

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

City and Borough of Sitka, Alaska

Project No. 2230-044
Alaska

NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT

(January 12, 2012)

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's (Commission or FERC's) regulations, 18 Code of Federal Regulations (CFR) Part 380 (Order No. 486, 52 Federal Register [FR] 47897), Commission staff has reviewed the City and Borough of Sitka's application for a capacity-related amendment to the license for the Blue Lake Hydroelectric Project (FERC Project No. 2230) and has prepared an environmental assessment (EA). The project is located on Sawmill Creek, formerly the Medvetche River, in the Borough of Sitka, Alaska. The project currently occupies a total of 1,676 acres of federal lands administered by the U.S. Department of Agriculture, Forest Service, and under the City of Sitka's proposal, it would occupy 1,798 acres of federal lands.

The EA contains the Commission staff's analysis of the potential environmental effects of the proposed modifications to the project and the addition of new generating capacity and the conclusion that authorizing the amendment, with appropriate environmental protective measures, would not constitute a major federal action that would significantly affect the quality of the human environment.

A copy of the EA is available for review at the Commission in the Public Reference Room 2-A of the Commission's offices at 888 First Street, NE, Washington, DC 20426. The EA also may be viewed on the Commission's Internet website at (www.ferc.gov) using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. Additional information about the project is available from the Commission's website using the eLibrary link. For assistance with eLibrary, contact FERCOnlineSupport@ferc.gov or toll-free at (866) 208-3676; for TTY contact (202) 502-8659.

You may also register online at www.ferc.gov/docs-filing/esubscription.asp to be notified via email of new filings and issuances related to this or other pending projects. For assistance, contact FERC Online Support.

Any comments should be filed within 30 days from the date of this notice. Comments may be filed electronically via the Internet. See 18 CFR 385.2001(a)(1)(iii) and the instructions on the Commission's web site at <http://www.ferc.gov/docs->

[filing/efiling.asp](#). Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at <http://www.ferc.gov/docs-filing/ecomment.asp>. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Online Support. Although the Commission strongly encourages electronic filings, documents may also be paper-filed. To paper-file, mail an original and seven copies to: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street, NE, Washington, DC 20426.

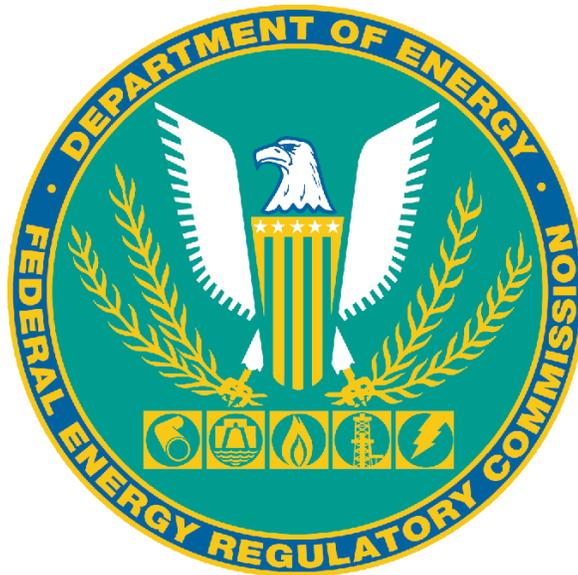
For further information, contact Steven Sachs by telephone at 202-502-8666 or by email at Steven.Sachs@ferc.gov.

Kimberly D. Bose,
Secretary.

**ENVIRONMENTAL ASSESSMENT
FOR A CAPACITY-RELATED AMENDMENT TO LICENSE**

Blue Lake Hydroelectric Project—FERC Project No. 2230-044

Alaska



Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Administration and Compliance
888 First Street, NE
Washington, D.C. 20426

January 2012

TABLE OF CONTENTS

| | |
|--|----|
| LIST OF FIGURES | iv |
| LIST OF TABLES..... | iv |
| ACRONYMS AND ABBREVIATIONS..... | v |
| EXECUTIVE SUMMARY | vi |
| 1.0 INTRODUCTION..... | 1 |
| 1.1 APPLICATION..... | 1 |
| 1.2 PURPOSE OF ACTION AND NEED FOR POWER..... | 1 |
| 1.2.1 Purpose of Action | 1 |
| 1.2.2 Need for Power..... | 4 |
| 1.3 STATUTORY AND REGULATORY REQUIREMENTS | 4 |
| 1.3.1 Federal Power Act | 4 |
| 1.3.1.1 Section 18 Fishway Prescriptions | 4 |
| 1.3.1.2 Section 4(e) Conditions | 5 |
| 1.3.1.3 Section 10(j) Recommendations..... | 5 |
| 1.3.2 Coastal Zone Consistency Determination | 6 |
| 1.3.3 Endangered Species Act..... | 6 |
| 1.3.4 National Historic Preservation Act..... | 6 |
| 1.3.5 Magnuson-Stevens Fishery Conservation and Management Act ... | 7 |
| 1.4 PRE-FILING PUBLIC REVIEW AND CONSULTATION..... | 8 |
| 1.4.1 Consultation..... | 8 |
| 1.4.2 Comments on the License Amendment Application and Interventions | 9 |
| 2.0 PROPOSED ACTION AND ALTERNATIVES..... | 10 |
| 2.1 NO-ACTION ALTERNATIVE..... | 10 |
| 2.1.1 Existing Project Facilities..... | 10 |
| 2.1.2 Existing Project Operations..... | 12 |
| 2.2 CITY OF SITKA’S PROPOSAL..... | 13 |
| 2.2.1 Proposed Project Facilities and Construction Activities | 13 |
| 2.2.1 Proposed Operational Modifications..... | 14 |
| 2.2.3 Proposed Environmental Measures | 17 |
| 2.2.5 Modifications to Licensee’s Proposal—Mandatory Conditions ... | 17 |
| 2.3 STAFF ALTERNATIVE | 18 |
| 2.4 STAFF ALTERNATIVE WITH MANDATORY CONDITIONS | 19 |
| 2.5 OTHER ALTERNATIVES..... | 19 |
| 3.0 ENVIRONMENTAL ANALYSIS..... | 19 |
| 3.1 GENERAL SETTING..... | 19 |

| | | |
|---------|--|----|
| 3.2 | SCOPE OF CUMULATIVE EFFECTS ANALYSIS | 20 |
| 3.3 | PROPOSED ACTION | 20 |
| 3.3.1 | Geologic and Soil Resources..... | 20 |
| 3.3.1.1 | Affected Environment..... | 20 |
| 3.3.1.2 | Environmental Effects | 21 |
| 3.3.2 | Aquatic Resources | 23 |
| 3.3.2.1 | Affected Environment..... | 23 |
| 3.3.2.2 | Environmental Effects | 29 |
| 3.3.2.3 | Cumulative Effects | 39 |
| 3.3.3 | Terrestrial Resources | 40 |
| 3.3.3.1 | Affected Environment..... | 40 |
| 3.3.3.2 | Environmental Effects | 44 |
| 3.3.3.3 | Cumulative Effects | 58 |
| 3.3.4 | Threatened and Endangered Species | 58 |
| 3.3.5 | Recreation and Aesthetics | 59 |
| 3.3.5.1 | Affected Environment..... | 59 |
| 3.3.5.2 | Environmental Effects | 60 |
| 3.3.5.3 | Cumulative Effects | 63 |
| 3.3.6 | Land Use..... | 63 |
| 3.3.6.1 | Affected Environment..... | 63 |
| 3.3.6.2 | Environmental Effects | 65 |
| 3.3.7 | Cultural Resources..... | 66 |
| 3.3.7.1 | Affected Environment..... | 66 |
| 3.3.7.2 | Environmental Effects | 68 |
| 3.4 | NO-ACTION ALTERNATIVE | 69 |
| 4.0 | DEVELOPMENTAL ANALYSIS | 70 |
| 4.1 | NO-ACTION ALTERNATIVE | 71 |
| 4.2 | PROPOSED ACTION | 71 |
| 4.3 | STAFF-RECOMMENDED ALTERNATIVE | 72 |
| 5.0 | CONCLUSIONS AND RECOMMENDATIONS..... | 72 |
| 5.1 | COMPARISON OF ALTERNATIVES..... | 72 |
| 5.1.1 | Measures Proposed by the Licensee..... | 73 |
| 5.1.2 | Additional Measures Recommended by Staff..... | 74 |
| 5.2 | UNAVOIDABLE ADVERSE EFFECTS..... | 76 |
| 5.3 | SUMMARY OF SECTION 10(J) RECOMMENDATIONS AND 4(E) CONDITIONS..... | 77 |
| 5.3.1 | Fish and Wildlife Agency Recommendations..... | 77 |
| 5.3.2 | Forest Service’s Section 4(e) Conditions | 81 |
| 5.4 | CONSISTENCY WITH COMPREHENSIVE PLANS..... | 82 |
| 6.0 | FINDING OF NO SIGNIFICANT IMPACT | 83 |

7.0 LITERATURE CITED..... 83

8.0 LIST OF PREPARERS 85

APPENDIX A—U.S. Department of Agriculture, Forest Service 4(e) Final Terms
and Conditions A-1

LIST OF FIGURES

| | | |
|-----------|---|----|
| Figure 1. | Blue Lake Project vicinity map | 2 |
| Figure 2. | Blue Lake Project features | 3 |
| Figure 3. | Existing features of the Blue Lake Project..... | 11 |
| Figure 4. | Proposed project changes near the existing powerhouse. | 15 |
| Figure 5. | Proposed project changes near the existing dam and intake. | 16 |
| Figure 6. | Blue Lake tributary inundation map..... | 27 |
| Figure 7. | Land use designations applicable to National Forest System lands..... | 64 |

LIST OF TABLES

| | | |
|----------|--|----|
| Table 1. | Monthly flow data (cfs) for USGS gage no. 15088000 Sawmill Creek near Sitka for 2001 to 2010 | 24 |
| Table 2. | Percentage of spawning in the major tributaries of Blue Lake. | 28 |
| Table 3. | Salmonid species in Sawmill Creek. | 28 |
| Table 4. | Plant species of special concern potentially occurring in the project area, 2008. | 41 |
| Table 5. | Animal species of special concern potentially occurring in the project area, 2008. | 45 |
| Table 6. | Acres by habitat type for entire watershed, inundation area, and percent reduction | 48 |
| Table 7. | Fish and wildlife agency recommendations for the Blue Lake Hydroelectric Project..... | 78 |
| Table 8. | Forest Service final section 4(e) conditions for the Blue Lake Hydroelectric Project..... | 82 |

ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| ACHP | Advisory Council on Historic Preservation |
| Alaska DF&G | Alaska Department of Fish and Game |
| Alaska SHPO | Alaska State Historic Preservation Officer |
| AIR | additional information request |
| APE | area of potential effect |
| °C | degrees Celsius |
| cfs | cubic feet per second |
| CFR | Code of Federal Regulations |
| City of Sitka or licensee Commission | City and Borough of Sitka Federal Energy Regulatory Commission |
| EA | environmental assessment |
| FERC | Federal Energy Regulatory Commission |
| Forest Service | U.S. Department of Agriculture, Forest Service |
| FPA | Federal Power Act |
| FR | Federal Register |
| FWS | U.S. Department of the Interior, Fish and Wildlife Service |
| GIS | Geographic Information System |
| HPMP | Historic Properties Management Plan |
| kV | kilovolt |
| kW | kilowatt |
| mg/L | milligrams per liter |
| msl | mean sea level |
| MW | megawatt |
| MWh | megawatt-hour |
| National Register | National Register of Historic Places |
| NMFS | National Marine Fisheries Service |
| NOAA | National Oceanic and Atmospheric Administration |
| Sitka Tribe | Sitka Tribe of Alaska |
| SM | stream mile |
| TOC | total organic carbon |
| USGS | U.S. Geological Survey |

EXECUTIVE SUMMARY

On November 23, 2010, and supplemented on March 10, and April 6, 7, and 14, 2011, the City and Borough of Sitka (City of Sitka or licensee) filed an application for an amendment of license for the Blue Lake Project (project). The City of Sitka proposes to raise the project dam from spill elevation 342 feet mean sea level (msl) to elevation 425 feet msl; construct a new powerhouse containing three 5.3-megawatt (MW) units; install new intake works and a surge chamber; and modify the power conduit to accommodate higher hydraulic pressure and connect new or relocated project features. In addition, the existing 0.670-MW fish valve unit generator would be replaced with a new 1-MW unit and the existing 0.870-MW pulp mill feeder unit would be decommissioned. The total authorized capacity of the project would rise from 7.5 MW to 16.9 MW. The project is located on Sawmill Creek, formerly the Medvetche River, in the Borough of Sitka, Alaska. The project currently occupies a total of 1,676 acres of federal lands administered by the U.S. Department of Agriculture, Forest Service (U.S. Forest Service), and under the City of Sitka's proposal, it would occupy 1,798 acres of federal lands.

Under the proposed action, the City of Sitka would inundate an additional 362 acres of land, creating an additional storage volume of about 122,000 acre-feet in Blue Lake. Overall, these changes would increase the average annual generation by about 50 percent. The City of Sitka was granted a new project license on July 10, 2007, and under its proposal, the City of Sitka's license would retain the majority of the license articles, including 12 Forest Service 4(e) license conditions.

The City of Sitka proposes to implement a number of environmental measures to limit the effects of the project expansion. It proposes to implement its Erosion and Sediment Control Plan to help avoid effects on water quality and aquatic resources during and after construction. It also filed a draft Water Quality Monitoring Plan that calls for the collection of data in various locations to identify effects on water quality in Sawmill Creek and drinking water for the community of Sitka. However, a final version of the Water Quality Monitoring Plan should include additional information on the locations of the monitoring sites, monitoring parameters, frequency of monitoring, and steps to be taken if reduced water quality is found. The new intake system is proposed to limit the effect of colder discharge water that would occur on the downstream aquatic resources with a deeper reservoir and the existing intake structure.

The City of Sitka further proposes to implement its Reservoir Inundation Plan, which is expected to limit effects from erosion and sedimentation on water quality. This plan would also include the collection and removal of floating debris from the reservoir, but not standing timber and vegetation in the inundation area. The City of Sitka would reseed some areas disturbed during construction.

The proposed project would not affect threatened or endangered species because the only listed species (Steller sea lion, humpback whale, and short-tailed albatross) are coastal species and do not occur in the project area. Forest Service 4(e) Condition Nos. 19, 20, and 21 specify the preparation of a Project Mitigation and Monitoring Plan, designation of a qualified environmental compliance monitor, and preparation of a Noxious Weed Management Plan to reduce effects on wildlife, respectively. In addition, staff recommends the City of Sitka develop and implement a Revegetation Plan.

To address the potential effects of increased recreational usage of Blue Lake on the water supply source for the community of Sitka, the City of Sitka has proposed a draft Reservoir Access Control Plan to prevent vehicle access to the lake since access could become more feasible with the proposed higher lake levels. The licensee plans to decommission several existing project features, and we have recommended a rehabilitation plan to specify that after removing the infrastructure that the disturbed areas should be restored and revegetated. The proposed project would involve the inundation of an additional 362 acres of land around Blue Lake and expansion of the project boundary to include an additional 122 acres of National Forest System lands. This expansion would require that the licensee obtain a special use authorization as specified in the Forest Service 4(e) Condition No. 13.

It is unlikely that significant historic properties would be affected in the new inundation area associated with the proposed amendment of the project or in the vicinity of the dam, intake, or powerhouse areas. Commission staff are consulting with the Alaska State Historic Preservation Officer pursuant to Section 106 of the National Historic Preservation Act.

Based on our analysis, staff recommends approval of the amendment of license as proposed by the licensee with staff's additional measures. Staff finds that approval of this amendment to the existing license would not constitute a major federal action significantly affecting the quality of the human environment.

FINAL ENVIRONMENTAL ASSESSMENT

Federal Energy Regulatory Commission
Office of Energy Projects
Division of Hydropower Administration and Compliance
Division of Hydropower Licensing
Washington, D.C.

Blue Lake Hydroelectric Project FERC Project No. 2230-044—Alaska

1.0 INTRODUCTION

1.1 APPLICATION

Application Type: Amendment of license

Date Filed: November 23, 2010; supplemented by filings on March 10, 2011, and April 6, 7, and 14, 2011

Applicant's Name: City and Borough of Sitka

Water body: Sawmill Creek

County and State: Borough of Sitka, Alaska

Federal Lands: The project currently occupies 1,676 acres of federal lands managed by the U.S. Department of Agriculture, Forest Service (Forest Service) within the Tongass National Forest; under the City of Sitka's proposal in this proceeding, the project would occupy 1,798 acres of federal lands.

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The Blue Lake Hydroelectric Project (Blue Lake Project or project) is the only project along Sawmill Creek near the community of Sitka, Alaska. The main existing powerhouse discharges near the tidal portion of Silver Bay (figures 1 and 2). The City and Borough of Sitka (City of Sitka, or licensee) has engaged in discussion with resource agencies and the general public to develop a plan that would allow the City of

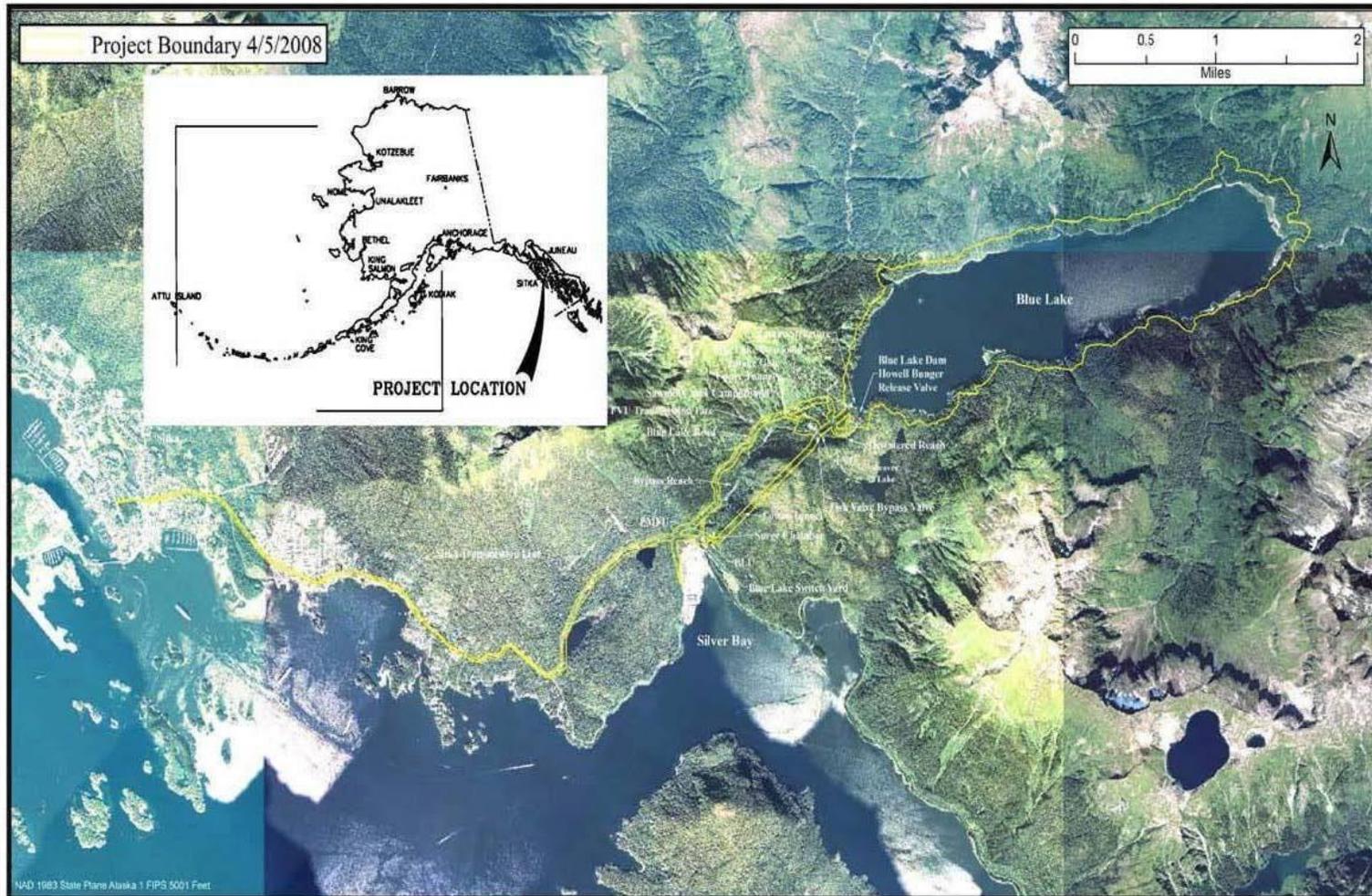


Figure 1. Blue Lake Project vicinity map. (Source: City of Sitka, 2010)

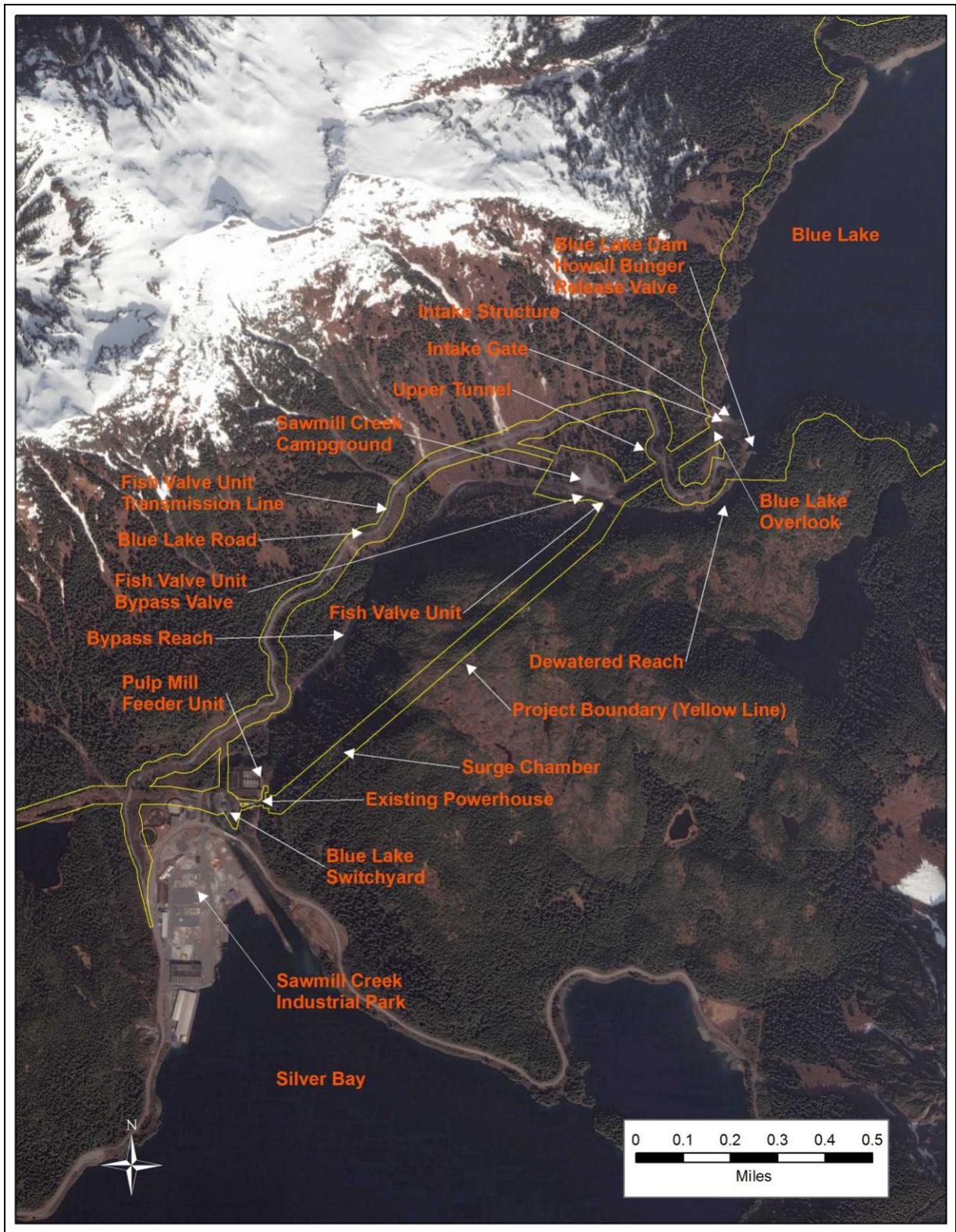


Figure 2. Blue Lake Project features. (Source: ESRI and Bing Maps, as modified by staff)

Sitka to increase the height of the Blue Lake dam, construct a new powerhouse, and implement other measures to increase the hydroelectric generation capacity of the project.

1.2.2 Need for Power

To assess the need for project power, Federal Energy Regulatory Commission (Commission or FERC) staff reviewed the City of Sitka's present and anticipated future use of project power. The Blue Lake Project generates an average of 63,680 megawatt-hours (MWh) annually. The City of Sitka sells power to its residential and commercial customers.

The community of Sitka and the Blue Lake Project are located on Baranof Island, an isolated area of Alaska. Hydroelectric generation from the project is used to displace diesel-fueled generation. According to the City of Sitka's September 2008 electrical load growth forecasts for the Sitka service area, a range from 1.2 to 1.9 percent in annual load growth is anticipated during the 2010–2030 period (City of Sitka, 2011).

By producing hydroelectricity, the Blue Lake Project displaces the need for other power plants, primarily diesel-fueled facilities, to operate thereby avoiding some power plant emissions and creating an environmental benefit. The present and future use of power from the Blue Lake Project, its displacement of nonrenewable fossil-fueled generation, and contribution to a diversified generation mix support a finding that the power from the project would help meet both the short- and long-term need for power for the City of Sitka.

The proposed expansion and modification of the Blue Lake Project would increase installed capacity by 9.36 megawatts (MW) from 7.54 MW to 16.9 MW and increase average annual generation by approximately 32,000 MWh from 63,680 MWh to 95,680 MWh, which would help the City of Sitka meet its projected loads and provide needed energy that might otherwise be provided by fossil-fueled generation.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A capacity amendment for the Blue Lake Project is subject to numerous requirements under the Federal Power Act (FPA) and other applicable statutes described below.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the FPA states that the Commission is to require the construction, operation, and maintenance of such fishways by a licensee as may be prescribed by the Secretaries of the U.S. Department of Commerce or the U.S. Department of the Interior.

However, during consultation and scoping proceedings, neither department filed Section 18 fishway prescriptions.

1.3.1.2 Section 4(e) Conditions

Section 4(e) of the FPA provides that any license issued by the Commission for a project within a federal reservation will be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. The Forest Service filed final 4(e) terms and conditions by letter filed June 7, 2011, pursuant to section 4(e) of the FPA. These conditions are described under section 2.2.5, *Modifications to Applicant's Proposal—Mandatory Conditions*.

1.3.1.3 Section 10(j) Recommendations

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the proposed project. On June 8, 2011, the Alaska Department of Fish and Game (Alaska DF&G) filed preliminary terms and conditions recommended under section 10(j). These conditions are summarized below:

- Maintain existing instream flow and ramping rates
- Preparation of a Fish Monitoring Plan for Blue Lake for five years of project operation or until a point decided upon by Alaska DF&G
- A draft Reservoir Inundation Plan filed with the Commission
- Maintain existing startup and shutdown procedures to ensure that instream flows are provided
- Maintain existing intake screen and tailrace design criteria
- A final Erosion and Sediment Control Plan filed with the Commission
- Monitor water quality to ensure effectiveness of the Erosion and Sediment Control Plan
- Preparation of a Fuel and Hazardous Substance Spill Plan
- Treatment of condensate and leakage from turbines and other equipment

- A preliminary draft Environmental Compliance Monitor Plan as filed with the Commission
- Provisions of access to the site by Alaska DF&G employees
- A preliminary draft Bear Safety Plan filed with the Commission
- A preliminary draft Reservoir Access Control Plan, developed but not yet filed with the Commission

1.3.2 Coastal Zone Consistency Determination

Section 307 (c)(3) of the Coastal Zone Management Act requires that all federally licensed and permitted activities be consistent with approved state coastal zone management programs. If the project is located within a coastal zone boundary, or if a project affects a resource located in the boundaries of the designated coastal zone, the applicant must certify that the project is consistent with the state coastal zone management program.

As of July 1, 2011, Alaska no longer has a federally approved coastal management program or defined coastal zone, so federal consistency does not apply to Alaska.

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species. The U.S. Department of the Interior, Fish and Wildlife Service's (FWS) list of listed species (FWS, 2011) identifies short-tailed albatross (*Phoebastria albatrus*) as potentially occurring in Sitka Borough. Two federally listed threatened or endangered aquatic species have been identified as occurring near the project—the Steller sea lion and the humpback whale. Both of these species reside within Sitka Sound and Silver Bay but are not in the immediate project area. By letter dated April 4, 2011, the National Marine Fisheries Service (NMFS) states that there are no listed species under its jurisdiction found in the vicinity of the project. Because all three of these species are coastal species and would not occur in the project area, the proposed action would not affect these species.

1.3.4 National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires that every federal agency take into account how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and

culture that are eligible for inclusion in the National Register of Historic Places (National Register).

Article 403 of the existing license requires the City of Sitka to consult with the Alaska State Historic Preservation Officer (Alaska SHPO), the Forest Service, and the Sitka Tribe of Alaska (Sitka Tribe) if archaeological or historic properties or human remains are identified during project modifications or construction that require land-disturbing activities or during project operation or maintenance other than routine maintenance. Forest Service 4(e) Condition No. 7 requires the City of Sitka to evaluate the potential effects of its actions on historic properties in compliance with section 106 of the NHPA and in consultation with the Forest Service and the Alaska SHPO. The condition also requires compliance with the Archaeological Resources Protection Act (36 Code of Federal Regulations [CFR] 296) if recovery, excavation, and or preservation of properties on federal lands is required.

The City of Sitka consulted with the Forest Service, the Alaska SHPO, and the Sitka Tribe regarding the proposed amendment and concluded in its final cultural resources survey report that there are no cultural resources listed on or eligible for the National Register within the area of potential effect (APE) and that the proposed amendment would not have any effect on cultural or historical properties. By letter dated December 15, 2011, the Alaska SHPO stated that it was unable to concur with the report's no effect finding. The Alaska SHPO recommends the City of Sitka conduct additional historic research on three segments of a potentially historic corduroy road¹ (site SIT-733) present within the project's approved APE before agreeing that the site is ineligible for listing on the National Register and concurring with the City of Sitka's effect recommendation. Commission staff will continue to consult with the Alaska SHPO pursuant to section 106 of the NHPA.

1.3.5 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with NMFS on all actions that may adversely affect essential fish habitat.

Essential fish habitat has been designated for pink, chum, and coho salmon including spawning and rearing habitat in Sawmill Creek (FERC, 2007). By letter dated April 1, 2011, NMFS states that with adoption of Alaska DF&G terms and conditions, filed June 8, 2011, and Forest Service 4(e) conditions, filed June 7, 2011, the City of Sitka's proposal would not adversely affect essential fish habitat in Sawmill Creek.

¹ A type of road constructed by placing logs perpendicular to the direction of the road to create a stable base for passage over low or swampy areas.

Therefore, no additional consultation is required with NMFS regarding essential fish habitat.

1.4 PRE-FILING PUBLIC REVIEW AND CONSULTATION

The Commission's regulations (18 CFR § 4.38) require that licensees consult with appropriate resource agencies, tribes, and other entities before filing an application for a capacity amendment to a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, Endangered Species Act, National Historic Preservation Act, and other federal statutes. Pre-filing consultation for a capacity amendment must be complete and documented according to the Commission's regulations.

1.4.1 Consultation

In its pre-filing consultation, the City of Sitka consulted with the Alaska DF&G, FWS, Alaska Department of Natural Resources, the Sitka Tribe, the Forest Service, the Alaska SHPO, NMFS, the Sitka Conservation Society, the Southeast Alaska Conservation Council, and the Public using the Commission's Alternative Licensing Process. On April 16 and 17, 2008, the City of Sitka conducted initial consultation meetings in Juneau and Sitka, respectively, and conducted a site review on April 17, 2008. The City of Sitka filed Scoping Document 1 on November 11, 2008, and held a scoping meeting and site review in Sitka on December 11, 2008. Comments on Scoping Document 1 were received from the Forest Service and Sitka Conservation Society, and Scoping Document 2 was filed on June 29, 2009. During this process, study plans were developed to investigate the issues with the proposed action. These study plans and reports included the following topics:

- Mineral potential of the Blue Lake area
- Reservoir sedimentation
- Timber inventory
- Wildlife studies
- Cultural resources survey
- Vegetation investigation
- Scenery resources
- Recreation resources

- Evaluation of the effects of a new intake location on water temperatures and anadromous salmonid use in Sawmill Creek
- Fisheries

The City of Sitka filed its draft amendment application and the preliminary draft environmental assessment (EA) on March 9, 2010, and comments were received from the FWS, Sitka Conservation Society, Alaska DF&G, and the Forest Service. The City of Sitka filed its final amendment application and its final draft EA on November 23, 2010, and filed supplemental information on March 10, and April 6, 7, and 14, 2011.

Staff has carefully considered and addressed stakeholder comments and questions raised during scoping in the development of this EA.

1.4.2 Comments on the License Amendment Application and Interventions

On April 8, 2011, the Commission issued a notice that the City of Sitka’s application for amendment of license had been accepted for filing and solicited motions to intervene and comments, recommendations, terms, and conditions, and fishway prescriptions. This notice set June 7, 2011, as the deadline for filing protests and motions to intervene and comments and terms and conditions, and July 22, 2011, as the deadline for reply comments. The following entities filed motions to intervene and comments.

| Entity | Date of Filing | Type of Filing |
|------------------------------|-----------------------|---------------------------|
| Forest Service | April 12, 2011 | Intervention |
| Jean (no last name provided) | April 18, 2011 | Comment |
| Forest Service | June 7, 2011 | Comments |
| Alaska DF&G | June 8, 2001 | Comments |
| Alaska DF&G | June 8, 2011 | Intervention ^a |

^a Late intervention granted on January 5, 2012.

Alaska DF&G filed preliminary 10(j) terms and conditions and the Forest Service filed final 4(e) terms and conditions for the project. Jean stated that this project needs an environmental impact statement instead of an EA, partly, because the project would affect federally owned land.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

The no-action alternative is amendment denial with the currently licensed project remaining unchanged. Under the no-action alternative, the project would continue to operate under the terms and conditions of the existing license, and no new environmental protection, mitigation, or enhancement measures would be implemented. We use this alternative as the baseline environmental conditions for comparison with the proposed alternative.

2.1.1 Existing Project Facilities

The existing Blue Lake Project consists of three developments: (1) the Blue Lake development (located between stream mile (SM) 2.31 at the dam and SM 0.32 at Blue Lake powerhouse); (2) the fish valve unit (located about 1,900 feet downstream of Blue Lake dam); and (3) the pulp mill feeder unit (located just upstream from the existing powerhouse) (see figure 3). The total length of the Sawmill Creek bypassed by the project (from Blue Lake dam to the existing powerhouse) is more than 10,000 feet.

Blue Lake development consists of: (1) a 211-foot-high, 256-foot-long concrete arch dam equipped with a 140-foot-long spillway at an elevation of 342 feet mean sea level (msl), sized to discharge a flow of 14,000 cubic feet per second (cfs); (2) a release valve at the base of the dam with a capacity of 450 to 650 cfs, depending on the lake level; (3) a 1,225-acre reservoir (Blue Lake) with a normal water surface elevation of 342 feet msl, a usable storage of 102,200 acre-feet, and a gross storage capacity of 145,200 acre-feet; (4) a submerged concrete intake structure located about 400 feet north of the dam at an invert at elevation 204; (5) a 7,110-foot-long power conduit consisting of: (a) an 11.5-foot-diameter modified horseshoe cross section, extending 1,500 feet from the intake structure to the upper penstock on the right side of Sawmill Creek; (b) an upper penstock (84 inches in diameter and 460 feet long) supported on piers crossing over Sawmill Creek connected to: (c) an unlined 10-foot diameter, 4,650-foot-long lower tunnel that extends to the lower penstock; (d) a lower penstock (84 inches in diameter and 500 feet long) with two taps immediately below the lower tunnel portal, including a 36-inch-diameter tap leading to the pump mill feeder unit and a 24-inch-diameter tap leading to the Sawmill Cove Industrial Park; (6) a powerhouse containing two 3,000-kilowatt (kW) generating units; (7) a 150-foot-long tailrace; (8) a 5-mile-long, 69-kilovolt (kV) transmission line; and (9) appurtenant facilities.

The fish valve unit consists of: (1) a 36-inch wye branch that connects to a valve on the power conduit; (2) a 24-inch-diameter, 19-foot-long penstock; (3) a powerhouse containing one 670-kW generating unit; (4) a 7,700-foot-long, 12.47-kV transmission line; and (5) appurtenant facilities.

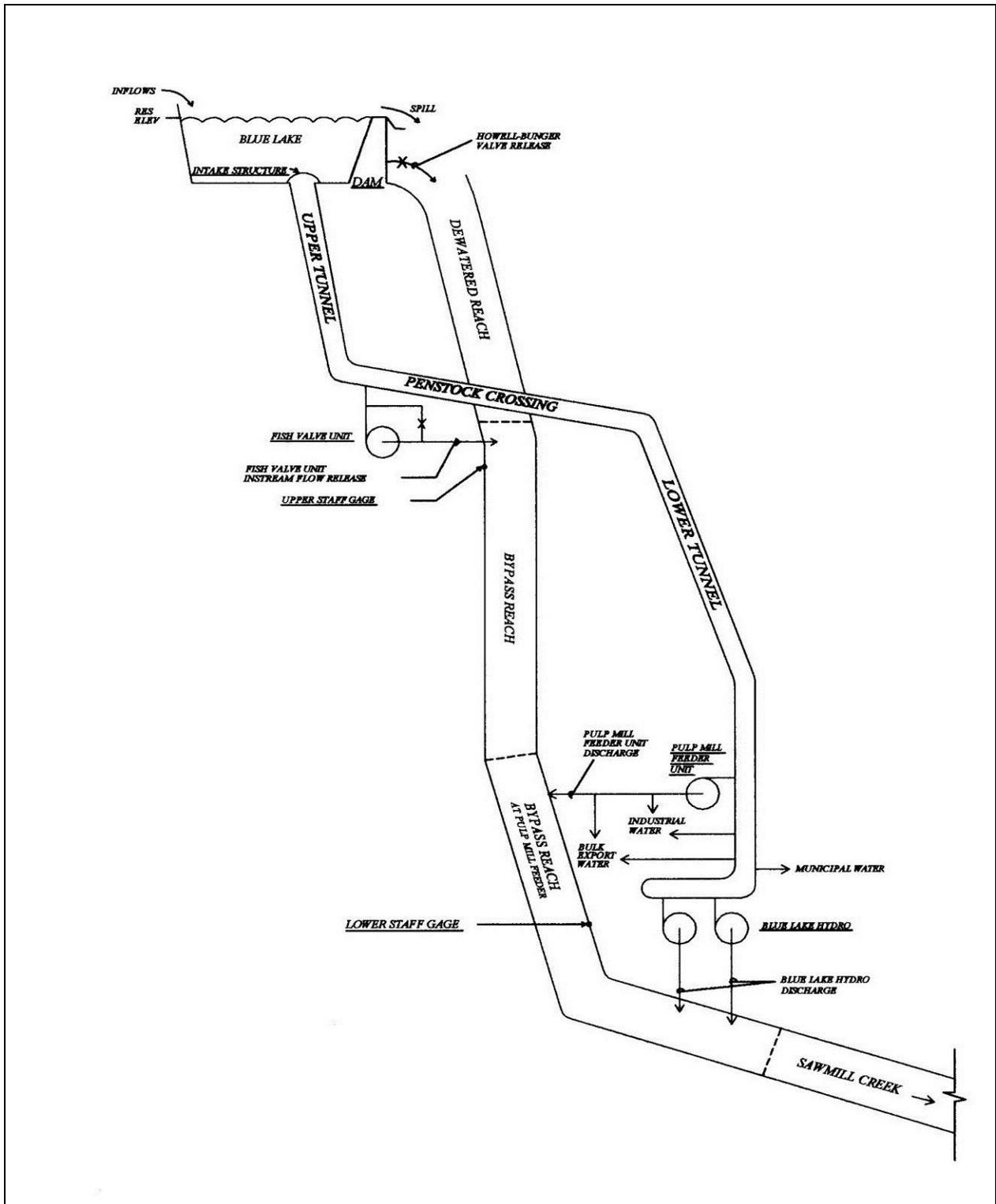


Figure 3. Existing features of the Blue Lake Project. (Source: City of Sitka, 2010)

The pulp mill feeder unit consists of: (1) a 36-inch tee connected to the power conduit; (2) a 36-inch-diameter, 24-foot-long penstock; (3) a powerhouse containing a 870-kW generating unit; (4) a 470-foot-long, 4.16-kV transmission line; and (5) appurtenant facilities.

The project boundary encloses all the facilities described above as well as project recreation facilities. Access to the project is from Forest Service Road 5755 (Blue Lake Road), which is 2.18 miles long. The total average annual generation is about 63,680 MWh.

2.1.2 Existing Project Operations

The Blue Lake Project is operated to meet the City of Sitka’s base load (off-peak) electric demand by maintaining Blue Lake at elevation 342 feet msl (i.e., the elevation of the Blue Lake spillway crest) to ensure that adequate storage, in conjunction with the Green Lake Project (FERC Project No. 2818), exists for generation. However, Blue Lake is gradually drawn down during the winter and early spring prior to snowmelt because water is continually released for hydroelectric generation and for municipal water use. The current license requires the City of Sitka to release a continuous minimum flow of 70 cfs from April 15 through June 30 from the fish valve unit into the Sawmill Creek bypassed reach, or the maximum hydraulic capacity of the fish valve unit, at the concurrent reservoir level, whichever is less. During the remainder of the year (July 1 through April 14), the City of Sitka ensures, by releases from the fish valve unit, a minimum instream flow of 50 cfs. An automatic bypass valve opens when the fish valve unit is not operating to maintain the required minimum flow in the Sawmill Creek bypassed reach.

In addition to the minimum bypassed flow requirement, the license for the project requires the City of Sitka to restrict ramping rates every time flow releases from the fish valve unit change. Under normal operations,² the City of Sitka operates the fish valve unit to ensure the following upramping and downramping rates:

| <u>Time Period</u> | <u>Upramping Rate</u> | <u>Downramping Rate</u> |
|---------------------------|------------------------------|--------------------------------|
| April 1–July 15 | 0.2 foot per hour | 0.1 foot per hour |
| July 16–Sept 30 | 0.1 foot per hour | 0.1 foot per hour |
| October 1–March 31 | 0.2 foot per hour | 0.2 foot per hour |

² Normal operations are defined as operation during the periods when the fish valve unit is the sole source of controllable water discharge into the bypassed reach of the Sawmill Creek.

The ramping rate is measured as the change in stage over a one-hour period at the upper staff gage, which is installed at the Sawmill Creek Bridge near the Forest Service Campground at Sawmill Creek SM 1.57.

During non-normal operations,³ the City of Sitka minimizes ramping rates to the extent possible given equipment constraints and needs for worker safety.

2.2 CITY OF SITKA'S PROPOSAL

2.2.1 Proposed Project Facilities and Construction Activities

The proposed project would include the following modifications:

- The dam crest would be raised by 83 feet to a spillway crest elevation of 425 feet msl and a parapet elevation of 428 feet msl.
- The existing intake structure would be replaced by a new intake structure located at a higher elevation and closer to the dam. The existing power conduit intake would be abandoned in place.
- A new underground power conduit would be installed from the new intake structure to an interconnection point with the existing underground power conduit. The portion of the existing power conduit from the existing intake structure to the point of interconnection would be plugged at the point of interconnection.
- The steel liners at the portals to the power conduit would be lengthened.
- An underground 20-foot-diameter surge chamber would be installed along the power conduit with venting to the surface at elevation 465 feet msl.
- The existing 7-foot-diameter penstock would be replaced with a new 9-foot-diameter penstock between the lower portal and the new powerhouse.
- The existing powerhouse would be decommissioned and a new powerhouse would be constructed housing three new generating units.

³ Non-normal operations are defined as those operations outside the normal daily operation of the fish valve unit or, specifically, operation of the Howell Bunger release valve at Blue Lake dam and the fish valve unit bypass valve. No ramping restrictions apply when these devices are in use.

- The existing 670-kW fish valve unit would be replaced with a new 1-MW generating unit.
- The existing 870-kW pulp mill feeder unit would be decommissioned.
- The existing powerhouse transformers would be replaced with new transformers.
- Equipment access and dam site staging facilities would be developed.
- Timber and other vegetation around the reservoir and in Blue Lake Creek Valley would be left in place and not cleared prior to inundation to the new water surface elevation.
- A 1,400-foot-long dam site power distribution line from the fish valve unit would travel along the tunnel alignment to Blue Lake Road and then follow Blue Lake Road to the dam site.
- The alignment of Blue Lake Road would be changed to accommodate heavy equipment transport.
- The project boundary would be expanded from 1,602 acres to 1,730 acres to accommodate the increased reservoir area.
- The construction facilities would include two spoil areas—one on Green Lake Road and the other at the Sawmill Creek Industrial Park—located outside of the project boundary.

Collectively, these actions are called the Blue Lake Project expansion or simply expansion. The main areas of proposed construction and disturbance are shown in figures 4 and 5.

2.2.1 Proposed Operational Modifications

Although the City of Sitka does not propose to change the existing instream flow release or ramping rate patterns at the fish valve unit or the existing powerhouse, under the proposed expansion, it proposes a lower seasonal drawdown of 55 to 65 feet, which would be significantly less than the 70 to 80-foot drawdown typical of operations with the existing dam height. The pulp mill feeder unit would be decommissioned.

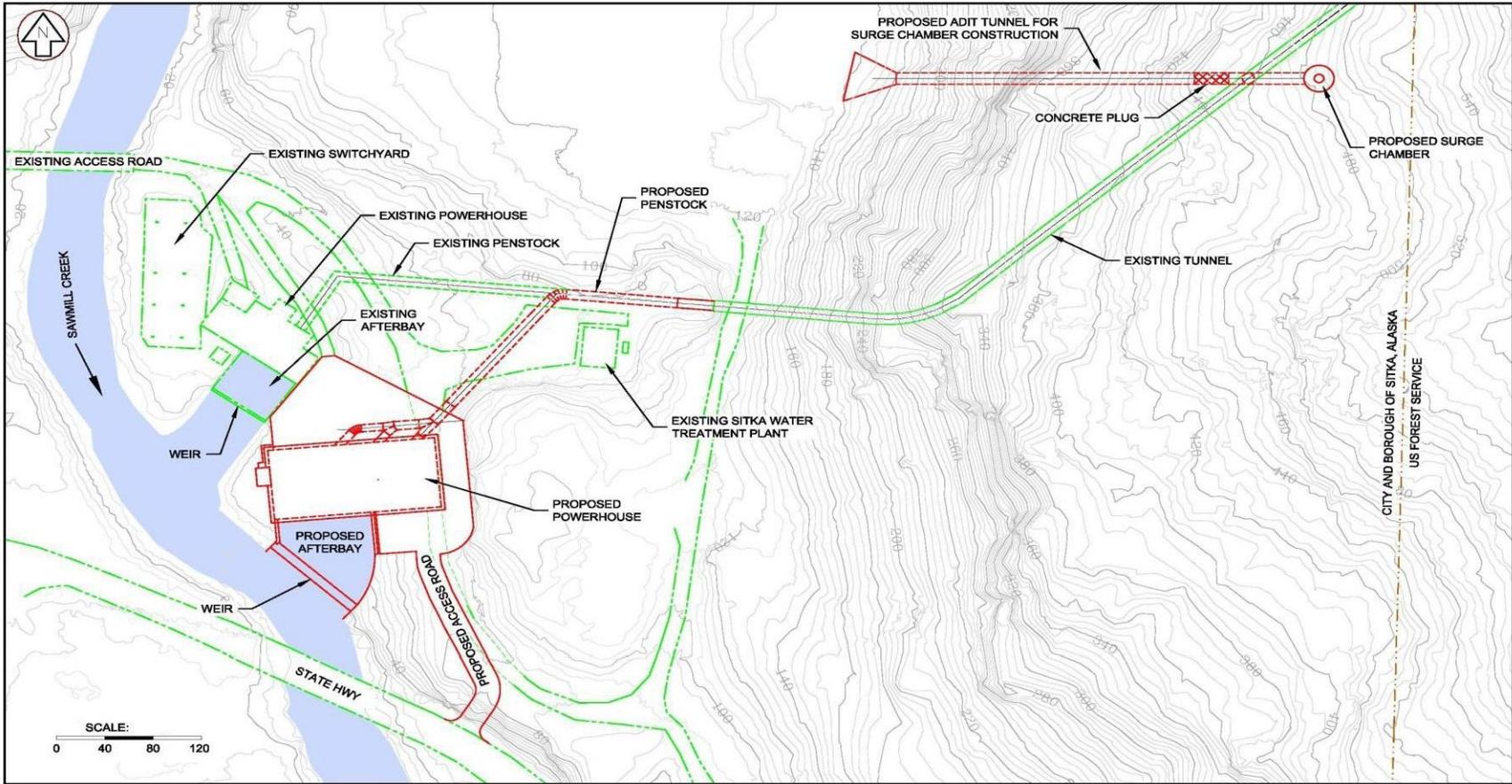


Figure 4. Proposed project changes near the existing powerhouse. (Source: City of Sitka, 2010)

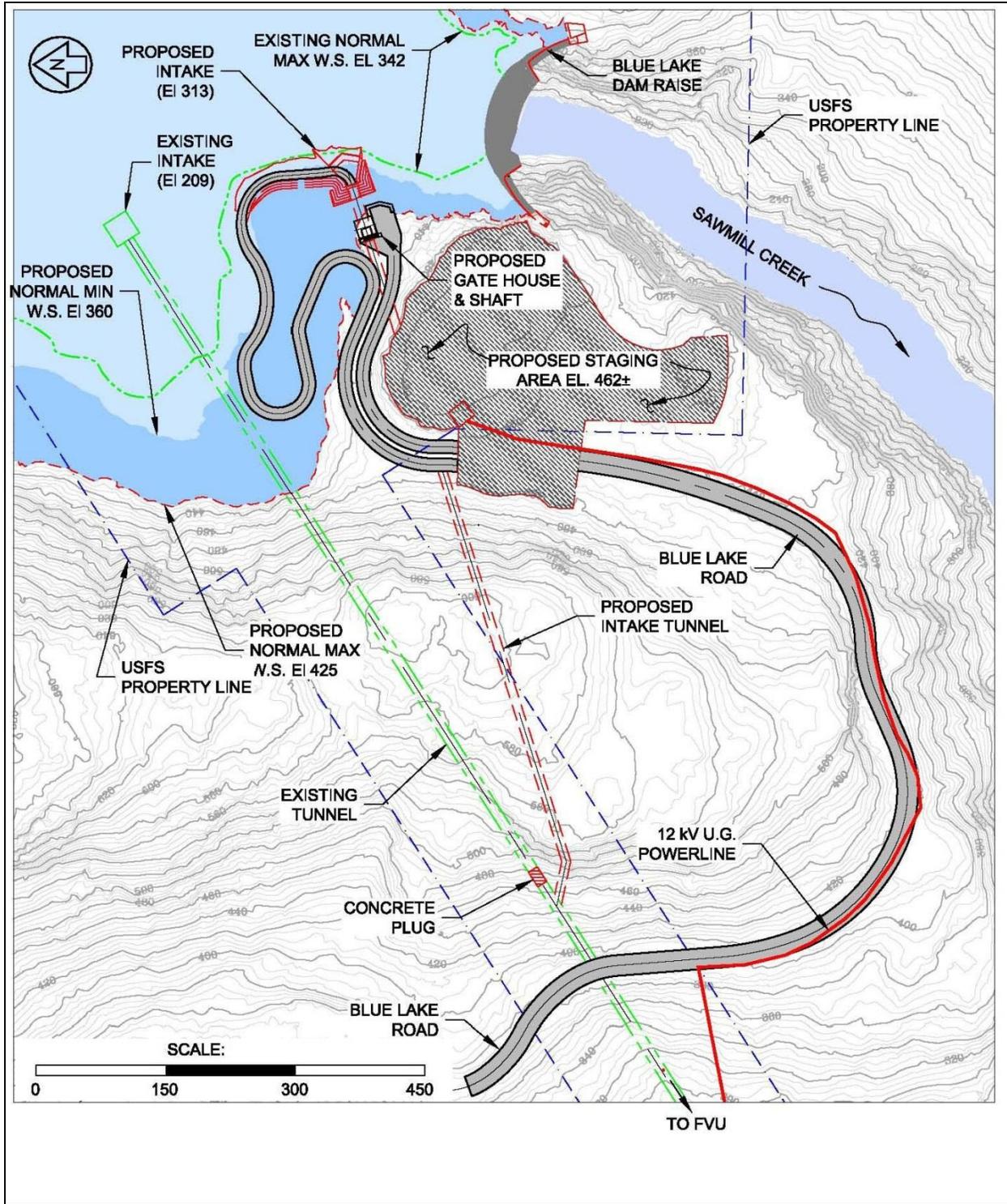


Figure 5. Proposed project changes near the existing dam and intake. (Source: City of Sitka, 2010)

2.2.3 Proposed Environmental Measures

To mitigate effects of its proposed license amendment, the City of Sitka would:

- Implement the final Erosion and Sediment Control Plan to avoid effects on water quality and aquatic resources during construction
- Implement the Reservoir Inundation Plan
- Implement the Water Quality Monitoring Plan
- Implement the final Fisheries Monitoring Plan
- Construct a new intake system to avoid impacts from colder water
- Comply with the City of Sitka’s Watershed Management Plan to address concerns about increased access related to higher lake levels
- Prepare and implement a Wildlife Disturbance Avoidance Plan
- Implement the Environmental Compliance Monitor Plan
- Implement the Bear Safety Plan
- Implement the Reservoir Access Control Plan
- Implement the Cultural Resources Monitoring Plan
- Implement the Cultural Resources Protection Plan

2.2.5 Modifications to Licensee’s Proposal—Mandatory Conditions

The following mandatory conditions have been provided and are evaluated as part of the City of Sitka’s proposal.

The Forest Service filed 4(e) conditions on June 7, 2011. The Forest Service stated that this project does not conflict with any existing or proposed projects and is consistent with the purposes for which the Tongass National Forest was created and/or acquired. The Forest Service states that it does not have an objection to an issuance of a license amendment, subject to certain conditions necessary for the protection and use of National Forest System lands and resources affected by this project. The Forest Service said that it expects to issue a special use authorization for the project if it is licensed by the Commission.

The July 10, 2007, license order for the Blue Lake Project contains Forest Service 4(e) conditions 1 through 12. The Forest Service's new 4(e) conditions are listed below:

- Condition No. 13—Requirement to Obtain a Forest Service Special-Use Authorization
- Condition No. 14—Forest Service Approval of Final Design
- Condition No. 15—Traffic Safety
- Condition No. 16—Safety During Project Construction
- Condition No. 17—Implementation and Modification of Forest Service Conditions
- Condition No. 18—Modifications of 4(e) Conditions after Biological Opinion or Certification
- Condition No. 19—Project Mitigation and Monitoring Plan
- Condition No. 20—Environmental Compliance Monitor
- Condition No. 21—Noxious Weed Management Plan
- Condition No. 22—Erosion Control Plan

2.3 STAFF ALTERNATIVE

The staff alternative includes the City of Sitka's proposed action and staff-recommended modifications and additional measures. Staff-recommended modifications to the City of Sitka's measures include (1) developing and implementing a detailed long-term Water Quality Monitoring Plan and a Construction Water Quality Monitoring Plan; (2) complying with 4(e) Condition No. 3 of the current license, which requires preparation of a Hazardous Substance Plan; (3) developing and implementing a detailed Fisheries Monitoring Plan; (4) developing and implementing a revegetation plan; and (5) developing and implementing a Rehabilitation Plan for the removal or partial removal of decommissioned infrastructure.

The staff alternative would also include all the 4(e) conditions specified by the Forest Service.

2.4 STAFF ALTERNATIVE WITH MANDATORY CONDITIONS

We recognize that the Commission is required to include valid section 4(e) conditions in any license issued for the project. The staff alternative with mandatory conditions includes staff-recommended measures. Incorporation of these mandatory conditions into an amended license would not cause us to modify or eliminate any of the environmental measures that we include in the staff alternative.

2.5 OTHER ALTERNATIVES

Commenting entities and Commission staff did not identify any other reasonable alternatives.

3.0 ENVIRONMENTAL ANALYSIS⁴

3.1 GENERAL SETTING

The Blue Lake Project area is located on the west side of Baranof Island, a major component of the Alexander Archipelago in southeast Alaska. Baranof Island, with an area of 1,569 square miles, is generally characterized by rugged mountainous terrain in its northern half and gentler, but still mountainous, topography in its southern half.

In the immediate project area, the Baranof Mountains rise to heights of more than 4,300 feet msl in the Blue Lake Basin and to more than 5,390 feet msl maximum on the island. The Blue Lake Basin's topography is the product of both glacial and riverine erosion.

The climate in 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 gathered at the Sitka airport for those same factors. The airport's NOAA weather station shows that the community of Sitka receives 86 inches of precipitation per year. Temporary rainfall monitoring done in the mountains near the project powerhouse shows more than 105 inches of precipitation per year.

Average monthly temperature at the airport is 43°Fahrenheit and is expected to be lower than at the project location. As with precipitation, temperature changes dramatically with elevation and is significantly lower in the mountains than at the

⁴ Unless otherwise noted, the information in this section was derived from the application for amendment of license (City of Sitka, 2010) for this project and additional information filed by the City of Sitka on March 10, 2011, and April 6, April 7, and April 14, 2011.

elevations of both Blue Lake and Sawmill Creek. No long-term measured data are available for these areas.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing National Environmental Policy Act (40 CFR §1508.7), a cumulative effect is the impact on the environment that results from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time, including hydropower and other land and water development activities.

Based on our review of the license application and agency and public comments, we have identified fisheries, wildlife, and recreation resources as having the potential to be cumulatively affected by the proposal for the Blue Lake Project. The geographic scope for the fisheries is based on the recommendations of Alaska DF&G and includes the Blue Lake and Sawmill Creek watersheds. The geographic scope for wildlife species is Game Management Unit 4 and the project boundary for recreation.

3.3 PROPOSED ACTION

In this section, we discuss the effect of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the specific site-specific and cumulative environmental issues. Only the resources that would be affected, or about which comments have been received, are addressed in detail in this EA. We have not identified any substantive issues related to socioeconomics associated with the proposed action, and, therefore, socioeconomics is not assessed in this EA. We present our recommendations in section 5.1, *Comprehensive Development and Recommended Alternative*.

3.3.1 Geologic and Soil Resources

3.3.1.1 Affected Environment

Geology in the project area was documented in detail prior to the construction of the original dam, tunnel, and powerhouse. Documentation of the geology included results of surface investigations and surveys that evaluated subsurface conditions and rock competency by employing numerous drill holes in the project area. During summer 2009, an expanded geotechnical survey was conducted at the dam site and at certain areas along the lower power conduit. Also in 2009, the stability of the expanded reservoir shoreline was surveyed.

The structure of the lowermost rocks in the Blue Lake area is a series of intricately folded, fractured, and re-cemented phyllite, greywacke, and argillite beds and lenses. These beds lie approximately 60 degrees west of a north bearing 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 the city of 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 feet.

Several light gray dioritic-appearing dikes were mapped along the stream channel. Those observed ranged from one to three 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 are overlain by very little overburden of alluvium, except where small talus slides exist.

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, believed to be associated with the major faulting, trend approximately east-west.

Geology in the Blue Lake powerhouse area was said to be underlain by the same general, sedimentary series. The geotechnical investigations conducted in 2009 concluded that underlying rock was competent at all test sites.

The proposed construction would also involve the use of two spoil disposal areas located outside of the project boundary—the Green Lake Road spoil disposal area and the Sawmill Creek Industrial Park spoil disposal and spoil processing area. The Green Lake disposal area is an existing borrow area located on the uphill side of Green Lake Road. It consists primarily of exposed rock and drains to the northwest where water exits through a culvert under Green Lake Road into Silver Bay. The Sawmill Creek Industrial Park spoil disposal area is located near the powerhouse and consists of a flat area containing an existing drainage system that includes a storm-water discharge into Silver Bay.

3.3.1.2 Environmental Effects

Construction-Related Effects

Construction of the proposed project modifications would affect underground and surface geology and soils. Construction would produce spoils consisting of overburden (organic and soil-related inorganic material) from initial surface stripping and rock from excavation, blasting and other activities. Limited amounts of overburden and rock may

be retained at or near their origin and replaced soon after construction. Exact removal and storage sites would be determined prior to construction. The final Erosion and Sediment Control Plan indicates a few potential temporary spoil storage areas.

Excavated material associated with construction would also be deposited at the two designated spoil areas. The Green Lake Road spoil disposal area would be used for disposal of overburden from the various construction areas. The Sawmill Creek Industrial Park spoil disposal and processing area would be used as a location for the construction office, material storage, and material processing. The City of Sitka proposes to haul much of the rock generated by project construction that would require processing to the Sawmill Creek Industrial Park spoil disposal and processing area for storage and processing. Processing may include rock crushing and/or screening and use in a concrete batch plant. Timber would also be hauled and stored temporarily at the site.

Prior to the transport and deposition of materials at the two disposal sites, the materials would be inspected for any invasive species.

The City of Sitka developed a final Erosion and Sediment Control Plan that has been reviewed by agencies, including Alaska DF&G, and would be implemented prior to and during construction. The plan includes best management practices to be implemented and specific sediment and erosion control measures to be implemented at each of the four major construction areas (and associated subareas within each): (1) dam and intake construction area; (2) fish valve unit construction area; (3) dam site power distribution line construction area; and (4) powerhouse and surge chamber construction area. The plan also includes spoils management and disposal measures to be undertaken for the temporary and permanent spoil disposal areas.

The City of Sitka originally proposed to clear timber along the perimeter of the existing reservoir to elevation 428 feet msl prior to the filling of the reservoir to elevation 425 feet msl. As a result of stakeholder consultation and concerns about water quality effects resulting from timber and vegetation removal, the City of Sitka proposes to leave all timber and vegetation in place as described in the draft Reservoir Inundation Plan, which is currently under review by agencies, including Alaska DF&G.

Our Analysis

The final Erosion and Sediment Control Plan was developed in consultation with stakeholders and appears to have addressed all of the concerns raised. The plan includes appropriate and necessary measures to reduce the potential for sedimentation and erosion in the construction areas. The City of Sitka proposes to submit, to the Commission, an addendum to the plan after approval of project final design but prior to construction. The addendum would include: (1) construction schedules and locations; (2) spoil and runoff volumes; and (3) discussions and capacities of drainage channels and settling basins.

With implementation of this plan, effects on geology and soil resources would be short term and minor.

Forest Service 4(e) Condition No. 22 specifies that prior to any new construction or non-routine maintenance with the potential to cause erosion and/or stream sedimentation on or affecting National Forest System lands, the City of Sitka file with the Commission an Erosion Control Measures Plan that has been approved by the Forest Service. The purpose of this plan is to identify measures to control erosion, stream sedimentation, and soil mass movement, based on geological, soil, and groundwater conditions at each site. The City of Sitka's proposed Erosion and Sediment Control Plan identifies erosion control measures to be implemented at the project during construction to minimize sediment releases to Blue Lake and Sawmill Creek. Forest Service 4(e) Condition No. 22 would address future construction and non-routine maintenance activities not addressed by the City of Sitka's Erosion and Sediment Control Plan. Development of the plan as specified by the Forest Service would identify measures the City of Sitka would implement to minimize potential adverse effects on water quality during future construction and non-routine maintenance.

The draft Reservoir Inundation Plan appears to be responsive to stakeholder concerns about potential timber clearing effects on water quality in the reservoir, resulting in the decision to leave timber and vegetation in place within the proposed inundation zone. The lack of clearing and logging within the inundation zone should help decrease erosion. Additional analysis of the Reservoir Inundation Plan is presented in section 3.3.2.2, *Water Quality*, and section 3.3.3, *Terrestrial Resources*.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Water Quantity

Blue Lake is a 1,284-acre water body impounded by Blue Lake dam at about SM 2.31. Blue Lake was created by glacial activity, and the depth and extent of the reservoir was increased when Blue Lake dam was constructed in the late 1950s. Prior to construction, Blue Lake was a 490-acre lake with a water surface elevation of 208 feet msl. Currently, the maximum depth of Blue Lake is about 468 feet or about 126 feet below sea level. The maximum water depth at the dam face is 134 feet, and the lake is much shallower, by about 20 feet, at the upper end. At the current maximum pool elevation of 342 feet msl, the capacity of Blue Lake is about 145,200 acre-feet, and the usable storage capacity is about 102,200 acre-feet. The average seasonal drawdown is about 70 to 80 feet with lowest levels reached in the spring and highest in the early fall.

Sawmill Creek flows out of Blue Lake and has an average annual flow of about 440 cfs, ranging from a monthly average low of 11 cfs in March to a monthly average

high of 1,690 cfs, occurring from June to October each year depending on rainfall and snowmelt. Recorded maximum flow in Sawmill Creek was 12,000 cfs in 1992. Table 1 provides monthly data from 2001 to 2010 for the current U.S. Geological Survey (USGS) gage located about 400 feet upstream of the existing powerhouse. Lowest flows normally occur from February to June and are higher in the July through December because of rainfall and snow melt.

Table 1. Monthly flow data (cfs) for USGS gage no. 15088000 Sawmill Creek near Sitka for 2001 to 2010. (Source: USGS, 2011)

| Month | Min. | Mean | Exceedance Values | | | | | Max. |
|-------|------|------|-------------------|-----|-----|-----|-----|------|
| | | | 10% | 25% | 50% | 75% | 90% | |
| Jan. | 51 | 100 | 169 | 119 | 80 | 69 | 63 | 266 |
| Feb. | 52 | 76 | 111 | 78 | 69 | 63 | 59 | 161 |
| March | 50 | 74 | 119 | 76 | 65 | 60 | 55 | 168 |
| April | 52 | 72 | 90 | 73 | 66 | 63 | 60 | 159 |
| May | 49 | 83 | 146 | 88 | 69 | 64 | 59 | 320 |
| June | 47 | 83 | 126 | 85 | 72 | 65 | 60 | 173 |
| July | 59 | 161 | 302 | 157 | 115 | 75 | 72 | 1710 |
| Aug. | 54 | 249 | 513 | 196 | 128 | 100 | 78 | 4760 |
| Sept. | 68 | 535 | 1311 | 710 | 238 | 117 | 79 | 4770 |
| Oct. | 64 | 536 | 1392 | 689 | 284 | 154 | 121 | 3710 |
| Nov. | 50 | 311 | 448 | 188 | 129 | 75 | 62 | 8950 |
| Dec. | 48 | 187 | 243 | 139 | 111 | 73 | 67 | 4110 |

Condition No. 8 of the existing license requires the City of Sitka to ensure minimum flows are released into the Sawmill Creek bypassed reach to protect aquatic resources. From April 15 through June 30, the City of Sitka is required to maintain a release of 70 cfs, or the maximum hydraulic capacity of the fish valve unit, at the concurrent lake level, whichever is less into Sawmill Creek. During the remainder of the year (July 1 to April 14), the City of Sitka is to release a minimum instream flow of 50 cfs from the fish valve unit.

Condition No. 9 of the existing license requires the City of Sitka to limit ramping rates at the fish valve unit. Under normal operations (i.e., when the fish valve unit is the sole source of controllable water discharge inflow into the bypassed reach), the City of Sitka is required to operate the fish valve unit with the following restrictions during upramping and downramping:

| Period | Up ramping Rate (foot/hour) | Down ramping Rate (foot/hour) |
|----------------------|--|--|
| April 1–July 15 | 0.2 | 0.1 |
| July 16–September 30 | 0.1 | 0.1 |
| October 1–March 31 | 0.2 | 0.2 |

Ramping rates are determined using flows recorded at the upper staff gage installed at the Sawmill Creek Bridge near the Forest Service campground at Sawmill Creek (SM 1.57). During non-normal operation, no ramping rate restrictions apply with the understanding that the City of Sitka would minimize ramping to the extent possible.

Water in Blue Lake and Sawmill Creek is used for hydropower generation, drinking water, and industrial water supply. Most water is used for hydropower generation with about 350 cfs of the water diverted on average in 2003–2004 to the project’s three powerhouses and about 5.30 cfs being diverted for drinking and industrial water combined. The recently constructed fish hatchery, Sawmill Cove Hatchery, within the Sawmill Creek Industrial Center would likely use between 10–20 cfs.

Water Quality

Water quality in Blue Lake and downstream Sawmill Creek is considered exceptionally high (FERC, 2007). Blue Lake supplies drinking water to the community of Sitka and requires no additional filtration prior to consumption. The City of Sitka’s Watershed Management Plan restricts human activity on the lake in efforts to ensure no adverse effects on water quality. Values for various inorganic, microbiological and volatile organic components in Blue Lake are quite low (FERC, 2007). The Forest Service federal land use designation of the Blue Lake Watershed is “Municipal Watershed,” which emphasizes protection of municipal water through watershed planning (FERC, 2008).

Water temperature monitoring in 2008 indicates that surface water temperatures of Blue Lake range from 2 degrees Celsius (°C) to 12°C and that Blue Lake stratifies by late summer. Dissolved oxygen concentrations can range from 11.0 milligrams per liter (mg/L) at the lake surface to 13.4 mg/L at the 100 foot depth (FERC, 2007). Water temperatures are uniform throughout the water column in winter.

In recent water quality monitoring in downstream Sawmill Creek, water temperatures were found to be between 2°C to 3°C at the fish valve unit and between 3°C to 12°C at the staff gage near the existing powerhouse. These data suggest that Sawmill Creek is quite cold, likely due to its incised nature, and water temperatures are directly influenced by project releases. During spill, water temperatures in Sawmill Creek approximate the surface water temperatures in Blue Lake. During non-spill periods,

downstream water temperatures approximate the water temperature of Blue Lake near the existing project intake at elevation 204 feet msl, about 138 feet below the existing normal maximum water surface elevation of 342 feet msl.

Sawmill Creek carries 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 upstream and downstream of the project dam, however, sediment input is considered moderate (FERC, 2007).

Fishery Resources

Blue Lake

Rainbow trout is the primary fish species found in Blue Lake. While access is an issue, Blue Lake is considered one of the best available sport fisheries for rainbow trout in southeast Alaska with regard to the relative size and abundance of fish. The rainbow trout population size in Blue Lake has been estimated twice in recent years. In 1994, results from a mark-recapture study the rainbow trout population in Blue Lake found 4,708 individuals, ranging from 3,197 and 7,093 fish. These fish were relatively large (measuring up to 250 millimeters). In 2004, results from a similar mark-recapture study estimated the population size to be 3,604 individuals, ranging from 2,848 and 4,361 fish.

Rainbow trout are known to primarily spawn at the confluences of the tributaries to Blue Lake, with spawning occurring from late May through June. Primary tributaries to Blue Lake include Blue Lake Creek, Becky Creek, Brad Creek, and Sheldon Creek (see figure 6). Blue Lake Creek is the largest tributary, draining about 19.9 square miles and comprising about 54 percent of Blue Lake's total drainage area (Wolfe, 2009). Becky Creek, Sheldon Creek, and Brad Creek have drainage areas of 4.9, 4.0, and 3.7 miles, respectively. Other smaller tributaries to Blue Lake include North and South Falls creeks.

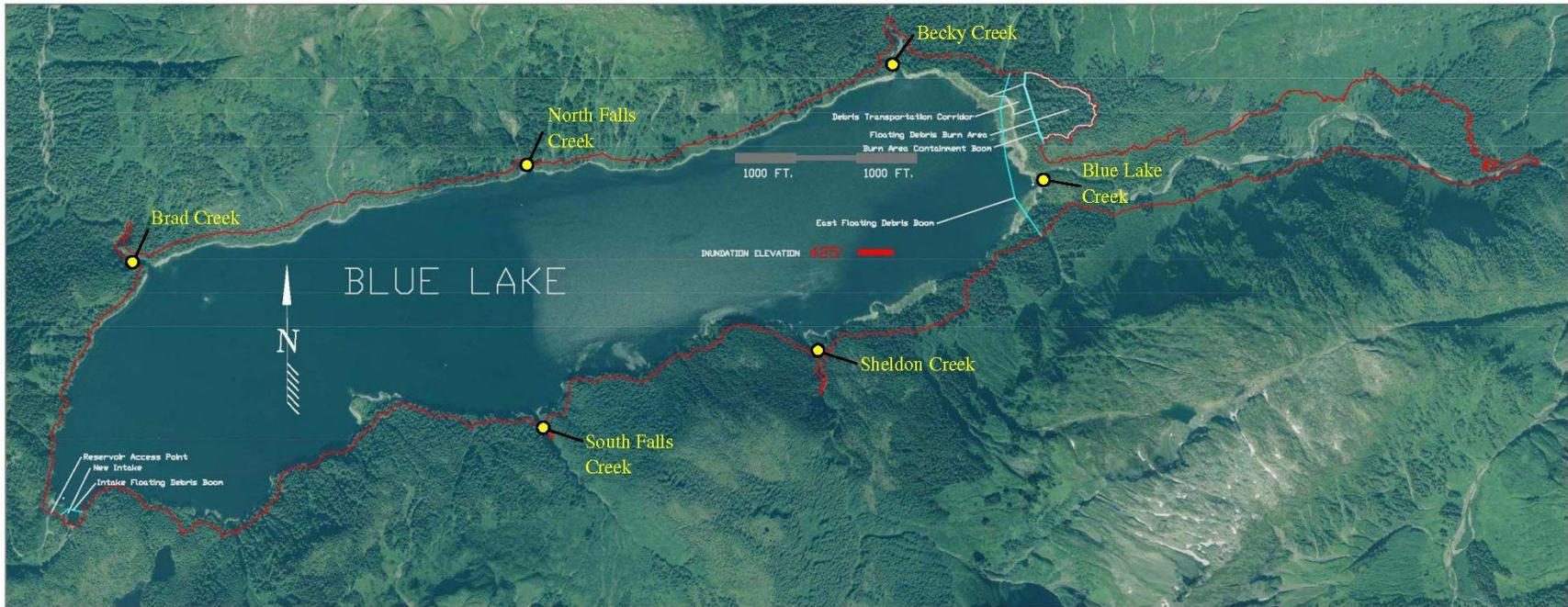


Figure 6. Blue Lake tributary inundation map. (Source: City of Sitka, 2010, as modified by staff)

Habitat among these tributaries varies because of natural barriers on the streams and changing lake levels. For example, Blue Lake Creek has two natural falls, one located at SM 0.12 and the other at SM 2.02.⁵ The lowermost falls is only a fish passage barrier when Blue Lake’s water levels are below elevation 320. At higher lake levels, the falls are inundated, eliminating this impediment to fish passage (Wolfe, 2009). When Blue Lake reaches elevation 342 feet msl (the dam crest elevation), barrier falls are reached on Sheldon, North Falls, South Falls, and Brad creeks.

Studies on rainbow trout spawning in the four major tributaries of Blue Lake conducted in 2005 and 2008 indicate that spawning is somewhat evenly distributed among the four major tributaries (table 2).

Table 2. Percentage of spawning in the major tributaries of Blue Lake. (Source: City of Sitka, 2010)

| Tributary | 2005 | 2008 | Average |
|------------------|-------------|-------------|----------------|
| Blue Lake Creek | 28 | 27 | 27.5 |
| Becky Creek | 20 | 25 | 22.5 |
| Brad Creek | 16 | 25 | 20.5 |
| Sheldon Creek | 23 | 17 | 20.0 |

Sawmill Creek

Sawmill Creek supports a variety of salmonid species (table 3).

Table 3. Salmonid species in Sawmill Creek. (Source: City of Sitka, 2010)

| Common Name | Scientific Name |
|--------------------------|-----------------------------|
| Coho (silver) salmon | <i>Oncorhynchus kisutch</i> |
| King (Chinook) salmon | <i>O. tshawytscha</i> |
| Pink (humpback) salmon | <i>O. gorbuscha</i> |
| Chum (dog) salmon | <i>O. keta</i> |
| Steelhead trout | <i>O. mykiss</i> |
| Rainbow (resident) trout | <i>O. mykiss</i> |
| Dolly Varden char | <i>Salvelinus malma</i> |
| Arctic grayling | <i>Thymallus arcticus</i> |

⁵ Distances along Blue Lake Creek defined here were established by designating SM 0.0 at Blue Lake (elevation 290 feet msl).

All of the species listed in table 3, except Arctic grayling and resident rainbow trout, are anadromous, meaning they migrate to salt water and return to fresh water to spawn. However, no anadromous fish of any species have been observed or captured upstream of the falls on Sawmill Creek located at about SM 0.73, about halfway between the Blue Lake powerhouse and the fish valve unit (FERC, 2007).

The most abundant fish species in Sawmill Creek are pink and chum salmon, with 18,500 to 160,000 pink and 250 to 669 chum using the area downstream of the project each year. Steelhead, coho, and Chinook salmon are found in much smaller numbers, primarily due to limited juvenile rearing habitat. Although steelhead and coho are thought to be native to Sawmill Creek, Chinook salmon are thought to be strays from nearby hatcheries.

Throughout the year, various life stages of these salmonid species are present in Sawmill Creek. Most adults return to Sawmill Creek from late spring through fall, with spawning of the various species also occurring during that same time. Depending on the species, juveniles can spend from one to three years rearing in Sawmill Creek. Pink salmon tend to enter the stream in late July to early August and spawn no later than mid-September. Chum salmon arrive earlier in July and spawn soon after entering the stream (EES Consulting, 2010). For both pink and chum salmon, these fry or early juveniles leave soon after emergence in April and May to rear in brackish water downstream of the project.

Other species found in Sawmill Creek include the staghorn sculpin (*Leptocottus armatus*) and the prickly sculpin (*Cottus asper*).

In 2008, the Northern Southeast Regional Aquaculture Association, Inc. completed construction of the Sawmill Cove Hatchery near the Sawmill Creek Industrial Park (NSRAA, 2011). This facility is designed to produce 2,000,000 coho smolt annually and is currently in the broodstock development stage using Salmon Lake coho retrieved at the head of Silver Bay. Any coho salmon produced at this hatchery are to be released in Deep Inlet, not in Sawmill Creek. However, this hatchery is supplied with water from Sawmill Creek.

3.3.2.2 Environmental Effects

Water Quantity

Construction-Related Effects

Construction activities related to the City of Sitka's proposal would result in changes to the project that may temporarily affect water quantity. These activities include control of the level of Blue Lake to allow construction to occur under dry conditions. The City of Sitka states that control of the reservoir level would be temporary

and not last longer than a few months and the instream flow requirements of the current license would not be affected. Alaska DF&G also recommends that the current intake screen and tailrace design remain intact and to maintain existing provisions to maintain minimum flows to Sawmill Creek during maintenance, emergency shutdowns, and interruptions to the power grid. Similar to recommendations by Alaska DF&G, the City of Sitka does not propose to change to these operating constraints that would affect flow in Sawmill Creek.

Our Analysis

Limited effects on water quantity are expected during construction because the City of Sitka would ensure that instream minimum flows of 70 cfs are provided between April 15 and June 30 and that flows of 50 cfs are provided during the remainder of the year to Sawmill Creek, as specified in the current license. However, some limitations to the occurrence of spill are possible because the lake levels would be kept at a low level to allow for construction, but these effects are expected to be short term, lasting no longer than a few months. Very limited effects also would be likely with the proposed tailrace associated with the new powerhouse since that is designed to be very similar to the existing tailrace but about 100 feet downstream from the existing tailrace.

Long-Term Operation Effects

During long-term operations, the lake levels would vary between elevations 360 and 425 feet msl but normally would be only about 55 to 65 feet below elevation 425 feet msl. This is a proposed change from a current maximum normal water level of 342 feet msl and an annual lake level change of 70 to 80 feet.

Our Analysis

Similar to existing conditions, with the proposed action, the highest lake levels would occur in the late spring and early summer based on snowmelt and runoff. While the lake level fluctuation is expected to be less under proposed conditions, roughly the same amount of usable storage, about 100,000 acre-feet, would be expected under the proposed conditions, resulting in only minor changes in spill frequency and no change in the ability to provide the required minimum flow requirements. The major long-term effects associated with the higher lake levels are related to rainbow trout spawning access to the tributaries; water quality; effects of inundation on terrestrial habitat surrounding the lake; and recreational access and land use issues, all of which are discussed below.

Water Quality

Construction-Related Effects

Construction activities related to the City of Sitka's proposal would result in substantial changes to the project that may adversely affect water quality. These activities include the raising the dam, constructing a new intake, extending and modifying Blue Lake Road, and developing a 1.5-acre staging area requiring the leveling of a hill, constructing a new project intake, constructing a new powerhouse, modifying the existing fish valve unit, and constructing a new transmission line from the fish valve unit to the dam/intake area. Land clearing activities associated with this construction have the potential to affect water quality in Blue Lake and downstream in Sawmill Creek. In addition, the potential exists for fuel, oil, and other contaminants to be spilled into project waters during construction.

In its application, the City of Sitka proposed to remove the vegetation in the 362 acres to be inundated after the dam is raised. However, in its draft Reservoir Inundation Plan, which was developed after the application was filed, the City of Sitka now proposes to leave the timber in place.

According to the City of Sitka's Timber Removal and Management Plan, Blue Lake would continue to supply drinking water to the community of Sitka throughout most of the construction period. Only during a one- to two-month period would the existing water supply system be non-operational. The City of Sitka is currently evaluating the feasible alternatives to provide water to the community of Sitka during this outage.⁶

Our Analysis

Because of the exceptional water quality of Blue Lake and its use as a drinking water source for the community of Sitka, minimizing adverse effects on water quality during construction is a major concern. Given the construction activities related to the City of Sitka's proposal, temporary adverse effects on water quality may be substantial, mainly resulting from increased turbidity expected during construction.

⁶ In its Timber Removal and Management Plan, the City of Sitka states that during this outage, a secondary source of water would come from the Indian River. Currently, the City of Sitka is pursuing other alternatives (see the *Change in Advertise Date of General Construction Contract 9*, available at: <http://www.cityofsitka.com/government/departments/electric/BlueLakeExpansion.html>. Accessed on November 4, 2011.

To minimize these effects, the City of Sitka developed an Erosion and Sediment Control Plan that provides detailed descriptions of activities at the four main construction sites (the dam and intake area, the fish valve unit area, the dam site power distribution line area, and the existing powerhouse area), along with best management practices for minimizing soil erosion and contamination of Blue Lake and Sawmill Creek. The Erosion and Sediment Control Plan identifies spoil disposal sites onsite, on Green Lake Road near the project, and at the Saw Mill Creek Industrial Park and provides for natural revegetation of sites, as well as seeding following construction, where deemed necessary. The Erosion and Sediment Control Plan also includes the draft Water Quality Monitoring Plan (currently under review by Alaska DF&G) and calls for water quality sampling to ensure the effectiveness of the erosion and sediment control measures. The Forest Service commented on the plan by letter dated January 13, 2011, and most of those comments were addressed by the City of Sitka, with one exception—the release of petroleum products and other contaminants.

Forest Service 4(e) Condition No. 22, specifies that, prior to any new construction or non-routine maintenance with the potential to cause erosion and/or stream sedimentation on or affecting National Forest System lands, the City of Sitka file with the Commission an Erosion Control Measures Plan that has been approved by the Forest Service. The plan is to identify measures to control erosion, stream sedimentation, and soil mass movement and be based on geological, soil, and groundwater conditions at each site. The City of Sitka's current plan identifies erosion control measures to be implemented at the project to minimize sediment releases into Blue Lake and Sawmill Creek. Forest Service 4(e) Condition No. 22 would address future construction and non-routine maintenance not addressed by the proposed Erosion and Sediment Control Plan. Development of the plan as specified by the Forest Service would identify measures (acceptable to the Forest Service) that the City of Sitka would take to minimize potential adverse effects on water quality during future construction and non-routine maintenance.

Regarding the Forest Service's specification to develop a plan on spill prevention and countermeasures for hazardous material spills (e.g., petroleum products and chemicals), such a plan would help reduce or minimize effects on water quality if spill events occur. Alaska DF&G, in its comments filed June 8, 2011, also recommends the development of a Fuel and Hazardous Substance Spill Plan, as well as a plan to treat leakage from turbines to remove pollutants.

Condition No. 3 of the existing license states that during planning for and prior to any new construction or maintenance, the City of Sitka would file with the Commission, a Hazardous Substances Plan approved by the Forest Service for oil and hazardous substances storage and spill prevention and cleanup. At a minimum, the plan would include the following measures:

- Outlining procedures for reporting and responding to releases of hazardous substances, including names and phone numbers of all emergency response personnel and their assigned responsibilities
- Maintaining, in the project area, a cache of spill cleanup equipment suitable to contain any spill from the project
- On a semi-annual basis, informing the Forest Service of the location of spill cleanup equipment on National Forest System lands and of the location, type, and quantity of oil and hazardous substances stored in the project area
- Informing the Forest Service immediately of the nature, time, date, location, and action taken for any spill affecting National Forest System lands and licensee-adjointing fee title property

In addition, Article 19 requires the City of Sitka to take reasonable measures to prevent soil erosion on lands adjacent to streams or other waters, stream sedimentation, and any form of water or air pollution. Compliance with Condition No. 3 and Article 19 of the existing license should minimize any negative effects on water quality related to accidental spills during construction and/or turbine leakage and should address the concerns of the Forest Service and the Alaska DF&G.⁷ Furthermore, the existing project has a sump alarm and an oil/water separator to treat condensate and turbine leakage.

Regarding the City of Sitka's decision to leave the vegetation in place in the 362 acres to be inundated, the City of Sitka states this decision was based on concerns of the Alaska Department of Environmental Conservation, the agency responsible for regulating drinking water, regarding negative effects that may result from logging activities around Blue Lake, primarily increased sedimentation and turbidity. Adverse effects would also occur by leaving the vegetation in place. The inundated areas, primarily in the Blue Lake Creek Valley in the eastern end of the reservoir, are dominated by spruce-hemlock forests. Decomposition of the wood, tree needles, and the understory vegetation may temporarily increase biological oxygen demand in Blue Lake, as well as increase total organic carbon (TOC) concentrations in Blue Lake. Increased TOC concentrations when treated with chlorine may result in the formation of unfavorable compounds.

⁷ We note that a draft Hazardous Substances Plan was included with the City of Sitka's Responses to Requests for Additional Information on Schedule B, Blue Lake Hydroelectric Expansion, filed April 14, 2011. However, the plan included with the filing is not specific to the City of Sitka's proposal here.

In an effort to minimize the amount of vegetation in Blue Lake that would be left to decompose, the City of Sitka would implement its Reservoir Inundation Plan that calls for installing debris booms to contain floating material as it becomes dislodged after inundation. Two booms would be installed in the area of Blue Lake Creek, and another boom would be installed near the dam and intake. The City of Sitka would collect the debris in the booms, move it onshore for burning, and bury the ash.

The City of Sitka also developed a draft Water Quality Monitoring Plan that includes provisions for monitoring water quality during construction, over the long term, and at the water treatment plant (located at the downstream end of the power conduit). During the construction period, the City of Sitka proposes to monitor water quality to detect: (1) sediments from excavation, road use, or vegetation clearing; (2) petroleum leakage from construction equipment and other vehicles; (3) materials from the decay of vegetation in inundated areas; and (4) blasting residue. The City of Sitka would focus sampling efforts on runoff water downslope of daily construction areas and on the effluent water from settling ponds. Details regarding specific parameters to be sampled, sampling locations, and sampling frequency during construction, were not included in the plan. Also not included were measures to take in the event of unacceptable water quality conditions. The City of Sitka proposes to develop these details in consultation with the agencies upon completion of the final design of the project. In its comments on the proposal filed June 8, 2011, Alaska DF&G indicates the plan is under review.

Monitoring of water quality during construction is important so that the City of Sitka can quickly identify and respond to any problems detected during construction. The current plan is lacking in detail and has not been approved by either the resource agencies or the Commission. Therefore, the City of Sitka should develop a detailed Construction Water Quality Monitoring Plan, in consultation with the Forest Service, Alaska DF&G, FWS, and NMFS, prior to the start of land-clearing activities to identify the exact locations of monitoring sites, the parameters to be monitored, and the frequency of monitoring during all phases of construction. The plan should also identify specific measures to be taken in the event that monitoring identifies unacceptable water quality conditions. The City of Sitka's should file the plan for Commission approval, documenting consultation with these agencies and including any comments received on the plan and responses to those comments.

Implementing Condition No. 3 of the existing license and Forest Service 4(e) Condition No. 22 and developing a detailed Construction Water Quality Monitoring Plan to include actions to take in the event that unacceptable water quality conditions are detected would minimize any temporary short-term adverse effects on water quality.

Long-Term Operation Effects

In terms of long-term operation, warmer water temperatures in Sawmill Creek are expected from raising the intake from invert elevation 204 to invert elevation 313. Water temperatures in Blue Lake are expected to remain unchanged with stratification continuing to occur during the summer and uniform temperatures continuing throughout the water column in winter.

Our Analysis

Based on studies conducted by the City of Sitka, raising the intake elevation may increase summer intake water temperatures by 1°C to 3°C (June to September), with an average annual increase in water temperatures of 0.5°C (EES Consulting, 2010). The greatest increases would be expected in July or August, with concurrent warmer air temperatures. Effects on winter temperatures are expected to be minimal (<1°C November to April) because water temperatures would be consistent throughout the water column during that time. These warmer intake temperatures may lead to similar warming in Sawmill Creek. Given the small change expected (1°C to 3°C), no significant long-term water quality effects are expected to occur. The primary effect of this temperature change would be on the fish populations in downstream Sawmill Creek, which is discussed under subsection *Fisheries* below.

In its draft Water Quality Monitoring Plan, the City of Sitka includes provisions to monitor water quality in the long term. Long-term monitoring locations would include Blue Lake, the fish valve unit, and Sawmill Creek. Data collected would be used to identify trends relative to different climatological and operational conditions. Also, data would be analyzed to determine the effects of the proposed elevated intake on drinking water quality and on aquatic resources in Blue Lake and Sawmill Creek.

The draft Water Quality Monitoring Plan included many details regarding long-term water quality monitoring in Blue Lake, however, some details were lacking, such as the monitoring locations in Sawmill Creek and the frequency of monitoring downstream. In its comments filed June 8, 2011, Alaska DF&G indicates the plan is under review. For these reasons, it is premature for the Commission to take action on this version of the plan.

The City of Sitka should develop a detailed long-term Water Quality Monitoring Plan, in consultation with the Forest Service, Alaska DF&G, FWS, and NMFS, that includes, but is not limited to, the following information: (1) identification of all monitoring sites in Blue Lake, at the powerhouses, and in Sawmill Creek; (2) the specific water quality parameters to be monitored at each site; and (3) the frequency of monitoring at each location as well as the duration of the monitoring during the term of the license. The plan should also identify specific measures to be taken in the event that monitoring indicates problems with water quality at the project. The City of Sitka should

file the plan for Commission approval, including documentation of consultation with the agencies and any comments received on the plan and responses to those comments.

Fishery Resources

Construction-Related Effects

The primary effect on fisheries from construction would be the potential for increased sediments that could settle out and reduce or eliminate fish habitat and temporarily decrease water quality in Blue Lake and Sawmill Creek. As discussed above, increased turbidity is a major concern during construction, as well as accidental spills of oil and other contaminants from construction equipment.

Our Analysis

Forest Service 4(e) Condition No. 22 specifies that the City of Sitka develop and file with the Commission an Erosion Control Plan that contains measures to prevent erosion and sedimentation at the project during construction. Development of agency agreed upon measures to reduce the potential for erosion and increased sedimentation should minimize this temporary adverse impact on fish resources. In addition, compliance with Condition No. 3 of the current license requires the City of Sitka to prepare a Hazardous Substances Plan, which would minimize adverse impacts associated with accidental spills during construction.

The development of a Construction Water Quality Monitoring Plan, as recommended by Commission staff, would identify sampling locations, sampling frequency, and measures to take in the event water quality problems are detected at the project. These measures would help minimize any realized temporary short-term adverse effects on fishery resources. Consultation with the Forest Service, Alaska DF&G, FWS, and NMFS in the plan's development and filing the plan with the Commission for approval would allow for proper review to ensure all concerns are addressed.

Long-Term Operation

In the long term, the primary concern in Blue Lake is the effect of raising the dam on the existing rainbow trout population and possible changes to spawning habitat in the major tributaries to Blue Lake.

In earlier comments on the 2008 final fisheries study report (Wolfe, 2009), the Forest Service expressed concern about physical changes that may result from raising the dam, such as increased water pressure due to increased depth over spawning areas. In comments on the application, Alaska DF&G and the Forest Service recommend that current operation of the project continue as required by the license (e.g., the existing requirements for instream flows and ramping rates).

Under existing operations, Blue Lake water levels increase at the beginning of the rainbow trout spawning period (primarily May to June). At the confluence of the main tributaries with Blue Lake (Blue Lake, Becky, Sheldon, and Brad creeks), sediments are deposited as water velocities slow, providing suitable spawning substrate for rainbow trout. As the lake levels continue to increase over these areas, new depositional areas are formed higher up in the tributaries, continuously forming new spawning habitat until the lake reaches its maximum water level.

The process of deposition would be expected to continue, only at higher elevations in the tributaries after the dam is raised. In some tributaries, the total spawning area would not be expected to change. In others, the higher stream gradient in upstream reaches (where steep canyons exist) would reduce available spawning habitat. In Blue Lake Creek, spawning habitat is expected to increase through inundation of the lower barrier, providing access to new habitat upstream (Wolfe, 2009).

The primary concern downstream in Sawmill Creek is the effect of warmer water releases on downstream salmon populations. Other concerns include the effect of warmer water supplied to the newly built Sawmill Cove Hatchery at Sawmill Creek Industrial Park, maintaining the current ramping rates and instream flows as required in the current license, and false attraction of anadromous fish to project discharge from the new powerhouse.

Studies conducted by City of Sitka related to its proposal predicts a one-day difference in emergence timing for chum salmon with a spawning date of September 4, and a three-day difference for pink salmon with a spawning date of September 8. Coho salmon incubation was one day earlier to five days later with a spawning date of October 30 (EES Consulting, 2010).

Our Analysis

Effects of the City of Sitka's proposal on the rainbow trout population in Blue Lake are difficult to quantify. Raising the dam would result in the loss of the existing spawning habitat, an unavoidable adverse long-term impact. Whether additional habitat created at the higher lake levels, as suggested by the City of Sitka, would offset this adverse effect is not known at this time. Monitoring both pre- and post-construction in Blue Lake would be necessary to document the creation of adequate spawning habitat higher in the tributaries.

In downstream Sawmill Creek, the warmer water temperatures may alter the timing of spawning and emergence of salmon. As in Blue Lake, the actual effect of these changes on the fish populations in Sawmill Creek is unknown. In its comments on the proposed plan, Alaska DF&G recommends the development of a Fish Monitoring Plan.

On October 24, 2011, the City of Sitka filed with the Commission a final Fisheries Monitoring Plan that outlined its approach to monitoring and provided specific monitoring measures in 2012. In general, the City of Sitka states the purpose of the Fish Monitoring Plan is to: (1) detect water quality changes from construction;⁸ (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 salmon spawning and emergence timing. In general, the City of Sitka proposes to conduct studies at the project from 2012–2017, create yearly study plans, prepare annual reports by March 1 of each year, and hold annual meetings on the results of the yearly studies.

In 2012, the City of Sitka proposes to visit the interface areas of the major tributaries of Blue Lake at least twice; monitor juvenile and fry recruitment in Blue Lake Creek in two trapping events (one occurring before the Lower Barrier Falls is breached by rising lake levels in July and the second occurring after the falls have been breached in the fall); conduct baseline monitoring of fish populations in Blue Lake and Sawmill Creek using methods of previous studies; and gather substrate particle size data in the major tributaries and pebble count data in Blue Lake Creek.

The City of Sitka did not provide documentation of consultation with any of the resource agencies on its final Fisheries Monitoring Plan and it is unclear whether the agencies concur with this approach and/or the proposed monitoring for 2012. Therefore, the City of Sitka should develop a detailed plan for Blue Lake in consultation with Alaska DF&G, Forest Service, FWS, and NMFS to monitor the effects of raising the dam, if any, on the rainbow trout population in Blue Lake and the salmon populations downstream in Sawmill Creek from its proposed action. The City of Sitka should file this plan with the Commission, including any mitigation measures and documentation of consultation with the resource agencies, as well as any comments received on the plan and responses to those comments.

Increased Water Pressure

Regarding the Forest Service's concern about increased water pressure over spawning areas in Blue Lake, the City of Sitka states that under current conditions, the average lake level on May 1 (when rainbow trout in the lake normally begin to spawn) is at about elevation 276 feet msl, which is 66 feet below the current spillway crest elevation of 342 feet msl. Trout eggs deposited at this elevation would be under as much as 66 feet of water at emergence two months later. The City of Sitka predicts that if its proposal is approved and the dam is raised, rainbow trout would initially spawn at water level elevation 370 feet msl during a normal operating year on May 1. This would be 55 feet below the proposed spillway crest elevation of 425 feet msl, or 11 feet less than

⁸ Water quality monitoring is addressed separately.

under the current operating conditions. Thus, the City of Sitka believes the effect of raising the dam on water depth and increasing the water pressure in the spawning areas of Blue Lake would be less than under existing conditions. Thus, the effect of raising the dam on water depth and increasing the water pressure in the spawning areas of Blue Lake would be less than or similar to existing conditions.

Entrainment

Alaska DF&G recommends that the existing design of the intake for fish exclusion be used under the new operating proposal. In its application, the City Sitka did not identify any changes to the intake, other than relocating and raising it to avoid some of the problems with the current intake location. The existing intake is at a maximum depth of 138 feet and is more than 4,000 feet from the nearest inlet tributary or documented spawning location. There has been no problem with fish entrainment using the existing intake. The proposed intake would be 26 feet higher but is located at roughly the same distance from the nearest tributary or known spawning area. Based on this configuration and the lack of both juvenile and adult fish observations and captures at this depth, increased entrainment would not be expected to occur and result in long-term effects on the reservoir fishery under the City of Sitka's proposal.

Tailrace Changes

The tailrace at the new powerhouse would be about 100 feet downstream from the existing tailrace. The new tailrace would have no pool (resting) area, and this should limit false attraction to the new powerhouse flows. Further, the City of Sitka states that spawning at the existing tailrace is limited to a small number of pink and chum salmon that tend to spawn in lower portions of Sawmill Creek. The proposed draft tubes would be of similar design to the existing draft tubes (i.e., vertical with the turbine centerline above the tailrace elevation, which would prevent fish from entering them). False attraction is not expected to be a problem. If, in the future, there is evidence to suggest false attraction at the new powerhouse results in a significant adverse effect on fishery resources, standard article 15 of the license allows the Commission to modify project structures and operation, after notice and opportunity for hearing.

3.3.2.3 Cumulative Effects

In Sawmill Creek, the 1°C to 3°C predicted increase in water temperature during the June to September period of the year would have a very slight effect on the timing of spawning and emergence of anadromous salmon species in this reach. Sawmill Cove Hatchery, which is in the early stages of operation, is supplied with water from Sawmill Creek. The slight increases in water temperature that may result from the City of Sitka's proposal to raise the dam could result in increased growth rates of hatchery fish, thus having a slight beneficial effect on hatchery operations.

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

Vegetation

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. Sitka spruce, western hemlock, and yellow cedar are found along Sawmill Creek with Sitka alder growing on adjacent slide areas and red alder growing along lower riparian areas. Hardwoods, mostly red alder and some cottonwood, occur along Sawmill Creek and on adjacent slide areas. In addition to the wooded terrain, understory vegetation comprises blueberry, red huckleberry, bunchberry, rusty menziesia, and devil's club. A variety of moss species form ground and exposed rock cover in moist areas.

Special-Status Plant Species

Based on past surveys and habitat requirements, sensitive or tracked plants likely to be found within the project area are: Lewis' monkey flower, American saw-wort, boreal bedstraw, Wright's filmy fern, and Alaska holly fern (table 4).

While conducting the plant surveys in 2008, the City of Sitka's consultants encountered one species on the Tongass National Forest sensitive plant list, *Papaver radicum* ssp. *alaskanum*, within the Blue Lake Project area. Researchers recorded this species on a gravel bar within the flood zone. The City of Sitka's consultants also found two species within the project area on the Alaska Natural Heritage tracking list:⁹ Alaska holly fern, which occurred in several forest stands, and Lewis' monkey flower, which occurred on two vegetated gravel bars on Blue Lake Creek. Boreal bedstraw occurs in brush fields and along streambanks, both of which are found within the project area. Although the preferred habitat of American saw-wort may not be abundant in the project area, this plant is found in the Sitka area on Harbor Mountain.

⁹ As of August 15, 2011, Alaska DF&G no longer maintains a species of special concern list. However, the Alaska Natural Heritage Program, supported by the University of Alaska Anchorage, collects, synthesizes, and validates information about Alaska's animal and plant species of concern and their habitats, as well as invasive species. The Alaska Natural Heritage Program provides this information to government agencies, businesses, land managers, scientists, and the public.

Table 4. Plant species of special concern potentially occurring in the project area, 2008. (Sources: NatureServe, 2011)

| Common Name | Latin Name | Rank ^a | | Habitat | Likelihood of Habitat Existing in Inundation Area |
|----------------------------------|--|-------------------|-------------------|---|---|
| | | G ^b | S ^c | | |
| Lewis' monkey flower | <i>Mimulus lewisii</i> | 5 | 2 | Avalanche tracks, disturbed floodplains and gravel bars; open streambanks | Potential habitat occurs in the inundation zone; effects on local population expected |
| American saw-wort | <i>Saussurea americana</i> | 5 | 3 | Subalpine meadows and brushfields | Potential habitat occurs in the inundation zone; however, no local populations identified |
| Boreal bedstraw | <i>Galium kamtschaticum</i> | 5 | 2 | Open forest; brushfields and along streambanks | Potential habitat occurs in the inundation zone; however, no local populations identified |
| Wright's filmy fern ^d | <i>Hymenophyllum wrightii</i> | 4? ^e | 1 | Prefers humid shaded boulders, cliffs and damp woods; occurs at base of trees and rock outcrops or in crevices of tree trunks | Potential habitat occurs in the inundation zone; effects on local population expected; however, no local populations identified |
| Alaska holly fern | <i>Polystichum setigerum</i> | 3 | 2, 3 ^f | Open, well drained forests | Potential habitat occurs in the inundation zone; effects on local population expected |
| Rooted poppy ^d | <i>Papaver radicum</i> ssp. <i>alaskanum</i> | 5 | 3, 4 ^f | Gravel bar | Potential habitat occurs in the inundation zone |

- a** Alaska Natural Heritage Program tracking list:

 - 1 – Critically imperiled
 - 2 – Imperiled
 - 3 – Vulnerable
 - 4 – Apparently secure
 - 5 – Demonstrably widespread, abundant, and secure.
- b** Global (G) rank.
- c** Subnational (S) rank.
- d** Forest Service sensitive species.
- e** The question mark indicates inexact numeric rank.
- f** A numeric range rank (e.g., S2, S3) indicates any range of uncertainty about the status of the species or ecosystem.

Wildlife

Wildlife in the project area is an important resource to the local human population for hunting, trapping, and wildlife viewing. Generally, the area supports the typical wildlife species common in this part of southeast Alaska. The 2008 wildlife survey reports, 71 wildlife species in the study area, which includes the Blue Lake Basin and areas in or to which potentially affected wildlife might migrate or otherwise travel.

Large mammals include mountain goat, Sitka black-tailed deer, and brown bear. Mountain goats commonly use the slopes above the Blue Lake and Blue Lake Creek Valley. During 2008 wildlife survey period, goats followed typical patterns for goats in southeast Alaska, wintering in lower elevation forested areas with escape terrain and summering in higher, alpine areas. Pellet counts and other methods during the 2008 wildlife surveys suggest healthy populations of deer in the Blue Lake Watershed, relative to available habitat. The City of Sitka's consultants encountered five brown bears in the area of the wildlife surveys, potentially indicating low populations of bears in the watershed.

Four observed species of smaller mammals are the northwestern deer mouse, cinereus shrew, root vole, and little brown myotis. Several furbearing species identified during the surveys are the red squirrel, American mink, North American river otter, and American marten. High-volume, old-growth stands below 1,500 feet in elevation are defined as "high-value marten habitat" (Forest Service, 2008).

While conducting wildlife surveys in 2008, the City of Sitka's consultants observed bald eagle, red-tailed hawk, and at least 32 songbirds. Eighteen of the 32 songbirds observed in the project area are common or abundant. Nineteen of the 32 songbirds observed are known or thought to breed in the project area, including the common raven, hermit thrush, tree swallow, winter wren, and dark-eyed junco. The east end of Blue Lake has a littoral zone of varying size and importance to waterfowl and shorebirds, depending on water level. These species use the rest of the lake and shoreline as well but to a much lesser degree, and waterfowl often use upland muskegs. While conducting the wildlife surveys in 2008, the City of Sitka's consultants encountered a total of 19 waterfowl and shorebird species. Based on observation of nests and/or young, six bird species are known to nest in the study area: belted kingfisher, Canada goose, common merganser, harlequin duck, mallard, and spotted sandpiper. The harlequin duck is the only species of waterfowl in the Northern Hemisphere to breed in turbulent, mountainous streams and also one of the few waterfowl species to have a high site fidelity to the breeding area.

Special Status Animal Species

Of the 71 species noted during 2008 wildlife surveys, several are listed below the level of 4 (i.e., apparently secure) (table 5).

One furbearer sub-species, the Baranof Island ermine, is listed as level 3, or vulnerable. The ermine population fluctuates greatly in response to prey populations (primarily voles), and the local population is typically low with an occasional year of moderate abundance. One small mammal sub-species, the Sitka root vole, is listed as level 2, or imperiled. Populations of this species, above the subspecies level, are listed as level 4, or apparently secure. Sitka root vole populations on Baranof Island are very cyclical and are typically restricted to muskeg and alpine tundra habitats at higher elevations.

Although the western screech owl has a subnational rank of level 2, or imperiled, it is common in the Sitka area and within the project area. The northern saw-whet and northern pygmy owls both have subnational rankings of level 3, or vulnerable. Both of these species are rarely observed in the project area.

Marbled murrelets are a federally listed threatened species in some Pacific Northwest states; however, their populations are healthy in southeast Alaska. In this area, this is the only species of seabird that nests inland in forested areas, preferring large old-growth trees with mossy branches.

3.3.3.2 Environmental Effects

Vegetation

Construction-Related Effects

Proposed construction activities for this project include burying power lines, realigning Blue Lake Road, constructing a new intake structure and new powerhouse, and raising the dam crest elevation. These activities would disturb vegetation through vegetation clearing, soil compaction, and grading. During construction, machinery and workers could also facilitate the introduction of noxious weeds to the project area above the dam. Equipment brought in from other areas may be contaminated with seeds and other parts of non-native species. Once established, weed species could displace native species, be unpalatable to native wildlife, and decrease plant species diversity in the project area.

The City of Sitka identifies several areas where vegetation removal would be required for construction activities. These areas include the dam construction site (1.5 acres) and the surge chamber work area (0.03 acre). Additional surface disturbance would occur in association with the burial of the transmission line and realignment of Blue Lake Road. To minimize these effects, the City of Sitka proposes to revegetate about 0.5 acre in the southwest corner of the dam site construction staging area. Revegetation activities would also occur in the surge chamber work area. The City of Sitka proposes to use seed and fertilizer to establish grass on exposed soils to prevent erosion as needed. The City of Sitka expects that the narrow corridor associated with burial of the distribution line would revegetate naturally.

Table 5. Animal species of special concern potentially occurring in the project area, 2008. (Sources: Alaska DF&G, 2011; Linzey et al., 2008; The Cornell Lab of Ornithology, 2011)

| Common Name | Latin Name | Rank ^a | | Preferred Habitat | Likelihood of Habitat Existing in Inundation Area |
|-----------------------|-------------------------------|-------------------|----------------|--|---|
| | | G ^b | S ^c | | |
| Baranof Island ermine | <i>Mustela erminea initis</i> | 3 | 3 | Occupies a wide range of habitats tied to small mammal prey abundance | Potential habitat occurs in the inundation zone |
| Sitka root vole | <i>Microtus oeconomus</i> | 2 | 2 | Prefers muskeg and alpine tundra habitats at higher elevations | Potential habitat occurs in the inundation zone; observed during field studies |
| Osprey | <i>Pandion haliaetus</i> | 5 | 2B | Regularly nests along lakes, rivers, and coastlines; seen during summer months soaring over water searching for fish | Potential habitat does not occur in the inundation zone; considered an accidental or occasional visitor in the Sitka area |
| Northern saw-whet owl | <i>Aegolius acadicus</i> | 5 | 3 | Breeds in all types of forest within its range; roosts in winter in small, dense conifer trees | Potential habitat occurs in the inundation zone |
| Northern pygmy owl | <i>Glaucidium gnoma</i> | 5 | 3 | Occupies coastal, temperate rain forest | Potential habitat occurs in the inundation zone; observed during field studies |
| Western screech owl | <i>Megascops kennicottii</i> | 5 | 2 | Lives in a variety of habitats, but primarily riparian habitats and deciduous trees | Potential habitat occurs in the inundation zone; observed during field studies |

| Common Name | Latin Name | Rank ^a | | Preferred Habitat | Likelihood of Habitat Existing in Inundation Area |
|-----------------------------|---------------------------------|-------------------|----------------|--|--|
| | | G ^b | S ^c | | |
| Cedar waxwing | <i>Bombycilla cedrorum</i> | 5 | 3 | Observed in deciduous, coniferous, and mixed woodlands, particularly areas along streams | Migratory species and considered very rare in the project area; however, potential habitat occurs in the inundation zone |
| Marbled murrelet | <i>Brachyramphus marmoratus</i> | 3, 4 | 2, 3 | Occupies large old-growth trees with mossy branches in both marine and forest habitats | Potential habitat occurs in the inundation zone; observed during field studies |
| Ring-necked duck | <i>Aythya collaris</i> | 5 | 2N, 3B | Observed in marshes, wooded ponds, and swamps | Potential habitat occurs in the inundation zone; observed during field studies |
| Trumpeter swan ^d | <i>Cygnus buccinator</i> | 4 | 3N, 4B | Breeds in freshwater marshes and along ponds and lakes; winters in lakes, streams, springs, rivers, and reservoirs | Potential habitat occurs in the inundation zone; observed during field studies |

^a Alaska Natural Heritage Program Tracking List:
1 – Critically imperiled
2 – Imperiled
3 – Vulnerable
4 – Apparently secure
5 – Demonstrably widespread, abundant, and secure
B – Status refers to breeding population
N – Status refers to nonbreeding population.

^b 2008 Global (G) rank.
^c 2008 Subnational (S) rank.
^d Forest Service sensitive species.

In its 4(e) Condition No. 19, the Forest Service specifies the development of a Project Mitigation and Monitoring Plan within 60 days after amendment issuance. The plan would include detailed descriptions of the mitigation and monitoring measures; implementation schedules (including public notification strategy); and detailed steps for planning, designing, and constructing the approved measures. Additionally, the plan would provide a mechanism for the City of Sitka and the Forest Service to meet periodically to review/modify the implementation schedule of these measures. Once approved by the Forest Service, the City of Sitka would file the final plan, including evidence of consolation, with the Commission and would implement those measures approved by the Commission.

Forest Service 4(e) Condition No. 20 specifies the designation of a qualified environmental compliance monitor. This person would oversee the project during construction activities (e.g., vegetation- or land-disturbing activities, or spoil producing activities). The compliance monitor would serve as a liaison between the Forest Service and the City of Sitka. The compliance monitor would be a third-party contractor independent of the City of Sitka or agency, subject to approval by both the City of Sitka and the Forest Service. The compliance monitor would have the authority to stop work or issue change orders in the field if conditions warrant it. Once major construction activities are completed, the compliance monitor would no longer be needed.

Forest Service 4(e) Condition No. 21 specifies the development of a Noxious Weed Management Plan. Within one year of amendment issuance or prior to any ground-disturbing activity, the City of Sitka would file with the Commission a Noxious Weed Management Plan that is approved by the Forest Service. At a minimum, the plan would: (1) identify methods for prevention and control of noxious weeds, (2) develop a monitoring program to evaluate the effectiveness of noxious weed control measures, and (3) develop procedures for identifying additional measures that the City of Sitka would implement if monitoring reveals that noxious weed control is not successful or does not meet intended objectives.

Our Analysis

Anticipated construction-related effects on vegetation resources in the project area include disturbance to about 1.5 acres at the dam construction site, and 0.4 acre associated with the burial of the distribution line and realignment of Blue Lake Road,¹⁰ and 0.03 acre associated with the surge chamber work area. These activities would cause destruction and fragmentation of habitat, direct mortality to vegetation, soil compaction, and potential introduction and spread of noxious weeds. The City of

¹⁰ Staff's estimates for disturbance acreage along Blue Lake Road and the distribution line are based on review of figure 13 in the City of Sitka (2010).

Sitka’s proposal to revegetate a 0.5-acre section of the construction staging area would help to reduce effects on vegetation. However, it is not clear why the remainder of the staging area would be left unvegetated. Leaving disturbed areas unvegetated or relying on natural revegetation processes to colonize these areas greatly increases the risk of introduction or spread of noxious weeds. Development and implementation of a Revegetation Plan that includes: (1) identification of areas disturbed during construction; (2) a list of native species to be used for planting and/or reseeded; (3) monitoring for successful establishment of native species; (4) criteria for success; and (5) measures for additional plantings if success criteria are not achieved would reduce the long-term effects of construction on vegetation resources.

The City of Sitka’s proposed measures do not fully address effects of noxious weeds resulting from construction-related activities. The development of a Project Mitigation and Monitoring Plan and Noxious Weed Management Plan, as the Forest Service specifies in its Condition Nos. 19 and 21, respectively, would aid in protecting vegetation resources and reduce effects associated with construction activities. Additionally, Forest Service 4(e) Condition No. 20 that specifies the need for a designated environmental compliance monitor would ensure adherence to license conditions, mitigation measures, and other environmental aspects of project construction.

Inundation

The City of Sitka’s proposal for raising the dam would inundate about 362 acres of land around Blue Lake with long-term effects on vegetation in the affected areas. Inundation is projected to drown vegetation below the 425-foot-msl elevation contour, resulting in the loss of forested habitat. This habitat consists mostly of spruce-hemlock forests and steep non-forested areas, such as slide zones and rock. Using Geographic Information System (GIS) vegetation layers produced by the Forest Service and results of the wildlife surveys in 2008, the City of Sitka compiled habitat types for the study area and entire watershed, and quantified acreages within the inundation zone (table 6).

Table 6. Acres by habitat type for entire watershed, inundation area, and percent reduction. (Source: City of Sitka, 2010)

| Habitat Types | Watershed | | Inundation | | % Reduction |
|------------------------------|------------------|----------|-------------------|----------|--------------------|
| | Acres | % | Acres | % | |
| High-volume spruce-hemlock | 505.1 | 2.2 | 102.7 | 32.3 | 20.3 |
| Medium-volume spruce-hemlock | 1,201.3 | 5.3 | 109.0 | 34.3 | 9.1 |
| Low-volume spruce-hemlock | 277.3 | 1.2 | 55.9 | 15.5 | 20.2 |

| Habitat Types | Watershed | | Inundation | | % Reduction |
|---------------------------------|------------------|----------|-------------------|-----------|--------------------|
| | Acres | % | Acres | % | |
| Muskeg | 201.9 | 0.9 | 13.5 | 4.2 | 6.7 |
| Alder | 179.5 | 0.8 | 8.8 | 2.8 | 4.9 |
| Grassland | 5.9 | 0.0 | 5.9 | 1.9 | 100.0 |
| Recurrent slide zone | 4,149.9 | 18.3 | 28.2 | 8.9 | 0.7 |
| Alpine, rock, and ice/snowfield | 16,101.2 | 71.2 | 36.0 | 11.3 | 0.2 |
| Road or power line corridor | 6.2 | 0.0 | 2.1 | 0.6 | 33.3 |
| Total | 22,628.3 | | 362 | -- | -- |

The City of Sitka acknowledges that the rising lake level would create a new shoreline and that existing vegetation may not persist because of seasonal change in water levels, root zone inundation, debris accumulation, and possible ice damage. To limit effects of potential erosion, the City of Sitka proposes to leave vegetation and timber in place during flooding. To minimize the effects of debris accumulation, the City of Sitka would designate a floating debris burn area between the spill and maximum draw down lake level. A floating boom would also be deployed to collect floating debris, which would accumulate during lake expansion.

Understory vegetation could be affected by an increase in available light (side lighting). The City of Sitka predicts that if existing vegetation does not persist along the new shoreline, colonization of the shoreline would occur from wind borne seeds (e.g., Sitka spruce, western hemlock, and Sitka alder) or bird born fruit/seed (e.g., elderberry, salmonberry, and Devil's club) from within the Blue Lake Watershed. Much of the existing Blue Lake shore vegetation is a narrow band of Sitka alder; the City of Sitka expects this band of vegetation to eventually establish itself on the new shoreline.

The City of Sitka predicts two types of existing vegetation may be extirpated at least in the short term from the Blue Lake area of the watershed. The meadow, or mudflat delta, on the eastern shore of Blue Lake would be inundated, and cottonwood would be at least temporarily extirpated upstream of the dam area. However, cottonwoods were only found in a few sites within the projected inundation zone.

The City of Sitka expects the most dramatic change in vegetation would occur in the narrow valley bottom along Blue Lake Creek. Areas of vegetated gravel bars, deciduous riparian forest and productive coniferous forest would be inundated. Most vegetation types found in the projected inundation zone, except vegetated gravel bars,

are well represented in other parts of the watershed. Gravel bars may re-establish over time because of continued sedimentation; however, the topography of the valley is narrower above the inundation zone, which may continue to limit formation of gravel bars and, therefore, the vegetation associated with the gravel bars.

Our Analysis

Inundation would result in either temporary or long-term extirpation of certain plant species, as well as habitat disturbance and reduction in the project area. Also, the potential exists for noxious weeds to spread quickly following inundation, as revegetation begins.

Initially, inundation would result in mortality of terrestrial vegetation as root systems are chronically submerged. Non-woody vegetation would degrade and decay over the short-term, delivering litter and nutrients to the new lake bed areas. Large woody vegetation (trees and large shrubs) would degrade and decay over the long-term, creating complex edge habitat of standing and fallen dead timber. Ultimately, inundation would result in long-term changes in the vegetation structure with aquatic species replacing terrestrial. Not all of the changes would result in long-term adverse effects but rather a change in the type of vegetative cover and habitat. Accumulation of large woody debris, if left unmanaged, would adversely affect vegetation within the inundation zone. For example, wave action could cause large woody debris to wash up against vegetation along the shoreline, potentially injuring or knocking down trees and scouring ground cover. These effects would be minor during normal water years but more severe during wet water years. The City of Sitka's proposed measures to minimize the effects of debris accumulation would reduce these adverse effects on vegetation in the inundation zone. Removal of debris would also prevent damage to project related structures and reduce risk to recreational users.

The City of Sitka's proposed measures do not fully address effects of noxious weeds resulting from construction-related activities. The development of a Project Mitigation and Monitoring Plan (Forest Service 4(e) Condition No. 19) and Noxious Weed Management Plan (Forest Service 4(e) Condition No. 21) would aid in protecting terrestrial resources from long-term effects associated with inundation. The development of a Noxious Weed Management Plan would aid in protecting terrestrial resources by reducing the likelihood that terrestrial invasive species would be introduced as a result of project activities. Environmental effects on the area below the dam would be negligible because of the relatively minimal expansion of the existing developed footprint and the relative lack of undisturbed vegetation.

Increased Access

An additional effect of the proposed project on vegetation above the inundation zone could be associated with increased recreation access to the Blue Lake Watershed.

The number of recreationists accessing the backcountry is currently limited by difficulty of access to the boat launching area near the terminus of the Blue Lake access road. With higher lake levels in late summer and fall, it would be possible for all boats, particularly those with larger motors, to reach the launch area, even using two-wheel drive tow vehicles.

To minimize these effects, the City of Sitka proposes to restrict access to the Blue Lake reservoir in accordance with the existing Reservoir Management Plan by implementing measures including, but not limited to, limiting launch facilities and installing a gate at the reservoir access road, restricting vehicle access to the reservoir as determined during stakeholder consultation.

Our Analysis

Anticipated effects of increased access include disturbance, increased hunting pressure, and spread of noxious weeds. Actions proposed by the City of Sitka and Forest Service Condition Nos. 19 and 21 would minimize these long-term adverse effects on terrestrial resources. No additional mitigation measures are necessary to protect terrestrial resources. This topic is discussed further in sections 3.3.5, *Recreation and Aesthetics*.

Wildlife

Construction-Related Effects

Potential threats to wildlife resulting from proposed construction activities include increasing habitat disturbance and fragmentation and direct mortality of certain species. Human activity related to construction, including the use of machinery and blasting, could result in short-term noise-related disturbances to wildlife species within the project area. To minimize these effects, the City of Sitka proposes to prepare a Wildlife Disturbance Avoidance Plan, which would seek to determine how wildlife disturbance might best be minimized, primarily through accommodations in seasonal and daily work schedules. The City of Sitka also proposes to implement its Bear Safety Plan (currently under review by Alaska DF&G and other agencies) that would seek to minimize potential for bear and human interactions, increasing safety for both construction workers and bears. This plan includes measures to train workers about appropriate actions to take when encountering bears and measures to reduce attracting bears to the work area.

Forest Service Condition No. 19 specifies the development of a Project Mitigation and Monitoring Plan, which would include detailed descriptions of the mitigation and monitoring measures, implementation schedules (including public notification strategy), and detailed steps for planning, design, and construction of the approved measures.

Alaska DF&G recommends and Forest Service Condition No. 20 specifies the designation of a qualified environmental compliance monitor, who would oversee the project during construction activities (e.g., vegetation- or land disturbing activities or spoil producing activities). The compliance monitor would have the authority to stop work or issue change orders in the field if conditions warrant it.

Forest Service Condition No. 21 specifies a Noxious Weed Management Plan to prevent colonization and spread of invasive species.

Alaska DF&G also recommends the City of Sitka grant free and unrestricted access through, to, and across project lands and project works to Alaska DF&G employees, after appropriate advance notification has been made. Alaska DF&G notes that such access is necessary for the management of wildlife resources.

Our Analysis

Anticipated construction-related effects on wildlife resources in the project area include disturbance, reduction of habitat, direct mortality, and spread of noxious weeds. The City of Sitka's proposed measure to prepare a Wildlife Disturbance Avoidance Plan would reduce long-term adverse effects on wildlife resources by determining actions necessary to minimize wildlife disturbance through timing of activities to avoid breeding seasons. Implementation of the Bear Safety Plan would reduce potential for human and bear interactions and help ensure such encounters have safe outcomes for both humans and bears.

Alaska DF&G's mission is to protect, maintain, and improve the fish, game, and aquatic plant resources of the state and manage their use and development in the best interest of the economy and the well-being of the people of the state, consistent with the sustained yield principle. To fulfill this goal, agency employees need access to state lands to conduct surveys and implement management plans. In some areas, access to these lands may require that Alaska DF&G employees cross project lands. Allowing such access, so long as it does not disrupt project operations or generate personal safety concerns related to project operations, would assist the agency in achieving its goals. Therefore, such a measure would increase the protection of wildlife resources.

However, the City of Sitka's proposal does not fully address effects of noxious weeds from construction-related activities on wildlife habitat. The development of a Project Mitigation and Monitoring Plan (Forest Service 4(e) Condition No. 19) and Noxious Weed Management Plan (Forest Service 4(e) Condition No. 21) would aid in protecting wildlife resources from known and future project effects. Additionally, Forest Service's specification for a designated environmental compliance monitor (Forest Service 4(e) Condition No. 20) would ensure adherence to license conditions, mitigation measures, and other environmental aspects of project construction. The compliance monitor's authority to stop work or issue change orders would help ensure

protection of wildlife resources during construction-related activities. Finally, allowing Alaska DF&G to access the project site would allow the agency to implement any studies and management plans it deems necessary to manage fish and wildlife resources in the watershed and would further increase the protection of fish and wildlife resources in the project area.

Operation-Related Effects

Inundation—Raising the lake level could result in either temporary or long-term loss of nesting and foraging habitat for many wildlife species. When habitat is lost, animals are forced to move to higher ground or other areas where habitat conditions may be less suitable, predators are more abundant, or the territory is already occupied. Inundation of ground nests and burrows could result in direct mortality if individuals are not able to move to higher ground.

The City of Sitka expects the greatest loss of wildlife habitat to be the 20.3 percent reduction in high-volume spruce-hemlock forest and the 9.1 percent reduction of medium-volume spruce-hemlock forest. Both of these areas consist of highly productive old-growth stands. However, in both of these habitats, the value to wildlife is reduced due to the lack of south facing aspect, absence of salmon streams, and great distance to the ocean. Nevertheless, inundation of these areas would reduce the carrying capacity for deer, marten, owls, forest birds, and small mammals within the watershed. Other wildlife, such as brown bear and waterfowl, would be affected too but to a lesser degree. Waterfowl that feed, rest, and possibly nest along the estuary shoreline would be displaced during construction and the period of inundation. However, similar habitat would likely become available to waterfowl again after several years of new lake levels. One exception to the effect on waterfowl would be the harlequin duck. During wildlife surveys in 2006 and 2008, researchers found that one pair of harlequin ducks typically used Blue Lake Creek Valley to raise young, and this habitat would be permanently lost.

Although the effect of this project on goats is unclear, it presents a possible significant long-term effect from potential habitat loss. There is also concern that flooding the upper valley would restrict dispersal of goats from one ridge complex to another and limit genetic diversity.

In its draft Timber Removal and Management Plan, the City of Sitka proposes to salvage timber from inundation areas prior to flooding. However, following comments from stakeholders, including the Sitka Water Department, the City of Sitka decided to leave timber in place and prepared its draft Reservoir Inundation Plan. Under this plan, the City of Sitka would: (1) manage decomposition materials by installing booms to restrict movement of floating materials and collecting floating material and transporting it to a specified burn area where it would be burned and the ash buried; and (2) monitor water quality by conducting an extensive water quality monitoring program.

As discussed above, Forest Service 4(e) Condition Nos. 19, 20, and 21 specify the preparation of a Project Mitigation and Monitoring Plan, designation of a qualified environmental compliance monitor, and preparation of a Noxious Weed Management Plan to reduce effects on wildlife, respectively.

Our Analysis

Inundation would result in habitat disturbance and fragmentation for several wildlife species in the project area. Implementation of the draft Reservoir Inundation Plan would reduce these long-term effects on wildlife by not removing timber, which would provide more winter cover for wildlife, limit erosion, and avoid increased human presence and use of machinery. Implementation of a Project Mitigation and Monitoring Plan (Forest Service 4(e) Condition No. 19) and Noxious Weed Management Plan (Forest Service 4(e) Condition No. 21) would help mitigate adverse long-term effects on wildlife resources. A Project Mitigation and Monitoring Plan would aid in protecting wildlife resources by identifying measures to limit habitat modification and species disturbance from inundation. The development of a Noxious Weed Management Plan would aid in protecting wildlife resources by preventing changes in forage opportunities or habitat structure as a result of noxious weeds. Environmental impacts on the area downstream of the dam are thought to be negligible because of the relatively minimal expansion of existing industrial footprint and the relative lack of undisturbed vegetation and habitat.

Increased Access—An additional long-term effect of the expansion project on wildlife above the inundation zone is expected to be associated with increased recreation access to the Blue Lake Watershed. The number of recreationists accessing the backcountry is currently limited by the difficulty of access to the boat launching area near the terminus of Blue Lake Road. With higher lake levels in late summer and fall, it would be possible for all boaters, particularly those owning boats with larger motors, to reach the launch area, even using two-wheel drive hauling vehicles.

Increased boat access on Blue Lake would provide easier access to goat hunters traveling to the Blue Lake Creek Basin. Increased hunting pressure on goats accessible from the Blue Lake Creek Valley might reduce goat populations or discourage them from using the valley in favor of nearby areas with less hunting pressure. Increased recreational use and equipment could facilitate introduction of invasive plant species.

The City of Sitka proposes to restrict access to Blue Lake in accordance with the existing Reservoir Access Control Plan by implementing measures including, but not limited to, limiting launch facilities and installing a gate at the reservoir access road to restrict vehicle access to the reservoir as determined during stakeholder consultation.

Our Analysis

Anticipated long-term effects of increased access include disturbance, increased hunting pressure, and spread of noxious weeds. Actions proposed by the City of Sitka and specified by the Forest Service in its 4(e) Condition Nos. 19 and 21 would minimize the long-term adverse effects on terrestrial resources. No additional mitigation measures would be necessary to protect terrestrial resources. This topic is discussed further in section 3.3.5, *Recreation and Aesthetics*.

Special-Status Species

Plants

Based on project surveys, Lewis' monkey flower, American saw-wort, boreal bedstraw, Wright's filmy fern, Alaska holly fern, and rooted poppy have the potential to occur within the project area. If inundation were to remove habitat for these species, there could be potential for increasing vulnerability of local populations.

During vegetation surveys in 2008, the City of Sitka identified potential habitat for these species in the area. The City of Sitka found Lewis' monkey within the project area in two locations on vegetated gravel bars on Blue Lake creek. The City of Sitka also found rooted poppy on one gravel bar within the flood zone.

The City of Sitka found that populations of Lewis' monkey flower and Alaska holly fern are most at risk due to inundation of their habitat. The City of Sitka indicates that both populations include few individuals and can easily be removed for replanting in suitable locations within the forest or included in botanical gardens in the community of Sitka.

As discussed above, Forest Service 4(e) Condition Nos. 19, 20, and 21 specify the preparation of a Project Mitigation and Monitoring Plan, designation of a qualified environmental compliance monitor, and preparation of a Noxious Weed Management Plan to reduce effects on wildlife, respectively.

Our Analysis

Inundation would disturb isolated populations of Lewis' monkey flower, Alaska holly fern, and rooted poppy; however, these long-term effects are expected to be limited to local individuals or small populations and would not further jeopardize the status of regional populations. Although potential habitat exists in the project area for American saw-wort, boreal bedstraw, and Wright's filmy fern, local populations were not identified during recent surveys within the inundation zone. Therefore, the long-term effects of inundation on these species are expected to be minor.

The potential exists for noxious weed to spread quickly following inundation, as revegetation begins. The City of Sitka's proposed measures do not fully address effects of noxious weeds resulting from construction-related activities. The development of a Project Mitigation and Monitoring Plan (Forest Service 4(e) Condition No. 19) and Noxious Weed Management Plan (Forest Service 4(e) Condition No. 21) would aid in protecting sensitive vegetation from long-term effects associated with inundation. The development of a Noxious Weed Management Plan would aid in protecting terrestrial resources by reducing the likelihood that terrestrial invasive species would be introduced as a result of project activities.

Mammals

Inundation and construction-related activities could result in disturbance and destruction of habitat for the Baranof Island ermine and Sitka root vole. The City of Sitka expects effects on Sitka root vole to be minimal because only 4.2 percent (13.5 acres) of the inundation area is in their preferred habitat (muskeg) and additional suitable habitat is present in the area.

To minimize these effects, the City of Sitka proposes to prepare a Wildlife Disturbance Avoidance Plan, which would seek to determine how wildlife disturbance might best be minimized, primarily through accommodations in seasonal and daily work schedules.

Our Analysis

Only 4.2 percent (13.5 acres) of the inundation area is preferred habitat for the Sitka root vole. Although inundation and construction could result in disturbance and destruction of habitat for the Baranof Island ermine, wildlife surveys indicate that the local population for this species is typically low with an occasional year of moderate abundance. Therefore, it is not anticipated that the project would result in a long-term adverse effect on population viability.

The City of Sitka's proposed measure to prepare a Wildlife Disturbance Avoidance Plan would reduce any adverse effects on sensitive mammals by determining actions necessary to minimize disturbance.

Land Birds

The City of Sitka identifies osprey as an "accidental" or migratory bird in southeast Alaska. This species was only observed a few times in the project area in 2009. Also, because osprey feed exclusively on fish, there is low concern for this species due to this project. The cedar waxwing is another migratory bird, which the City of Sitka considers to be very rare within the project area. Although the City of

Sitka expects this project to result in some habitat loss for this species, it anticipates effects would be minimal.

The City of Sitka found the western screech owl to be common in the Sitka area and within the project area, while the northern saw-whet and northern pygmy owls are rarely observed in the project area. However, the City of Sitka expects the loss of approximately 210 acres of medium- to high-volume forest could reduce the carrying capacity of these three owl species or displace them to adjacent forested areas.

To minimize these effects, the City of Sitka proposes to prepare a Wildlife Disturbance Avoidance Plan to minimize wildlife disturbance, primarily through accommodations in seasonal and daily work schedules.

Our Analysis

Because osprey feed exclusively on fish, there is low concern for this species due to this project. Additionally, impacts of the project on cedar waxwing are expected to be minor due to the rarity of this species in the project area.

The loss of 210 acres of medium- to high-volume forest could affect the western screech owl, northern saw-whet, and northern pygmy by reducing the carrying capacity of these species or displacing them to adjacent forested areas. The City of Sitka's proposed Wildlife Disturbance Avoidance Plan would reduce any long-term adverse effects on sensitive land birds by determining actions necessary to minimize disturbance.

The development of a Project Mitigation and Monitoring Plan (Forest Service 4(e) Condition No. 19) would aid in protecting sensitive wildlife from known and future project effects. Additionally, the Forest Service specification for a designated environmental compliance monitor (Forest Service 4(e) Condition No. 20) would ensure adherence to license conditions, mitigation measures, and other environmental aspects of project construction. The compliance monitor's authority to stop work or issue change orders would help ensure protection of wildlife resources during construction-related activities.

Water Birds

The City of Sitka expects that waterfowl that feed, rest, and possibly nest along the estuary shoreline would be displaced during construction and the inundation years. However, the City of Sitka expects that similar habitat would likely become available to waterfowl again after several years of new lake levels.

The City of Sitka found no evidence of the ring-necked duck breeding in the project area, but it appears to use the lake as a resting area during spring and fall migrations. The City of Sitka found that trumpeter swans use Blue Lake for resting and

feeding along the eastern shoreline, but this species does not breed in the area. The marbled murrelet is considered an uncommon resident in the project area. The City of Sitka predicts that the amount of shoreline for waterfowl activity should not be changed substantially by this project.

To minimize any impacts that would result from construction, inundation, or increased access, the City of Sitka proposes to prepare a Wildlife Disturbance Avoidance Plan, which would seek to determine how wildlife disturbance might best be minimized, primarily through accommodations in seasonal and daily work schedules.

Our Analysis

Although some disturbance may result for waterfowl within project area, project activities would not substantially alter the amount of available habitat for waterfowl. Therefore, effects on sensitive waterfowl are expected to be minor and short term. The City of Sitka's proposed measure to prepare a Wildlife Disturbance Avoidance Plan would reduce any adverse effects on sensitive water birds by determining actions necessary to further minimize disturbance.

The development of a Project Mitigation and Monitoring Plan (Forest Service 4(e) Condition No. 19) would aid in protecting sensitive wildlife from known and future project impacts. Additionally, Forest Service's specification for a designated environmental compliance monitor (Forest Service 4(e) Condition No. 20) would ensure adherence to license conditions, mitigation measures, and other environmental aspects of project construction. The compliance monitor's authority to stop work or issue change orders would help ensure protection of wildlife resources during construction-related activities.

3.3.3.3 Cumulative Effects

Scoping Document 2 identifies potential cumulative effects on wildlife resources associated with the development of the Sawmill Cove Hatchery in the Saw Mill Creek Industrial Park. The Saw Mill Creek Industrial Park was the site of the former Alaska Pulp Mill. The site has been heavily disturbed in the past and construction of the fish hatchery had minimal effects on wildlife. No effects on wildlife associated with the future operation of the hatchery are expected. Therefore, cumulative effects of the project and the Sawmill Cove Hatchery would be minimal.

3.3.4 Threatened and Endangered Species

Only two federally listed threatened or endangered aquatic species have been identified as being in the project vicinity—the Steller sea lion and the humpback whale. Both of these species reside within Sitka Sound and Silver Bay but are not in the

immediate project area. By letter dated April 4, 2011, NMFS states that there are no listed species under its jurisdiction found in the vicinity of the project.

One endangered wildlife species—the short-tailed albatross—has been identified near the project area, but similar to the aquatic species, the short-tailed albatross is a coastal species and is not found in the immediate project area. Because no federally listed threatened or endangered species or critical habitat would be affected by the City of Sitka’s proposed project operation, no further consultation with FWS is required, unless the project is modified or new information indicates that listed species may be affected.

3.3.5 Recreation and Aesthetics

3.3.5.1 Affected Environment

The project area in the vicinity of Blue Lake has a rural character and is accessible by Blue Lake Road. This road is very steep with tight turns, and requires a high-clearance four-wheel drive vehicle to access the water’s edge even under optimal conditions. Consequently, most of project area near Blue Lake provides a setting for dispersed recreation activities, such as hiking, hunting, fishing and camping. Blue Lake provides the most easily accessible fresh water sport fishery from the nearby community of Sitka. The reservoir is located on National Forest System lands, and the shoreline is undeveloped. There is no road access to the shoreline other than Blue Lake Road, which terminates at the dam. Blue Lake Road is typically closed to non-essential vehicle traffic from approximately November through April due to winter weather. However, the road is open to foot traffic and provides access to National Forest System lands for hikers, hunters, and skiers. The City of Sitka maintains a parking lot located on its land outside of the project boundary at the intersection of the Blue Lake Road and Sawmill Creek Road where visitors can park when the road is closed.

Where Blue Lake Road terminates near the dam, visitors launch boats to access the reservoir. City of Sitka discourages recreation use in the Blue Lake Watershed because it is a domestic water supply source. Therefore, the area used for launching boats is unsurfaced and intentionally unimproved, making access challenging, particularly at lower water levels. The City of Sitka further discourages recreation use by only allowing camping in the Blue Lake drainage by permit. Blue Lake Overlook, a project facility, is also located at the end of Blue Lake Road.

Under current project operations, maximum lake levels typically occur in fall and winter. From late spring to summer, Blue Lake is typically drawn down approximately 70 to 80 feet from maximum pool. It is primarily used by local residents for rainbow trout fishing by boat. Hunters access the area surrounding the reservoir by boat to hunt for mountain goats in the late summer and fall.

One developed Forest Service campground, Sawmill Creek Campground, is located within the project boundary. It has 11 campground sites with restrooms and a parking area (figure 2). Estimated visitation at the campground is 1,000 visitors per year. The Forest Service maintains the two-mile Beaver Lake hiking trail, which begins near the Sawmill Creek Campground. Some visitors use the parking area while picnicking, hiking, or fishing near the campground. Visitors using Blue Lake Road also enjoy the scenic drive to the campground from the nearby community of Sitka.

Aesthetic resources can be described for three general areas—the reservoir, bypass reach, and lower reaches of Sawmill Creek near the powerhouse. At the reservoir, the expansive viewshed includes the reservoir, rugged mountains, steep forested slopes, and waterfalls entering the reservoir. These features are visible from Blue Lake Overlook located near the dam. Visitors accessing the eastern end of the reservoir by boat can view Blue Lake Creek Valley, a lower relief forested area surrounding Blue Lake Creek, the primary source of inflow. Blue Lake is drawn down approximately 70 to 80 feet each year, typically in late spring and summer, as a result of hydroelectric power generation and municipal drinking water use. This drawdown leaves a ring of exposed, unvegetated lakebed that contrasts sharply with the forested areas above and the water below. Except for the effects of drawdown, Blue Lake offers largely intact scenic views similar to the surrounding landscape with no habitation or industrialization.

The bypass reach, Sawmill Creek, extends two miles from the dam to tidewater in Silver Bay. Almost all of Sawmill Creek Canyon is steep sided and heavily forested and is viewed primarily from Blue Lake Road, which affords infrequent views from vehicles while traveling along the road or from roadside pull offs. Scenic values in Sawmill Creek Canyon are in many areas quite spectacular, particularly when viewed from the stream itself. However, foot travel within the canyon is infrequent because it is difficult and, in some cases, dangerous.

Features of the Blue Lake Project, including the penstock, powerhouse, tailrace and switchyard, and Sawmill Creek Industrial Park are located in the lowest reaches of Sawmill Creek near Silver Bay. At the lower tunnel portal, the City of Sitka's water treatment plant is a prominently visible feature. The lower reach of Sawmill Creek from the powerhouse access bridge to tidewater is a heavily industrialized area with limited scenic and aesthetic values.

3.3.5.2 Environmental Effects

Key components of the City of Sitka's proposed project that could affect recreation and aesthetic resources are associated with increased lake levels and fluctuation, Blue Lake Road improvements, power lines, changes to the infrastructure in the vicinity of the existing powerhouse, and construction activities. To address potential

effects on recreation, the City of Sitka's proposal includes a draft Reservoir Access Control Plan that states a gate would be installed to prevent vehicles from driving to the water's edge of the reservoir; only hand launched boats would be permitted. The City of Sitka proposes to address recreation access during construction when it develops its final construction plans. After construction, the City of Sitka states it will follow provisions of a Rehabilitation Plan to reduce long-term scenic impacts and restore vegetation in unspecified areas. The City of Sitka also proposes to leave standing vegetation in the area that would be inundated at Blue Creek Valley. The draft Reservoir Inundation Plan describes how, as vegetation dislodges and becomes floating debris, it would be contained by floating booms for burning at a designated, cleared, 21-acre site located below the high-water mark. Debris would be collected and burned when the reservoir is drawn down in the spring and the ash would be buried. After the new powerhouse is installed, the City of Sitka would remove existing project infrastructure that is replaced.

The Forest Service provides 4(e) conditions that relate to recreation and aesthetic resources that specify that the City of Sitka: (1) provide a Traffic Safety Plan (Condition No. 15); (2) provide a Safety During Construction Plan (Condition No. 16); and (3) provide an environmental compliance monitor (Condition No. 20).

Our Analysis

Construction-Related Effects

At Blue Lake dam and intake construction sites, heavy equipment and large work crews would be visible during the entire two-year construction period. Noise from human and mechanical activity, as well as periodic blasting, would also reduce the aesthetic appeal of the area. The City of Sitka states it would probably restrict access to the site during the construction period for safety reasons, so visitors would not be able to use or drive to Blue Lake for up to two years. Visitor access to Sawmill Campground may be periodically disrupted when construction equipment is moved to and from the dam.

Similar construction-related impacts would occur in the powerhouse area. Work crews and equipment would be visible and noise from equipment operation and blasting would be noticeable. Construction effects in this area, however, would be comparatively low because of the industrialized appearance of this area.

Developing and implementing plans for traffic and safety and providing an environmental compliance monitor, as specified by the Forest Service would minimize disruption to visitors accessing Sawmill Creek Campground and Beaver Creek trail, hunters, and anglers. The Safety During Construction Plan, as specified by the Forest Service, would address reservoir access as well as all areas where construction activities would occur, including the 21-acre debris disposal site to protect public safety during

construction. Effects on recreation and aesthetics during construction would be minor and short term.

Operation-Related Effects

More visitors would be able or willing to use Blue Lake Road as a result of the improvements necessary for constructing the project. In addition, there would be higher and less fluctuating lake levels that would shorten the distance visitors would have to go to launch their boats. The raised reservoir would also provide easier access to Blue Creek Valley, attracting more hunters. Although these circumstances would potentially increase recreational use at Blue Lake, implementing the City of Sitka's proposal to prevent vehicle access to the water's edge would be a deterrent to many reservoir users. Boaters would find it difficult to navigate the newly inundated area in the vicinity of Blue Creek Valley because of the standing and submerged vegetation and debris booms extending across the east end of the reservoir. Consequently, the project would not likely change the level of recreation use on the reservoir. However, the improvements to Blue Lake Road would likely increase the number of visitors to the overlook, as well as the number of hunters and anglers accessing areas in the vicinity of Blue Lake Road. Because the improvements to Blue Lake Road would be made beyond the turnoff to the Sawmill Creek Campground, recreation use at the campground would not increase.

Blue Lake would continue to be the most prominent view for visitors that travel to the end of Blue Lake Road. Although the maximum water surface level would be higher than it is currently, the overall view would continue to be dominated by the large water body, and the view would not likely appear different to most visitors. Reservoir fluctuation would continue to expose a barren swath of land as the reservoir recedes. However, because the current reservoir fluctuation of 70 to 80 feet would be reduced to about 55 to 65 feet, the exposed area that encircles the reservoir shoreline would appear smaller, slightly improving the view of the reservoir.

The new distribution line that would provide power to operate the new gate at Blue Lake would not affect visual resources in the area because it would be located underground. The visual appearance of the land at the overlook would be changed after it is used for a construction laydown area. The currently gently sloping land would be leveled and present a 1.5-acre land form that contrasts with the surrounding steep hillsides. Provisions in a Rehabilitation Plan could minimize this effect.

In the vicinity of Blue Lake powerhouse, there would be many visual changes; however, the most prominent view of this industrialized area, from State Highway 7, would not look much different. The powerhouse would approximately double in size, the penstock would increase from seven to nine feet in diameter, the access road would be slightly realigned, and the project infrastructure would be moved from about 500 feet to 200 feet away from the State Highway 7. There would still be a switchyard and

tailrace where water would enter Silver Bay. These features do not contrast with the visual appearance of other industrial type of features that are abundant in this area.

Although the City of Sitka states the existing powerhouse and other project features would be removed after constructing the powerhouse, a final determination of which features would be removed would be provided in a Rehabilitation Plan to be submitted later. It is also unclear whether the City of Sitka's proposal for decommissioning the pulp mill feeder unit includes removal. If a Rehabilitation Plan specified removing all replaced infrastructure and restoring and revegetating disturbed areas in this area, there would be no long-term effects that would cause a noticeable change in the visual appearance of the area.

3.3.5.3 Cumulative Effects

The City of Sitka proposes to restrict boating access in Blue Lake as described in its draft Reservoir Access Control Plan. Implementing the controls described in the plan would maintain the low use of the reservoir. Because recreational access to the reservoir would remain relatively unchanged, the project would not likely have any cumulative effects related to recreation use.

3.3.6 Land Use

3.3.6.1 Affected Environment

Lands within the existing project boundary comprise 1,790 acres, including 1,676 acres of federal land managed by the Forest Service and 114 acres of non-federal land that is mostly owned by the City of Sitka. The lands in the vicinity of Blue Lake and the bypass reach potentially affected by the project are public lands managed by the Forest Service. These lands are managed under guidance in the Tongass National Forest Land and Resource Management Plan, as amended in 2008. The National Forest System lands that would be affected by this project are designated Municipal Watershed under the 2008 Tongass National Forest Land and Resource Management Plan. The project reservoir is located within Inventoried Roadless Area No. 331—Sitka Urban where certain activities such as timber harvest and road building are prohibited. However, the Secretary of Agriculture signed a decision memorandum on April 7, 2011, to issue a special use authorization to the City of Sitka for the use and occupancy of National Forest System lands in the roadless area to implement this project.

The land use designations applicable to National Forest System lands are shown below in figure 7 and described as follows:

- Municipal watershed—Manage municipal watersheds to meet state water quality standards for domestic water supply. Applicable standards and guidelines state: (1) dams, reservoirs, and pipelines are consistent with this

designation; (2) activities and recreation use levels can be provided that are not detrimental to water quality and flow; (3) considerations for scenery resource are secondary to the objectives of the municipality's watershed objectives.

- Semi-remote recreation—Provide for recreation and tourism in natural-appearing settings where opportunities for solitude and self-reliance are moderate to high. Applicable standards and guidelines state: (1) roads to or through lands with this designation should be managed for maintenance level 3 (passable by passenger vehicles); (2) small-scale, rustic recreation and tourism facilities are consistent with this designation and should blend with the natural setting; and (3) rehabilitation techniques may be used to restore disturbed landscapes.

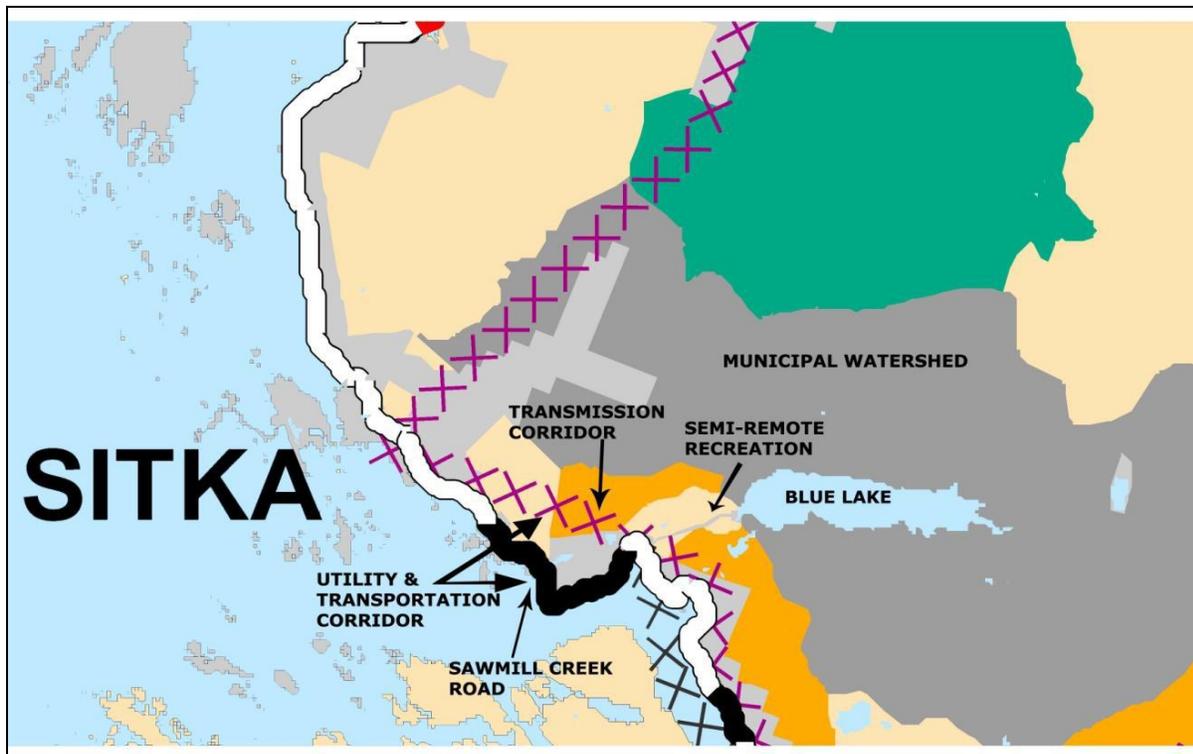


Figure 7. Land use designations applicable to National Forest System lands. (Source: City of Sitka, 2010)

The project boundaries that could be affected by the project are at Blue Lake, Blue Lake Road, and in the vicinity of the Blue Lake powerhouse. The project boundary at the reservoir is located 200 horizontal feet above the high water elevation of 342 feet msl and includes the dam, intake, release valve, and an overlook. Blue Lake Road has a 200-foot-wide project boundary that extends from Sawmill Creek Road to the dam. The project boundary in the vicinity of Blue Lake powerhouse encompasses

the powerhouse, switchyard, and tail race and includes the City of Sitka-owned parcel of land at this location. Access to the Blue Lake powerhouse and the pulp mill feeder unit is along a City of Sitka-owned road connected to Sawmill Creek Road.

3.3.6.2 Environmental Effects

The City of Sitka proposes to enlarge the reservoir, decommission the pulp mill feeder unit and transmission line, relocate the powerhouse, tailrace and switchyard, construct a new surge chamber, and construct a new distribution line between the fish valve unit and the dam. The boundary in all areas below the project dam, including those along Sawmill Creek, around the various powerhouses, and within the various transmission corridors, would remain unchanged.

The City of Sitka also proposes to expand the boundary at Blue Lake by 206 acres at the east end of Blue Lake on National Forest System lands to accommodate the additional 362 acres of inundated lands and provide a 50-foot buffer above the 425-foot-msl high water surface level. The City of Sitka would implement its Reservoir Inundation Plan that includes (1) leaving standing vegetation in the area that would be inundated, (2) removing vegetation and creating a 21-acre site for burning debris, and (3) installing debris booms for containing floating material as it becomes dislodged after inundation.

The proposed features would be constructed on City of Sitka-owned lands, except the: (1) 1,400 feet of the 12-kV distribution line following the tunnel alignment and Blue Lake Road that would supply power to the dam site, and (2) the proposed intake tunnel. The City of Sitka would also improve Blue Lake Road by widening turns and adjusting the road grade to accommodate construction equipment. Following construction, the City of Sitka would improve and resurface the road with gravel as required by Condition No. 11 of the existing license.

Forest Service 4(e) Condition No. 13 specifies that the City of Sitka obtain a special use permit for use and occupancy of the additional National Forest System lands that would be inundated.

Our Analysis

Construction-Related Effects

Under the City of Sitka's proposal, the project boundary would include all lands, access roads, and right-of-way corridors necessary for constructing the project. Implementing a Rehabilitation Plan at the laydown area near the dam that includes revegetating and grading to diminish its size and horizontal appearance would be consistent with land management direction to restore disturbed landscapes. Retaining

lands within the project boundary that are in the vicinity of the powerhouse where facilities are proposed for removal would ensure the lands would be properly restored.

Operation-Related Effects

The project boundary would contain 1,913 acres, comprising 1,798 acres of federal land and 115 acres of non-federal land. The proposed boundary at the reservoir, including a 50-foot buffer along the shoreline above the maximum water surface level, would include sufficient lands to operate the project. The reservoir, as enlarged under the City of Sitka's proposal, would remain consistent with the types of facilities allowed on National Forest System lands that are designated as municipal watersheds. Although the project would require management activities in a roadless area, the Secretary of Agriculture issued a decision delegating authority to the Forest Service to issue a special use authorization for the project stating that the Forest Service has taken all measures available to preserve the character of the roadless area. Requiring that the City of Sitka obtain a special use authorization, as specified in Forest Service 4(e) Condition No. 13 is consistent with the Secretary of Agriculture's decision related to the roadless area.

All other changes to the project would take place within the footprint of the existing project boundary. Improvements to Blue Lake Road are consistent with land management direction in terms of providing road access that is passable to passenger vehicles to or through lands with a semi-remote recreation land use designation. Although small increases in recreational use on this road for recreational purposes may occur as a result of road improvements, no additional recreation facilities are proposed. Therefore, the project would be consistent with management direction to provide recreation and tourism in natural-appearing settings where opportunities for solitude and self-reliance are moderate to high.

Restricting vehicle access to the shoreline, as proposed by the City of Sitka and described in the draft Access Control Plan (currently under review by Alaska DF&G and other agencies), would discourage recreational use on the reservoir and would be consistent with protecting water quality in this designated municipal watershed. Measures in the Reservoir Inundation Plan would also help protect water quality.

3.3.7 Cultural Resources

3.3.7.1 Affected Environment

Pursuant to section 106, the Commission must take into account whether any historic property within the APE of a proposed license amendment could be affected by the approval of the amendment. The APE is determined in consultation with the Alaska SHPO and is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist.

In July 2008, the City of Sitka prepared a draft Cultural Resources Study Plan for the proposed amendment and provided it to Alaska state and federal agencies and the Sitka Tribe for review and comment (City of Sitka, 2008). The draft Cultural Resources Study Plan called for the determination of the APE, completion of a literature review, consultation with the Sitka Tribe, field survey of the APE, and preparation of draft and final reports. In July 2008, the Forest Service concurred with the draft Cultural Resources Study Plan (letter to C. Walls, Utility Director, City and Borough of Sitka, Electric Department, Sitka, AK, from C. Goularte, District Ranger, Tongass National Forest, Sitka, AK, dated July 21, 2008 [included as part of the March 10, 2011, filing]). Additional documentation of the Alaska SHPO, Forest Service, and Sitka Tribe concurrence on the draft Cultural Resources Study Plan were provided in the City of Sitka's April 6, 2011, response to the Commission's February 22, 2011, additional information request (AIR) letter.

The final Cultural Resources Survey Report (Paleo Logic, 2009) provides the results of the draft Cultural Resources Study Plan implementation, including the literature review, field surveys, and consultation with the Sitka Tribe. In the report, the APE is defined as two primary areas: one located upstream of the project dam and one downstream of the dam. The upper APE includes all land and water features to the maximum limit of inundation at the proposed spill elevation of 425 feet msl. The lower APE includes the dam, all necessary access roads and staging areas, the proposed locations of the new powerhouse, and associated features near the current powerhouse. The Alaska SHPO concurred with this definition of the APE (letter from J.E. Bittner, Alaska SHPO, State of Alaska Office of Historic Preservation, Anchorage, AK, to D. Orbison, Expansion Project Manager, City of Sitka, AK, filed January 6, 2012).

The literature review and archaeological survey of the project APE resulted in the identification of site SIT-733, the historic 1898 Pande Basin corduroy road or pack trail. Twelve segments of the road had been previously documented within the project vicinity with three segments located within the APE. In its final draft EA, the City of Sitka described these three segments as poorly preserved and stated that consultation with the Forest Service indicated that the resource does not qualify for inclusion on the National Register. However, the Alaska SHPO stated in response to a letter initiating Section 106 consultation, that it needs the City of Sitka to conduct additional historical research on this resource before it could concur that it was not eligible for listing (letter from J.E. Bittner, Alaska SHPO, State of Alaska Office of Historic Preservation, Anchorage, AK, to D. Orbison, Expansion Project Manager, City of Sitka, AK, filed January 6, 2012). No other archaeological resources were identified.

The results of consultations with the Sitka Tribe were also presented in the Cultural Resources Survey Report. Four interviews with tribal members were conducted, indicating that traditional use of the Blue Lake area had been affected by the construction of the Alaska Pulp Corporation's mill and current hydroelectric project and

that use of the area by Sitka Tribe members is currently limited (Paleo Logics, 2009). No tribal concerns regarding the current proposal were expressed.

3.3.7.2 Environmental Effects

The final Cultural Resources Survey Report concludes that the potential for cultural materials to be present in the lower APE in the vicinity of the proposed new facilities is extremely low (Paleo Logics, 2009). Further, the report states that no significant cultural resources were recorded in the proposed inundation area of the upper APE and, therefore, no historic properties would be affected by the proposed amendment. In its final draft EA, the City of Sitka reiterates this conclusion but proposes to implement a Cultural Resources Monitoring Plan prior to and during construction to ensure that workers are aware of the potential for unanticipated discoveries. If resources are identified during construction, the City of Sitka's Construction Superintendent would report the discovery to the Forest Service.

In its February 22, 2011, AIR, the Commission requested further documentation of consultation regarding the proposed amendment. As mentioned above, in its response filed April 6, 2011, the City of Sitka provided copies of various consultation documents. However, no documentation from the Alaska SHPO or Forest Service indicating concurrence with the City of Sitka's no effect recommendation was provided. The City of Sitka initiated consultation with Alaska SHPO in an email dated November 17, 2011.

Also in the February 22, 2011, AIR, the Commission requested that Sitka provide draft mitigation plans for various resources. Because no properties that are recommended eligible for listing on the National Register were documented within the APE, the Commission did not specifically request a plan for cultural resources management. However, in its response filed April 14, 2011, the City of Sitka provided a preliminary draft Cultural Resources Protection Plan, containing language that the City of Sitka stated was taken from an unspecified FERC license for another hydroelectric project in southeast Alaska. This plan stated that the licensee would (1) not initiate any work other than the work authorized under the license without first consulting with the Forest Service, the Alaska SHPO, and tribes; (2) conduct a cultural resources survey in those areas, and (3) file a Cultural Resources Management Plan approved by the Forest Service to avoid or mitigate effects on cultural sites. Further, the proposed plan provided measures for any unanticipated discoveries identified during construction activities and during project implementation. If significant resources are identified, the City of Sitka would enter into a Memorandum of Understanding developed by the Forest Service that would call for documentation, National Register evaluation, assessment of potential effects, identification of measures to avoid or mitigate effects, consultation with all interested parties, and a schedule for mitigating such effects and conducting additional studies.

In a letter filed January 6, 2012, the Alaska SHPO did not concur with the City of Sitka's effect recommendations (letter from J.E. Bittner, Alaska SHPO, State of Alaska Office of Historic Preservation, Anchorage, AK, to D. Orbison, Expansion Project Manager, City of Sitka, AK). In its letter, the Alaska SHPO pointed out that in the November 17, 2011, email, the City of Sitka requested concurrence with a finding of "no adverse effect," implying that eligible historic properties are present in the APE but would not be adversely affected by the action, while the City of Sitka's final cultural resources report recommended a finding of "no historic properties affected," which concludes that no eligible historic properties are found within the APE. The Alaska SHPO recommended additional section 106 review and consultation for the project, including further research and evaluation of the historic corduroy road (site SIT-733), to develop a formal determination of eligibility and an appropriate effects determination.

Our Analysis

Commission staff agrees that it is unlikely that significant historic properties would be affected by the new inundation area associated the proposed amendment of the project. Staff also agrees that it is highly unlikely that significant cultural resources would be identified in the vicinity of the dam, intake, and powerhouse areas because of the extent of previous disturbance. However, formal determination of eligibility of site SIT-733 in consultation with the Alaska SHPO and Forest Service would clarify whether or not a "no historic properties affected" or "no adverse effects" determination is warranted and would enable the Commission to ensure compliance with section 106.

Commission staff acknowledges the Cultural Resources Protection Plan filed by the City of Sitka and the City of Sitka's proposal in its license application to also implement a Cultural Resources Monitoring Plan during construction. If site SIT-733 is determined eligible for listing on the National Register, the preparation of a Historic Properties Management Plan (HPMP) in consultation with the Alaska SHPO and the Forest Service and in accordance with the guidance jointly prepared by the Advisory Council on Historic Preservation (ACHP) and the Commission titled, *Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects* (ACHP and FERC, 2002) to address potential effects on this property would ensure that site SIT-733 is appropriately considered under section 106. However, if the resource is determine to be ineligible, , Article 403 and Condition No. 7 of the existing license would provide for sufficient guidance and protection of unanticipated cultural materials that could be identified during project construction or future operation, as well as a plan for consultation with the Forest Service, Alaska SHPO, and the Sitka Tribe.

3.4 NO-ACTION ALTERNATIVE

The affected environment for the no-action alternative would be the same as that described in sections 3.3.1 through 3.3.7. The no-action alternative would require the City of Sitka to operate the project under the terms of the existing license. The Blue

Lake Project would not be expanded; therefore, (1) the installed capacity would not increase from 7.5 MW to 16.9 MW; (2) the dam crest elevation would not be raised; (3) the existing intake structure would remain and the existing power conduit intake would not be abandoned; (4) a new underground power conduit would not be installed; (5) the steel liners at the portals to the power conduit would not be lengthened; (6) an underground surge chamber would not be installed; (7) the penstock would not be replaced; (8) the existing powerhouse would remain functional and a new powerhouse would not be constructed; (9) the existing 670-kW fish valve unit would not be replaced; (10) the existing pulp mill feeder unit would not be decommissioned; (11) the existing powerhouse transformers would not be replaced; (12) no equipment access and dam site staging facilities would be developed; (13) a power distribution line would not be constructed; (14) Blue Lake Road would not be realigned; (15) the project boundary would not be expanded; and (16) no spoil areas would be established.

The no-action alternative would not result in ground disturbance or changes to the inundation areas, water quality, recreation access, or fish and wildlife habitat, and it would not include staff's recommended measures. Therefore, City of Sitka's proposed plans (e.g., Erosion and Sediment Control Plan, Reservoir Inundation Plan, Reservoir Access Control Plan, Water Quality Monitoring Plan, Fisheries Monitoring Plan, or Wildlife Disturbance Avoidance Plan) meant to protect environmental resources with the potential to be affected by the project also would not be needed. Further, under the no-action alternative, the project would not provide the 32,000-MWh increase in annual energy generation, and the City of Sitka would be required to increase its reliance on other generating methods, potentially including the use of fossil fuels, such as diesel, to meet projected energy demands.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the City of Sitka's proposed action and alternatives to the proposed action to compare differences in the project's costs and power generation. In keeping with Commission policy as described in *Mead Corporation, Publishing Paper Division*,¹¹ our economic analysis is based on current costs with no consideration for potential future inflation or escalation.

Our economic analysis helps to support an informed decision concerning what is in the public interest with respect to a proposed license amendment. However, our economic analysis is not a determination that any action is reasonable or prudent.

¹¹ 72 FERC ¶61,027 (July 13, 1995).

4.1 NO-ACTION ALTERNATIVE

Under the no-action alternative, there would be no change in project facilities or operations and no change to project generation. Therefore, there would be no change in the economics of the project.

4.2 PROPOSED ACTION

The City of Sitka proposes to modify the project facilities and implement environmental enhancement and protection measures at an estimated capital cost of \$100,360,000 (2011 dollars). This cost includes the following project modifications: (1) raising the dam crest by 83 feet, increasing the storage capacity of the reservoir; (2) replacing the existing intake structure and upper power conduit tunnel with a new intake structure and tunnel; (3) constructing a new underground surge chamber and adit tunnel upstream of the penstock; (4) replacing the existing 6.0-MW powerhouse and penstock with a new 15.9-MW powerhouse and larger penstock; (5) replacing the existing 670-kW fish valve unit with a new 1-MW unit; (6) decommissioning the existing 870-kW pulp mill feeder unit and associated transmission line; (7) replacing the existing powerhouse transformers; and (8) developing equipment access roads and construction staging areas. The City of Sitka also proposes at minimal cost beyond that already in the construction costs to: (1) implement the final Erosion and Sediment Control Plan; (2) implement the Reservoir Inundation Plan; (3) implement the Reservoir Access Control Plan; (4) implement the Water Quality Monitoring Plan; (5) implement the Fisheries Monitoring Plan; (6) comply with the City of Sitka's Watershed Management Plan; and (7) prepare a Wildlife Disturbance Avoidance Plan. We estimate that the cost of routine operation and maintenance of the modified project on an annual basis would be comparable to the cost to operate and maintain the existing project. The levelized annual cost of the City of Sitka's proposed action, including its environmental measures, would be approximately \$8,554,000 annually.¹²

The City of Sitka estimates that operation of the modified project would result in an increase in annual generation of approximately 32,000 MWh. Using a regional estimated alternative energy value of \$350/MWh, based on replacement of project energy with diesel-fuelled generation, which is the only locally available fuel source, this additional generation would be valued at \$11,200,000 annually. . Therefore, the net benefit of the licensee's proposed action, including total capital costs and generation benefits, would be approximately \$2,646,000 annually.

¹² The capital cost was annualized over a 27-year period, which is the remaining term of the project license, using an interest rate of six percent.

4.3 STAFF-RECOMMENDED ALTERNATIVE

In addition to the City of Sitka's proposal to modify the project, the staff-recommended alternative includes several environmental mitigation and enhancement measures. These recommended measures would require the licensee to: (1) develop and implement a Project Mitigation and Monitoring Plan at an estimated levelized annual cost of \$1,970; (2) designate an environmental compliance monitor at an estimated levelized annual cost of \$2,560; (3) develop and implement a Noxious Weed Management Plan at an estimated levelized annual cost of \$2,380; (4) file an Erosion Control Measures Plan during planning and before any new construction or non-routine maintenance activities with the potential to cause erosion and/or stream sedimentation on or affecting National Forest Service lands; (5) develop and implement a Revegetation Plan at an estimated levelized annual cost of \$2,040; (6) develop and implement a Rehabilitation Plan at an estimated levelized annual cost of \$2,560; (7) develop and implement a Construction Water Quality Monitoring Plan at an estimated levelized annual cost of \$930; (8) develop and implement a long-term Water Quality Monitoring Plan at an estimated levelized annual cost of \$2,620; and (9) develop and implement a detailed plan to monitor effects on rainbow trout and salmon populations at an estimated levelized annual cost of \$2,180. The total levelized annual cost for these staff-recommended measures would be approximately \$17,000. Under the staff-recommended alternative, annual generation and its value would be the same as under the proposed action. The total levelized annual cost of the licensee's proposed action, including staff's recommended measures and mandatory conditions, would be approximately \$8,571,000. Therefore, the net benefit of the licensee's proposed action, including total capital costs, generation benefits, and staff recommended alternatives, would be approximately \$2,629,000 annually.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF ALTERNATIVES

Sections 4(e) and 10(a) of the FPA require the Commission to give equal consideration to all uses of the waterway on which a project is located. When we review a hydropower project, we consider the water quality, fish and wildlife, recreation, cultural, and other non-developmental values of the involved waterway equally with its electric energy and other developmental values. In deciding whether, and under what conditions a hydropower project should be licensed, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing the waterway. This section contains the basis for, and a summary of, our recommendations for conditions to be included in any amendment to the license for the Blue Lake Project.

Based on our independent review and evaluation of the environmental and economic effects of: the proposed action; the proposed action with additional staff modifications; and the no-action alternative, we recommend the proposed action with additional staff-recommended measures, as the preferred alternative. We recommend this alternative because: (1) issuing an amendment to the project license would allow the licensee to continue operating the project as a beneficial and dependable source of electric energy; (2) the project, with an increased installed capacity of 16.9 MW, would eliminate the need for an equivalent amount of fossil-fuel-produced energy and capacity, which helps conserve these nonrenewable resources and decreases atmospheric pollution; and (3) the proposed and staff-recommended environmental measures would protect project resources.

5.1.1 Measures Proposed by the Licensee

We recommend including the following environmental measures proposed by the City of Sitka, in any amended license issued by the Commission for the Blue Lake Project:

- Implement the Erosion and Sediment Control Plan, including rehabilitation and revegetation prescriptions, to limit effects on water quality and aquatic resources during construction. This plan would provide information on site-specific conditions, construction and operation-related risks, and proposed measures to avoid slope failure, sedimentation of water bodies, spoils disposal and stockpile, revegetation, and rehabilitation.
- Construct a new intake system to avoid effects from colder water from Blue Lake that would result if the existing intake were in use after the proposed raising of the dam.
- Implement the Reservoir Inundation Plan that would include leaving the timber and vegetation in the inundation area to limit the erosion, sedimentation, and effects on water quality that could occur during a removal process. This plan would also include the collection and disposal of floating debris on the reservoir.
- Comply with the City of Sitka's Watershed Management Plan to address concerns about increased access related to higher lake levels. This and the draft Reservoir Access Control Plan (currently under agency review) would include limiting vehicle access to the lake to stop larger motorized boats access to the lake.
- Implement construction schedules to avoid wildlife and recreation disturbance as part of a proposed Wildlife Disturbance Avoidance Plan.

- Implement the Bear Safety Plan to reduce the potential for human and bear interactions and help ensure such encounters have safe outcomes.

5.1.2 Additional Measures Recommended by Staff

Staff recommends that the City of Sitka implement the following proposed measures and develop plans in consultation with appropriate agencies and file the plans with the Commission for approval. Staff also recommends adoption of the final 4(e) conditions filed by the Forest Service, which are attached in appendix A.

- Develop and implement a Revegetation Plan that includes: (1) identification of areas disturbed during construction; (2) a list of native species to be used for planting and/or reseeded; (3) monitoring for successful establishment of native species; (4) criteria for success; and (5) measures for additional plantings, if success criteria are not achieved, to reduce effects of construction on vegetation resources. We recommend the development and implementation of this plan because the revegetation prescriptions included as part of the City of Sitka's Erosion and Sediment Control Plan did not include sufficient detail about the components listed above.
- The City of Sitka's Erosion and Sediment Control Plan (which we recommend), identifies erosion control measures to be implemented at the project during the proposed construction to minimize sediment releases to Blue Lake and Sawmill Creek. Forest Service 4(e) Condition No. 22 would address future construction and non-routine maintenance activities that might not be addressed by the City of Sitka's Erosion and Sediment Control Plan.
- Develop and implement a Project Mitigation and Monitoring Plan, within 60 days after amendment issuance, that includes: (1) detailed descriptions of the mitigation and monitoring measures; (2) implementation schedules (including public notification strategy); and (3) detailed steps for planning, designing, and constructing the approved measures. Additionally, the plan should provide a mechanism for the City of Sitka and the Forest Service to meet periodically to review/modify the implementation schedule of these measures. Once approved by the Forest Service, the City of Sitka should file the final plan, including evidence of consultation, with the Commission. (Forest Service 4(e) Condition No. 19).
- Designate a qualified environmental compliance monitor to oversee the project during construction activities (e.g., vegetation- or land-disturbing activities or spoil-producing activities). The compliance monitor should serve as a liaison between the Forest Service and the City of Sitka. The compliance monitor should be a third-party contractor independent of the City of Sitka or the Forest Service, subject to approval by both the City of

Sitka and the Forest Service. The compliance monitor would have the authority to stop work or issue change orders in the field, if conditions warrant it. Once major construction activities are completed, the compliance monitor would no longer be needed. (Forest Service 4(e) Condition No. 20).

- Provide access to Alaska DF&G representatives through, to, and across project lands. This would allow Alaska DF&G to continue their mission to protect, maintain, and improve the fish, game, and aquatic resources of the state. Agency employees would need access to state lands to conduct surveys and implement management plans and that access may involve crossing project lands. Allowing this access, so long as it does not disrupt project operations or result in personal safety concerns related to project operations, would assist the agency in achieving its goals of ensuring the protection of wildlife resources.
- Develop and implement a Noxious Weed Management Plan, within one year of amendment issuance or prior to any ground-disturbing activity. Prepare the plan in consultation with the Forest Service and Alaska DF&G. At a minimum, the plan should: (1) identify methods for prevention and control of noxious weeds, (2) develop a monitoring program to evaluate the effectiveness of noxious weed control measures, and (3) develop procedures for identifying additional measures that the City of Sitka would implement if monitoring reveals that noxious weed control is not successful or does not meet intended objectives. (Forest Service 4(e) Condition No. 21).
- Develop and implement a Construction Water Quality Monitoring Plan in consultation with the Forest Service, Alaska DF&G, FWS, and NMFS, prior to the start of land-clearing activities. The plan should identify the exact locations of monitoring sites, the water quality parameters to be monitored, and the frequency of monitoring during all phases of construction. The plan also should identify specific measures to be taken in the event that monitoring identifies unacceptable water quality conditions. We recommend this plan instead of the Water Quality Monitoring Plan proposed by the City of Sitka because a Construction Water Quality Monitoring Plan would provide for more information about monitoring sites, parameters, frequency and identification of measures that could be taken in the event that unacceptable water quality is detected. In addition, we found that the City of Sitka's plan lacked the requirement for agency comment and approval. The development of a plan, as recommend, would ensure that the plan would be adequately reviewed by resource agencies and Commission staff and that any resource agency concerns would be adequately addressed.

- Develop and implement a long-term Water Quality Monitoring Plan in consultation with the Forest Service, Alaska DF&G, FWS, and NMFS, prior to the start of land-clearing activities. The plan should include, but not be limited to, the following information: (1) identification of all long-term water quality monitoring sites in Blue Lake, at the powerhouses, and in Sawmill Creek; (2) the specific water quality parameters to be monitored at each site; and (3) the frequency of monitoring at each location, as well as the duration of the monitoring during the term of the license. The plan should also identify specific measures to be taken in the event that monitoring indicates problems with water quality at the project. For reasons similar to our recommended Construction Water Quality Monitoring Plan, we recommend this long-term plan instead of the Water Quality Monitoring Plan proposed by the City of Sitka.
- Develop and implement a detailed plan for Blue Lake in consultation with the Forest Service, Alaska DF&G, FWS, and NMFS to monitor the effects of raising the dam, if any, on the rainbow trout population in Blue Lake and the salmon populations downstream in Sawmill Creek. The plan should be developed within one year of amendment issuance or prior to any ground-disturbing activity. The City of Sitka should file this plan with the Commission, including any mitigation measures and documentation of consultation with the resource agencies, as well as any comments received on the plan and responses to those comments. We recommend this plan instead of the City of Sitka's plan because the City of Sitka did not provide documentation of consultation with any of the resource agencies on its final Fisheries Monitoring Plan and it is unclear whether the agencies concur with the proposed approach (preparing annual study plans) and/or the proposed monitoring for 2012.
- Develop and implement a Rehabilitation Plan in consultation with the Forest Service, Alaska DF&G, and FWS. The plan would include the removal of decommissioned facilities, such as the powerhouse and other facilities, and would also include regrading and revegetation to ensure that the lands are properly restored.
- Formally evaluate site SIT-733, the historic corduroy road, for National Register eligibility in consultation with the Alaska SHPO and the Forest Service. Following a determination of eligibility, assess project effects in accordance with the requirements of section 106. The project would either have no effect on historic properties (road found to be not eligible), no adverse effect (road found to be eligible, but effects are not adverse), or adverse effects (road found to be eligible and effects are adverse). Currently, the City of Sitka's proposed measures (implementation of the Cultural

Resources Monitoring Plan and the Cultural Resources Protection Plan) do not include measures for the corduroy road because the City of Sitka states that the road is not eligible for listing on the National Register. However, per the Alaska SHPO's letter, filed January 6, 2012, the site has not yet been adequately evaluated for listing on the National Register. As such, the assessment of project effects remains unresolved. If the resource is determined to be ineligible, implementation of the City of Sitka's proposed measures would be appropriate; if the road is determined to be eligible, the City of Sitka should develop and implement an HPMP in consultation with the Alaska SHPO and the Forest Service to address any effects to this resource.

5.2 UNAVOIDABLE ADVERSE EFFECTS

Raising the project reservoir would inundate 362 acres of forest lands containing timber and other vegetation types that provide habitat for wildlife. This habitat would be lost or disturbed by inundation resulting in an unavoidable loss of nesting and foraging habitat. Some wildlife species would be lost while others would be displaced by this loss of habitat.

Some currently available spawning habitat to rainbow trout in the inflowing streams to Blue Lake particularly in Sawmill Creek would be lost as a result of raising the project reservoir. Such a loss would be expected to have some impact on the rainbow trout population in Blue Lake. However, with an increase in the project reservoir level some spawning habitat could become available in the inflowing streams.

Inundation of standing vegetation would have an unavoidable adverse effect on water quality in Blue Lake. Decomposition of wood, tree needles, and understory vegetation would impact water quality through an increase in biological oxygen demand. This impact to water quality would be expected to lessen over time. Further, there is expected to be a temporary substantial increase in turbidity during the initial phases of construction that would adversely impact water quality.

5.3 SUMMARY OF SECTION 10(j) RECOMMENDATIONS AND 4(e) CONDITIONS

5.3.1 Fish and Wildlife Agency Recommendations

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency will attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. In response to our public notice, Alaska DF&G, by letter filed June 8, 2011, submitted recommendations for the project.

Table 7 lists Alaska DF&G’s 14 recommendations filed pursuant to section 10(j), and whether the recommendations are adopted under the staff alternative. Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document and the previous section.

Of Alaska DF&G’s 14 recommendations, we consider six of these recommendations to be within the scope of section 10(j). We adopt all six recommendations within the scope of section 10(j), and we adopt all of Alaska DF&G’s remaining recommendations pursuant to section 10(a) of the FPA

Table 7. Fish and wildlife agency recommendations for the Blue Lake Hydroelectric Project (Source: staff).

| Recommendation | Agency | Within Scope of Section 10(j)? | Annualized Cost | Recommend Adopting? |
|---|---------------|--|---|--|
| 1. Maintain existing instream flow conditions, as described in the project license issued in 2007 | Alaska DF&G | Yes | No additional cost (existing measure) | Yes |
| 2. Maintain existing ramping rates, as described in the project license issued in 2007 | Alaska DF&G | Yes | No additional cost (existing measure) | Yes |
| 3. Prepare and implement a Fish Monitoring Plan to monitor rainbow trout spawning and recruitment | Alaska DF&G | No, monitoring alone is not a specific measure to protect or enhance fish and wildlife | Minimal (included in the overall construction cost ^a) | Yes, we recommend a plan to monitor rainbow trout spawning and recruitment |

| Recommendation | Agency | Within Scope of Section 10(j)? | Annualized Cost | Recommend Adopting? |
|--|---------------|--|---|---|
| 4. Reservoir Inundation Plan (licensee has prepared a preliminary draft Reservoir Inundation Plan, which is currently under agency review) | Alaska DF&G | No, a statement (without any action) is not a specific measure to protect or enhance fish and wildlife | Minimal (included in the overall construction cost ^a) | Yes, we recommend finalizing and implementing this plan |
| 5. Maintain existing startup and shutdown procedures to maintain minimum flows in Sawmill Creek during maintenance, emergency shutdowns, and interruptions in the power grid | Alaska DF&G | Yes | No additional cost (existing measure) | Yes |
| 6. Maintain existing intake screens and tailrace design criteria, as described in the project license issued in 2007 | Alaska DF&G | Yes | No additional cost (existing measure) | Yes |
| 7. Erosion and Sediment Control Plan (licensee has prepared and the agencies have reviewed the final Erosion and Sediment Control Plan) | Alaska DF&G | No, a statement (without any action) is not a specific measure to protect or enhance fish and wildlife | Minimal (included in the overall construction cost ^a) | Yes, we recommend implementing this plan |
| 8. Monitor water quality to confirm effectiveness of erosion and sediment control measures | Alaska DF&G | Yes | Minimal (included in the overall construction cost ^a) | Yes |

| Recommendation | Agency | Within Scope of Section 10(j)? | Annualized Cost | Recommend Adopting? |
|--|---------------|--|---|---|
| 9. Prepare and implement and Fuel and Hazardous Substance Spill Plan | Alaska DF&G | Yes | No additional cost (existing measure) | Yes |
| 10. Treat condensate and leakage from turbines and other equipment to remove pollutants | Alaska DF&G | Yes | No additional cost (existing measure) | Yes |
| 11. Environmental compliance monitor (licensee has prepared a preliminary draft Environmental Compliance Monitor Plan, which is currently under agency review) | Alaska DF&G | No, a statement (without any action) is not a specific measure to protect or enhance fish and wildlife | No additional cost (included in 4(e) Condition No. 20) | Yes, we recommend implementing this plan |
| 12. Provide access to Alaska DF&G representatives through, to, and across project lands | Alaska DF&G | No, providing access is not a specific measure to protect or enhance fish and wildlife | None | Yes, we recommend this measure |
| 13. Bear Safety Plan (licensee has prepared a preliminary draft Bear Safety Plan, which is currently under agency review) | Alaska DF&G | No, a statement (without any action) is not a specific measure to protect or enhance fish and wildlife | Minimal (included in the overall construction cost ^a) | Yes, we recommend finalizing and implementing this plan |

| Recommendation | Agency | Within Scope of Section 10(j)? | Annualized Cost | Recommend Adopting? |
|---|---------------|--|---|---|
| 14. Restricting road access and land use to minimize effects on fish and wildlife (licensee has prepared a preliminary draft Reservoir Access Control Plan, which is currently under agency review) | Alaska DF&G | No, a statement (without any action) is not a specific measure to protect or enhance fish and wildlife | Minimal (included in the overall construction cost ^a) | Yes, we recommend finalizing and implementing this plan |

^a As discussed in section 4.2, the capital cost for the proposed project is about 100 million dollars.

5.3.2 Forest Service’s Section 4(e) Conditions

In section 2.2.5, *Modifications to Applicant’s Proposal—Mandatory Conditions*, we list the final 4(e) conditions submitted by the Forest Service and note that section 4(e) of the FPA provides that any license issued by the Commission “for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation.” Thus, any 4(e) condition that meets the requirements of the law must be included in any license issued by the Commission, regardless of whether we include the condition in our staff alternative.

Of the Forest Service’s 10 final conditions, we consider five of the conditions (conditions 14 through 18¹³) to be administrative or legal in nature and not specific environmental measures. We, therefore, do not analyze these conditions in this EA. Table 8 summarizes our conclusions with respect to the five final 4(e) conditions that we consider to be environmental measures. We include in the staff alternative five conditions as specified by the agency.

¹³ The project license issued in 2007 includes 12 Forest Service 4(e) conditions. In its June 7, 2011 letter, the Forest Service maintained consecutive numbering of its conditions, numbering its new 4(e) conditions 13 through 22. To maintain consistency with the letter, we are using the same numbering here.

Table 8. Forest Service final section 4(e) conditions for the Blue Lake Hydroelectric Project (Source: staff).

| Condition | Annualized Cost | Adopted? |
|--|---|-----------------|
| No. 13, special-use authorization | Minimal (included in the overall construction cost ^a) | Yes |
| No. 19, Project Mitigation and Monitoring Plan | \$1,970 | Yes |
| No. 20, Environmental compliance monitor | \$2,560 | Yes |
| No. 21, Noxious Weed Management Plan | \$2,380 | Yes |
| No. 22, Erosion Control Plan | Minimal (included in the overall construction cost ^a) | Yes |

^a As discussed in section 4.2, the capital cost for the proposed project is about 100 million dollars.

5.4 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2)(A) of the FPA, 16 U.S.C. §803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with the federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed five comprehensive plans that are applicable to the Blue Lake Project, listed below. No inconsistencies were found.

Alaska Department of Natural Resources. Northern Southeast Area Plan.

Alaska Department of Natural Resources. Sitka Coastal Management Plan.

City and Borough of Sitka. City of Sitka Comprehensive Plan (CSCP).

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

City and Borough of Sitka. Sitka Non-motorized Transportation Plan.

Sitka Trail Works. 2003. Sitka Trail Plan.

U.S. Forest Service. 2008. Tongass National Forest Land and Resource Management Plan. Department of Agriculture, Ketchikan, Alaska. January 2008.

6.0 FINDING OF NO SIGNIFICANT IMPACT

If the capacity-related amendment to the Blue Lake Project is approved with the staff-recommended measures, the project would continue to operate while providing protection and enhancements to water quality, aquatic, terrestrial, and recreation resources.

Based on our independent analysis, approval of the amendment with staff-recommended measures would not constitute a major federal action significantly affecting the quality of the human environment.

7.0 LITERATURE CITED

ACHP and FERC (Advisory Council on Historic Preservation and Federal Energy Regulatory Commission). 2002. Guidelines for the development of historic properties management plans for hydroelectric projects. Advisory Council on Historic Preservation and Federal Energy Regulatory Commission, Washington, DC. May 20, 2002.

Alaska DF&G (Alaska Department of Game and Fish). 2011. Species: All animals web page. Available at: <http://www.adfg.alaska.gov/index.cfm?adfg=animals.listall>. Accessed October 25, 2011. Alaska Department of Game and Fish, Juneau, AK.

City of Sitka (City and Borough of Sitka, Alaska). 2011. Sitka's electric energy requirements and resources (1973–2030). www.cityofsitka.com/government/departments/electric/documents/SitkaLoadvsResourcesForecast091308.pdf. Accessed October 6, 2011. City and Borough of Sitka Electric Department, Sitka, AK.

City of Sitka. 2010. Application for capacity-related amendment, Blue Lake Hydroelectric Project (FERC No. 2230) expansion. Volumes 1 and 2: Exhibits A through G. City and Borough of Sitka Electric Department, Sitka, AK. November 2010.

City of Sitka. 2008. Draft cultural resources study plan, Blue Lake Hydroelectric Project (FERC No. 2230) expansion. City and Borough of Sitka Electric Department, Sitka, AK. July 2008.

EES Consulting. 2010. Evaluation of change in Blue Lake Hydroelectric Project intake location on water temperatures and anadromous salmonid utilization in Sawmill Creek. Dated July 2010. Filed with the Commission October 7, 2010.

- FERC (Federal Energy Regulatory Commission). 2008. Order issuing new license, issued July 10, 2008 (FERC No. 2230-034). Federal Energy Regulatory Commission, Washington, D.C.
- FERC. 2007. Environmental assessment for new hydropower license for the Blue Lake Hydroelectric Project, issued April 2007. Federal Energy Regulatory Commission, Washington, D.C.
- Forest Service (U.S. Forest Service). 2008. Tongass Land and Resource Management Plan final environmental impact statement and record of decision, plan amendment. R10-MB-603a. Available at: http://tongass-fpadjust.net/Documents/Record_of_Decision.pdf. U.S. Forest Service, Alaska Region. Accessed October 25, 2011.
- FWS (U.S. Fish and Wildlife Service). 2011. Species by county web page. Available at: http://ecos.fws.gov/tess_public/countySearch!speciesByCountyReport.action?fips=02220. Accessed November 14, 2011. U.S. Forest Service.
- Linzey, A.V., S. Shar, D. Lkhagvasuren, R. Juškaitis, B. Sheftel, H. Meinig, G. Amori, and H. Henttonen. 2008. The IUCN red list of threatened species: *Microtus oeconomus*. Available at: <http://www.iucnredlist.org/apps/redlist/details/13451/0>. Accessed October 26, 2011.
- NatureServe. 2011. NatureServe Explorer: An online encyclopedia of life web application. Available at: <http://www.natureserve.org/explorer>. Accessed October 26, 2011. NatureServe, Arlington, VA.
- NSRAA (Northern Southeast Regional Aquaculture Association, Inc.). 2011. Sawmill Cove Hatchery web page. Available at: http://www.nsraa.org/Sawmill_Cove.html. Accessed on November 3, 2011. Northern Southeast Regional Aquaculture Association, Inc., Sitka, AK.
- Paleo Logics. 2009. Final cultural resources survey report, Blue Lake Hydroelectric Project (FERC No. 2230) expansion, Sitka, AK. Paleo Logics, Wrangell, AK. April 2009.
- The Cornell Lab of Ornithology. 2011. All about birds: Bird guide web page. Available at: <http://www.allaboutbirds.org/guide/search>. Accessed October 26, 2011. The Cornell Lab of Ornithology, Ithaca, NY.

USGS (U.S. Geological Survey). 2011. USGS surface water data for Alaska web page. Available at: <http://waterdata.usgs.gov/ak/nwis/sw>. Accessed October 5, 2011. Updated November 17, 2011. U.S. Geological Survey, Reston, VA.

Wolfe, K. 2009. Final 2008 fisheries study report, Blue Lake Project (FERC No. 2230) Expansion. Prepared for the City and Borough of Sitka Electric Department, December 2009.

8.0 LIST OF PREPARERS

Federal Energy Regulatory Commission

Steven Sachs—Project Coordinator, Engineering, Geology and Soils, Water Quantity, and Terrestrial Resources (B.S., Environmental Systems Engineering)

John Novak—Water Quality and Fisheries (M.S., Zoology; B.S., Biology)

Kurt Powers—Recreation, Land Use, Aesthetics, and Cultural Resources (B.S., Environmental Science; M.S., Environmental Science and Engineering)

Louis Berger Group

John Hart—Task Manager, Water Quantity (Hydrologist; B.A., Physics)

Carol Efird—Recreation, Land Use, and Aesthetics (Senior Recreational Recreation and Land Use Planner; B.S., Forestry)

Kenneth Hodge—Geology and Soils, Need for Power, and Developmental Analysis (Senior Engineer; B.S., Civil Engineering)

Coreen Johnson—Editorial Review (Technical Editor; B.A., English/Education)

Alison Macdougall—Cultural Resources (Senior Environmental Manager; B.A., Anthropology)

Lia Peckman—Terrestrial, Threatened and Endangered Species (Environmental Scientist, B.S. Biology)

Tyler Rychener—Terrestrial, Threatened and Endangered Species (Environmental Scientist/GIS; M.S., Plant Biology; B.S., Biology)

Diana Shannon—Water Quality and Fisheries (Aquatic Ecologist; M.S., Biology; B.A., Biology)

APPENDIX A

**U.S. Department of Agriculture, Forest Service
Final 4(e) Terms and Conditions**

General

License articles contained in the Federal Energy Regulatory Commission's (Commission) Standard Form L-1 issued by Order No. 540, dated October 31, 1975, cover those general requirements that the Secretary of Agriculture, acting by and through the USDA Forest Service, considers necessary for adequate protection and utilization of the land and related resources of the Tongass National Forest. Under authority of section 4(e) of the Federal Power Act (16 U.S.C. 797(e)), the following terms and conditions are deemed necessary for adequate protection and utilization of Tongass National Forest lands and resources. These terms and conditions are based on those resources enumerated in the Organic Administration Act of 1897 (30 Stat. 11), the Multiple-Use Sustained Yield Act of 1960 (74 Stat. 215), the National Forest Management Act of 1976 (90 Stat. 2949), and any other law specifically establishing a unit of the National Forest System or prescribing the management thereof (such as the Wilderness Act or Wild and Scenic Rivers Act), as such laws may be amended from time to time, and as implemented by regulations and approved Land and Resources Management Plans prepared in accordance with the National Forest Management Act. Therefore, pursuant to section 4(e) of the Federal Power Act, the following conditions covering specific requirements for protection and utilization of the National Forest System lands shall also be included in any license amendment issued for the Blue Lake Hydroelectric Project.

USDA Forest Service Terms and Conditions

Appendix A of the July 10, 2007 License Order for the Blue Lake Hydroelectric Project contains Forest Service Final 4(e) conditions 1 through 12, which are also applicable to this Amendment. Therefore, we have begun numbering the 4(e) conditions for this Amendment with 13.

Condition No. 13 – Requirement to Obtain a Forest Service Special-Use Authorization

Condition No. 14 – Forest Service Approval of Final Design

Condition No. 15 – Traffic Safety

Condition No. 16 – Safety During Project Construction

Condition No. 17 – Implementation and Modification of Forest Service Conditions

Condition No. 18 – Modifications of 4(e) Conditions after Biological Opinion or Certification

Condition No. 19 Project Mitigation and Monitoring Plan

Condition No. 20 – Environmental Compliance Monitor

Condition No. 21 – Noxious Weed Management Plan

Condition No. 22 – Erosion Control Plan

Condition No. 13 – Requirement to Obtain a Forest Service Special-Use Authorization

The Licensee shall obtain a special-use authorization from the Forest Service for the occupancy and use of National Forest System lands. The licensee shall obtain the executed authorization before beginning ground-disturbing activities on National Forest System lands and within one year of amendment issuance.

The Licensee may commence ground-disturbing activities authorized by the Amendment and special-use authorization no sooner 60 days following the date the licensee files the Forest Service special-use authorization with the Commission, unless the Commission prescribes a different commencement schedule.

In the event there is a conflict between any provisions of the license and Forest Service special-use authorization, the special-use authorization shall prevail to the extent that the Forest Service, in consultation with the Commission, deems necessary to protect and utilize National Forest System resources.

Rationale

The Energy Policy Act of October 24, 1992 (106 Stat. 2776; 43 U.S.C. 1761(d)) amended section 501 of the Federal Land Policy and Management Act (FLPMA) of October 21, 1976 by providing that Forest Service special use authorizations are required for the continued operation of projects licensed by FERC as of October 24, 1992, if additional National Forest System lands are proposed to be added to the licensed project area.

Condition No. 14 – Forest Service Approval of Final Design

Prior to undertaking activities on National Forest System lands, the Licensee shall obtain written approval from the Forest Service for all final design plans for project components that the Forest Service deems as affecting or potentially affecting National Forest System lands and resources. As part of such prior written approval, the Forest Service may require adjustments in final design plans and facility locations to preclude or mitigate impacts and to assure that the project is compatible with on-the-ground conditions. Should the Forest Service, the Commission, or the Licensee determine that necessary changes are a substantial change; the Licensee shall follow the procedures of Article 2 of the license. Any changes to the license made for any reason pursuant to Article 2 or Article 3 shall be made subject to any new terms and conditions the Secretary of Agriculture may make pursuant to section 4(e) of the Federal Power Act.

Rationale

This condition addresses the Forest Service's concerns for operation and maintenance of the Licensee's improvements as they may affect NFS lands and compliance with Federal, State, and local laws and regulations. Including this standard condition insures that Project operations are consistent with these requirements.

This article is consistent with the 2008 Tongass Land and Resource Management Plan Municipal Watershed land use designation management prescriptions and the standards and guidelines for Facilities (FAC3), Fish (FISH2), Recreation and Tourism (REC2), Scenery (SCENE1), Soil and Water (SW3), and Wetlands (WET).

Condition No. 15 – Traffic Safety

When construction is in progress adjacent to or on Forest Service controlled roads open to public travel, the Licensee shall furnish, install, and maintain temporary traffic controls to provide the public with adequate warning and protection from hazardous or potentially hazardous conditions associated with the Licensee's operations. Devices must be appropriate to current conditions and must be covered or removed when not needed.

Rationale

It is essential that the Licensee be required to take measures to protect against damage, injury, death, risks and hazards associated with use of the Blue Lake Road (NFSR 5755) during project construction. This standard condition requires the Licensee to seek out and eliminate, or minimize risks associated with their activities and thus protect the public interests.

This article is consistent with the 2008 Tongass Land and Resource Management Plan Forestwide standards and guidelines for Transportation (TRAN2).

Condition No. 16 – Safety During Project Construction

Within 60 days of ground-disturbing activity, the Licensee shall file with the Commission a Safety During Construction Plan that has been approved by the Forest Service and identifies potential hazard areas and measures necessary to protect public safety. Areas to consider include construction activities near public roads, trails, recreation areas, and facilities.

The Licensee shall perform daily (or on a schedule otherwise agreed to by the Forest Service in writing) inspections of Licensee's construction operations on National Forest System lands and Licensee adjoining fee title property while construction is in progress. The Licensee shall document these inspections (informal writing sufficient) and shall deliver such documentation to the Forest Service on a schedule agreed to by the Forest

Service. The Licensee shall act immediately to correct any items found to need correction.

Rationale

While unlikely, there is a possibility that construction activities could be responsible for damage, injury, or death. It is appropriate for the Licensee and not the Forest Service, to protect against damage, injury, death, risks and hazards associated with the use and/or occupation of NFS lands authorized by the Project amendment. It is essential that the Licensee be required to take measures to minimize this risk to Federal lands and human life. This condition provides an incentive to the Licensee to seek out and eliminate, or minimize risks associated with the construction activities and thus protect the public interests.

Condition No. 17 – Implementation and Modification of Forest Service Conditions

(Applies only to issuance of Special Use Permit)

The Forest Service reserves the authority to modify Forest Service 4(e) terms and conditions if upon completion of the Forest Service administrative appeals process at 36 Code of Federal Regulations (CFR) Part 251, the Chief, USDA Forest Service, or Secretary of Agriculture directs that substantial changes to the terms and conditions submitted herein be made.

Rationale

This license condition is necessary for compliance with the Forest Service administrative appeals process at 36 Code of Federal Regulations (CFR) Part 251.

Condition No. 18 – Modifications of 4(e) Conditions after Biological Opinion or Certification

The Forest Service reserves the right to modify these conditions, if necessary, to respond to any Final Biological Opinion issued for this Project by the National Marine Fisheries Service, United States Fish and Wildlife Service; or any Certification issued for this Project by the State of Alaska.

Rationale

This license condition provides protection for forest resources on NFS land by requiring modifications if environmental requirements change due to actions by other agencies.

This article is consistent with the 2008 Tongass Land and Resource Management Plan Municipal Watershed and Semi-Remote Recreation land use designation management prescriptions and the forest-wide standards and guidelines for Fish (FISH2, FISH3), Soil and Water (SW3), Wetlands (WET), and Wildlife (WILD1).

Condition No. 19 – Project Mitigation and Monitoring Plan

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.

Rationale

The Forest Service has an obligation under various laws, regulations and the Forest Plan to protect, mitigate and monitor for impacts documented in the License amendment reports and NEPA document. Implementation of the measures recommended and approved in this Plan will aid in protecting forest resources from known and future project impacts.

This article is consistent with the 2008 Tongass Land and Resource Management Plan Municipal Watershed and Semi-Remote Recreation land use designation management prescriptions and the standards and guidelines for Facilities (FAC3), Fish (FISH2, FISH3), Recreation and Tourism (REC2), Scenery (SCENE1), Soil and Water (SW3), Wetlands (WET), and Wildlife (WILD1).

Condition No. 20 - Environmental Compliance Monitor

To ensure adherence to license conditions, mitigative measures, and other environmental aspects of project construction, including those stated in each management and mitigation plan, the Forest Service will require the licensee to provide a qualified environmental compliance monitor to oversee the project during construction activities (e.g., vegetative or land disturbing, or spoil producing activities). The compliance monitor will be a liaison between the Forest Service and Licensee. The compliance monitor should be a third party contractor independent of the licensee or agency, subject to approval for both the Licensee and the Forest Service. The compliance monitor will have the authority to stop work or issue change orders in the

field should conditions so warrant. Once major construction activities are completed the compliance monitor will no longer be needed.

Rationale

It is essential that the Licensee ensure adherence to license conditions, mitigation measures, and environmental requirements of project construction. This license condition provides protection for resources on NFS lands by requiring an independent compliance monitor to observe and, if necessary, intervene during major construction activities.

This article is consistent with the 2008 Tongass Land and Resource Management Plan Municipal Watershed and Semi-Remote Recreation land use designation management prescriptions and the standards and guidelines for Facilities (FAC3), Fish (FISH2, FISH3), Invasive Species (INV1, INV3), Plants (PLA2), Recreation and Tourism (REC2), Scenery (SCENE1), Soil And Water (SW3), Wetlands (WET), and Wildlife (WILD1).

Condition No. 21 – Noxious Weed Management Plan

Within one year of amendment issuance or prior to any ground-disturbing activity, the Licensee shall file with the Commission a Noxious Weed Management Plan that is approved by the Forest Service. At a minimum the Plan shall:

- Identify methods for prevention and control of noxious weeds.
- Develop a monitoring program to evaluate the effectiveness of noxious weed control measures, and
- Develop procedures for identification of additional measures that the licensee shall implement if monitoring reveals that noxious weed control is not successful or does not meet intended objectives.

Rationale

This condition provides for the protection of forest resources by reducing the likelihood that terrestrial and aquatic invasive species and noxious weeds will be introduced as a result of project activities.

This article is consistent with the 2008 Tongass Land and Resource Management Plan Municipal Watershed and Semi-Remote Recreation land use designation management prescriptions and the standards and guidelines for Invasive Species (INV1, INV3), Plants (PLA2).

Condition No. 22—Erosion Control Plan

During planning and before any new construction or non-routine maintenance projects with the potential for causing erosion and/or stream sedimentation on or affecting National Forest System Lands, the Licensee shall file with the Commission an Erosion Control Measures Plan that has been approved by the Forest Service. The Plan shall include measures to control erosion, stream sedimentation, and soil mass movement. The plan shall be based on actual site geological, soil, and groundwater conditions.

Rationale

Project construction activities, operation and non-routine maintenance projects have the potential for causing erosion and/or stream sedimentation on or affecting National Forest System Lands. This license condition provides protection for forest resources on NFS land by requiring preventative measures to control erosion.

This article is consistent with the 2008 Tongass Land and Resource Management Plan Municipal Watershed and Semi-Remote Recreation land use designation management prescriptions and the standards and guidelines for Fish (FISH2, FISH3), Soil and Water (SW3), Wetlands (WET).