TYEE LAKE HYDROELECTRIC PROJECT

FERC NO. 3015

PRE-APPLICATION DOCUMENT

TYEE LAKE HYDROELECTRIC PROJECT
(FERC NO. 3015)

APPLICATION FOR NEW LICENSE

PRE-APPLICATION DOCUMENT

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DEFINITIONS OF TERMS, ACRONYMS, AND ABBREVIATIONS

°C	degrees Celsius
°F	degrees Fahrenheit
A	
AAC	Alaska Administrative Code
ABR	ABR, Inc.—Environmental Research and Services
ACCS	Alaska Center for Conservation Science
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Department of Fish and Game
ADOT&PF	Alaska Department of Transportation and Public Facilities
ADNR	Alaska Department of Natural Resources
This is AEIDC	Alaska Environmental Information and Data Center
AHRS	Alaska Heritage Resource Survey
AKEPIC	Alaska Exotic Plants Information Clearing House
AMHS	Alaska Marine Highway System
ANCSA	Alaska Native Claims Settlement Act
APA	Alaska Power Authority
AS	Alaska Statute
ASCE	American Society of Civil Engineers
AWC	Anadromous Waters Catalog
B	
BCC	Bird(s) of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
C	
CEII	Critical Energy Infrastructure Information
CFR	United States Code of Federal Regulations
cfs	cubic feet per second
CO	carbon monoxide
Commission	Federal Energy Regulatory Commission
CZMA	Coastal Zone Management Act
D	
DLA	Draft License Application
DO	dissolved oxygen
DPS	Distinct Population Segment
E	
EA	Environmental Assessment

EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ENSO	El Niño Southern Oscillation
ESA	Endangered Species Act
F	
FERC	Federal Energy Regulatory Commission
FLA	Final License Application
FOIA	Freedom of Information Act
FR	Federal Register
Ft	feet or foot
ft/s	feet per second
FPA	Federal Power Act
G	
GIS	geographic information system
GMU	Game Management Unit
H	
HPMP	Historic Properties Management Plan
Hz	hertz
I	
IECO	International Engineering Company, Inc.
Intertie	Swan-Tyee Intertie
IPaC	Information for Planning and Consultation
J	
JAM	Joint Agency and Public Meeting
K	
kV	kilovolt
kVA	kilovolt-ampere
kW	kilowatt
L	
License Application	Application for New License
Licensee	Southeast Alaska Power Agency
LUD	Land Use Designation
LWCF	Land and Water Conservation Fund
M	
MBTA	Migratory Bird Treaty Act
mg/L	milligrams per liter

mllw	mean lower low water
mm	millimeter
MMPA	Marine Mammal Protection Act
MW	megawatt
MWh	megawatt-hours
N	
NEPA	National Environmental Policy Act
NGO	non-governmental organization
NHPA	National Historic Preservation Act
NLURA	Northern Land Use Research Alaska
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NRCS	Natural Resource Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
O	
OA/FA	oil-air/fan-assisted
P	
PAD	Pre-Application Document
PDO	Pacific Decadal Oscillation
PM&E	protection, mitigation, and enhancement
ppt	parts per thousand
Project	Tyee Lake Hydroelectric Project, FERC Project No. 3015
Project area	The general geographic area in which the Project is located that might be influenced by the Project's presence and operations
Project Boundary	The boundary line defined in the Project license issued by FERC that surrounds those areas needed for operation and maintenance of the Project
R	
RM	river mile
Rpm	revolutions per minute
S	
SCORP	Statewide Comprehensive Outdoor Recreation Plan
SEAPA	Southeast Alaska Power Agency
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Office
SWAP	State Wildlife Action Plan

T	
TDAT	Tribal Directory Assessment Tool
THPO	Tribal Historic Preservation Officer
TLP	Traditional Licensing Process
Tongass Forest Plan	2016 Tongass National Forest Land and Resource Management Plan
Tyee Lake Project	Tyee Lake Hydroelectric Project, FERC Project No. 3015
U	
U.S. Census	United States Census Bureau
UAF	University of Alaska Fairbanks
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
V	
V	Volt

1.0 INTRODUCTION

The Southeast Alaska Power Agency (SEAPA or Licensee) is the Licensee, owner, and operator of the Tyee Lake Hydroelectric Project, Federal Energy Regulatory Commission (FERC or Commission) Project No. 3015 (Tyee Lake Project or Project). The Tyee Lake Project is a major project located at the head of Bradfield Canal, approximately 40 miles southeast of Wrangell, 70 air miles southeast of Petersburg, and 60 miles northeast of Ketchikan, Alaska (Figure 1-1). The major Project features occupy state and federal lands and are surrounded by United States Forest Service (USFS) Tongass National Forest lands.

The Tyee Lake Project started operation in May 1984 under a license issued by FERC (1981) that expires July 2031. The Tyee Lake Project originally supplied power to the communities of Wrangell and Petersburg. In 2009, SEAPA completed the 57-mile-long Swan-Tyee Intertie (Intertie) connecting the Tyee Lake Project to SEAPA's Swan Lake Hydroelectric Project (FERC Project No. 2911) and the community of Ketchikan (Figure 1-1). Since completion of the Intertie and the Swan Lake Dam raise in 2017, the average annual generation at Tyee Lake has been 108,644 megawatt-hours (MWh).

Currently, the powerhouse includes two Pelton-type turbine generating units having a total installed capacity of 22.5 megawatts (MW). FERC issued a license amendment order on April 14, 2026, that approved the installation of a third turbine in the powerhouse; SEAPA anticipates installing the third turbine in the powerhouse in fall 2027, which will increase the installed capacity to 33.75 MW.[1]

The existing Project Boundary (Figure 1-2) contains 3,094 acres of federal, state, borough, and private lands. On April 1, 2026, SEAPA distributed a draft non-capacity amendment application for public comment to exclude the transmission line extending from the Tyee Lake powerhouse switchyard to the Wrangell and Petersburg substations from the FERC Project Boundary.[2] As a result of the construction of the Intertie, the transmission line extending from Tyee to Petersburg no longer meets the definition of "primary" transmission as defined by the Federal Power Act (FPA). Exclusion of the non-primary transmission line from the FERC Project Boundary is ministerial and non-discretionary.

[1] SEAPA filed a capacity amendment application for installation of a third turbine on January 27, 2025. FERC issued its order amending SEAPA's license on April 14, 2026 (Accession Number 20260414-3027).

[2] SEAPA anticipates filing its final non-capacity amendment application with FERC in June 2026 to exclude the non-primary transmission line extending from the Tyee Lake powerhouse switchyard to Petersburg, Alaska, from the FERC Project Boundary.

Accordingly, the Project area considered in this Pre-Application Document (PAD) consists of the non-transmission portion of the Project Boundary and includes Tyee Creek, Hidden Creek, and the marine environment in Bradfield Canal (Figure 1-3).

SEAPA is providing this PAD as required by Title 18 of the United States Code of Federal Regulations (CFR), § 5.6 and § 16.8. This PAD accompanies SEAPA's Notice of Intent (NOI) to seek a new license for the Tyee Lake Project. SEAPA is simultaneously distributing this PAD and NOI to federal and state resource agencies,[3] local governments, Alaska Native Tribes, non-governmental organizations (NGOs), members of the public, and other parties potentially interested in the relicensing proceeding. As specified in 18 CFR § 5.6(c) and (d), the PAD provides FERC and the entities listed above with summaries of existing, relevant, and reasonably available information related to the Tyee Lake Project that is in SEAPA's possession or was obtained through due diligence.

By filing the NOI and PAD, SEAPA is initiating the formal start of the FERC relicensing process for the Tyee Lake Project. SEAPA is simultaneously requesting use of the Traditional Licensing Process (TLP). A formal request for authorization to use the TLP is included in the cover letter filed with this PAD.

[3] Resource agencies include the United States Army Corps of Engineers (USACE), National Oceanic and Atmospheric Administration (NOAA), United States Forest Service (USFS), United States Fish and Wildlife Service (USFWS), Bureau of Indian Affairs (BIA), Alaska Department of Fish and Game (ADF&G), Alaska State Historic Preservation Office (SHPO), Alaska Department of Natural Resources (ADNR), and Alaska Department of Environmental Conservation (ADEC).

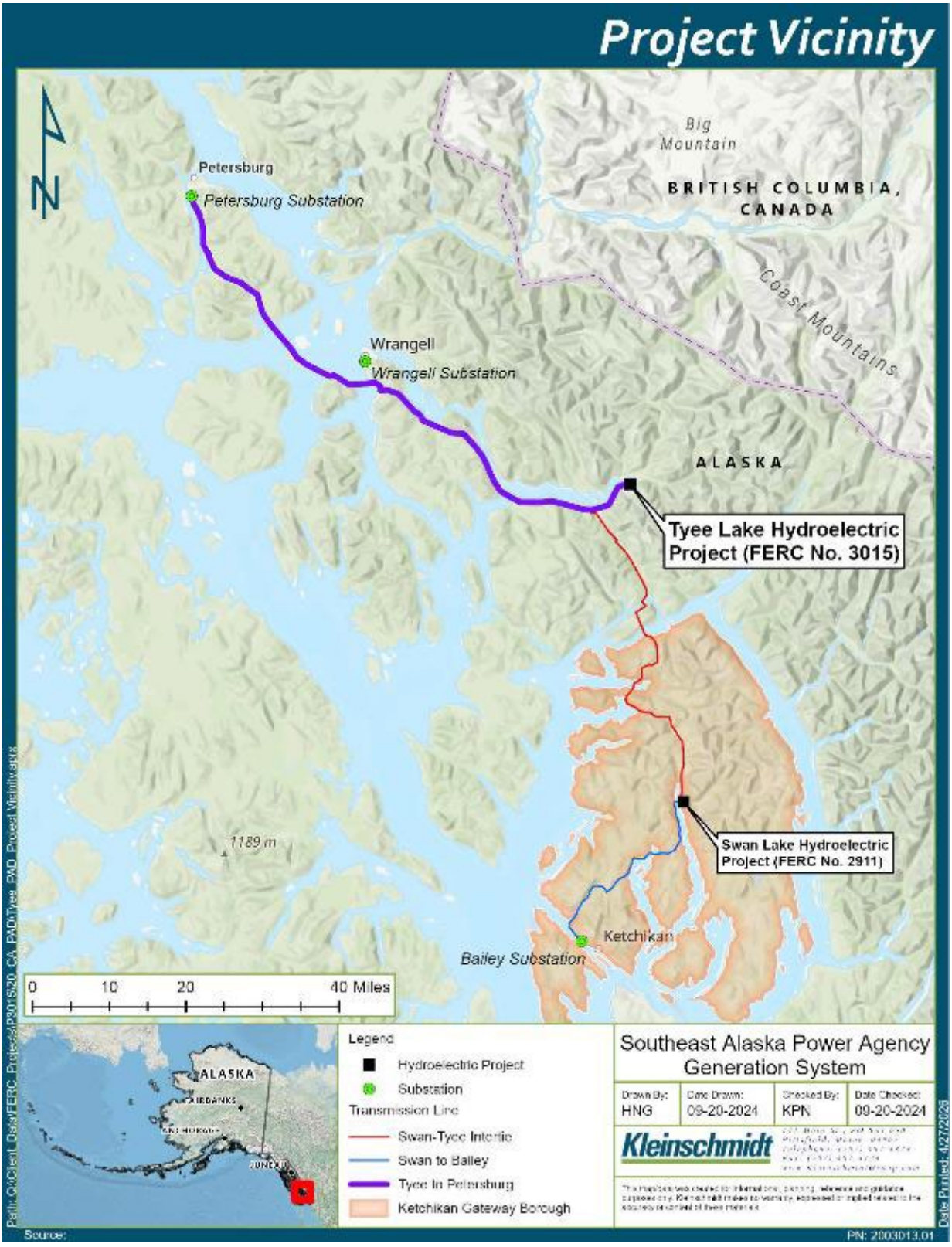

Figure 1-1 Tyee Lake Hydroelectric Project (FERC No. 3015) vicinity.

Figure 1-2 Existing Tyee Lake FERC Project Boundary.

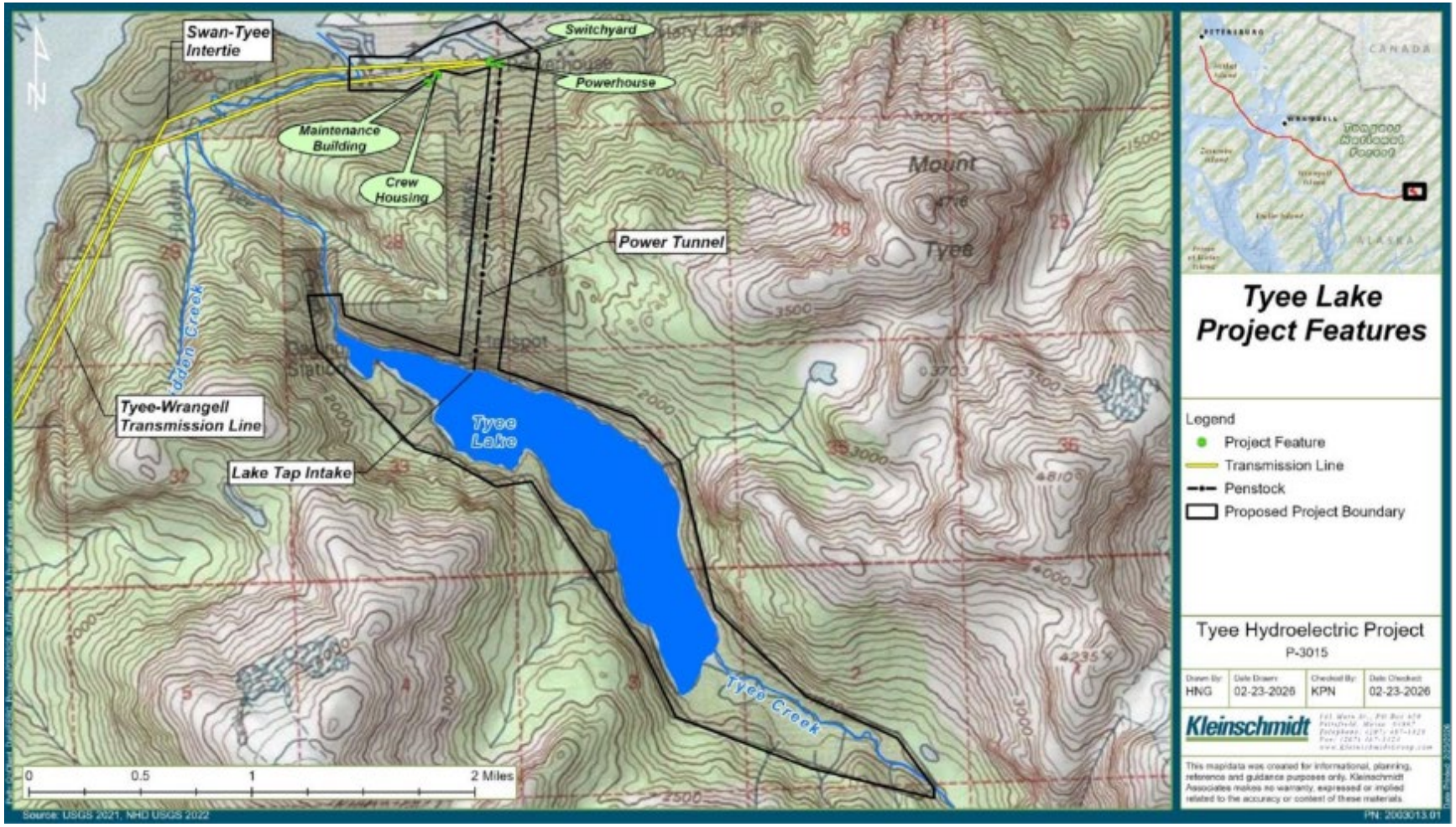

Figure 1-3 Tyee Lake proposed FERC Project Boundary and features. [4]

[4] As a separate proceeding, SEAPA distributed a draft non-capacity amendment application for public comment on April 1, 2026, to exclude the non-primary transmission line extending from the Tyee Lake powerhouse switchyard to Petersburg, Alaska, from the FERC Project Boundary. SEAPA anticipates filing the final non-capacity amendment application with FERC in June 2026.

1.1 Document Purpose

This PAD was prepared in compliance with 18 CFR Part 5, which defines the form and content requirements of the document. The purpose of the PAD is to provide FERC, federal and state agencies, and other interested stakeholders with existing background information related to Project facilities and operational, engineering, economic, and environmental aspects of the Project. The PAD defines pertinent Tyee Lake Project issues and potential study needs. In accordance with the regulations, the PAD and associated NOI will be filed with FERC and distributed to federal and state resource agencies, local governments, relevant Tribal entities, NGOs, and other interested parties. In addition, by filing the NOI and PAD with FERC, SEAPA is requesting and initiating the TLP to relicense the Tyee Lake Project.

FERC's regulations require that a licensee exercise due diligence in obtaining and including existing relevant and reasonably available information about the Project and related resources. In preparing its amendment application in 2024 to install and operate the third turbine unit, SEAPA conducted searches of publicly available databases including peer-reviewed journal articles, reference books, and the internet and reviewed its own files for relevant information. SEAPA also contacted appropriate federal and state governmental agencies, municipal representatives, NGOs, and others potentially having relevant information. SEAPA relied on this information and recent consultations in preparing this PAD. SEAPA also held an initial outreach meeting with representatives from the Alaska Department of Fish and Game (ADF&G), USFS, and United States Fish and Wildlife Service (USFWS) on December 6, 2025, to introduce relicensing the Project and discuss potential resource concerns. SEAPA inquired with stakeholders in March and April 2026 to confirm if they have any baseline information to include in the PAD or if they wanted to attend a meeting. By the time of PAD filing, ADF&G had responded in support of the use of the TLP. SEAPA will continue to engage agencies and other interested parties in consultation throughout the relicensing process.

The information presented in this PAD provides parties interested in this relicensing the materials necessary to review existing information about Project resources; identify issues and related information needs; develop study requests and study plans; and analyze SEAPA's Application for New License (License Application) that will be filed with FERC on or before July 31, 2029. The PAD is a precursor to the environmental analysis section of the License Application and eventually to FERC's Scoping Documents and Environmental

Impact Statement (EIS) or Environmental Assessment (EA) under the National Environmental Policy Act (NEPA).

1.2 Agents for Southeast Alaska Power Agency

The following people are authorized to function as agent for the applicant pursuant to 18 CFR § 5.6(d)(2)(i):

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1.3 Pre-Application Document Content

The information contained in this document was assembled based on the requirements set forth in 18 CFR § 5.6(c) and (d). All references and sources of information used in the development of this document are included in a references section for each respective section of this document (18 CFR § 5.6(c)(2)). This PAD is organized as follows:

- Section 1: Introduction
- Section 2: Process Plan and Schedule (18 CFR § 5.6(d)(1))
- Section 3: Project Location, Facilities, and Operations (18 CFR § 5.6 (d)(2))
- Section 4: General Description of the River Basin (18 CFR § 5.6 (d)(3)(xiii))
- Section 5: Description of Existing Environment (18 CFR § 5.6 (d)(3)(ii)-(xiii))
- Section 6: Preliminary Issues and Studies List for Each Resource Area, including Comprehensive Management Plans (18 CFR § 5.6 (d)(3) and (4))
- Appendix A: Original License and Amendments
- Appendix B: Single-Line Diagram (CEII) *(Critical Energy Infrastructure Information –DO NOT RELEASE)*

- Appendix C: Flow Duration Curves
- Appendix D: Tyee Lake Bathymetry

Information containing Critical Energy Infrastructure Information (CEII) pursuant to FERC's June 23, 2003 Order No. 630-A or confidential financial information as defined by 18 CFR § 388.112 is filed as an appendix under separate cover to FERC only.

1.4 References

Federal Energy Regulatory Commission (FERC). 1981. Order Issuing License (Major). Tyee Lake Hydroelectric Project, FERC No. 3015. Issued August 5, 1981.

2.0 PROCESS PLAN AND SCHEDULE

Pursuant to 18 CFR § 5.3(b) and (c), SEAPA is requesting FERC's approval to use the TLP to relicense the Tyee Lake Project. SEAPA is submitting this request to FERC concurrently with the submittal of the NOI and PAD. Under the TLP, the three-stage pre-filing consultation process described in 18 CFR § 16.8 would be completed and documented.

The first stage includes coordination between the Licensee, resource agencies, affected Alaska Native Tribes, stakeholders, and the public, and it includes initial information gathering via the PAD, notification of interested parties, and study planning.

The second stage involves study implementation and additional data gathering as well as development of a Draft License Application (DLA) and review of the DLA by resource agencies and, optionally, FERC.

The third stage commences with the filing of the Final License Application (FLA), whereby FERC initiates its own review and public comment process, completes an environmental analysis per NEPA, and ultimately decides on issuing a new license for the Tyee Lake Project.

The Process Plan and Schedule for the relicensing of the Tyee Lake Project is provided in Table 2-1 and outlines actions by FERC, SEAPA, and other participants in the relicensing process through filing of the FLA. This Process Plan and Schedule assumes FERC approval of the TLP and is based upon the NOI/PAD filing date of April 28, 2026, from which all subsequent dates are derived. The Process Plan and Schedule is subject to change throughout the relicensing process; however, regulatory timeframes will adhere to 18 CFR Part 16.

Table 2-1 Proposed Process Plan and Schedule.

Activity	Responsible Party	Timeframe	Regulation	Dates[1,2]
First Stage of Consultation				
File NOI/PAD	SEAPA	At least 5 but no more than 5.5 years prior to license expiration	18 CFR § 5.5(d), 5.6	April 28, 2026
Request for Non-Federal Representative Designation	SEAPA	Concurrent with filing the PAD and NOI	18 CFR § 5.5(e)	April 28, 2026
Submit TLP Request	SEAPA	Concurrent with filing of NOI and PAD	18 CFR § 5.5, 5.3(d)(1)	April 28, 2026
Publish notice of NOI/PAD and TLP request in daily or weekly newspaper	SEAPA	Concurrent with filing of NOI and PAD	18 CFR § 5.3(d)(2)	April 28, 2026
Comments on use of TLP	FERC / Stakeholders	Within 30 days of TLP Request	18 CFR § 5.3	May 28, 2026
FERC Notice of Commencement and Action on Use of TLP	FERC	Within 60 days of NOI/PAD	18 CFR § 5.8	June 29, 2026
Joint Meeting Notification and Agenda to FERC and Stakeholders[3]	SEAPA	At least 15 days prior to Joint Agency and Public Meeting (JAM)	18 CFR § 16.8(b)	July 2026
Publish Public Notice of Joint Meeting in Newspaper	SEAPA	At least 14 days prior to the JAM	18 CFR § 16.8(b)	July 2026
Conduct Joint Meeting and Site Visit	SEAPA	30 to 60 days after FERC Notice of Commencement and TLP Approval	18 CFR § 16.8(b)	July 2026
File Comments on PAD and Study Requests	Stakeholders	Within 60 days of Joint Meeting	18 CFR § 16.8(b)(5)	October 19, 2026

Activity	Responsible Party	Timeframe	Regulation	Dates[1,2]
Initial Dispute Resolution Process (if necessary)	SEAPA, Stakeholders, and FERC	Within 60 days of Joint Meeting	18 CFR § 16.8(b)(6)(i)	October 19, 2026
Second Stage of Consultation				
Conduct First Season of Studies	SEAPA	--	18 CFR § 16.8(c)	2027
Conduct Second Season of Studies (if necessary)	SEAPA	--	18 CFR § 16.8(c)	2028
Issue Study Reports to Stakeholders	SEAPA / Stakeholders	Upon study completion	18 CFR § 16.8(c)(4)(ii)	January 2029
File DLA	SEAPA	No later than 150 days prior to deadline for filing FLA	18 CFR § 16.8(c)(4)(i)	March 2, 2029
File Comments on Applicant's DLA	Stakeholders	Within 90 days of filing DLA	18 CFR § 16.8(c)(5)	May 31, 2029
Third Stage of Consultation				
File FLA	SEAPA	No later than 24 months before existing license expires	18 CFR § 16.2(b)	July 30, 2029

[1] If the due date falls on a weekend or holiday, the deadline is the following business day.
[2] The schedule is subject to change throughout the relicensing proceeding. If conducting an Integrated Licensing Process, FERC approval of pre-filing schedule changes may be required.
[3] This activity assumes FERC's approval on the use of the TLP.

2.1 Joint Agency and Public Meeting, and Site Visit

As set forth in the TLP regulations, SEAPA will schedule a Joint Agency and Public Meeting (JAM), including an opportunity for a site visit, with all pertinent resource agencies, Alaska Native Tribes, NGOs, and members of the public. Subsequent to FERC granting authorization of the TLP, SEAPA will provide stakeholders with written notice of the time and place of the joint meeting and a written agenda at least 15 days in advance of the meeting. Pursuant to 18 CFR §16.8(b)(3), the joint meeting will be held no earlier than 30 days and no later than 60 days from the date of FERC approval of use of the TLP. SEAPA is tentatively planning to hold the meeting and site visit during July 2026. SEAPA will

confirm the location and time of the meeting and opportunity for site visit with parties on the Distribution List upon receiving notification from FERC regarding the TLP request.

2.2 Communication and Document Distribution

SEAPA's goal is to maintain open communication during the relicensing process and to provide public access to relevant Tyee Lake Project relicensing information. SEAPA anticipates distribution of relevant documents, submittal of comments, and correspondence will be largely conducted electronically, either by electronic filing of documents with FERC or via email distribution. SEAPA will maintain documentation of all electronic correspondence as part of formal agency consultation proceedings.

Relicensing documents can be downloaded from SEAPA's Tyee Lake Project relicensing website at: https://www.tyeelakerelicensing.com/. All requests for hard copies of relicensing documents should be sent to Mark Hilson and should clearly indicate the document name, publication date, and FERC Project No. 3015. A reproduction charge and postage costs may be assessed for hard copies requested by the public.

Mark Hilson, P.E.
Southeast Alaska Power Agency
55 Don Finney Lane
Ketchikan, AK 99901
907-228-2017
mhilson@seapahydro.org

Relicensing documents are also available to the public through the FERC eLibrary, a records information system on the internet that contains documents submitted to and issued by FERC. The eLibrary can be accessed through FERC's homepage, at http://www.ferc.gov, or directly at https://elibrary.ferc.gov/eLibrary/. Documents filed with FERC as part of the Tyee Lake Project relicensing process are available for viewing and printing via eLibrary by searching under the Tyee Lake Project's docket, "P-3015." Interested parties can subscribe to the P-3015 docket for the Tyee Lake Project under eSubscription on FERC's website to receive notices of issuance and filings by email.

2.3 Restricted Documents

Certain Tyee Lake Project-related documents are restricted from public viewing in accordance with FERC regulations. CEII (defined under 18 CFR § 388.113), which includes

materials related to the design and safety of hydroelectric projects and their appurtenant facilities, as well as information that is necessary to protect national security and public safety, is restricted. Anyone seeking CEII from FERC must file a CEII request. FERC's website is https://www.ferc.gov/ceii and contains additional details related to CEII. CEII documents associated with Appendix B of this PAD have been filed separately with FERC.

Additional restricted materials include Privileged Information associated with protecting sensitive information, such as the location of rare, threatened, or endangered species, and sensitive archaeological or other culturally significant properties. Anyone seeking this information from FERC must file a Freedom of Information Act (FOIA) request. Instructions for FOIA are available on FERC's website at https://www.ferc.gov/foia-privacy-act-and-ceii.

2.4 TLP Participation

SEAPA provides this PAD to representatives of federal and state agencies, local governments, Alaska Native Tribes, NGOs, members of the public, and other parties potentially interested in the relicensing proceedings. Any party that would like to be added to or removed from the Distribution List should send a request to:

Betsy McGregor
Senior Scientist and Regulatory Consultant
Kleinschmidt Associates
11901 Circle Drive
Anchorage, AK 99507
907-885-3418
betsy.mcgregor@kleinschmidtgroup.com

2.5 Comments on PAD and Study Requests

In accordance with FERC's regulations (18 CFR § 16.8(b)(5)) and the TLP, relicensing participants may provide comments on the PAD and identify resource studies for consideration, as outlined in Table 2-1 above. Comments on the PAD and study requests will be due 60 days after the JAM. Participants should consider the following criteria in making any study requests:

- Describe the goals and objectives of each study proposal and the information to be obtained.

    - If applicable, explain the relevant resource management goals of the agencies or Alaska Native Tribes with jurisdiction over the resource to be studied.
- If the requestor is not a resource agency, explain any relevant public interest considerations in regard to the proposed study.
- Describe existing information concerning the subject of the study proposal and the need for additional information.
- Explain any nexus between Project operations and effects (direct, indirect, and/or cumulative) on the resource to be studied and how the study results would inform the development of license requirements.
- Explain how any proposed study methodology (including any preferred data collection and analysis techniques, or objectively quantified information, and a schedule including appropriate filed season[s] and the duration) is consistent with generally accepted practice in the scientific community or, as appropriate, considers relevant Tribal values and knowledge.
- Describe considerations of the level of effort and cost, as applicable, and why any proposed alternative studies would not be sufficient to meet the stated information needs.

The requestor should also describe any available cost-share funds or in-kind services that the sponsor of the request may contribute toward the study effort. The requester should email or mail completed study requests in Microsoft Word or PDF format to:

Mark Hilson, P.E.
Southeast Alaska Power Agency
55 Don Finney Lane
Ketchikan, AK 99901
907-228-2017
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3.0 PROJECT LOCATION, FACILITIES, AND OPERATIONS

3.1 Project Background and Location

The Tyee Lake Project is located on Tyee Creek near the head of Bradfield Canal approximately 40 miles southeast of Wrangell, 70 air miles southeast of Petersburg, and 60 miles northeast of Ketchikan, Alaska (Figure 1-1). The townships, ranges, and sections occupied by Project facilities are shown in Table 3-1.

Table 3-1 Tyee Lake Project facility locations (Copper River Meridian).

Facility	Township	Range	Section
Spillway Weir	65S	90E	28
Tyee Lake/Reservoir	65S	90E	28, 33, 34
	66S	90E	3
Intake Structure / Lake Tap	65S	90E	33
Power Tunnel and Penstock	65S	90E	21, 22, 28,33
Powerhouse	65S	90E	22
Tailrace	65S	90E	22
Switchyard	65S	90E	21
Appurtenant Facilities	65S	90E	22, 21, 33

3.1.1 Original Construction

Construction of the Tyee Lake Project began on October 20, 1981, and was completed in 1984, with commencement of commercial operations in May 1984.

3.1.2 Modifications or Additions to the Project

3.1.2.1 2013 Outlet Weir Construction

License Article 8 required the Licensee to maintain staff gages for flow measurements at the Tyee Lake Project. Historically, the Licensee and the United States Geological Survey (USGS) worked together to measure the outflow above and below the Tyee Lake Project; however, the build-up of a log jam resulting in poor-quality measurements necessitated removal and installation of a weir at the natural outflow of Tyee Lake to prevent future issues.

Removal of the log jam and installation of the weir and all necessary facilities was completed in October 2013, and by Order dated March 21, 2014, FERC approved the as-built drawings for the weir.

3.1.2.2 2014 Weir Repair

The weir was inspected in 2014 following high flows and was found to have significant leakage around the left and right abutments. Due to leakage in several locations, 45 cubic yards of fill was placed to preserve the flow monitoring capabilities of the weir.

3.2 Project Boundary

The FERC Project Boundary currently includes 3,094 acres. Most of this area is a transmission line right-of-way corridor extending from the switchyard at the Tyee Lake powerhouse to the Wrangell and Petersburg substations. The existing Project Boundary is shown in Figure 1-2.

SEAPA is separately pursuing a non-capacity related amendment application to exclude the transmission line extending from the Tyee Lake switchyard to the Wrangell and Petersburg substations because it no longer meets the definition of "primary" transmission per the FPA since construction of the Intertie in 2009. This amendment is largely administrative in nature and will not result in any changes to land ownership or management of the transmission line. A draft application was submitted to resource agencies for review on April 1, 2026; SEAPA anticipates filing the final amendment application with FERC in June 2026. When the transmission line right-of-way is excluded from the Project Boundary, the new boundary would be 1,161.7 acres, comprised of state and federal lands (Figure 1-3).

3.3 Existing Project Facilities

Tyee Lake is a natural lake with a drainage area of approximately 14.4 square miles. Water from Tyee Lake supplies the hydroelectric project via a lake tap. The Project facilities consist of Tyee Lake, spillway weir, intake structure with gatehouse, power tunnel and penstocks, powerhouse, tailrace, switchyard, crew housing, maintenance buildings, dock, boat ramp, and barge bulkhead (Table 3-2, Photo 3-1).

Table 3-2 Tyee Lake Project components and specifications.

Description	Number or Fact
General Information	
FERC Project Number	P-3015
Owner	SEAPA
Current License Term	50 years
Licensed Capacity*	33.75 MW
Installed Capacity*	22.5 MW
Nearest County (Borough)	Borough of Wrangell, Alaska
Nearest Town	City of Wrangell, Alaska
River	Tyee Creek
Drainage Area at the Lake Outlet	14.4 square miles
River Mile (RM)	1.1
Tyee Lake / Reservoir	
Normal Full Pool Elevation	1,396 ft mllw
Minimum Surface Elevation	1,250 ft mllw
Gross Head	1,221 to 1,385 ft
Net Head	1,306 ft (1,163 to 1,384 ft)
Lake Length	2.3 miles
Surface Area at Normal Full Pool	481 acres
Gross Storage at Normal Full Pool	86,660 ac-ft
Usable Storage Capacity	52,400 ac-ft
Intake Structure / Lake Tap	
Construction Type	Lake tap
Construction Date	May 1984
Lake Tap Invert	1,230 ft mllw
Powerhouse	
Construction Type	Reinforced concrete, structural steel and metal panel
Location	Latitude 56°13'01" Longitude -131°29'15"
Dimensions	122 ft long x 38 ft wide

Description	Number or Fact
Turbines	
Number of Turbine/Generator Units Installed*	2 units
Minimum Hydraulic Capacity	3 cfs (for station service at 100 kW for the annual 10-day maintenance shutdown)
Maximum Hydraulic Capacity*	234 cfs total (2 units at 117 cfs each)
Installed Capacity*	22.5 MW total (2 units at 11.25 MW per unit)
Tailrace	
Length	1,140-ft-long; 30-ft bottom width, 2:1 sides
Normal Tailwater Elevation	22 to 24 ft mllw at powerhouse (tidally influenced)

ac-ft = acre-feet; cfs = cubic feet per second; ft = feet; kW = kilowatt; mllw = mean lower low water; MW = megawatt

* On April 14, 2026, FERC issued an amendment to SEAPA's Tyee Lake FERC license to install and operate a third turbine unit. SEAPA anticipates installing the third unit in fall 2027. Once installed, the maximum hydraulic capacity will increase to 351 cfs and the installed capacity will increase to 33.75 MW.

Photo 3-1 Tyee Lake Hydroelectric Project development.

3.3.1 Tyee Lake / Reservoir

Tyee Lake is naturally impounded, requiring no constructed dam. Operations range from water surface elevations of 1,250 to 1,396 feet mean lower low water (mllw) with an active storage of 52,400 acre-feet. At normal maximum pool elevation, the lake's surface area is 481 acres.

3.3.2 Spillway Weir

A trapezoidal reinforced concrete weir was constructed in 2013 at the natural outlet of Tyee Lake to measure outflow into Tyee Creek (Photo 3-2). The weir is 18 feet long with a 1:4 horizontal-to-vertical (H:V) side slope.

Photo 3-2 Tyee Lake spillway weir.

3.3.3 Intake Structure / Lake Tap

The hydropower intake structure is located approximately 2,000 feet east of the natural outlet of Tyee Lake on the northern shore of Tyee Lake. The elevation of the intake invert is approximately 1,230 feet mllw. The intake structure is fitted with a trashrack and directs water into a drop shaft that connects to the power tunnel.

3.3.4 Power Tunnel and Penstock

An 8,300-foot-long, 10-foot-diameter unlined power tunnel extends north-northwest from the intake structure, connecting to a steel 1,350-foot-long penstock bringing flow into the powerhouse, where the penstock trifurcates; the first two portions connect to turbine-generating Units 1 and 2. The third leads to a closed valve in an existing empty bay within the powerhouse (Photo 3-3). SEAPA expects to install a third turbine in the empty bay in fall 2027.

Photo 3-3 Penstock and concrete thrust box in empty bay for the third unit.

3.3.5 Powerhouse, Turbines, and Generators

The powerhouse, which is located near Bradford Canal, is an above-ground reinforced concrete substructure and steel superstructure that is 122 feet long by 38 feet wide (Photo 3-4). It was constructed with provisions for three turbines. The powerhouse currently contains two horizontal-axis, Pelton-type (impulse) turbines, operating at 720 revolutions per minute (rpm) with a rated capacity of 16,750 horsepower and 12,500 kilovolt-amperes (kVA) under a net effective head of 1,306 feet. Gross head ranges from 1,221 to 1,385 feet, and net head ranges from 1,163 to 1,384 feet.

Each existing turbine is coupled to a vertical-shaft synchronous generator rated at 12,500 kVA at 13.8 kilovolt (kV) and 0.9 power factor (Photo 3-5). The generators can deliver 115 percent rated kVA continuously and each has a static excitation system. The third turbine, expected to be installed in fall 2027, would be the same type and capacity as the existing turbines and would be installed in the empty bay in the powerhouse.

Service power to the station is provided by tapping the main leads of each generator and connecting to a 480-volt (V) switchgear through a 13,800/480-V stepdown transformer. Emergency station power is supplied by a pair of 125-kilowatt (kW) diesel generators.

All equipment is designed for local-manual, local-automatic, and remote operation based on the concept that the powerhouse is normally unattended and can be controlled from the supervisory control and data acquisition (SCADA) control center at Wrangell via power line carrier equipment.

Photo 3-4 Tyee Lake powerhouse, switchyard, and tailrace.

Photo 3-5 Existing turbines in the Tyee Lake powerhouse.

3.3.6 Tailrace

The tailrace is approximately 1,100 feet long and discharges into Airstrip Slough, a side channel of Hydro Creek, which flows into the head of Bradfield Canal (Photo 3-6). The tailrace is tidally influenced. The normal tailwater elevation fluctuates with the tides and typically ranges from 22 to 24 feet as measured by the National Oceanic and Atmospheric Administration (NOAA) using the National Tidal Datum Epoch in the upper concrete portion of the tailrace under the powerhouse, and a few feet lower near Airstrip Slough downstream of the powerhouse. The tailrace was constructed to accommodate the operation of three turbines operated at full capacity.

Photo 3-6 Tailrace looking upstream from Airstrip Slough to the Tyee Lake powerhouse.

3.3.7 Switchyard

The switchyard is located approximately 200 feet west of the powerhouse. The switchyard includes the generator step-up transformers, circuit switchers, circuit breakers, 138-kV

bus, disconnecting switches, line traps, potential transformers, coupling capacitors, and the line take-off structures.

Each generator is connected to a step-up transformer by a 15-kV cable laid in a duct bank. Each step-up transformer is rated at 11,250/15,000 kVA, oil-air/fan-assisted (OA/FA), 13.8/69-138 kV, three-phase 60 hertz (Hz) with surge arrestors mounted at the high-voltage bushings. The high-voltage side of these transformers is connected to a 138-kV bus via circuit switchers. A three-phase, three-wire overhead non-primary transmission line is connected to the bus via an oil circuit breaker. The transmission line operating voltage is set at 69 kV.

The switchyard area was originally designed and constructed with room for equipment associated with the third turbine unit (Photo 3-7).

Photo 3-7 Switchyard showing space for installation of third transformer.

3.3.8 Appurtenant Facilities

There is no road access to the Project; access is by air or water only. A bulkhead for barge access with a staging area as well as docks and ramps for small boats and float planes are located at tidewater on Bradfield Canal. A short access road to the east connects the dock and staging area to maintenance buildings, crew housing, the switchyard and powerhouse, and an airstrip. See Photo 3-1 for the layout of tidewater appurtenant facilities.

A gatehouse with a helicopter landing pad is located at Tyee Lake for operations personnel to control water flow at the intake (Photo 3-8).

Photo 3-8 Gatehouse at Tyee Lake.

3.4 Project Operations

The Tyee Lake Project is operated as a conventional hydroelectric plant and, since completion of the Swan-Tyee Intertie, it has been operated in conjunction with the Swan Lake Hydroelectric Project. Because of the generational flexibility required in this closed-

loop system, water levels in Tyee Lake vary based on loads and inflow to the system. Under current operations of the two turbines, more than 90 percent of the inflow into Tyee Lake is diverted to the powerhouse. When the facility is operated at capacity, Tyee Lake may be drawn down approximately 135 feet to 140 feet below the normal lake surface level, with the lowest levels occurring in spring prior to snowmelt. Under normal water years, the lake refills during the summer months and peaks during late summer or fall but is not expected to spill into the lake's outlet stream except during heavy rainfall events. When inflow causes Tyee Lake elevations to exceed 1,396 feet mllw, excess water is spilled over the weir at the natural outlet of Tyee Lake into Tyee Creek. Between 2017 and 2023, spill occurred during 4 years for a total of 2 to 130 days per year. There are no minimum flow requirements into Tyee Creek; however, substantial unmeasured flow enters Tyee Creek at the natural Tyee Lake outlet underneath and around the weir when lake elevations exceed approximately 1,360 feet.

3.5 Other Project Information

3.5.1 Current License Requirements

The Tyee Lake Project license (FERC 1981) is subject to FERC's standard terms and conditions designated Articles 1 through 32 set forth in Form L-2, revised October 1975 (FERC 1975). Additional Project-specific license articles stated in the 1981 Tyee Lake Project License, and as amended in 2014 (Article 33, annual charges), are included in Appendix A.

3.5.2 Compliance History of the Project

There are no known instances of non-compliance with regulatory requirements.

3.5.2.1 FERC Inspections

The FERC Regional Office conducts periodic inspections. The most recent FERC safety inspection occurred on August 20, 2015. SEAPA has completed all necessary corrective actions to address comments and recommendations arising from FERC inspections.

3.5.3 Summary of Project Generation and Outflow

Average monthly energy production for current operations of the Project (2017 to 2025) are summarized in Table 3-3. During this period, average monthly generation ranged from 5,212 MWh in June to 11,610 MWh in December.

Section 5.2.2 provides additional information pertaining to streamflow into the Project, and Appendix C contains annual and monthly flow duration curves. Outflow records are also provided in Table 5-4 and Table 5-5 in Section 5.2.2.

3.5.4 Average Annual Energy and Dependable Capacity

The dependable capacity of the Tyee Lake Project is 4,150 MWh. This represents the available capacity when Tyee Lake has 10 feet of usable storage. At this elevation, SEAPA typically ceases generation in favor of other generation sources in the system (e.g., diesel generators).

Average annual power generation at the Tyee Lake Project from 2017 through 2025 was approximately 108,643 MWh.

Table 3-3 Average generation by month in MWh (2017–2025).

Month	Average Monthly Energy Generation (MWh)
January	11,409
February	10,855
March	10,994
April	9,924
May	7,355
June	5,212
July	8,736
August	8,981
September	6,770
October	7,321
November	9,477
December	11,610
Average	**9,054**

3.5.5 Current Net Investment 2025

The Tyee Lake Project including the substation and transmission line to Wrangell and Petersburg were constructed for $130 million in 1984. Adjusting to 2026 dollars, the Project's capital expenditures are estimated to be valued between $700 million and $950 million. Such an adjustment is complex for a timeframe of that length, before even considering that this is a remote construction project in Alaska. Because of the Project's initial construction and ownership by the State of Alaska and subsequent divesture and transfer, depreciation calculations did not occur under SEAPA as the current owner. If depreciation values are deemed necessary, SEAPA will make their best efforts to recreate depreciation calculations from Project inception in the License Application.

3.6 Proposed New Facilities and/or Changes in Project Operation

SEAPA is considering changing operations of the Tyee Lake Project by modifying the lower lake draft limit from 1,250 feet to 1,235 feet elevation. A lower draft limit would provide SEAPA with additional operational flexibility and reliability in remote Alaska that is not connected to any other power grid. The increases in flexibility and reliability would have environmental, economic, socioeconomic, and water use efficiency benefits. The following are some of the benefits:

- **Diesel Avoidance**. During spring, low lake levels have occasionally required the use of diesel generation to meet energy demands. Diesel generation is dirty, expensive, and less reliable. The lower draft limit would allow more generation and therefore reduce the reliance on diesel generation.
- **Additional Water Storage**. When SEAPA snow surveys identify an unusually deep snowpack, the lower draft limit would allow reservoir drawdown to create additional storage space for snowmelt.
- **Capital Improvement Water Efficiency**. In the event of maintenance projects where generation would be suspended, Tyee Lake could be drafted deeper than normal, thereby minimizing spill.
- **Curtailment Flexibility**. Short-term water movement by wire (across the Swan-Tyee Intertie) would allow more efficient generation while balancing water use for SEAPA's Swan and Tyee facilities.
- **Mitigate Unexpected Circumstances**. Under a worst-case scenario where other means of generation or transmission are lost during a low springtime lake level, then the lower draft limit would allow additional generation.

Even though SEAPA only operates two hydroelectric facilities, the operations are complex. Weather is a significant variable, as precipitation levels and temperature can cause extreme fluctuations in inflow. Temperature can cause runoff to remain frozen longer in higher elevations of the watershed. Project use of lower draft limits would depend on specific weather conditions, precipitation, and runoff. SEAPA expects it would be unusual for the reservoir to be drawn down lower than typical historical levels. For example, a review of operations data from 2017 through 2025 indicates that a lower draft limit would have only been beneficial in 2019.

This proposal to lower the draft limit remains preliminary in nature—SEAPA intends to use the relicensing process to evaluate engineering constraints associated with lower lake levels and to identify potential environmental impacts from the lower operating level.

3.7 References

Federal Energy Regulatory Commission (FERC). 1975. Form L-2: Terms and Conditions of License for Unconstructed Major Project Affecting Navigable Waters and Lands of the United States. October 1975.

_____. 1981. Final Environmental Impact Statement for the Tyee Lake Project FERC No. 3015 – Alaska. June 1981.

4.0 GENERAL DESCRIPTION OF THE RIVER BASIN

4.1 Overview

The Tyee Lake Project is located at the head of Bradfield Canal, approximately 40 miles southeast of Wrangell. Tyee Lake is part of the 16.1-square-mile Hidden Creek watershed (USGS 2016), with Tyee Creek as the main tributary flowing into the lake (Figure 4-1). Hidden Creek, after its confluence with Tyee Creek (the lake outlet), empties into Bradfield Canal.

Tyee Lake is a natural lake that drains a 14.4-square-mile area (USGS 2016) that ranges in elevation from approximately 1,250 to 5,005 feet mllw. The watershed is primarily covered by dense coniferous forest below the alpine. The lake is located at the lower end of a northwest-trending glacial valley, which extends approximately 6 miles above the lake outlet (International Engineering Company, Inc. [IECO] 1979).

The Project is surrounded by Tongass National Forest, which is managed under the guidance of the 2016 Tongass National Forest Land and Resource Management Plan (Tongass Forest Plan, USFS 2016) and the delineated Land Use Designations (LUDs; USFS 2016). The Tongass Forest Plan includes specific guidelines and goals for each of the LUDs, for transmission line and energy projects, and vegetation and wildlife management approaches. The LUD surrounding Tyee Lake is Remote Recreation, the area east of the Project is Timber Production LUD, and the area west of the Project is Semi-Remote Recreation LUD. The management objectives for Remote Recreation are to provide for recreation in natural-appearing or remote settings where opportunities for solitude and self-reliance are moderate to high or high, respectively (USFS 2016).

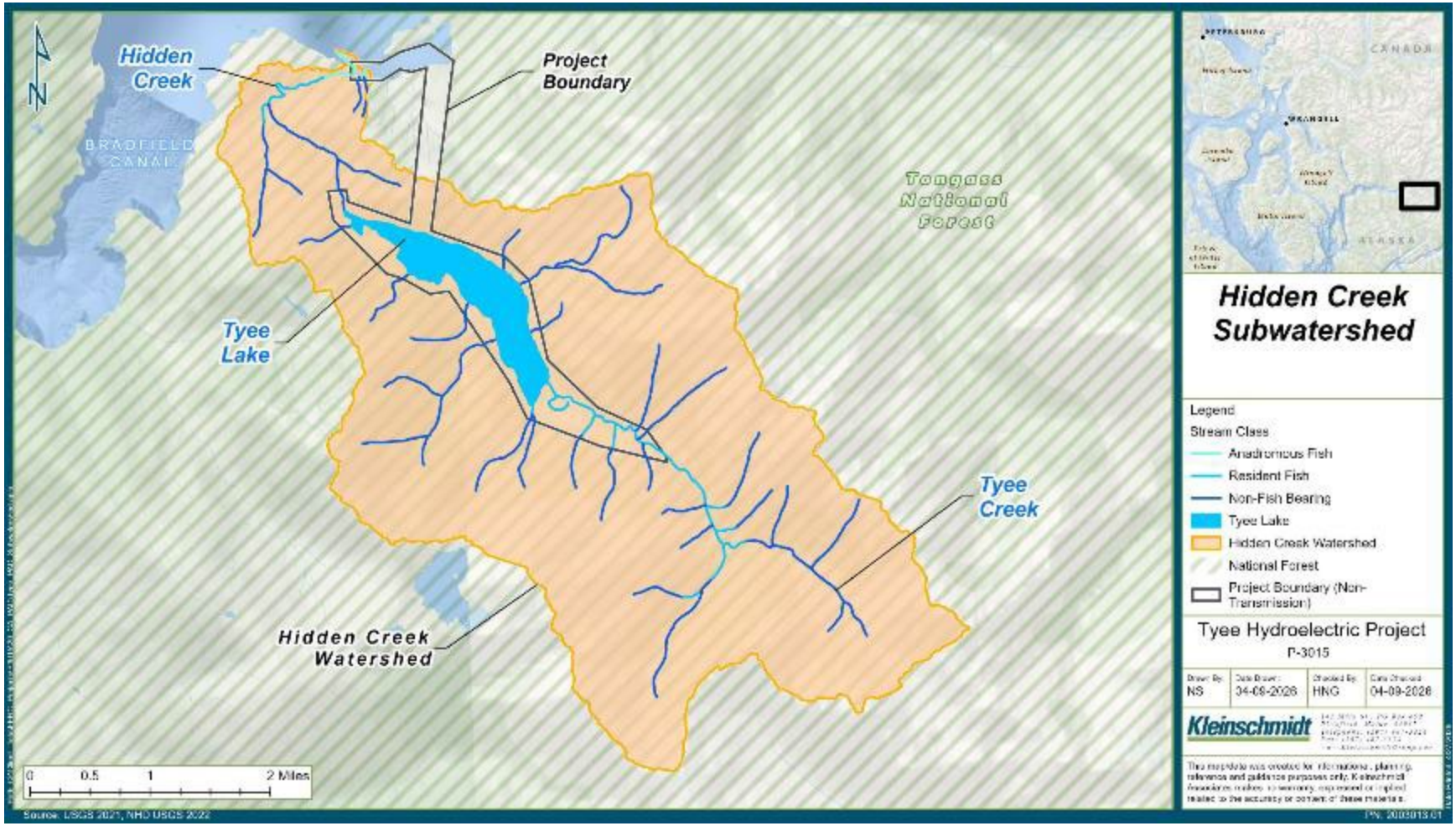

Figure 4-1 Hidden Creek watershed.

4.2 Major Water Uses

Existing uses of water from Tyee Lake include aquatic habitat, hydropower generation, and limited-contact recreation. Other than water used for Project facility personnel, there are no public water supply or other consumptive water uses in the Hidden Creek subwatershed.

4.3 Tributary Streams and Lakes in the Project Drainage Basin

The Project Boundary falls within two USGS 12-digit Hydrologic Unit Codes (HUC12): 190101040208 (Hidden Creek) contains Tyee Lake and its watershed, while 190101040209 (Mount Tyee-Bradfield River) includes the Hydro Creek watershed, which contains the powerhouse and associated infrastructure. Tyee Lake is a deep, U-shaped lake scoured by glacial activity, with very steep sides and a well-developed bottom. Tyee Lake is the only lake within the Project Drainage Basin and serves as the catchment for the majority of the watershed. The primary tributary to Tyee Lake is Tyee Creek, but multiple smaller, high-gradient, non-fish bearing tributaries also enter the lake. Tyee Creek upstream of the lake runs through a glacial valley with a moderate gradient of roughly 17 feet of elevation drop per 1,000 feet of stream length. Conversely, Tyee Creek downstream of the lake is much higher gradient, with 127 feet of elevation drop per 1,000 feet of stream length (FERC 1981).

4.4 Climate

Tyee Lake is located in a maritime climate zone (University of Alaska Fairbanks [UAF] 2024). Weather conditions vary in this area due to the complex mountainous terrain. Summers are usually cool and cloudy with moderate temperatures ranging from an average of 47 to 64 degrees Fahrenheit (°F) between June and September (UAF 2024; U.S. Climate Data 2024). Winter temperatures range from an average 30 to 44°F between November and March. Precipitation is highest between the months of September to January, and the average annual precipitation is 141 inches (U.S. Climate Data 2024). Heavy snowfall occurs along the coasts, including the Tyee Lake drainage area, due to the moisture-rich air being lifted over the coastal mountains. Winds are strongly affected by the local landscape features, ocean temperature contrast, and pressure systems moving across the area. High winds are more common in the fall and winter compared to the spring and summer (UAF 2024).

4.5 References

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5.0 DESCRIPTION OF EXISTING ENVIRONMENT

This section describes the existing conditions of resources in the vicinity of the non-transmission portion of the FERC Project Boundary. The transmission line that runs from the Tyee Lake switchyard to Wrangell and Petersburg is non-primary and not exclusively needed for Project purposes. SEAPA distributed a draft non-capacity amendment application to the public on April 1, 2026, to exclude the non-primary transmission line from the FERC Project Boundary. SEAPA intends to file its final non-capacity amendment application with FERC in June 2026 and anticipates that the line will be removed from the Project Boundary prior to filing the License Application. Therefore, resources within the transmission line corridor are not discussed in the following existing environment description.

5.1 Geological and Soil Resources

5.1.1 Existing Geological Features

The Tyee Lake Project is located within the Bradfield Canal in the southwestern portion of the Coast Mountains. The Project is sited in rugged mountainous terrain, altered by glaciation. The area has steep mountains with deep U-shaped valleys and fjords. Features tend to align northwestward, parallel to gneissic banding in bedrock (Callahan and Wanek 1969, as cited in FERC 1981).

Tyee Lake is a naturally formed lake that sits in a glacially scoured bedrock basin about 1,400 feet above the Bradfield Canal (Alaska Power Authority [APA] 1979). The shorelines are steep, rising at 50- to 70-degree angles to an average elevation of 3,500 feet, with several nearby peaks reaching just under 5,000 feet (FERC 1981). Tyee Lake drains from the north end through the deep and narrow gorge of Tyee Creek.

The Tyee Lake Project is within the Tracy Arm terrane, a batholithic complex in Southeast Alaska's Coast Range Mountains (APA 1979). When the granitic rocks were intruded, they were granitized and magmatized, fractured and injected, faulted and folded, and highly regionally metamorphosed (APA 1979). Because of the high metamorphism, the igneous and metamorphic geology is difficult to differentiate near Tyee Lake (APA 1979). Most of the rocks at Tyee Lake likely have the chemical and mineralogical composition of a quartz diorite, though the texture and appearance are highly variable (APA 1979).

5.1.2 Bedrock Geology

The bedrock at the Tyee Lake Project is dense, impermeable igneous and metamorphic rock. The igneous rocks, part of the Coast Range batholith, include quartz diorite, granodiorite, and hornblendite; the metamorphic rocks are a composite gneiss (FERC 1981). The 1979 field investigations conducted for the License Application further divided the quartz diorite into two categories: massive homogeneous quartz diorite with little to no foliation and distinctly foliated and/or lightly banded quartz diorite (APA 1979). Rocks considered gneiss were heavily banded, with alternating layers of light schistose and dark crystalline mineralization, of both igneous and metamorphic origin (APA 1979). The hornblendite, less resistant to erosion than other rock types at the Project, is a coarse-grained rock composed of 75 to 100 percent euhedral black hornblende with up to 25 percent interstitial plagioclase (APA 1979).

5.1.3 Soils

Sediments at the surface at the Tyee Lake area include alluvial and glaciofluvial sediments, rock and landslide debris, talus, fanglomerate, colluvium, organics, and some human-made fill (APA 1979). Glacial deposition in the alluvial valley at the head of Tyee Lake is primarily sandy gravels and perhaps coarser deposits at depths (APA 1979). The margins of Tyee Lake and the valley of Bradfield Canal include numerous rockslide and landslide deposits carrying talus deposits and large rubble (APA 1979).

Soils are relatively young and of shallow depth in the Tyee Lake area; 1 to 3 feet of organic material is present in typical soil profiles and directly overlies bedrock or talus and rubble (APA 1979). The organic layer of material develops down to a dark moist peat, overlaying a poorly developed A-horizon, which is only present where there are fine-grained soils (APA 1979). Alluvial valley fills, such as the Tyee Lake inlet area, have a more natural soil profile and consist of sandy gravels, are well drained, and support more vegetation (APA 1979).

United States Department of Agriculture Natural Resource Conservation Service (USDA NRCS) soil types mapped near the Project are listed in Table 5-1 and shown in Figure 5-1 below. Soils near the powerhouse and tailrace are NRCS type "80 – Cryaquents-Cryaquepts complex, 0 to 3 percent slopes" (USDA NRCS 2026). Cryaquents and Cryaquepts soil types occur in deltas and depressions, in concave areas, and have alluvium parent material; their composition is typically silt loam or loam, and they are poorly

drained (USDA NRCS 2026). Soil types 11D and 36B occur on the hillside adjacent to the powerhouse area, rather than the flat lowlands the powerhouse is sited on (Table 5-1).

Table 5-1 USDA NRCS soil types near the Project.

Location	NRCS Soil Type	
Lowlands Near Powerhouse	80	Cryaquents-Cryaquepts complex, 0 to 3% slopes
	11D	Kupreanof-Tolstoi association, 35 to 75% slopes
	36B	Kupreanof silt loam, 5 to 35% slopes
	431X	Typic Humicryods, 15 to 75% slopes
	16F	Mosman-Kupreanof complex, 75 to 110% slopes
Surrounding Tyee Lake	72	Rock outcrop
	410X	Lithic Cryosaprists-Lithic Humicryods association, 15 to 120% slopes, alpine
	411X	Typic Cryumbrepts, loamy-skeletal, 15 to 75% slopes
	412X	Lithic Cryumbrepts, loamy-skeletal, mixed-Rock outcrop complex, 55 to 120% slopes
	415X	Cryofluvent and Typic Cryaquent soils, 0 to 15% slopes, alpine
	422X	Lithic Cryaquods-Lithic Cryosaprists association, 35 to 120% slopes
	424X	Cryosaprists-Lithic Cryaquods complex, 10 to 45% slopes
	425X	Typic Humicryods-Typic Cryumbrepts, loamy-skeletal complex, 15 to 75% slopes
	435X	Lithic Hymicryods, 15 to 75% slopes
	436X	Lithic Humicryods, 75 to 120% slopes
	437X	Cryaquods-Lithic Humicryods complex, 5 to 35% slopes
	438X	Lithic Humicryods-Cryaquods complex, 35 to 75% slopes

Source: USDA NRCS 2026.

Landslides and other forms of soil mass movement are common throughout the area, as slopes have been over-steepened by glacial erosion and other geologic influences and are often steeper than the stable angle for the slope materials (FERC 1981). Mass movement typically occurs during or after periods of heavy rainfall or during snowmelt when soils are saturated (FERC 1981).

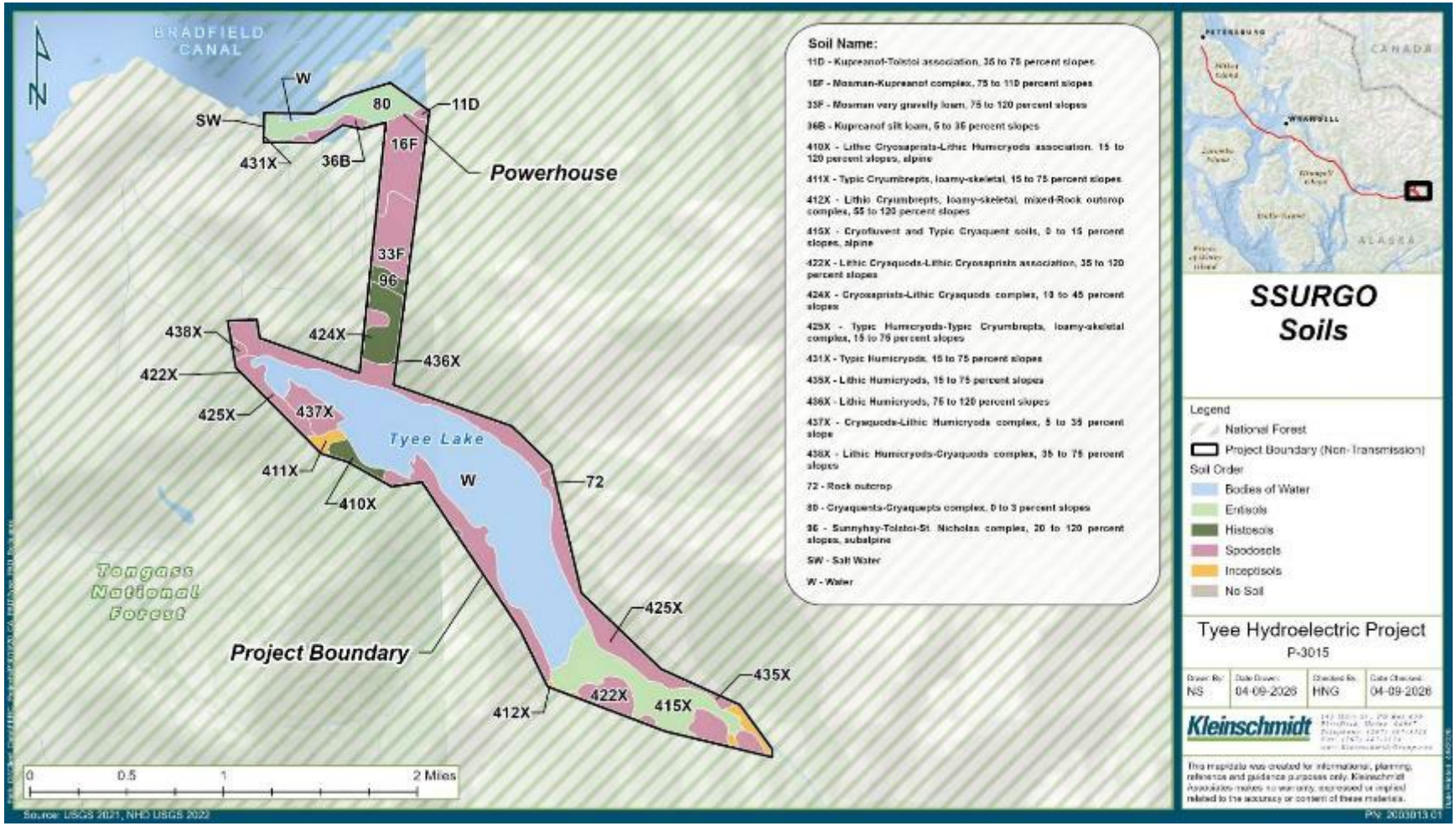

Figure 5-1 Soil types within the Tyee Lake Hydroelectric Project proposed FERC Project Boundary.

5.1.4 Seismicity

Alaska is the most seismically active state in the United States, so earthquakes at the Tyee Lake Project are possible. However, the Wrangell area has a relatively low chance of having a damaging earthquake in the next 100 years (USGS 2024a). A magnitude 7.1 to 7.6 earthquake occurred in 1972 near Sitka, about 175 miles from the Tyee Lake Project (APA 1979). None of the geologic faults near the Project are considered active (FERC 1981). A ground motion of 0.1 gravitational acceleration is estimated for an earthquake event that has a 2 percent probability of exceedance in 50 years (approximate return period of 2,475 years) (American Society of Civil Engineers [ASCE] 2024). The mean earthquake magnitude associated with this return period is magnitude 6.9 (USGS 2024b).

The 370-mile-long Coast Range lineament is the closest recognized major fault structure near the Tyee Lake Project, traversing the whole length of the Southeast Alaska panhandle (APA 1979). There is no evidence of recent movements along the lineament (APA 1979). The Coast Range lineament runs west of Tyee Lake through the Eagle River valley and delineates the boundary between the Taku and Tracy Arm terranes (APA 1979).

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5.2 Water Resources

5.2.1 Drainage Area

Tyee Lake is part of the 16.1-square-mile Hidden Creek watershed (USGS 2016). Tyee Lake is a natural lake that drains a 14.4-square-mile area (USGS 2016) that ranges in elevation from approximately 1,250 to 5,005 feet mllw. The lake is located at the lower end of a northwest-trending glacial valley, which extends approximately 6 miles above the lake outlet (IECO 1979). The watershed is primarily covered by dense coniferous forest below the alpine.

5.2.2 Streamflow, Gage Data, and Flow Statistics

5.2.2.1 Inflow to Tyee Lake

There are currently no gages that record the inflow into Tyee Lake or the amount of water available for generation. There was a USGS gage (USGS Gage No. 15020100) that operated from August 1, 1963, to September 29, 1969, at the mouth of Hidden Creek near Bradfield Canal, downstream from Tyee Lake and Tyee Creek's confluence with Hidden Creek representing a drainage area of 16.1 square miles. Through correlation with concurrent records available for the Harding River USGS Gage (located about 5 miles west of the mouth of Tyee Creek), records for flow at the mouth of Hidden Creek were expanded to cover water years 1952 through 1978, and inflow from Tyee Lake was then synthesized from drainage area proportioning and adjusted for elevation and runoff differences between the upper and lower portions of the basin (IECO 1982). The estimated mean monthly and daily discharge from Tyee Lake across the period of record is presented in Table 5-2.

Runoff from spring snowmelt and seasonal precipitation is the primary water source for Tyee Lake, as no glaciers are present within the watershed. Approximately 70 percent of the runoff in the Tyee Lake basin occurs from June through October (IECO 1982). Historical mean monthly flows peaked in June, July, September, and October and were lowest in February and March, highlighting the seasonal variability in water availability. The runoff pattern shows a high volume of flow occurring during June and July, the magnitude and duration of which depend on the depth of the snow in the basin, the temperatures during the melting season, and the occurrence of rain. Extremely high flows also occur in September and October, and to a lesser extent August, resulting from heavy rain events.

Table 5-2 Synthesized average monthly and daily discharge at the Tyee Lake outlet (1952–1978).

Month	Average Monthly Discharge (cfs)	Average Daily Discharge (cfs)
January	47	5.8
February	36	1.0
March	28	0.1
April	53	2.2
May	193	66.9
June	350	199.1
July	293	159.4
August	238	98.7
September	218	154.0
October	275	143.1
November	113	40.9
December	76	12.8
Annual	**161**	**73.8**

Source: IECO 1982.

Exceedance flows (Table 5-3) and an annual flow duration curve (Figure 5-2) were derived from the 7-year (1963 to 1969) daily flow record from USGS Gage No. 15020100 (USGS 2024c) at the mouth of Hidden Creek near Bradfield Canal. Appendix C contains monthly flow duration curves. The hydrograph pattern at the mouth of Hidden Creek would be slightly different from the Tyee Lake outlet. The winter flow recorded at the mouth of Hidden Creek would primarily represent melting snowpack below Tyee Lake where the temperatures are lower, and there would be less snowpack in the lower basin, unlike the significant snowmelt runoff that occurs in June and July from the upper watershed above the Tyee Lake outlet (IECO 1982).

Table 5-3 Estimated exceedance flows at the mouth of Hidden Creek based on data from USGS Gage No. 15020100 (August 1963 to September 1969).

Percentage of Time Flow is Equaled or Exceeded (%)	Daily Average Discharge (cfs)
5	523
10	433
20	300
30	226
40	161
50	112
60	72
70	48
80	32
90	21
95	15

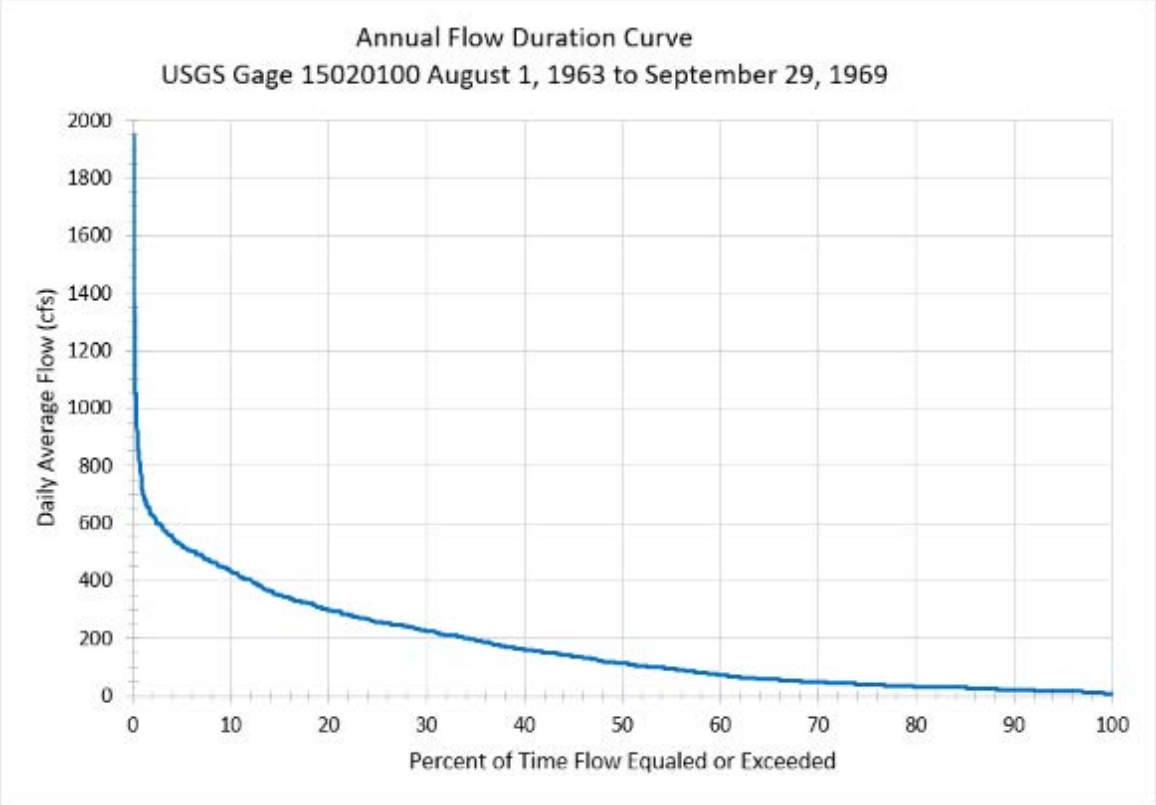


Figure 5-2 Annual flow duration curve at mouth of Hidden Creek from USGS Gage No. 15020100 (August 1, 1963, to September 29, 1969).

5.2.2.2 Outflow from Tyee Lake

Lake levels at the Tyee Lake Project range between 1,250 feet and the full pool at spillway weir invert elevation of 1,396 feet mllw to store runoff during the summer and fall (mid-May through October) and release flows for power generation year-round. SEAPA has water rights permits to use 135,000 acre-feet of Tyee Lake water for hydroelectric power generation annually.

5.2.2.2.1 Tyee Lake Powerhouse

Water generation data, including the monthly minimum, mean, and maximum discharge, are provided in Table 5-4 from 2017 through 2025. The average monthly discharge ranged from 75 cubic feet per second (cfs; 4,458 acre-feet) in June to 166 cfs (9,282 acre-feet) in February. Over the period of record, an average of 92,614 acre-feet of water was used annually for power generation from the two installed turbines.

Table 5-4 Daily discharge statistics (minimum, mean, and maximum) by month and average monthly and annual discharge through the Tyee Lake powerhouse (2017–2025).

Month	Min(cfs)	Mean (cfs)	Max (cfs)	Mean (ac-ft)
January	47	158	226	9,684
February	47	166	223	9,282
March	20	155	215	9,523
April	41	147	216	8,757
May	35	105	178	6,432
June	0	75	166	4,458
July	0	113	188	7,377
August	0	123	196	7,585
September	0	96	184	5,711
October	0	100	174	6,120
November	77	133	196	7,906
December	0	160	222	9,779
Annual	**-**		**-**	**92,614**

5.2.2.2.2 Spillway Weir

A spillway weir was constructed in 2013 at the Tyee Lake outlet to comply with License Article 8 to measure Tyee Lake outflow. The weir was further modified in 2015 to reduce the amount of unquantified flow leaking under and around the weir to Tyee Creek.

However, an unquantified flow to Tyee Creek continues to leak from underneath the weir or around the large boulders at the outlet when Tyee Lake elevations exceed approximately 1,360 feet.

USGS Gage No. 15019990 has measured Tyee Lake water surface elevations since 1979 (USGS 2026). When Tyee Lake elevations exceed the spillway weir invert at 1,396 feet mllw, excess water is spilled over the weir into Tyee Creek. Spill typically occurs in response to precipitation events, the frequency and intensity of which are influenced by the El Niño Southern Oscillation (ENSO) and the Pacific Decadal Oscillation (PDO), as is the air temperature and demand for power. Spill does not occur during low water years and may or may not occur during average water years.

Monthly minimum, mean, and spill data are provided in Table 5-5. Figure 5-3 shows the daily Tyee Lake surface elevations over a period of 7 years (2017 to 2023) representing current operations. Over the period of record, no spill occurred in 2017 (average year) or 2018 to 2019 (dry years). During above-average water years (2020 to 2022), spill over the weir occurred from June through November. In 2023 (average year), spill occurred 1 day in October and another day in November. The monthly mean spill ranged from 6 cfs in November to 69 cfs in August. Monthly maximum spill flows ranged from 350 cfs in November to 637 cfs in August.

Table 5-5 Daily spill statistics by month for the weir at the Tyee Lake outlet (2017–2025).

Month	Min (cfs)	Mean (cfs)	Max (cfs)	Average # Days of Spill
January	0	0	0	0
February	0	0	0	0
March	0	0	0	0
April	0	0	0	0
May	0	0	0	0
June	0	16	514	1.3
July	0	32	357	7.1
August	0	54	637	9.2
September	0	64	608	8.2
October	0	51	600	10.2
November	0	13	458	3.0
December	0	0	0	0

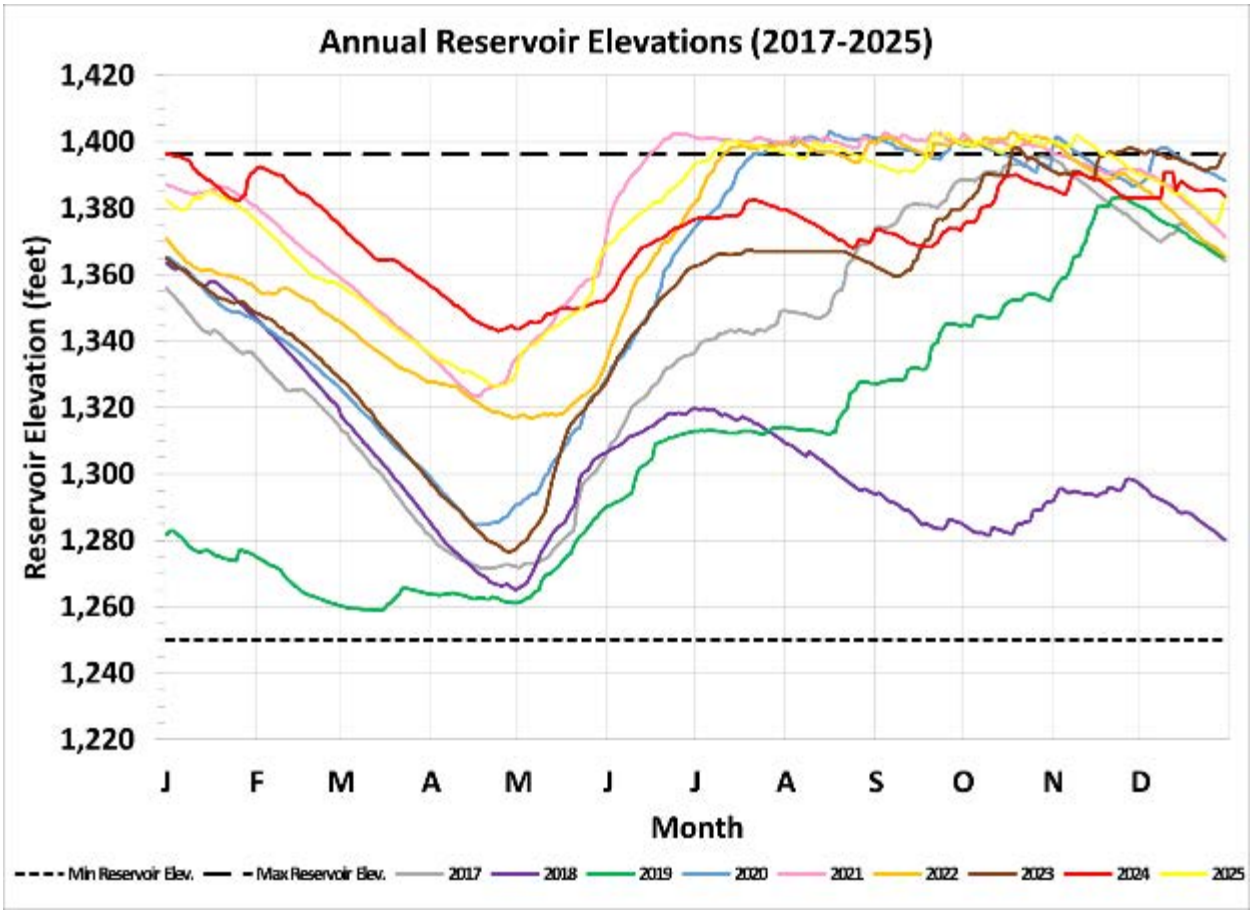


Figure 5-3 Tyee Lake elevations from 2017 through 2025.

5.2.2.2.3 Unquantified Outflow to Tyee Creek

Water from Tyee Lake flows to Tyee Creek from underneath the weir and around the boulders at the lake outlet, as shown in Photo 5-1 and Photo 5-2. This typically occurs during the summer and fall when Tyee Lake water surface elevations exceed approximately 1,360 feet.

Photo 5-1 Tyee Creek at the Tyee Lake outlet weir looking downstream when no water is flowing from Tyee Lake over the weir.

Photo 5-2 Tyee Creek at the Tyee Lake outlet weir looking upstream when no water is flowing from Tyee Lake over the weir.

5.2.3 Existing and Proposed Uses of Water

Waters in Alaska are protected for all uses according to standards outlined in the Alaska Water Quality Standards (Alaska Department of Environmental Conservation [ADEC] 2024). Existing uses of water from Tyee Lake include aquatic habitat, hydropower generation, and limited-contact recreation. Other than water used for Project facility personnel, there are no public water supply or other consumptive water uses in the Hidden Creek subwatershed.

5.2.4 Existing Instream Flow Uses and Water Rights

SEAPA currently has two water rights permits from the Alaska Department of Natural Resources (ADNR) (Permit Nos. ADL100887 and LAS 27045) for the use of 135,000 acre-feet of Tyee Lake water annually for purposes of hydroelectric power generation. There are no required minimum flow releases from Tyee Lake to Tyee Creek downstream of the weir.

5.2.5 Reservoir Information

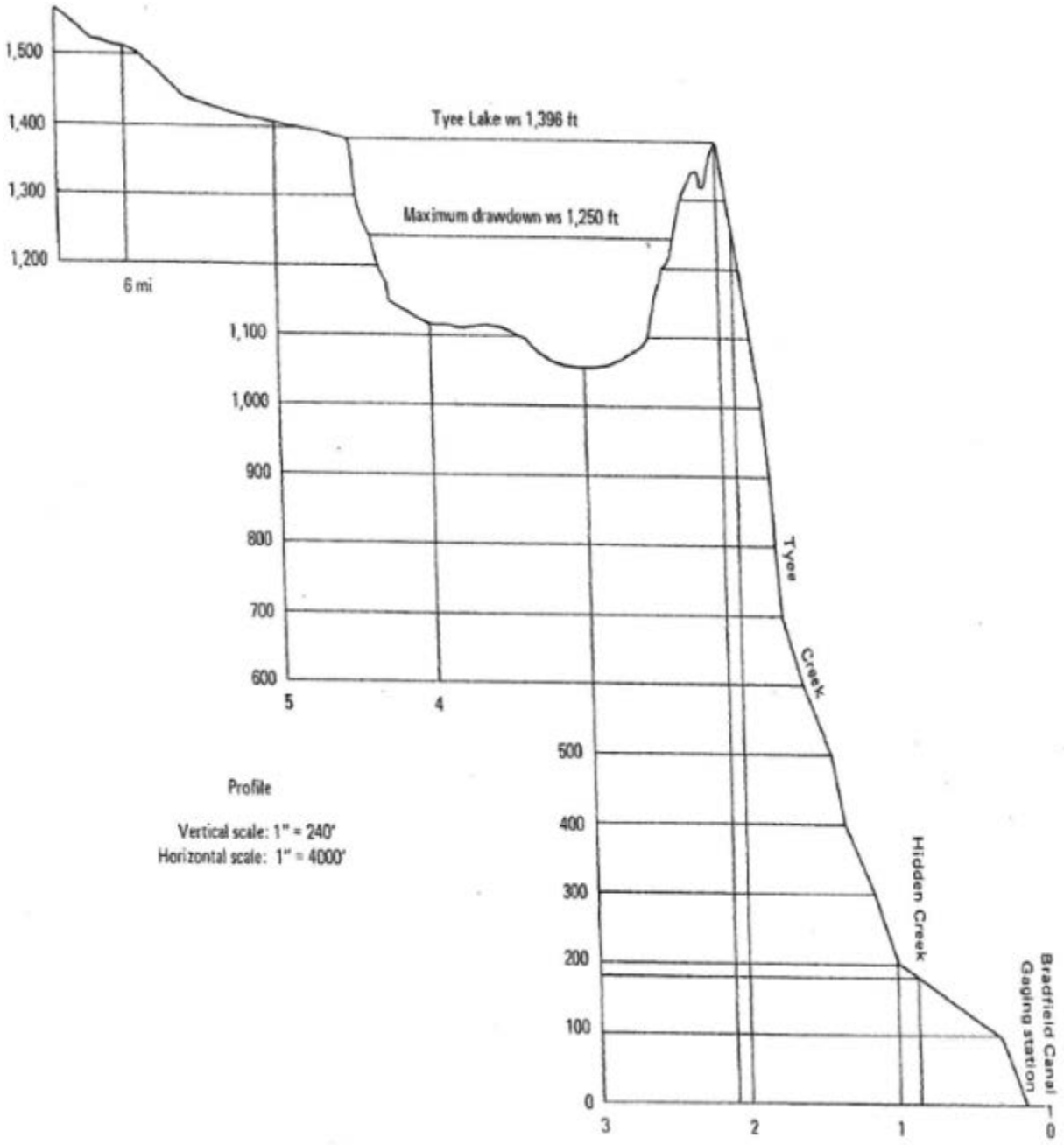
Tyee Lake is approximately 2.5 miles long and about 0.5 mile wide. The lake is one of several long, linear lakes in the region formed by glacial scouring of less resistant sedimentary and volcanic rock, leaving more resistant plutonic rock intact. Tyee Lake is situated in a steep-sided valley with shoreline gradients often exceeding moderate slopes, leading to rapid transitions in elevation. Its steep shorelines lead to rapid depth increases, with an average depth of 300 feet at full pool. The deepest portion of the lake is approximately 324 feet. There are approximately 7.7 miles of shoreline around the reservoir, much of which is moderately to extremely steep. The Tyee Lake bathymetry is provided in Appendix D. The naturally impounded lake has an active storage of 52,400 acre-feet. At normal maximum pool elevation, the lake's surface area is 481 acres.

Drafting and filling the reservoir over time has removed loose soils and vegetation, resulting in primarily rock surfaces with little to no soil around the normal full pool elevation. Rock and tree slides, often caused by heavy rain after dry periods, have been known to occur at elevations above normal pool, causing slide material to deposit into the reservoir.

5.2.6 Gradient of Downstream Reaches

Tyee Creek, located on the northwest side of Tyee Lake, serves as the natural outlet extending approximately 1.2 miles through a steep narrow gorge composed of a series of waterfalls and cascades until its confluence with Hidden Creek. Figure 5-4 shows the profile of Tyee Lake, Tyee Creek, and Hidden Creek. During the low flow period when Tyee Lake levels are low, water may not flow from the Tyee Lake outlet. Minor tributaries contribute flow to Tyee Creek between the lake outlet and Hidden Creek. The average gradient of Tyee Creek exceeds 17 percent.

From its confluence with Tyee Creek, Hidden Creek flows northeast approximately 1 mile before entering a slough at the head of the Bradfield Canal (ADF&G 2018). There is a 30-foot-high waterfall about 460 feet upstream of the mouth that prevents upstream fish passage. Upstream of the waterfall barrier, the average gradient is moderate at about 4 percent. The habitat consists of cascades over boulders and pockets of pools with gravel substrate. Downstream of the waterfall, Hidden Creek is a low-gradient intertidal stream with widths varying from 50 to 108 feet. The substrate near the waterfall is primarily bedrock and boulders, while near the stream's mouth, it consists of cobble, gravel, sand, and mud (ADF&G 2018).



Source: USGS 1963, as cited in ADF&G 2010.

Figure 5-4 Tyee Lake profile and Tyee Creek and Hidden Creek slope.

5.2.7 Federally Approved Water Quality Standards

The State of Alaska does not have programs in effect related to the requirements regarding FERC-licensed hydropower projects for compliance with FPA 401 Water Quality Certifications nor compliance with the Coastal Zone Management Act (CZMA) Section 307

regarding Determination of Consistency of a proposed federal action with the State Coastal Zone Management Program.

Except as specified in 18 Alaska Administrative Code (AAC) 70 Article 2, all waters in Alaska are protected for all uses according to standards outlined in the Alaska Water Quality Standards (ADEC 2024) regardless of their actual use. Freshwater streams in the Tyee Lake Project area, including the Tyee Lake/Hidden Creek watershed, are protected for water supply (drinking, agriculture, aquaculture, and industrial); water recreation (contact and secondary); and growth and propagation of fish, shellfish, other aquatic life and wildlife. All the marine waters, such as Bradfield Canal, are protected for water supply (aquaculture, seafood processing, and industrial), water recreation (contact and secondary); growth and propagation of fish, shellfish, other aquatic life and wildlife; and harvesting for consumption of raw mollusks or other raw aquatic life.

ADEC established numeric criteria for water quality standards according to protected use classes and subclasses (18 AAC 70.020). If a waterbody is protected for more than one use class, the most stringent water quality criteria for all the included use classes applies. The most recent water quality data collected for the Project area is discussed below.

5.2.8 Existing Water Quality Information

5.2.8.1 Tyee Lake

Tyee Lake is a cold, near neutral system (Alaska Environmental Information and Data Center [AEIDC] 1980). Historically, Tyee Lake had a pH that varied from neutral to slightly acidic (6.2 to 7.0), with little variation and low values (≤10 micromhos/centimeter) of specific conductance, low dissolved solids, and low suspended solids (≤ 1.4 milligrams per liter [mg/L]) (AEIDC 1980). Surface water temperature varied from 4.5 degrees Celsius (°C) in May to 13°C in July at Tyee Lake, and dissolved oxygen (DO) saturation was 100 percent (AEIDC 1980).

Currently, neither the United States Environmental Protection Agency (USEPA) nor ADEC have listed Tyee Lake for any impairments (ADEC 2022). USGS began recording water temperature data at Gage No. 15019990 at the Tyee Lake outlet August 24, 2023. Since then, instantaneous surface water temperature measured at the gage ranged from a low of 3.2°C in May of 2025 to a high of 8.1°C in October of 2024 (USGS 2026).

5.2.8.2 Hidden Creek

Historical sampling found little difference in the water quality between the Tyee Lake outlet, Tyee Creek, and Hidden Creek (FERC 1981). The lowermost reach of Hidden Creek below the falls is tidally influenced. In April 2010, ADF&G collected a single measurement of DO and temperature in a pool directly below the falls during low tide when water was not flowing from the Tyee Lake outlet; the DO was 13.54 mg/L and the temperature was 4.4°C (ADF&G 2010). Water quality in the lowermost intertidal reach is expected to be similar to the tailrace.

5.2.8.3 Tailrace

ADF&G monitored the intertidal tailrace surface water quality in 2010-2011 (ADF&G 2010) and 2015-2016 and found that the data were similar to the 1980s monitoring showing characteristics of colder freshwater during low tide and warmer brackish water during high tide with seasonal variation (ADF&G 2018). In April 2016, ADF&G collected water temperature, DO, salinity, conductivity, and pH data from the Project tailrace at five transect locations during a +19.0-foot tide (ADF&G 2018). The tailrace water temperature ranged from 3.5 to 8.3°C and was lowest during low tides (ADF&G 2018). DO concentrations ranged from 8.8 to 17.0 mg/L, with the greatest DO concentrations occurring at the surface for all tide stages and the lowest during high tide near the channel bottom (ADF&G 2018). The salinity of the tailrace ranged from 0 to 17 parts per thousand (ppt), and conductivity varied from 1 to 19,000 microsiemens/centimeter; both generally increased downgradient during high tide, with the greatest concentrations occurring along the channel bottom. The pH of the tailrace ranged from 6.0 to 7.6. Freshwater from Tyee Lake and saline water from the tidal influence are thought to be fully mixed before reaching Airstrip Slough. These data fall within the natural range of variability (ADF&G 2018).

5.2.9 References

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5.3 Fish and Aquatic Resources

5.3.1 Aquatic Habitats

Aquatic habitat within the Project area includes Bradfield Canal, the Hidden Creek basin, and the Hydro Creek basin.

5.3.1.1 Bradfield Canal

Bradfield Canal is a tidally influenced inlet in Southeast Alaska that extends approximately 19 miles west from the Bradfield River to Earnest Sound, approximately 30 miles southeast of Wrangell. Depths in Bradfield Canal reach over 200 feet but are much shallower in the vicinity of the Project (NOAA 2011). Bradfield Canal habitat varies, as it contains numerous tributaries and backwater sloughs, offering a diverse array of habitat types that support various aquatic species. Hidden Creek and Hydro Creek enter the head of Bradfield Canal within 0.5 mile of each other (Photo 5-3).

Source: ADF&G 2018.

Photo 5-3 Head of Bradfield Canal. Bradfield River (left) and Tyee Lake Hydroelectric Project tailrace, Airstrip Slough, and Hydro Creek (right).

5.3.1.2 Tyee Lake

There is not much known about the aquatic habitat in Tyee Lake, though based on the bathymetric profile in Appendix D showing steep sides, it appears that the littoral zones are limited and focused around the mouths of the main tributaries like upper Tyee Creek. The shoreline contains alluvial deposits of gravels, cobbles, and larger boulders (Photo

5-4). The substrate in the deeper portions of the lake is generally comprised of fine-grained sediments with particle size decreasing from the inlet of Tyee Lake to the outlet, as the heavier particles tend to settle out closer to the inlet. Fine sandy silt is present at the upper end of the lake, and silt, silty clay, and clayey soil with some organic content is present near the outlet of the lake (TerraSond, Ltd. 2009).

Source: TerraSond, Ltd. 2009.

Photo 5-4 Tyee Lake shoreline.

5.3.1.3 Lower Tyee Creek

Lower Tyee Creek is composed of a series of high-gradient waterfalls and cascades that are unlikely to provide suitable habitat for aquatic species until its confluence with Hidden Creek. Flow levels vary throughout the year based on spill over the weir at the outlet of Tyee Lake and seepage from below the weir (Table 5-5, Photo 5-1; Photo 5-2).

5.3.1.4 Hidden Creek

The 30-foot-high waterfall about 460 feet upstream of the mouth of Hidden Creek delineates the main habitat types available in the creek (Photo 5-5). Upstream of the waterfall barrier, habitat consists of cascades over boulders and pockets of pools with gravel substrate with a moderate gradient of 4 percent.

Downstream of the waterfall, Hidden Creek is a low-gradient intertidal stream with bedrock and boulders in the immediate vicinity of the waterfall and more cobble, gravel, sand, and mud as it flows downstream to its confluence with Bradfield Canal (ADF&G 2018; Photo 5-6; Photo 5-7; Photo 5-8).

When the Project was constructed, there was concern that diversion of Tyee Lake water for hydropower generation would result in the loss of anadromous fish habitat in Hidden Creek. However, Hidden Creek has continued to flow year-round since Tyee Lake Project began operations in 1984. After 40 years of operation, ADF&G (2018) concluded that the Project has had de minimis impact on anadromous fish habitat and fish populations and that fisheries mitigation for the Project was not necessary.

Source: ADF&G 2018.

Photo 5-5 Waterfall at Hidden Creek creating barrier to upstream fish passage.

Source: ADF&G 2018.

Photo 5-6 Hidden Creek at low tide, looking upstream at the waterfall.

Source: ADF&G 2018.

Photo 5-7 Hidden Creek at mid-tide, looking upstream at the waterfall.

Source: ADF&G 2018.

Photo 5-8 Hidden Creek at low tide, downstream view of the mouth.

5.3.1.5 Tailrace and Airstrip Slough

Water from Tyee Lake flows into the tailrace after passing through the powerhouse units. This human-made channel, carved into a tidal wetland, extends approximately 1,100 feet from the powerhouse to Airstrip Slough, a tidally influenced side channel to Hydro Creek (ADF&G 2018; Photo 3-6). The tailrace channel has a bed gradient of less than 1 percent and a bottom width of approximately 30 feet with 2:1 sloped sides. As described in Section 5.2.8.3, the tailrace is tidally influenced and exhibits characteristics of colder freshwater during low tide and warmer brackish water during high tide with seasonal variation (ADF&G 2018). Photo 5-9 and Photo 5-10 show views of the tailrace from the powerhouse at -1.5-foot tide and +18.5-foot tide, respectively.

As required fisheries mitigation for the anticipated potential loss of salmon spawning habitat in Hidden Creek from construction and operation of the original Tyee Lake Project, gravel was added to the tailrace channel to provide suitable Pink Salmon (*Oncorhynchus gorbuscha*) spawning habitat (ADF&G 2018). ADF&G has periodically monitored the experimental spawning channel collecting data between August 2010 and May 2011, August 2015 and May 2016, and in August 2018. Over time the tailrace bed has deepened and developed shallow riffles and scour pools (ADF&G 2018). During low tide, water depths generally ranged from 0.5 to 2.5 feet. Water velocities measured at low tide in April 2016 ranged from 1.43 to 4.40 feet per second (ft/s) and were lowest at riffles near the channel margins, providing suitable Pink Salmon spawning habitat (ADF&G 2018). The percentage of fines in the channel substrate has increased, with samples consisting of <10 percent fines near the powerhouse increasing to 17 percent fines closer to Airstrip Slough.

ADF&G concluded that without a continual source for gravel recruitment, the spawning habitat quality would degrade over time. However, ADF&G also concluded that creation of the tailrace experimental spawning channel was not necessary because Hidden Creek has continued to provide anadromous spawning habitat since the Project began operations in 1984. Therefore, no fisheries mitigation was needed at the Project following construction in 1984 (ADF&G 2018).

Source: ADF&G 2018.

Photo 5-9 Tyee Lake Project tailrace at -1.5-foot tide, looking downstream from the powerhouse.

Source: ADF&G 2018.

Photo 5-10 Tyee Lake Project tailrace at +18.5-foot tide, looking downstream from the powerhouse.

5.3.2 Essential Fish Habitat

Bradfield Canal has been designated Essential Fish Habitat (EFH) for various life stages of Chinook (*O. tshawytshca*), Sockeye (*O. nerka*), Coho (*O. kisutch*), Chum (*O. keta*), and Pink salmon (Table 5-6) (NOAA 2024).

Table 5-6 EFH by species and life stage for Bradfield Canal.

Species	Life Stage(s) Found
Chinook Salmon	Marine Immature Adult Marine Mature Adult
Sockeye Salmon	Marine Immature Adult Marine Juvenile Marine Mature Adult
Coho Salmon	Marine Juvenile Marine Mature Adult
Chum Salmon	Marine Immature Adult Marine Juvenile Marine Mature Adult
Pink Salmon	Marine Juvenile Marine Mature Adult

The tailrace (referred to as Tailrace Creek) and Hidden Creek are listed in the Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes – Southeast Region, Effective June 2024 (ADF&G 2024). Waterbodies that fall into this category also fall under the jurisdiction of Alaska Statute (AS) 16.05.871. The Alaska Anadromous Waters Catalog (AWC) lists the lower approximately 460 feet of Hidden Creek (AWC Stream No. 107-40-10538) as providing habitat for Chum, Coho, and Pink salmon (ADF&G 2024). The tailrace (Tailrace Creek AWC Stream No. 107-40-10537-2008) and Hydro Creek (AWC Stream No. 107-40-10537) are listed for presence of Chum Salmon and Pink Salmon and rearing Coho Salmon (ADF&G 2024). Figure 5-5 and Figure 5-6 show the stream reaches that support anadromous fish in the Hidden Creek and Hydro Creek basins, respectively.

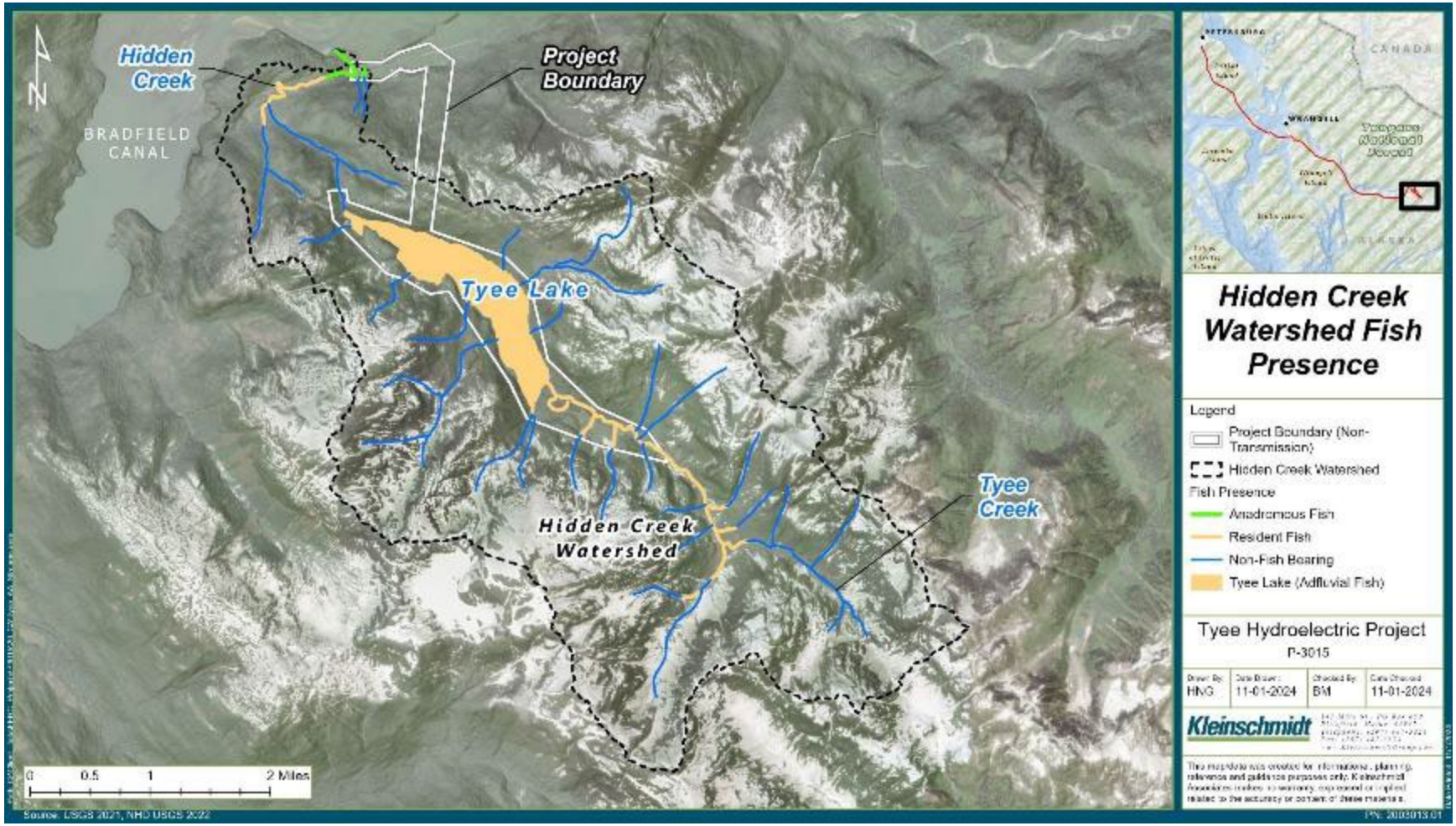

Figure 5-5 Fish presence in the Hidden Creek basin.

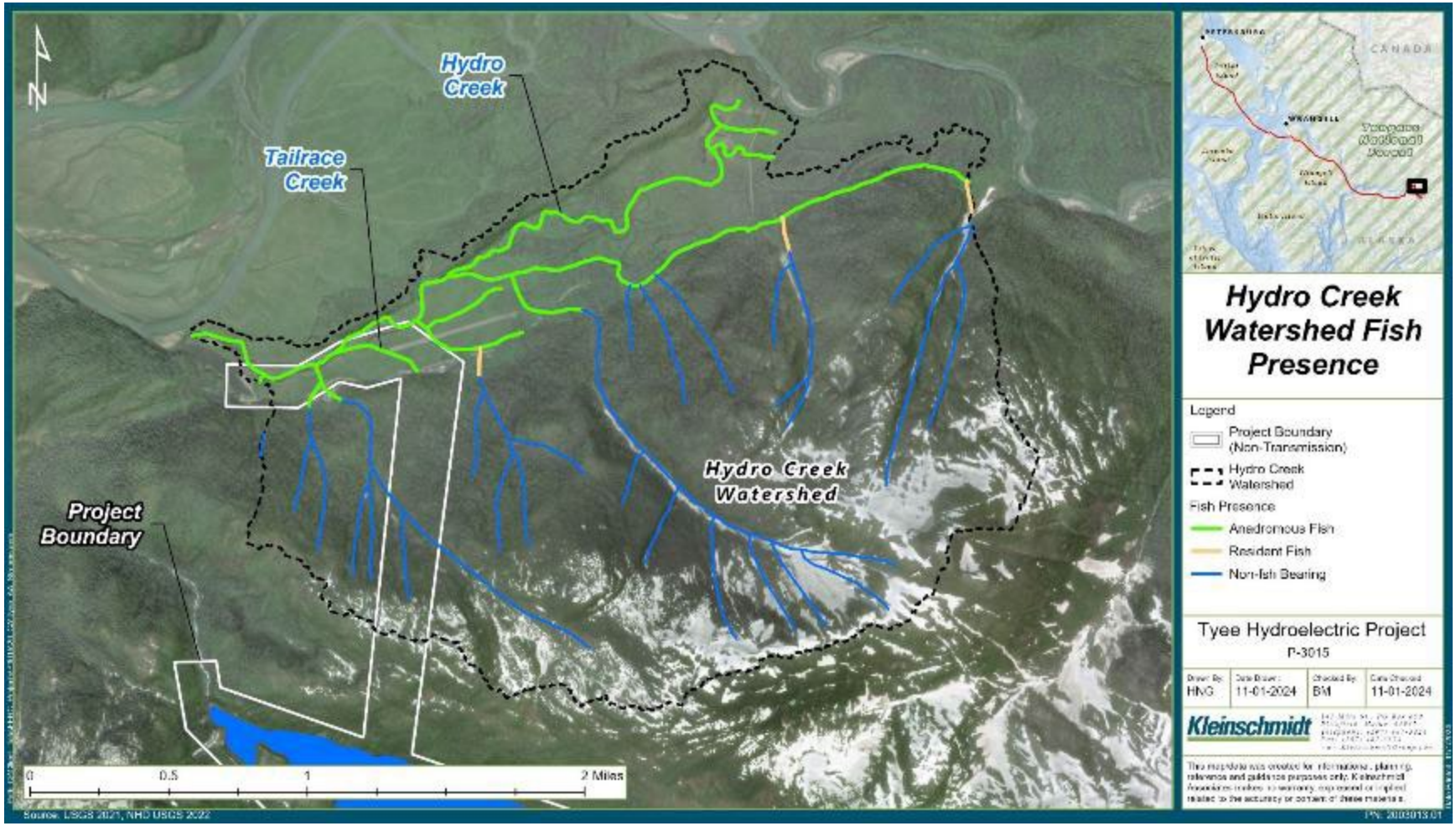

Figure 5-6 Fish presence in the Hydro Creek basin.

5.3.3 Existing Fisheries Assemblage

5.3.3.1 Tyee Lake

Surveys conducted in 1980 documented an Arctic Grayling (*Thymallus arcticus*) population of approximately 5,000 fish in Tyee Lake. No other fish species were known to occur in the lake (FERC 1981). ADF&G planted Arctic Grayling eggs in the main inlet of Tyee Lake in 1962, and 20,000 Arctic Grayling fry were stocked in the lake in 1967 and 1968 (FERC 1981).

During licensing studies for the existing Project, biologists identified primary spawning habitats in several inlet streams at the head of the lake and documented spawning activity and fry development. Adults spawned in the major lake tributaries (Figure 5-6) mid-May to mid-June, with young-of-year observed in the tributaries by mid-July. Both adults and fry dispersed into the shallow littoral zones of the lake during the summer (FERC 1981). For the original Project, it was thought that the Arctic Grayling population would be affected by limited access between lake and tributary habitats from operations and changes to lake levels. Prior to constructing the original Project, it was proposed to move the Arctic Grayling to another lake. However, these plans were abandoned when the fish were sampled in 1982 and found to have bacterial kidney disease and enteric red mouth (ADF&G 2018). In 2015, ADF&G opportunistically sampled Tyee Lake and documented the continued presence of Arctic Grayling in the lake (ADF&G 2018).

5.3.3.2 Tyee Creek

While resident fish species have been documented in Hidden Creek between the falls and the Tyee Creek confluence, Tyee Creek from its confluence with Hidden Creek upstream to Tyee Lake is categorized as a Class 3 non-fish-bearing stream by the USFS (University of Alaska Southeast 2014).

5.3.3.3 Hidden Creek

The natural waterfall in Hidden Creek acts as a barrier, preventing anadromous fish species from migrating upstream. Above the Hidden Creek waterfall, fishery biologists documented Rainbow Trout (*O. mykiss*) less than 130 millimeters fork length during Project planning and licensing studies conducted in the early 1980s.

During the same investigations, biologists documented spawning Chum (~600 fish) and Pink (~250 fish) salmon downstream of the waterfall in early August 1980 and early

September 1980, respectively (Dwight 1980). Dolly Varden (*Salvelinus malma*), Cutthroat Trout (*O. clarkii*), and sculpin (*Cottidae* spp.) were also observed (Dwight 1980).

ADF&G conducted surveys for adult Pink and Chum salmon during low tides in Hidden Creek in 2010 and 2018. In 2010, three Pink Salmon were observed near the mouth of Hidden Creek, but not within the creek itself. In August 2018, three surveys were performed, revealing no evidence of adult salmon presence or spawning activity. However, a school of juvenile Coho Salmon and a few sculpin were observed near the mouth (ADF&G 2018). A single Rainbow Trout (130 millimeters fork length) was captured by ADF&G in 2010 downstream of the waterfall (ADF&G 2018). In 2018, ADF&G reported that Hidden Creek substrates were generally unsuitable for Chum and Pink salmon spawning (ADF&G 2018).

Pink Salmon in Southeast Alaska predominantly spawn in small rivers and estuaries near river mouths, rarely traveling more than 40-miles upstream (ADF&G n.d.-b). Spawning in Southeast Alaska, such as in the Tyee Lake area, primarily occurs in July and August (Groot and Margolis 1991). In Alaska, up to 70 percent of Pink Salmon populations spawn in intertidal areas (Tait and Kirkwood 1962; Helle et al. 1964). Survival rates of eggs in these zones are often equal to or greater than those observed in freshwater spawning areas (Groot 1989). Pink Salmon have been observed spawning at salinities ranging from freshwater to 28 ppt (Raleigh and Nelson 1985). Pink Salmon spawn in current velocities ranging from 1 to 3.3 ft/s, occasionally reaching 4.6 ft/s (Groot and Margolis 1991). The optimal range for spawning is 1.3 to 2.3 ft/s (Raleigh and Nelson 1985).

Pink Salmon eggs undergo a 5- to 8-month period of embryonic development within the gravel. Eggs, alevins, and pre-emergent fry must be protected from environmental stressors such as freezing, desiccation, streambed scouring, and predation to survive (Groot and Margolis 1991). After hatching, alevins remain in the gravel, subsisting on their yolk sacs until emerging as fry (ADF&G n.d.-b). In Southeast Alaska, fry migration peaks between mid-April and mid-May, with juveniles moving quickly downstream to estuaries (Groot and Margolis 1991).

In Southeast Alaska, Chum Salmon exhibit distinct seasonal runs based on migration timing. Summer-run Chum Salmon peak in abundance from mid-July to mid-August, with spawning primarily occurring in August. Fall-run Chum Salmon peak later, in September or beyond, with spawning continuing into late fall or early winter in some systems (ADF&G n.d.-c).

Chum Salmon primarily spawn in freshwater environments, such as rivers and streams. However, they also utilize intertidal zones, where eggs may be exposed to varying salinity levels due to tidal influences. Unlike Pink Salmon, Chum Salmon rarely spawn in lower intertidal areas, where survival of eggs and alevins decreases compared to upper intertidal zones (Groot and Margolis 1991). Salinity has a significant impact on egg development, with research showing that fertilized Chum Salmon eggs are highly sensitive to salinity variations, which influence ontogeny and hatching (Ban et al. 2022). Experimental studies at salinities of 1, 3, and 5 ppt demonstrated that survival rates of eggs less than 1 day old decrease significantly at salinities of 3 ppt or higher, with complete mortality observed at 5 ppt (Park et al. 2024). Eggs at the eyed stage exhibit higher tolerance to salinity, with successful hatching occurring even at elevated levels (Park et al. 2024). These findings suggest that early-stage Chum Salmon eggs are highly vulnerable to increased salinity, but their tolerance improves as they develop.

Chum Salmon spawning has been observed at water velocities ranging from 0 to 5.5 ft/s. In a study of over a thousand redds in Washington State, Johnson et al. (1971) noted that 80 percent of Chum Salmon spawned in velocities between 0.7 to 2.7 ft/s, with a mean of 1.7 ft/s. Despite being the second largest Pacific salmon species, Chum Salmon have adapted to spawning in shallower depths and lower velocities than Pink Salmon (Groot and Margolis 1991).

Chum Salmon eggs incubate in redds during the winter months. Incubation duration varies with water temperature, with colder conditions prolonging development. Typically, embryos hatch from eggs after 3 to 4 months (ADF&G n.d.-a). After hatching, Chum Salmon alevins remain in the gravel, absorbing their yolk sacs for an additional 60 to 90 days before emerging as fry. They begin their migration to the sea within days or weeks of emergence (ADF&G n.d.-a).

5.3.3.4 Tailrace

Article 43 of the original FERC Project license required a plan to mitigate potential effects of Project operations on fishery resources, including the reduction of water entering Hidden Creek. In 1983, a Revised Fisheries Mitigation Plan was approved by FERC that resulted in the tailrace being used as an experimental spawning channel to mitigate potential spawning impacts to Chum and Pink salmon. After tailrace construction, biologists captured juvenile Coho Salmon, Dolly Varden, and sculpin in the tailrace and observed spawning Chum and Pink salmon (Kelly 1987). Spawning habitat quality has

decreased over the years, which has been attributed to an increasing proportion of sand transported by tide from the Bradfield River delta (Kelly 1987). ADF&G and the 1987 Kelly report that the best spawning habitat is in the upper half of the tailrace, which is less often influenced by salt water.

In 2010, a study was conducted to determine if any negative effects to Pink Salmon spawning occurred following the increased flow in the tailrace from Project operations (ADF&G 2018). ADF&G biologists found that the creek had low quality spawning habitat without a continual source of gravel. Spawning habitat quality was degraded due to sand dispersion from tidal movements (Kelly 1987). The study found that manual input of gravel substrate or increased scouring could expose intertidal flat gravel, ultimately improving spawning habitat. ADF&G concluded that the tailrace would not benefit from additional artificial spawning habitat and stated that tailrace discharge could expose tidal flat gravel suitable for spawning (ADF&G 2018).

5.3.4 Entrainment and Fish Passage

Currently, there is limited specific information available regarding resident fish entrainment at the Project. Spill events over the weir may transport fish from Tyee Lake downstream, potentially introducing them to lower reaches of Tyee Creek and Hidden Creek or Bradfield Canal.

The 30-foot-high natural waterfall in Hidden Creek acts as a barrier, preventing anadromous fish species from migrating upstream. Anadromous fish access is restricted to the lower 460 feet of Hidden Creek due to the waterfall near the outlet to Bradfield Canal.

5.3.5 Benthic Macroinvertebrates

Currently, there is limited information available regarding benthic macroinvertebrate communities and aquatic insect populations in the immediate Project vicinity.

5.3.6 Freshwater Mussels

Freshwater mussels are integral components of aquatic ecosystems, contributing to water filtration and serving as bioindicators of environmental health. In Alaska, three primary species are recognized: Yukon floater (*Sinanodonta beringiana*), western floater (*Anodonta*

kennerlyi), and western pearlshell (*Margaritifera falcata*) (Alaska Center for Conservation Science [ACCS] 2015).

While the distribution of these species in Southeast Alaska is not comprehensively documented, the western pearlshell has been recorded in parts of the region, suggesting potential presence in suitable habitats (ACCS 2015).

5.3.7 Aquatic Invasive Species

SEAPA is not aware of any aquatic invasive species occurring in the Project Boundary. However, Southeast Alaska, including the Project area, faces an increasing risk of aquatic nuisance species due to warming climates, expanding human activity, and maritime traffic.

ADF&G developed the Alaska Aquatic Nuisance Species Management Plan in 2002 (ADF&G 2002). The plan provides an overview of invasive species in Alaska and outlines relevant laws, regulations, and ongoing projects aimed at managing these species.

One non-indigenous fish species and two invasive crab species could potentially be present in the marine and intertidal habitats of Bradfield Canal in the future, as described below. Additionally, several tunicates, including *Didemnum vexillum*, *Botrylloides violaceus*, and *B. otryllus schlosseri*, as well as the invasive seaweed *Sargassum muticum*, are known to be invasive in Alaska (ADF&G 2025a).

Atlantic Salmon (*Salmo salar*) are often raised in densely populated hatcheries. Escaped Atlantic Salmon from net pens in British Columbia and Washington have dispersed as far north as the Bering Sea and have been found in Southeast Alaska and the Gulf of Alaska (USGS 2025a). These escaped salmon pose a threat to native salmon and trout populations through competition for spawning and rearing habitat and the potential spread of diseases and parasites to salmon fisheries (ADF&G 2002).

The European green crab (*Carcinus maenas*) has established populations along the Pacific Coast and was first detected in Alaska at the Annette Islands Reserve in 2022 (ADF&G 2025b). This species poses significant ecological risks, including predation on native species and competition for habitat. Its spread into Southeast Alaska is primarily driven by larval transport through ocean currents, with warming water temperatures likely facilitating range expansion (ADF&G 2025b).

Another invasive species of concern is the Chinese mitten crab (*Eriocheir sinensis*), a catadromous species capable of migrating long distances upstream. This crab has been documented as far north as Prince of Wales Island in Southeast Alaska and has the potential to impact native salmon populations by preying on eggs and competing for critical habitats (USGS 2025b; ADF&G 2002).

Dreissenid mussels, including zebra (*D. polymorpha*) and quagga mussels (*D. bugensis*), are invasive freshwater species that pose significant ecological and economic threats. Native to Europe, they were introduced to the United States in the 1980s via ballast water discharge and have since spread to various waterbodies across the country. These mussels can dramatically alter ecosystems by forming dense colonies, filter-feeding on plankton (thereby reducing food availability for native species), and attaching to various surfaces, leading to infrastructure damage (USFWS 2025). To prevent their introduction into Alaska, a network of watercraft inspection and decontamination stations has been established, involving state, federal, provincial, and Tribal agencies. USFWS operates the only watercraft inspection and decontamination station in Alaska, located at the Alaska-Canada Highway Land Port of Entry—the primary land access point to the state. Inspectors at this station examine watercraft entering Alaska, assess the risk of transporting aquatic invasive species, and perform decontaminations when necessary. Thanks to these efforts, Alaska remains one of the few western states not infested with dreissenid mussels.

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5.4 Wildlife Resources

Because there are no specific field survey data documenting wildlife species occurrence in the Tyee Lake Project area, the assemblage of wildlife species likely to occur on a regular basis in the area was developed based on the known species ranges, the currently available habitats, and the known habitat relationships for wildlife species in Southeast Alaska. Currently available habitats were identified by photointerpretation of image signatures evident on recent (2021) high-resolution satellite imagery that covers the Tyee Lake Project area and surrounding terrain (see Section 5.5.2, *Vegetation and Wildlife Habitats*). A set of 16 wildlife habitat types were identified in that effort ranging from subalpine dwarf scrub, coastal coniferous rain forests, tall shrublands, lacustrine and riverine waterbodies, and various coastal habitats and developed areas in upper Bradfield Canal, where the Project powerhouse and associated infrastructure is located. The 16 habitat types were classified based on the set of broad-scale habitats used in the wildlife habitat-value assessments developed by ADF&G for all Southeast Alaska in the 2025 State Wildlife Action Plan (SWAP) for Alaska (ADF&G 2025).

Using those habitat-value assessments, wildlife Species of Greatest Conservation Need (SGCN), as defined by ADF&G (2025), that are likely to regularly occur in the Tyee Lake Project area was determined. This was accomplished by selecting those species that had high and moderate habitat-value rankings for one or more of the 16 identified wildlife habitats in the Project area. In this analysis, wildlife use of the adjacent marine waters in upper Bradfield Canal was also considered. The combination of high and moderate habitat-value rankings represent those with a higher probability of species occurrence and represent the set of habitats that can be regularly used by wildlife (Marcot et al. 2015; Welch et al. 2023). Additional wildlife species known to occur in Southeast Alaska were added to the species list when it was determined that suitable habitats were available. Wildlife species that have been recorded rarely in southern Southeast Alaska (i.e., vagrants or accidentals occurring as single individuals or in small numbers outside their normal range) were omitted from this analysis because they would not occur on a regular basis in available habitats in the Project area.

5.4.1 Terrestrial Mammals

Using the procedures described above, it was determined that a total of 35 species of terrestrial mammals are likely to occur on a regular basis in the Tyee Lake Project area (Table 5-7). The large mammals include brown bear (*Ursus arctos*), black bear (*Ursus*

americanus), moose (*Alces alces*), mountain goat (*Oreamnos americanus*), Sitka black-tailed deer (*Odocoileus hemionus sitkensis*), Alexander Archipelago gray wolf (*Canis lupus ligoni*), and wolverine (*Gulo gulo*) (Table 5-7; APA 1979; MacDonald and Cook 2009; ADF&G 2026). Eight furbearer species could be found in the Project area, including beaver (*Castor canadensis)*, river otter (*Lontra canadensis mira*), American mink (*Neovison vison*), American marten (*Martes americana*), ermine (*Mustela erminea*), lynx (*Lynx canadensis*), coyotes (*Canis latrans*), and red fox (*Vulpes vulpes*) (Table 5-7; APA 1979; MacDonald and Cook 2009; ADF&G 2026). Fifteen small mammal species including shrews, jumping mice, lemmings, voles, deermice, squirrels, and porcupine and five species of bats may occur in the Project area (Table 5-7).

Table 5-7 Terrestrial mammals likely to occur regularly in available habitats within the Tyee Lake Project vicinity.

Scientific Name	Common Name	Conservation Status[1]
Beavers and Porcupines		
Castor canadensis	Beaver	
Erethizon dorsatum	Porcupine	SGCN
Marmots		
Marmota caligata	Hoary marmot	SGCN
Squirrels		
Tamiasciurus hudsonicus picatus	Red squirrel	SGCN
Glaucomys sabrinus griseifrons	Northern flying squirrel	SGCN
Jumping Mice		
Zapus hudsonius	Meadow jumping Mouse	SGCN
Zapus princeps	Western jumping mouse	
Lemmings		
Synaptomys borealis	Northern bog lemming	SGCN
Voles and Deermice		
Microtus longicaudus	Long-tailed vole	SGCN
Microtus pennsylvanicus[2]	Meadow vole	SGCN
Myodes gapperi phaeus	Southern red-backed vole	SGCN
Ondatra zibethicus	Common muskrat	SGCN
Peromyscus keeni	Northwestern deermouse	SGCN
Shrews		
Sorex cinereus streatori	Cinereus/Masked shrew	SGCN
Sorex obscurus longicaudus	Dusky/Montane shrew	SGCN
Sorex navigator	Western water shrew	SGCN

Scientific Name	Common Name	Conservation Status[1]
Bats		
Myotis californicus	California myotis	SGCN
Myotis evotis[3]	Western Long-eared Bat	
Myotis volans	Long-legged myotis	SGCN
Myotis lucifugus	Little brown myotis	SGCN
Lasionycteris noctivagans	Silver-haired bat	SGCN
Felids and Canids		
Lynx canadensis[4]	Lynx	
Canis lupus ligoni	Wolf (Alexander Archipelago)	
Canis latrans[2]	Coyote	
Vulpes vulpes[2]	Red fox	
Bears		
Ursus arctos	Brown bear	
Ursus americanus	Black bear	
Weasels and Otters		
Gulo gulo	Wolverine	
Lontra canadensis mira	River otter	SGCN
Martes americana	American marten	
Mustela erminea	Ermine (Short-tailed weasel)	SGCN
Neovison vison	American mink	
Bovines		
Oreamnos americanus	Mountain goat	
Deer and Moose		
Alces alces	Moose	
Odocoileus hemionus sitkensis	Sitka black-tailed deer	

[1] SGCN = Species of Greatest Conservation Need (ADF&G 2025).
[2] Rare.
[3] Previously misclassified in Southeast Alaska as Keen's myotis (*Myotis keenii*).
[4] Marginal record.

5.4.1.1 Large Mammals

Brown bears occur throughout much of Alaska, including the coastal mainland of Southeast Alaska, and on the northern islands of the Alexander Archipelago between Icy Strait and Frederick Sound (MacDonald and Cook 2007; Schoen and Gende 2007). The population of brown bears in the Bradfield Canal area appears to be stable to increasing. Based on a study involving DNA mark-recapture techniques, ADF&G estimated that the

Bradfield Canal area had a population density of 70 bears per 1,000 square miles (27 bears per 1,000 square kilometers) in 2005 and 114 bears per 1,000 square miles (44 bears per 1,000 square kilometers) in 2006 (Flynn et al. 2010), much lower densities than in some other parts of Southeastern Alaska. Brown bears use seasonally available food resources. In spring, brown bears often feed on vegetation including sedges, skunk cabbage roots (*Lysichiton americanus*), and horsetail (*Equisetum* spp.) but will also feed on deer, voles, and herring roe (McCarthy 1989). During late summer and fall, salmon are a major food component when available, but bears also begin to forage extensively on berries, including devil's club (*Oplopanax horridus*), blueberry, currant, salmonberry (*Rubus spectabilis*), and twisted stalk (*Streptopus amplexifolius*). As a result, brown bears preferentially use tidal sedge flats, south-facing avalanche slopes, subalpine and alpine ridges, salmon-spawning streams, riparian areas, and upland old-growth forests (Schoen and Beier 1990; Apps et al. 2004; Schoen and Gende 2007). Brown bear dens on Admiralty and Chichagof islands occurred in natural rock cavities, under the root structure of old-growth trees, or excavated into earthen slopes (Schoen et al. 1987).

In Southeast Alaska, black bears are an important game species. Mainland populations are assumed to be stable, though densities are lower than on nearby islands due to habitat constraints and competition with brown bears (Robbins 2021a; Dorendorf 2026). While quantitative data are limited to specific island studies, research indicates that black bears track high-quality, seasonal food sources from sea level to alpine zones (Schoen and Peacock 2007; MacDonald and Cook 2009). During spring and early summer, bears forage for emergent vegetation on tidal sedge flats, south-facing avalanche slopes, and young clearcuts (Erickson et al. 1982; Robbins 2021a). By mid-summer, activity shifts toward coastal shorelines for invertebrates and anadromous streams for salmon (Lowell 2008). However, where they coexist sympatrically with brown bears, black bears often avoid salmon-rich areas to reduce competition, resulting in a more herbivorous and frugivorous diet (Belant et al. 2006; Fortin et al. 2007; Jacoby et al. 1999).

The long-term viability of these populations is closely tied to forest structure. In the region's high-precipitation environment, black bears require large-diameter old-growth trees, snags, or hollow logs for dry denning (Erickson et al. 1982; Kramer et al. 2001). While timber harvest initially provides early successional forage, subsequent canopy closure after 25 years renders the habitat less suitable, though pre-commercial thinning can mediate these impacts (Lowell 2008; Robbins 2021a). Consequently, extensive logging remains the most significant threat to black bear habitat in areas like Game Management

Unit (GMU) 3, as it depletes the late-successional structures necessary for winter survival (Lowell 2008).

Moose in GMU 1A and 1B are recent colonizers from mainland British Columbia and are of the mainland subspecies *andersoni*, which is found across most of Canada. In contrast, the subspecies *gigas* is found throughout the majority of Alaska, Yukon, and Northwest Territories (MacDonald and Cook 2009; Dorendorf 2021; Robbins 2025a). Moose are uncommon in Southeast Alaska, concentrated where suitable habitat is present, which includes portions of Bradfield Canal and the nearby Unuk River drainage (Dorendorf 2021; Robbins 2025a). Moose concentrate at elevations below 100 feet and are rarely above 2,000 feet (Craighead et al. 1984). Moose prefer riparian habitat, subalpine shrublands, and recent clearcuts in Southeast Alaska (ADF&G 2026; Robbins 2025a; Hundertmark et al. 1983). Moose forage on a variety of items in the summer, including aquatic vegetation, grasses, sedges, forbs, and deciduous leaves of primarily willow, aspen, and birch, and in the winter, they eat primarily twigs from deciduous trees and shrubs (ADF&G 2026). Winter distribution in Southeast Alaska is driven by a tradeoff to avoid deep snow but also meet nutritional needs. Therefore, in years of low snow, moose can forage in recent clearcuts, shrublands, and mixed/deciduous forests readily, but in years of deep snow, they will avoid recent clearcuts and select conifer forests that have shallower snow (Hundertmark et al. 1990). The moose population in GMU 1B is declining as clearcuts transition into less favorable coniferous vegetation (Robbins 2025a).

Mountain goats are native to the mountains of coastal Southcentral and Southeastern Alaska and may be found in the Tyee Lake Project area. Goat populations in coastal Alaska are limited principally by winter severity (mainly snow depth) and the availability of suitable habitat (Fox et al. 1989). USFS (2016) considers mountain goats a management indicator species, and a changing climate may threaten mountain goats through deeper winter snow, warmer summers, and rising tree lines (Nadeau et al. 2017). Mountain goat survival declines in both winters with high snowfall and warm summers, especially for older animals (White et al. 2011). Avalanches can be a major source of mountain goat mortality (White et al. 2024). Mountain goats can be sensitive to human activity; one study reported that mountain goats were found at lower-than-expected levels within 1,800 meters (5,906 feet) of a mine during winter and 1,000 meters (3,281 feet) during the summer (White and Gregovich 2017).

Mountain goats are closely associated with rugged terrain with high solar heat loads, which decreases snow depth and increases plant production (Shafer et al. 2012; ADF&G 2026). Their preferred habitat consists of steep escape terrain with refugia from predators located next to forage areas (Fox et al. 1989). Mountain goats use avalanche chutes and low south-facing slopes during the spring and high elevation alpine and subalpine habitat with the decline in snowpack during summer (Robbins 2021b). Goats consume a wide variety of foods including alder, rhizomes, new fern shoots, and early emergent sedges and forbs (Fox and Smith 1988; Fox et al. 1989). During the winter, mountain goats stay close to escape cover (e.g., cliffs) but often move into mature forests at lower elevations to escape deep snow or stay on windswept slopes (Smith 1986; White and Gregovich 2017). They forage primarily on conifers, mosses, lichens, shrubs, forbs, ferns, and grasses (Fox and Smith 1988).

The Sitka black-tailed deer is a subspecies of mule deer endemic to the coastal areas of Southeast Alaska and northern British Columbia. Sitka black-tailed deer populations are subject to dramatic fluctuations, largely in response to the depth and duration of winter snow (Hanley 1984). Abundances are relatively higher at lower elevations along the outer coast and islands as a result of milder winters and more productive forests. Sitka black-tailed deer are associated with coastal temperate rainforests in the area and use a variety of habitats throughout the year. Habitat use generally varies with snow depth and plant growth, such that deer track resources across broad elevational gradients, varying slope aspects, and diverse habitat types (Doerr et al. 2005; Schoen and Kirchhoff 1985, 1990). In spring, deer are found predominantly at lower elevations and southerly exposures below 450 meters (1,500 feet), where they search for new plant growth, of which skunk cabbage, fiddlehead ferns (*Matteuccia struthiopteris*), and new leaves of various browse species are particularly important. In summer, deer are widely dispersed from sea level to high elevations, and subalpine meadows become increasingly important as a source of emerging herbaceous forage. After fall frosts limit the availability and quality of herbaceous forage, deer move into upper elevation forests until they are pushed to lower elevations by deepening snow, often into old-growth forests below 300 meters (1,000 feet) elevation and predominantly on south-facing slopes. Large-diameter stands of spruce and hemlock provide refuge from deep snow and provide evergreen forbs and low shrubs as forage, as well as lichens blown from the canopy of mature trees (Farmer et al. 2006). In managed landscapes, deer use clearcuts approximately 20 years old or younger extensively for the abundant forage during the growing season (Schoen and Kirchhoff 2007).

Wolves inhabiting coastal Southeast Alaska belong to a distinctive subspecies known as the Alexander Archipelago wolf (*C. l. ligoni*; Person et al. 1996; MacDonald and Cook 2007). The population size for GMU 1B is roughly estimated at 45–125 wolves in 8 packs with an assumed population density greater than that found in interior Alaska (Robbins 2025b). Wolves are able to thrive in a wide variety of habitats from alpine areas to the coast, with the limiting factor being prey availability (MacDonald and Cook 2009). In GMU 1B on the coastal mainland, deer populations are lower and spottier than on nearby islands, and therefore wolves likely have a more diverse diet than other nearby populations that rely more heavily on deer (Smith et al. 1987; Person et al. 1996). Wolves on the coastal mainland are more opportunistic and rely on a combination of deer, moose, goats, beavers, salmon, waterfowl, small mammals, and occasionally marine mammals (Lowell 2006; Person et al. 1996; Robbins 2025b). Suitable habitat for wolves in Southeast Alaska occurs up to elevations of 549 meters (1,800 feet) (Lowell 2006), but they spend the majority of their time below 396 meters (1,300 feet) where most of their primary prey occurs (Person 2001). In winter, wolf packs on Prince of Wales Island selected for closed-canopy old growth in areas where snow accumulated, whereas on Kosciusko Island, with lower snow accumulation, a pack selected for open-canopy old growth (Person 2001). Data from radio-collared wolf relocations on Prince of Wales and Kosciusko islands indicated that wolves avoided clear cuts, second-growth forests, and roads (Person et al. 1996).

5.4.1.2 Furbearers

The wolverine is the largest North American land member of the weasel family (*Mustelidae*) and occurs throughout Alaska, including within the Project area (APA 1979). They are generally solitary and have large home ranges, traveling extensively in search of food (ADF&G 2026). Generally, they are found in a variety of habitats and elevations but are more common in alpine and subalpine habitats in the summer and often move to lower elevations in the winter where they can also use forest habitats (USFWS 2018). In northern Southeast Alaska, wolverines prefer lower elevation shrub and unvegetated habitats and avoid higher elevations and steep slopes, extensively using the sides of valleys but not valley bottoms (Lewis et al. 2012). Wolverines are opportunistic scavengers and hunters that eat almost anything, including deer, moose, goats, marmots, grouse, ptarmigan, and other small mammals (Lewis et al. 2012; ADF&G 2026).

Red fox, coyote, and lynx are all infrequent visitors of southern Southeast Alaska, though all are common in mainland British Columbia (MacDonald and Cook 2009). Sightings are most likely to occur along major river valleys with connections to the interior. Beavers are aquatic furbearers that occur exclusively in association with woody vegetation and freshwater habitats, including streams, rivers, impoundments, and lakes, from sea level to alpine zones (Copper Valley Electric Association 2011). They require 2 to 3 feet of water year-round for lodges, protection from predators, and to transport and store food (ADF&G 2026). Beavers dam slow moving creeks to create ponds in which to build lodges, sometimes causing extensive flooding (USFS 2026; ADF&G 2026). Lodges can be built into the banks of relatively stable rivers and streams or as standalone structures in lakes and ponds. They eat the tree bark of trees, leaves, grasses, and aquatic vegetation (ADF&G 2026).

The river otter is generally found in food-rich coastal areas, estuaries, the lower portions of rivers and streams and coastal marshes with little human disturbance (Larsen 1983; Woolington 1984; Melquist et al. 2003). River otters feed almost exclusively on fish, especially sculpin in Southeast Alaska, but they may occasionally forage on crustaceans, amphibians, insects, birds, and mammals (Larsen 1984; Melquist et al. 2003). In Prince William Sound and Southeast Alaska, river otters exhibit a strong selection for coastal shorelines adjacent to old-growth forests (Larsen 1984; Woolington 1984; Bowyer et al. 2003). River otters forage in marine areas and lower portions of drainages but use old-growth forests for escape and refuge from predators (Woolington 1984; Ben-David et al. 1995). They inhabit shorelines sheltered by large overstory tree canopy, where adequate understory exists to provide cover from predators. Roots of large trees and logs also provide holes and crevices that function as shelter for resting and denning (Woolington 1984; Melquist et al. 2003). Old-growth forests provide high-quality habitat for this species, where it is associated within 152 meters (500 feet) of coastal shorelines and riparian areas (Woolington 1984; USFS 2008). Tidal lagoons with connecting streams containing significant salmon runs, such as the Bradfield Canal, are favored habitats of river otters, and often dens will be located near these areas (APA 1979). Otters are moderately tolerant of human activity and are relatively abundant throughout the Project area (APA 1979).

The American marten, mink, and ermine are three small weasel species that occur throughout Southeast Alaska (APA 1979). They are all predators of a variety of small mammals, birds, fish, eggs, and crustaceans (ADF&G 2026). Like river otters, mink are

closely associated with productive aquatic habitats, feeding heavily on fishes (Larivière 1999; Johnson 1985). However, mink tend to prefer drier shorelines and eat more small mammals and birds than do otters (Larivière 1999; Johnson 1985).

The American marten occurs throughout most of the forested areas of Southeast Alaska, including both the mainland and the Alexander Archipelago. They occur as native and introduced populations in the Alexander Archipelago. Martens native to the Wrangell Island area belong to the subspecies *M. a. americana* (Small et al. 2003). Seasonal movements and habitat use are strongly related to the distribution and abundance of food. Martens feed on small mammals year-round, and voles are the most common prey for martens in most areas (Flynn et al. 2004; Poole et al. 2004; Potvin et al. 2000). Long-tailed voles are the most common species eaten by martens in Southeast Alaska (Flynn and Schumacher 2001, 2009). Martens supplement their food supplies with larger prey species, especially snowshoe hare (*Lepus americanus*), red squirrel (*Tamiasciurus hudsonicus picatus*), and grouse (Poole et al. 2004), as well as winter-killed deer carcasses in the spring, and birds, berries, and occasionally salmon in summer and fall (USFS 2008; Schoen et al. 2007). A close relationship has been observed between martens and old-growth forests in Southeast Alaska (DeGayner 1997). Habitat use on Chichagof Island was concentrated in large- and medium-tree old-growth stands, and densities were highest in intact forests and lower in fragmented forests (Flynn and Schumacher 2001; Hargis et al. 1999). Marten preference for forests with complex structure and large tree size is relatively consistent throughout the species' range, as are the negative impacts of clearcutting and high road densities on marten populations (Chapin et al. 1997; Potvin et al. 2000; Poole et al. 2004; Schoen et al. 2007; Godbout and Ouellet 2008; Flynn and Schumacher 2001, 2009).

The ermine, or long-tailed weasel, is a well distributed small weasel in Alaska. The subspecies previously described as *M. erminea alascensis* is found in Southeast Alaska south of Lynn Canal (MacDonald and Cook 2009). They are major predators of small mammals and prefer a variety of habitats with good cover and an abundance of their preferred prey (MacDonald and Cook 2009). Riparian corridors and edge habitat are also preferred (ADF&G 2026). They can be found at lower elevations along the coast and in alpine habitats (ADF&G 2026).

5.4.1.3 Small Mammals

The North American porcupine (*Erethizon dorsatum*) is primarily an arboreal species that uses a broad variety of habitats and at varied elevations (MacDonald and Cook 2009; ADF&G 2026). They eat the inner bark of spruce, birch, and hemlock and spruce needles in the winter, and in the spring and summer, they eat the buds and young green leaves of birch, aspen, cottonwood, and willow (ADF&G 2026). They strategically locate the most nutritious foods on the landscape at specific times of the year and will return to those food sources in subsequent years (ADF&G 2026).

Hoary marmots (*Marmota caligata*) den in talus slopes, boulder fields, and rock outcrops, burrowing into the soil under rocks (MacDonald and Cook 2009). Because they are often found in alpine habitats that are present in the surrounding area, but not in the immediate Project area, they are unlikely to be found in the Project area. Muskrat (*Ondatra zibethicus*) are an aquatic rodent found in wet-favoring locations with 4 to 6 feet of water that feeds on herbaceous aquatic plants like cattails, lilies, grasses, and sedges (ADF&G 2026). They appear to be rare in Southeast Alaska, with MacDonald and Cook (2009) documenting the nearest known specimen on Revillagigedo Island.

Several subspecies of Northern flying squirrel (*Glaucomys sabrinus*) occur throughout forested areas of Southeast Alaska (ADF&G 2026). *G. s. griseifrons* is found on Prince of Wales and adjacent islands, the Alexander Archipelago, and some mainland portions of Southeast Alaska, and *G. s. saphaeus* is found in Southeast Alaska and northwestern coastal portions of British Columbia (MacDonald and Cook 2009). In Southeast Alaska, they are associated with old growth forests of Sitka spruce (*Picea sitchensis*), western hemlock (*Tsuga heterophylla*), and cedar, especially at lower elevations with well-developed understories (MacDonald and Cook 2009; Smith and Nichols 2003). They den in natural tree cavities that are more prevalent in older forests with more snags (Bakkar and Hastings 2002).

The red squirrel is found throughout Southeast Alaska and is abundant on many islands in the Alexander Archipelago (USFS 2016) and a breeding population occurs on Wrangell Island. Old-growth forests provide higher-quality habitat for red squirrels than younger forest stands (Yahner 2003). Late-successional forests provide higher densities of cavities and interlocking branches for homesites and produce important food resources (e.g., cone seeds) for squirrels. Red squirrels are opportunistic feeders on seeds from a variety of conifer species, including spruce and pine. They also feed on buds, fungi, shoots, and

cambium and phloem tissues. Although habitat suitability for red squirrels is reduced through the conversion of mature forest stands to second growth, recovery of habitat capability after timber harvest is faster for red squirrels than other species (USFS 2016). Formation of structures favored for nesting and food storage (e.g., cavities) is limited in young forests, yet food availability recovers quickly as cone production typically begins 40 years after harvest. It is likely that late-successional disturbed forests (those greater than 150 years old since disturbance) also may provide sufficient food and cover.

Seven species of deermice, jumping mice, lemmings, and voles may be found in the Project area. Northern bog lemmings (*Synaptomys borealis*) primarily live in burrows among sedges and grasses (Wilson and Ruff 1999). They can be found where moisture levels are high, and growth of sedges and grasses are sufficient to provide cover as well as act as their food supply (Wilson and Ruff 1999). Northern bog lemmings can be fairly common in Southeast Alaska, with most captured in Wrangell-St. Elias National Park in wet grass-shrub meadows, open tussock bogs, and other wetland habitats (Cook and MacDonald 2003). The species may be restricted to lower elevation forested regions (MacDonald and Cook 2009).

The long-tailed vole (*Microtus longicaudus*) occupies a variety of habitats including dry grassy openings in forests, meadows, mountain meadows, stream banks, rocky mountain slopes, shrub thickets, and riparian zones (Banfield 1974). The meadow vole (*Microtus pennsylvanicus*) has only been found in the Taku, Chilkat, and Stikine river valleys and on Admiralty, Mitkof, and Wrangell islands (MacDonald and Cook 2009). While it is possible it occurs in the Project area, it is unlikely. Meadow voles are primarily found in grassy meadows, a habitat highly restricted in the Project area. The southern red-backed vole (*Myodes gapperi*) is found throughout much of boreal North America. The subspecies *M. g. phaeus* is located in southern Southeast Alaska and adjacent British Columbia (MacDonald and Cook 2007, 2009). These voles are habitat generalists (MacDonald and Cook 2009).

The northwestern deermouse (*Peromyscus keeni*) is common along coastal British Columbia and Southeast Alaska. They can be found in a variety of habitats at various elevations, but they appear to favor forest-beach edges and have been observed in large spruce and hemlock trees (MacDonald and Cook 2009). They also commonly inhabit human dwellings (MacDonald and Cook 2009). Meadow jumping mice (*Zapus hudsonius*) have only been found in southern Southeast Alaska at two locations, both on nearby

Revillagigedo Island (MacDonald and Cook 2007). They inhabit open and shrub habitats, especially riparian habitats (MacDonald and Cook 2007). The western jumping mouse (*Zapus princeps*) is found on the mainland of Southeast Alaska south of the Taku River (MacDonald and Cook 2007). They have similar habitat preferences to the meadow jumping mouse (MacDonald and Cook 2009) and both jumping mice can be locally abundant (MacDonald and Cook 2009).

Three species of shrew may be found in the Project area, the Cinereus shrew (*Sorex cinereus*), dusky shrew/montane shrew (*Sorex obscurus/Sorex monticolus*), and the western water shrew (*Sorex navigator*). The cinereus shrew subspecies *S. c. streatori* is located in Southeast Alaska. Cinereus shrews occupy a diversity of habitats; most common are open and closed forests, meadows, riverbanks, lakeshores, and willow thickets (Lee 2001). The highest population densities can be found in moist environments. They also do well in disturbed habitats such as those disturbed by fire or logging (Lee 2001; Cook and MacDonald 2003). On Wrangell Island, cinereus shrews occur in all major vegetation types, but they are most numerous in moist open habitats at lower elevations (Cook and MacDonald 2003). Dusky shrews occupy a wide range of habitats including tundra, alpine meadows, forests, and prairies (Forsyth 1985). On Wrangell Island, dusky shrews were generally confined to herbaceous and scrub-tundra habitats in the mountains (Cook and MacDonald 2003). Cook and MacDonald (2003) captured more montane shrews than any other species of shrew. All but one of the 91 animals sampled were taken at higher elevations. The water shrew may have the most limited habitat distribution of any of the shrew species, as it is restricted to riparian habitats with dense ground cover along clear streams, lakes, beaver ponds, and marshes at various elevations (Conaway 1952; Cook and MacDonald 2003; Lehmkuhl et al. 2008; MacDonald and Cook 2009). Members of the *S. navigator* species group are uniquely adapted to freshwater environments; for example, modified hairs provide insulation by repelling water and trapping air, and a fringe of stiff hairs on the feet and toes allows them to swim underwater and to walk on the surface of water (Frey 2020).

5.4.1.4 Bats

Five species of SGCN bats are found in Southeast Alaska and could possibly be present in the Project area. The little brown myotis (*Myotis lucifugus*) is the most widely distributed bat species in Alaska, occupying a vast range of environments from the temperate rainforests of the Southeast to the interior spruce-birch forests and the treeless, shrub-

dominated communities of the West (ADF&G 2026). They inhabit a variety of habitats, but overhead canopy cover, particularly in mixed forests, and proximity to waterbodies are associated with greater bat detections (Loeb et al. 2014; ABR, Inc.—Environmental Research and Services [ABR] 2015; Testerman and Jochum 2018) while other studies have found that little brown myotis prefer edge habitats (Nelson and Gillam 2016). Some little brown myotis in Southeast Alaska use caves for overwintering, but most use human structures (ADF&G 2025; Tessler et al. 2014).

The silver haired bat (*Lasionycteris noctivagans*) is found at low densities throughout much of Southeast Alaska, with the nearest confirmed occurrences on Prince of Wales Island (Boland et al. 2009; ADF&G 2025). They are associated with forested habitats with adjacent openings (MacDonald and Cook 2009; ADF&G 2025). They roost exclusively in tree foliage, cavities, loose bark, or human structures, and the only known hibernacula in the state are human structures (MacDonald and Cook 2009; ADF&G 2025).

Southeast Alaska is the northernmost distribution for the California myotis (*Myotis californicus*), which is found at low densities (Boland et al. 2009; MacDonald and Cook 2009). Most confirmed occurrences in Alaska are from Prince of Wales Island, but individuals have also been confirmed near Juneau and on Mitkof Island (Boland et al. 2009; MacDonald and Cook 2009). The California myotis prefers to roost in rock crevices, trees, cliffs, and bridges, and in caves and mine shafts. It is closely associated with dense forest habitats in the Pacific Northwest (MacDonald and Cook 2009).

The Western long-eared bat (*Myotis evotis*), previously misclassified in Southeast Alaska as the Keen's myotis (*Myotis keenii*), has one of the most restricted ranges in North America. This bat occurs in wet coastal forests in the Pacific Northwest and Southeast Alaska, and specimens have been confirmed near the Project area on Wrangell Island (Filla 2005; Boland et al. 2009; MacDonald and Cook 2009; ADF&G 2026). Little is known about their habitat preferences other than they are associated with coastal rainforests (MacDonald and Cook 2009). They prefer roosting in the bark of large-diameter western hemlock and Sitka spruce, caves, snags, and human-made structures (Filla 2005). The only known hibernacula are in karst formations, and they are not known to migrate, thus their distribution is highly limited (Filla 2005).

The long-legged myotis (*Myotis volans*) is also found at low densities in southern Southeast Alaska, including on Wrangell Island and Prince of Wales Island (Boland et al.

2009). It is generally associated with conifer forests and riparian areas in Southeast Alaska (Boland et al. 2009; MacDonald and Cook 2009).

5.4.2 Amphibians

Six amphibian species are likely to occur regularly in the Project area (Table 5-8): Columbia spotted frogs (*Rana luteiventris*), wood frogs (*Lithobates sylvaticus*), western toads (*Anaxyrus boreas*), long-toed salamanders (*Ambystoma macrodactylum*), northwestern salamanders (*Amystoma gracile*), and rough-skinned newts (*Taricha granulosa*).

Table 5-8 Amphibian species likely to occur regularly in available habitats within the Tyee Lake Project vicinity.

Scientific Name	Common Name	Conservation Status*
Rana luteiventris	Columbia spotted frog	SGCN
Lithobates sylvaticus	Wood frog	SGCN
Anaxyrus boreas	Western toad	SGCN
Ambystoma macrodactylum	Long-toed salamander	SGCN
Ambystoma gracile	Northwestern salamander	SGCN
Taricha granulosa	Rough-skinned newt	SGCN

* SGCN = Species of Greatest Conservation Need (ADF&G 2025).

Columbia spotted frogs prefer permanent lakes, ponds, and slow-moving streams less than 1.5 meters (4.9 feet) deep with stable water levels and temperatures, and an abundance of aquatic vegetation for protection from predators and for depositing egg masses (Kiehl 2015; ADF&G 2026). In colder areas, they may stay close to springs and undercut banks where waters do not freeze (Kiehl 2015). They are rarely found far from water (ADF&G 2026).

The wood frog is found throughout much of northern North America, including much of Alaska. They live in a variety of habitats and are highly terrestrial, only occupying aquatic habitats during the breeding season (Gotthardt and Hammerson 2005b; Broderson and Tessler 2008). The wood frog has the ability to freeze solid in winter, making it extremely cold tolerant (Broderson and Tessler 2008).

Western toads are common in many areas of Southeast Alaska, occupying primarily open terrestrial habitats within 1 kilometer (1.6 miles) of water (Davis 2002; Broderson and Tessler 2008; ADF&G 2026). They can breed in a variety of waterbody types (ADF&G 2026).

Long-toed salamanders lay their eggs in temporary or permanent water but are primarily terrestrial, commonly found in subterranean habitats in well-drained areas with abundant leaf litter and in close proximity to permanent waterbodies (Graham 1997; Gotthardt and Hammerson 2005a). They can be found in a variety of habitats, including clearcuts (Graham 1997). During the breeding season, they are likely to be located under debris close to water (Gotthardt and Hammerson 2005a).

The northwestern salamander is endemic to the Pacific Coast, ranging from central California to the southeastern panhandle of Alaska (Petranka 1998). As a primarily fossorial species, it selects terrestrial habitats based on high moisture, soil stability, and the presence of coarse woody debris or subterranean burrows (AmphibiaWeb 2024; Matthews 2003). Throughout the Pacific Northwest and Alaska, the species strongly prefers old-growth coniferous forests, particularly coastal hemlock-spruce, which offer the stable, cool microclimates necessary for survival (Whatcom County Amphibian Monitoring Program 2024; Alaska Herpetological Society 2024). For breeding, the species uses permanent or semi-permanent waterbodies, such as muskeg ponds and sloughs, typically selecting depths exceeding 2 meters (6.6 feet) (Hoffman et al. 2003; Alaska Herpetological Society 2024). In colder northern regions like Alaska, many populations exhibit neoteny (paedomorphism), reaching sexual maturity while retaining larval features like gills (Alaska Herpetological Society 2024; Hoffman et al. 2003).

The rough-skinned newt is a common amphibian in the Pacific Northwest and Southeast Alaska, extending from central California to the Juneau area (Matthews 2003; Alaska Herpetological Society 2024). Terrestrially, this species is highly associated with mature old-growth coastal forests, particularly Douglas fir (*Pseudotsuga menziesii*) and hemlock-spruce stands, where it seeks refuge under logs, stumps, and rocks to maintain its skin moisture (ADF&G 2026; Matthews 2003). It selects breeding habitats characterized by quiet, still, or slow-moving waters, such as lakes, ponds, muskegs, and sloughs, where it attaches its eggs singly to submerged vegetation (AmphibiaWeb 2024; Alaska Herpetological Society 2024). While most adults migrate seasonally between terrestrial and breeding habitats, some populations, particularly at high elevations or in stable permanent lakes, may remain aquatic year-round (AmphibiaWeb 2024; Matthews 2003).

5.4.3 Avian Species

The 16 habitats identified in the Tyee Lake Project area (see Section 5.5.2, *Vegetation and Wildlife Habitats*), plus adjacent marine waters, encompass areas that can be regularly

used by multiple bird species, including waterbirds, shorebirds, seabirds, raptors, and landbirds (Table 5-9). These species are likely to use the area for breeding and during migration, and in some cases, can be year-round residents. Using a broad checklist of 232 birds recorded in the Wrangell Borough, based on eBird observations (eBird 2026), the birds most likely to consistently use the terrestrial and marine habitats in the Tyee Lake Project vicinity were determined. Based on (1) the ranges of the 232 species known to occur in the Wrangell Borough, (2) the 16 habitats available in the Project area, plus marine waters, (3) the wildlife habitat-value assessments for bird SGCN in the Alaska SWAP (ADF&G 2025), and (4) expert opinion based on decades of ornithological field experience in Alaska, it was determined the Project area and vicinity may be used regularly by at least 137 bird species (Table 5-9). In the SWAP habitat-value assessments, 68 species with high or moderate habitat-value rankings were associated with the 16 habitats identified in the Project area. An additional 69 species were included when it was determined that suitable habitats were also available in the Project area. In this analysis, those bird species recorded rarely in the Wrangell Borough (i.e., vagrants or accidentals occurring as single individuals or in small numbers outside their normal range) were omitted because they would not occur on a regular basis in available habitats in the Project area.

Table 5-9 Avian species likely to occur regularly in available habitats in the Tyee Lake Project vicinity.

Common Name	Scientific Name	Expected Occurrence	Conservation Status[1]
Waterbirds			
Snow Goose	Anser caerulescens	Migrant	
Greater White-fronted Goose	Anser albifrons	Migrant	
Cackling Goose	Branta hutchinsii	Migrant	
Vancouver Canada Goose	Branta canadensis fulva	Resident	USFS management indicator
Trumpeter Swan	Cygnus buccinator	Breeding	SGCN, USFS sensitive
Northern Shoveler	Spatula clypeata	Breeding	
Gadwall	Mareca strepera	Winter	
American Wigeon	Mareca americana	Breeding	
Mallard	Anas platyrhynchos	Resident	
Northern Pintail	Anas acuta	Breeding	SGCN
Green-winged Teal	Anas crecca	Breeding	
Greater Scaup	Aythya marila	Winter	
Lesser Scaup	Aythya affinis	Migrant	SGCN
Harlequin Duck	Histrionicus histrionicus	Breeding, winter	SGCN
Surf Scoter	Melanitta perspicillata	Winter	SGCN
White-winged Scoter	Melanitta deglandi	Winter	SGCN
Black Scoter	Melanitta americana	Winter	SGCN
Long-tailed Duck	Clangula hyemalis	Winter	SGCN
Bufflehead	Bucephala albeola	Winter	
Common Goldeneye	Bucephala clangula	Breeding, winter	
Barrow's Goldeneye	Bucephala islandica	Breeding, winter	
Hooded Merganser	Lophodytes cucullatus	Winter	
Common Merganser	Mergus merganser	Resident	
Red-breasted Merganser	Mergus serrator	Winter	
American Coot	Fulica americana	Winter	
Sandhill Crane	Antigone canadensis	Migrant	SGCN
Horned Grebe	Podiceps auritus	Breeding, winter	SGCN

Common Name	Scientific Name	Expected Occurrence	Conservation Status[1]
Red-necked Grebe	Podiceps grisegena	Breeding, winter	SGCN
Red-throated Loon	Gavia stellata	Breeding, winter	SGCN
Pacific Loon	Gavia pacifica	Migrant, winter	
Common Loon	Gavia immer	Breeding, winter	
Yellow-billed Loon	Gavia adamsii	Winter	BCC
Great Blue Heron	Ardea herodias	Resident	SGCN, USFS management req.
Shorebirds			
Killdeer	Charadrius vociferus	Breeding	
Semipalmated Plover	Charadrius semipalmatus	Breeding	
Whimbrel	Numenius hudsonicus	Migrant	
Short-billed Dowitcher	Limnodromus griseus	Breeding	BCC, SGCN
Long-billed Dowitcher	Limnodromus scolopaceus	Migrant	
Wilson's Snipe	Gallinago delicata	Breeding	SGCN
Spotted Sandpiper	Actitis macularius	Breeding	SGCN
Lesser Yellowlegs	Tringa flavipes	Breeding	BCC, SGCN
Greater Yellowlegs	Tringa melanoleuca	Breeding	SGCN
Least Sandpiper	Calidris minutilla	Migrant	SGCN
Pectoral Sandpiper	Calidris melanotos	Migrant	BCC, SGCN
Seabirds			
Marbled Murrelet	Brachyramphus marmoratus	Breeding	BCC, SGCN, USFS management req.
Pigeon Guillemot	Cepphus columba	Resident nonbreeding	
Bonaparte's Gull	Chroicocephalus philadelphia	Migrant	
Short-billed Gull	Larus brachyrhynchus	Resident	SGCN
American Herring Gull	Larus smithsonianus	Winter	SGCN
Glaucous Gull	Larus hyperboreus	Winter	
California Gull	Larus californicus	Migrant	
Glaucous-winged Gull	Larus glaucescens	Resident	SGCN
Iceland Gull	Larus glaucoides	Winter	
Arctic Tern	Sterna paradisaea	Breeding	

Common Name	Scientific Name	Expected Occurrence	Conservation Status[1]
Brandt's Cormorant	Urile penicillatus	Winter	
Pelagic Cormorant	Urile pelagicus	Resident nonbreeding	
Double-crested Cormorant	Nannopterum auritum	Winter	
Raptors			
Osprey	Pandion haliaetus carolinensis	Breeding	USFS sensitive
Sharp-shinned Hawk	Accipiter striatus	Resident	
Queen Charlotte Goshawk	Astur atricapillus laingi	Breeding	SGCN, USFS sensitive
Northern Harrier	Circus hudsonius	Breeding	
Bald Eagle	Haliaeetus leucocephalus	Breeding	SGCN, USFS management indicator
Red-tailed Hawk	Buteo jamaicensis	Breeding	SGCN
Western Screech-Owl	Megascops kennicottii	Resident	BCC, SGCN
Great Horned Owl	Bubo virginianus	Resident	SGCN
Northern Hawk Owl	Surnia ulula	Resident	
Northern Pygmy-Owl	Glaucidium gnoma	Resident	
Barred Owl	Strix varia	Resident	
Short-eared Owl	Asio flammeus	Breeding	BCC, SGCN
Northern Saw-whet Owl	Aegolius acadicus	Resident	SGCN
Merlin	Falco columbarius	Breeding	SGCN
Peale's Peregrine Falcon	Falco peregrinus pealei	Resident	SGCN, USFS sensitive
Landbirds			
Sooty Grouse	Dendragapus fuliginosus	Resident	SGCN
Willow Ptarmigan	Lagopus lagopus	Resident	SGCN
Rock Ptarmigan	Lagopus muta	Resident	SGCN
Black Swift	Cypseloides niger	Breeding	BCC, SGCN
Vaux's Swift	Chaetura vauxi	Breeding	BCC, SGCN
Anna's Hummingbird	Calypte anna	Resident	
Rufous Hummingbird	Selasphorus rufus	Breeding	BCC, SGCN
Belted Kingfisher	Megaceryle alcyon	Resident	
Red-breasted Sapsucker	Sphyrapicus ruber	Resident	SGCN, USFS management indicator

Common Name	Scientific Name	Expected Occurrence	Conservation Status[1]
American Three-toed Woodpecker	Picoides dorsalis	Resident	SGCN
Downy Woodpecker	Dryobates pubescens	Resident	
Hairy Woodpecker	Leuconotopicus villosus	Resident	SGCN, USFS management indicator
Northern Flicker	Colaptes auratus	Resident	
Olive-sided Flycatcher	Contopus cooperi	Breeding	BCC, SGCN
Alder Flycatcher	Empidonax alnorum	Breeding	SGCN
Hammond's Flycatcher	Empidonax hammondii	Breeding	
Western Flycatcher	Empidonax difficilis	Breeding	
Northern Shrike	Lanius borealis	Resident	SGCN
Steller's Jay	Cyanocitta stelleri	Resident	
Black-billed Magpie	Pica hudsonia	Resident	
American Crow	Corvus brachyrhynchos	Resident	
Common Raven	Corvus corax	Resident	
Chestnut-backed Chickadee	Poecile rufescens	Resident	BCC, SGCN
Horned Lark	Eremophila alpestris	Migrant	
Tree Swallow	Tachycineta bicolor	Breeding	SGCN
Violet-green Swallow	Tachycineta thalassina	Breeding	SGCN
Barn Swallow	Hirundo rustica	Breeding	SGCN
Cliff Swallow	Petrochelidon pyrrhonota	Breeding	
Ruby-crowned Kinglet	Corthylio calendula	Breeding	SGCN
Golden-crowned Kinglet	Regulus satrapa	Resident	SGCN
Red-breasted Nuthatch	Sitta canadensis	Resident	
Brown Creeper	Certhia americana	Resident	USFS management indicator
Pacific Wren	Troglodytes pacificus	Resident	
American Dipper	Cinclus mexicanus	Resident	
European Starling	Sturnus vulgaris	Resident	
Varied Thrush	Ixoreus naevius	Resident	BCC, SGCN
Swainson's Thrush	Catharus ustulatus	Breeding	
Hermit Thrush	Catharus guttatus	Breeding	SGCN

Common Name	Scientific Name	Expected Occurrence	Conservation Status[1]
American Robin	Turdus migratorius	Breeding	
Bohemian Waxwing	Bombycilla garrulus	Resident	
American Pipit	Anthus rubescens	Migrant	
Pine Grosbeak	Pinicola enucleator	Resident	SGCN
Redpoll	Acanthis flammea	Winter	SGCN
Red Crossbill	Loxia curvirostra	Resident	
White-winged Crossbill	Loxia leucoptera	Resident	
Pine Siskin	Spinus pinus	Resident	SGCN
Lapland Longspur	Calcarius lapponicus	Migrant	
Snow Bunting	Plectrophenax nivalis	Winter	
American Tree Sparrow	Spizelloides arborea	Breeding	SGCN
Fox Sparrow	Passerella iliaca	Resident	SGCN
Dark-eyed Junco	Junco hyemalis	Resident	SGCN
White-crowned Sparrow	Zonotrichia leucophrys	Winter	SGCN
Golden-crowned Sparrow	Zonotrichia atricapilla	Breeding	SGCN
Savannah Sparrow	Passerculus sandwichensis	Breeding	SGCN
Song Sparrow	Melospiza melodia	Resident	SGCN
Lincoln's Sparrow	Melospiza lincolnii	Breeding	SGCN
Red-winged Blackbird	Agelaius phoeniceus	Breeding	SGCN
Rusty Blackbird	Euphagus carolinus	Breeding	SGCN
Tennessee Warbler	Leiothlypis peregrina	Breeding	
Orange-crowned Warbler	Leiothlypis celata	Breeding	SGCN
Northern Yellow Warbler	Setophaga aestiva	Breeding	
Yellow-rumped Warbler	Setophaga coronata	Breeding	SGCN
Townsend's Warbler	Setophaga townsendi	Breeding	SGCN
Wilson's Warbler	Cardellina pusilla	Breeding	SGCN
Western Tanager	Piranga ludoviciana	Breeding	

[1] BCC = Birds of Conservation Concern (USFWS 2021), SGCN = Species of Greatest Conservation Need (ADF&G 2025), USFS sensitive = Sensitive Species (USFS 2009), USFS management indicator = Forest Management Indicator Species (USFS 2016), USFS management req. = Special Management Requirements (USFS 2016).

Nearly all of Alaska's bird species, including those that can occur within the Project area, are protected under the provisions of the Migratory Bird Treaty Act (MBTA; 16 United States Code [USC] 703-712). Bald (*Haliaeetus leucocephalus*) and golden (*Aquila chrysaetos*) eagles receive additional protection under the Bald and Golden Eagle Protection Act (BGEPA; 16 USC 668-668d). The MBTA protects migratory birds by prohibiting the take of protected migratory bird species, their eggs, or nests, unless authorized by permit or state-authorized subsistence use. The BGEPA protects eagles from take, defined as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb," at any time of year, including disturbance of nest sites, roosts, and foraging sites (50 CFR 22.6).

None of the bird species listed as likely to occur in the Project area (Table 5-9) are listed under the Endangered Species Act (ESA), though a number of those species are of conservation concern for state and/or federal agencies. The USFWS goal for their Birds of Conservation Concern (BCC) listings is to identify species, subspecies, or populations that are not federally listed as threatened or endangered but may become candidates for federal listing without implementation of additional conservation actions (USFWS 2021). Similarly, for wildlife species known to occur on Tongass National Forest lands, USFS designates sensitive species (USFS 2009), as well as forest management indicator species and species with special management requirements (USFS 2016). ADF&G also maintains a large list of SGCN for Southeast Alaska, which includes the conservation listings for non-governmental avian conservation organizations (ADF&G 2025). ADF&G's list of bird SGCN for Southeast Alaska includes species for which there are conservation concerns and/or Alaska habitat stewardship concerns.

5.4.3.1 Waterbirds

A total of 33 waterbird species, which includes waterfowl, loons, grebes, rails, cranes, and herons, are expected to occur on a regular basis in the Project area, during spring and fall migration, during the breeding season, or in winter (Table 5-9). These species require open water and wetlands for feeding and nesting and generally will be found on lakes, marshes, ponds, rivers, wetlands, and coastal estuaries. Most waterbirds frequent rivers, river mouths, and coastal freshwater or brackish wetlands during migration because they are rich in food and because they are the first ice-free areas in spring. Waterbirds breed in a variety of aquatic and palustrine wetland habitats. Some species specialize in using primarily one habitat type (American dippers [C*incla mexicanus*] prefer running water),

while other species use many different habitat types (mallards [*Anas platyrhynchos*] use lakes, ponds, bogs, rivers, and palustrine wetlands). Stable water levels, irregular shorelines, emergent vegetation, organic content, and water clarity, acidity, and depth are some of the important features that determine whether a waterbody is used during the breeding season by waterfowl for foraging, nesting, and/or brood-rearing (Billerman et al. 2025). Use of meadow and forest habitats for nesting by waterbirds depends on their proximity to a waterbody that serves as foraging and/or brood-rearing habitat. Distance of a nest from water depends on each species' habitat requirements and can vary widely among individuals within a species. Meadow and forest-edge habitats adjacent to waterbodies are most frequently used for nesting and for protective cover during brood-rearing.

5.4.3.2 Shorebirds

Eleven shorebird species are expected to occur on a regular basis in the Project area, during spring and fall migration or during the breeding season (Table 5-9). Migrant and wintering shorebirds are most commonly found on mudflats, rocky shores, beaches, estuaries, and wetlands. These habitats are not extensive in the very limited coastal areas that occur in the Project area in upper Bradfield Canal (see Sections 5.5.2, *Vegetation and Wildlife Habitats*, and 5.6.2, *Wetland Habitat*). Additionally, most migrant shorebirds in the Wrangell Borough are expected to use the extensive intertidal areas at the Stikine River Delta to the north of the Project area, where up to 3 million shorebirds stage for spring migration (Alaska Shorebird Group 2019). For these reasons, the number of migrant shorebird species expected to occur regularly in the Project area is relatively low. In forested regions, shorebird species breed in open alpine tundra, littoral zones along streams and lacustrine waterbodies, and forest edges and openings. Breeding shorebirds in Southeast Alaska generally are adapted to utilize open shrublands and forest openings in the lowlands (e.g., scrub bogs and graminoid-dominated wetlands), lacustrine waterbodies, gravel river bar and coastal shoreline habitats, and dwarf-scrub and meadow habitats in upland and alpine areas.

5.4.3.3 Seabirds

Thirteen seabird species are expected to occur on a regular basis, primarily in the marine waters adjacent to the Project area in upper Bradfield Canal; these species are likely to occur during spring and fall migration, during the breeding season, or in winter (Table 5-9). Seabirds, which include gulls and terns, are found most commonly in marine and

coastal environments and are expected to be relatively common in Bradfield Canal depending on the season. One species of particular conservation concern is the marbled murrelet (*Brachyramphus marmoratus*), which is listed as of concern to the USFWS, USFS, and ADF&G in Southeast Alaska. The coastal rainforest habitats in the Project area may provide suitable nesting sites for this species, which forages in marine waters and nests in mature coniferous forests (Nelson 2020).

5.4.3.4 Raptors

Fifteen raptor species, including eagles, hawks, falcons, and owls, are expected to occur on a regular basis in the Project area during the breeding season or as year-round residents (Table 5-9). Raptors will use a wide variety of habitats for hunting and nesting. osprey (*Pandion haliaetus*), northern harrier (*Circus hudsonius*), bald eagle, red-tailed hawk (*Buteo jamaicensis*), great horned owl (*Bubo virginianus*), short-eared owl (*Asio flammeus*), merlin (*Falco columbarius*), and peregrine falcon (*Falco peregrinus*) prefer hunting for fish, small mammals, and/or birds in open habitats (Billerman et al. 2025). These habitats can include open graminoid- and shrub-dominated meadows, riverine and lacustrine areas, and coastal saltmarshes and mudflats. These species often nest in adjacent forest habitats. Other species, sharp-shinned hawk (*Accipiter striatus*) and Queen Charlotte goshawk (*Astur atricapillus laingi*, formerly *Accipiter gentilis laingi*), both hunt and nest in forest habitats. Bald eagles commonly breed in southeast Alaska, typically in large Sitka spruce or black cottonwood (*Populus trichocarpa*) trees along the coast where fish are present, and they overwinter in congregations where open water with fish and waterbird prey occur (USFWS 2026). Golden eagles are generally considered to be rare breeders along the southern Alaska coast (ADF&G 2025) and are not expected to occur regularly in the Project area.

5.4.3.5 Landbirds

A total of 65 landbird species, which includes grouse and ptarmigan, swifts, hummingbirds, kingfishers, woodpeckers, and a diversity of passerines, are expected to occur on a regular basis in the Project area (Table 5-9). These species can occur during spring and fall migration and as breeders during the summer, and many are resident in Southeast Alaska. Landbirds as a group are generally adapted to terrestrial habitats, although some species can also use freshwater and brackish water aquatic habitats. Many passerines occurring in Alaska (e.g., flycatchers, swallows, thrushes, some finches, longspurs, sparrows, and warblers) are migrants that either breed in the area or pass

through on migration. Most grouse and ptarmigan are residents, as are woodpeckers, many finches, chickadees, and corvids (e.g., jays, magpies, crows, ravens).

5.4.4 Marine Mammals

All marine mammals are protected by the Marine Mammal Protection Act (MMPA; Public Law 92-522; 16 USC §§ 1361-1423h) of 1972. Species descriptions and population status, unless otherwise noted, have been summarized from species profiles available on the ADF&G (2026) or NOAA (2026) websites. Marine mammals likely to occur in the waters of upper Bradfield Canal include Northern sea otter (*Enhydra lutris kenyoni*), harbor seal (*Phoca vitulina*), Steller sea lion (Eastern distinct population segment [DPS]; *Eumetopias jubatus*), harbor porpoise (*Phocoena phocoena*), killer whales (*Orcinus orca*), minke whales (*Balaenoptera acutorostrata*), and humpback whale (*Megaptera novaeangliae*).

Northern sea otters are the smallest marine mammals and are in the weasel family. Sea otters generally occur in nearshore areas and prefer habitats with islets and rocky reefs (ADF&G 2026). They are social species and tend to form colonies in a suitable habitat. Sea otters frequent coastal areas, including the Bradfield Canal, where sea urchins and other food sources are present. The sea otter population in Southeast Alaska is not listed under the ESA. The Southeast Alaska stock of sea otters was decimated by commercial harvest in the 1700s; translocation efforts in the 1960s helped to bring the species back to Southeast Alaska. In 2022, the total population of the Southeast Alaska stock of sea otters was estimated at 22,359 individuals (Schuette et al. 2023).

Harbor seals are frequent throughout Southeast Alaska, including Bradfield Canal. Harbor seals are not listed under the ESA or designated as depleted or strategic under the MMPA. These seals are relatively small and agile marine mammals, often well-adapted to human presence and boat traffic. They can be frequently found in boat harbors and marinas.

The Steller sea lion Eastern DPS occurs in marine waters of Southeast Alaska. The Steller sea lion Eastern DPS was delisted under the ESA in 2013. Sea lions are relatively small and agile marine mammals, often well-adapted to human presence and boat traffic. They can be found frequently in boat harbors and marinas. No major haul outs or rookeries are known to occur in the Bradfield Canal or on Wrangell Island (NOAA 2026). Steller sea lions are known to be sensitive to human disturbance, over-harvest, and vessel traffic, particularly while they are hauled out on land at rookeries and resting areas (Kucey and Trites 2006).

There are three stocks of harbor porpoise in Alaska: the Bering Sea stock, the Gulf of Alaska stock, and the Southeast Alaska stock (Young et al. 2024), the latter of which occur in the marine waters in the vicinity of the Tyee Lake Project. Harbor porpoises are not designated as depleted under the MMPA or listed under the ESA, but they are denoted as "strategic" under the MMPA. The Southeast Alaska stock of harbor porpoises can occur in Bradfield Canal.

Killer whales are found throughout Southeast Alaska, commonly in pods of up to 40 animals (ADF&G 2026). They are opportunistic feeders and will prey on any marine mammal, fish, and occasionally birds (ADF&G 2026). The southern resident killer whale population is listed as endangered under the ESA but is unlikely to range as far north as Bradfield Canal. Most resident killer whales in the vicinity of Bradfield Canal are likely the Northern Resident stock, which is not listed under the ESA.

Minke whales are common in southeast Alaska in the spring and summer (ADF&G 2026). Their population is considered stable throughout almost their entire range (NOAA 2026). They are filter feeders that prey primarily on euphuasiids, copepods, sand-lance, and larger schooling fishes such as herring, pollock, and salmon. Minke whales are not currently listed under the ESA, nor are they listed as depleted under the MMPA. Killer whales are the only natural predators of minke whales.

Humpback whales are migratory baleen whales who feed on euphausiids and small schooling fish (ADF&G 2026). Humpback whales present in Southeast Alaska belong to either the Hawaii DPS (98 percent of humpback whales in southeast Alaska) or the Mexico DPS (2 percent of humpback whales in Southeast Alaska; NMFS 1991). The Mexico DPS is listed as threatened under the ESA. Humpback whales are primarily present in Southeast Alaska in the spring and summer months but can be present year-round. Humpback whales face threats from fishing gear entanglement, vessel strikes, vessel-based harassment, and underwater noise (NOAA 2026). Ship collision is an increasing threat to many whale species, and the incidence of encounters is expected to increase as vessel traffic and speeds increase. Humpback whales have been photographed in Southeast Alaska with large dents or gashes on their upper bodies, likely caused by collisions with ships, and short-term behavioral disturbance because of vessels has been documented (NMFS 1991). Humpback whales are further described in Section 5.7.1.1.2, *Humpback Whale Mexico DPS*.

Other whale, dolphin, or porpoise species that range throughout the Gulf of Alaska and may travel in the Southeast Alaska panhandle, but would not likely enter Bradfield Canal, include blue whale (*Balaenoptera musculus*), sperm whale (*Physeter macrocephalus*), sei whale (*Balaenoptera borealis*), North Pacific right whale (*Eubalaena japonica*), fin whale (*Balaenoptera physalus*), gray whale (*Eschrichtius robustus*), Dall's porpoise (*Phocoenoides dalli*), and false killer whale (*Pseudorca crassidens*).

5.4.5 Invasive Wildlife Species

SEAPA is not aware of any invasive wildlife species occurring in the Project Boundary. However, invasive terrestrial wildlife species in Southeast Alaska have the potential to disrupt native ecosystems, compete with native species, and alter habitat conditions. Several invasive species have been documented in the region, with their occurrence linked to habitat availability and ecological adaptability.

The European black slug (*Arion ater*) is an invasive invertebrate known for its adaptability to various environments, including temperate rainforests like those in Southeast Alaska. It feeds on a wide range of plant materials, including native vegetation, and has the potential to outcompete native invertebrates for resources. While its primary habitats include moist forest floors and riparian zones, the high humidity and dense vegetation in the Project area could facilitate its establishment (McClory and Gotthardt 2008).

Non-native bird species, such as the European starling (*Sturnus vulgaris*) and rock pigeon (*Columba livia*), have been observed in Southeast Alaska. These species are typically associated with human-modified landscapes but may also exploit open forest edges or disturbed habitats. Although the Project area is remote and relatively undisturbed, the presence of these birds in surrounding areas suggests that localized competition with native birds could occur if suitable conditions arise (McClory and Gotthardt 2008).

Elk (*Cervus canadensis*), though not native to the Project area, are capable swimmers and could theoretically reach the area from nearby locations. The availability of suitable forested and riparian habitats within the Project area could support this species. Elk are known to alter forest understory vegetation and compete with native herbivores for forage, potentially impacting the ecological balance (McClory and Gotthardt 2008).

The red-legged frog (*Rana draytonii*) is considered an invasive species in Southeast Alaska, with populations introduced through unauthorized translocations. Tadpoles of this

species are algae grazers, which can alter the abundance and composition of algae and periphyton in aquatic ecosystems, potentially resulting in widespread changes to the aquatic food web. Red-legged frogs also use habitats for foraging and breeding that overlap with those of native amphibians, such as the wood frog and Western toad, creating potential competition for resources. Additionally, this species may carry pathogens or diseases harmful to native amphibians, further threatening their populations (McClory and Gotthardt 2008). The introduced population of red-legged frogs in the region has primarily been documented on Chichagof Island, making their occurrence in the Project area possible, but unlikely.

5.4.6 References

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5.5 Upland Botanical Resources

5.5.1 Ecoregion and Physiography

The Tyee Lake Project is located in the Coastal Western Hemlock-Sitka Spruce Forests ecoregion in Southeast Alaska (Gallant et al. 1995; Figure 5-7). This landscape in this ecoregion has been shaped by glaciation and is characterized by deep and narrow bays, steep forested valley walls, irregular coastlines, high sea cliffs, and deeply dissected glacial moraine deposits covering the lower slopes of valley walls. The climate is mild with cool moist summers and wet, mildly cold winters. While abundant western hemlock and Sitka spruce forests dominate lower elevations near the coast, the ecoregion extends to higher elevations and also includes subalpine shrub and tundra vegetation.

The Tyee Lake Project area includes five physiographic zones: Subalpine, Riverine, Lacustrine, Upland, and Coastal (Table 5-10). Physiographic zone, combined with landscape position and hydrogeomorphology, largely dictates the vegetation and habitat present. The Subalpine zone surrounding Tyee Lake includes tall alder scrub, mesic dwarf shrub tundra, and wet drainages and blanket bogs. The Subalpine zone at Tyee Lake is limited to the higher ridges surrounding the lake. The steep slopes around the lake support tall shrub avalanche slopes, evergreen forest, and low open-shore pine muskeg communities. Riverine communities include open water, barrens near active stream channels, riparian alder and willow thickets, and wet graminoid meadows at the west side of the lake where Tyee Creek enters. The Lacustrine zone consists solely of Tyee Lake, which has a relatively narrow or absent lacustrine fringe except for the mouth of Tyee Creek. The Upland zone includes the lower forested slopes above the airstrip, access road and powerhouse, which is dominated by Sitka spruce and western hemlock forests. The Coastal zone encompasses areas directly influenced by tidewater at the Bradfield River mouth.

Figure 5-7 Ecoregions in the vicinity of the Tyee Lake Project.

Table 5-10 Wildlife habitats, physiographic occurrence, and location within the Tyee Lake Project area.

Habitat Type*	Physiographic Occurrence	Description and Location
Tidal Riverine Waters	Coastal	Tidal slough of the Bradfield River at the mouth of Bradfield Canal.
Temperate Pacific Tidal Salt and Brackish Marsh	Coastal	Area surrounding the airstrip, powerhouse, and tailrace, bordering the tidal slough of the Bradfield River, primarily sedge cover with little or no exposed mudflat.
Alaskan Pacific Maritime Coastal Meadow and Slough-Levee	Coastal	Higher topographic locations in the estuary; includes various salt tolerant sedges, grasses, and low deciduous shrubs.
Lacustrine Waters	Lacustrine	Tyee Lake.
Temperate Pacific Freshwater Emergent Marsh	Lacustrine, Riverine	Extensive graminoid marsh at the eastern end of Tyee Lake near the inlet of Tyee Creek. Seasonally flooded during the growing season with higher water levels due to lake level rise.
North Pacific Shrub Swamp	Lacustrine, Riverine	Patches of poorly drained closed tall shrub on the east side of Tyee Lake near the outlet of Tyee Creek. Seasonally flooded during the growing season with higher water levels due to lake level rise.
Riverine Waters	Riverine	Tyee Creek and numerous small tributaries draining into Tyee Lake.
Riverine Barrens	Riverine	Small areas of riverine barrens along Tyee Creek on the east side of Tyee Lake.
Alaskan Pacific Maritime Mesic Herbaceous Meadow	Upland	Likely present immediately surrounding the airstrip and roadways in the estuary.
Alaskan Pacific Sitka Spruce Forest and Beach Ridge	Upland	Mature forest fringe immediately adjacent to the estuary.

Habitat Type*	Physiographic Occurrence	Description and Location
Alaskan Pacific Maritime Mountain Hemlock-Shore Pine Peatland	Upland	Low shrub peatlands in low-lying areas or slope breaks above Tyee Lake.
Alaskan Pacific Maritime Western Hemlock Forest	Upland	Majority of the coniferous forest on the north-facing mountain slope above the tailrace and airstrip and middle to low elevations around Tyee Lake.
Alaskan Pacific Mesic Western Hemlock-Yellow-cedar Forest	Upland	Patches of yellow cedar forest may occupy portions of the evergreen forests on steep mountain slopes.
Developed-Roads	Upland	Developed airstrip, road, and pads within and bordering the estuary.
Alaskan Pacific Maritime Avalanche Slope Shrubland	Upland, Subalpine	Numerous steep avalanche chutes dominated by closed alder shrub on the ridge above Tyee Lake extending down to the powerhouse at Bradfield Canal.
Alaskan Pacific Alpine-Subalpine Dwarf-shrubland and Heath	Western water shrew	Mesic subalpine meadows intermixed with exposed bedrock on the crests of ridges.

* Vegetation and land cover types identified on satellite imagery acquired in June 2021 and classified as wildlife habitats following the habitat classification used in the Alaska Wildlife Action Plan for Southeast Alaska (ADF&G 2025).

5.5.2 Vegetation and Wildlife Habitats

The extent of vegetation and wildlife habitat types in the Project area were not mapped for the PAD but are proposed to be mapped during the licensing process from new aerial photography and LiDAR data SEAPA intends to acquire for the Project in summer 2026. To investigate the occurrence of vegetation and wildlife habitats in the area, land cover types, treated as wildlife habitats following ADF&G (2025), were determined by photo-interpretation of image signatures evident on recent high-resolution satellite imagery. The imagery used was the ESRI Best Data Layer, accessed using ABR's license with ESRI that allows imagery to be used for analysis purposes only. The imagery reviewed, which covers the Project area and surrounding terrain, is the orthorectified WorldView-2 satellite imagery acquired on June 30, 2021, with 0.5-meter (1.6-foot) resolution. Land cover types were classified as wildlife habitats following the classification of wildlife habitats used in the Alaska SWAP (ADF&G 2025), which is based on broad-scale statewide raster mapping of Alaska including the southeast panhandle. Following these procedures, a total of 16 wildlife habitats were identified within the Project area. Descriptions of individual wildlife habitat types identified and their locations and occurrence within the physiographic zones in the Project area are presented in Table 5-10.

The Coastal physiography zone at Bradfield Canal includes three habitat types: Tidal Riverine Waters, Temperate Pacific Tidal Salt and Brackish Marsh, and Alaskan Pacific Maritime Coastal Meadow and Slough-levee (Table 5-10). The Tidal Riverine Waters type in the Project area is a side slough of the Bradfield River close to the upper extent of the Bradfield Canal. This freshwater slough is regularly flooded with saltwater diurnally, and the channel is unvegetated and bordered by graminoid vegetation. The Temperate Pacific Tidal Salt and Brackish Marsh type is also likely flooded by salt water diurnally and is likely to be dominated by Lyngbye's (*Carex lyngbyei*) or Ramensk's (*Carex ramenskii*) sedges. Alaskan Pacific Maritime Coastal Meadow and Slough Levee is typically located in higher, better drained marsh settings on raised terraces or levees. This coastal meadow type is primarily a graminoid community and is expected to be dominated by Lyngbye's sedge, largeflower speargrass (*Poa eminens*), dunegrass (*Leymus mollis*), and low shrubs such as sweetgale (*Myrica gale*) and Sitka alder (*Alnus sinuata*).

The Lacustrine physiographic zone includes Lacustrine Waters and Temperate Pacific Freshwater Emergent Marsh. Lacustrine Waters are limited to Tyee Lake itself, which is a natural lake with a maximum pool elevation that fluctuates between 1,250 feet and 1,398

feet (SEAPA 2025). The littoral habitat within that water level fluctuation zone is primarily barren, coarse gravel and boulders, but some Temperate Pacific Freshwater Emergent Marsh is present on the east side of the lake at the Tyee Creek outlet. This emergent marsh type is likely dominated by obligate wetland sedges capable of withstanding prolonged freshwater flooding during the growing season. North Pacific Shrub Swamp was interpreted to occur along the shoreline on the east side of Tyee Lake, particularly at the base of smaller freshwater streams where lake waters are shallow and alluvium has been deposited. Similar to the freshwater graminoid marsh types, the shrub swamp likely supports low to tall shrubs capable of withstanding prolonged flooding during the growing season. These areas are likely to support Sitka alder, thin-leaf alder (*Alnus incana* ssp. *tenuifolia*), and Barclay's (*Salix barclay*i), grayleaf (*S. glauca*), and tealeaf (*S. pulchra*) willows.

The freshwater riverine system in the Project area includes two unvegetated types (Riverine Waters and Riverine Barrens). Riverine Waters include the inlets and outlets of Tyee Creek and numerous smaller tributaries flowing off the steep hillsides. Riverine Barrens are limited in extent and found at the mouth of Tyee Creek on the east side of the lake.

The Upland physiographic zone includes seven habitat types including three mature forest types, two shrublands/peatlands, one mesic meadow, and one barren disturbance type (Table 5-10). The forest types include Alaskan Pacific Sitka Spruce Forest and Beach Ridge, Alaskan Pacific Maritime Western Hemlock Forest, and Alaskan Pacific Mesic Western Hemlock-Yellow-Cedar Forest. Sitka spruce is expected to be dominant at lower elevations on the north-facing slope above the powerhouse. Western hemlock is the dominant overstory tree on the forested slopes above the powerhouse and around Tyee Lake, with some limited patches of yellow cedar (*Callitropsis nootkatensis*) in suitable landscape positions. The understory is likely to be dominated by deciduous shrubs including numerous species in the *Vaccinium* genus, rusty menziesia (*Rhododendron menziesii*), and devil's club. The shrublands in the Project area include Alaskan Pacific Maritime Avalanche Slope Shrubland and Alaskan Pacific Maritime Mountain Hemlock-Shore Pine Peatland (known locally in Southeast Alaska as muskeg). The avalanche slopes are located on middle to upper slopes above Tyee Lake and above the powerhouse. These are very steep landscape positions supporting a closed tall deciduous shrub canopy typically composed of Sitka alder with very low understory diversity. Muskeg is prevalent on poorly drained slope breaks and is dominated by sapling-sized western hemlock and

dwarf shore pine (*Pinus contorta*). Muskeg is also characterized by thick moss and peat layers with patches of open surface water and wetland obligate sedges and forbs. The Developed Roads type is limited to the airstrip, access roads, and Project facility building pads near the powerhouse. The Alaskan Pacific Maritime Mesic Herbaceous Meadow type is likely to occur immediately adjacent to the developed areas.

The Subalpine physiographic zone in the Project area is limited to areas above tree line on the ridge between Tyee Lake and the powerhouse. The Alaskan Pacific Alpine-Subalpine Dwarf-Shrubland and Heath is likely to be dominated by numerous deciduous and evergreen dwarf shrubs including white mountain heather (*Cassiope mertensiana*), Alaska bellheather (*Harrimanella stelleriana*), crowberry (*Empetrum nigru*m), bog blueberry (*Vaccinium uliginosum*), and various prostrate willow species. The subalpine tundra may also support a relatively high biodiversity of forbs including larkspurleaf monkshood (*Aconitum delphiniifolium*), great burnet (*Sanguisorba officinalis*), Sitka valerian (*Valeriana sitchensis*), paintbrush (*Castilleja* spp.), wooly geranium (*Geranium erianthum*), and Nootka lupine (*Lupinus nootkatensis*). Depending on the exposure of the ridgetop landscape positions, subalpine tundra may range from well vegetated below the ridge crest to rocky and wind-exposed sites.

5.5.3 Invasive Plants and Noxious Weeds

The Wrangell-Petersburg Invasive Plant Management EA (USFS 2022) issued a finding of no significant impact statement for invasive plant management in the Wrangell and Petersburg Ranger Districts of the Tongass National Forest, expanding on the available acres for treatment identified in prior iterations of the plan. The EA identified 89 invasive plant species in these ranger districts (USFS 2022).

The Alaska Center for Conservation Science (ACCS) Alaska Exotic Plants Information Clearinghouse (AKEPIC) assigns invasiveness rankings to plants based on the biology, ecological impacts, distribution and role of humans as a vector, and feasibility of control (ACCS 2026). Of the 89 invasive plant species identified in the Wrangell and Petersburg Ranger Districts area, 20 were assigned a moderate or higher invasive rank and collectively covered above 75 percent of the infested acres (Table 5-11; USFS 2022). Five of the known invasive plants within the Wrangell-Petersburg area were assigned an extremely invasive rank (≥80), six were assigned a highly invasive rank (70-79), and the remaining nine were assigned a moderate invasive rank (60-69).

Most of the moderately to extremely invasive species identified in the area (Table 5-11) are located along roadsides and in administration sites, but some, including reed canarygrass (*Phalaris arundinacea)* and orange hawkweed (*Hieracium aurantiacum*), are documented in wilderness areas and in riparian restoration sites.

Within the Tyee Lake Project Boundary, invasive plant species are most likely to be found along roadsides, on or near gravel fill or Project work areas, or in areas with natural or anthropogenic disturbance. AKEPIC (ACCS 2026) has documented no invasive plant species within the Project Boundary. Within 50 meters (164 feet) of the transmission line, AKEPIC (ACCS 2026) recorded over 500 observations of invasive plants including Canada thistle (*Cirsium arvense*), bohemian knotweed (*Fallopia x bohemica* and *F. japonica*), orange hawkweed, meadow hawkweed (*Hieracium caespitosum*), pale yellow iris (*Iris pseudacorus*), oxeye daisy (*Leucanthemum vulgare*), bird's foot trefoil (*Lotus corniculatus*), reed canarygrass, and creeping buttercup (*Ranunculus repens*).

AKEPIC (ACCS 2026) documented white sweetclover (*Melilotus albus*, invasiveness rank of 81), yellow sweetclover (*M. officinalis*, invasiveness rank 69), tall buttercup (*Ranunculus acris*, invasiveness rank 60), and common tansy (*Tanacetum vulgare*, invasiveness rank 60) within the Wrangell Borough or within 50 meters (164 feet) of the transmission line.

If an invasive plant species survey is warranted for the Tyee Lake Project, the list of invasive plant species identified in Table 5-11, with the addition of those four moderately to highly invasive plant species, should be used as a focal species list for the survey.

Table 5-11 Invasive plants recorded in the Wrangell and Petersburg Ranger Districts ranked as moderately invasive or higher (USFS 2022).

Common Name	Scientific Name	AKEPIC Ranking
Bohemian knotweed	*Fallopia x bohemica* and *F. japonica*	87
Spotted knapweed	*Centaurea stoebe*	86
Reed canarygrass	*Phalaris arundinacea*	83
Giant hogweed	*Heracleum mantegazzianum*	81
Orange hawkweed	*Hieracium aurantiacum*	79
Meadow hawkweed	*Hieracium caespitosum*	79
Canada thistle	*Cirsium arvense*	76
Field sowthistle	*Sonchus arvensis*	73
Creeping buttercup	*Ranunculus repens*	72

Common Name	Scientific Name	AKEPIC Ranking
Bigleaf lupine	*Lupinus polyphyllus ssp. polyphyllus var. polyp Hyllus*	71
Scotch broom	*Cytisus scoparius*	69
Robert geranium	*Geranium robertianum*	67
Pale yellow iris	*Iris pseudacorus*	66
Bird's foot trefoil	*Lotus corniculatus*	65
Tall fescue	*Schedonorus arundinaceus*	63
Stinking willie	*Senecio jacobea*	63
Smooth brome	*Bromus inermis*	62
Oxeye daisy	*Leucanthemum vulgare*	61
Bull thistle	*Cirsium vulgare*	61

AKEPIC = Alaska Exotic Plants Information Clearinghouse (ACCS 2026).

5.5.4 References

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5.6 Riparian, Wetland, and Littoral Resources

5.6.1 Riparian Habitat

Riparian zones are the areas adjacent to the bank of a waterbody where terrestrial processes influence the aquatic environment (ADF&G 2006). In general, the banks of Alaska's lakes, rivers, and streams are vegetated (except for areas at certain altitudes or with recent deglaciation), and the term "riparian zone" is in reference to the vegetated corridor adjacent to waterbodies. Riparian zones function as the interface between terrestrial and aquatic habitats. As a certain type of "edge habitat," riparian zones support a wide diversity of wildlife (ADF&G 2006). The functions of riparian zones in Alaska include: contributing large woody debris habitat, providing leaf litter for primary consumer production, filtering sediments and pollution, reducing wind, and regulating water temperature (ADF&G 2006).

The vegetation associated with riparian zones is determined by geographic location, elevation, and soil characteristics. Wetland obligate sedges like water sedge (*Carex aquatilis*) and Northwest Territory sedge (*C. utriculata*) commonly dominate the permanently to seasonally flooded banks of slow-moving sloughs and low-gradient systems. Active floodplains that experience seasonal flooding often contain Sitka willow (*Salix sitchensis*) and/or Sitka alder thickets, sometimes with black cottonwood trees. Where rivers and streams have limited active to inactive floodplain, they are surrounded by vegetation as described for the upland physiographic zone (see Section 5.5.1, *Ecoregion and Physiography*). Bird species often associated with riparian zones in Alaska (ADF&G 2006), and which are also likely to occur in the Project area (see Section 5.4.3, *Avian Species*), include rusty blackbird (*Euphagus carolinus*), barn swallow (*Hirundo rustica*), and cliff swallow (*Petrochelidon pyrrhonota*). Riparian zones in the Project area occur along the banks of a side slough of Bradfield River, along Tyee Creek, and to a lesser extent, along the small unnamed streams flowing down steep slopes into Tyee Lake.

5.6.2 Wetland Habitat

USFWS National Wetlands Inventory (NWI) mapping within the Tyee Lake Project Boundary was conducted in 1986 using 1985 and 1986 color-infrared imagery at a scale of 1:58,000 (USFWS 1986). A total of 13 wetland and water types were identified in the Project Boundary (Table 5-12, Figure 5-8).

Table 5-12 Wetlands and waters (acres and percentage of Project area) mapped within the Tyee Lake proposed non-transmission Project Boundary as of 1986.

NWI Type*	NWI Code	Area (acres)	Percentage of Project Area (%)
Total Waters		444.9	38.3
Estuarine Subtidal Unconsolidated Bottom	E1UBL	9.3	0.8
Riverine Upper Perennial Permanently Flooded Unconsolidated Bottom	R3UBH	5.4	0.5
Riverine Seasonally Flooded Intermittent Streambed	R4SBC	0.2	0.0
Riverine Unknown Perennial Permanently Flooded Unconsolidated Bottom	R5UBH	6.8	0.6
Lacustrine Limnetic Permanently Flooded Unconsolidated Bottom	L1UBH	423.1	36.4
Total Wetlands		196.6	16.9
Estuarine Intertidal Irregularly Flooded Persistent Emergent	E2EM1P	58.2	5.0
Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent Scrub	PSS1/EM1B	4.1	0.3
Palustrine Seasonally Saturated Broad-leaved Deciduous Scrub-Shrub	PSS1B	43.3	3.7
Palustrine Seasonally Saturated Needle-leaved Evergreen Shrub/Persistent Emergent Scrub	PSS4/EM1B	35.1	3.0
Palustrine Seasonally Saturated Needle-leaved Evergreen Forest/Persistent Emergent Scrub	PFO4/EM1B	12.3	1.1
Palustrine Seasonally Saturated Needle-leaved Evergreen Forest	PFO4B	30.4	2.6
Palustrine Seasonally Flooded Persistent Emergent	PEM1C	11.7	1.0
Palustrine Temporarily Flooded Broad-leaved Deciduous Scrub-Shrub	PSS1A	1.5	0.1
Total Uplands		520.2	44.8
Upland	U	520.2	44.8
Grand Total		1,161.7	100.0

* NWI = National Wetland Inventory wetland types identified in the Project area (USFWS 1986).

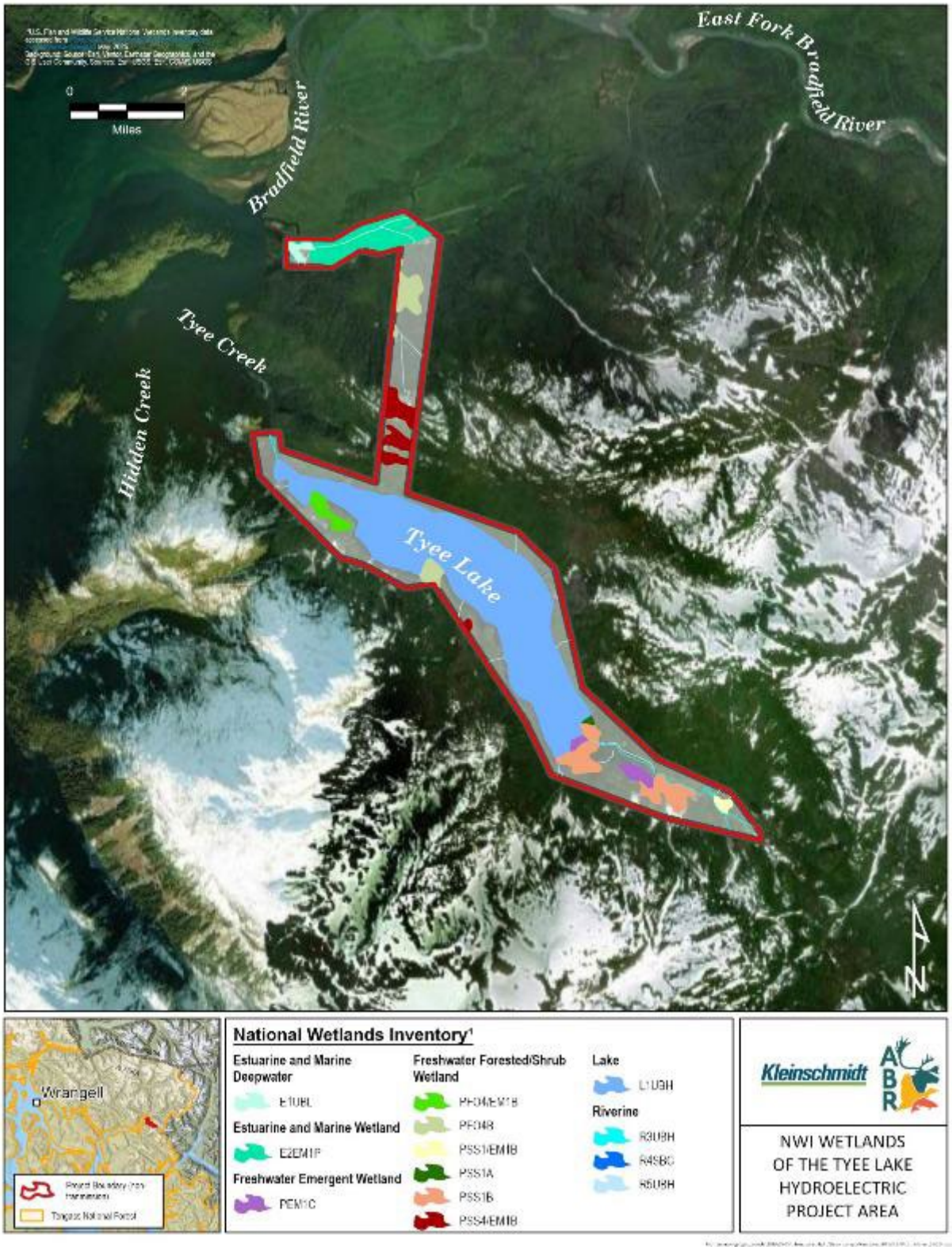

Figure 5-8 NWI wetland mapping within the Tyee Lake proposed Project Boundary as of 1986.

Coastal physiography at the northern extent of the Project Boundary includes two waters, Estuarine Subtidal Unconsolidated Bottom (E1UBL) and a tidal river attributed as Riverine Unknown Perennial Permanently Flooded Unconsolidated Bottom (R5UBH), and one wetland, Estuarine Intertidal Irregularly Flooded Persistent Emergent (E2EM1P, Figure 5-8). The coastal E1UBL waters are the upper extent of Bradfield Canal, and the R5UBH stream is a side slough of the Bradfield River. The coastal E2EM1P wetlands experience tidal flooding and are likely dominated by wetland obligate salt-tolerant sedges such as Lyngbye's sedge and Ramensk's sedge.

Lacustrine physiography in the center of the Project Boundary includes Tyee Lake, which is classified as Lacustrine Limnetic Permanently Flooded Unconsolidated Bottom (L1UBH; Figure 5-8) and comprises the majority of mapped wetlands and waters (Table 5-12). NWI mapping (USFWS 1986) is based on 1985 and 1986 imagery, and the southern end of Tyee Lake does not reflect current conditions. While the Tyee Lake Project construction was completed in 1984, in 2013 an outlet weir was constructed that expanded the southern extent of Tyee Lake waters. NWI mapping depicts a mix of uplands and temporarily flooded (Palustrine Temporarily Flooded Broad-leaved Deciduous Scrub-Shrub [PSS1A]), seasonally flooded (Palustrine Seasonally Flooded Persistent Emergent [PEM1C]), and saturated (Palustrine Seasonally Saturated Broad-leaved Deciduous Scrub-Shrub [PSS1B]) wetlands in what is now Tyee Lake and adjacent wetlands described as shrub swamp and sedge marsh communities (Figure 5-8, see Section 5.5.2, *Vegetation and Wildlife Habitats*). The shrub swamp and sedge marsh wetlands are more accurately described as Palustrine Semipermanently Flooded Broad-leaved Deciduous Scrub-Shrub (PSS1F) and Palustrine Semipermanently Flooded Persistent Emergent (PEM1F) wetlands. PSS1F wetlands are likely dominated by Sitka willow shrubs, and the PEM1F wetlands are likely dominated by wetland obligate graminoids such as water sedge. Both PSS1F and PEM1F wetlands are likely to have extensive shallow surface water and organic soils.

Riverine corridors, except for the tidal river described above, include Tyee Creek and the small, unnamed streams flowing down steep hillsides (Figure 5-8). Tyee Creek is classified as Riverine Upper Perennial Permanently Flooded Unconsolidated Bottom (R3UBH) and is a small, swiftly flowing stream with coarse substrates. The small unnamed tributaries are classified as R5UBH and Riverine Seasonally Flooded Intermittent Streambed (R4SBC) but are likely a mix of perennial R3UBH and seasonal R4SBC streams that are high velocity systems with coarse substrates.

Several palustrine wetland types are present in the Tyee Lake Project area upland physiography: Palustrine Seasonally Saturated Broad-leaved Deciduous Shrub/Persistent Emergent Scrub (PSS1/EM1B), PSS1B, Palustrine Seasonally Saturated Needle-leaved Evergreen Shrub/Persistent Emergent Scrub (PSS4/EM1B), Palustrine Seasonally Saturated Needle-leaved Evergreen Forest (PFO4B), and Palustrine Seasonally Saturated Needle-leaved Evergreen Forest/Persistent Emergent Scrub (PFO4/EM1B, Figure 5-8).

PSS1/EM1B and PSS1B wetlands are located in the southern extent of the Tyee Lake Project area on alluvial fans (Figure 5-8). These saturated wetland systems are likely dominated by shrubs such as Sitka willow and graminoids such as bluejoint (*Calamagrostis canadensis*) and water sedge. These saturated wetlands likely have a near surface water table and saturated soils but little to no surface water and mineral soils with thin surface organic horizons.

PSS4/EM1B wetlands are muskegs with small stature shore pine (*Pinus contorta*) and western hemlock trees; salal (*Gaultheria shallon*), common juniper (*Juniperinus communis*), bog Labrador tea (*Rhododendron groenlandicum*), and bog blueberry (*Vaccinium uliginosum*) shrubs; and wetland obligate sedges such as livid sedge (*Carex livida*), fewflower sedge (*C. pauciflora*), manyflower sedge (*C. pluriflora*), tall cottongrass (*Eriophorum angustifolium*), and white beaksedge (*Rhynchospora alba*). While PSS4/EM1B wetlands may have scattered patches of shallow surface water, overall they are saturated systems with thick organic soils.

PFO4B and PFO4/EM1B wetlands are coniferous forests dominated by Sitka spruce and western hemlock trees. Understory vegetation likely includes Alaska blueberry (*Vaccinium alaskaense*), oval-leaf blueberry (*V. ovalifolium*), and red huckleberry (*V. parvifolium*) shrubs, and American skunk cabbage emergents. PFO4B and PFO4/EM1B wetlands often have pronounced microtopography with higher areas supporting trees and shrubs and low areas supporting American skunk cabbage with shallow surface water or a water table at the ground surface.

5.6.3 Littoral Habitat

ADF&G defines littoral as "of or relating to the shore of a body of water" (ADF&G 2006). A broader definition of littoral zones, as they refer to lakes, is the area between the shoreline and maximum lake depth where photosynthesis can still occur, allowing the

growth of aquatic plants (Seekell et al. 2021). The steep slopes surrounding Tyee Lake continue below the water surface, resulting in limited littoral habitat in Tyee Lake.

5.6.4 References

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5.7 Rare, Threatened, and Endangered Species

5.7.1 Rare, Threatened, and Endangered Wildlife

5.7.1.1 Federally Listed Species

The ESA (73 Federal Register [FR] 63667-63668) provides a program for the conservation of threatened and endangered plants and animals and their habitats. USFWS and NMFS are the lead federal agencies that implement the ESA. The law requires federal agencies, in consultation with USFWS (terrestrial and freshwater species) or NMFS (marine species), to ensure that actions they authorize, fund, or carry out are not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of designated critical habitat of such species. The law prohibits any action that causes "taking" of any listed species of endangered fish or wildlife. There are two ESA-listed species that occur in Southeast Alaska that could potentially occur in the vicinity of the Tyee Lake Project, the short-tailed albatross (*Phoebastria albatrus*) and the humpback whale (Mexico DPS).

5.7.1.1.1 Short-tailed Albatross

In the USFWS Information for Planning and Consultation (IPaC) official species list for the Tyee Lake Project area, the only federally listed species under USFWS jurisdiction with a potential range in the area is the short-tailed albatross (USFWS 2026a). The short-tailed albatross was listed as endangered under the ESA in July 2000 with a recovery plan published in September 2008. It is also listed as endangered by the State of Alaska (ADF&G 2026). This species is widely distributed across its historical range, with the population estimated to be 1,200 birds, 600 of which are of breeding age. Currently, most of the world's breeding nests are on Torishima Island, Japan. Nesting sites are typically on steep sites on soils with loose volcanic ash, usually with grasses that stabilize the soils and provide nesting materials. They breed on remote islands of the Pacific Ocean, and their only known nesting in the United States is in Hawaii (USFWS 2026b). However, the marine range of short-tailed albatross extends into the open ocean of the Gulf of Alaska, Aleutian Islands, and the North Pacific Ocean where they feed along the shelf, from 0 to 200 meters (656 feet) in depth, and in shelf break areas (USFWS 2008). Juveniles and younger sub-adults (up to 2 years old) use the wider geographic range that encompasses Alaska compared to the adults (O'Connor et al. 2013). This species is unlikely to occur within the Tyee Lake Project area because it spends most of its time at sea, is very rare, and has only

a few active breeding colonies remaining, none of which are near the Project area (ADF&G 2026; USFWS 2008). Critical habitat has not been designated for short-tailed albatross.

5.7.1.1.2 Humpback Whale Mexico DPS

There are 14 DPSs of humpback whales (81 FR 62259, September 2016). The threatened Mexico DPS is the only ESA-listed DPS that could be encountered off the coast of Southeast Alaska (Young et al. 2024). The Mexico DPS whales that occur in Southeast Alaska belong to the Mexico-North Pacific stock. These whales winter off the coast of Mexico and the Revillagigedo Archipelago and summer primarily in Alaska waters, from Southeast Alaska and the Gulf of Alaska to the Aleutian Islands and Bering Sea (Young et al. 2024). Humpback whales are common in Southeast Alaska; however, the probability of an encountered humpback whale being from the Mexico DPS is only 2 percent (NMFS 2023). The abundance estimate of the Mexico-North Pacific stock across its Alaska summer feeding areas is 918 animals (Young et al. 2024). It is unknown if this population is increasing; there have been recent declines in abundance and calf production rates of mixed stocks observed in the western Gulf of Alaska, Prince William Sound, Glacier Bay, and Icy Strait (Young et al. 2024). Potential threats most likely to cause direct human-caused mortality or serious injury include vessel strikes and entanglement in fishing gear and marine debris. The minimum estimated mean annual level of human-caused mortality and serious injury of this stock in U.S. waters in Southeast Alaska between 2016 and 2020 is 0.11 whales, caused by commercial, recreational, or subsistence fisheries gear entanglements (0.04 whales), marine debris entanglements (0.02 whales), and vessel strikes (0.041 whales; Young et al. 2024). There is no estimate for the undocumented fraction of human-caused injuries or death to humpback whales in Alaska. Vessel strikes may be underreported in Alaska; a comparison of observed versus estimated annual vessel strikes along the U.S. West Coast indicates approximately 10 percent of vessel strikes are documented.

5.7.1.2 Federally Designated Critical Habitat and Habitat Use

There is no federally designated critical habitat within the vicinity of the Tyee Lake Project (USFWS 2026a).

5.7.1.3 Federally Protected Species Under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act

As discussed in Section 5.4.3, *Avian Species*, nearly all of Alaska's birds are protected under provisions of the MBTA, and eagles are further protected under the BGEPA.

5.7.1.4 USFS Alaska Region Sensitive Species

The USFS Alaska Region Sensitive Species List was last updated in 2009 (USFS 2009) and is included in the Tongass Forest Plan (USFS 2016). In addition to the ESA-listed species noted above, two USFS Alaska Region Sensitive Species may occur in the vicinity of the Project: the Queen Charlotte goshawk and the black oystercatcher (*Haematopus bachmani*). Rocky shore habitats suitable for black oystercatchers, however, likely do not occur within the Project area (see Sections 5.4.3.2, *Shorebirds*, 5.5.2, *Vegetation and Wildlife Habitats*, and 5.6.2, *Wetland Habitat*).

Steller sea lions are considered in the Tongass Forest Plan (USFS 2016). On November 4, 2013, NMFS issued a final rule (78 FR 66140) to remove the eastern Steller sea lion DPS from the List of Endangered and Threatened Wildlife. A species removed from listing under the ESA because recovery criteria have been met will automatically be added to the sensitive species list for at least 5 years (USFS 2009). The western DPS remains endangered and may also occur within waters surrounding the Tongass National Forest but are not likely to occur near the Tyee Lake Project. Sea lions are also discussed in Section 5.4.4, *Marine Mammals*.

The Queen Charlotte goshawk is a comparatively small, dark subspecies that occurs only in Southeast Alaska and British Columbia (Billerman et al. 2025). Goshawks are predators that can capture and eat prey as large as snowshoe hare, grouse, ptarmigan, and ducks (Billerman et al. 2025). They prefer to nest in mixed stands of coniferous and deciduous trees, and they will occasionally reuse an old nest (Billerman et al. 2025). The Queen Charlotte goshawk is not listed under the ESA.

The black oystercatcher is a seabird that occurs along rocky shorelines of the North American Pacific coast from Baja California to the Aleutian Islands (Billerman et al. 2025). They feed exclusively on intertidal macroinvertebrates. During the breeding season, breeding pairs are widely distributed and form small winter flocks in ice-free tidal flats or rocky islets with dense mussel beds (Billerman et al. 2025). Half of the global population occurs in the Prince William Sound and the Kodiak Archipelago. There have been 57

incidental sightings between Baranof Island and the Canadian border, most of which were at the Forrester Island group along the outer coast.

5.7.1.5 State Listed Species

ADF&G is responsible for determining and maintaining a list of endangered species in Alaska under AS 16.20.190. A species or subspecies of fish or wildlife is considered endangered when the ADF&G Commissioner determines that its numbers have decreased to such an extent as to indicate that its continued existence is threatened. The State Endangered Species List currently includes the ESA-listed species mentioned above—the short-tailed albatross and the humpback whale Mexico DPS.

5.7.2 Rare, Threatened, and Endangered Plant Species and Habitats

The USFS Alaska Region Sensitive Species List was last updated in 2009 (USFS 2009) and is included in the Tongass Forest Plan (USFS 2016). The 2009 Sensitive Species List contains 18 species, 17 vascular plants and one lichen, all but two of which are known or suspected to occur within the Tongass National Forest.

Of these 18 species, several have habitats that are present within the Tyee Lake Project Boundary. Moonworts (*Botrychium* spp.) generally prefer well-drained open areas, such as roadsides and alpine tundra. Macoun's thistle (*Cirsium edule* var. *macounii*) is found in mesic subalpine to alpine meadows. Muskegs and surrounding forests can support lady's slipper orchids (*Cypripedium* spp.), lesser round-leaved orchid (*Platanthera orbiculata*), and Calder's lovage (*Ligusticum calderi*). Unalaska mistmaiden (*Romanzoffia unalaschcensis*) can be found on moist to wet riverbanks, beach terraces, and in rock crevices. Low-energy estuarine areas and intertidal flats can support sessile-leaf scurvy grass (*Cochlearia sessillifolia*) and Henderson's checkermallow (*Sidalcea hendersonii*). The spruce-hemlock forests near Bradfield Canal may not be suitable for the large lungwort (*Lobaria amplissima*) lichen, which is only known from beach fringe forests that are exposed to large expanses of ocean waters.

A field guide of rare Alaska vascular plants (Nawrocki et al. 2013) documents eight species that have been sighted in Southeast Alaska within the same general ecoregion as the Tyee Lake Project. The Tyee Lake Preliminary Draft EA (SEAPA 2025) indicated that the nearest documented observation of one of these rare plants is Calder's lovage on the southwest side of Prince of Wales Island, which is approximately 90 miles from the Tyee Lake Project Boundary.

If a rare plant survey is determined to be warranted for the Tyee Lake Project, a target list of focal species for the survey should be developed in consultation with both the USFS and ACCS.

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5.8 Recreation and Land Use

5.8.1 Regional Recreation Opportunities

The adjacent USFS land surrounding Tyee Lake is classified as Remote Recreation (USFS 2024b). Tyee and Hidden creeks flow through the Semi-Remote Recreation LUD. The management objective of these LUDs is to provide for recreation in remote or natural-appearing settings where opportunities for solitude and self-reliance are high or moderate to high, respectively (USFS 2016). Recreation in these areas includes, but is not limited to, hiking, hunting, fishing, camping, photograph, skiing, snowmachining, exploring forest roads, wildlife viewing, using recreational cabins, beachcombing, kayaking, canoeing, and enjoying the marine environment adjacent to forest lands (USFS 2016). The USFS land to the east of the Project area is managed for Timber Production.

There are opportunities for recreation in the surrounding area with guided and self-guided tours (USFS 2024a). Two nature viewing sites are located at the confluence of Bradfield Canal and Ernest Sound: the Anan Creek Wildlife Viewing Site and Anan Wildlife Observatory Site (USFS 2024a). Additionally, Alaska Winter Cruises uses the Bradfield Canal for tours during the daytime hours (Sea Venture 2024). The Bradfield Canal is home to marine mammals and fishes. The Bradfield Canal and adjacent waters can be used for recreational, subsistence, and commercial fishing. Especially in Bradfield Canal, Pink Salmon abundance is high (Thynes et al. 2022). Recreational users can also utilize the Harding River Cabin on the Bradfield Canal, which supports wildlife viewing, fishing, hunting, camping, and boating in the area (Recreation.gov 2024).

The surrounding area of the Tongass National Forest also offers opportunities for dispersed recreation. Dispersed recreation refers to activities that occur in an area of a national forest with limited or no amenities provided for recreational users. In the Tongass National Forest, dispersed recreation includes activities such as camping outside of established campgrounds, fishing, and exploring undeveloped coastal areas (USFS 2024c).

The Tyee Lake Project is approximately 40 miles southeast of Wrangell. The community of Wrangell developed a Sustainable Outdoor Recreation Plan in 2012 to guide continued growth of outdoor recreation opportunities in the area, with the goal to improve the community's outdoor recreation opportunities to help support economic expansion in the area. There are extensive existing outdoor recreation opportunities available in the community of Wrangell, including trail systems, lake access, docks that support on-the

water activities, parks, and kayak routes and facilities (Wrangell 2012). The community of Wrangell offers extensive outdoor recreation opportunities in the vicinity of the Project.

5.8.2 Recreation in the Vicinity of the Project

The Tyee Lake Project is located in a remote area of Southeast Alaska along a narrow bench of land between the tidal estuary of the Bradfield River and a steep mountainside and is accessible only by air or boat (SEAPA 2024). The Project occupies state lands that are surrounded by the Tongass National Forest, which is managed by the USFS. The Tongass National Forest is the nation's largest national forest and covers most of Southeast Alaska (USFS 2024b).

The Tyee Lake Project has no developed recreation facilities associated with it and, due to its remote location, supports little to no recreation use. As part of the original license agreement for Project mitigation, the State of Alaska provided the USFS with funds that were used to develop a recreation site at Blind Slough on Mitkof Island over 100 miles from the Tyee Lake Project. This site is completely owned and managed by the USFS (Alaska Energy Authority 1997).

5.8.3 Project Vicinity Recreational Needs Identified in Management Plans

Management plans that cover recreation resources within the vicinity of the Tyee Lake Project are summarized below.

5.8.3.1 Alaska's Statewide Comprehensive Outdoor Recreation Plan 2022–2027

Alaska's Statewide Comprehensive Outdoor Recreation Plan (SCORP) provides government agencies, communities, and nonprofits with a reference for outdoor recreation preferences, use trends, and issues relevant to Alaska through 2027; identifies statewide capital investment priorities for acquiring, developing, and protecting outdoor recreation resources; identifies the state's priorities and strategies for Land and Water Conservation Fund (LWCF) funding; and provides information that agencies and communities need to ensure their project proposals are eligible for LWCF assistance. Goals of the SCORP that may be relevant to the Tyee Lake Project include increasing participation in outdoor recreation, maintaining sustainable outdoor recreation infrastructure, and ensuring future funding and support for outdoor recreation (ADNR 2024).

5.8.3.2 Tongass National Forest Land and Resource Management Plan 2016

The Tongass Forest Plan (USFS 2016) guides natural resource management activities and establishes management direction for the Tongass National Forest. The recreation goal (also tied to tourism) identified in the Tongass Forest Plan is to provide a range of recreation opportunities consistent with public demand, emphasizing locally popular recreation places and those important to the tourism industry. Objectives include (1) manage the Tongass National Forest's recreation settings in accordance with the Recreation Opportunity Spectrum Standards and Guidelines for each LUD type; (2) maintain existing USFS system trails to a standard that provides for the health and safety of all users; and (3) maintain existing recreation sites and facilities to provide for the health and safety of all users (USFS 2016).

5.8.3.3 City and Borough of Wrangell Comprehensive Plan 2010

The City and Borough of Wrangell Comprehensive Plan (Comprehensive Plan), published in 2010, is a long-range document that memorializes the vision of the community and the leadership of the Borough. The Comprehensive Plan's Land Use and Future Growth goal in relation to recreation is to "Designate and zone land in appropriate locations to meet current and future commercial, residential, industrial, public and recreational needs of all communities in the Borough" (City and Borough of Wrangell 2010). The Comprehensive Plan's Future Growth Maps include the USFS "Remote Recreation LUD" in its "Parks, Recreation, or Open Space" designation.

5.8.3.4 United States Forest Service Ketchikan-Misty Fjords Outfitter and Guide Management Plan

The Ketchikan-Misty Fjords Outfitter and Guide Management Plan EIS analyzed the effects of four alternatives for allocating special use permits to outfitters and guides on USFS lands within the Ketchikan-Misty Fjords Ranger District. In the final record of decision, the preferred alternative was selected, which allocated 50,671 service days annually for outfitter and guide recreational use on USFS lands within the Ketchikan-Misty Fjords Ranger District and includes adaptive management. The plan did not affect unguided visitors. Under the decision, all outfitter and guide operations are subject to area-wide and site-specific management elements and mitigation measures to protect natural and historic resources and minimize crowding and conflicts between guided and unguided visitors (USFS 2012).

5.8.3.5 Alaska Department of Natural Resources Central/Southern Southeast Area Plan, November 2000

The Central/Southern Southeast Area Plan determines management intent, land-use designations, and management guidelines that apply to all state lands in the planning area (Sumdum-Stephens passage region to Ketchikan region). The Central/Southern Southeast Area Plan states that lands will be provided for accessible outdoor recreation opportunities with well-designated and conveniently located recreational facilities. In addition, undeveloped lands are to be provided for recreational pursuits. Recreation opportunities will be realized by: (1) developing a state park system of recreation areas, trails, waysides, rivers and sites which provide a wide range of year-round outdoor recreation opportunities for all; (2) providing recreation opportunities on less developed land and water areas; (3) assisting communities through cooperative planning, conveyance of state lands, and grants-in-aid for parks and trails within population centers; encouraging commercial development of recreational facilities and services while minimizing environmental impacts; and (4) protecting recreation resources (ADNR 2000).

5.8.4 National Wild and Scenic River System or State-Protected River Segment

The National Wild and Scenic Rivers System was created in 1968 by Congress (Public Law 90-542; 16 USC 1271 et seq.) to preserve certain rivers with outstanding natural, cultural, and recreational values in a free-flowing condition for the enjoyment of present and future generations. Tyee Lake is not designated as a National Wild and Scenic River. The Tyee Lake Project is not located within or adjacent to a river segment designated as part of, or under study for inclusion in, the National Wild and Scenic River System or state-protected river segment (National Wild and Scenic Rivers System 2025).

5.8.5 National Trail System or Wilderness Area Designation

The National Trails System Act of 1968 (Public Law 90-542; 16 USC §1241) was created to promote the preservation and appreciation of natural and historic places in the United States as well as to support increasing outdoor recreation needs. Within the act, four categories of trails are recognized: (1) National Recreation Trails; (2) National Scenic Trails; (3) National Historic Trails; and (4) Connecting or Side Trails.

The Wilderness Act of 1964 established the National Wilderness Preservation System and authorizes Congress to designate Wilderness Areas. The Bureau of Land Management, National Park Service, USFS, and USFWS cooperatively manage more than 800 Wilderness

Areas (USFWS 2025). The Project is not located within a Wilderness Area; however, the western boundary of Misty Fjords National Monument Wilderness is approximately 3 miles from Tyee Lake.

5.8.6 Land Use and Management Adjacent to the Project

The Project occupies state lands that are surrounded by the Tongass National Forest, which is managed by the USFS. The Tongass National Forest is the nation's largest national forest and covers most of Southeast Alaska (USFS 2024b).

5.8.6.1 Land Use

The land adjacent to the Project Boundary consists of Tongass National Forest lands designated as Remote Recreation, Semi-Remote Recreation, and Timber Production LUDs (USFS 2016). The Remote Recreation LUD allows for primitive types of recreation and tourism in extensive, unmodified natural environments. Motorized and non-motorized recreation opportunities in natural and natural-appearing environments are allowed in the Semi-Remote Recreation LUD, in addition to occasional concentrated recreation and tourism facilities (USFS 2016). Roads are few, and timber harvest is limited to salvage from catastrophic events and beach log recovery. The primary purpose of the Timber Production LUD is to maintain and promote long-term wood production from forest lands; these areas have a network of roads that can also be used for recreation and tourism.

Additional land use data were gathered from the Multi-Resolution Land Characteristics Consortium under the 2016 National Land Cover Database (Multi-Resolution Land Characteristics Consortium 2019), which provides land use information by generalizing land cover in the Project area. As summarized in Table 5-13, predominant land cover type is Evergreen Forest, which covers 35.4 percent of the half mile buffer around the Project Boundary, closely followed by Shrub Scrub at 34.7 percent.

Table 5-13 Landcover type within 0.5 mile of the Tyee Lake Project Boundary.

Land Cover Type	Acres	Percentage (%)
Barren Land	64.9	1.2
Deciduous Forest	434.7	8.1
Developed, Low Intensity	4.4	0.1
Developed, Medium Intensity	1.6	0.0

Land Cover Type	Acres	Percentage (%)
Dwarf Shrub	57.3	1.1
Emergent Herbaceous Wetlands	52.7	1.0
Evergreen Forest	1,890.2	35.4
Mixed Forest	466.9	8.7
Open Water	489.8	9.2
Perennial Ice/Snow	1.7	0.0
Shrub Scrub	1,853.3	34.7
Woody Wetlands	23.8	0.4

Note: Land cover within 0.5 mile of the Project Boundary based on National Land Cover Database data.

5.8.6.2 Land Management

The Project Boundary occupies state lands within the Hidden Creek watershed and is surrounded by federal lands managed by USFS within the Tongass National Forest.

Land in the Tongass National Forest is managed in accordance with the 2016 Tongass Forest Plan (USFS 2016). The 2016 Tongass Forest Plan provides guidance for the management of resources, desired conditions and goals, management prescriptions, and priority of direction in the event of conflict. The Tongass National Forest land adjacent to the non-transmission portion of the Project is designated as Semi-remote Recreation, the management objectives of which are to provide for recreation in natural-appearing or remote settings where opportunities for solitude and self-reliance are moderate to high (USFS 2016).

5.8.7 Management of Lands Within the Tyee Lake Project Boundary

The proposed Project Boundary predominantly occupies state lands, with one parcel and the access road owned and managed by the USFS. The Project Boundary is surrounded by state and federal lands. The federal lands are managed by USFS under the guidance of the 2016 Tongass Forest Plan based on designated LUDs.

Tyee Lake Project operation and management are in alignment with the LUD goals and objectives of the 2016 Tongass Forest Plan (see Section 6.14, *Relevant Resource Management Plans*; USFS 2016).

5.8.8 References

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5.9 Aesthetic Resources

This section summarizes and describes the existing aesthetic resources, the visual character of the Project land and waters, and the nearby scenic attractions within the Tyee Lake Project vicinity.

5.9.1 Visual Character of Project Lands and Waters

The Tongass National Forest is the largest national forest in the United States and covers most of Southeast Alaska (USFS 2025). The Tongass National Forest has more than 5,756,000 acres of open Wilderness Areas that cover approximately one third of the forest. The 19 Wilderness Areas are distributed throughout the Tongass National Forest. Tourists can participate in activities such as taking sled-dog rides, fishing in nearby streams or the ocean, or visiting a glacier (USFS 2026). The Tongass National Forest is home to diverse wildlife and botanical resources (see Sections 5.4 and 5.5 of this PAD). The Tongass National Forest also contains five bear-viewing areas, one of which is between Anan Lake and Boulder Lake, only approximately 17 miles west of the Tyee Lake Project (USFS 2026).

The Tyee Lake Project is entirely surrounded by the massive Tongass National Forest, a maritime forest known for its stunning vistas. The aesthetics of the Project vicinity are remote in nature and range from mountain-top lakes to coastal rainforest (Photo 5-11 and Photo 5-12). The USFS Tongass Forest Plan includes Scenic Integrity Objectives for the LUDs that surround the Project (USFS 2016).

- Remote Recreation = High Scenic Integrity Objective
- Semi-Remote Recreation = Moderate Scenic Integrity Objective to any developments, facilities, or structures
- Timber Production = Low Scenic Integrity Objective in the foreground distance zone, as seen from Visual Priority Travel Routes and Use Areas; Very Low Scenic Integrity Objective to all other areas

Photo 5-11 Tyee Lake scenery 1.

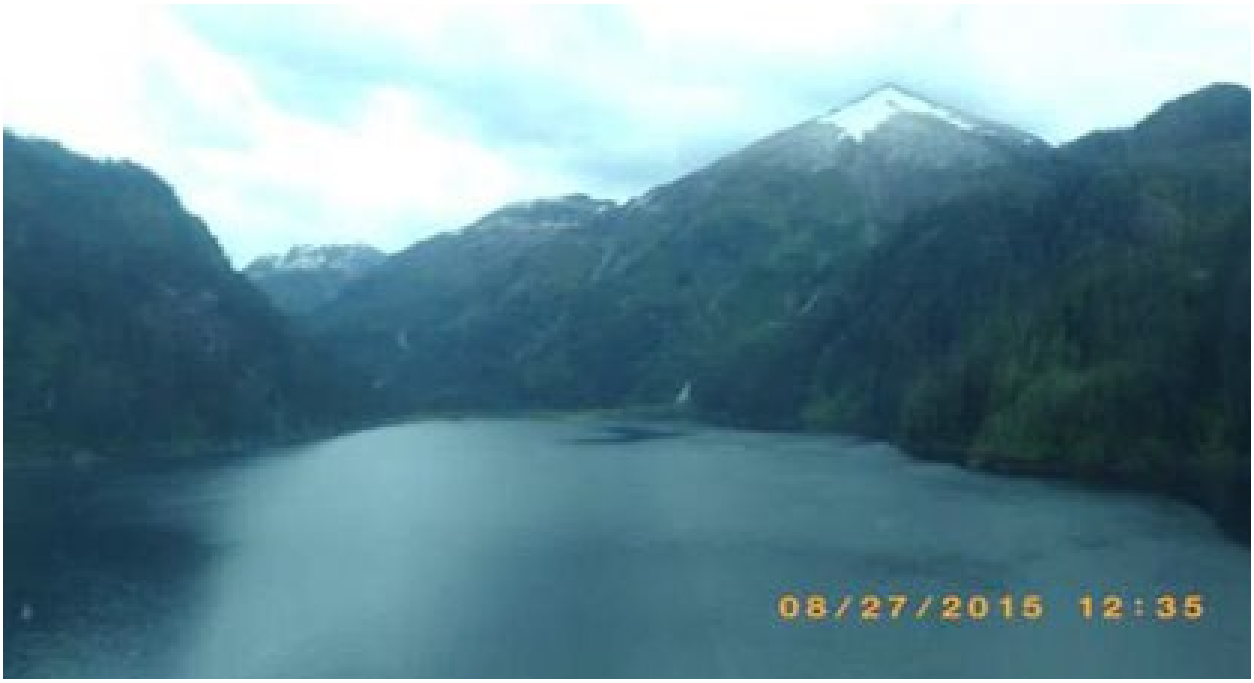

Photo 5-12 Tyee Lake scenery 2.

5.9.2 Nearby Scenic Attractions

Because of the remote nature of the Project, the nearest scenic public attractions are in Wrangell.

5.9.2.1 Petroglyph Beach State Historic Park

The Petroglyph Beach State Historic Park is a 7-acre park located approximately 1 mile north of Wrangell. The roughly 8,000-year-old site is home to the highest concentration of petroglyphs in the southeast region of Alaska (ADNR n.d.-a). At least 40 petroglyphs have been discovered in the surrounding area (ADNR n.d.-a). The park provides an accessible boardwalk overlooking the beach and petroglyph replicas for tourists to make rubbings on (Photo 5-13).

Source: ADNR n.d.-c.

Photo 5-13 Boardwalk overlook with petroglyph replicas.

5.9.2.2 Thoms Place State Marine Park

Thoms Place State Marine Park is an 1,198-acre marine park located approximately 25 miles south of Wrangell. The marine park consists of both the Thoms Place Bay and the land surrounding the bay. The primary activities for tourists include fishing, wildlife viewing, and walking on maintained paths (ADNR n.d.-b). There is no road access to the marine park; tourists must arrive by boat or floating plane.

5.9.2.3 Mt. Dewey Trail

Mt. Dewey Trail is a hiking trail located in northern Wrangell. The 0.5-mile-long trail ends with a platform overlooking the City of Wrangell and its adjacent water resources (Photo 5-14). The trail is situated within a hemlock forest and is considered relatively easy in terms of difficulty. In 1879, American naturalist John Muir accidentally scared the Tlingit people living near the base of the trail, leading to the "No Campfires!" sign along the trail (Travel Wrangell n.d.).

Source: Alaska Digital Archives circa 1904.

Photo 5-14 Fort Wrangell, Alaska, from Mt. Dewey.

5.9.2.4 Shakes Island

Shakes Island is a National Register of Historic Places (NRHP)-registered historic site located in southern Wrangell. The island is home to a replica of prominent Native American Chief George Shakes of the Tlingit Tribe's Tribal house. The island showcases a reminder of Southeast Alaska Natives and their distinctive totemic art (City and Borough of Wrangell n.d.). The site, which is owned by Wrangell Cooperative Association, is set on the authentic location historically occupied by Chief Shakes' lineage.

5.9.2.5 Alaska Marine Highway System

The Alaska Marine Highway System (AMHS) connects over 3,100 miles of coastal cities and communities in the State of Alaska via ferry system (Alaska Department of Transportation and Public Facilities [ADOT&PF] 1995). The Inside Passage, which spans from the Queen Charlotte Islands of British Columbia to Skagway, contains "dramatic fjords, pristine islands, and forests" (ADOT&PF 1995). All routes along the AMHS are considered, collectively, an "All-American Road," signifying they have met at least two of six intrinsic qualities varying from archeological, cultural, historical, natural, recreational, or scenic values. The AMHS passes along the western coast of Wrangell Island directly past Wrangell, which is approximately 39 miles from the Project's powerhouse.

5.9.2.6 Scenic Lakes

The Tyee Lake Project is surrounded by many small lakes nestled throughout the lower portion of the Alaskan mainland. The largest lakes by area near the Tyee Lake Project are Reflection Lake, Eagle Lake, Lake McDonald, Lake Shelokum, Boulder Lake, Anan Lake, Halfmoon Lake, Marten Lake, Lake Nellie, Little Eagle Lake, Fall Lake, and Upper Marten Lake.

5.9.2.7 Scenic Mountains

There are several large mountain peaks in the Project vicinity including Mount Tyee (4,321 feet high), Mount Cloud (5,538 feet high), the Kapho Mountains (maximum 4,452 feet high), Table Mountain (6,314 feet high), and Mount Pounder (6,493 feet high) (USGS 2017).

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5.10 Cultural Resources

Pursuant to 18 CFR § 5.6(d)(3)(x), this section includes a summary of discovery measures and identified cultural resources (including both built environment and archaeological resources) within the Project Boundary and adjacent vicinity. This section also includes an overview of the prehistory, ethnohistory, and history of the archaeological resource area (within 0.5-mile buffer from the Project Boundary); a discussion of relevant thematic contexts for the built environment; a summary of the previous cultural resource studies completed within and near the Project Boundary; and bibliographic resources. The major Project features occupy state lands and are surrounded by USFS Tongass National Forest lands.

Pursuant to 36 CFR § 800.2(c), SEAPA has requested within its NOI to be designated as FERC's non-federal representative for the purposes of conducting consultation pursuant to Section 106 of the National Historic Preservation Act (NHPA) with the Alaska State Historic Preservation Office (Alaska SHPO), Tribal Historic Preservation Officer (THPO), and Tribes.

5.10.1 History of the Project Vicinity

Due to the rugged and remote geography of Southeast Alaska, there is limited information about the early human settlement of the region. Archeologists have long debated the peopling of the North American continent, with some furthering the Bering Land Bridge Theory that people walked down an inland corridor between large glaciers of western Canada around 13,500 years ago, and others arguing that sea travel is likely to have occurred much earlier, based on earlier dates of human occupation in other parts of North and South America. In the last 20 years, studies have been accumulating that suggest the latter, although direct evidence has still been hard to find.

New research dating rocks and animal bones suggests that Southeast Alaska was largely ice-free and full of plant and animal life as early as 17,000 years ago. Genetic evidence supports a theory that the ancestors of contemporary Indigenous people in the area lived for 15,000 years on the Bering Land Bridge until the last ice age ended (Elias 2014). A recent underwater discovery of a submerged stone fish weir on the west side of Prince of Wales Island reveals that people have lived in what is now Southeast Alaska for at least 11,000 years (Archaeology Magazine 2022).

The Project area is within the traditional territory of the Stikine Tlingit, or *Kaachxana aakw* (People of the Bitter Water) (Goldschmidt and Haas 1998). Few systematic and comprehensive archaeological surveys have been conducted in the region. Known archaeological sites are associated with traditional use and occupation of the area by the Stikine Tlingit, their ancestors, and possible earlier Indigenous populations (Andrews, 1980; Greiser, 2013).

Historically, the Stikine Tlingit lived, hunted, fished, and trapped in the lower Stikine River basin and throughout the islands of the Alexander Archipelago. Traditional Native use of the area for subsistence activities prompted settlement along shorelines and stream banks. The earliest known settlements date to 8,000 years ago, and descendants believe that they migrated from the Canadian interior along the Stikine River, traveling beneath glaciers to escape the great floods of the last Ice Age (Alaska Natives without Land n.d.). After settling in the Wrangell area, the Stikine Tlingit established trading networks extending into the interior of Canada and up the Copper River (Alaska Natives without Land n.d.). While there is evidence of Tribal seasonable use along Bradfield Canal, there is no indications of sites in the vicinity are associated with the vicinity of Tyee Lake (Andres, 1980, Goldschmidt and Has, 1998). No native burial or cemetery sites were identified in the Tyee Lake area in Sealaska's 1975 report, *Native Cemetery and Historic Sites of Southeast Alaska* (Sealaska, 1975, Greiser, 2013).

In the mid- to late 1700s, the Alexander Archipelago was visited, explored, mapped, and colonized by the Russians, Spanish, and British. It soon became the center of the Maritime Fur Trade, in which the Stikine were active participants. As early as 1775, the effects of Spanish colonization were felt by the local Indigenous populations with the introduction of smallpox (Andrews 1980). Gold was discovered on the upper Stikine River in 1861, and the following year prospectors arrived at the Native village in Wrangell. With the Alaska Purchase of 1867, the United States gained control of the region from Russia and prospecting increased. Today, tourism, fishing, and logging are the main industries in the area.

Construction of the hydroelectric facility's buildings and components began on October 20, 1981, and was completed in 1984, which is less than 50 years ago. Therefore, currently the hydroelectric facility's buildings and its components do not qualify as potential historic properties since they are less than 50 years old.

5.10.2 Prior Cultural Resource Investigations

The Tyee Lake Project area has been the subject of multiple cultural resource investigations associated with hydroelectric development, transmission interties, land management and planning, and timber sales. These investigations span several decades and include project-specific surveys, reconnaissance-level inventories, and background research efforts conducted by private consultants, the USFS, and Alaska Native Claims Settlement Act (ANCSA) Corporations.

Early regional and project-related investigations were conducted in the late 1970s and 1980s in connection with the Tyee Lake Project (Arndt 1979; Andrews, 1980; Roberts 1981; 1988; Greiser 2013). In 1979, Arndt prepared a cultural resources background study for the Tyee Lake Project (Arndt 1979), reporting that no cultural resource sites were known to be present on or near Tyee Lake. Arndt suggested that most archaeological sites in the region were likely concentrated along the coast. Despite the presumed low potential in inland settings, Arndt recommended that archaeological surveys be conducted in areas near Tyee Lake.

In 1980, the Arctic Environmental Information and Data Center sponsored an archaeological survey that examined 47 localities along proposed routes for the Tyee Lake Power Project, including areas surrounding Tyee Lake (Andrews 1980). This study involved aerial and pedestrian survey methods and a records review. While several previously reported sites elsewhere along the proposed corridors were not relocated, the survey confirmed four previously recorded sites and documented six new archaeological sites. No cultural resources were identified in the immediate Tyee Lake area.

Additional surveys conducted in 1981 and 1988 focused on the Campbell Study Area, Bradfield Canal, and the Bradford Hydroelectric Line. These investigations did not identify archaeological or historic resources within the Tyee Lake area (Roberts 1981, 1988). Similarly, a 1984 USFS reconnaissance survey in the Hoya Canal area recorded historic-era resources such as the Bradfield Canal Cabin (XBC 00028) and modern trapline features but did not identify archaeological sites proximity of Tyee Lake (Roberts 1984). Broader regional survey efforts were also conducted in the 1970s to support ANCSA (Sealaska Corporation 1975).

More intensive cultural resource evaluations occurred during the 1990s. In 1996, cultural resource survey and testing program conducted for the Swan–Tyee Intertie EIS

determined that site XBC-00030 was eligible for listing in the NRHP (Greiser 1996). A follow-up heritage resource survey conducted in 1998 in support of the Canal Hoya Timber Sale revisited previously recorded sites, including XBC-00028, XBC-00030, and completed formal Determinations of Eligibility. Timber harvest plans were subsequently designed to avoid adverse effects to these historic properties (Hanks et al. 1998).

During the early 2000s, additional cultural resource investigations were completed to support timber and hydroelectric projects in nearby areas. A 2001 cultural resource investigation for the Shady–Highbush timber project on Wrangell Island identified no cultural resources (Esposito and Smith 2002). In contrast, the 2002 heritage resource inventory for the Blind Slough Hydroelectric Project included an intensive pedestrian survey, which evaluated site PET-00485 and determined it was not eligible for NRHP listing (Greiser 2002).

In 2013, Greiser prepared a background research report for the Tyee Lake hydroelectric facility (Greiser 2013). The study was a review of existing research and resources and evaluated the likelihood of encountering cultural resources in the area. No confirmed or unconfirmed sites were identified in or near the area. No evidence of historic structures or features, such as cabins or mines, was found during review of public land records (Greiser 2013).

Based upon this body of work, Grieser concluded that the Tyee Lake area, which ranges in elevation at approximately 1,300 to 1,400 feet above sea level and is characterized by rugged terrain, falls within the low sensitivity zone for probability of encountering cultural resources, as defined in the *Third Amended Programmatic Agreement Among the USDA Forest Service, Alaska Region, the Advisory Council on Historic Preservation, and the Alaska State Historic Preservation Officer Regarding Heritage Resource Management on National Forests in the State of Alaska* (Programmatic Agreement 2010). The Alaska SHPO determined that no pedestrian survey would be required and that there would be no historic properties affected because of the lake tap intake project (File No. 3130-IRFERC).

5.10.3 Existing Discovery Measures and Identified Cultural Resources

Most known archaeological sites in the vicinity are associated with traditional use and occupation of the area by the Stikine Tlingit, their ancestors, and possible earlier Indigenous populations (Andrews 1980; Grieser 2013). Recorded resources include prehistoric sites, petroglyph sites, and post-contact sites such as winter villages, other

seasonal settlements, forest/outposts, burials, fishing traps and weirs, canoes, cedar source, and a garden (Andrews 1980). One notable site, the Coffman Cove site (PET-067), located on Prince of Wales Island, was found to contain multiple human burials. Excavations conducted in the 1970s yielded radiocarbon dates of 1685 Before Common Era (B.C.E.), along with diagnostic slate projectile points dating to 2500 to 800 B.C.E. (Andrews 1980). Interviews with two Stikine Tlingit men in 1946 indicated that the upper end of Bradfield Canal belonged to the *Naanyaa.aayi* clan, although at least one other clan also made claim to streams in the area. Both men indicated that historically, two white men lived at the mouth of the Harding River and controlled access to the area. While there is evidence of Native American seasonal use along Bradfield Canal, there is no indication of sites in the vicinity of Tyee Lake (Andrews 1980; Goldschmidt and Hass 1998). No Native burial or cemetery sites were identified in the Tyee Lake area in Sealaska Corporation's 1975 report, *Native Cemetery and Historic Sites of Southeast Alaska* (Sealaska Corporation 1975; Grieser 2013).

Historic-period resources in the region include canneries, forts dating to 1834–1877 in the Wrangell area, educational institutions, fur farms, a goat and cattle ranch, and a marble mining site on Blake Island (Andrews 1980). Cultural resource identification monitoring has continued under USFS stewardship. Site visits documented in the USFS Alaska Region Heritage Program's 2007 Annual Report (Yarborough et al. 2008) revealed that sites XBC-00041 and XBC-00045 were more extensive than previously recorded, resulting in expanded site boundaries. The most recent investigation, conducted in 2014 to support maintenance activities along portions of the Tyee electrical transmission line, identified no significant cultural resources within the Area of Potential Effect for the proposed maintenance work (Slaughter 2015).

In April 2026, Northern Land Use Research Alaska (NLURA) prepared an initial assessment of known cultural resources within the Tyee Lake Project area as part of cultural resources management for FERC relicensing (NLURA 2026). The review included an examination of the Alaska Heritage Resource Survey (AHRS) records, available historic photographs, and prior cultural resource surveys conducted within the Project area. This review identified no AHRS sites occurring within 0.5 mile of the Tyee Lake hydroelectric facility. Overall, these investigations demonstrate a long history of cultural resource identification and management within the Project area, ranging from broad regional studies to focused project-specific surveys, and incorporated into avoidance and protection planning.

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5.11 Tribal Resources

In 1936, the United States government extended coverage pursuant to the Indian Reorganization Act of 1934 to include Alaska Natives and encouraged Native villages to adopt constitutions for self-government under the act. There is one Native American entity, located in southern Southeast Alaska, incorporated under this act. The Metlakatla Indian Community Annette Island Reserve is located approximately 20 miles (32.2 kilometers) south of Ketchikan and 63 miles (102 kilometers) south of the Tyee Lake Project and is the only Indian Reserve in the State of Alaska (Metlakatla Indian Community Staff 2022).

A federally recognized Tribe is recognized as having a government-to-government relationship with the United States, with the responsibilities, powers, limitations, and obligations attached to that designation, and is eligible for funding and services from the Bureau of Indian Affairs (BIA). Furthermore, federally recognized Tribes are recognized as possessing certain inherent rights of self-government (i.e., Tribal sovereignty) and are entitled to receive certain federal benefits, services, and protections because of their special relationship with the United States. At present, there are 229 federally recognized American Indian and Alaska Native Tribes and villages in Alaska (BIA 2024). There are no federal Tribal trust lands within the Project area.

The following federally recognized Alaska Native Tribes may have interest in the Project area:

- Ketchikan Indian Community
- Organized Village of Saxman
- Petersburg Indian Association
- Wrangell Cooperative Association
- Haida Indian Tribes of Alaska
- Central Council of the Tlingit and Haida Indian Tribes of Alaska
- Craig Tribal Association
- Klawock Cooperative Association
- Hydaburg Cooperative Association
- Organized Village of Kake
- Metlakatla Indian Community, Annette Island Reserve

Based on the cultural history presented in Section 5.10 of this PAD, the following Alaska Native Claims Settlement Act corporations and Alaska Native interest groups may also have a cultural presence within the Project area:

- Cape Fox Corporation
- Sealaska Corporation
- Sealaska Heritage Institute
- Kake Tribal Corporation

5.11.1 References

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5.12 Socioeconomics

The following sections describe the socioeconomic resources present in the Tyee Lake Project vicinity, including discussion of general land use patterns, population patterns, employment resources, and household/family distribution and income.

5.12.1 General Land Use Patterns

The Tyee Lake Project is located 1.5 miles southeast of the easternmost end of the Bradfield Canal in Southeast Alaska. It lies within the Tyee Lake drainage basin, approximately 32 air miles southeast of Wrangell, within the Wrangell Ranger District of the Tongass National Forest. The three primary population centers nearby include Ketchikan, Wrangell, and Petersburg Borough. Other populated areas in the Project vicinity include Haines Borough, the City and Borough of Juneau, Prince of Wales-Outer Ketchikan Census Area, the City and Borough of Sitka, Skagway-Hoonah-Angoon Census Area, and Ketchikan Gateway Borough (including Saxman).

The City of Ketchikan encompasses a total area of 3.8 square miles, the City and Borough of Wrangell has a land area of 2,556 square miles, and the Petersburg Borough is 2,900.7 square miles (United States Census Bureau [U.S. Census] 2024). Tyee Lake Project is

located primarily within the Tongass National Forest, the largest national forest in the United States at approximately 17 million acres.

The following is a summary of socioeconomic data for the cities, boroughs, and state in the Project vicinity, including population patterns, average household income, and employment sectors.

5.12.2 Population Patterns

The Tyee Lake Project is located at the head of Bradfield Canal within the Borough of Wrangell, approximately 39 miles southeast of downtown Wrangell, Alaska. The Project started operation in 1984 and supplies power to the communities of Wrangell and Petersburg. Following completion of the Swan-Tyee Intertie in 2009, the Tyee Lake Project is also connected to SEAPA's Swan Lake Hydroelectric Project and the City of Ketchikan.

Southeast Alaska is divided into four boroughs, three consolidated cities and boroughs, one municipality, and two Census Areas. Boroughs in Alaska correspond with the county governments found elsewhere in the United States, but unlike counties in other states, the boroughs in Alaska do not cover the entire state. The remaining unorganized areas are allocated to Census Areas, which are statistical units that are generally recognized as county equivalents from a data reporting standpoint. The cities of Ketchikan and Petersburg are located in Ketchikan Gateway Borough and Petersburg Borough, respectively. The City and Borough of Wrangell is a consolidated city/borough government.

The City and Borough of Wrangell had a total estimated population of 2,037 in 2025 (Table 5-14). The cities of Ketchikan and Petersburg had estimated populations of 7,632 and 3,070 in 2025, respectively. The population is estimated to have decreased in the Ketchikan Gateway Borough, City of Ketchikan, Petersburg Borough, and the City and Borough of Wrangell from 2020 to 2025, while the City of Petersburg is estimated to have experienced a slight population increase from 2020 to 2025.

Table 5-14 Population data from 2010, 2020, and 2025.

Geographic Area	2010	2020	2025	2010 to 2020		2020 to 2025	
				Net Change	Percent Change (%)	Net Change	Percent Change (%)
Ketchikan Gateway Borough	13,477	13,948	13,377	471	3.5	-571	-4.3
City of Ketchikan	8,050	8,192	7,632	142	1.8	-560	-7.3
Petersburg Borough	3,815	3,398	3,395	-417	-10.9	-3	-0.1
City of Petersburg	2,948	3,043	3,070	95	3.2	+27	0.9
City and Borough of Wrangell	2,369	2,127	2,037	-242	-10.2	-90	-4.4
Alaska	710,231	733,391	737,270	23,160	3.3	+3,879	0.5

Source: U.S. Census 2010; Alaska Department of Labor and Workforce Services 2025.
Note: Data for 2010 and 2020 are decennial census counts. Data for 2025 are estimates.

There are no communities located near the Tyee Lake Project. Review of population data provided via USEPA's Environmental Justice Screening and Mapping Tool (EJScreen) identified no population within 10 miles of the Project.

5.12.3 Employment Resources in the Project Vicinity

An estimated 1,190 people were employed in the City and Borough of Wrangell in 2022 (Table 5-15). Government and retail trade were the largest sectors by employment accounting for 18 percent and 12 percent of total jobs, respectively. An estimated 9,674 and 2,394 people were employed in the Ketchikan Gateway and Petersburg boroughs, respectively. Government and retail trade were also the largest employers in these boroughs. Health care and social assistance was also important in Ketchikan Gateway Borough (Table 5-15).

Table 5-15 Employment in the City and Borough of Wrangell in 2022.

Economic Sector	Alaska	Ketchikan Gateway Borough	Petersburg Borough	City and Borough of Wrangell
Total employment (number of jobs)	457,687	9,674	2,394	1,190

Economic Sector	Alaska	Ketchikan Gateway Borough	Petersburg Borough	City and Borough of Wrangell
Percentage of Total (%)				
Agriculture	0	0	0	0
Forestry, fishing, and related	2	(D)	(D)	(D)
Mining	3	(D)	(D)	2
Utilities	1	(D)	0	0
Construction	5	5	4	(D)
Manufacturing	3	4	9	5
Wholesale Trade	2	(D)	(D)	1
Retail Trade	9	11	10	12
Transportation and Warehousing	7	8	(D)	5
Information	1	1	2	2
Finance and Insurance	3	3	1	1
Real estate and Rental and Leasing	4	6	3	2
Professional, Scientific, and Technical Services	5	3	(D)	(D)
Management of Companies	1	1	0	0
Administrative and Waste Services	4	3	(D)	(D)
Educational Services	1	1	(D)	(D)
Health care and Social Assistance	12	11	(D)	(D)
Arts, Entertainment, and Recreation	2	3	2	1
Accommodation and Food Services	8	9	6	6
Other Services	5	3	5	6
Government	22	22	22	18

Source: U.S. Bureau of Economic Analysis 2023.

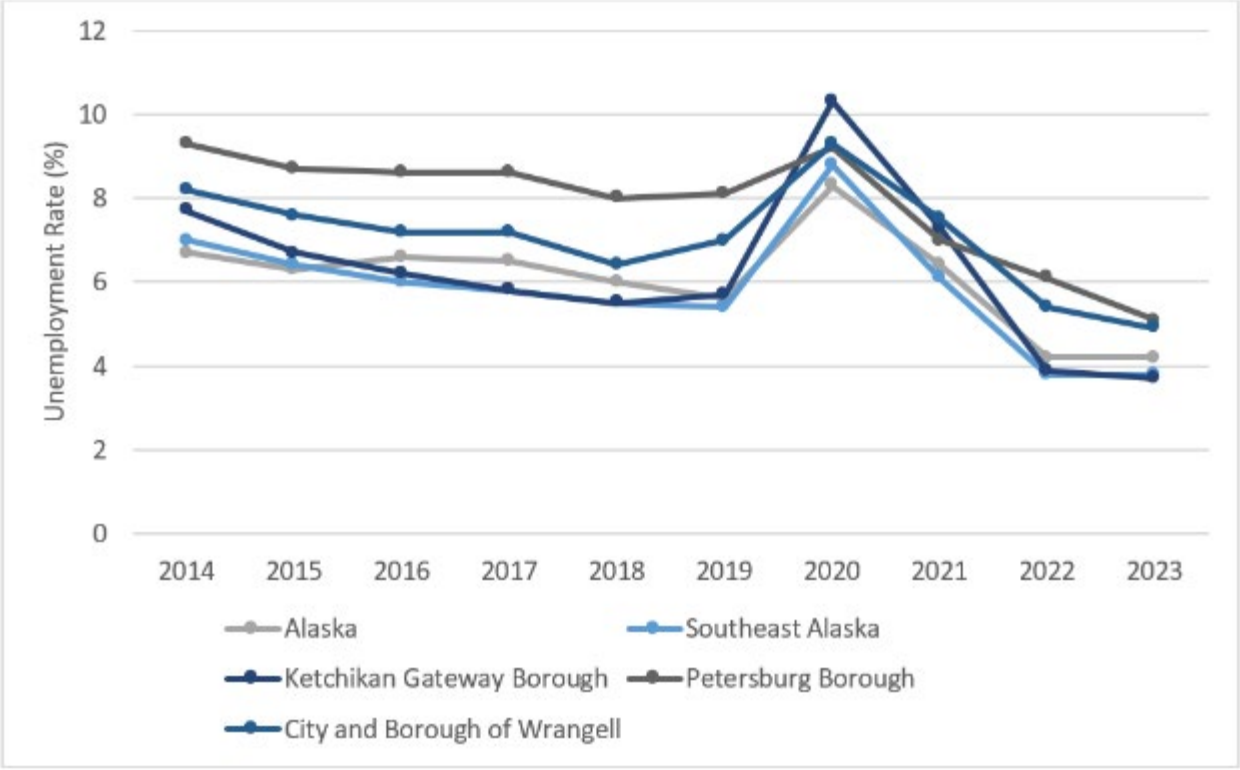
Notes:

(D) Not shown to avoid disclosure of confidential information; estimates for this item are, however, included in the totals.

1/ Employment estimates include self-employed individuals. Employment data are by place of work, not place of residence, and, therefore, include people who work in the area but do not live there. Employment is measured as the average annual number of jobs, both full- and part-time, with each job counted at full weight.

2/ Percentages for Ketchikan Gateway and Petersburg boroughs and the City and Borough of Wrangell do not sum to 100 because employment counts are not provided for some sectors to avoid disclosing confidential information (identified by [D] in the table).

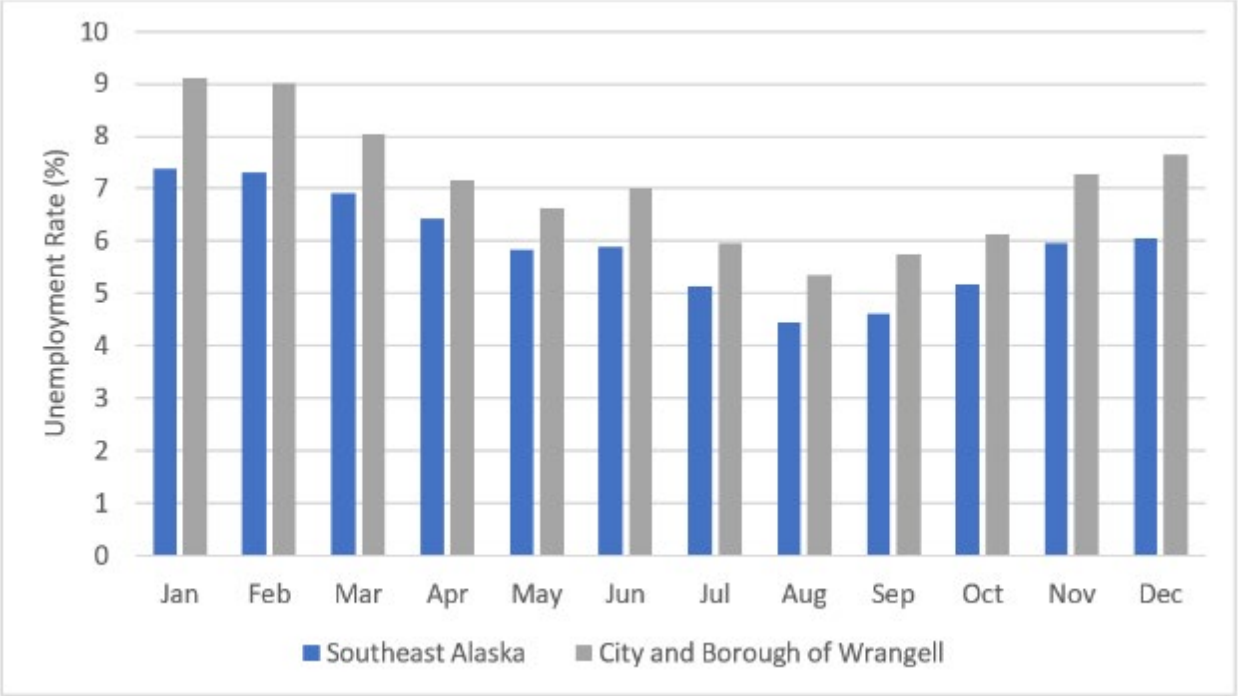
Annual average unemployment rates for Alaska, Southeast Alaska, Ketchikan Gateway and Petersburg boroughs, and the City and Borough of Wrangell are presented from 2014 to 2023 in Figure 5-9. Unemployment rates in all five areas peaked in 2020 as a result of the COVID-19 pandemic and have since trended downward. Unemployment rates were lower than pre-pandemic levels in 2023 in all five areas, ranging from 3.7 percent in Ketchikan Gateway Borough to 5.1 percent in Petersburg. The annual average unemployment rate in the City and Borough of Wrangell in 2023 was 4.9 percent (Figure 5-9).



Source: Alaska Department of Labor and Workforce Services 2024a.
Note: Data are not seasonally adjusted.

Figure 5-9 Average annual unemployment rates, 2014–2023.

Southeast Alaska's economy is highly seasonal. Average monthly unemployment rates from 2014 to 2023 ranged from 4.5 percent in August to 7.4 percent in January (Figure 5-10). Monthly unemployment rates were higher in the City and Borough of Wrangell, ranging from 5.4 percent in August to 9.1 percent in January, with a larger range between low and high values, 3.8 percent compared to 2.9 percent (Figure 5-10).



Source: Alaska Department of Labor and Workforce Services 2024b.
Note: Data are not seasonally adjusted.

Figure 5-10 Average monthly unemployment rates, 2014–2023.

5.12.4 Household/Family Distribution and Income

The highest paying industries in Ketchikan are utilities ($140,333 average salary); professional, scientific, and technical services ($138,318); and public administration ($128,016) (DataUSA 2024a). Similarly, the highest paying industries in the City and Borough of Wrangell are accommodation and food services ($223,756); public administration ($127,772); and professional, scientific, and technical services ($121,058) (DataUSA 2024b). In Petersburg Borough, the highest paying industries are mining, quarrying, and oil and gas extraction ($242,132); educational services ($166,755); and agriculture, forestry, fishing and hunting ($135,815) (DataUSA 2024c).

The annual median household income in the City of Ketchikan is $85,275. In the City and Borough of Wrangell, the annual median household income is $63,750, and in Petersburg Borough, the annual median household income is $75,125—all of which are lower than the annual median household income for the State of Alaska, which is $95,700 (U.S. Census 2024). The City and Borough of Wrangell has a similar but slightly less population density (approximately 0.8 people per square mile) than the State of Alaska (1.3) and the Petersburg Borough (1.2); compared to Ketchikan Gateway Borough with a population density of only approximately 0.1 person per square mile (U.S. Census 2024). Table 5-16 shows household and workforce data for the Project vicinity.

Table 5-16 Household information in the Project vicinity.

	Alaska	Ketchikan Gateway Borough	Petersburg Borough	Wrangell City and Borough
Households	270,533	5,732	1,371	976
Percentage of Population in Civilian Workforce (%)	62.2	64.1	62.6	51.0
Unemployment Rate (%)*	5.0	4.6	6.1	5.1
Average Household Size	2.61	2.34	2.28	2.08
Population Density	1.3	0.1	1.2	0.8

Source: U.S. Census 2024; Department of Labor and Workforce Development 2024.
*Unemployment rate as of December 2025.

5.12.5 References

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6.0 PRELIMINARY ISSUES AND STUDIES LIST FOR EACH RESOURCE AREA

SEAPA proposes to continue Project operations as established under the current license, with the exception of lowering the reservoir drawdown limit. Based on the information provided in Section 5.0, SEAPA believes that sufficient information already exists to understand how continued operations of the Project would affect environmental resources. Because SEAPA is considering modifying operations of the Tyee Lake Project by changing the lower draft limit from 1,250 feet to approximately 1,235 feet (a 15-foot change), as described in Section 3.6 and 6.1, SEAPA is proposing a multidisciplinary study to evaluate the effects of a lower draft limit on environmental resources.

Parties to the relicensing have an opportunity to comment on this PAD and request other studies that they consider necessary to fully evaluate the effects of continued operation of the Project. All study requests must satisfy FERC's study plan requirements as noted in the TLP regulations (18 CFR § 16.8) and must be made in writing to FERC and SEAPA no later than October 19, 2026. Section 2.5 provides additional information and guidelines for submitting study requests.

6.1 New Minimum Pool Elevation

6.1.1 Potential Issues and Project Effects

The primary engineering concern related to lowering the lake draft limit is air introduction from vortex formation into the power tunnel and its effect on turbine performance. Vortex formation is not an exact science, but it generally depends on water velocity, the geometry around the intake, and the distance from the water surface to the top intake tunnel. The exact elevation of the top of the intake structure was not surveyed after being built. If the Power Tunnel Intake Sections Record Drawing TY_31-011 is scaled, the top of the tunnel is about elevation 1,233 feet mllw. It seems intuitive that a minimum draft elevation would be above 1,233 feet due to vortex formation and floating debris. However, it is not possible to predict the lower lake limit in advance of studying it in the field. SEAPA proposes to use a study during the relicensing process to determine what the lowest possible operational level is for the Project given reduced generation parameters.

6.1.2 Proposed Study

The preliminary goals and objectives of the "New Minimum Pool Elevation Study" are to:

- Determine the operational limits and feasibility of a lower drawdown that would establish a new bottom level draft limit (i.e., new minimum pool elevation) in a future license;
- Assess the risks of the new operational limits on equipment and structures;
- Estimate the Tyee Lake unit capacity and energy that could be available from low level operation; and
- Identify potential effects of the new lower limit operations to fish and aquatic resources, water quality and quantity, and soils and slope stability in the reservoir.

SEAPA is currently preparing a study plan for the New Minimum Pool Elevation Study. Execution of the study plan would require temporarily lowering the Tyee Lake Reservoir below the currently authorized level of 1,250 feet and, as such, will require FERC approval of a variance of the license condition establishing the current minimum reservoir elevation. SEAPA plans to file a request for a variance with FERC in summer 2026 to obtain FERC approval for the temporary variance in time to conduct the study in spring 2027 or 2028 as reservoir conditions allow. SEAPA is therefore hoping to consult with agencies regarding the study plan and the request for a lake level variance on an expedited schedule (i.e., prior to the JAM and site visit).

It is likely that the reservoir will not go lower than it historically has for many years. Based on a review of operations data from the years 2016 to 2025, it appears that 2019 was the only recent year where generation was curtailed at elevation 1,259 feet; diesel generation would have been less during 2019 with a lower draft limit. The remaining 9 feet of lake elevation was held in reserve in case of diesel generator failure.

6.2 Geology and Soils

6.2.1 Potential Issues and Project Effects

Drafting and filling the reservoir over time has removed loose soils and vegetation, resulting in primarily rock surfaces with little to no soil around the normal full pool elevation. Rock and tree slides, often caused by heavy rain after dry periods, have been known to occur at elevations above normal pool, causing slide material to deposit into the reservoir. Mass wasting events would continue to occur on the steep slopes with shallow bedrock surrounding much of the lake, whether or not the drawdown limit is lowered. This would only occur near the shoreline and would be similar to existing conditions. Natural landslides would continue throughout the watershed. None of the slides to date have caused issues with Project operation or generation, other than causing

floating debris that must be removed at the intake, and some sediment deposits in the reservoir.

6.2.2 Proposed Studies

As a component of the New Minimum Pool Elevation Study, SEAPA plans to visually observe the shoreline during drawdown conditions to identify and document areas that may be susceptible to significant erosion or mass wasting events.

6.2.3 Continued or Proposed PM&E Measures

Because the potential effects of a lower drawdown to geological and soil resources are currently unknown, it is premature to define protection, mitigation, and enhancement (PM&E) measures at this time.

6.3 Water Resources

6.3.1 Potential Issues and Project Effects

Under current Project operations, there are no known effects to water quality in Tyee Lake or downstream of the Project in Tyee Creek or Hidden Creek. Effects of lowering the reservoir's draft limit are currently unknown but may potentially temporarily increase turbidity.

6.3.2 Proposed Studies

As a component of the New Minimum Pool Elevation Study, SEAPA plans to spot check turbidity and temperature during drawdown conditions.

6.3.3 Continued or Proposed PM&E Measures

Because the potential effects of a lower drawdown to water resources are currently unknown, it is premature to define PM&E measures at this time.

Two monitoring programs related to the installation of the third turbine, under a separate FERC proceeding, are being implemented at the Project beginning in May 2026 and concluding after 1 year of monitoring has occurred after turbine operation. The Hidden Creek Flow Monitoring Plan will help determine if there are Project effects on EFH in lower Hidden Creek due to potential flow reductions from Tyee Lake to Hidden Creek after the third turbine is operational. The Tailrace Scour and Deposition Monitoring Plan will help

determine if increased flow through the tailrace causes scour and downstream deposition of fine sediments after the third turbine is operational. The draft monitoring plans were submitted to FERC on June 11, 2025, and to ADF&G, USFWS, NMFS on April 13, 2026 for a 30-day review from. SEAPA will address agency comments and file the final plans with FERC.

6.4 Fish and Aquatic Resources

6.4.1 Potential Issues and Project Effects

Anadromous fish access in the Project area is restricted to the lower 460-foot-long intertidal reach of Hidden Creek, upstream of which a 30-foot waterfall blocks fish passage into the system.

Resident Arctic Grayling utilize Tyee Lake and a few of its tributaries. The reservoir would be drawn down to the lowest limits for a short period of time in early spring, prior to snowmelt. During licensing studies, Arctic Grayling were observed spawning in Tyee Lake from mid-May to mid-June. While Tyee Lake is a deep, steep-sided reservoir, it is possible that Arctic Grayling may use the relatively shallower area at the east side of the reservoir near the Tyee Creek confluence.

6.4.2 Proposed Studies

As a component of the New Minimum Pool Elevation Study, SEAPA is proposing to conduct inspections for fish and other aquatic species. Visual inspections will look for signs of stressed behavior and stranding in readily observable species.

6.4.3 Continued or Proposed PM&E Measures

Because the potential effects of a lower minimum reservoir level to fish and aquatic resources are currently unknown, it is premature to define PM&E measures at this time.

6.5 Wildlife Resources

6.5.1 Potential Issues and Project Effects

Several wildlife species utilize Tyee Lake as habitat, such as waterfowl, river otter, amphibians, and macroinvertebrates. Some use it year-round, and others only use it seasonally (e.g., migratory birds).

Continued operation of the Project, including an additional 15 feet of proposed reservoir drawdown in early spring, before snowmelt, is not expected to negatively affect wildlife species.

6.5.2 Proposed Studies

To expand on the information presented in this PAD regarding the currently existing wildlife habitats in the Tyee Lake Project Boundary, SEAPA is proposing a desktop mapping effort to delineate and quantify the extent of vegetation and wildlife habitat types. Based on the acreage and landscape context of available habitats, the mapping developed in this study could also support updates to the information on the wildlife species expected to occur in the Project Boundary.

The proposed mapping would be conducted using the high-resolution aerial photography to be acquired by SEAPA in summer 2026 for the Project Boundary. After the study plan is finalized in 2026, preliminary desktop mapping of vegetation and wildlife habitat types would be conducted digitally on screen in the first quarter of 2027 to quantify the current extents of those landscape features in the Project Boundary. A reconnaissance-level overflight of the Project Boundary could also be made to collect oblique aerial photographs and record notes on the occurrence of vegetation and wildlife habitat types in the mapping area, if needed. A limited number of ground-reference plots may be sampled to collect data on the landscape variables (physiography, vegetation type, surface form, disturbance type) used in deriving wildlife habitat types. This field-verification effort would focus on those landscape features that were difficult to identify by image interpretation and would then be used to update and refine the Project Boundary mapping in late summer and fall 2027. The draft vegetation and wildlife mapping study report would be completed in the fourth quarter of 2027 after updating the preliminary mapping. The mapping of vegetation and wildlife habitats would also be summarized in Exhibit E of the DLA and FLA in 2029.

The mapping work would occur in a single process during which vegetation and wildlife habitat variables would be attributed to each map polygon as they are digitized. Vegetation would be classified to Level IV of the Alaska Vegetation Classification (Viereck et al. 1992). The wildlife habitat variables expected to be identified and mapped include Level IV Alaska Vegetation Classification vegetation type, physiography, surface form, and disturbance type, as applicable for the Project Boundary. Wildlife habitats would be mapped and derived using Integrated Terrain Unit mapping methods conducted in

tundra, boreal forest, and coastal regions in Alaska (see Wells et al. 2014 for an example study in Kenai Fjords National Park). After mapping in a geographic information system (GIS; i.e., ESRI's ArcGIS Pro) is complete, the wildlife habitat variables for each map polygon would be combined and the resulting large set of multivariate, concatenated types would be aggregated to develop a smaller set of wildlife habitat types that share landscape features considered to be important to wildlife species in Southeast Alaska. The landscape features important for wildlife include vegetation structure, cover and escape habitat, breeding and overwintering habitat, plant forage species (for herbivores), and prey species habitat (for carnivores). When developing wildlife habitat types, the team will consult with ABR wildlife biologists for input on the set of habitats to be mapped in the Project Boundary so the final set is representative of how wildlife in Southeast Alaska typically use terrestrial and marine habitats.

Deliverables for the landscape mapping study include a draft and final study report describing the mapping methods, the derivation of wildlife habitat types, the mapping results for vegetation and wildlife habitats, copies of any field data collected including field photographs, and GIS data files containing the map polygons for the vegetation and wildlife habitat types identified and mapped in the Project Boundary.

6.5.3 Continued or Proposed PM&E Measures

Because no effects to wildlife resources are expected from continued Project operations or the proposed action, SEAPA is not currently proposing any additional PM&E measures at this time.

6.6 Upland Botanical Resources

6.6.1 Potential Issues and Project Effects

Upland vegetation on the steep slopes of the Tyee Lake perimeter is primarily coniferous forest with a dense shrub understory. This upland vegetation does not rely on Tyee Lake's water levels for survival.

Continued operation of the Project, including a potential lower reservoir level in early spring, before snowmelt, is not expected to adversely affect upland botanical resources in the Project area.

6.6.2 Proposed Studies

As described above in Section 6.5.2, SEAPA intends to acquire aerial imagery of the Project Boundary in 2026. SEAPA proposes to use the aerial imagery to map vegetation communities in the Project Boundary. SEAPA is not proposing any other studies pertaining to upland botanical resources at this time.

6.6.3 Continued or Proposed PM&E Measures

Because no effects to upland botanical resources are expected from continued Project operations or the proposed action, SEAPA is not currently proposing any additional PM&E measures at this time.

6.7 Riparian, Wetland, and Littoral Resources

6.7.1 Potential Issues and Project Effects

Riparian areas occur along Tyee Creek, Hidden Creek, tributaries into Tyee Lake, and along the shorelines of Tyee Lake. The forested areas along the perimeter of Tyee Lake are affected by aquatic interaction.

Limited, if any, littoral habitat occurs around Tyee Lake because of the lake's steep sides; some littoral habitat does occur at the tributary mouths.

The riparian and wetland habitats receive their hydrology primarily from snowmelt, as does Tyee Lake. Continued operation of the Project, including a potential lower reservoir level in early spring, before snowmelt, is not expected to adversely affect riparian or wetland resources in the Project area.

6.7.2 Proposed Studies

As described above in Section 6.5.2, SEAPA intends to acquire aerial imagery of the Project Boundary in 2026. SEAPA proposes to use the aerial imagery to map vegetation communities in the Project Boundary. SEAPA is not proposing any other studies pertaining to riparian, wetland, or littoral resources at this time.

6.7.3 Continued or Proposed PM&E Measures

Because the potential effects of a lower minimum reservoir level to riparian, wetland, and littoral resources are currently unknown, it is premature to define PM&E measures at this time.

6.8 Rare, Threatened, Endangered, and Special-Status Species

6.8.1 Potential Issues and Project Effects

No federally listed wildlife species are known to utilize Tyee Lake; the listed wildlife in the Project area are marine species that can occur in Southeast Alaska. No rare, threatened, or endangered plant species are known to occur in the Project Boundary.

Continued operation of the Project, including a potential lower reservoir level in early spring, before snowmelt, is not expected to negatively affect rare, threatened, endangered, or special status species.

6.8.2 Proposed Studies

SEAPA is not proposing any studies pertaining to rare, threatened, or endangered species resources at this time.

6.8.3 Continued or Proposed PM&E Measures

Because no effects to rare, threatened, or endangered species resources are expected from continued Project operations or the proposed action, SEAPA is not currently proposing any additional PM&E measures at this time.

For the installation of the third turbine, under a separate FERC proceeding, SEAPA has agreed to implement NMFS' recommended mitigation measures to ensure the transport of equipment and supplies would not likely adversely affect the humpback whale ESA-listed Mexico DPS or other marine mammals. These measures are included in the January 27, 2025 filing of the Final Application for Capacity Amendment and the April 14, 2026 FERC order approving the capacity amendment.[5]

[5] FERC Accession Numbers 20250127-5027 and 20260414-3027.

6.9 Recreation and Land Use

6.9.1 Potential Issues and Project Effects

Due to the remote nature of the Project area and limited access, little to no recreation occurs there. There are no Project-related recreation facilities.

Continued operation of the Project, including a potential lower reservoir level in early spring, before snowmelt is not expected to adversely affect recreation or land use resources in the Project area.

6.9.2 Proposed Studies

SEAPA is not proposing any studies pertaining to recreation or land use resources at this time.

6.9.3 Continued or Proposed PM&E Measures

Because no effects to recreation or land use resources are expected from continued Project operations or the proposed action, SEAPA is not currently proposing any additional PM&E measures.

6.10 Aesthetic Resources

6.10.1 Potential Issues and Project Effects

There are currently no known issues related to aesthetic resources at the Project. Continued operation of the Project, including a potential lower minimum reservoir level, is not expected to adversely affect aesthetic resources in the Project area.

6.10.2 Proposed Studies

SEAPA is not proposing any studies pertaining to aesthetic resources at this time.

6.10.3 Continued or Proposed PM&E Measures

Because no effects on aesthetic resources are expected from continued Project operations or the proposed action, SEAPA is not currently proposing any additional PM&E measures.

6.11 Cultural Resources

6.11.1 Potential Issues and Project Effects

As part of this relicensing effort, SEAPA will undergo cultural resources consultation, including identification of the Area of Potential Effect, under the Section 106 process. The Section 106 process (defined at 36 CFR Part 800) is intended to identify and assess the effect of federal undertakings on historic properties through a process of consultation with agency officials, Alaska SHPO, federally recognized Alaska Native Tribes, and other parties with a potential interest in an undertaking's effects on historic properties. SEAPA is not aware of potential adverse effects to archeological and historic resources from the continued operation including a lower minimum reservoir level.

6.11.2 Proposed Studies

To date, SEAPA is not proposing any studies pertaining to cultural resources.

6.11.3 Continued or Proposed PM&E Measures

SEAPA anticipates consultation with the SHPO and Alaska Native Tribes during the relicensing process to determine the need for an Historic Properties Management Plan (HPMP), and if applicable, to develop and implement an HPMP for the term of a new license.

6.12 Tribal Resources

6.12.1 Potential Issues and Project Effects

The Project will undergo cultural resources consultation, including identification of Tribal resources, under the Section 106 process. The Section 106 process (defined at 36 CFR Part 800) is intended to accommodate the management of traditional cultural properties as part of the identification and assessment of the effect of federal undertakings on historic properties through a process of consultation with agency officials, Alaska SHPO, Alaska Native Tribes, and other parties with a potential interest in an undertaking's effects on Tribal resources. SEAPA is not aware of potential adverse effects to traditional cultural properties from continued operation of the Project over the term of the new license.

6.12.2 Proposed Studies

SEAPA is not proposing any studies pertaining to Tribal resources at this time.

6.12.3 Continued or Proposed PM&E Measures

Because no effects to Tribal resources are expected from continued Project operations or the proposed action, SEAPA is not currently proposing any additional PM&E measures.

6.13 Socioeconomics

6.13.1 Potential Issues and Project Effects

There are currently no known issues related to socioeconomic resources at the Project. Continued operation of the Project is not expected to adversely affect socioeconomic resources in the Project area.

6.13.2 Proposed Studies

SEAPA is not proposing any studies pertaining to socioeconomic resources at this time.

6.13.3 Continued or Proposed PM&E Measures

Because no effects on socioeconomic resources are expected from continued Project operations or the proposed action, SEAPA is not currently proposing any additional PM&E measures.

6.14 Relevant Qualifying Federal and State or Tribal Comprehensive Waterway Plans

Section 10(a)(2)(A) of the FPA, 16 USC § 803(a)(2)(A), requires FERC to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway affected by the project. FERC Order No. 481-A, issued on April 27, 1988, established that FERC will accord comprehensive plan status under FPA Section 10(a)(2)(A) to any federal or state plan that: (1) is a comprehensive study of one or more of the beneficial uses of the waterway or waterways; (2) specifies the standards, the data, and the methodology used; and (3) is filed with the Secretary of the Commission.

FERC currently lists 106 comprehensive plans for the State of Alaska (FERC 2025); however, because this list contains some outdated resources, more recent versions of each document have been cited, as appropriate. The following 23 comprehensive plans pertain to the area within the Tyee Lake Project vicinity:

1. Alaska Administrative Code. 2003. 5 AAC § 75.222 Policy for the Management of Sustainable Wild Trout Fisheries. Juneau, Alaska.
2. Alaska Administrative Code. 2012. 5 AAC § 39.222 Policy for the Management of Sustainable Salmon Fisheries. Juneau, Alaska.
3. ADF&G, USFWS, Manomet Center for Conservation Sciences, and Western Hemisphere Shorebird Reserve Network. 2010. Black Oystercatcher (*Haematopus bachmani*) Conservation Action Plan, Version 1.1. Anchorage, Alaska. February 2010.
4. ADF&G. 2022. Technical Guidance and Management Plan for Invasive Northern Pike in Southcentral Alaska: 2022-2023. Anchorage, Alaska.
5. ADF&G. 2024. Alaska Anadromous Waters Catalog - Southeastern Region. Anchorage, Alaska. June 2024.
6. ADF&G. USFWS. 2007. Black Oystercatcher (*Haematopus bachmani*) Conservation Action Plan. Anchorage, Alaska. April 2007.
7. ADNR. 2000. Central/Southern Southeast Area Plan. Anchorage, Alaska. November 2000.
8. ADNR. 2023. Alaska's Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2023-2027 Anchorage, Alaska.
9. Alaska Shorebird Group. 2019. Alaska Shorebird Conservation Plan. Version III. Anchorage, Alaska. April 2019.
10. NMFS. 1991. Final Recovery Plan for the Humpback Whale. Silver Spring, Maryland. November 1991.
11. NMFS. 2008. Recovery Plan for the Steller Sea Lion: Eastern and Western Distinct Population Segments (*Eumetopias jubatus*). National Marine Fisheries Service, Juneau, Alaska. March 2008.
12. NMFS. 2010. Recovery Plan for the Fin Whale. Silver Spring, Maryland. July 2010.
13. NMFS. 2010. Recovery Plan for the Sperm Whale. Silver Spring Maryland. December 2010.
14. National Park Service. 2025. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C.
15. Southeast Alaska Fish Habitat Partnership. 2017. Fish Habitat Conservation Action Plan 2017-2021. Juneau, Alaska. 2017.
16. USFWS, et al. 2008. Alaska Shorebird Conservation Plan. Version II. Anchorage, Alaska. 2008. Updated: April 2019.

17. USFWS. 1994. Conservation Plan for the Sea Otter in Alaska. Anchorage, Alaska. June 1994.
18. USFWS. 1996. Spectacled Eider (*Somateria fischeri*) Recovery Plan. Anchorage, Alaska. August 1996.
19. USFWS. 2002. Steller's Eider (*Polysticta stelleri*) Recovery Plan. Fairbanks, Alaska. September 2002.
20. USFWS. 2005. Regional Seabird Conservation Plan. Pacific Region, Portland, Oregon. January 2005.
21. USFWS. 2009. Alaska Seabird Conservation Plan. Anchorage, Alaska. 2009.
22. USFWS. n.d. Fisheries USA: the Recreational Fisheries Policy of the United States Fish and Wildlife Service. Washington, D.C.
23. USFS. 2016. Tongass National Forest Land and Resource Management Plan. Ketchikan, Alaska. December 2016.

6.15 Relevant Resource Management Plans

Section 10(a)(2)(A) of the FPA, 16 USC § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. The following list names the comprehensive plans that are applicable to the Project. No inconsistencies were found.

- ADF&G. 2025. Moose Management Report and Plan, Game Management Unit 1B: Report Period 1 July 2025-30 June 2020, and Plan Period 1 July 2020-30 June 2025.
- ADF&G. 2021. Black Bear Management Report and Plan, Game Management Unit 1B: Report Period 1 July 2013-30 June 2018, and Plan Period 1 July 2018-30 June 2023.
- ADF&G. 2025. Deer Management Report and Plan, Game Management Unit 1B: Report Period 1 July 2016-30 June 2021, and Plan Period 1 July 2021-30 June 2026.
- ADF&G. 2021. Mountain Goat Management Report and Plan, Game Management Unit 1B: Report Period 1 July 2013-30 June 2018, and Plan Period 1 July 2018-30 June 2023.
- ADF&G. 2025. Wolf Management Report and Plan, Game Management Unit 1B: Report Period 1 July 2025-30 June 2020, and Plan Period 1 July 2020-30 June 2025.

- ADF&G. 2019. Furbearer Management Report and Plan, Game Management Unit 1B: Report Period 1 July 2012-30 June 2017, and Plan Period 1 July 2017-30 June 2022.
- ADF&G. Alaska Wildlife Action Plan. 2015. July 2019.
- ADF&G. 2022. 2022 Spring Troll Fishery Management Plan. Regional Information Report No. 1J22-07.
- ADF&G. 2024 Spring Troll Fishery Management Plan. Regional Information Report No. Draft.
- ADF&G. 2024. 2024 Southeast Alaska Salmon Purse Seine Fishery Management Plan.
- ADF&G. 2024 Southeast Alaska Salmon Drift Gillnet Fishery Management Plan. Regional Information Report No. Draft.
- ADNR. 2016. Southeast State Forest Management Plan. Division of Forestry. February 2016.
- ADNR. 1982. Alaska State Park System: Statewide Framework. June 1982.
- ADNR. 2013. Totem Bight State Historical Park Master Development Plan. June 2013.
- ADNR. 2000. Alaska Recreational Trails Plan. October 2000.
- Alaska State Parks and ADNR. 2006. Alaska State Parks Strategic Plan 2007 – 2017.
- USFS. 2016. Tongass National Forest Land and Resource Management Plan. Ketchikan, Alaska. December 2016.

6.16 References

Federal Energy Regulatory Commission (FERC). 2025. List of Comprehensive Plans. Online [URL]: https://www.ferc.gov/comprehensive-plans. Accessed March 2026.

Viereck, L.A., Dryness C.T., Batten, A.R., and Wenzlick, K.J., 1992, The Alaska vegetation classification: U.S. Department of Agriculture, Forest Service, General Technical Report PNW-GTR-286, 278 p.

Wells, A.F., G.V. Frost, T. Christopherson, and E.R. Trainor. 2014. Ecological land survey and soil landscapes map for Kenai Fjords National Park, Alaska, 2013. Natural Resource Technical Report. NPS/KEFJ/NRTR—2014/921. National Park Service. Fort Collins, Colorado.

APPENDIX A

ORIGINAL LICENSE AND AMENDMENTS

Document Accession #: 20010120-0701 Filed Date: 08/25/1981

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Before Commissioners: Georgiana Sheldon, Matthew Holden, Jr., and J. David Hughes.

Alaska Power Authority) Project No. 3015

ORDER ISSUING MAJOR LICENSE

(Issued August 5, 1981)

The Alaska Power Authority (APA) has filed an application for license for its proposed Tyee Lake Project No. 3015. The project would be located on Tyee Creek approximately 40 miles east-southeast of the City of Wrangell, Alaska near the head of Bradfield Canal and would occupy lands within the Tongass National Forest under the administratin of the United States Forest Service.

APA filed its application for license on December 19, 1979 and substantially revised it on September 8, 1980. The application was circulated for agency comment and given public notice. On February 26, 1980 the staff issued a Draft Environmental Impact Statement (DEIS) analyzing the proposed project. After reviewing the comments submitted on the DEIS and performing further analysis, the staff issued a Final Environmental Impact Statement (FEIS) on June 17, 1981.

Several agencies and groups have filed significant comments on the application and on the DEIS. Their concerns are addressed below. No one has filed a petition to intervene in the proceeding.

PROJECT DESIGN AND OPERATION

The Tyee Lake project would consist of: (1) Tyee Lake with a surface area of 434 acres at normal water surface elevation 1,396 feet mllw; 1/ (2) an intake structure at elevation 1,230 feet mllw; (3) an 8,300-foot long power tunnel; (4) a powerhouse containing two 10,000-kW generating units with provisions for a third unit; (5) a tailrace channel discharging into Airstrip Slough; (6) a switchyard adjacent to the powerhouse; and (7) a 42-mile long, 115-kV transmission system to the Wrangell Substation. There is no dam or spillway proposed as part of the project. A more detailed project description is contained in ordering paragraph (B).

1/ All elevations refer to mean lower low water (mllw) datum where mllw equals mean sea level minus 8.0 feet.

Except for a 400-kW and a 1,600-kW hydroelectric unit owned by the Petersburg Municipal Power and Light Company, the Wrangell-Petersburg areas power requirements are supplied by diesel units. The generating capacity of the proposed Tyee Lake Project, or additional capacity would be required to meet the forecast peak electric energy demand and reserve requirements of the area in 1987.

The Tyee Lake Project would be operated together with the existing hydroelectric units, to generate all the energy requirements of the Cities of Wrangell and Petersburg through the year 2000. 2/ Existing diesel capacity would be maintained to provide standby emergency capacity only. Tyee Lake Reservoir would have a potential operating range from elevations 1,396 to 1,250 feet, which would provide an active storage of 52,400 acre-feet. The reservoir would be operated to store runoff during the summer months and to release regulated flows for power generation throughout the year.

SAFETY AND ADEQUACY

Flows in excess of those that can be used by the generating units will pass through the natural outlet of Tyee Lake. The proposed 115-kV project transmission system leading from the Tyee Lake Powerhouse to the Wrangell Substation would have sufficient capacity to transmit the rated generating capacity of the project. The powerhouse would be founded on rock and would be safe against natural hazards of floods and earthquake.

An approximately 6,000-foot-long span of transmission line conductor would cross Eagle Bay along Bradfield Canal about 770 feet above the surface of the bay. APA reported that the Eagle Bay air corrider is actively used by aircraft in the region. An overhead span would therefore pose a potential hazard to aircraft from the Eagle Bay span. The Department of the Interior recommended that the overhead span not be used. APA stated that the span would be marked with brightly colored markers in accordance with Federal Aviation Administration guidelines and that announcements would be made describing this span and its location would be noted on air navigation charts. Any portion of the transmission line which presents hazards for aircraft should be made plainly visible and should comply with USFS requirements. Article 44 requires APA to conduct a study of the project transmission line including its effects on aircraft safety.

2/ The proposed project with its annual generation of 133,000 Mwh will utilize a renewable resource that will save the equivalent of approximately 245,500 barrels of oil per year.

It is concluded that the project under the conditions of this license, will be safe and adequate.

ECONOMIC FEASIBILITY

The 1984 on-line estimated cost of the project is $64,102,800. The cost of the proposed project was compared to various alternative sources of energy and is more fully described in the FEIS. Alternative sources included hydroelectric (sites other than Tyee Lake), diesel, and woodwaste steam electric. For the period after 1986, the proposed project is economically feasible when compared to diesel fueled generation, the Swan Lake hydroelectric alternative, and the woodwaste generation plant.

WATER QUALITY

Construction activities related to the project power tunnel, powerhouse, tailrace, switchyard, access roads, and construction camp would result in increased levels of suspended material and increased rates of sediment deposition in Airstrip Slough and to a lesser degree on the eastern end of Bradfield Canal. Article 41 requires APA to file with the Commission an erosion control plan. The plan must include an implementation schedule, a maintenance program, and evidence of agency consultation.

During initial project operations clearwater discharges ranging from 150 to 200 cfs from the powerhouse would result in scouring of the slough, which runs through wet lands in the vicinity of the powerhouse and tailrace. Scouring would continue, with consequent increases in the sediment load to Bradfield Canal, until a new equilibrium is established in the slough.

Airstrip Slough would also undergo changes in thermal characteristics. The low-level discharge from Tyee Lake, coupled with the much greater volume of flow from the tailrace in relation to the natural flow of the slough, would result in a drop in summer water temperatures and an increase in winter water temperatures. Considering the volume and exit temperature of the tailrace discharge ice-free conditions should be maintained in Airstrip Slough. Article 42 requires APA to conduct a study of the effects of the project construction and operation on the wetlands in the vicinity of the powerhouse and tailrace. The State of Alaska reviewed APA's application for a water quality certificate, found no evidence to suggest a significant adverse effect on waters of the United States and therefore decided not to act on the application.

FISHERIES

Operation of the project would result in the reduction or elimination of the Tyee Lake grayling population. The existing grayling population has not been utilized by the general fishing public, and thus has had little economic or recreational importance. Mitigative measures discussed by Staff in the FEIS include: (1) maintenance of the existing grayling population by artificial propagation and annual stocking, (2) maintenance of the existing population by manipulation of lake levels or other artificial methods to ensure fish access to spawning streams, or (3) transplantation of the population to another lake in the area.

The project would also result in losses to Tyee Creek salmon and trout populations due to a 92 percent reduction in the flows of the creek as measured at its outlet. Mitigative measures discussed by Staff include: (1) provisions for a minimum flow by diverting a portion of the powerhouse discharge into Tyee Creek, or (2) modification of Airstrip Slough, the tailrace structure, and the energy of the discharge to compensate for lost fishery habitat in Tyee Creek.

Article 43 requires APA to develop a plan to mitigate the effects of project operation on the fishery resources at Tyee Lake and Tyee Creek.

WILDLIFE

Disturbance and probable loss of wildlife would occur during construction of the project, especially in areas of transmission line corridor clearing. In-flight collisions of birds into the transmissions line would result in some bird mortality. Staff, however, believes that APA's proposed routing of the transmission line will satisfactorily minimize such in-flight collisions.

VISUAL RESOURCES

The presense of the project transmission line would result in the aesthetic degradation of visually sensitive areas. Clearing in areas of high visibility should be done in such a way as to minimize such adverse visual impacts. Towers, insulators, fencing, and substations should be dark and nonreflective. Structures, however, presenting hazards to aircraft should be plainly visible to the maximum extent possible. Article 44 requires APA to complete a study of transmission line facilities to minimize significant adverse impacts to the existing visual environment and aircraft safety.

FOREST RESOURCES

Construction of the project would result in the loss of approximately 490 acres of commercial forest land. In locating the final transmission line alignment, low or nonproductive timber sites should be used. The alignment should not preclude the opportunity for management of previously harvested timber lands and should be chosen to protect timber resources and allow for long sections of minimal or no clearing. Article 38 requires APA to file with the Commission a plan and implementation schedule for the collection and disposal of such timber.

CULTURAL RESOURCES

The project does not affect any sites included in or being considered for inclusion in the National Registry of National Landmarks on the National Register of Historic Places. APA has stated that it would avoid any known or newly discovered cultural properties during construction and operation of the project. The Alaska State Historic Preservation Officer (SHPO) concurs with APA's proposal. Article 40 requires that APA implement an acceptable cultural resources management plan for the project.

RECREATION

APA's recreation plan for the project proposes limited recreational facilities at the project powerhouse site. The U. S. Forest Service (USFS) which administers much of the land in the project area has stated that due to its inaccessibility, Tyee Lake and its surrounding area has limited potential for recreational development. USFS believes that other sites along the Bradfield Canal offer more potential for recreational development, but that current demands on the canal area are met by existing USFS facilities.

It appears that other project lands away from Tyee Lake along the transmission line corridor may be more suitable for development. Article 39, requires APA, following consultation with state agencies, to file a revised Exhibit R, if needed, describing any changes in proposed recreational development.

OTHER ENVIRONMENTAL CONSIDERATIONS

Both hydroelectric and nonhydroelectric alternatives to the proposed Tyee Lake Development were considered by the Commission's staff. The staff-developed alternative was found to be a viable hydroelectric alternative and a woodwaste generation plant was found to be a viable nonhydroelectric alternative.

The Swan Lake alternative is located on Thomas Bay about 16.5 air miles northeast of Petersburg. It would require a lake tap intake structure similar to that proposed at Tyee Lake and would require

18 miles of overhead and 4 miles of submarine transmission line from the project to Petersburg, plus 39 miles of transmission line between Petersburg and Wrangell. Unavoidable adverse construction impacts resulting from development of Swan Lake would be essentially equivalent to those described for the Tyee Lake Project. Development of Swan Lake, however, would result in the probable loss of recreational resources and the loss of an important rainbow trout fishery at Swan Lake. The Tyee Lake Project with appropriate mitigative measures would therefore be environmentally superior to the Swan Lake alternative.

A woodwaste generation alternative would probably be located near Wrangell and would require a 35-acre site. Air and water quality perturbations associated with woodwaste generation, however, could result in unacceptable levels of environmental disruption, considering the probable plant proximity to either Wrangell or Petersburg.

Considering all factors, we conclude that a Swan Lake hydroelectric plant or a woodwaste plant are inferior alternatives to the Tyee Lake project. We therefore find that licensing of the Tyee Lake Project is in the public interest.

OTHER ASPECTS OF COMPREHENSIVE DEVELOPMENT

The Tyee Lake project has the capability of using all the water entering Tyee Lake except occasional flood flows. The project would make good use of the waters of Tyee Lake, and would not conflict with any planned development. We conclude that the project, subject to the terms and conditions of this license, is best adapted to the comprehensive development of the basin under present conditions.

ANNUAL CHARGES

For the purpose of reimbursing the United States for the cost of administration of Part I of the Federal Power Act, APA is being assessed annual charges. The authorized installed capacity for this purpose is 26,700 horsepower. Additional charges are being assessed for the use and occupancy of federal lands. These charges are provided for in Article 33.

LICENSE TERM

The proposed Tyee Lake project is a major unconstructed project. In accordance with our usual policy, this license will be issued for a term of 50 years, effective the first day of the month in which the license is issued.

The Commission orders:

(A) A license is issued to the Alaska Power Authority (Licensee) under Part I of the Federal Power Act (Act) for a period of 50 years, effective the first day of the month in which this license is issued, for the construction, operation, and maintenance of the Tyee Lake Project, FERC Project No. 3015, located on Tyee Creek approximately 40 miles from the City of Wrangell, Alaska. This license is subject to the terms and conditions of the Act, which is incorporated by reference as part of this license, and to the regulations the Commission issues under the provisions of the Act.

(B) The Tyee Lake Project consists of:

(i) All lands constituting the project area and enclosed by project boundary, to the extent of the Licensee's interests in those lands. The project area and the project boundary are generally described by the exhibits of the application for license as follows:

Exhibit	FERC Drawing No. 3015-	Titled
J-1	1	General Arrangement
J-2	2	General Arrangement
K-3	31	Transmission Corridor
K-4	32	Transmission Corridor
K-5	33	Transmission Corridor
K-6	34	Transmission Corridor
K-7	23	Tyee Lake

(ii) Project works consisting of: (1) Tyee Lake with a surface area of 434 acres and a usable storage capacity of 52,400 acre-feet between the natural surface elevation of 1,396 feet and a minimum surface elevation of 1,250 feet; (2) a power tunnel, approximately 8,300 feet long and 10 feet in diameter leading from an intake structure in Tyee Lake at elevation 1,230 feet to the powerhouse where it would trifurcate into 3 penstocks; (3) a surface powerhouse containing two 10,000-kW generating units with provisions for a third unit; (4) a 1,100-foot-long tailrace channel discharging into Airstrip Slough; (5) a 13.8/115-kV switchyard adjacent to the powerhouse; (6) a 115-kV transmission system consisting of 40 miles of overhead line and 2 miles of submarine cables, leading from the powerhouse switchyard to the Wrangell Substation; and (7) appurtenant facilities.

The location, nature and character of these project works is specifically shown and described by the exhibits cited above and more specifically described by the following exhibits.

Exhibit	FERC Drawing No. 3015-	Titled
L-1	24	Power Tunnel Profile and Sections
L-2	25	Power Tunnel Intake Structure
L-3	26	Powerhouse Site Plan
L-4	27	Powerhouse General Arrangement Plan
L-5	28	Powerhouse General Arrangement Sections
L-6	29	Powerhouse Switchyard General Arrangment
L-10	30	Reservoir Area & Capacity Curves

Exhibit M: Nine typewritten pages of text entitled "General Description of the Mechanical and Electrical Equipment, and the Transmission Line" filed on September 8, 1980.

Exhibit S: Fifteen typewritten pages of text and a 38 page appendix.

(iii) All of the structures, fixtures, equipments, or facilities used or useful in the maintenance and operation of the project and located in the project area, and any other property used or useful in connection with the project or any part of it; together with all riparian or other rights, the use or possession of which is necessary or appropriate in the maintenance or operation of the project.

(C) This license is subject to Articles 1 through 32 set forth in FERC Form L-2 (Revised October 1975) entitled "Terms and Conditions of the License for Unconstructed Major Project Affecting Lands of the United States," which are attached to and made a part of this license. This license is also subject to the following special conditions set forth as additional articles:

Article 33. The Licensee shall pay the United States the following annual charge, effective as of the first day of the month in which this license is issued:

(a) for the purpose of reimbursing the United States for the cost of administration of Part I of the Act, a reasonable annual charge as determined by the Commission in accordance with the provisions of its regulations, in effect from time to time. The authorized installed capacity for such purpose is 26,700 horsepower.

(b) for the purpose of recompensing the United States for the use, occupancy and enjoyment of its lands an amount to be determined later.

Article 34. The Licensee shall file with the Commission's Regional Engineer in San Francisco, California, and the Director, Office of Electric Power Regulation one copy each of the contract drawings and specifications for pertinent features of the project, such as water retention structures, powerhouse, and water conveyance structures, at least 30 days prior to the start of construction. The Director, Office of Electric Power Regulation may require changes in the plans and specifications to assure a safe and adequate project.

Article 35. The Licensee shall commence construction of the project within two years from the effective date of the license and shall thereafter in good faith and with due diligence prosecute such construction and shall complete construction of such project works within five years from the effective date of the license.

Article 36. The Licensee within 6 months following the date of commencement of operation of the project shall file a revised Exhibit F and, for approval, "as built" Exhibits J, K, and L to show the project as finally constructed and located.

Article 37. The Licensee shall retain a Board of three or more qualified, independent, engineering consultants to review the design, specifications, and construction of the project for safety and adequacy. The names and qualifications of the Board members shall be submitted to the Director, OEPR, for approval. Among other things, the board shall assess the geology; the design, specifications, and construction of the power tunnel, power tunnel intake, and powerhouse; electrical and mechanical equipment involved in water control and emergency power supply; instrumentation; the construction inspection program; and construction procedures and progress. The Licensee shall submit to the Commission copies of the Board's Report on each meeting. Reports reviewing each portion of the project shall be submitted prior to or simultaneously with the submission of the corresponding Exhibit L final design drawings. The Licensee shall also submit a final report of the Board upon completion of the project. The final report shall contain a statement indicating the Board's satisfaction with the construction, safety, and adequacy of the project structures.

Article 38. The Licensee shall, after consultation with the U.S. Forest Service and the Alaska Department of Public Health, and 30 days prior to beginning construction of the powerhouse, power tunnel, tailrace, and clearing of the transmission line right-of-way, develop and file with the Commission's Regional Engineer in San Francisco, and the Director, Office of Electric Power Regulation, a comprehensive plan for collection and disposal of sanitary and solid wastes to include, but not be limited to, excavated material and non-merchantable timber, during construction and operation of the project. The Director may require changes in the plan to protect the environment of the area.

Article 39. The Licensee shall consult with the U.S. Forest Service and the Alaska Department of Natural Resources concerning the need, if any, to revise plans for recreational development at the project. Licensee, within 1 year from the date of issuance of this license, shall file with the Commission the results of its consultation with the above agencies, and for approval a Revised Exhibit R, if needed, describing any changes in the proposed recreational development for the project.

Article 40. The Licensee, at least 60 days prior to any ground-disturbing activity at the project, shall file a cultural resource management plan for Commission review that describes: (1) procedures which would be employed to avoid impacts to archeological and historic sites; and (2) the monitoring program to avoid and mitigate impacts at direct impact areas which have been noted as having potential for subsurface archeological deposits. This plan should be site-specific, and be prepared in consultation with the Alaska State Historic Preservation Officer (SHPO). If any previously unrecorded archeological or historic sites are discovered during the course of construction or development of any project works or other facilities at the project, construction activity in the vicinity shall be halted, a qualified archeologist shall be consulted to determine the significance of the sites, and the Licensee shall consult with the SHPO to develop a management plan for protection of significant archeological or historical resources. If the Licensee and the SHPO cannot agree on the amount of money to be expended on archeological or historical work related to the project, the Commission reserves the right to require the Licensee to conduct, at its own expense, any such work found necessary.

Article 41. The Licensee, in consultation with the U.S. Forest Service, the Alaska Department of Fish and Game, and the U.S. Army Corps of Engineers, shall prepare and file with the Commission's Regional Engineer in San Francisco, California, and the Director, Office of Electric Power Regulation, at least 30 days prior to any ground disturbing activity or spoil disposal, a detailed plan to control soil erosion, dust, and slope stability, and to minimize the quantity of inorganic sediment or other potential water pollutants resulting from construction

and operation of project facilities. This plan shall include an implementation schedule, maintenance program, and evidence of agency consultation. The Director, Office of Electric Power Regulation, may require changes in the plan to minimize erosion, dust, sedimentation, water pollution, or slope stability problems.

Article 42. The Licensee, in consultation with the Alaska Department of Fish and Game, the U.S. Forest Service, the U.S. Army Corps of Engineers, the U.S. Fish and Wildlife Service, and the National Marine Fisheries Service, shall develop a plan to minimize effects of project construction and operation on the wetlands in the vicinity of the proposed powerhouse and tailrace. The Licensee, at least 60 days prior to any ground-disturbing activities in the wetlands, shall file this plan with the Commission along with comments on the plan by the consulted agencies.

Article 43. The Licensee, in consultation with the Alaska Department of Fish and Game, the U.S. Forest Service, the National Marine Fisheries Service, and the U.S. Fish and Wildlife Service, shall develop a plan to mitigate the effects of project operation on the fishery resources of Tyee Lake and Tyee Creek. This plan shall include recommendations regarding mitigation of loss to the Tyee Lake Arctic grayling population, to include the practicality and cost of establishing a grayling population in another lake in the area, and recommendations regarding the most practical and effective means of mitigating the loss of fishery resources in Tyee Creek, downstream of the falls, to include possible use of the tailrace or Airstrip Slough as replacement fishery habitat. Licensee, within 1 year from the date of issuance of this license, shall file this plan with the Commission for approval, along with comments on the plan by the consulted agencies.

Article 44. The Licensee, within six months from the date of issuance of this license, and in consultation with the Supervisor, Tongass National Forest of the U.S. Forest Service, the Federal Aviation Administration, and the Alaska Department of Transportation and Public Facilities, shall complete a study of the location, design, construction and maintenance procedures of all transmission line facilities, including rights-of-way, submarine cable terminals, and high aerial crossings, to include the crossing over Eagles Bay on Bradfield Canal, and near the Orion Triangulation Station on Eastern Passage. That study shall address the need to prevent, or minimize to the extent possible, significant adverse impacts to the existing visual environment and aircraft safety. Licensee, within six months from the date of issuance of this license, shall file a report on the results of that study, to include documentation of consultation and subsequent recommnedation. The Commission reserves the right to require modification of transmission line facilities with regard to visual resources and aircraft safety.

Article 45. (a) In accordance with the provisions of this article, the Licensee shall have the authority to grant permission for certain types of use and occupancy of project lands and waters and to convey certain interests in project lands and waters for certain other types of use and occupancy, without prior Commission approval. The Licensee may exercise the authority only if the proposed use and occupancy is consistent with the purposes of protecting and enhancing the scenic, recreational, and other environmental values of the project. For those purposes, the Licensee shall also have continuing responsibility to supervise and control the uses and occupancies for which it grants permission, and to monitor the use of, and ensure compliance with the covenants of the instrument of conveyance for, any interests that it has conveyed, under this article. If a permitted use and occupancy violates any condition of this article or any other condition imposed by the Licensee for protection and enhancement of the project's scenic, recreational, or other environmental values, or if a covenant of a conveyance made under the authority of this article is violated, the Licensee shall take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, cancelling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The types of use and occupancy of project lands and waters for which the Licensee may grant permission without prior Commission approval are: (1) landscape plantings; (2) non-commercial piers, landings, boat docks, or similar structures and facilities; and (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the Licensee shall require multiple use and occupancy of facilities for access to project lands or waters. The Licensee shall also ensure, to the satisfaction of the Commijssion's authorized representative, that the uses and occupancies for which it grants permission are maintained in good repair and comply with applicable State and local health and safety requirements. Before granting permission for construction of bulkheads or retaining walls, the Licensee shall: (1) inspect the site of the proposed construction, (2) consider whether the planting of vegetation or the use of riprap would be adequate to control erosion at the site, and (3) determine that the proposed construction is needed and would not change the basic contour of the reservoir shoreline. To implement this paragraph (b), the Licensee may, among other things, establish a program for issuing permits for the specified types of use and occupancy of project lands and waters, which may be subject to the payment of a reasonable fee to cover the Licensee's costs of administering the permit program. The Commission reserves the right to require the Licensee to file a description of its

standards, guidelines, and procedures for implementing this paragraph (b) and to require modifications of those standards, guidelines, or procedures.

(c) The Licensee may convey easements or rights-of-way across, or leases of, project lands for: (1) replacement expansion, realignment, or maintenance of bridges and roads for which all necessary State and Federal approvals have been obtained; (2) storm drains and water mains; (3) sewers that do not discharge into project waters; (4) minor access roads; (5) telephone, gas, and electric utility distribution lines; (6) non-project overhead electric transmission lines that do not require erection of support structures within the project boundary; (7) submarine, overhead, or underground major telephone distribution cables or major electric distribution lines (69-kV or less); and (8) water intake or pumping facilities that do not extract more than one million gallons per day from a project reservoir. No later than January 31 of each year, the Licensee shall file three copies of a report briefly describing for each conveyance made under this paragraph (c) during the prior calendar year, the type of interest conveyed, the location of the lands subject to the conveyance, and the nature of the use for which the interest was conveyed.

(d) The Licensee may convey fee title to, easements or rights-of-way across, or leases of project lands for: (1) construction of new bridges or roads for which all necessary State and Federal approvals have been obtained; (2) sewer or effluent lines that discharge into project waters, for which all necessary Federal and State water quality certificates or permits have been obtained; (3) other pipelines that cross project lands or waters but do not discharge into project waters; (4) non-project overhead electric transmission lines that require erection of support structures within the project boundary, for which all necessary Federal and State approvals have been obtained; (5) private or public marinas that can accommodate no more than 10 watercraft at a time and are located at least one-half mile from any other private or public marina; (6) recreational development consistent with an approved Exhibit R or approved report on recreational resources of an Exhibit E; and (7) other uses, if: (i) the amount of land conveyed for a particular use is five acres or less; (ii) all of the land conveyed is located at least 75 feet, measured horizontally, from the edge of the project reservoir at normal maximum surface elevation; and (iii) no more than 50 total acres of project lands for each project development are conveyed under this clause (d)(7) in any calendar year. At least 45 days before conveying any interest in project lands under this paragraph (d), the Licensee must file a letter to the Director, Office of Electric Power Regulation, stating its intent to convey the interest and briefly describing the type of interest and location of the lands to be conveyed (a marked Exhibit G or K map may be used), the nature of the proposed use, the identity of any Federal

or State agency official consulted, and any Federal or State approvals required for the proposed use. Unless the Director, within 45 days from the filing date, requires the Licensee to file an application for prior approval, the Licensee may convey the intended interest at the end of that period.

(e) The following additional conditions apply to any intended conveyance under paragraphs (c) or (d) of this article:

(1) Before conveying the interest, the Licensee shall consult with Federal and State fish and wildlife or recreation agencies, as appropriate, and the State Historic Preservation Officer.

(2) Before conveying the interest, the Licensee shall determine that the proposed use of the lands to be conveyed is not inconsistent with any approved Exhibit R or approved report on recreational resources of an Exhibit E; or, if the project does not have an approved Exhibit R or approved report on recreational resources, that the lands to be conveyed do not have recreational value.

(3) The instrument of conveyance must include convenants running with the land adequate to ensure that: (i) the use of the lands conveyed shall not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; and (ii) the grantee shall take all reasonable precautions to ensure that the construction, operation, and maintenance of structures or facilities on the conveyed lands will occur in a manner that will protect the scenic, recreational, and environmental values of the project.

(4) The Commission reserves the right to require the Licensee to take reasonable remedial action to correct any violation of the terms and conditions of this article, for the protection and enhancement of the project's scenic, recreational, and other environmental values.

(f) The conveyance of an interest in project lands under this article does not in itself change the project boundaries. The project boundaries may be changed to exclude land conveyed under this article only upon approval of revised Exhibit G or K drawings (project boundary maps) reflecting exclusion of that land. Lands conveyed under this article will be excluded from the project only upon a determination that the lands are not necessary for project purposes, such as operation and maintenance, flowage, recreation, public access, protection of environmental resources, and shoreline control, including shoreline aesthetic

values. Absent extraordinary circumstances, proposals to exclude lands conveyed under this article from the project shall be consolidated for consideration when revised Exhibit G or K drawings would be filed for approval for other purposes.

(D) This order is final unless an application for rehearing is filed within 30 days from the date of its issuance, as provided in Section 313(a) of the Act. The filing of an application for rehearing does not operate as a stay of the effective date of this license or of any other date specified in this order, except as specifically ordered by the Commission. Failure of the Licensee to file an application for rehearing shall constitute acceptance of this license. In acknowledgment of acceptance of this license, the license shall be signed for the Licensee and returned to the Commission within 60 days from the date of issuance of this order.

By the Commission.

(S E A L)

Kenneth F. Plumb,
Secretary.

IN TESTIMONY of its acknowledgment of acceptance of all of the terms and conditions of this order, Alaska Power Authority this _____ day of _____, 1981, has caused its corporate name to be signed hereto by _____ its _____ Director, and its corporate seal to be affixed hereto and attested by _____ its, _____ Secretary, pursuant to a resolution of its Board of Directors duly adopted on the _____ day of _____, 19 __, a certified copy of the record of which is attached hereto.

Alaska Power Authority

By _____
Director

Attest:

_____
Secretary

Document Accession #: 20010120-0701 **Filed Date: 08/25/1981**

Document Content(s)

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Alaska Power Authority) Project No. 3015-001

ORDER APPROVING "AS-BUILT" EXHIBITS

(Issued February 28, 1986)

On August 5, 1981, a license was issued for the Tyee Lake Project No. 3015, located on Tyee Creek near the City of Wrangell, Alaska.

On December 24, 1984, the Licensee filed a revised Exhibit F and for approval "as-built" Exhibt M and Exhibit J, K, and L drawings in compliance with Article 36 of the license.

The "as-built" exhibits have been examined and found to conform to the Commission's Rules and Regulations.

Annual Charges:

Article 33 of the license will be revised to show the exact acreage of U.S. lands occupied by the project. The Licensee will be billed for occupancy of U.S. lands by the project, as set by Article 33, since August 1, 1981, the effective date of the license.

Approval of the "as-built" Exhibits and the amendment of the annual charge article, to reflect the amount of lands occuped by the project, is an administrative action and is not a major Federal action significantly affecting the quality of the human environment.

The Director orders:

(A) Paragraph B(ii) of the license for Project No. 3015 is revised, in part, as follows:

...(5) a 13.8/138-kV switchyard adjacent to the powerhouse; (6) a 138-kV transmission system consisting of 69 miles of overhead transmission line and 12 miles of submarine cables, leading from the powerhouse switchyard to the City of Wrangell and between the City of Wrangell and the City of Petersburg...

(B) Subparagraphs (ii) and (iii) of Article 33 of the license for Project No. 3015 are revised as follows:

(ii) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of 1,150 acres of its lands exclusive of those used for transmission line right-of-way, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time.

DC-A-7

(iii) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of 757.94 acres of its lands for transmission line right-of-way only, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time.

(C) The following Exhibits are approved and made a part of the license for FERC Project No. 3015 superseding the indicated exhibits:

Exhibit M - General Descriptions of Mechanical, Electrical, and Transmission Line consisting of 7 typewritten pages; filed December 24, 1984, superseding the Exhibit M approved in the license on August 5, 1981.

EXHIBIT	FERC DRAWING NO. 3015-	SHOWING	SUPERSEDING FERC DRAWING NO. 3015-
J-1	36	Project Facilities General Arrangements	1
J-2	37	Project Facilities General Arrangements	2
K-1	38	Transmission Line	31, 32, 33
K-2	39	Transmission Line	31, 32, 33
K-3	40	AS-BUILT EASEMENT DIAGRAM - ADL NO. 103426 PROTRACTED SECTION 2	
K-4	41	AS-BUILT EASEMENT DIAGRAM - ADL NO. 103426 PROTRACTED SECTIONS 27 AND 36	
K-5	42	AS-BUILT EASEMENT DIAGRAM - ADL NO. 103426 PROTRACTED SECTION 22	
K-6	43	PROJECT AREA	23, 34
K-7	44	Shoemaker Bay-Wrangell 138-kV T/L Alignment Details	
K-8	45	Shoemaker Bay-Wrangell 138-kV T/L Alignment Details	
L-1a	46	Power Tunnel Plan & Profile	24

EXHIBIT	FERC DRAWING NO. 3015-	SHOWING	SUPERSEDING FERC DRAWING NO. 3015-
L-1b	47	Power Tunnel Sections	
L-1c	48	Power Tunnel Pressure Shaft Sections	
L-2a	49	Power Tunnel Intake Plan	
L-2b	50	Power Tunnel Intake Sections	
L-3a	51	Powerhouse Site Plan	26
L-3b	52	Tailrace Channel General Arrangement	
L-4a	53	Powerhouse General Arrangement Plan at El. 20.00	27
L-4b	54	Powerhouse General Arrangement Plan at Machine Floor El. 33.00	
L-4c	55	Powerhouse General Arrangement Plan at Machine Floor El. 33.00	
L-4d	56	Powerhouse General Arrangement Plan at Generator Floor El. 43.50	
L-5a	57	Powerhouse General Arrangement Transverse Sections	28
L-5b	58	Powerhouse General Arrangement Longitudional Section, 1 of 2	

EXHIBIT	FERC DRAWING NO. 3015-	SHOWING	SUPERSEDING FERC DRAWING NO. 3015-
L-5c	59	Powerhouse General Arrangement Longitudional Section, 2 of 2	
L-6a	60	Tyee Lake Switchyard General Arrangement Plan	29
L-6b	61	Switchyard General Arrangement Sections and Details	

(D) Within 90 days from the date of this order the Licensee must file with the Commission's Secretary one original and one Diazo-type duplicate aperture card showing the approved Exhibit drawings. The originals must be reproduced on silver or gelatin 35 mm microfilm and mounted on Type D (3 1/4" x 7 3/8") aperture cards. The Licensee must also submit at the same time Diazo-type duplicate aperture cards to the Commission's Portland Regional Office. The FERC drawing numbers shall be shown in the margin below the title block of the microfilmed drawings and in the upper right corner of the aperture cards.

(E) This order is issued under authority delegated to the Director and is final unless appealed to the Commission under Rule 1902 within 30 days from the date of this order. Failure to file a petition appealing this order to the Commission shall constitute acceptance of this order.

Fred E. Springer

Fred E. Springer
Director, Division of
Project Management

146 FERC ¶ 62,161
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Southeast Alaska Power Agency P-3015-015

ORDER REVISING ANNUAL CHARGES

(Issued March 5, 2014)

1. On January 13, 2014, the Southeast Alaska Power Agency, licensee for the Tyee Lake Project, FERC No. 3015, filed a request to revise the annual charges under Article 33 of its license.[1] The project is located on Tyee Creek in Wrangell Borough, Alaska and occupies federal lands administered by the U.S. Forest Service within the Tongass National Forest.

Background

2. Article 33 of the license states that the project occupies a total of 1,907.94 acres of federal lands.[2] This acreage includes lands administered by the U.S. Forest Service as well as lands subject to a power site reservation under Section 24 of the Federal Power Act (Act).[3] Article 33 of the license requires, in part, that the licensee pay the United States the following annual charges, effective the first day of the month in which the license was issued:

> (ii) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of 1,150 acres of its lands exclusive of those used for transmission line right-of-way, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time.
>
> (iii) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of 757.94 acres of its lands for transmission line right-of-way only, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time.

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[1] *Alaska Power Authority*, 16 FERC ¶ 61,112 (1981).

[2] *Alaska Power Authority,* 34 FERC ¶ 62,429 (1986).

[3] 16 U.S.C. § 818 (2012).

3. By order issued March 21, 2013, the Commission announced that it "will no longer assess annual charges with respect to former federal lands included within the boundaries of hydropower projects as to which a section 24 reservation obtains [*sic*]."[4] In response to this order, the licensee is requesting the removal of 1,460.2 acres of former federal land subject to a power site reservation under section 24 of the Act from those lands designated as lands of the United States in Article 33(ii) and (iii) of its license.

Review

4. The Commission's records indicate the project occupies 1,907.94 acres of federal land. However, the licensee's application utilized data from a more accurate digital elevation model showing that the project occupies a total of 2,634.6 acres of federal lands and lands with a power site reservation. Also included in the application were copies of land transfer documents that show the United States transferred 1,460.2 acres of land occupied by the project to the state of Alaska. Based on this information, we find that the land ownership has been properly documented and totaled and the project currently occupies 1,174.4 acres of federal land, all of which is located within the transmission line right-of-way. Therefore, ordering paragraph (A) of this order revises license Article 33 to reflect the removal of the licensee's obligation to pay annual charges on those lands owned by the state of Alaska with a power site reservation.

5. The licensee also provided a revised Exhibit K which includes a table quantifying the amount of federal land occupied by the project as well as non-federal land with and without a power site reservation. However, these drawings do not clearly show which lands within the project boundary are federal lands or non-federal lands with or without a power site reservation. Therefore, we will require the licensee to file revised Exhibit K drawings which include this information and conform to the Commission's current standards. The licensee should also continue to identify these lands on other related project documents.

The Director orders:

(A) Article 33 of the license is amended, in part, to read as follows:

(ii) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of 0 acres of its lands exclusive of those used for transmission line right-of-way, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The project occupies 1204 acres of section 24 lands

[4] *See Power Site Reservation Fees Group*, 142 FERC ¶ 61,196, at P 7 (2013).

outside a transmission line right-of-way. Under the Commission's policy currently in effect, projects occupying section 24 lands will not be assessed an annual charge for use of those lands.

(iii) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of 1,174.4 acres of its lands for transmission line right-of-way only, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The project occupies 2,634.6 acres of federal lands (1,460.2 acres of which are section 24 lands). Under the Commission's policy currently in effect, projects occupying section 24 lands will not be assessed an annual charge for use of those lands.

(B) Within 45 days of the date of issuance of this order, the licensee shall file, for Commission approval, revised Exhibit K drawings which identify federal lands and non-federal lands with a power site reservation that are occupied by the project. The licensee shall also revise the drawings to conform to the Commission's current regulations at 18 CFR sections 4.39 and 4.41(h).

(C) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 825*l* (2012), and the Commission's regulations at 18 C.F.R. § 385.713 (2013). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Charles K. Cover, P.E.
Chief, Project Review Branch
Division of Hydropower Administration
and Compliance

Document Accession #: 20140305-3038 **Filed Date: 03/05/2014**

Document Content(s)

P-3015-015.DOCX.....1

Document Accession #: 20140321-3025 Filed Date: 03/21/2014

146 FERC ¶ 62,206
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Southeast Alaska Power Agency Project No. 3015-016

ORDER APPROVING EXHIBIT L DRAWING

(Issued March 21, 2014)

1. On February 6, 2014, Southeast Alaska Power Agency (SEAPA), licensee for the Tyee Lake Hydroelectric Project, FERC No. 3015, [1] filed an Exhibit L drawing for the as-built spillway weir for approval. The project is located on Tyee Creek in Wrangell Borough, Alaska and occupies federal lands administered by the U.S. Forest Service within the Tongass National Forest.

Background

2. The spillway weir was constructed to measure outflows from the lake, as required by standard Article 8 of the license. The construction of the spillway weir was completed in October 2013.

Review

3. The Exhibit L drawing reflects the as-built outlet weir as required. The Exhibit L drawing submitted conform to the Commission's rules and regulations and is approved by this order, as shown in ordering paragraph (A).[2] In ordering paragraph (B), we are requiring the licensee to file the approved exhibit drawing in aperture card and electronic file formats.

The Director orders:

(A) The following Exhibit L drawing conforms to the Commission's rules and regulations, and is approved and made part of the license:

[1] *Alaska Power Authority*, 16 FERC ¶ 61,112 (1981).

[2] Since Exhibit L-10 is the last in the series for Exhibit L drawings under the license, we are assigning L-11 to this as-built drawing.

Exhibit	FERC Drawing No.	FERC Superseded Drawing No.	Title
L-11	3015-64	None	Lake Outlet Weir - Plan and Elevation

(B) Within 45 days of the date of issuance of this order, the licensee shall file the approved exhibit drawings in aperture card and electronic file formats.

a) Three sets of the approved exhibit drawings shall be reproduced on silver or gelatin 35mm microfilm. All microfilm shall be mounted on type D (3-1/4" x 7-3/8") aperture cards. Prior to microfilming, the FERC Project-Drawing Number (i.e., P-3015-64) shall be shown in the margin below the title block of the approved drawing. After mounting, the FERC Drawing Number shall be typed on the upper right corner of each aperture card. Additionally, the Project Number, FERC Exhibit (i.e., L-11), Drawing Title, and date of this order shall be typed on the upper left corner of each aperture card.

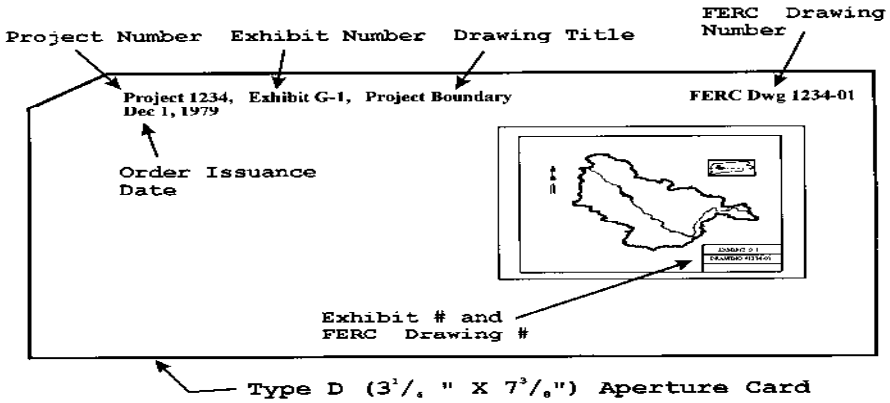

Figure 1. Sample Aperture Card Format

Two of the sets of aperture cards shall be filed with the Secretary of the Commission, ATTN: OEP/DHAC. The third set shall be filed with the Commission's Division of Dam Safety and Inspections Portland Regional Office.

b) The licensee shall file two separate sets of exhibit drawings in electronic raster format with the Secretary of the Commission, ATTN: OEP/DHAC. A third set shall be filed with the Commission's Division of Dam Safety and Inspections Portland Regional Office. Exhibit F drawings must be segregated from other project exhibits, and identified as **(CEII) material under 18 CFR §388.113(c).** Each drawing must be a separate electronic file, and the file name shall include: FERC Project-Drawing Number, FERC Exhibit, Drawing Title, date of this order, and file extension in the following format [P-3015-64, L-11, Lake Outlet Weir - Plan and Elevation, MM-DD-YYYY.TIF]. Electronic drawings shall meet the following format specification:

IMAGERY - black & white raster file
FILE TYPE – Tagged Image File Format, (TIFF) CCITT Group 4
RESOLUTION – 300 dpi desired, (200 dpi min)
DRAWING SIZE FORMAT – 24” x 36” (min), 28” x 40” (max)
FILE SIZE – less than 1 MB desired

(C) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 825*l* (2012), and the Commission’s regulations at 18 C.F.R. § 385.713 (2013). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee’s failure to file a request for rehearing shall constitute acceptance of this order.

Kelly Houff
Chief, Engineering Resources Branch
Division of Hydropower Administration
and Compliance

Document Accession #: 20140321-3025 **Filed Date: 03/21/2014**

Document Content(s)

p-3015-016.DOC.....1

147 FERC ¶ 62,058
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Southeast Alaska Power Agency Project No. 3015-017

ORDER APPROVING REVISED EXHIBIT J AND K DRAWINGS

(Issued April 22, 2014)

1. On April 14, 2014, Southeast Alaska Power Agency, licensee for the Tyee Lake Project, FERC Project No. 3015, filed revised Exhibit K drawings pursuant to ordering paragraph (B) of an Order Revising Annual Charges.[1] The project is located on Tyee Creek in Wrangell Borough, Alaska. The project occupies federal lands administered by the U.S. Forest Service within the Tongass National Forest.

Background

2. Ordering paragraph (B) states that within 45 days of issuance, the licensee shall file, for Commission approval, Exhibit K drawings which identify federal lands and non-federal lands with a power site reservation (Section 24 lands) that are occupied by the project. The licensee shall also revise the drawings to conform to the Commission's current regulations at 18 CFR sections 4.39 and 4.41(h). [2]

3. On April 14, 2014, the licensee submitted the required exhibits and requested that Article 33 of the license[3] be revised based on further modifications and new area calculations made by the licensee's land surveyor.

Review

4. We reviewed the revised Exhibit J and K drawings and found they accurately show all principal works necessary for the operation and maintenance of the project. In addition, the Exhibit K drawings identify federal lands and non-federal lands with a power site reservation that are occupied by the project. We georeferenced the Exhibit K drawings and found them in agreement with our current mapping requirements.

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[1] 146 FERC ¶ 62,161 (2014).

[2] 18 C.F.R. §§ 4.39 and 4.41 (2013).

[3] 16 FERC ¶ 61,112 (1981).

5. In reviewing the Exhibit K drawings, we determined that Exhibit K-1 does not include a note/table stating the total acreages of federal and section 24 lands occupied by the project. Ordering paragraph (A) requires the licensee to provide a note/table displaying the amount of non-transmission line federal and section 24 lands, as well as, transmission line federal and section 24 lands occupied by the project. The revised exhibits conform to the Commission's rules and regulations, and are approved, as modified by this order. In ordering paragraph (C) we are requiring the licensee to file the approved drawings in aperture card and electronic file formats.

6. With regards to the licensee's request to amend annual charges, the Commission will determine the acreage for amended Article 33 of the license upon receipt of the information required by ordering paragraph (A) and verified by the Geographic Information Systems (GIS) data required by ordering paragraph (C) of this order.

The Director orders:

(A) The licensee shall add a note/table to Exhibit K-1 to display the acreage totals for:

1) Non-transmission line federal lands occupied by the project.
2) Non-transmission line section 24 lands occupied by the project
3) Transmission line federal lands occupied by the project
4) Transmission line section 24 lands occupied by the project

(B) The following exhibit drawings, filed on April 14, 2014, conform to the Commission's rules and regulations, as modified above, and are approved, and made a part of the license.

Exhibit No.	FERC Drawing No.	Superseded FERC Drawing No.	Drawing Title
J-1	3015-65	3015-36,37	Location Map
K-1	3015-66	3015-42,43	Project Boundary
K-2	3015-67	3015-38	Project Boundary - TL
K-3	3015-68	3015-39,40,41	Project Boundary - TL
K-4	3015-69	3015-39,44,45	Project Boundary - TL
K-5	3015-70	New Drawing	Project Boundary - TL
K-6	3015-71	New Drawing	Project Boundary - TL

(C) Within 45 days of the date of issuance of this order, the licensee shall file the approved exhibit drawings in aperture card and electronic file formats.

a) Four sets of the approved exhibit drawings shall be reproduced on silver or gelatin 35mm microfilm. All microfilm shall be mounted on type D (3-1/4" X 7-3/8") aperture cards. Prior to microfilming, the FERC Project Drawing Number (i.e., P-3015-65) shall be shown in the margin below the title block of the approved drawing. After mounting, the FERC Drawing Number shall be typed on the upper right corner of each aperture card. Additionally, the Project Number, FERC Exhibit (i.e., J-1, K-1, etc.), Drawing Title, and date of this order shall be typed on the upper left corner of each aperture card. See Figure 1.

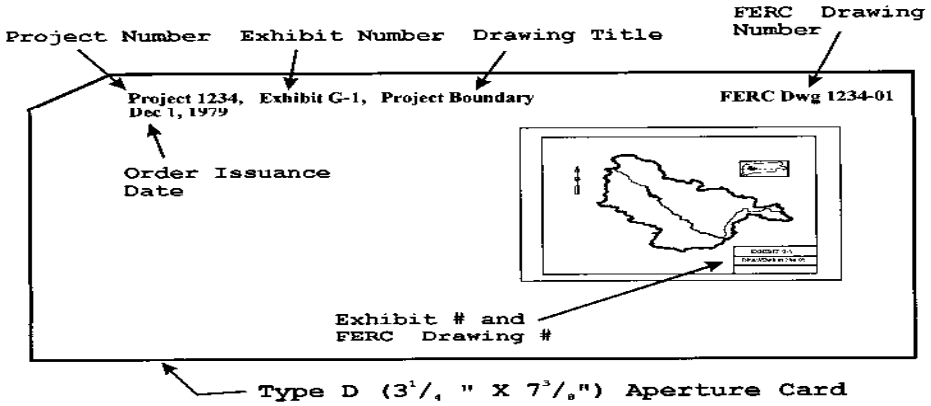

Figure 1 Sample Aperture Card Format

Two of the sets of aperture cards along with form FERC-587 shall be filed with the Secretary of the Commission, ATTN: OEP/DHAC. The third set shall be filed with the Commission's Division of Dam Safety and Inspections Portland Regional Office. The remaining set of aperture cards and a copy of Form FERC-587 shall be filed with the Bureau of Land Management office at the following address:

Bureau of Land Management
Division of Alaska Lands (AK-963)
222 W 7TH AVE STOP 13
ANCHORAGE AK 99513-7504

Form FERC-587 is available through the Commission's website at the following URL: http://www.ferc.gov/docs-filing/forms/form-587/form-587.pdf. If the form cannot be downloaded from the Internet, a hard copy may be obtained by mailing a request to the Secretary of the Commission.

b) The licensee shall file two separate sets of exhibit drawings in electronic raster format with the Secretary of the Commission, ATTN: OEP/DHAC. A third set shall be filed with the Commission's Division of Dam Safety and Inspections Portland Regional Office. Each drawing must be a separate electronic file, and the file name shall include: FERC Project-Drawing Number, FERC Exhibit, Drawing Title, date of this order, and file extension in the following format [P-3015-66, K-1, Location Map, MM-DD-YYYY.TIF]. Electronic drawings shall meet the following format specification:

IMAGERY - black & white raster file
FILE TYPE – Tagged Image File Format, (TIFF) CCITT Group 4
RESOLUTION – 300 dpi desired, (200 dpi min)
DRAWING SIZE FORMAT – 24" x 36" (min), 28" x 40" (max)
FILE SIZE – less than 1 MB desired

Each Exhibit K drawing that includes the project boundary must contain a minimum of three known reference points (i.e., latitude and longitude coordinates, or state plane coordinates). The points must be arranged in a triangular format for GIS georeferencing the project boundary drawing to the polygon data, and must be based on a standard map coordinate system. The spatial reference for the drawing (i.e., map projection, map datum, and units of measurement) must be identified on the drawing and each reference point must be labeled. In addition, each project boundary drawing must be stamped by a registered land surveyor.

c) The licensee shall file two separate sets of the project boundary data in a georeferenced electronic file format (such as ArcView shape files, GeoMedia files, MapInfo files, or a similar GIS format) with the Secretary of the Commission, ATTN: OEP/DHAC. The filing shall include both polygon data and all reference points shown on the individual project boundary drawings. An electronic boundary polygon data file(s) is required for each project development. Depending on the electronic file format, the polygon and point data can be included in single files with multiple layers. The georeferenced electronic boundary data file must be positionally accurate to ±40 feet in order to comply with National Map Accuracy Standards for maps at a 1:24,000 scale. The file name(s) shall include: FERC Project Number, data description, date of this order, and file extension in the following format [P-3015, boundary polygon/or point data, MM-DD-YYYY.SHP]. The filing must be accompanied by a separate text file describing the spatial reference for the georeferenced data: map projection used (i.e., UTM, State Plane, Decimal Degrees, etc), the map datum (i.e., North American 27, North American 83, etc.), and the units of measurement (i.e., feet, meters, miles, etc.). The text file name shall include: FERC Project Number, data description, date of this order, and file extension in the following format [P-3015, project boundary metadata, MM-DD-YYYY.TXT].

In addition, for those projects that occupy federal lands, a separate georeferenced

polygon file(s) is required that identifies transmission line acreage and non-transmission line acreage affecting federal lands for the purpose of meeting the requirements of 18 CFR §11.2. The file(s) must also identify each federal owner (e.g., BLM, USFS, Corps of Engineers, etc.), land identification (e.g., forest name, Section 24 lands, national park name, etc.), and federal acreage affected by the project boundary. Depending on the georeferenced electronic file format, the polygon, point, and federal lands data can be included in a single file with multiple layers.

(D) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the Federal Power Act, 16 U.S.C. § 825*l* (2012), and the Commission's regulations at 18 C.F.R. § 385.713 (2013). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Charles K. Cover, P.E.
Chief, Project Review Branch
Division of Hydropower Administration
and Compliance

Document Content(s)

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148 FERC ¶ 62,130
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Southeast Alaska Power Agency Project No. 3015-017

ORDER AMENDING ANNUAL CHARGES

(Issued August 12, 2014)

1. On May 9, 2014, and supplemented August 4, 2014, Southeast Alaska Power Agency, licensee for the Tyee Lake Project, FERC No. 3015, filed Geographic Information Systems (GIS) data and project exhibit drawings. The project is located on Tyee Creek in Wrangell Borough, Alaska. The project occupies federal lands administered by the U.S. Forest Service within the Tongass National Forest.

Background

2. In an Order Approving Revised Exhibit J and K Drawings (Exhibit Order),[1] the Commission required the license to file the exhibits to identify the federal lands and non-federal lands with a power site reservation (section 24 lands) that are occupied by the project. The order also stated upon receipt of this information, Commission staff would review the amount of federal lands occupied by the project and revise Article 33 of the license.

3. On August 4, 2014, the licensee filed corrected GIS data to verify that the project occupies 1,174 of lands within the Tongass National Forest (transmission), and 1,418 acres of section 24 lands (256 acres transmission and 1,162 acres non-transmission). By order issued March 21, 2013, the Commission announced that it "will no longer assess annual charges with respect to former federal lands included within the boundaries of hydropower projects as to which a section 24 reservation obtains [*sic*]."[2] In response to this order, the licensee is requesting the removal of 1,418 acres of former federal land subject to a power site reservation under section 24 of the Act from those lands designated as lands of the United States in Article 33(ii) and (iii) of its license.

[1] 147 FERC ¶ 62,058 (April 22, 2014).
[2] *See Power Site Reservation Fees Group*, 142 FERC ¶ 61,196, at P 7 (2013).

Review

4. Commission staff reviewed the licensee's GIS data filing and verified the amount of federal acreage located within the project boundary, and on the licensee's most recently approved Exhibit K-1 (FERC drawing P-3015-66) . Therefore, ordering paragraph (A) amends Article 33 of the license.

The Director orders:

(A) Article 33 of the license is amended, in part, to read as follows:

(ii) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of 0 acres of its lands exclusive of those used for transmission line right-of-way, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The project occupies 1,162 acres of section 24 lands outside a transmission line right-of-way. Under the Commission's policy currently in effect, projects occupying section 24 lands will not be assessed an annual charge for use of those lands.

(iii) For the purpose of recompensing the United States for the use, occupancy, and enjoyment of 1,174 acres of its lands for transmission line right-of-way only, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The project occupies 1,430 acres of federal lands (256 acres of which are section 24 lands). Under the Commission's policy currently in effect, projects occupying section 24 lands will not be assessed an annual charge for use of those lands.

(B) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in section 313(a) of the FPA, 16 U.S.C. § 825*l* (2012), and the Commission's regulations at 18 C.F.R. § 385.713 (2014). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Charles K. Cover, P.E.
Chief, Project Review Branch
Division of Hydropower Administration
and Compliance

Document Content(s)

P-3015-017.DOC.....1-2

195 FERC ¶ 62,028
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Southeast Alaska Power Agency Project No. 3015-019

ORDER AMENDING LICENSE, REVISING PROJECT DESCRIPTION, REVISING ANNUAL CHARGES, AND APPROVING REVISED EXHIBIT L AND M

(Issued April 14, 2026)

1. On January 27, 2025, as supplemented on June 12, 2025 and March 23 2026, Southeast Alaska Power Agency (licensee or SEAPA), filed an application for a capacity amendment of its license for the Tyee Lake Hydroelectric Project No. 3015.[1] The licensee proposes to install a third turbine-generator unit (Third Unit), which would increase the total installed capacity of the project from 22.50 megawatts (MW) to 33.75 MW.[2] The licensee included with the application a revised Exhibit L and a revised Exhibit M for Commission approval.[3] The project is located on the Tyee Creek in Wrangell-Peterson, Alaska. The project occupies land within the Tongass National Forest, administered by the U.S. Forest Service (Forest Service).

2. Commission staff prepared an Environmental Assessment (EA) for the licensee's proposed amendment. The EA, issued on January 22, 2026,[4] addressed the

[1] *Alaska Power Authority*, 16 FERC ¶ 61,112 (1981).

[2] During the review process a discrepancy between the authorized installed capacity and nameplate capacities of the units was identified. The authorized installed capacity was listed as 10 MW per unit, with each unit having a rated capacity of 12,500 kilovolt-amperes (kVA) and a power factor of 0.9. However, according to 18 C.F.R §11.1 (i), a generating unit with those specifications corresponds to an authorized installed capacity of 11.25 MW. The licensee corrected this discrepancy in its revised application, submitted on June 12, 2025.

[3] The Exhibit M (project description) and Exhibit L (general design drawings) are identified as Exhibits A and G, respectively, in the Commission's current regulations; however, for the purpose of consistency, Commission staff will continue to use the naming conventions in effect at the time the project was licensed.

[4] Commission staff issued a Notice of Availability of Environmental Assessment on January 22, 2026, for the amendment. 91 *Fed Reg*. 17, 3489 (2026).

environmental effects of the amendment request, and any changes to the environment that may have occurred since Commission staff issued an Environmental Impact Statement on licensing the project on June 17, 1981. The EA for the proposed amendment addressed the effects to geology and soils; water resources; fish and aquatic resources; wildlife, botanical, and wetland resources; threatened and endangered species; recreation, land use, and aesthetic resources; and cultural and historic resources. In the EA, Commission staff concluded that the licensee's proposed amendment would not constitute a major federal action significantly affecting the quality of the human environment.

I. Background

3. On August 5, 1981, the Commission issued a new license to construct, operate, and maintain the project. The Tyee Lake project works include: (1) Tyee Lake with a surface area of 481 acres at normal full pool elevation 1,398.3 feet North American Vertical Data of 1988 (NAVD88); (2) an intake structure fitted with a trash rack at approximately 1,228.9 feet NAVD88, which directs water into a drop shaft; (3) an unlined power tunnel approximately 8,300-foot-long and 10 feet in diameter; (4) a 1,350-foot-long steel penstock that trifurcates into three penstocks in the powerhouse; (5) a 122-foot-long by 38-foot-wide concrete and steel powerhouse containing two 11.25-MW generating units for a total installed capacity of 22.50 MW, and provisions for a Third Unit; (6) a 1,100-foot-long tailrace discharging into Airstrip Slough; (7) a 13.8/115-kilovolt (kV) switchyard 200-foot west of the powerhouse which was designed and constructed with room to accommodate the equipment associated with a Third Unit; (8) a three-phase, 138-kV transmission system consisting of 68.1 miles of overhead line and 11.4 miles of submarine line, leading approximately 40 miles to the Wrangell Switchyard then approximately 40 miles to the Petersburg Switchyard; and (9) appurtenant facilities.

II. Licensee's Proposal

4. The 22.50-MW Tyee Lake Project was designed and constructed with two 11.25-MW turbine-generator units and an empty bay within the powerhouse for the future installation of a third 11.25-MW turbine-generator unit. To meet the current and future demands of the communities of Wrangell, Petersburg, and Ketchikan; reduce the need for and reliance on diesel generation; increase operational flexibility; increase reserves and system reliability; and provide redundancy to the two existing units; the licensee proposes to install a Third Unit in the empty bay in the existing powerhouse at the project. The proposal to add the Third Unit would increase the total installed capacity of the project from 22.50 MW to 33.75 MW.

5. All activities associated with the installation of the Third Unit would occur within the existing powerhouse and project facilities already used for maintenance, repair, and other activities related to project operation, with no ground disturbing activities anticipated. However, the licensee would require the use of barges to transport

equipment and supplies during high tide from Wrangell, travelling along the east side of Wrangell Island to the head of Bradfield Canal and the existing bulkhead on site. The licensee estimates that it would use five to six barge trips from Wrangell to the project site in the late spring/early summer of 2026 to complete the proposed amendment. Barges would be off-loaded by forklift or front-end loader already present on site. Equipment and materials would be temporarily placed in the existing staging area near the barge bulkhead or transported directly to the powerhouse area using the existing road. The licensee further notes that up to approximately 15 workers would be on site at one time. Construction workers would either be flown to the Tyee Lake airstrip or transported to the dock or barge bulkhead by private ferry. The licensee would house construction crew and engineers in an existing onsite bunkhouse or at existing Forest Service cabins under the licensee's Special Use Permit.

III. Pre-Filing Consultation and Public Comment

A. Pre-Filing Consultation

6. On August 15, 2024, the licensee held an initial conference call with representatives from the National Marine Fisheries Service (NMFS), U.S. Fish and Wildlife Service (FWS), and Alaska Department of Fish and Game (Alaska DFG) to discuss the proposed amendment. The licensee held a second meeting on September 25, 2024, with a representative of the Forest Service. During each call, the licensee provided an overview of the project, the proposed amendment and schedule, and presented a proposed expedited license amendment process.

7. On October 9, 2024, the licensee requested to be designated as the Commission's non-federal representative for the purposes of consultation under section 7 of the Endangered Species Act (ESA), section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act), and section 106 of the National Historic Preservation Act (NHPA). In a letter dated November 1, 2024, the Commission designated the licensee as its non-federal representative.

8. On October 9, 2024, the licensee provided state and federal resource agencies,[5]

[5] State and federal resource agencies included the following: Alaska Department of Environmental Conservation (Alaska DEC), Alaska DFG, Alaska Department of Natural Resources (Alaska DNR), Alaska Energy Authority, Alaska State Historic Preservation Office (Alaska SHPO), Forest Service, FWS, NMFS, and the U.S. Army Corps of Engineers.

local governments,[6] Tribes,[7] Alaska Native Claims Settlement Act corporations, utilities and power purchasers, and other interested parties with an initial consultation document in the format of a draft amendment application, which included engineering exhibits and a draft of the preliminary draft EA (PDEA), and requested review prior to a Joint Agency and Public Meeting (JAPM).[8]

9. On November 14, 2024, the licensee held a JAPM, hosting both morning and afternoon sessions, to present the Third Unit proposal to stakeholders, resources agencies, and interested members of the public. Notice of the JAPM was published in three newspapers serving the area: the Wrangell Sentinel and Ketchikan Daily News on October 16 and October 30, 2024, and the Petersburg Piper on October 17 and October 31, 2024.[9] At the JAPM, the licensee provided an overview of the proposed amendment and expedited amendment process, reviewed baseline conditions and anticipated environmental effects, and discussed the requests to waive the requirements of second stage consultation and to substitute the PDEA for the Exhibit E. Resource agencies in attendance included Alaska DFG, Alaska DNR, and NMFS.[10] A public review period was open for 60 days following the submittal of the draft amendment application and the JAPM. During this time, the licensee continued to engage in conversations with state and federal resource agencies.

10. By letter dated November 27, 2024, Alaska DFG supported the licensee's request to waive second stage consultation and use the PDEA in lieu of an Exhibit E. On December 4, 2024, NMFS notified the licensee that, if it agrees to monitor the lower 460 feet of Hidden Creek after the Third Unit becomes operational to ensure that the reduction in spill does not affect salmon or salmon habitat, then it would agree to waive a

[6] Local governments consulted with included the City and Borough of Petersburg, City and Borough of Wrangell, City of Ketchikan, City of Saxman, and the Ketchikan Gateway Borough.

[7] The licensee provided the initial consultation document to the following Tribes: Ketchikan Indian Community; Metlakatla Indian Community, Annette Island Reserve; Organized Village of Kake; Organized Village of Saxman; Petersburg Indian Association; and the Wrangell Cooperative Association.

[8] The licensee filed a copy of the initial consultation document with the Commission on October 9, 2024.

[9] The licensee provided copies of the public notices in Appendix A of the application.

[10] The licensee filed a summary of the meeting and meeting materials with the Commission on January 14, 2025, and made this information available to the public on its website.

second stage of consultation and for the licensee to use the PDEA in lieu of an Exhibit E. By email dated December 9, 2024, the FWS provided a letter waiving second stage consultation and supporting the licensee's use of a PDEA in lieu of an Exhibit E.

11. On January 21, 2025, Alaska DNR reviewed its water rights casefile database for water rights associated with the Tyee Lake Project. Alaska DNR identified two water rights casefiles issued for the project, ADL 100887 and LAS 27405, that authorize a cumulative water use of 135,000 acre-feet per year at a maximum diversion rate of 254 cubic feet per second sourced from Tyee Lake.

12. On January 21, 2025, Alaska DFG reviewed the proposed amendment in accordance with Alaska's Anadromous Fish Act[11] and Fishway Act.[12] Alaska DFG provided the licensee with an amended Fish Habitat Permit (FH10-I-0160), subject to the project description, permit terms, terms of the original permit, and the following stipulation: the licensee will complete shutdown maintenance activities May 1 to July 31.

13. By email dated May 8, 2025, the licensee provided the Forest Service with a project status update and requested comments or recommendations from the Forest Service pertaining to the proposed amendment and resource areas including, but not limited to, the use of Forest Service land, and wildlife, botanical, and wetland resources. The licensee subsequently contacted the Forest Service by voicemail on June 10, 2025. As of the June 12, 2025 filing, the licensee had not received a response to the email or voicemail.

14. By email dated May 9, 2025, the licensee provided Alaska DEC with an overview of the proposed amendment and requested consultation, comments, and recommendations. On May 22, 2025, Alaska DEC confirmed that it had issued a waiver for the project license and did not intend to revoke that waiver. Alaska DEC had no further comments on the proposed amendment.

B. Public Notice

15. On July 18, 2025, the Commission issued a public notice that the licensee's amendment application was accepted for filing, soliciting comments, motions to intervene and protests.[13] The notice established a 30-day deadline, or August 19, 2025, for filing responses to the notice. On August 19, 2025, the U.S. Department of

[11] AS 16.05.871(b).

[12] AS 16.05.841.

[13] 90 *Fed. Reg.* 139, 34647-34648 (2025).

Agriculture, through the Forest Service, filed a motion to intervene. No other comments or motions to intervene were received.

16. In the notice, Commission staff additionally noted that the documentation of consultation in the initial application and supplemental materials adequately addresses the issues such that no additional agency consultation is necessary.

C. Notice of Intent

17. On October 6, 2025, the Commission issued a notice of intent to prepare an EA for the proposed amendment. The notice provided a proposed schedule for completion of the EA and invited federal, state, local, and Tribal agencies with jurisdiction and/or special expertise with respect to environmental issues affected by the proposal to cooperate in the preparation of the EA. No parties sought to cooperate on the preparation of the EA.

IV. Tribal Consultation

18. On November 26, 2024, the licensee requested consultation pursuant to section 106 of the NHPA with the Cape Fox Corporation, Hydaburg Cooperative Association, Kake Tribal Corporation, Organized Village of Kake, Ketchikan Indian Community, Petersburg Indian Association, Organized Village of Saxman, Wrangell Cooperative Association, Metlakatla Indian Community – Annette Island Reserve, and Sealaska Corporation. By emails dated November 26, 2024, the Metlakatla Indian Community – Annette Island Reserve and the Sealaska Corporation acknowledged receipt of the request. No other comments were received.

19. In a December 13, 2024 email, Alaska SHPO recommended that the licensee conduct outreach to the Central Council of the Tlingit and Haida Indian Tribes of Alaska, and the Sealaska Heritage Institute as potential consulting parties. In a letter dated April 7, 2025, Commission staff additionally directed the licensee to consult with the Craig Tribal Association and the Klawock Cooperative Association. The licensee subsequently provided documentation that on November 26, 2024, it requested consultation with the Craig Tribal Association. In separate emails dated May 5, 2025, the licensee requested consultation with the Central Council of the Tlingit and Haida Indian Tribes of Alaska, the Sealaska Heritage Institute, Craig Tribal Association, and Klawock Cooperative Association, and provided the Tribes with the finding that no historic properties would be affected by the proposed amendment. No comments were received.

20. Pursuant to the Commission's Tribal Consultation Policy,[14] Commission staff consulted with the federally recognized Tribes that have interests within the project's area of potential effect (APE). On August 8, 2025, Commission staff issued a letter to the

[14] https://www.ferc.gov/sites/default/files/2020-04/tribal-policy.pdf.

federally-recognized Native American Tribes[15] requesting comments on the licensee's amendment application within 30 days of letter issuance, or September 8, 2025. In emails dated September 29, 2025 and November 12, 2025, Commission staff reached out to the federally-recognized Tribes to follow-up on its letter requesting comments. No comments were received. In this regard, Commission staff has completed its consultation obligations pursuant to section 106 of the NHPA and the Commission's Tribal Consultation Policy.

V. Environmental Review

21. The National Environmental Policy Act (NEPA) requires federal agencies to consider the environmental impacts of their actions in the decision-making process and provide a detailed statement on proposals for major federal actions significantly affecting the quality of the human environment.[16]

22. To satisfy the requirements of the NEPA, Commission staff reviewed the proposed amendment and agency comments, and issued an EA addressing the potential environmental effects of the amendment request on the following resources: geology and soils; water resources; fish and aquatic resources; wildlife, botanical, and wetland resources; threatened and endangered species; recreation, land use, and aesthetic resources, and cultural and historic resources. In the EA, Commission staff noted that all activities associated with the installation of the Third Unit would occur within the existing powerhouse and project facilities already used for maintenance, repair, or other activities related to project operation, and would not require any ground-disturbing activities or in-water construction. Project operations following the installation of the Third Unit would not change from existing conditions, and the project would continue to be operated between the natural pool elevation and the minimum surface elevation of the project.

23. In the EA, Commission staff, concluded that, with the implementation of best management practices (BMPs), including, but not limited to, erosion and sediment control measures, a spill prevention and control plan, and ensuring that refueling does not occur adjacent to waterbodies, the proposed amendment would have no effects to

[15] Addressees included: Craig Tribal Association; Hydaburg Cooperative Association; Klawock Cooperative Association; Metlakatla Indian Community, Annette Island Reserve; Organized Village of Kake; Petersburg Indian Association; Wrangell Cooperative Association; Ketchikan Indian Community; Organized Village of Saxman; and Central Council of the Tlingit and Haida Indian Tribes.

[16] 42 U.S.C. §§ 4321 *et seq*.; *see also* 18 C.F.R. pt. 380 (Commission's regulations implementing NEPA).

geology and soil resources.[17] Additionally, Commission staff concluded in the EA that, while the proposed amendment would result in no effects to botanical or wetland resources, the construction and operation of the Third Unit, with the implementation of BMPs and mitigation measures to protect sensitive species, including minimizing the duration of noise disturbing activities and timing restrictions, would have temporary and minor effects on wildlife.[18] Though noise levels would increase slightly during the construction period, the remote nature of the project and limited recreational use in the project vicinity would limit these effects to land use, recreation, and aesthetic resources. Therefore, Commission staff concluded in the EA that the effects on land use, recreation, and aesthetics from the construction and installation of the Third Unit would be temporary and minor. However, following installation of the Third Unit, the licensee's continued operation of the project between the natural full pool elevation and the minimum surface elevation of the project would result in no effects to land use, recreation, or aesthetic resources.[19]

24. The EA's findings for water resources, fish and aquatic resources, threatened and endangered species, and cultural and historic resources are summarized below.

25. On February 23, 2026, Alaska DFG filed comments in response to the Commission's Notice of Availability and the EA issued for the proposed amendment. Alaska DFG stated that staff reviewed the EA and had no comments.

26. On March 23, 2026, the licensee filed a supplement to the amendment application which included revised Exhibits L and M, as well as additional documentation of agency consultation with Alaska DNR by letter dated February 27, 2026.[20]

A. Water Resources

27. As discussed in the EA, construction activities associated with the proposed amendment would not affect the quantity of water flowing from Tyee Lake into Tyee or Hidden Creeks, or into Bradfield Canal. Work would be limited to transporting and installing the new Pelton-style turbine at the powerhouse and associated equipment at the

[17] *See* Section 5.3.1 of the EA.

[18] *See* Section 5.3.4 of the EA.

[19] *See* Section 5.3.6 of the EA.

[20] Southeast Alaska Power Agency submits revised Exhibit L as supplemental information to the Application for Capacity Amendment to License re the Tyee Hydroelectric Project under P-3015 (P-3015-019). Accession No. 20260323-5228. *See* https://elibrary.ferc.gov/eLibrary/filelist?accession_number=20260323-5228.

switchyard. Existing units would be shut down for approximately 7–10 days during installation, similar to the routine annual maintenance period. During this time, unused water would be stored in Tyee Lake for later generation. A small amount of water would be withdrawn from the powerhouse outflow for concrete mixing.[21,22] However, the short-term and low-volume withdrawal would have no measurable effect on water quantity in the tailrace or Airstrip Slough. Therefore, Commission staff concluded in the EA that the effects on water quantity from construction and installation of the proposed Third Unit would be temporary and minor.[23]

28. The frequency and magnitude of spill events into Tyee Creek may decline slightly with the additional generating capacity. However, as noted in the EA, Commission staff does not expect this change to significantly affect overall water quantity. There is no instream flow requirement for Tyee Creek under the current project license. Under current operations, spill does not occur every year and has historically occurred only during above-average water years. Therefore, Commission staff concluded in the EA that the construction and operation of the Third Unit would not result in any significant changes in water quantity relative to the conditions and effects authorized under the current project license.[24] By letter dated February 27, 2026, Alaska DNR confirmed that that they will amend the existing water rights permits to reflect the increased maximum diversion rate upon issuance of the amended project license.

29. While installation of the Third Unit would not require any ground-disturbing activities or in-water construction, the presence and operation of construction equipment and the barge operations would increase the potential for fuel and hazardous substance spills. To mitigate effects to water quality, the licensee would implement BMPs, including, but not limited to, an erosion and sediment control plan, spill prevention and control plan, and ensuring that refueling does not occur adjacent to waterbodies. Commission staff, therefore, concluded in the EA that, with the implementation of such BMPs, the effects to water quality due to construction activities would be negligible.[25]

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[21] The licensee would obtain a temporary water use permit from Alaska DNR and a Fish Habitat Permit from Alaska DFG's Division of Habitat.

[22] Because the powerhouse was originally designed to accommodate the Third Unit, concrete requirements are minimal and expected to be completed within two weeks.

[23] *See* Section 5.3.2.1 of the EA.

[24] *See* Section 5.3.2.1 of the EA.

[25] *See* Section 5.3.2.2 of the EA.

30. As no significant operational changes are proposed, Commission staff stated in the EA that it is unlikely that operation of the Third Unit would affect water quality. However, the introduction of more freshwater into the tailrace would result in minor changes to water temperature and salinity, while dissolved oxygen (DO) levels would increase slightly due to the typically higher oxygen content in freshwater, as compared to brackish or saline water. The licensee anticipates that full mixing of freshwater with saline water would continue to occur before reaching Airstrip Slough. Because the additional generation from the Third Unit would have less of an incremental effect on the existing baseline water quality of Airstrip Slough compared to the project as currently licensed, Commission staff does not anticipate water quality to be diminished.[26]

31. As discussed in the EA, while no scour is anticipated in Airstrip Slough, higher flow velocities would occur in the tailrace when all three units are operating and would result in minor scouring of the tailrace channel bed, temporarily increasing suspended sediment and exposing more suitable spawning gravel in the tailrace. However, Commission staff anticipates that the deposition of this sediment in the intertidal area at the lower tailrace would mirror the natural sedimentation processes typical of the intertidal area. To ensure that the environment in the tailrace channel is responding as expected to an increase in flow, including the potential changes in bed scour and downstream deposition of fine suspended sediments in the tailrace resulting from the operation of all three turbines, the licensee proposes to develop and implement a final Tailrace Scour and Deposition Monitoring Plan (Tailrace Monitoring Plan). As proposed, the licensee would monitor the tailrace three times (August, December/January, and April/May) once prior to operation of the Third Unit (establishing baseline conditions) and once post-operation.[27] Data collection at the tailrace transects would include the following: channel and wetted dimensions, discharge, velocity, surface water quality parameters (temperature, DO, conductivity, salinity, pH), and spawning habitat quality (substrate composition). The Tailrace Monitoring Plan would include annual reporting and consultation with resource agencies, including FWS, NMFS, and Alaska DFG, to review results and discuss plans for subsequent sampling and any proposed changes. Ordering paragraph (J) requires the licensee to develop the Tailrace Monitoring Plan, in coordination with FWS, NMFS, and Alaska DFG, and to file the plan, for Commission approval, within 60 days of order issuance.

32. The licensee also anticipates that the addition of the Third Unit would result in decreased spill over the weir and decreased flow from lower Tyee Creek into Hidden

[26] *See* Section 5.3.2.2 of the EA.

[27] The licensee intends for the Tailrace Monitoring Plan to build upon tailrace monitoring previously completed by Alaska DFG in 2010-2011 and again in 2015-2016 by collecting similar parameters at the same tailrace transects established by Alaska DFG.

Creek. To demonstrate that year-round flow continues into Hidden Creek without spill from Tyee Lake, the licensee proposes to develop and implement a final Hidden Creek Flow Monitoring Plan (Flow Monitoring Plan).[28] As proposed, the licensee would monitor the flow in Hidden Creek at a suitable location, based on access and channel morphometry, in the reach between its confluence with Tyee Creek located at approximately river mile (RM) 0.6 and the upstream end of the anadromous barrier located near its mouth (RM 0.1). Monitoring of discharge would occur during the open water period of approximately April through October, one year prior to the operation of the Third Unit and one-year post-operation to confirm continual flow in Hidden Creek. The Flow Monitoring Plan would also include annual reporting and consultation with resource agencies, including FWS, NMFS, and Alaska DFG, to review results and discuss plans for subsequent sampling and any proposed changes. Ordering paragraph (K) requires the licensee to develop the Flow Monitoring Plan, in coordination with FWS, NMFS, and Alaska DFG, and to file the plan, for Commission approval, within 60 days of order issuance.

33. Following the installation and operation of the Third Unit, sediment deposition would be comparable to the sedimentation processes for the intertidal area. Commission staff concluded in the EA that, with the implementation of the proposed BMPs, and the development and implementation of the final Tailrace Monitoring Plan and Flow Monitoring Plan, any effects to water quality due to the construction and operation of the Third Unit would be minor and would not vary significantly from the effects of the project under the current license.[29]

B. Fish and Aquatic Resources

34. Bradfield Canal has designated essential fish habitat (EFH) for various life stages of Chinook (*Oncorhynchus tshawytscha*), sockeye (*O. nerka*), coho (*O. kisutch*), chum (*O. keta*), and pink (*O. gorbuscha*) salmon. By email dated November 21, 2024, the licensee requested consultation with NMFS pursuant to the Magnuson-Stevens Act. The licensee stated that there is an anadromous fish passage barrier in Hidden Creek located approximately 460 feet upstream from Bradfield Canal, and that the head of Bradfield Canal has been designated EFH for various life stages of Chinook, chum, coho, pink, and sockeye salmon. The licensee noted that all areas of EFH associated with the proposed amendment, including Hidden Creek, the tailrace, and Hydro Creek, are intertidal, and that the proposed amendment would not affect EFH in Bradfield Canal or the listed anadromous waters.

[28] The licensee provided a draft Flow Monitoring Plan as Attachment 4 in the June 12, 2025 filing.

[29] *See* Section 5.3.2 of the EA.

35. As previously noted, by letter dated December 4, 2024, NMFS reviewed the licensee's proposed application and stated that it did not object to the installation of the Third Unit. However, NMFS noted that it would be important to monitor the lower 460 feet of Hidden Creek after the turbine is operational to ensure that the reduction in spill does not affect salmon or salmon habitat. Therefore, a monitoring plan, developed in consultation with NMFS, should be established.

36. In a September 10, 2025 letter to NMFS, Commission staff stated that the licensee's PDEA discussed the potential effects to EFH in Bradfield Canal for various life stages of Chinook, chum, coho, pink, and sockeye salmon due to the proposed amendment. To mitigate effects to EFH, the licensee proposed to develop and implement a Flow Monitoring Plan to monitor the lower 460 feet of Hidden Creek after the turbine is operational to ensure that the reduction in spill does not affect salmon or salmon habitat. Commission staff, therefore, notified NMFS that EFH for Chinook, chum, coho, pink, and sockeye salmon may be affected by the proposed amendment.

37. By letter dated September 25, 2025, NMFS reviewed the project plans and information provided, and concurred with Commission staff's conclusion that the proposed amendment would not adversely affect EFH for all five species of Pacific salmon in the project area. The potential adverse effects to EFH would be mitigated if the identified mitigation measures and BMPs are implemented. Therefore, NMFS had no conservation recommendations for the proposed action, and stated that no additional EFH consultation is necessary.

38. In the EA, Commission staff stated that, because the project was originally designed for the Third Unit, construction effects on fish and aquatic resources due to the proposed amendment would be limited. All proposed construction activities would occur within the powerhouse or switchyard, outside of the ordinary high-water mark (OHWM), and would not require ground disturbing activities that would affect fish and aquatic resources. As previously discussed, as a BMP, the licensee would ensure that fuel, lubricants, or other hazardous substances are not used or stored below the OHWM, and would implement an erosion and sediment control plan, and spill prevention and control plan to mitigate effects to fish and aquatic resources. With the implementation of such BMPs, Commission staff concluded in the EA that the construction of the proposed Third Unit would have no effect on fish and aquatic resources within the project tailrace. However, in the event that unexpected work occurs below the OHWM, the licensee would consult with Alaska DFG and would limit any work to within the "fish window" (May 15 to July 15) to avoid any potential effects on salmonids.[30]

39. Commission staff also stated in the EA that scouring from the increased flow in the tailrace due to the Third Unit would improve spawning habitat by removing sand and

[30] *See* Section 5.3.3 of the EA.

sediment that may be covering spawning gravel. The potential for increased flow resulting from the proposed amendment would improve pink salmon spawning habitat quality, resulting in a permanent net beneficial change. However, increased velocities would affect spawning suitability.[31]

40. The installation and operation of the Third Unit would reduce flow from Tyee Lake to Hidden Creek, particularly during low precipitation years. This reduction of flow would affect EFH and salmonid species. As discussed under *Water Resources* above, to evaluate the effects of the Third Unit on Hidden Creek, the licensee proposes to develop and implement a Flow Monitoring Plan. The licensee would additionally develop and implement a Tailrace Monitoring Plan to evaluate the potential changes in bed scour and downstream deposition of fine suspended sediments. Commission staff, therefore, concluded in the EA that, with the implementation of the proposed BMPs, and the development and implementation of the Flow Monitoring Plan and Tailrace Monitoring Plan, any effects to fish and aquatic resources due to the construction and operation of the Third Unit would be minor and would not vary significantly from the effects of the project under the current license.[32]

C. Threatened and Endangered Species

41. As documented in the amendment application, by email dated November 8, 2024, the licensee provided the FWS with a request for informal consultation pursuant to section 7 of the ESA. The licensee stated that the FWS's Information for Planning and Consultation (IPaC) database indicated that the endangered short-tailed albatross (*Phoebastria albatrus*) may be present in the project vicinity, but that no critical habitat has been designated for this species. Therefore, the licensee requested informal consultation on this species, as well as any plant and animal species of concern that are known or suspected to occur in the project area and, as appropriate, mapped locations of known occurrences of these species in the region of the project. On November 14, 2024, the FWS acknowledged receipt of the licensee's request, and provided additional information on developing species determinations, and the location of range maps for the listed species.

42. By email dated November 21, 2024, the licensee requested informal consultation with NMFS pursuant to section 7 of the ESA.[33] The licensee stated that it developed a preliminary list of ESA-listed species under the jurisdiction of NMFS, and identified that

[31] *See* Section 5.3.3 of the EA.

[32] *See* Section 5.3.3 of the EA.

[33] The licensee attached a letter dated November 20, 2024 to the email, which provided a description of the proposed amendment.

the threatened Mexico Distinct Population Segment (DPS) of humpback whale (*Megaptera novaeangliae*) may be present in the waters between Wrangell and the project site during the summer, however no critical habitat has been designated for this species. The licensee stated, in part, that the proposed amendment would include five to six barge trips from Wrangell to the project barge bulkhead at the head of Bradfield Canal to transport equipment and materials to the powerhouse area, and that workers would be transported to the site via private ferry. However, the licensee stated that the limited number of barge or ferry trips between Wrangell and Bradfield Canal would not adversely affect the Mexico DPS of humpback whale. As such, the licensee requested informal consultation on the Mexico DPS of humpback whale, as well as any other ESA-listed species or species of concern that are known or suspected to occur in the project area, and clarification on if a Biological Assessment would need to be prepared for these species.

43. On December 6, 2024, NMFS requested additional information and provided the licensee with suggested mitigation measures to incorporate into the proposed action to ensure the safety of listed marine mammals. By email dated December 6, 2024, the licensee notified NMFS that it would follow the suggested mitigation measures by including them as requirements in construction contracts, and stated that it would add these as protection, mitigation, and enhancement measures in the final amendment application to be filed with the Commission. Given the licensee's written agreement to implement the recommended mitigation measures, NMFS initiated consultation on December 6, 2024. By letter dated December 13, 2024, NMFS reviewed the proposed amendment and concurred with the licensee's determination that the proposed amendment may affect, but is not likely to adversely affect, the ESA-listed Mexico DPS of humpback whale.

44. On August 1, 2025, and January 7, 2026, Commission staff accessed the FWS's IPaC database and determined that one federally listed species, the endangered short-tailed albatross, may occur within the area affected by the proposed amendment. No

critical habitat was identified within the project's action area.[34,35] Commission staff noted in the EA that, as the short-tailed albatross is rare, spends much of its time at sea, and only has a few active breeding colonies remaining (none of which are near the project area), it is unlikely to occur within the project area.[36] Therefore, Commission staff concluded that the construction and operation of the proposed amendment would have no effect on short-tailed albatross.

45. Though the Mexico DPS of humpback whale was not identified in the IPaC database, based on the information provided in the licensee's application, Commission determined that the proposed amendment may affect, but is not likely to adversely affect, the Mexico DPS of humpback whale. Therefore, in the September 10, 2025 letter to NMFS, Commission staff also requested informal consultation with NMFS for the proposed amendment. Commission staff subsequently provided NMFS with additional information in support of this request by emails dated September 26, 2025 and September 30, 2025.

46. By email dated November 28, 2025, NMFS notified Commission staff that the previous effects determinations from NMFS are still valid, and that NMFS still concurs with the effects determinations based on the slight change in megawatts. NMFS stated that the email serves as notice of the reinitiation request, and that the Commission can close out consultation on the ESA section 7 request.[37]

47. In the EA, Commission staff noted that, while all activities associated with the installation of the Third Unit would occur within the existing powerhouse and project facilities, the potential effects to the Mexico DPS of humpback whale associated with the

[34] *See* Commission staff's August 1, 2025 and January 7, 2026 memorandums on List of Threatened, Endangered, Candidate, and Proposed Species under the ESA.

[35] The FWS's IPaC database further identified the Southeast Alaska Stock of northern sea otter (*Enhydra lutris kenyoni*) as a marine mammal that may occur within the area affected by the proposed amendment. This stock is not designated as depleted under the Marine Mammal Protection Act (MMPA), nor is it listed as threatened or endangered under the ESA. Per the MMPA, the stock is currently classified as non-strategic. As discussed in Appendix A, *Statutory and Regulatory Requirements*, of the EA, given the minimal increase in vessel traffic required to transport materials to the project site, Commission staff concluded that the northern sea otter would not be affected by vessel strikes or disturbance.

[36] *See* Section 5.3.5 of the EA.

[37] *See* emails between NMFS and Commission staff. Communication memorandum filed December 1, 2025.

licensee's proposed use of barges and private ferries include the following: (1) vessel noise; (2) vessel strike; and (3) entanglement in vessel lines and marine debris. To minimize the potential effects to the humpback whale, the licensee developed mitigation measures in coordination with NMFS. Those mitigation measures are attached to this order as Appendix A. Such mitigation measures include, but are not limited to, the following: (1) maintaining a watch for marine mammals at all times while underway; (2) staying at least 91 meters (100 yards) away from listed marine mammals; (3) travelling at less than 5 knots when within 274 meters (300 yards) of a whale; (4) avoiding changes in direction and speed within 274 meters (300 yards) of a whale; (5) not positing vessels in the path of a whale or cutting in front of a whale in a way or at a distance that causes the whale to change direction of travel of behavior; (6) reducing vessel speed to 10 knots or less when weather conditions reduce visibility to 1.6 kilometers (1 mile) or less; (7) adhering to the Alaska Humpback Whale Approach Regulations when vessels are transiting to and from the project site; and (8) project-specific barges would travel at 12 knots or less. In the EA, Commission staff concluded that the implementation of the agreed upon mitigation measures would ensure that the effects from vessel noise would be insignificant, and that the potential risks for vessel strikes and entanglement are extremely unlikely to occur.[38] Therefore, ordering paragraph (K) requires the licensee to implement the humpback whale mitigation measures.

48. To keep NMFS informed of interactions with marine mammals during project activities, the proposed mitigation measures include reporting requirements for: (1) unauthorized take; (2) stranded, injured, sick, or dead listed species (not associated with the project); (3) illegal activities; and (4) extralimital sightings. The licensee would additionally submit a final report to NMFS within 90 calendar days of the completion of the project that summarizes all in-water activities associated with the proposed amendment, including dates, times, and geographic coordinates of listed marine mammals observed by the individual piloting the vessel, as well as water depth, species, age/size/gender (if applicable), group sizes, and any photos or videos taken of marine mammals. So the Commission remains informed, ordering paragraph (L) of this order requires the licensee to file a copy of any report or notification for which it is responsible under the humpback whale mitigation measures.

D. Cultural and Historic Resources

49. On November 8, 2024, the licensee requested consultation with the Alaska SHPO pursuant to section 106 of the NHPA for the proposed capacity amendment. By email dated December 13, 2024, the Alaska SHPO acknowledged receipt of the November 8, 2024 consultation request, and stated that it had no objections to the level of

[38] *See* Section 5.3.5 of the EA.

effort to identify historic properties at that time. The Alaska SHPO additionally recommended defining the APE with a 100-foot buffer around the proposed use areas.

50. By email dated May 5, 2025, the licensee provided the Alaska SHPO with a finding that no historic properties would be affected by the proposed amendment and requested concurrence with this finding. By letter dated June 10, 2025, the Alaska SHPO reviewed the licensee's May 5, 2025 correspondence and concurred that no historic properties would be affected by the proposed amendment.[39]

51. In the EA, Commission staff noted that a cultural resources review of existing information identified no archaeological, historic, or other cultural resources located within the APE, and that no Tribal resources have been identified in the vicinity of the APE.[40] While construction would result in no ground-disturbing activities, as a BMP, and pursuant to Article 40 of the project license, the licensee would incorporate an inadvertent discovery provision into construction contracts, whereby the contractor would stop work and notify the licensee immediately if any archaeological significant materials or sites are discovered during construction activities. Accordingly, Commission staff concluded in the EA that the construction and operation of the Third Unit would have no effect on cultural and historic resources.[41]

VI. Administrative Provisions

A. Installed Capacity and Annual Charges

52. During the review process, Commission staff identified a discrepancy between the authorized installed capacity and the nameplate capacities of the units. Under 18 C.F.R. § 11.1(i), authorized installed capacity is defined as "the lesser of the ratings of the generator or turbine units." The rating of a turbine is the product of the turbine's capacity in horsepower (hp) at best gate opening under the manufacturer's rated head times a conversion factor of 0.75 kilowatt (kW)/hp. The rating of a generator is the product of the continuous-load capacity rating of the generator in kilovolt-amperes (kVA) and the system power factor in kW/kVA. Based on the information provided by the licensee, the current authorized installed capacity is 22.50 MW.

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[39] A copy of the Alaska SHPO's June 10, 2025 letter was filed with the Commission on July 11, 2025.

[40] The licensee defined the APE as the project action area (including all material and equipment landing and staging areas, housing, affected existing structures, and access roads) in addition to a 100-foot buffer zone surrounding the affected area.

[41] *See* Section 5.3.7 of the EA.

53. The licensee's proposal to install the Third Unit at the Tyee Lake Hydroelectric Project would result in an 11.25 MW increase in the total installed capacity of the project, from 22.50 MW to 33.75 MW. Therefore, Article 33 of the license should be updated to reflect the current authorized installed capacity and the increase due to the proposed installation of the Third Unit. Accordingly, ordering paragraph (C) of this order revises Article 33 to reflect the changes to the authorized installed capacity. The change in annual charges will be effective as of the issuance date of this order for the current authorized installed capacity, and from the date the Third Unit becomes operational for the additional capacity resulting from the proposed upgrades.[42] Ordering paragraph (I) of this order requires the licensee to submit a report specifying the date when the Third Unit begins operation.

B. Revised Exhibits L and M

54. On March 23, 2026, the licensee filed a revised Exhibit M to reflect the proposed design modifications and to revise the referenced datum elevation. The Exhibit M conforms to the Commission's rules and regulations and should be approved, as shown in ordering paragraph (D) of this order. Ordering paragraph (B) of this order revises the project description in ordering paragraph (B)(ii) of the license consistent with the revised Exhibit M.

55. In addition, the licensee included 6 revised Exhibit L drawings for Commission approval to reflect the proposed changes. On March 23, 2026, the licensee submitted revised Exhibit L drawings to revise the proposed exhibit drawing numbers. Commission staff reviewed the drawings and determined they conform to the Commission's rules and regulations. Ordering paragraph (E) of this order approves the drawings filed on March 23, 2026. Ordering paragraph (F) of this order requires the licensee to file the approved exhibit drawing in electronic file format. Furthermore, ordering paragraph (I) of this order requires the licensee to file revised Exhibits K, L, and M, as necessary, to reflect as-built conditions. The filing must also include photographs of the turbine-generator units' nameplates.

C. Dam Safety

56. The licensee may not begin construction until the Commission's Division of Dam Safety and Inspections (D2SI) – Portland Regional Engineer has reviewed and commented on the plans and specifications, determined that all preconstruction requirements have been satisfied, and authorized start of construction. Ordering paragraph (G) of this order requires the licensee to submit final design documents prior to

[42] 18 C.F.R. § 11.1(d)(6) (2025).

receiving approval to start construction from the Commission's D2SI – Portland Regional Engineer.

D. Construction Articles

57. Commission staff reviewed the amendment application and concludes that the proposed modifications would not adversely impact the safety of the project when constructed, operated, and maintained in accordance with the Commissions standards and oversight. The licensee plans to commence the installation of the Third Unit at the Tyee Lake Hydroelectric Project, starting in May of 2026, and completing installation of the Third Unit by fall 2027. Nevertheless, Commission staff is requiring in ordering paragraph (H) of this order that the licensee starts and completes the upgrades within two and five years, respectively, from the issuance date of this order.

VII. Discussion and Conclusion

58. The proposed amendment and installation of the Third Unit would not constitute a major federal action significantly affecting the quality of the human environment. Under the proposed amendment, the licensee would install a Third Unit in the existing empty bay, which would increase the total installed capacity of the project to 33.75-MW. This proposed Third Unit would allow the licensee to meet the current energy demands of the communities of Petersburg, Wrangell, and Ketchikan, and significantly reduce the licensee's reliance on diesel generation. Therefore, the licensee's application for amendment of the license should be approved.

The Director orders:

(A) Southeast Alaska Power Agency's (licensee) application to amend the license for the Tyee Lake Hydroelectric Project No. 3015, filed on January 27, 2025, as supplemented on June 12, 2025, and March 23, 2026, is approved, subject to the requirements in the ordering paragraphs below.

(B) This order revises ordering paragraph (B)(ii) of the license to read as follows:

(ii) The Tyee Lake project works include: (1) Tyee Lake with a surface area of 481 acres and a usable storage capacity of 52,400 acre-feet between the natural surface elevation of 1,396 feet mean lower low water (mllw) and a minimum surface elevation of 1,250 feet; (2) a power tunnel, approximately 8,300 feet long and 10 feet in diameter leading from an intake structure in Tyee Lake to the powerhouse where it connects to a steel 1,350-foot-long penstock that trifurcates into 3 penstocks leading to each unit bay; (3) a powerhouse constructed out of steel and concrete that is 122 feet long by 38 feet wide; (4) three 16,750-horsepower Pelton-type (impulse) turbines connected to three 11.25-megawatt generators; (5) a 1,100-foot-long tailrace channel discharging into

Airstrip Slough; (6) a 13.8/138-kV switchyard adjacent to the powerhouse; (7) a 3-phase, 138-kV transmission system that includes 68.1 miles of overhead transmission circuit and 11.4 miles of submarine line, the transmission system extends from the powerhouse switchyard to the Wrangell Substation for 40 miles and then about 40 miles to the Petersburg Switchyard; and (8) appurtenant facilities.

(C) This order revises Article 33 of the license, in part, to read as follows:

Article 33. The licensee shall pay the United States annual charges, as determined in accordance with provisions of the Commission's regulations in effect from time to time, for the purposes of:

a) reimbursing the United States for the cost of administration of Part I of the Federal Power At, a reasonable amount as determined in accordance with the provisions of the Federal Energy Regulatory Commission's regulations in effect from time to time. The authorized installed capacity for that purpose is 22.5 MW, effective the issuance date of this order, and will increase to 33.75 MW, effective as of the date by which the third unit authorized by this order becomes operational;

b) recompensing the United States for the use, occupancy, and enjoyment of 0 acres of its lands exclusive of those used for transmission line right-of-way, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The project occupies 1,162 acres of section 24 lands outside a transmission line right-of-way. Under the Commission's policy currently in effect, projects occupying section 24 lands will not be assessed an annual charge for use of those lands; and

c) recompensing the United States for the use, occupancy, and enjoyment of 1,174 acres of its lands for transmission line right-of-way only, a reasonable amount as determined in accordance with the provisions of the Commission's regulations in effect from time to time. The project occupies 1,430 acres of federal lands (256 acres of which are section 24 lands). Under the Commission's policy currently in effect, projects occupying section 24 lands will not be assessed an annual charge for use of those lands.

(D) The revised Exhibit M filed on March 23, 2026, conforms to the Commission's rules and regulations and this order approves the Exhibit M and makes it part of the license. The previous Exhibit M is eliminated from the license.

(E) This order approves the revised Exhibit L drawings filed on March 23, 2026, as shown in the table below. The previous Exhibits L-4B though L-4D, L-5B through L-5C, and L-6A, drawing Numbers P-3015-54 through P-3015-56 and P-3015-58 through P-3015-60, are superseded and deleted from the license.

Exhibit No.	FERC Drawing No.	Drawing Title	Filename Title[43]
L-4B	P-3015-72	Powerhouse General Arrangement Plan at CL Turbine EL 29.00 ft mllw	Powerhouse General Arrangement Plan EL29
L-4C	P-3015-73	Powerhouse General Arrangement Plan Machine Floor EL 33.00 ft mllw	Powerhouse General Arrangement Plan EL33
L-4D	P-3015-74	Powerhouse General Arrangement Plan Generator Floor EL 43.50 ft mllw	Powerhouse General Arrangement Plan EL43.5
L-5B	P-3015-75	Powerhouse General Arrangement Longitudinal Section	Powerhouse General Arrangement Longitudinal Section
L-5C	P-3015-76	Powerhouse General Arrangement Transverse Section – Unit 3	Powerhouse General Arrangement Transverse Section Unit 3
L-6A	P-3015-77	Switchyard General Arrangement Plan	Switchyard General Arrangement Plan

(F) Within 45 days of the date of issuance of this order, as directed below, the licensee must file the approved exhibit drawings in electronic file format.

The licensee must prepare digital images of the approved exhibit drawings in electronic format. Prior to preparing each digital image, the licensee must add the FERC Project-Drawing Number (i.e., P-3015-72 through P-3015-77) in the margin below the title block of the corresponding approved drawing. The licensee must **label and file the Exhibit L drawings as Critical Energy Infrastructure Information (CEII) material under 18 C.F.R. § 388.113** (The submission should consist of: 1) a public portion consisting of a cover letter; and 2) a CEII portion containing only the Exhibit L drawings). Each drawing must be a separate electronic file, and the file name must include: FERC Project-Drawing Number, FERC Exhibit Number, Filename Title, date of this order, and file extension in the

[43] These exact drawing titles must be used in the filename when filing the electronic file format drawings required in ordering paragraph (E). Commission staff shortened the drawing titles due to filename character limits. There is no need to modify the titles as they appear on the drawings.

following format [P-3015-72, L-4B, Powerhouse General Arrangement Plan EL29, MM-DD-YYYY.TIFF]. All digital images of the exhibit drawings must meet the following format specification:

IMAGERY:	black & white raster file
FILE TYPE:	Tagged Image File Format, (TIFF) CCITT Group 4 (also known as T.6 coding scheme)
RESOLUTION:	300 dots per inch (dpi) desired, (200 dpi minimum)
DRAWING SIZE:	22" x 34" (minimum), 24" x 36" (maximum)
FILE SIZE:	less than 1 megabyte desired

(G) *Final Design Documents.* At least 60 days prior to the start of any construction, the licensee must file final design documents with the Commission by eFiling to the Portland Regional Office. The design documents must include final plans and specifications, and the following items as appropriate: supporting design report, Quality Control and Inspection Program, Temporary Construction Emergency Action Plan, and Soil Erosion and Sediment Control Plan. The licensee may not begin construction until the Division of Dam Safety and Inspections – Portland Regional Engineer has reviewed and commented on the documents, determined that all preconstruction requirements have been satisfied, and authorized start of construction.

(H) The licensee must start construction of the proposed work authorized in this order within two years and complete all construction within five years from the issuance date of this order. Within 90 days of the date of completion of construction authorized in this order, the licensee must file with the Commission, the date of commencement and completion of construction.

(I) Within 90 days of completion of construction of the improvements authorized by this amendment, the licensee must file for Commission approval, revised Exhibits K, L, and M, as applicable, to reflect as-built conditions at the Tyee Lake Hydroelectric Project. If the licensee determines the previously approved exhibits reflect the as-built facilities and no revisions are necessary, the licensee must file a letter stating the approved exhibits reflect the as-built project facilities. Additionally, the letter must include the specific date on which the Third Unit begins operation. This certification process ensures that the Commission has accurate documentation of the project and its operational status. The filing must include photographs of the nameplates for the turbines and generators.

(J) To monitor potential changes in bed scour and downstream deposition of fine suspended sediments in the tailrace that may result from operating all three turbines at higher rates than current operations, the licensee must develop a Tailrace Scour and Deposition Monitoring Plan and file the plan, for Commission approval, within 60 days

of order issuance. The plan must identify baseline data, monitoring locations, the type of data to be collected, and operational flows of interest.

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

(K) To ensure Hidden Creek receives enough flow to maintain essential fish habitat in the lowermost approximately 460 feet of Hidden Creek, the licensee must develop a Hidden Creek Flow Monitoring Plan and file the plan, for Commission approval, within 60 days of order issuance. The plan must identify the location, duration, and frequency of monitoring efforts to ensure there is no effect to salmon or salmon habitat in lower Hidden Creek.

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

(L) To mitigate the potential for disturbance to humpback whales due to activities associated with the proposed amendment, the licensee must implement the humpback whale mitigation measures developed with the National Marine Fisheries Service. Those mitigation measures are set forth in Appendix A to this order.

(M) The licensee must file with the Commission copies of any reports or notifications for which it is responsible, or to which it contributes, under the humpback whale mitigation measures, as developed with the National Marine Fisheries Service (NMFS). The licensee must allow NMFS a minimum of 30 days to comment and make recommendations before filing the reports with the Commission. For any agency recommendations that the licensee does not incorporate into the reports filed with the Commission, the licensee must provide its reasons using project-specific information.

(N) This order constitutes final agency action. Any party may file a request for rehearing of this order within 30 days from the date of its issuance, as provided in § 313(a) of the Federal Power Act, 16 U.S.C. § 825*l*, and the Commission's regulations at 18 C.F.R. § 385.713 (2025). The filing of a request for rehearing does not operate as a stay of the effective date of this order, or of any other date specified in this order. The licensee's failure to file a request for rehearing shall constitute acceptance of this order.

Jot Splenda, Chief
Environmental Project and Review Branch
Division of Hydropower Administration
and Compliance

APPENDIX A

Humpback Whale Mitigation Measures for the Tyee Lake Hydroelectric Project No. 3015

General Mitigation Measures

1. The project proponent will inform the National Marine Fisheries Service (NMFS) of impending in-water activities a minimum of one week prior to the onset of those activities (email information to akr.prd.records@noaa.gov).

2. Consistent with AS 46.06.080, trash will be disposed of in accordance with state law. The project proponent will ensure that all closed loops (e.g., packing straps, rings, bands, etc.) will be cut prior to disposal. In addition, the project proponent will secure all ropes, nets, and other marine mammal entanglement hazards so they cannot enter marine waters.

Project-Dedicated Vessels

3. Vessel operators will:

    a. Maintain a watch for marine mammals at all times while underway;

    b. Stay at least 91 meters (100 yards) away from listed marine mammals, except that they will remain at least 460 meters (500 yard) away from endangered North Pacific right whales;

    c. Travel at less than 5 knots when within 274 meters (300 yards) of a whale;

    d. Avoid changes in direction and speed within 274 meters (300 yards) of a whale, unless doing so is necessary for maritime safety;

    e. Not position vessel(s) in the path of a whale, and will not cut in front of a whale in a way or at a distance that causes the whale to change direction of travel of behavior (including breathing/surfacing pattern);

    f. Reduce vessel speed to 10 knots or less when weather conditions reduce visibility to 1.6 kilometers (1 mile) or less; and

    g. Adhere to the Alaska Humpback Whale Approach Regulations when vessels are transiting to and from the project site: (see 50 C.F.R. §§ 216.18, 223.214, and 224.103(b); these regulations apply to all humpback whales).

Specifically, pilot and crew will not:

i. Approach, by any means, including by interception (i.e., placing a vessel in the path of an oncoming humpback whale), within 100 yards of any humpback whale;
ii. Cause a vessel or other object to approach within 100 yards of any humpback whale; or
iii. Disrupt the normal behavior or prior activity of a humpback whale by any other act or omission.

4. If a whale's course and speed are such that it will likely cross in front of a vessel that is underway, or approach within 91 meters (100 yards) of the vessel, and if maritime conditions safely allow, the engine will be put in neutral and the whale will be allowed to pass beyond the vessel, except that vessels will remain 460 meters (500 yards) from North Pacific right whales.

5. Vessels will not allow lines to remain in the water unless both ends are under tension and affixed to vessels or gear.

6. Project-specific barges will travel at 12 knots or less.

Reporting

Unauthorized Take

7. If a listed marine mammal is injured or killed as a direct or indirect result of the action, the licensee will report the incident to NMFS within one business day, with information submitted to akr.prd.records@noaa.gov. These records will include:

   a. Digital, queryable documents containing observations and records, and digital, queryable reports;

   b. The date, time, and location of each event (provide geographic coordinates);

   c. Description of the event;

   d. Number of individuals of each listed marine mammal species affected;

   e. The time the animal(s) was first observed, and, if known, the time the animal was last seen, and the fate of the animal;

   f. Mitigation measures implemented prior to and after the animal was taken;

g. If a vessel struck a listed marine mammal, the contact information for individual piloting the vessel; and

h. Photographs or video footage of the animal(s), if available.

Stranded, Injured, Sick or Dead Listed Species (not associated with the project)

8. If the individual piloting the vessel observes an injured, sick, or dead marine mammals (i.e., stranded), they will notify the Alaska Marine Mammal Stranding Hotline at 877-925-7773. If possible, the individual piloting the vessel will submit photos and available data to aid NMFS in determining how to respond to the stranded animal. If possible, data submitted to NMFS in response to stranded marine mammals will include date/time, location of stranded marine mammal, species and number of stranded individuals, description of the stranded marine mammal's condition, event type (e.g., entanglement, dead, floating), and behavior of live-stranded marine mammals.

Illegal Activities

9. If the individual piloting the vessel observes listed marine mammals or other marine mammals being disturbed, harassed, harmed, injured, or killed (e.g., feeding or unauthorized harassment), these activities will be reported to NMFS Alaska Region Office of Law Enforcement (Table 2: 1-800-853-1964).

10. Data submitted to NMFS will include date/time, location, description of the event, and any photos or videos taken.

Extralimital Sightings

11. All observations of Endangered Species Act-listed marine mammal species not considered in this consultation will be reported to NMFS within 24 hours. Photographs and/or video should be taken if possible to aid in Photo ID of individual animals. Reports will include all applicable information that would be included in a final report.

Final Report

12. A final report will be submitted to NMFS within 90 calendar days of the completion of the project summarizing the data recorded by emailing it to akr.prd.records@noaa.gov. The report will summarize all in-water activities associated with the proposed action.

13. The final report for projects will include:

    a. Dates, times, and geographic coordinates of listed marine mammals observed by the individual piloting the vessel, including water depth, species, age/size/gender (if determinable), and group sizes; and

    b. Any photos or videos taken of marine mammals.

Reason for Contact	**Contact Information**
Consultation Questions & Unauthorized Take	akr.prd.records@noaa.gov
Reports & Data Submittal	akr.prd.records@noaa.gov
Stranded, Injured, or Dead Marine Mammals	Stranding Hotline (24/7 coverage) 1-877-925-7773
Oil Spill & Hazardous Materials Response	U.S. Coast Guard National Response Center: 1-800-424-8802 and AKRNMFSSpillResponse@noaa.gov
Illegal Activities (*not related to project activities, e.g., feeding, unauthorized harassment, or disturbance to marine mammals*)	NMFS Office of Law Enforcement (AK Hotline): 1-800-853-1964
In the event that this contact information becomes obsolete	NMFS Anchorage Maine Office: 907-271-5006 or NMFS Juneau Maine Office: 907-586-7236

APPENDIX B

SINGLE-LINE DIAGRAM (CEII)

Critical Energy Infrastructure Information 18 CFR § 388.113—DO NOT RELEASE

APPENDIX C

FLOW DURATION CURVES

Monthly Flow Duration Curves Developed from USGS Gage No. 15020100 (Tyee Creek at Mouth) for the 6-Year Period of Record (1963-1969)

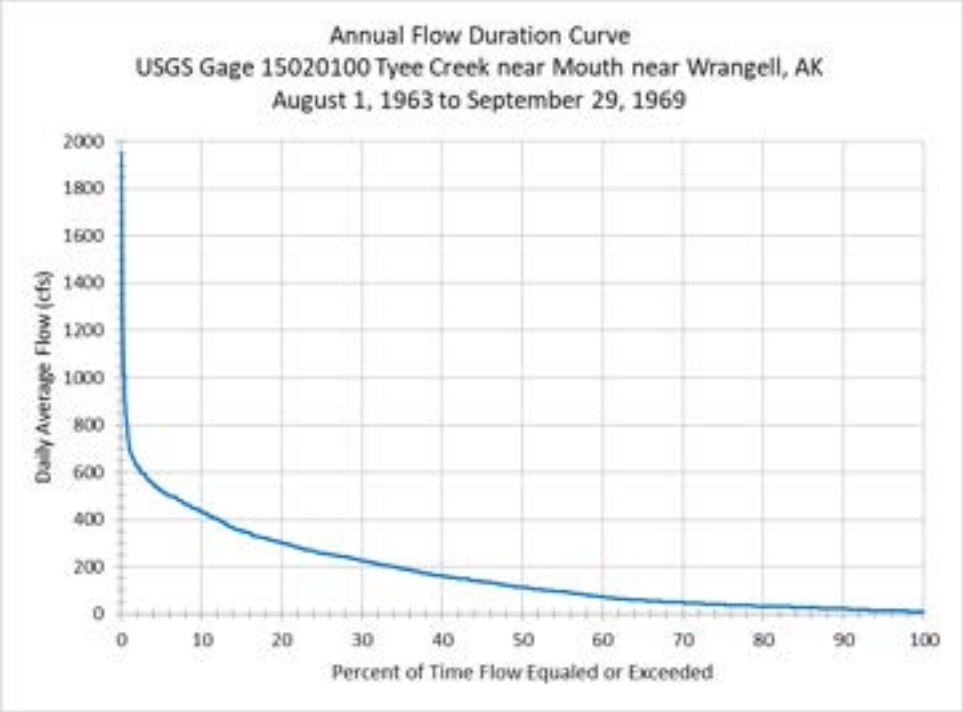


Figure C-1 Annual Flow Duration Curve at Mouth of Tyee Creek USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

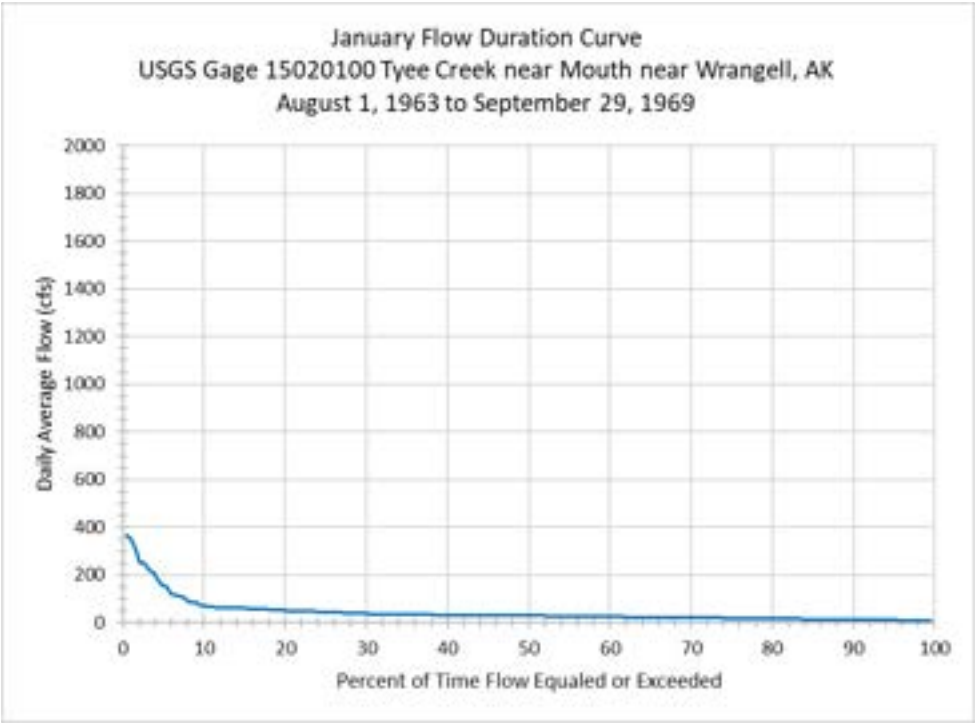


Figure C-2 January Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

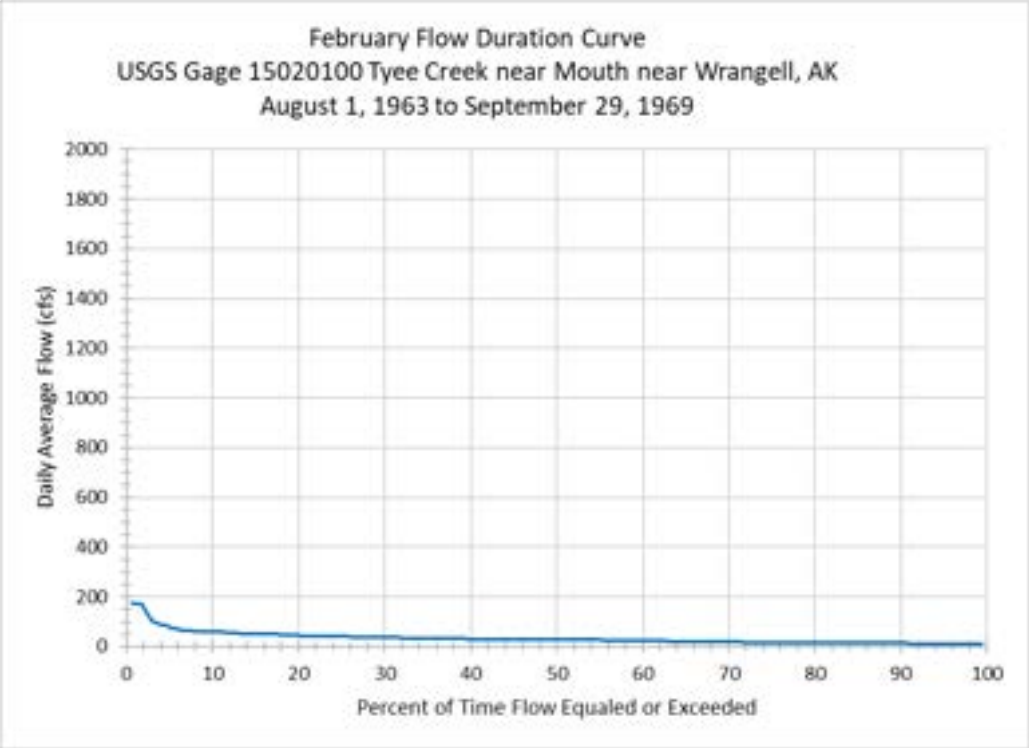


Figure C-3 February Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

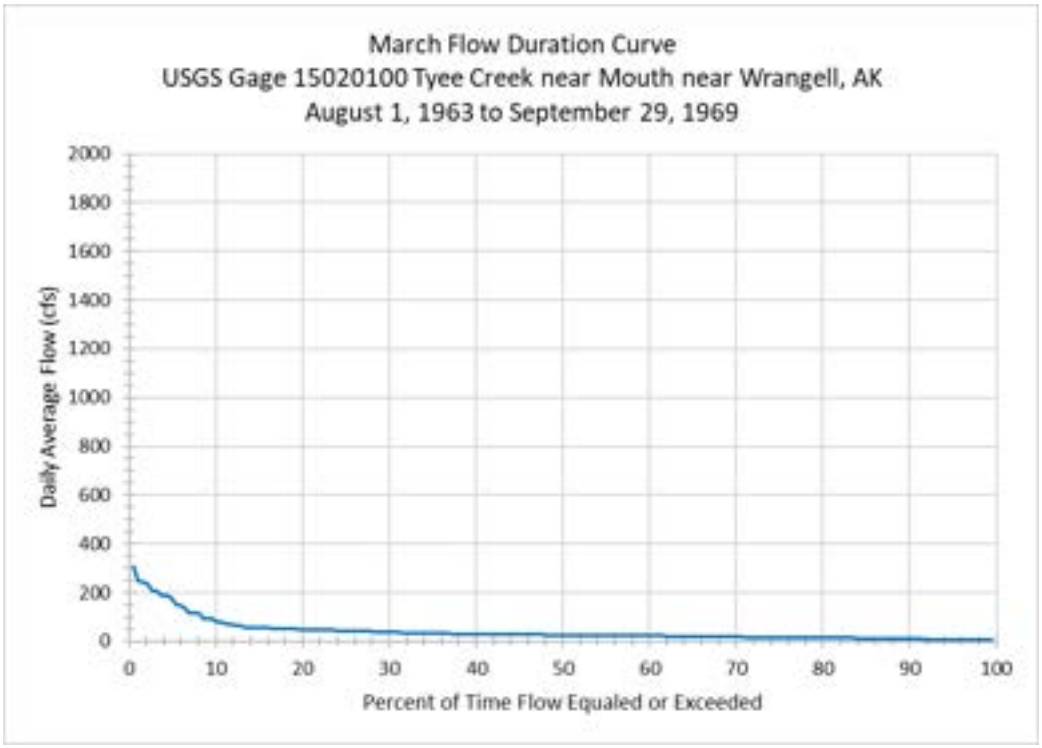


Figure C-4 March Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

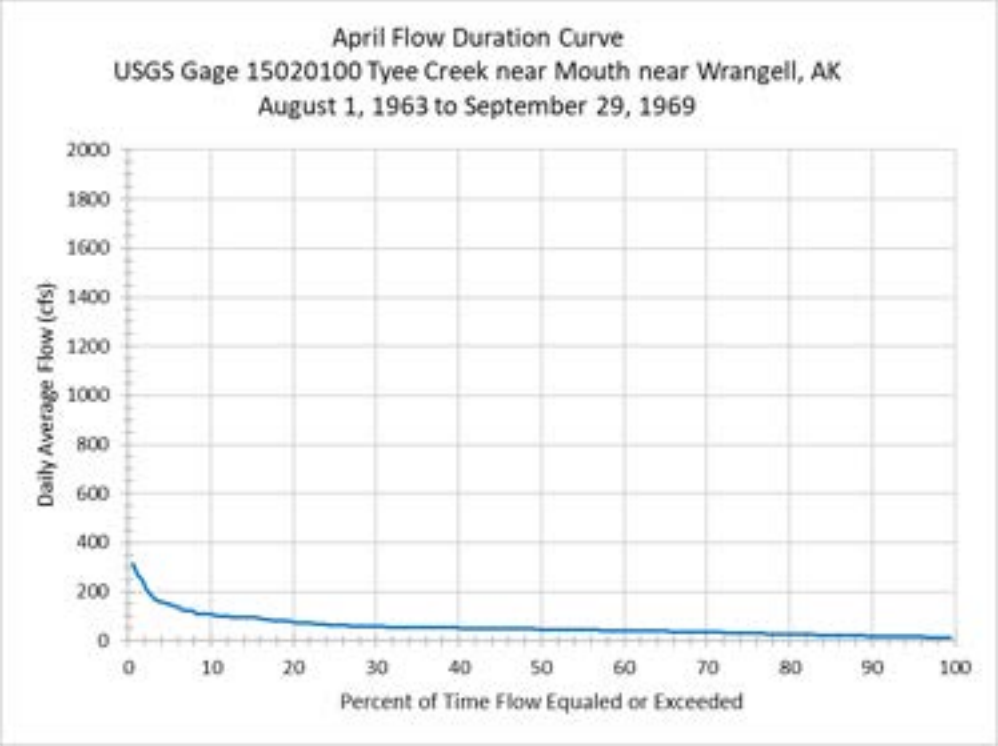


Figure C-5 April Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

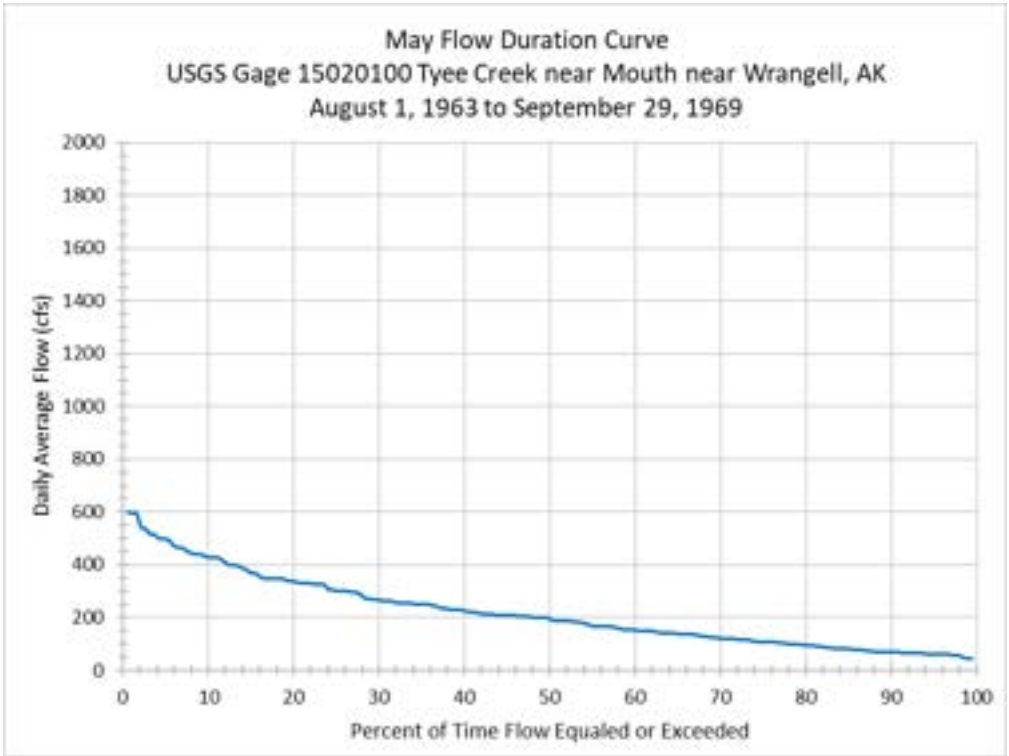


Figure C-6 May Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

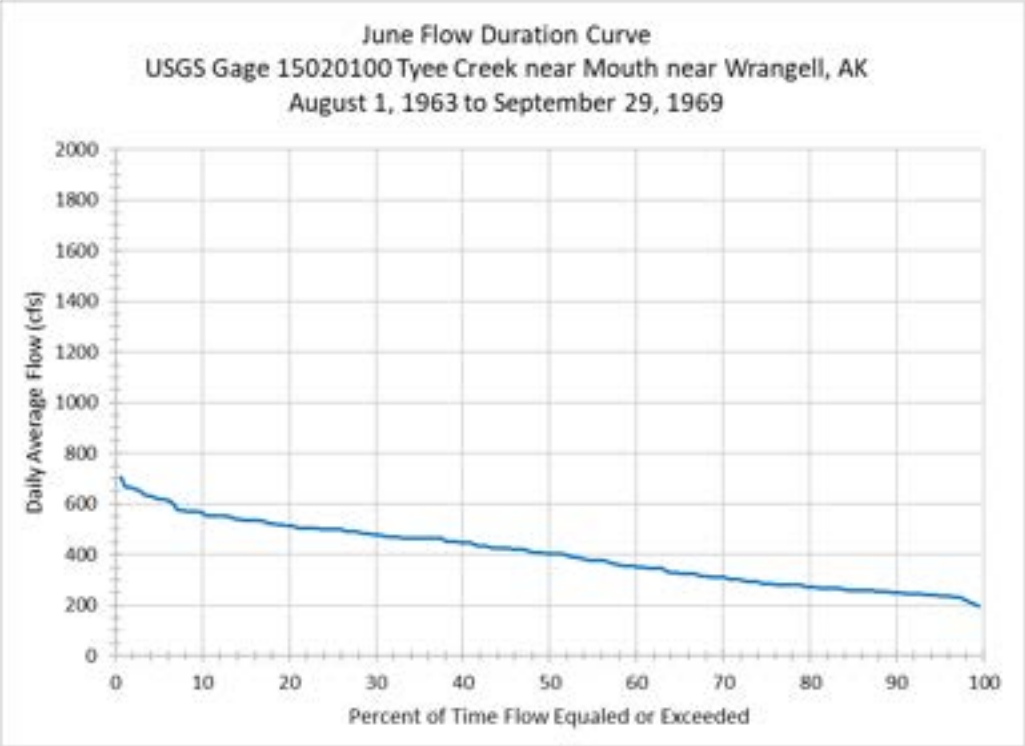


Figure C-7 June Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

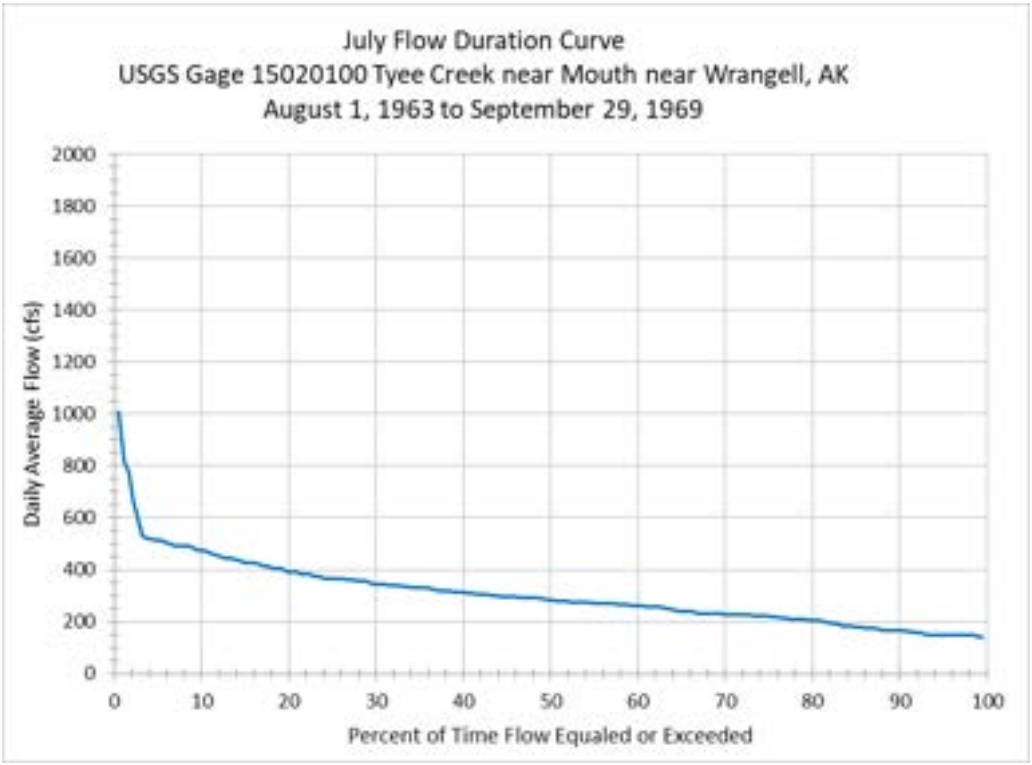


Figure C-8 July Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

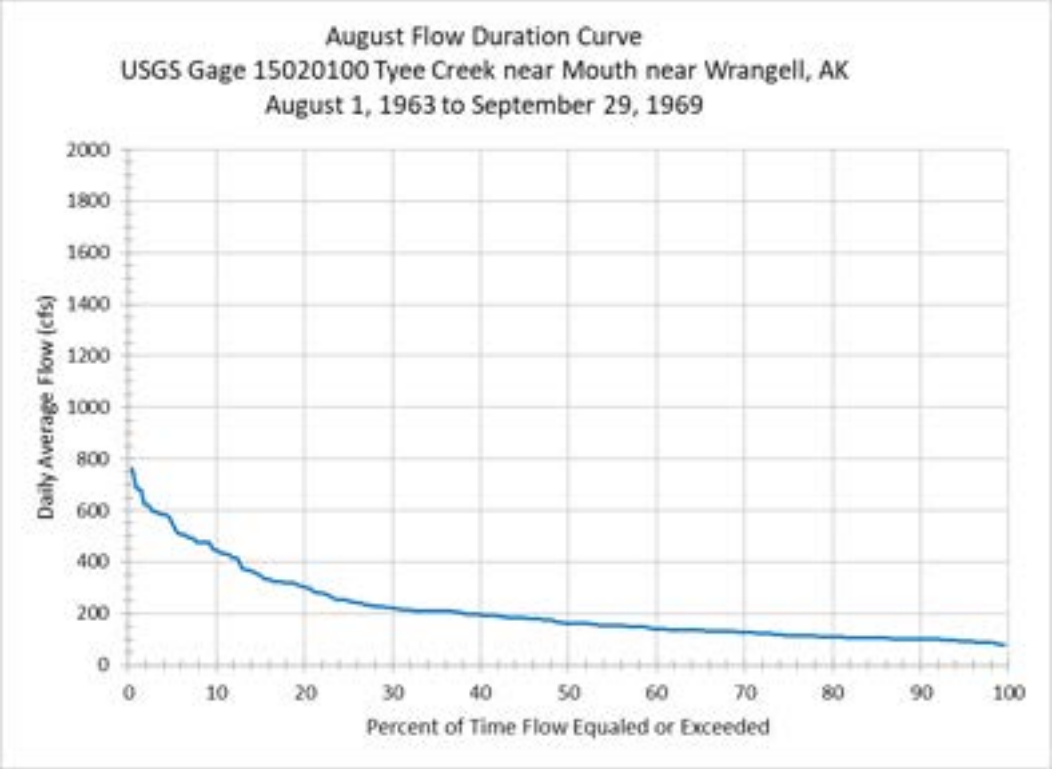


Figure C-9 August Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

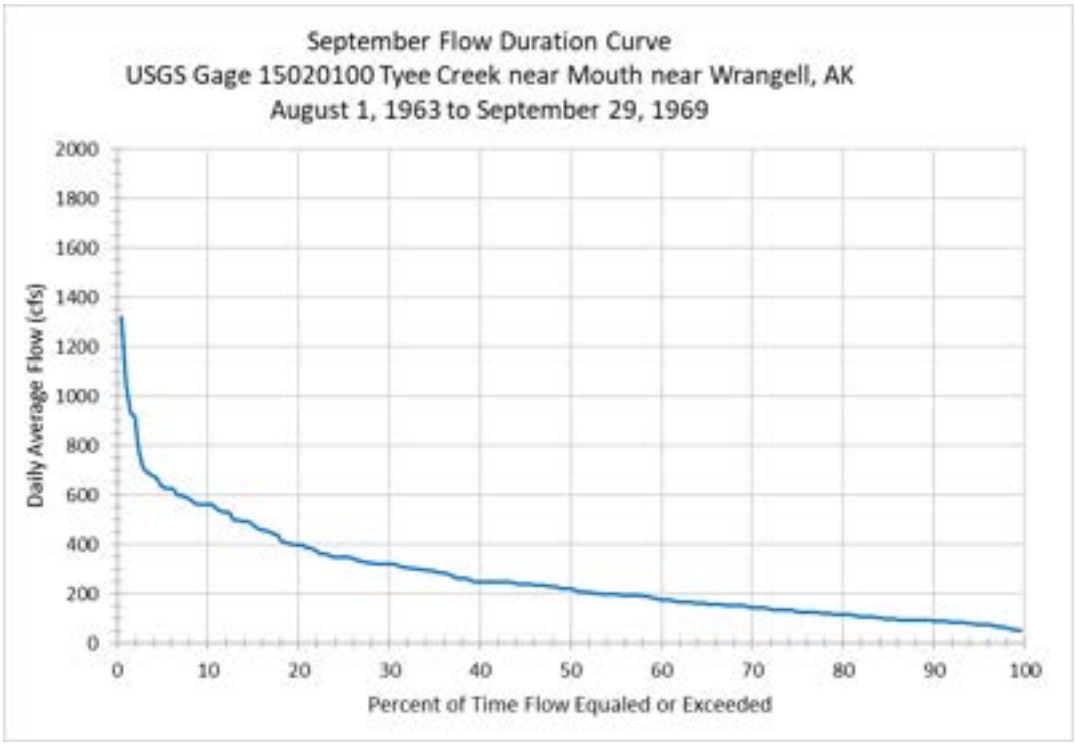


Figure C-10 September Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

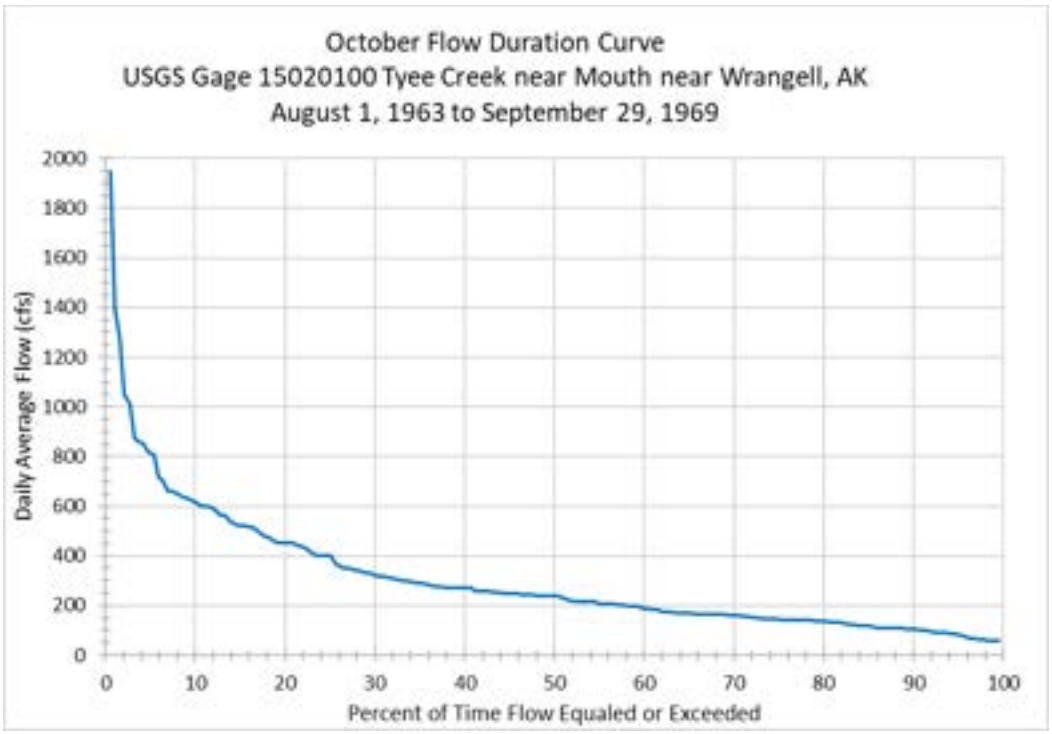


Figure C-11 October Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

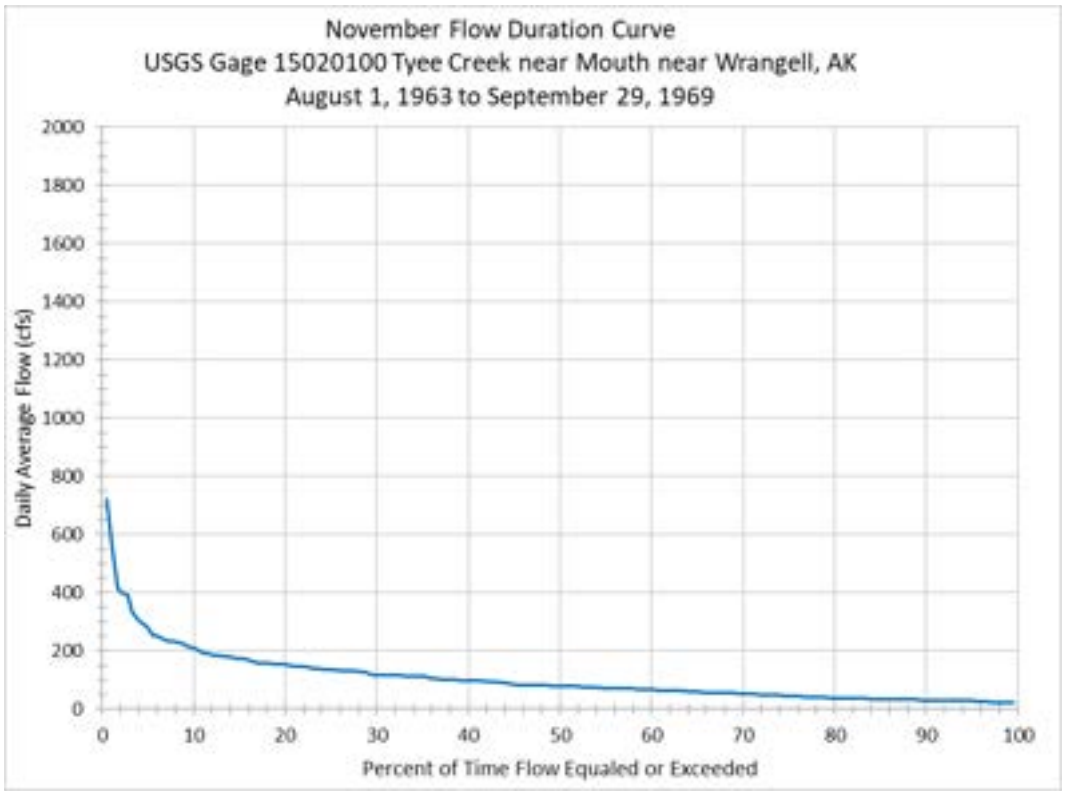


Figure C-12 November Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

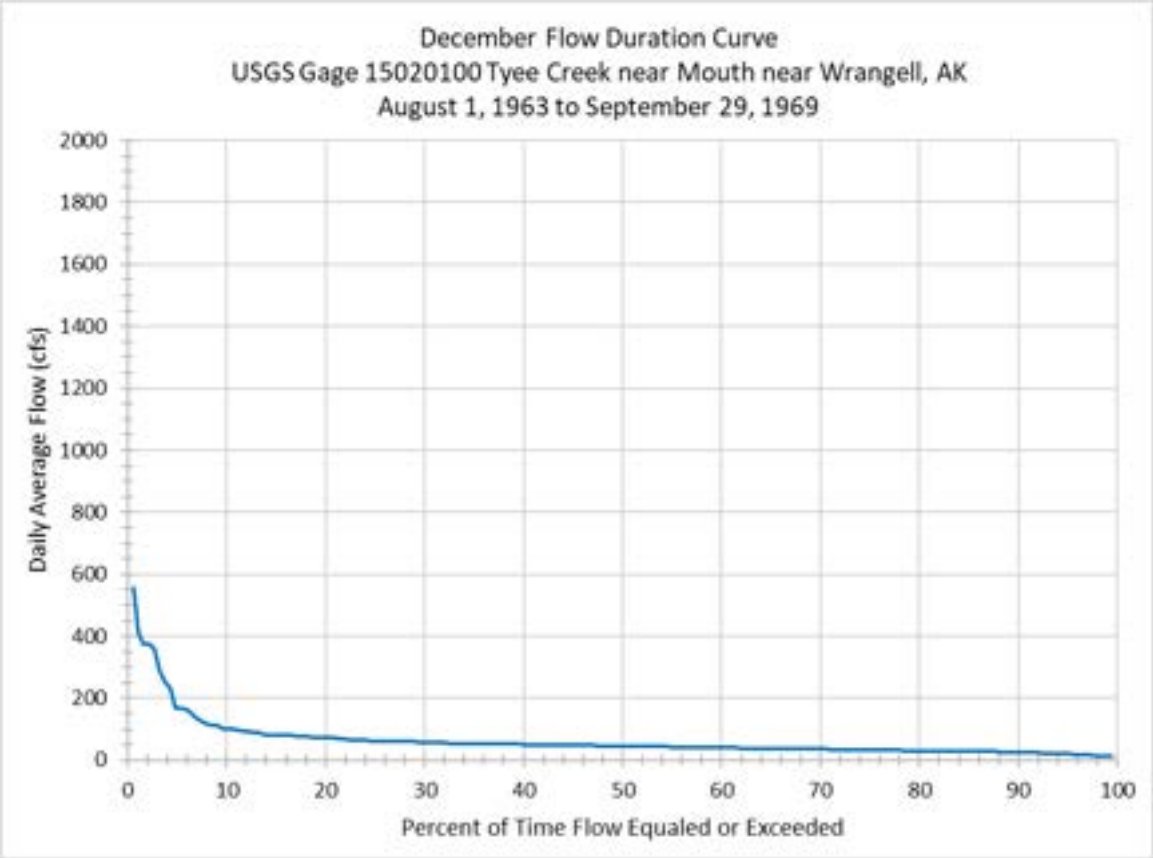


Figure C-13 December Flow Duration Curve, USGS Gage 15020100 Tyee Creek near Mouth near Wrangell, AK.

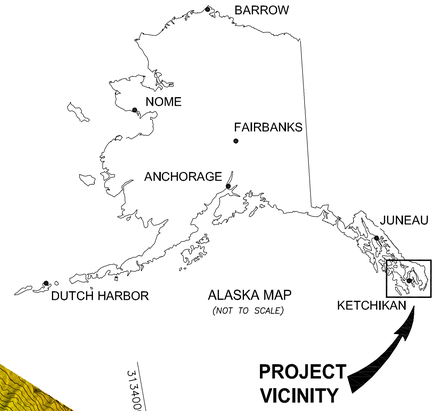
APPENDIX D

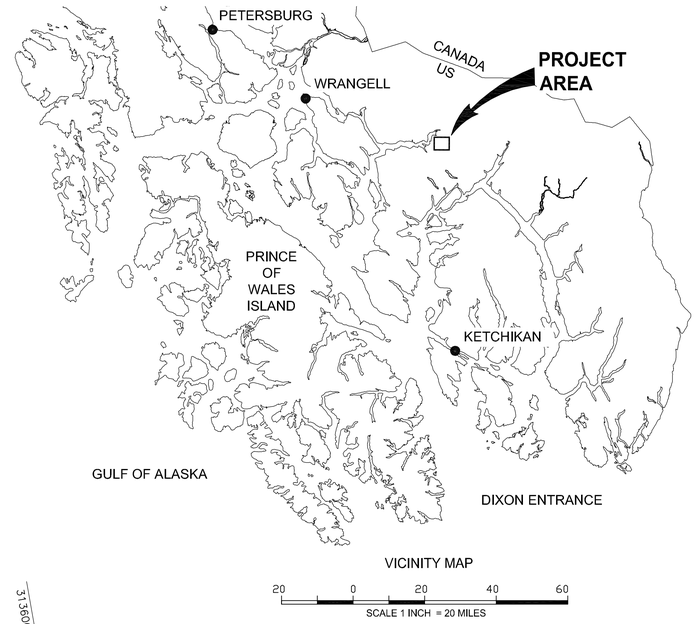
TYEE LAKE BATHYMETRY

TYEE LAKE RESERVOIR BATHYMETRIC SURVEY (SEAPA-09-05)

NOTES

1. BATHYMETRIC AND TOPOGRAPHIC SURVEY OF TYEE LAKE WAS CONDUCTED BY TERRASOND AUGUST 3 - 5, 2009 FOR THE SOUTHEAST ALASKA POWER AGENCY (SEAPA).
2. HORIZONTAL DATUM IS NAD83 AND PROJECTION IS ALASKA STATE PLANE, ZONE 1, US SURVEY FEET. VERTICAL DATUM IS NAVD88 BASED ON THE GEOID06 MODEL APPLIED TO THE ELLIPSOID HEIGHT DERIVED FROM A STATIC GPS OBSERVATION.
3. PROJECT CONTROL WAS BASED ON UNITED STATES GEODETIC SURVEY (USGS) CONTROL AT THE TYEE LAKE STREAM GAUGE. "SCREW" WAS HELD AS LATITUDE 56° 11' 49.62662" N, LONGITUDE 131° 30' 12.39570" W, NAD83 (CORS96, 2003 EPOCH). USGS BRASS CAP "RM3" WAS HELD AS 1397.58' (NAVD88).
4. LAKE LEVEL THROUGHOUT THE SURVEY WAS ESTABLISHED FROM DIFFERENTIAL LEVELS FROM "RM3" TO THE WATER LINE AT THE BEGINNING AND END OF EACH SURVEY SESSION. SPILLWAY ELEVATION IS 1389.11' AS REPORTED BY THE USGS.
5. MULTIBEAM BATHYMETRIC SURVEY WAS CONDUCTED WITH AN R2 SONIC 2024 ECHOSOUNDER, CODA F185 INERTIAL NAVIGATION SYSTEM, AML SVPLUS VELOCIMETER AND TRIMBLE R8 LOCAL BASE STATION BROADCASTING DIFFERENTIAL CORRECTIONS.
6. AIRBORNE TOPOGRAPHIC LIDAR WAS ACQUIRED BY AERO-METRIC AUGUST 4, 2009 USING A PIPER NAVAHO WITH AN OPTECH ALTM GEMINI LASER OPERATING AT A 50 KHZ SCAN FREQUENCY. ALTITUDE WAS CONTROLLED WITH POST PROCESSED KINEMATIC GPS AND CALIBRATED TO TOPOGRAPHIC CONTROL POINTS AT TYEE LAKE.
7. BOTTOM SAMPLES WERE COLLECTED AT 31 LOCATIONS THROUGHOUT THE LAKE USING A PONAR 6"X6" GRAB SAMPLER.





PROJECT CONTROL

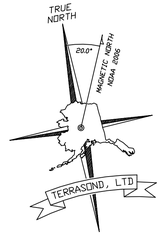
STATION	LATITUDE	LONGITUDE	NORTHING	EASTING	ELEVATION
SCREW	56° 11' 49.62662" N	131° 30' 12.39570" W	1600447.26	3126391.03	1418.04
RM3	---	---	---	---	1397.58

THE INTAKE LOCATION WAS IDENTIFIED IN THE RAW BATHYMETRIC DATA AT ELEVATION 1228.9'. HORIZONTAL COORDINATES FOR THE INTAKE ARE 1600360.6 N, 3128302.3 E.

LEGEND

- 2000 / 1900 — CONTOURS, 100' INDEX INTERVAL
- LAKE LEVEL AUGUST 4, 2009 (1394.11')
- 1500' ELEVATION CONTOUR
- APPROXIMATE DAM LOCATION
- TYEE LAKE HORIZONTAL CONTROL "SCREW"
- TYEE LAKE BENCHMARK "RM3"
- HELICOPTER PAD
- INTAKE LOCATION

GEODETIC PARAMETERS:
HORIZONTAL: NORTH AMERICAN DATUM OF 1983 (NAD83, CORS96, 2003 EPOCH)
VERTICAL: NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88, GEOID06)
PROJECTION: ALASKA STATE PLANE ZONE 1, US SURVEY FEET



500 0 500 1000 1500
SCALE 1 INCH = 500 FEET

TYEE LAKE RESERVOIR BATHYMETRIC SURVEY
AUGUST 3 - 5, 2009
TYEE LAKE, ALASKA

SHEET 1 OF 1

Rev.No.	Revision	Signed	Date

Drawn: LNL	Checked: CDK	Date:	09/17/2009
Interpretation:	Approved: CDK	Dwg No.:	2009-050

SEAPA
Southeast Alaska Power Agency

TERRASOND
TERRESTRIAL AND SEA FLOOR MAPPING

STATE OF ALASKA 49 TH
Christopher Kemp
No.10846
REGISTERED PROFESSIONAL LAND SURVEYOR

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT I AM PROPERLY REGISTERED AND LICENSED TO PRACTICE LAND SURVEYING IN THE STATE OF ALASKA AND THAT THIS MAP REPRESENTS A HYDROGRAPHIC AND TOPOGRAPHIC SURVEY MADE BY ME OR UNDER MY DIRECT SUPERVISION. THE INFORMATION SHOWN HEREON DEPICTS THE CONDITIONS AS SURVEYED AUGUST 3-5, 2009, TO THE BEST OF MY KNOWLEDGE AND BELIEF.