

FINAL FISHERIES MONITORING PLAN

BLUE LAKE HYDROELECTRIC PROJECT EXPANSION

FERC No. 2230-044

SITKA, ALASKA

Prepared By:

City and Borough of Sitka

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INTRODUCTION

The City and Borough of Sitka Electric Department (“City”) is in the process of applying for an amendment to the existing FERC license for the Blue Lake hydroelectric project (“Project”, FERC No. 2230) to address recent electric load growth in the face of increasing diesel fuel costs. The amendment will reflect two significant changes in Project design: 1) construction of a new powerhouse including 3 new turbine generators and decommissioning of the existing turbine generators; and 2) raising the Project dam as much as 83 feet from the existing spillway height of El (elevation in feet above mean sea level) 342 to El 425. Collectively, these and other associated changes are referred to as the "Blue Lake Expansion" or simply "Expansion".

Details of the proposed Expansion are described in the Final Amendment Application (City, 2009), available at the City’s Project website:

(www.cityofsitka.com/departments/electric/bluelakeexpansion).

NEED for FISHERIES MONITORING

In the Final Draft Environmental Assessment (FDEA), there were three primary fisheries impact issues: 1) construction-related water quality effects in both Blue Lake and Sawmill Creek; 2) changes in access to spawning habitat in certain Blue Lake inflow tributaries; and 3) changes in water temperature regime in lower Sawmill Creek from operation of the new intake. In all these cases, the FDEA noted that impacts could be avoidable (as in the case of construction-related impacts) or that overall impacts were expected to be minimal.

In the case of inflow tributary spawning access, it was noted that the length of spawnable area of certain tributaries would increase while area in others would decrease. Also, access to spawnable habitat in Blue Lake Creek (the primary inflow tributary) might improve because the post-Expansion reservoir level would be exceed height of a barrier falls in the lower Creek. Finally, in the case of lower Sawmill Creek water temperature effects, the new, higher (relative to the water surface) intake would capture warmer water which, when released at the Blue Lake powerhouse, might affect pink salmon spawning, incubation and rearing downstream.

The fisheries monitoring program, then, would seek to 1) detect water quality changes from construction; and 2) validate predictions of Blue Lake inflow tributary access and habitat availability and; 3) validate predicted water temperature regime in lower Sawmill Creek, as well as effects on pink salmon spawning and emergence timing.

If fisheries impacts were noted during monitoring, funds would be available from a mitigation escrow fund to address the unforeseen impacts.

FISHERIES MONITORING PROGRAM

FISHERIES MONITORING GENERAL PROVISIONS

Fund and Conduct Monitoring Studies

The City will fund and conduct, through approved contractor(s) fisheries monitoring studies beginning prior to construction and continuing for a period of three (3) years after reservoir filling.

Reports

Prior to March 1 of each monitoring year, the City and its contractors will prepare an annual report of all fisheries monitoring study results for the previous year, and distribute the report to the appropriate resource Stakeholders. The report will contain copies of all field data collection notes.

Annual meetings

The appropriate resource agencies and licensee will meet once per year, 30 to 45 days after issuance of the annual monitoring report. At this meeting, the results of all monitoring activities and reports will be evaluated and, if necessary, the monitoring program will be redirected.

Yearly Study Plans

The fisheries monitoring program will be implemented through a series of yearly monitoring studies, each performed according to an accepted study plan. These study plans will be prepared after Stakeholder review of monitoring reports for the previous year, and after the annual meetings. First in this series of Study Plans will be the plan for 2012, presented in the following sections.

Note that plans for 2012-2015 will be primarily directed at noting impacts during construction because Project construction will continue until the reservoir is filled in 2014. After the reservoir is filled, monitoring will focus on impacts.

FISHERIES MONITORING PROGRAM TIME PERIODS

The fisheries monitoring studies are expected to change over the time period beginning in 2012 and ending about 3 years after the reservoir is filled. During this period, monitoring studies will take place in three primary time periods related to the Expansion schedule. These are:

- **Project Construction (2012-2013);**
- **Reservoir Filling (2013-2015); and**
- **Long-term Operation (2015-2018).**

Prior to start of monitoring studies for each successive year, the City and its contractor(s) will prepare a draft monitoring study plan documenting study time period, study areas and

study methods for the coming calendar year and will distribute the draft plan for Stakeholder review. Stakeholder comment will be incorporated with the objective of addressing all reviewer concerns without dispute.

Following are descriptions of general study parameters for the three monitoring time periods listed above:

Initial Construction (2012)

Monitoring during these two years will be focused on water quality and on extending the baseline survey period for fish in Blue Lake, its inflow tributaries, and Sawmill Creek.

Reservoir Filling (2013-2015)

During reservoir filling, emphasis will shift from water quality monitoring to documenting physical and biological changes in Blue Lake itself and its major inflow tributaries, and in Sawmill Creek, particularly in areas downstream of the Blue Lake powerhouse. Water quality studies will be conducted to note decomposition products from the decaying forest and water temperature regimes in Blue Lake and near the new Project intake structure.

Long-term Operation (2015-2017)

During these monitoring studies, researchers will document fish usage of upstream reaches of Blue Lake Creek made accessible by increased water levels relative to the upstream passage barrier on Blue Lake Creek. Further observations will also be made of fish utilization of the major Blue Lake inflow tributaries. Water quality in Blue Lake will be continuously monitored with emphasis on water temperature changes and levels of TOC.

In Sawmill Creek, monitoring will focus on water temperature throughout the stream but with emphasis in the reach downstream of the Blue Lake powerhouse. At the same time, researchers will note timing of spawning, incubation and emergence of potentially affected pink salmon in the reach.

Long-term operation monitoring studies will continue for 3 years following the first year in which Blue Lake reservoir levels reach El 425.

PROPOSED FISHERIES MONITORING STUDIES for 2012

As stated above, fisheries monitoring studies in CY 2012 will emphasize water quality monitoring near construction areas and will sample fish in both Blue Lake and Sawmill Creek, as described in detail below.

Water Quality Monitoring

During initial construction, the primary potential impact would be input of sediment and other deleterious materials to Blue Lake and Sawmill Creek. Measures to control sediment

and other construction-related materials such as surface runoff, sediment, fuels and blasting residue are described in the Sediment and Erosion Control Plan (ESCP, City 2010a), prepared by the City in 2010. Control measures and Best Management Practices (BMP's) in the ESCP will reduce the likelihood of sediment and other contaminant inputs to major water bodies.

Monitoring for various water quality constituents is described in the Water Quality Monitoring Plan (WQMP, City 2010b) prepared by the City in May, 2011. Studies in the WQMP will include continuous measurement of several water quality parameters throughout the construction period, to document construction effects on the City's drinking water supply. The reader is referred to these plans for detailed methods, areas and time periods.

Also during the initial construction period, water temperature monitoring will continue at the locations noted in the WQMP. Water temperature will be continuously monitored in Blue Lake at two thermograph arrays (Figure 1). Water temperature grab samples will also be collected and sample positions noted using GPS.

In Sawmill Creek, the existing continuous water temperature monitoring sites will be retained, including those downstream of the Blue Lake Project powerhouse to extend the pre-Expansion baseline begun in 2010.

Fisheries Sampling

During the 2012 construction period, fisheries researchers will visit the interface areas of the major Blue Lake inflow tributaries at least twice during the May-June rainbow trout spawning period. Also during 2012 juvenile and fry recruitment will be examined during two trapping events; one taking place prior to the Lower Barrier Falls being breached by rising reservoir levels in July and the second taking place after the falls have been breached in the fall.

Surveys will be conducted in the same areas and using the same methods as were used in the 2008-2009 Blue Lake Expansion fisheries surveys (CBS 2008a, CBS 2008b). These will include foot surveys, boat surveys, snorkeling, trapping, and hook and line sampling (Wolfe 2009). Water levels during this period are not expected to differ from levels currently observed, but fish observations and direct sampling will extend the baseline information on rainbow trout life stage periodicity, location, and relative abundance prior to raising the reservoir level.

During 2012, researchers will continue gathering visual particle size data in the Blue Lake inflow tributaries as well as pebble count data in Blue Lake Creek. This data will add to the baseline information collected in 2009 and will be used to describe channel changes which might affect stream passage access and spawning characteristics. This study element will also help validate sediment transport predictions made in Dube, 2010.



BLUE LAKE EXPANSION INUNDATION AREA
 1646 ACRES, 362 ADDITIONAL ACRES
 RESERVOIR WATER QUALITY MONITORING FEATURES

Figure 1. Blue Lake Temperature Monitoring Locations.

In Sawmill Creek, baseline stream surveys will be conducted to document distribution, relative abundance and periodicity of the anadromous and resident fish. Since there have been no Sawmill Creek fisheries surveys since 2007, work done in 2012 will provide more recent baseline documentation. As in Blue Lake, baseline survey methods will include foot surveys, minnow trapping, snorkeling, and hook and line sampling. Surveys in 2012 will be less frequent and at a reduced number of sampling sites compared to surveys done to support Blue Lake Project relicensing.

LITERATURE CITED

City and Borough of Sitka Electric Department, 2008a. Final Blue Lake Rainbow Trout Spawning Survey Study Plan for 2008. Blue Lake Hydroelectric Project (FERC No. 2230) Expansion. May 2008 15 pp.

City and Borough of Sitka Electric Department, 2008b. Revisions to Blue Lake Expansion Fisheries Study Plan. Blue Lake Hydroelectric Project (FERC No. 2230) Expansion. 4 pp.

City and Borough of Sitka Electric Department, 2010a. Final Erosion and Sediment Control Plan. 6pp.

City and Borough of Sitka Electric Department, 2010b. Draft Water Quality Monitoring Plan. 5pp.

Dube, K. 2010. Final Reservoir Sedimentation Study Report Blue Lake Project (FERC No. 2230) Expansion. City and Borough of Sitka, Licensee. January, 2010. 33pp.

EES, 2010. Evaluation of change in Blue Lake Hydroelectric project intake location of water temperatures and anadromous salmonid utilization in Sawmill Creek. City and Borough of Sitka, Licensee. Prepared By: Dennis Schult and John Blum. February, 2010. 32pp.

Wolfe, K.F. 2009. Final 2008 Fisheries Studies Report Blue Lake Hydroelectric Project (FERC No. 2230) Expansion. City and Borough of Sitka, Licensee. December, 2009. 72pp.