are displayed in a 12X28 matrix, called the "Discharge

Matrix" named according to a nomenclature system which describes the input variables specific to a selected operational alternative.

From the IFIM study, a group of "Q vs. Weighted Usable Area (WUA)" relationships were developed for the selected target species, steelhead trout and coho salmon. These relationships showed WUA for steelhead and coho spawning, fry rearing and juvenile rearing at specific Sawmill Creek cross-section locations selected to describe areas where the majority of Sawmill Creek target species had been observed during a 4 ½ year fisheries survey conducted for the relicensing. Discussion of specific cross-sections and species/life stages is in City and Borough of Sitka Electric Department, 2005c. Life history timing and habitat utilization are discussed in City and Borough of Sitka Electric Department, 2004c.

Using the Discharge Matrix and Q vs. WUA relationships, a "Habitat Matrix" was developed, in which each successive mean monthly discharge was converted to a mean monthly WUA using an Excel spreadsheet interpolational calculation. The Habitat Matrix was then evaluated by ranking the WUA values for the yearly time period when the selected species/life stage was active, known as "periodicity" (City and Borough of Sitka, 2004 b). We elected to examine the 50th and 20th percentile exceedance points as comparators of the habitat results for each alternative.

ANALYSIS STRUCTURE

ALTERNATIVES EVALUATED

Alternatives evaluated in the DLA included a three-turbine configuration with 60 cfs minimum releases during May and June as the Preferred Alternative (**3T 60a 0.8)**. Also included was a two-turbine alternative with 60 cfs release during May and June and 50 cfs for the remainder of the year (**2T 60 0.8)**. After agency review of the DLA, the three-turbine alternative was dropped and the **2T 60 0.8** alternative proposed as the City's Preferred Alternative. In response, the IFT requested analysis of a two-turbine alternative with 70 cfs release from April 15 to June 30, and 50 cfs for the remainder of the year. This alternative was called **2T 70 0.8**. After further consideration, the City selected this as its Preferred Alternative for the FLA. Alternatives evaluated in this document, then, are as follows:

NA 0.8 -- No Action Alternative, 0.8 percent load growth;
2T 60 0.8 --Two turbines, 60 cfs from May 1 through June 30, 0.8 percent load growth;
2T 60a 0.8 --Two turbines, 60 cfs released all year;
2T 70 0.8 --Two turbines, 70 cfs from May 15 through June 30, 0.8 percent load growth;
2T 75a 0.8 -- Two turbines, 75 cfs all year (this alternative was requested by agencies during consultation leading to adoption of the 2T 70 0.8 alternative).
NA 2.0 -- No Action Alternative, 2.0 percent load growth

Q vs. WUA RELATIONSHIPS

Three primary Q vs. WUA relationships were used to address Issue F1: 1) spawning for steelhead trout and coho salmon at the Falls Pool IFIM site; 2) rearing for steelhead and coho fry and juveniles at the Pulp Mill Outflow 2 (PMO2) site; and 3) for steelhead juveniles at the Index Pool 1 (IP1) site (Table 1). These sites were selected as those representing the largest and most consistent fish utilization, as described in City and Borough of Sitka, 2005c. Spawning and rearing were observed only at these sites every year of the Wolfe surveys. Inclusion of other sites, we believe, would lead to the need for weighting of flow requirements, a complex and uncertain process.

Table 1. Species/life stages and associated cross-sections, Sawmill Creek instream flow alternatives analysis.

Species	Life-Stage	Cross-Section	Periodicity
Steelhead	Spawning	FP1-3	May, June
Steelhead	Fry Rearing	PMO2	August-May
Steelhead	Juvenile Rearing	PMO2, IP1	Year around
Coho	Spawning	FP1-3	October, November
Coho	Fry Rearing	PMO2	Year around
Coho	Juvenile Rearing	PMO2	Year around

RESULTS FORMAT and ALTERNATIVE SELECTION

Two primary factors were examined during evaluation of the output: 1) total fish habitat for the relevant species/life-stage/cross-section; and 2) economic evaluation of electrical generation. Details of the full Operations Model output for each alternative are not presented in this paper, but will be made available as appendices to the draft and final license applications.

A final generation economics vs. fish habitat benefit table was prepared after initial evaluation of alternatives. The Applicant's Preferred Flow Alternative was the one which offered the highest values for both fish habitat and generating economics.

GENERATION COST CALCULATION

For economic comparisons among alternatives, the comparator was the difference in total cost of diesel operation (over the 28-year period) between the No Action Alternative and the Alternative under consideration. Diesel operation was selected as the cost comparator because the Sitka generation system has, and will retain into the future, an energy surplus. That is, the Blue Lake Project spills essentially every year, effectively releasing water which cannot be used for electrical generation. At the yearly periods when the Project is not spilling, however, load may not be met because of low reservoir elevation. When load is not met, or when reservoir elevation falls below El 270, diesels must be run. When these conditions occur, cost of electrical generation to the City increases dramatically. It is this cost that is shown in Table 1 as generation cost.

RESULTS

Results are presented showing comparisons among alternatives in terms of 50th and 20th percentile habitat values and total generating revenue for the 28-year forecast period (Table 2).

Table 2. Comparisons Of Diesel Operation Cost And Median Time Series WUA for Various Blue Lake Project Alternatives (20th Percentile WUA Values in Parentheses).

Alternative	Steelhead Spawning FP1-3	Steelhead Fry PMO2	Steelhead Juvenile PMO2 / IP1	Coho Spawning FP1-3	Coho Fry PMO2	Coho Juvenile PMO2	Average Annual Cost (millions)
NA 0.8	386.8 (368.5)	88.3 (25.1)	251.1 / 232.0 (248.7 / 132.6)	94.1 (37.7)	115.2 (20.2)	196.3 (132.2)	$1.016
2T 60 0.8	431.5 (417.3)	88.0 (26.0)	251.2 / 228.9 (248.7 / 134.8)	94.1 (37.7)	110.0 (60.2)	193.0 (133.8)	$1.021
2T 70 0.8	457.9 (457.9)	88.3 (26.2)	253.4 / 227.3 248.7 / 137.7	94.1 (37.7)	108.6 (61.6	191.8 (135.8)	$1.028
2T 60a 0.8	417.3 (417.3)	77.0 (27.0)	260.0 / 216.4 (257.0 / 192.7)	91.9 (44.4)	99.2 (84.6)	183.1 (168.6)	$1.047
2T 70a 0.8	457.9 (457.9)	67.5 (27.8)	269.6 / 196.6 (267.0) / 186.1	92.2 (51.5)	86.0 (82.1)	170.6 (165.1)	$1.066
2T 75a 0.8	471.4 (471.4)	64.8 (33.3)	269.2 / 183.5 (267.3/173.1)	93.1 (55.0)	81.2 (77.3)	163.7 (158.2)	$1.121
NA 2.0	386.8 (368.5)	88.3 (28.4)	251.1/232.0 (248.7/225.8)	87.0 (37.7)	115.2 (107.3)	196.3 (190.5)	$4.326

ALTERNATIVES COMPARISONS

LOAD GROWTH of 0.8 PERCENT.

Under the 0.8 percent load growth projections, WUA for steelhead spawning showed the most consistent change relative to the different alternatives. Relative to the NA 0.8 (the most foreseeable No Action condition), the Preferred Alterative (2T 70 0.8) increased steelhead spawning habitat by about 18%, while the 60 cfs alternative (2T 60 0.8) increased this habitat by on about 8%. The 2T 75 0.8 alternative resulted in 22% habitat increase. The 75 cfs flow, however, was considered at the limit of the mechanical capabilities of the FVU turbine, however, and was not considered feasible. Costs comparisons between the 2T 60 0.8 and 2T 70 0.8 alternatives showed that the Preferred Alternative cost about $12,000 per year relative to the No Action alternative. The 2T 60 0.8 alternative cost about $5,000 per year more than No Action, or about $7,000 per year less than the 2T 70 0.8 operation. The increase in steelhead spawning habitat, however, outweighed the additional cost.

Coho spawning was remarkably stable under all alternatives, probably because coho spawning occurs later in summer after spill has begun in most years. Increases in minimum flow are not seen at this time of year because flows are typically much higher than minimum during the entire coho spawning season.
For fry and juvenile coho and steelhead, the Preferred Alternative caused little change relative to No Action. The 2T 60 and 75 "a" alternatives, with increase streamflow all year, resulted in lower habitat for both immature life stages in both species, probably because the Q vs. WUA curves for these species declined steeply with flow across most of the discharge range.

LOAD GROWTH of 2.0 PERCENT.

There was almost no difference between habitat values under the 0.8 and 2.0% load growth No Action alternatives. A more definitive analysis would include comparisons among the various instream flow alternatives under both load growths, but this was not done because the 0.8%

REFERENCES

(Note: Reference dating and numbering corresponds to citations in the Literature Cited Section of the PDEA).

City And Borough Of Sitka Electric Department 2004a. Supplement To Instream Flow Study Plan, Blue Lake Project (FERC) 2230. City And Borough of Sitka Electric Department. April 2004. 12 pp.

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