

Draft Mitigation and Monitoring Plan

**In response to US Forest Service Section 4(e) Condition No. 19
Article 405**

Blue Lake Hydroelectric Project (FERC No. 2230) Expansion

City and Borough of Sitka Electric Department

Sitka Alaska

July, 2012

1.0 Introduction and Background

The City and Borough of Sitka, Alaska ("City") owns and operates the Blue Lake Hydroelectric Project (FERC No. 2230) near Sitka. Due to unforeseen electrical load growth in the City, the City and Borough of Sitka Electric Department has proposed to raise the dam and construct other project features which will increase annual energy output at the Project. Actions to accomplish this new construction are called the Blue Lake Project Expansion ("Expansion").

The new Project license was issued by the Federal Energy Regulatory Commission (FERC) in 2007 and will require amendment in order for the proposed construction and operation to take place. As part of the amendment process it is expected that both FERC and reviewing state and federal resource agencies will include environmental and other conditions which the City must meet.

1.1 Need for This Plan

This Draft Mitigation and Monitoring Plan (Plan) has been developed to satisfy a request for a Mitigation and Monitoring Plan from the US Department of Agriculture Forest Service (USFS), Condition No. 19. Condition 19 reads as follows:

The Licensee, in consultation with the Forest Service and interested stakeholders, will develop a Project Mitigation and Monitoring Plan (Plan) within 60 days after amendment issuance. The Plan shall include detailed descriptions of the mitigation and monitoring measure(s), implementation schedules (including public notification strategy), and detailed steps for planning, design, construction, etc. of the approved measure(s). Additionally, the Plan shall provide a mechanism for the Licensee and the Forest Service to meet periodically to review/modify the implementation schedule of these measures. Once approved by the Forest Service, the Licensee shall file the final Plan, including evidence of consultation, with the Commission and shall implement those measures approved by the Commission.

It is anticipated that certain details of the environmental monitoring (e.g., specific years of sampling and/or specific study sites) may need modification during development of detailed study plans or during subsequent implementation of the environmental monitoring. All such

modifications shall be developed in consultation with the Forest Service and stakeholders and approved by these agencies and provided to the Commission before implementation.

1.2 Plan Organization

This Plan was prepared by the City to describe both mitigation proposals and the details of proposed monitoring programs for a list of resources. As described below, the mitigation proposals will be specific actions proposed by the City to mitigate for unavoidable project-related impacts.

The monitoring plans will be resource-specific plans to monitor conditions of specific resources during and after construction, for a specified period of time. Monitoring plans for the following resources are envisioned at this time:

- Fish and Aquatic Resources;
- Wildlife and Botanical Resources;
- Water Quality;
- Recreation; and
- Aesthetics Resources.

1.3 Consultation

The City is distributing this draft plan for review by a group of Stakeholders thought most likely to have an interest in its conditions. The City will address all review comments in the final plan.

2.0 Mitigation Proposals

2.1 Mitigation Planning Background

The City has been involved in mitigation planning for several years. The planning effort has included several City-Stakeholder meetings and distribution of at least three documents and mitigation meetings describing City mitigation proposals. The USFS outlined two proposals for mitigation in a letter dated June 13, 2011 (Attachment IA). This mitigation proposal is based plan A outlined in that letter.

During the course of mitigation planning, the City has solicited mitigation recommendations from Stakeholders and after review has either included or eliminating these proposals from further consideration.

2.2 Resource-specific impacts and City Response

Based on the analyses in the FERC EA, the City has developed a list of unavoidable impacts to which mitigation measures could be applied. Note that not all resources were noted to be significantly impacted by the Project. In many cases, impacts noted in the FERC EA will be addressed by avoidance measures obviating the need for mitigation measures. These cases are

noted in the following discussion of impacts and measures for each resource. Resources have been divided into three categories: 1) Those with no impacts and no need for mitigation; 2) resources which may have impacts which will be addressed by avoidance measures; and 3) resources which may have impacts and for which mitigation is proposed.

2.2.1 Resources with no impacts

Fish. The FERC EA did not note significant impacts to fish, either in Blue Lake or in Sawmill Creek. In Blue Lake, rainbow trout were not expected to be impacted by the higher reservoir level (trout would gain in spawning habitat in some inflow tributaries, lose habitat in others, and would have a similar amount in the remainder, resulting in no net change among all areas) or by the reduced rate of reservoir fluctuation relative to the existing condition. Therefore, no avoidance, mitigation or compensation is proposed for fish.

2.2.2 Resources with Impacts Addressed by Avoidance Measures

Wildlife. One of the Project's significant impacts would be increased access to Blue Lake if increased boat access from raised water level were not restricted. To avoid this occurrence, the City plans to restrict access to blue lake, particularly for the purpose of launching a boat. This restriction would be achieved by emplacement of a gate, near the current parking lot, past which no vehicles may pass. No specific mitigation measures are proposed at this time because the City believes that the access restriction will avoid wildlife impacts

Water Quality. Similar to increased access-related impacts to wildlife, it is expected that water quality might be affected by facilitating easier boat launching and consequent recreation usership. Restrictions in the City's Watershed Control Plan prohibit increased usership, beyond current levels, on Blue Lake because the lake is the City's drinking water supply. Therefore, without access restrictions, lake use could increase violating Control Plan conditions and possibly impacting drinking water quality.

As with the plan for wildlife resources, the City believes that restricting access, using the gate, will sufficiently impede access to avoid water quality impacts.

2.2.3 Resources with impacts addressed by mitigation

Inundation of 362 acres around the Blue Lake Creek valley and other areas of the lakeshore.

Description of Impacts

The most significant unavoidable impact would be permanent loss of the timber, recreation, and vegetative resources around the lake due to raised water levels. All of these land areas are currently within the National Forest System and are under ownership of and management by USFS.

Also included in discussions of the 362 acre inundation were wetlands which would be inundated. A quantitative functional analysis of impacts to wetlands and Waters of the U.S. was performed in consultation with the US Army Corps of Engineers and other Stakeholders.

City-Proposed Mitigation

The City proposes to transfer ownership of 48 acres of land on Chichagof Island as mitigation for the inundated area. The lands in question, in three parcels known as "Basoiniuer No. 1, Basoiniuer No. 2 and Golden West" on City planning documents, are currently private inholdings in the West Chichagof-Yakobi Wilderness Area managed by the USFS Sitka Ranger District.

Mining claims for these properities were staked and patent 1087814 was issued to Joseph T. Baur and John Soini in 1936 at which time the property was located in the Sitka mining district. Sitka records indicate that the properties were on the delinquent tax roll and foreclosure list for the tax year 1968. In that year, the property was deeded to the Greater Sitka Borough.

In 1984 the City and Borough of Sitka leased the property to Boomer Exploration Inc. (In this document, these lands will be referred to as the "Boomer" land area). Boomer Inc. prospected the property but filed no mineral report. The Boomer prospecting camp was abandoned and the City removed potential hazardous material from the site in the late 1990s. The deteriorated camp and prospecting equipment remains to this day.

The non wilderness designation of the Boomer property is not consistent with that in the surrounding West Chichagof-Yacobi Wilderness area. It has been suggested by the USFS that the most appropriate use of the property would be to include it in the wilderness area after certain rehabilitation measures were performed.

The City has in principle agreed to this land transfer, plus certain actions related to improving the area. The actions currently under discussion are:

- 1) Transfer the Boomer lands to the USFS through formal transfer of deed or other official ownership document(s);
- 2) Clean up the equipment and buildings left at the exploration site and restore the land to a condition suitable for regrowth by native vegetation;
- 3) Quantitatively Inventory the properties for wetlands and conduct a functional analysis of these wetlands against a similar analysis of wetlands within the 362 acres lost to inundation in Blue Lake Creek Valley. The Blue Lake wetlands functional analysis, including both field and office work has been completed.

Recreation and Aesthetics.

Description of Impacts

Recreation. Restriction to reservoir access for the purposes of meeting the City's Watershed Control Plan (discussed under wildlife and water quality sections, above) would reduce recreation access for certain recreation elements resulting in no impact relative to access. However, recreational use of the reservoir has decreased in recent years (based on ADF&G harvest records) and ADF&G closed goat hunting in the Blue Lake drainage in 2011 due to over-harvest of females.

Surveys conducted by Sitka Conservation Society indicate there is significant recreation in the Blue Lake watershed, particularly in the Blue Lake Creek valley. Fishing in Blue Lake Creek, a high quality sport fishery which will be almost entirely eliminated by the dam raise. This impact is difficult to quantify, but, whatever the use level, it is recognized as significant based the qualities of the fishery and its surrounding environs.

Aesthetics. Analyses based on photographic rendering of pre- and with-Project conditions indicated that there would be minimal visual impact of the higher water levels expected after the dam raise. For most of the lake's viewshed, in fact, visual impacts would slightly decrease with the Project because of the lower level of drawdown each year and reduced "bathtub ring" visible from viewpoints near the reservoir access point. But, not removing the timber from the reservoir will result in a "bathtub ring of a different nature (because of standing timber) that will remain year around. Visual impacts from the access view point could be similar.

Visual impacts in the upper reaches of the lake, however, could be significant based on the current plan to leave the potentially-inundated forests intact after flooding. This would create visual impacts at both high water and low water levels.

City Proposed Mitigation

The City proposes two measures to mitigate for recreation and aesthetic impacts associated with inundation of the Blue Lake Creek valley. These are:

- 1) Directly fund a campground host at the Sawmill Creek campground near the FVU. This funding would be set at about \$10,000 per year. The City would reimburse the USFS for the cost of funding the campground host every year

2.3 Stakeholder-Requested Mitigation Proposals

At meetings held on June 2, 2010, Nov. 5, 2010 and May 19, 2011, the City and Stakeholders discussed specific mitigation proposals. After the meetings, some Stakeholders [Sitka Conservation Society (SCS), Sitka Tribe of Alaska (STA) and US Forest Service (USFS)] provided the City with written requests for such proposals. In Attachment I, we present the written proposals and the City's response to each.

3.0 Resource-Specific Monitoring Plans

In Attachment II we present monitoring plans which the City has prepared during the pre- and early post-filing period. Most of these plans have been reviewed by Stakeholders, and review comments incorporated in a final version.

4.0 Mitigation and Monitoring Effectiveness Evaluation

Beginning one year following the initiation of mitigation measures and individual monitoring plans, the City will invite comment from responsible Stakeholders regarding effectiveness of the various plans and measures. To the extent possible, evaluations will be done objectively and quantitatively, recognizing that such outcomes may not be possible in all cases.

The purposes of these evaluations will be twofold: First, to evaluate how the plan or measure was implemented during the preceding year. Were the monitoring studies conducted? Were they properly conducted, according to plan specifications?

Second, evaluations, after having concluded that the measures and/or studies were properly implemented, would be examined to note how resources were being affected. For example, did the recreation measure to restrict access to Blue Lake succeed in reducing hunting pressure on goats? Has Blue Lake water quality been affected by additional use, or were the access restrictions successful at protecting drinking water quality?

Based on its own evaluation methods and input from reviewing Stakeholders, the City will prepare annual mitigation and monitoring reports documenting the status of all measures implemented during the previous year.

ATTACHMENT I

SCS, USFS and STA MITIGATION PROPOSALS and CITY RESPONSES

Sitka Conservation Society Mitigation Proposals and City Responses (By Andrew Thoms, Director)

Timber (T)

SCS T1. First selection of trees and wood products (burls, etc) for use in local Native Education carving programs (STA, NPS, SNEP, etc)

1. City sponsorship (in association with sponsorships and contributions of other entities) of a Tlingit Canoe, carved by local carver Tommy Joseph, that represents the City's investment in renewable energy/action on climate change and serves as a memorial for the loss of the Blue Lake Forest
2. Use of timber from Blue Lake valley for personal use wood.

***City Response.** It would be possible to highgrade some Yellow Cedar by felling and limbing the trees prior to inundation the limited number of trees could be collected just prior to spill and removed from the reservoir.*

SCS T2. For the utility grade wood, I think we need to develop the ideas a little bit more on how we are going to put this wood to use. I think that this is a potential opportunity to supply firewood or provide an opportunity for a local business to process this wood (pellets, bricks, packaged cords, etc). However, I think that the City/Forest Service will need to be fairly strategic on how this is done. The wood that comes out could easily flood the market. Or, the wood could be stockpiled to the point that it rots and is un-usable and becomes a liability. SCS would be willing to help work on a plan for figuring out how to best approach this subject.

***City Response.** Utility wood will be left standing or burned in the burn area based on the inundation plan.*

SCS T3. For the saw logs, I would like to see the city give a premium or incentives for any local processing of this wood. I don't know what the structure of this would look like but the value of the economic activity and sale-taxes associated with local processing of the wood may be more valuable than the money saved in the timber removal contract for selling the timber. More work needs to be done to figure out how to best utilize this resource for full benefit to Sitka

***City Response.** Saw logs will be left standing or burned in the burn area based on the inundation plan.*

Viewshed (VS)

SCS VS1. Upon completion of the project, the upper staging area for dam construction will be converted to a scenic overlook of Blue Lake with interpretive signs that could serve as a potential tourist attraction or focal point for visitors

City Response. The 2007 license requires development of an overlook. This suggestion can be incorporated in the overlook. This would be classified as improved recreation.

Inundated Habitat (IH)

SCS IH 1. Analyze value of habitat to be inundated and set up a mitigation program as per examples/involvement of Corp of Engineers Representative.

City Response. This will be addressed in the wetlands study plan.

SCS IH 2. The loss of habitat for recreation and subsistence is especially important to my membership. Part of the mitigation for this loss of this habitat should be the commitment by the City to partner with the Forest Service and Trailworks to find a way to bridge the Vodopad River and connect a trail to the Salmon Lake Valley. The City's contribution would be to at least commit to installing a hiking bridge over the River.

City Response. The City is opposed to providing access across the Vodopad River for security and safety reasons. Routing hikers across the dam site or by the switchyard and tailrace is considered a liability.

SCS IH 3. For the irreversible loss of habitat in the Blue Lake valley, mitigation compensation should include additional lands transferred to the Tongass National Forest. These could include lands available on the Sitka Ranger District that are available for transfer/sale or the trade of City Lands (especially lands within the West Chichagof Wilderness Area)

City Response. "Boomer Properties", 48 acres per city tax roles. This land swap must be discussed in more detail with City staff and USFS. The ultimate decision must be made at the Assembly level.

SCS IH 4. TLMP amendment that changes the entirety of the Salmon Lake Valley to a Remote Recreation LUD

City Response. This is under the jurisdiction of the USFS, not the City.

US Forest Service (USFS) Mitigation Proposals and City Responses

USFS 1. Stocking Blue, Beaver, Heart, and/or Thimbleberry Lakes with native rainbow trout every X years for the duration of the license

City Response. This must be reviewed with ADF&G. The City would prefer to agree to a one time mitigation escrow fund. The fund would mitigate for any impacts discovered during the monitoring address. This would particular request would be classified as mitigation for lost fish habitat at Blue Lake.

USFS 2. Enter into an agreement to annually purchase food grade fertilizer to enhance juvenile sockeye production at Redoubt Lake for X years

City Response. The City would rather participate in one time mitigation acceptable to all stakeholders. The future of Redoubt is currently in question.

USFS 3. Supply and maintain john boats and oars at Blue, Beaver, Heart, and Thimbleberry Lakes

City Response. This is recreation mitigation, The city would rather fund a one time project

USFS 4. construct a hike-in public recreation cabin along the Blue Lake to Beaver lake route

City Response. The City could agree to a cabin at Beaver Lake but not Blue Lake

USFS 5. Consideration for the increase in accessibility for goat hunting - we're not sure what type of mitigation to seek but it needs to be considered

City Response. The access to Blue Lake will not be increased. Even so the access to goat areas may be improved. The increased access must be reviewed by ADF&G.

USFS 6. Provide the money to construct a fishing pier at the Starrigavan Recreation Area

City Response. The City needs more specific information to consider this suggestion

USFS 6. Provide the money to develop additional improvements at Sandy Beach

City Response. This is offsite mitigation and a onetime project that the City believes would provide public benefit. The city could agree

USFS 7. Provide the money to have a campground host at Sawmill Creek campground

City Response. The City and USFS would mutually benefit from having a Camp Ground host at Sawmill Creek Campground. The city could agree

USFS 8. provide firewood at Sawmill Creek campground

City Response. *The City prefers not to enter into a multiyear service supply agreement*

USFS 9. donation of the X acres the City owns within the West Chichagof-Yakobi Wilderness. The property would have to present no known health/safety/liability problems, (that is hazardous waste contamination, unsafe structures, and the like) that the City is not willing to correct.

City Response. *This land swap must be discussed in more detail with City staff and USFS. The ultimate decision must be made at the Assembly level.*

USFS 10. Develop partnerships to find a way to cross the Green Lake Dam outfall

City Response. *This recommendation is not on National Forest Land. The City is opposed to providing access across the Vodopad River for security and safety reasons. Routing hikers across the dam site or by the switchyard and tailrace is considered a liability.*

Sitka Tribe of Alaska

STA 1. STA staff does not fully support a solely analytical approach to the mitigation process. The staff feel that a social or human aspect in terms of lost or reduced sport or subsistence opportunities should be factored into the mitigation process. STA firmly believes that the mitigation process should not take place between just the city, state, and federal agencies but that it should be a transparent process that is open to the public. The mitigation process should also take into account that the full effects of the project on the aquatic and terrestrial wildlife may not be realized until years after the completion of the project.

City Response

City Response The entire Blue Lake Amendment process has been open to the public and the public has been encouraged to participate.

The Blue Lake Project Expansion provides an overall benefit to all Stakeholders by decreasing environmental impacts. Mitigation should generally not be required for an overall benefit.

STA 2. STA supports the partial funding of the Redoubt Lake fertilization project in the amount of \$10,000 per year for 10 years as mitigation for the loss of subsistence opportunities caused by the project's impacts.

City Response

See USFS 2 above

ATTACHMENT IA



File Code: 2770

Date: June 13, 2011

Mr. Christopher Brewton
Utility Director
City and Borough of Sitka
105 Jarvis Street
Sitka, AK 99835

Dear Mr. Brewton:

The purpose of this letter is to document the mitigation measures that are under discussion for the Blue Lake Hydroelectric Expansion Project, P-2230-044 and to indicate the Forest Service's preference.

We are appreciative of your willingness to consider several proposed mitigation projects for the Blue Lake project. I want to emphasize that the Forest Service will not attempt to compel the City and Borough of Sitka (City) into agreeing to unacceptable or unduly burdensome mitigation. Any mitigation measures must be acceptable to both the City and the Forest Service. We do, however, find that it is appropriate for the City to mitigate for the 362 acres of National Forest System (NFS) lands that will be inundated by the expansion of Blue Lake.

The two combinations of potential mitigation projects under consideration are:

Plan A

1. Donation of two City-owned parcels of land within West Chichagof-Yakobi Wilderness to the United States. Exact acreage is unknown but appears to be between 48 and 69 acres. Title to the property and site conditions at the time of transfer would need to be acceptable to the Forest Service.
2. Development of a collection agreement to provide funding to the Forest Service for a campground host at the Sawmill Creek Campground. The City would contribute all of the funds needed to maintain the campground host, up to \$10,000 per year for the term of the license.

Plan B

1. Construction of a hike-in public recreation cabin along the Blue Lake to Beaver Lake trail route. Funding would be provided by the City. After construction, the cabin would be maintained by the Forest Service and added to the cabin reservation system.
2. Improvements at the Forest Service Sandy Beach recreation area according to a plan agreed to by both the City and the Forest Service.



3. Development of a collection agreement to provide funding to the Forest Service for a campground host at the Sawmill Creek Campground. The City would contribute up to \$10,000 per year for the term of the license.

The Forest Service prefers Plan A and finds that these two projects would provide quality mitigation for the impacts of the Blue Lake project to NFS lands and resources. Project 1 would eliminate two Wilderness inholdings and provide additional land for public use and recreation. Project 2 would improve visitor service and security at the Sawmill Creek Campground and would also improve security at the nearby Blue Lake Hydro structures and dam.

Plan B is also potentially acceptable to the Forest Service. If the West Chichagof-Yakobi land donation cannot be implemented, we would consider accepting Plan B as appropriate mitigation for the Blue Lake Expansion Project. Project 1 would increase recreation opportunities in the Sitka area. Project 2 would benefit the public by upgrading a popular recreation site, and Project 3, a host at the Sawmill Creek Campground, would benefit both the public and the City.

We look forward to working with you to reach mitigation decisions that are agreeable to both the City and the Forest Service. Carol Goularte and her staff at the Sitka Ranger District are your primary contacts for the mitigation discussions. They can be reached at (907) 747-6671.

Sincerely,

/s/ Forrest Cole
FORREST COLE
Forest Supervisor

ATTACHMENT II

RESOURCE-SPECIFIC MONITORING PLANS

- 1. FINAL FISHERIES MONITORING PLAN**
- 2. FINAL WILDLIFE MONITORING PLAN**
- 3. DRAFT WATER QUALITY MONITORING PLAN**

FINAL FISHERIES MONITORING PLAN

BLUE LAKE HYDROELECTRIC PROJECT EXPANSION

FERC No. 2230-044

SITKA, ALASKA

Prepared By:

City and Borough of Sitka

October, 2011

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 preformed 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.

FINAL WILDLIFE MONITORING PLAN, GENERAL

And

FINAL WILDLIFE MONITORING PLAN for 2011-12

**BLUE LAKE HYDROELECTRIC PROJECT EXPANSION
FERC No. 2230-044**

SITKA, ALASKA

Prepared By:

City and Borough of Sitka

Sept, 2011

INTRODUCTION

The City and Borough of Sitka Electric Department (“City”) has applied 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:

<http://www.cityofsitka.com/government/departments/electric/BlueLakeExpansion.html>

NEED for WILDLIFE MONITORING

In the Final Draft Environmental Assessment (FDEA), wildlife impacts were predicted to be in two primary areas: 1) impacts on mountain goats related to increased boat access to Blue Lake and 2) loss of wildlife habitat due to inundation of 362 acres of vegetation around Blue Lake and in the Blue Lake Creek valley. Further, while the licensing material did not predict impacts on certain species of special concern, wildlife monitoring will note all effects on these species during project construction and long-term operation. Finally, monitoring will also examine effects of construction, with emphasis on wildlife disturbance from construction activity, equipment operation and blasting. An escrow fund will be established to fund mitigation for any unforeseen impacts.

CONSULTATION and COMMENT

The draft version of this monitoring plan was distributed in July, 2011, with a request for comment. No comments were received pursuant this request. However, on review of the draft wildlife study plan for the City's proposed Takatz Lake hydro Project (FERC No. 13234), Alaska Department of Fish and Game requested that brown bears be tagged to address cumulative effects of the Takatz and Blue Lakes, collectively. We have added tagging of two brown bears in the Blue Lake/Sawmill Creek area, and assistance in tracking those collars, to the scope of wildlife monitoring measures, as described on page 7 of this plan.

WILDLIFE MONITORING PROGRAM

WILDLIFE MONITORING PLAN GENERAL PROVISIONS

Fund and Conduct Monitoring Studies

The City will fund and conduct, through approved contractor(s), wildlife 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 contractor(s) will prepare an annual report of all wildlife 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 wildlife monitoring program will be implemented through a series of yearly monitoring studies, each preformed according to an accepted study plan for that year. Except for the first plan (for 2011-12), study plans will be prepared after Stakeholder review of monitoring reports for the previous year, and after the annual meetings. At the meetings and in yearly study plan development, the City will describe the stage of Project completion to guide monitoring for the coming year. In the early development years, the focus will be on construction and on continuing baseline surveys, particularly in the areas of Sawmill and Blue Lake Creeks; in later years the focus will shift to impact assessment relative to the issues described in amendment application material.

WILDLIFE MONITORING PROGRAM ELEMENTS

The wildlife monitoring studies are expected to change over the time period beginning in 2011 and ending in 2018, about 3 years after the reservoir is filled. During this period, monitoring studies will take place in four primary time periods related to the Expansion schedule. These are:

- Pre-Project Construction (2011-2012);
- Project Construction (2012-2013);
- Reservoir Filling (2013-2015); and
- Long-term Operation (2015-2018).

Prior to the 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 comments will be incorporated with the objective of addressing all reviewer concerns without dispute.

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

Pre-Project Construction (2011-2012)

The focus on wildlife monitoring studies during this time period will be the continuation of baseline surveys and updating wildlife temporal and spatial use of the project area, particularly the areas of Sawmill Creek construction and the inundation of Blue Lake Creek valley. Studies will include methods as described in Bovee 2010. GPS data from the cooperative mountain goat project with ADF&G (see section below) will be used to assess potential impacts on goats. Another, smaller scale cooperative project, will begin on brown bears, with the goal being to radio collar 2 brown bears, especially females, to determine denning sites and seasonal use patterns within and adjacent to the project area. This study will also help to assess and minimize potential bear/human interactions.

Project Construction (2012-2013)

Monitoring during these two years will be focused on assessing any effects on wildlife from activities in construction areas. Baseline surveys will be continued as well. Potential disturbances to wildlife from construction could include -

- blasting
- tunneling
- drilling
- heavy equipment operation
- helicopter
- chainsaw
- burning

The degree to which these potential disturbances effect wildlife may depend on many factors, including nature of disturbance (i.e. intensity, duration, frequency, distance) and nature of wildlife (i.e. species, proximity, age, sex, prior exposure to disturbance, season). Review of literature has produced a "working" Disturbance Buffer Distance (DBD) (Table 1) but this will need to be revised with agency comments to the draft study plan. For the sake of this draft monitoring plan, DBD will apply to major disturbances, such as blasting, and will be considered an approximate DBD, with the likelihood of

it increasing or decreasing depending on agency comments and more details being provided by contractor (i.e. dB of blasting, frequency, timing).

Reservoir Filling (2013-2015)

During reservoir filling, emphasis will shift to monitoring wildlife responses to raising water levels, particularly waterfowl and brown bear along Blue Lake shoreline and Blue Lake Creek and valley.

Long-term Operation (2015-2018)

Standard field methods will continue during this time period and analysis of data from prior field seasons will be done to assess the impact of the project on wildlife. Any necessary mitigation measures will be determined and cooperative work with agencies will be done to address these concerns.

PROPOSED WILDLIFE MONITORING STUDIES for 2011-2012 (Pre-Project Construction)

In order to assess impacts from construction activities, solid baseline data will be needed prior to activities to evaluate effects on wildlife. While prior studies have addressed this, data needs to be updated on temporal and spatial distribution of wildlife in the project area, particularly the areas of Sawmill Creek construction and the inundation of Blue Lake Creek. Proposed wildlife monitoring activities during 2011-12 will include three main aspects -

- Continuation of baseline surveys
- Mountain goat observations and telemetry study
- Brown bear observations and telemetry study

Wildlife Baseline Surveys

Baseline information about temporal and spatial use by wildlife species in the project area has been gathered (Bovee 2006, 2010) and most of these studies will continue during 2011-2012, particularly in the areas of Sawmill Creek construction and the inundation of Blue Lake Creek. Level of effort in monitoring studies will be roughly the same as that in the 2010 field surveys for similar methods. Emphasis will be on the following species:

- Mountain goat
- Brown bear
- Northern goshawk
- Bald eagle
- Forest owls
- Harlequin duck

- Marbled murrelet

Table 1 lists these species and their approximate DBD, with associated citation, time period of concern, and methods that will be used for monitoring. For more details on methods, refer to Bovee 2010. Existing data on the use of the project area by these species will be used to produce maps showing wildlife distribution and seasonal use. Field work during 2011 will be used to update and revise these maps as needed. This will assist stakeholders in making recommendations pertaining to potential wildlife effects from this project.

Mountain Goat Studies

In 2010, the City joined in a cooperative agreement with ADF&G to help fund mountain goat research. In September 2010, ADF&G captured and radio collared 12 mountain goats in central Baranof Island, including 4 in the Blue Lake basin (White et al. 2010). One of the purposes of this research is to document goat movement and habitat utilization to better address cumulative impacts of the Blue Lake Expansion and Takatz Lake hydro project (FERC No. 13234) developments. Data from this research will provide critical information on goat use within and adjacent to the inundation zone and construction areas. It will also provide insight into goat responses to these activities.

Five of the 12 goats are equipped with downloadable GPS collars which were downloaded on April 26, 2011 (Figure 1). Three of these goats have winter locations within the inundation zone and one of these 3 also was within 1.6 km (1 mi) from the dam construction site, which is within the 1.5 - 2 km (0.9 - 1.2 mi) recommended DBD (Cote 1996, Table 1). Data such as this clearly show the importance of this technology in determining potential impacts of the project on mountain goats. The remaining 7 goats are equipped with GPS "store-on-board" transceivers and the data will not be available until June 15, 2014. The City will continue to participate in the goat telemetry studies through at least the 2011-2012 field season through cost sharing agreements and providing field work support.

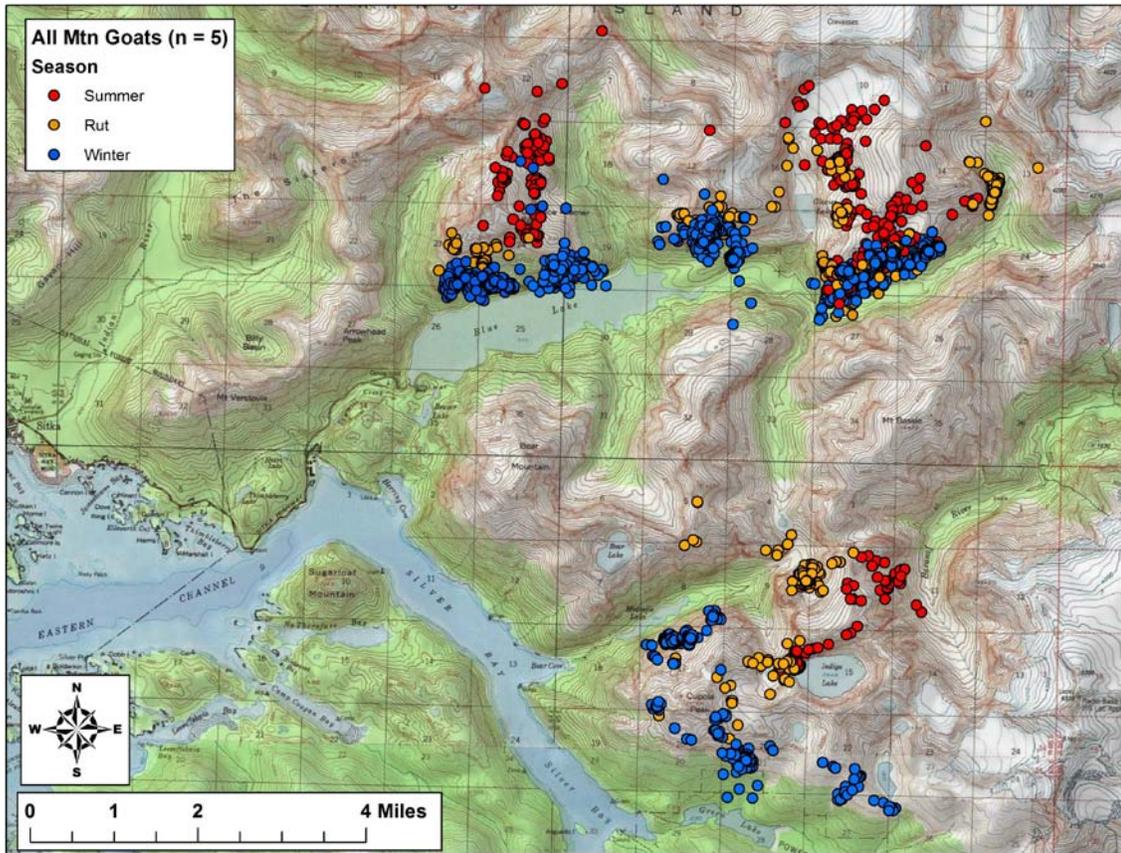


Figure 1. GPS locations of 5 mountain goats , September 7, 2010 - April 26, 2011, color coded by season (ADFG unpublished data), in central Baranof Island.

Brown Bear Studies

During past seasons of wildlife and fisheries studies, several different bears have been observed in the areas of the Sawmill Creek construction sites and the inundation zone. There have also been several bear/human interactions in the immediate area of Sawmill Creek and adjacent areas. Determining potential disturbances to bears from construction and inundation, especially as it pertains to denning activities, will be an important part to the monitoring activities. Equally important will be monitoring, and hopefully preventing, potential bear/human interactions. By deploying several radio collars on bears in the area these issues can be addressed. ADFG has ongoing bear research on bear/human interactions and has funding for collaring at least one bear. The City proposes working cooperatively with ADFG to deploy 2 more collars and assist in the monitoring of these bears. Bear monitoring under this plan would continue until completion of Project construction.

LITERATURE CITED

Bovee, Kent. 2006. Wildlife Investigations for 2005. In Support of Blue Lake Project (FERC No. 2230) Relicensing. Prepared for: City And Borough Of Sitka Electric Department, Sitka, AK. February, 2006. 16 pp plus Appendix.

Bovee, Kent T. 2010. Final 2008 Wildlife Studies Report, Blue Lake Project (FERC No. 2230) Expansion. City and Borough of Sitka Electric Department, January 2010. Website: http://www.cityofsitka.com/government/departments/electric/documents/final2008wildlifestudiesreport_012110.pdf

Chatwin, T. 2010. Set-back distances to protect nesting and roosting seabirds off Vancouver Island from boat disturbance. M.S. thesis, Royal Roads University, Victoria, BC, Canada.

Cote, Steeve D. 1996. Mountain goat response to helicopter disturbance. *Wildlife Society Bulletin*. 24(4): 681-685.

Linnell, J.D.C., J.E. Swenson, R. Anderson, and B. Barnes. 2000. How vulnerable are denning bears to disturbance? *Wildlife Society Bulletin* 28:400-413.

USFS 2008. Tongass Land and Resource Management Plan: Final Environmental Impact Statement Plan Amendment. United States Department of Agriculture.

US Fish and Wildlife Service. May 2007. National Bald Eagle Management Guidelines. 23p.
<http://www.fws.gov/midwest/eagle/guidelines/guidelines.html>

USDI, Fish and Wildlife Service (USFWS) 2006. Estimating the Effects of Auditory and Visual Disturbances to Northern Spotted Owls and Marbled Murrelets in Northwestern California.

White, K. S., P. Mooney, and K. Bovee. 2010. Mountain Goat Movement Patterns and Population Monitoring on Baranof Island. Wildlife Research Annual Progress Report. Alaska Department of Fish and Game, Division of Wildlife Conservation, Douglas, AK. 5 pp.

Table 1. Species of Concern, Approximate Disturbance Buffer Distance (DBD), Citation, Time Period of Concern, and Methods for Monitoring for Blue Lake Expansion Project

Species	Approximate DBD*	Citation	Time Period of Concern	Methods for Monitoring
Mountain Goat	1.5 - 2 km (0.9 - 1.2 mi) 1.6 km (1 mi)	Cote 1996 USFS 2008	Kidding, wintering	Radio telemetry Ground based observations
Brown Bear	1 km (0.6 mi)	Linnell et al. 2000	Spring, summer, fall Winter denning	GPS collars Ground base observations
Northern Goshawk	183 m (600 ft)	USFS 2008	Nesting (March 15-August 15)	Broadcast calling
Bald Eagle	0.8 km (0.5 mi)	USFWS 2007	Nesting (February-August)	Helicopter nest survey Ground based observations
Forest Owls	500 m (0.3 mi)	USFWS 2006	Nesting (February-July)	Broadcast calling
Harlequin Duck	50 m (164 ft)	Chatwin 2010	Nesting (April 1-July 30)	Ground based observations
Marbled Murrelet	500 m (0.3 mi) 200 m (660 ft)	USFWS 2006 USFS 2008	Nesting (May 1-August 15)	Audio-visual surveys

* For the sake of this plan, DBD will apply to major disturbances (i.e. blasting) and will be considered an approximate DBD, with it very likely changing depending on agency comments and more details being provided by contractor (i.e. dB of blasting, frequency, timing).

DRAFT WATER QUALITY MONITORING PLAN

In response to Articles 409 and 410

FERC Order Issuing Amendment

BLUE LAKE HYDROELECTRIC PROJECT (FERC No. 2230) EXPANSION

Prepared by:

City and Borough of Sitka Electric Department

June, 2012

1.0 Introduction and Background

The City and Borough of Sitka, Alaska ("City") owns and operates the Blue Lake Hydroelectric Project (FERC No. 2230) near Sitka. Due to unforeseen electrical load growth in the City, the City and Borough of Sitka Electric Department has proposed to raise the dam and construct other project features which will increase annual energy output at the Project. Actions to accomplish this new construction are called the Blue Lake Project Expansion ("Expansion").

The new Project license was issued by the Federal Energy Regulatory Commission (FERC) in 2007. Changes of the scale necessary to achieve Expansion objectives require an amendment to the new license in order for the proposed construction and operation to take place. The Order Issuing Amendment of the license was in May of 2012. As part of the Amendment, FERC and reviewing state and federal resource agencies have submitted environmental and other conditions which the City must observe during and after construction.

1.1 Purpose and Need for This Plan

This Draft Water Quality Monitoring Plan (Plan) has been developed in response to Articles 409 and 410 of the Amendment.

Article 409 concerns water quality monitoring during the Project construction period and specifies that:

"At least 60 days prior to ground disturbing activities, the licensee shall file with the Commission, for approval, a Construction Water Quality Monitoring Plan.

The plan shall identify at a minimum:

(1) exact locations of monitoring sites; (2) water quality parameters to be monitored including but not limited to turbidity and total organic carbon; (3) a frequency of monitoring during all phases of construction which shall be at least daily; and (4) specific measures to be taken in the event that monitoring identifies unacceptable water quality conditions.

The licensee shall prepare the plan after consultation with the U.S. Forest Service, Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, and the U.S. Fish and Wildlife Service. The licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan. Implementation of the plan shall not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee shall implement the plan including any changes required by the Commission.

Article 410 concerns water quality monitoring during long-term Project operation, and specifies that:

"At least 60 days prior to ground disturbing activities, the licensee shall file with the Commission, for approval, a Long-Term Water Quality Monitoring Plan.

The plan shall include at a minimum:

(1) identification of all long-term water quality monitoring sites including Blue Lake, the powerhouses, and Sawmill Creek; (2) the specific water quality parameters to be monitored at each site, including but not limited to turbidity and total organic carbon; (3) the frequency of monitoring at each location which shall be at least weekly as well as the duration of monitoring during the term of the license; and (4) identification of specific measures to be taken in the event that monitoring indicates problems with water quality at the project.

The licensee shall prepare the plan after consultation with the U.S. Forest Service, Alaska Department of Fish and Game, Alaska Department of Environmental Conservation, and the U.S. Fish and Wildlife Service. The licensee shall include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee shall allow a minimum of 30 days for the agencies to comment and make recommendations before filing the plan with the Commission. If the licensee does not adopt a recommendation, the filing shall include the licensee's reasons, based on project-specific information."

Details of the proposed Expansion are described in the Order Issuing Amendment (City, 2012), available at the City's Project website:

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

NEED for WATER QUALITY MONITORING

Several aspects of the Expansion are likely to affect water quality in both Blue Lake and Sawmill Creek, the lake's primary outflow waterway. These changes will be important during both construction and long-term operation of the Expansion because 1) Blue Lake is the source of unfiltered drinking water for the City of Sitka; and 2) Sawmill Creek harbors several species of anadromous (migratory) and non-anadromous fish.

Of particular concern are potential effects from flooding of 362 acres around Blue Lake by the 83-foot dam raise. Flooding of extensive coniferous and deciduous vegetation may cause increases in certain contaminant concentrations, either directly or after the water is processed by chlorination in the City's water treatment plant.

As Sitka's water supply, Blue Lake's naturally high water quality obviates the need for water filtration as defined in the City's Watershed Control Plan. Any Project-related effects on Blue Lake water quality, particularly if suspended sediment or turbidity were increased, might require expensive water filtration. Similarly, any construction-related or other contaminants which enter Blue Lake and subsequently the City's drinking water system will require immediate attention. Long-term changes in the water temperature regime of Blue Lake will affect water temperature in Sawmill Creek with potential impacts to anadromous and resident fish there.

Therefore it will be necessary to document both construction period and long-term changes in Blue Lake and Sawmill Creek water quality conditions, under provisions of the following monitoring program.

WATER QUALITY MONITORING PROGRAM

EXISTING WATER QUALITY MONITORING

Because Blue Lake is the primary source of Sitka's municipal drinking water, the quality of water diverted to that use is strictly monitored by the Sitka Water Department. Monitoring takes place at tap on the raw water supply to the Water Department's treatment plant located at the lower portal. Diverted water is tested continuously and this testing program will be incorporated in both the construction-related and long-term operation water quality monitoring programs described in detail below.

WATER QUALITY MONITORING PROGRAM, GENERAL

Expansion-related water quality monitoring will address potential effects due to both construction and long-term operation, as described in the following sections. The program will be comprised of water quality monitoring to document both site-specific and non-point source inputs. At all times, in addition to monitoring at other locations and for other purposes, the City will conduct its required analysis of both raw and treated water to meet the City's Drinking Water Program requirements.

In the following sections, we describe the Expansion Water Quality Monitoring Program in three parts: 1) Construction Period Monitoring; 2) Long-Term Operation Monitoring; and 3) the City's Drinking Water Quality Monitoring.

In the following plan, the exact methods and equipment to be used for water quality monitoring have been deferred to a group of agency representatives qualified to speak for their respective agencies in the immediate pre-construction period. In particular, the Environmental Compliance Monitor (ECM), who has not been selected at the time of this draft plan, will have important input on these details. The monitoring will be the responsibility of the City.

CONSTRUCTION PERIOD MONITORING

The Objective of construction period monitoring will be to determine whether, where and in which quantities deleterious materials are entering potentially-affected water bodies. Construction period monitoring will be done 1) at certain fixed sites and on specific time intervals, to document comparative changes over time; and 2) on a daily basis and at varying locations corresponding directly to active construction.

Construction period monitoring will document water quality of both Blue Lake and Sawmill Creek, emphasizing detection of:

- Sediment from excavation, road use or vegetation clearing;
- Petroleum products from vehicles and other construction equipment;

- Materials from decay and burning of vegetation in the potentially-inundated areas; and
- Blasting residue.

Construction activity will be concentrated near 1) Blue Lake dam and the proposed intake structure; 2) segments of the Blue Lake road which will be widened and those on which heavy equipment traffic may increase; 3) the Fish Valve Unit; and 4) the powerhouse/surge chamber areas.

In each of these areas, the City expects to generally emphasize sampling of water quality 1) in runoff water downslope of daily construction areas; and 2) in the effluent water from settling ponds; and 3) in the reservoir itself.

Water samples will be collected at various intervals depending on schedule and proximity to active construction sites. In all these areas, water quality sampling will be conducted at locations and time intervals agreed to after determination of both construction methods and the construction schedule. After these milestones are reached, the City will, prior to any ground disturbance, complete a detailed Construction-Related Water Quality Monitoring Plan documenting exact locations, constituents, methods and frequency of construction-related sampling. A draft of the plan will be reviewed and commented on by the appropriate state and federal resource agencies, and all comments will be addressed in the final plan which will be distributed to agencies required by FERC.

It is expected that the City, the ECM, (position and duties of whom are described in a separate plan) and other appropriate state and federal resource agencies will consult prior to and during construction to define the exact locations, water quality constituents, and sampling and analytic methods for this daily monitoring program.

LONG-TERM OPERATION MONITORING

The objective of this program will be to develop a continuous record of water quality conditions with which to detect trends and upon which to make comparisons of effects relative to different climatological and operational conditions. Results of these analyses and comparisons may be used to determine effects on the City's Drinking Water quality and on environmental conditions, particularly water temperature effects on aquatic resources in both Blue Lake and Sawmill Creek.

Generally, long-term monitoring will consist of continuous temperature monitoring in both Blue Lake and Sawmill Creek, and point- and time-specific sampling for an approved set of water quality constituents. Continuous temperature monitoring will disclose any changes in depth-integrated water temperature near the intake to help determine effects on fish populations in both Blue Lake and in Sawmill Creek downstream of the Fish Valve Unit and the Blue Lake powerhouse where intake water is released. Monitoring components in Blue Lake and Sawmill Creek are described separately below.

Blue Lake

Continuous Temperature Monitoring

To continuously monitor water temperature at various levels down to and below the actual point at which water will enter the proposed intake, the City will install the "Intake Array" consisting of electronic temperature measurement devices ("loggers") at various depths along a fixed vertical cable (Figure 1). (Note that a similar array is currently installed about 400 yards east of the existing intake. This array will be replaced by the Intake Array, because 1) it will be very difficult to extend the existing array upwards to El 425 due to topography and vegetation; and 2) measurements will be taken closer to the intake which is the area of most interest).

The Intake Array will extend downward from an anchor point fixed about 10 feet above El 425 (spill elevation of the Expansion dam height above mean sea level) to about El 200, or at a depth of about 225 feet below the post-Expansion spill elevation. Loggers will be emplaced approximately every 15 feet along the cable.



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

Figure 1

The loggers may be set to record water temperature at small intervals (matters of minutes) and may be left unattended for periods of months. The City has extensive experience with this monitoring system having installed an identical system (discussed earlier), and having retrieved data from that system for over 6 years.

Monitoring of Other Water Quality Parameters in Blue Lake

The City will also collect grab samples from two locations near the midline of Blue Lake during periods when weather and ice conditions permit boat access. These samples will be collected at points approximately 1 and 2 miles east of the dam, respectively (See Figure 1). The samples will be taken on a weekly or more frequent basis during construction (based on agreements reached between the City, ECM and other reviewing parties) and on a monthly basis, depending on lake access, for a specified period (to be approved by reviewing agencies) following construction. Exact methods for analysis of lake samples will be agreed upon among the City, ECM and other reviewing parties prior to construction.

Constituents sampled at these two sites will include, but not be limited to, the following, beginning at the onset of construction and lasting for an acceptable period determined in consultation with reviewing agencies:

- **Turbidity** (at various depths above and below the thermocline);
- **Total Organic Carbon (TOC)**;
- **Dissolved Oxygen (DO)**;
- **pH** (at various depths above and below thermocline);
- **Iron** (at various depths above and below thermocline);
- **Manganese** (at various depths above and below thermocline);
- **Total Dissolved Solids (TDS)**;
- **Water Transparency** (using Secchi disc); and
- **Methyl Mercury** (quarterly sample during reservoir filling, annual after reservoir has spilled)

Exact constituents, sampling protocols and measurement methods will be determined based on agency comment and review of equipment and methods available at the time of the onset of monitoring.

Sawmill Creek

Both construction period and long-term monitoring will take place in Sawmill Creek. As in Blue Lake, the primary monitoring types will be 1) continuous temperature monitoring; and 2) monitoring of other water quality parameters. Both monitoring programs will commence during construction to provide comparisons between pre- and with-project conditions.

In addition to these monitoring programs, the City will continue its continuous monitoring of drinking water quality at the Water Treatment Facility.

Sawmill Creek Continuous Temperature Monitoring

The primary concern for water temperature impacts in Sawmill Creek relates to effects from the new intake elevation which would be closer to the lake surface at all reservoir levels than is the current intake. This might cause water to be warmer at certain times of the year, with potential effects on aquatic resources in Sawmill Creek. All of Sawmill Creek from the output from the Fish Valve Unit to tidewater would be variously affected by the new intake location.

Continuous temperature monitoring will take place in Sawmill Creek at three locations, using the same loggers installed in Blue Lake. (Several loggers have been active in Sawmill Creek for more than five years; loggers at these sites will serve as good sites at which to compare pre- and with-Expansion effects.)

These locations generally will be: 1) downstream of the FVU outlet at a distance sufficient to allow for mixing of FVU and water from above the FVU; 2) upstream of the Blue Lake powerhouse, at an accessible location just upstream from the upper Sawmill Creek bridge; and 3) below the Blue Lake powerhouse tailrace at a downstream distance sufficient to allow mixing of tailrace and main Sawmill Creek water temperature. Sawmill Creek loggers will be set to monitor temperature at about the same intervals as the monitors in Blue Lake.

In addition, during 2010, the City commissioned a study of Sawmill Creek water temperature downstream of the powerhouse (EES 2010) to analyze potential temperature effects on pink and chum salmon populations in the stream reach from the powerhouse to low tide level. As part of this study, several additional continuous loggers were emplaced downstream of the powerhouse.

Monitoring of Other Water Quality Parameters

In addition to temperature, the City will periodically (no more than monthly) monitor certain constituents in Sawmill Creek, beginning at the onset of construction and lasting for an acceptable period determined in consultation with reviewing agencies. During construction, these measurements will be as often as daily, depending on instructions from the ECM. These measurements will be made at the same three locations as for continuous temperature monitoring discussed above. The constituents will be:

- **Turbidity;**
- **Dissolved Oxygen (DO);**
- **pH; and**
- **Total Dissolved Solids (TDS).**

These constituents will be measured using an approved apparatus, which, to the extent possible, uses direct readout meters instead of streamside analytic methods. Several field kits are available to do this sort of work, and the one

or ones employed will be approved by reviewing agencies and other appropriate Stakeholders.

Water Quality Monitoring at the City's Water Treatment Plant and Fish Valve Unit.

The City routinely monitors Blue Lake water at a tap at the existing water treatment plant. All sampling and analysis are done according to DEC requirements. These measurements and their associated frequency are as follows:

- Turbidity (continuously)
- Temperature (daily)
- pH (daily)
- Fecal Coliform (3 times per week)

The City will install a continuous raw water turbidity monitor at the Fish Valve Unit (FVU). This monitor will provide advanced warning via the water treatment plant SCADA system of water turbidity approaching the treatment plant.

The City will monitor the raw water for nitrates weekly for one month following the generation outage to establish that blast residue has been flushed from recently constructed tunnels and shafts.

Specific Measures if Monitoring Identifies Unacceptable Water Quality Conditions

Dam/Intake Area

Several measures are available if monitoring detects unacceptable conditions, depending on where the conditions occurred and which constituents were involved. If turbidity from construction or a heavy runoff and mud slide were to occur near the existing intake, experience has shown that the material would be detected almost immediately by the drinking water supply testing program. This is because the intake is positioned on the lake bottom and because runoff material stops as it falls into position in front of the intake. Under these circumstances, immediate cessation of the activity would be required (if it was a construction-related event) and the tap from the penstock to the City's water treatment plant would be closed to keep contaminated water from going through the plant. During such a by-pass period, the City's water supply would come from emergency tanks. After the pulse of contaminated water passed, the tap at the water treatment plant would be re-opened.

After construction and activation of the new intake, bankside sediment will flow downgrade past the new intake and will not collect there. There may be a temporary peak in sediment or turbidity, but it should pass quickly. In such a case, the same by-pass procedure described above could be utilized. The offending activity on shore, however, will be

suspended in any case until no more contamination occurs at the drinking water monitoring point.

Petroleum products spilled into the lake will float and will not mix in significant concentrations to be subject to entrainment into the intake. However, if such products remain until the lake surface approaches spill level, they may migrate downstream into productive fisheries areas in Sawmill Creek. If it appears that petroleum or other floating contaminants are likely to spill from the Lake, much of the material may be absorbed by placing absorbent material along the log boom near the dam. This is specified in the City's Hazardous Materials Management Plan. Boats may also be deployed to use absorbent materials near the dam in such a case.

Upper Blue Lake

Sediment input to upper Blue Lake, presumably from lake filling, would have to travel the entire length of the lake before entering the intake. It is likely that such materials, particularly sediment, would settle out between the upper and lower ends of the lake. However, if such an event occurred, it would be detected and dealt with just as a high-turbidity event would be addressed near the dam/intake area.