ENVIRONMENTAL ASSESSMENT FOR SMALL HYDROELECTRIC PROJECT EXEMPTION

Kupreanof Microhydro Project
FERC Project No. 14862-001
Alaska

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

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1.0 APPLICATION

On November 28, 2018, Douglas Leen filed (Mr. Leen or applicant), with the Federal Energy Regulatory Commission (Commission), an application for a small hydroelectric project (10 megawatt [MW] or less) exemption from licensing for the proposed 1.5-kilowatt (kW) Kupreanof Microhydro Project (project).[1] The project would be located on an unnamed stream, in Petersburg Borough, Alaska (figure 1). The project would occupy property owned by the applicant and 0.651 acre of federal land in the Tongass National Forest (Tongass), managed by the U.S. Department of Agriculture's Forest Service (Forest Service).

2.0 PURPOSE OF ACTION AND NEED FOR POWER

2.1 Purpose of Action

The Commission must decide whether to grant an exemption from licensing for the project and what conditions, if any, should be included in any exemption issued. Issuing an exemption from licensing would allow Mr. Leen to generate electricity, making about 2.5 megawatt-hours (MWh) of electric power from a renewable resource available to his residence. In this Environmental Assessment (EA), we assess the effects of constructing and operating the project as proposed by Mr. Leen, alternatives to the proposed project including a no-action alternative and recommend conditions to become a part of any exemption from licensing that may be issued.

[1] On September 26, 2019, the applicant informed the Commission of its intent to convert its application for minor license filed on November 28, 2018 to an application for exemption from licensing and included additional information necessary to augment the license application and convert it to an application for exemption from licensing.

2.2 Need for Power

Under section 213 of the Public Utility Regulatory Policies Act (PURPA), the authority of the Commission to grant an exemption from licensing is not limited by a determination of the need for power. *See Briggs Hydroelectric*, 32 FERC ¶ 61,399 (1985). *See also David Cereghino*, 35 FERC ¶ 61,067 (1986). Nonetheless, here Mr. Leen would use the project's power to serve his residence, which is currently dependent on diesel. Thus, the project would serve to reduce fossil fuel use and the risk of potential spills to the aquatic environment during fuel delivery.

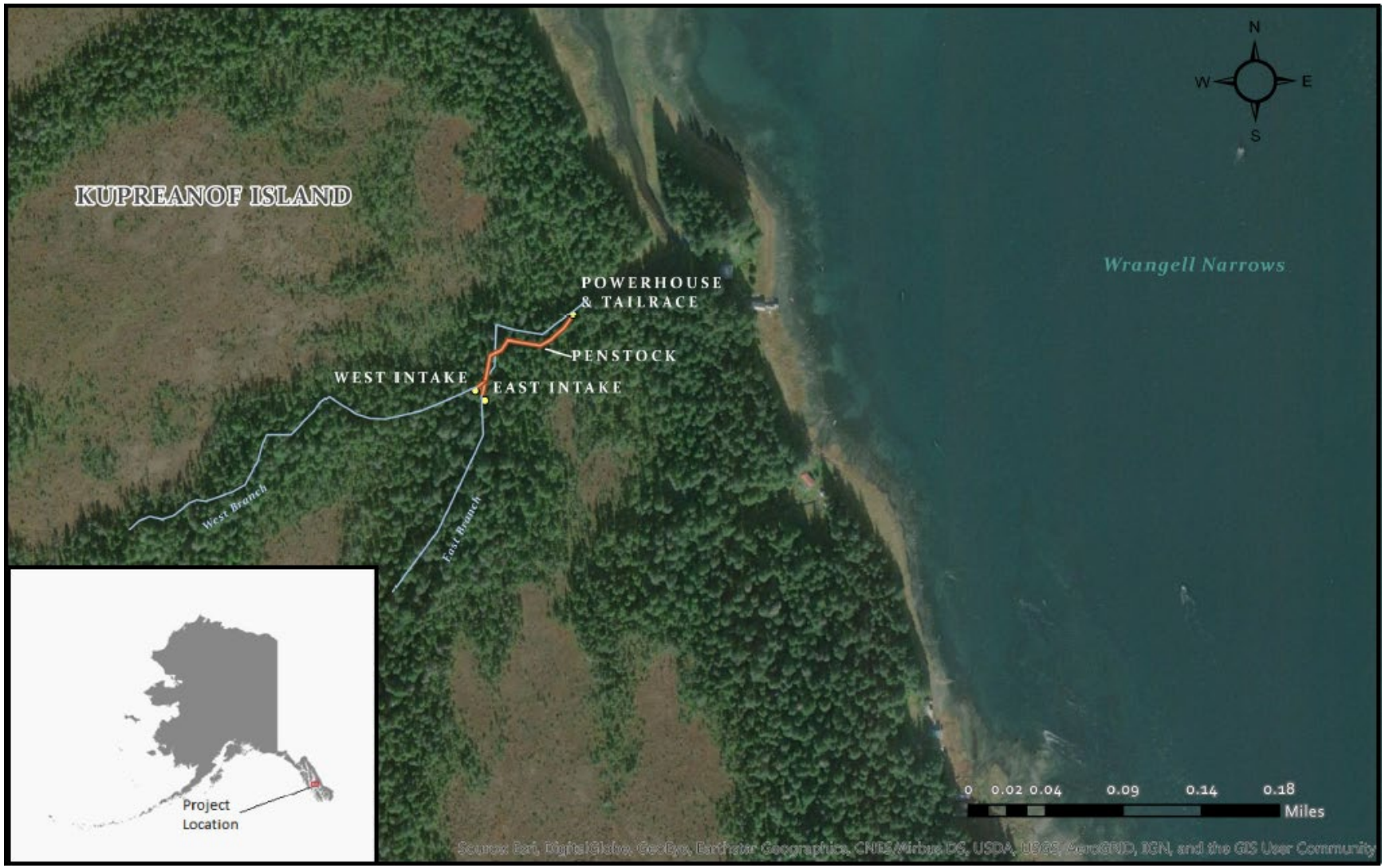

Figure 1. Kupreanof Microhydro Project site plan and general location (see insert) in Alaska (Source: staff).

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 Proposed Action

3.1.1 Project Description

The Kupreanof Microhydro Project would consist of: (1) two surface water intakes: (a) a 3-foot-long, 1.5-foot-wide, 1.5-foot-deep steel intake box located in the east branch of the unnamed stream; and, (b) a 2.5-foot-long, 1-foot-wide, 1.25-foot-deep steel intake box located in the west branch of the unnamed stream; (2) a 6-inch diameter, 458-foot-long partially buried plastic penstock connecting the east branch intake to a powerhouse; (3) a 3-inch-diameter, 30-foot-long, partially buried plastic penstock connecting the west branch intake to the penstock leading from the east branch intake; (4) a powerhouse containing a 1.5-kilowatt (kW) turbine/generator unit; (5) a 3-foot-long, 3-foot-wide tailrace that discharges into the mainstem unnamed stream; (6) a 420-foot-long, transmission line; and (7) appurtenant facilities.

The two intake boxes would be installed in a natural pool within the east and west branches. The intake boxes would have top openings, screened with an angled steel plate with 0.125-inch diameter holes, and would be elevated above the streambed to allow flow to pass around the intakes to ensure a continuous flow in the unnamed streams below the diversions. Water collected through the east and west branch intakes would be carried through the penstocks to the turbine/generator unit and discharged immediately downstream into the mainstem unnamed stream. Power would be transmitted over a 420-foot long transmission line that would be attached to the underside of an existing boardwalk and trees to connect to a battery bank located in a shed adjacent to Mr. Leen's residence. The power would serve Mr. Leen's residence. The average annual generation would be about 2.5 MWh.

3.1.2 Project Operation

Mr. Leen proposes to operate the project in run-of-river mode, where outflow from the project would approximate inflow. Mr. Leen proposes to maintain a year-round minimum flow of 50 gallons per minute (gpm) (0.11 cubic feet per second [cfs]), or inflow, whichever is less, to the 525-foot-long mainstem bypassed reach as measured below the confluence of the east and west branch unnamed streams.[2]

[2] The east and west branch intakes would be located an additional 50 feet upstream of the confluence that forms the mainstem unnamed stream, so the total length of the

As proposed, the maximum hydraulic capacity of the project (flow through the plant) would be 300 gpm (0.67 cfs). At flows of 50 gpm (0.11 cfs) or less in the mainstem unnamed stream, the project would not operate, and all flow would pass into the bypassed reach. At flows greater than 50 gpm (0.11 cfs) and up to 350 gpm (0.78 cfs) (the maximum hydraulic capacity plus the minimum flow), the project would operate, and 50 gpm (0.11 cfs) would pass into the bypassed reach. At flows greater than 350 gpm (0.78 cfs), the project would operate at its maximum capacity, and all remaining flow would pass downstream of the intakes into the bypassed reach. Inflows to the project are not enough to operate the project year-round.

3.1.3 Proposed Measures

In addition to the proposed minimum flow, Mr. Leen proposes to implement the following measures:

- Install angled perforated plate screens with 0.125-inch-diameter holes on the intake openings to prevent entrainment of fish and debris.
- Install boulders in the project's tailrace to prevent the powerhouse discharge from eroding the streambank.
- Following construction of the project facilities, restore stream contours, stream banks, and trenched areas to pre-construction condition.
- Rinse footwear prior to entering project area during construction to prevent the spread of invasive plants.

3.2 Section 30(C) Conditions

Pursuant to section 30(c) of the FPA, 16 U.S.C. § 823a(c), federal and state fish and wildlife agencies have mandatory conditioning authority on exempted projects. No entities filed conditions.

bypassed reach would be 575 feet as measured from the powerhouse discharge to each of the intakes.

3.3 Additional Staff-recommended Measures

The staff alternative includes Mr. Leen's proposed measures and the following additional staff-recommended measures:

- Develop and implement a soil erosion and sedimentation control plan that includes measures for minimizing soil erosion and sedimentation during project construction.

- Develop an operation compliance monitoring plan to document run-of-river operation and maintenance of the minimum flow in the bypassed reach.

- Develop an invasive plants management plan that includes provisions for cleaning equipment as well as footwear prior to entering the project site during construction or maintenance work.

- Stop all work, consult with the Alaska State Historic Preservation Officer (Alaska SHPO), and implement the necessary measures to protect cultural resources, including the preparation of a HPMP, if necessary, to protect any newly discovered cultural resources during project construction, operation, or maintenance,

- Consult with the Alaska SHPO prior to conducting any maintenance, land-clearing, or land-disturbing activities, or implementing any changes to project operation or facilities not specifically authorized by the Commission that may affect cultural resources to minimize adverse effects on any previously undiscovered cultural resources from project activities.

3.4 No-Action Alternative

Under the no-action alternative (*i.e.*, denial of the application), the project would not be constructed. The project would not annually generate an estimated average of 2.5 MWh, and environmental resources in the project area would not be affected. This is the baseline against which the action alternatives are compared.

4.0 CONSULTATION AND COMPLIANCE

4.1 Agency Consultation

The Commission's regulations require that applicants consult with appropriate state and federal agencies, tribes, and the public before filing an exemption application.

This consultation is required to comply with the Endangered Species Act (ESA), the National Historic Preservation Act (NHPA), and other federal statutes. Pre-filing (or initial) consultation must be completed and documented in accordance with Commission regulations.

4.2 Public Outreach and Scoping

On January 10, 2018, Mr. Leen held a pre-filing meeting and site visit at the project location. Mr. Leen invited federal, state, and local agencies and the general public to participate in the meetings and site visit. No agencies or public attended the on-site meeting.

On November 28, 2018, Mr. Leen filed his final license application. On December 11, 2018, the Commission issued a public notice tendering the final application and soliciting additional study requests.

On September 26, 2019, Mr. Leen informed the Commission of his intent to convert his application for minor license to an application for exemption from licensing. On October 23, 2019, the Commission issued a public notice accepting the exemption application, soliciting motions to intervene, stating the Commission's intent to waive scoping, stating that the application was ready for environmental analysis, and requesting comments, terms and conditions, and recommendations. Motions to intervene, as well as comments, terms and conditions, and recommendations were due on December 23, 2019. No motions to intervene were filed. The Alaska Department of Fish and Game (Alaska DFG) filed comments on December 19, 2019. No comments were filed on the notice of intent to waive scoping.

4.3 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with the National Marine Fisheries Service (NMFS) on all actions that may adversely affect Essential Fish Habitat (EFH). Salmon EFH includes all "waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (50 CFR 600.10). In Alaska, freshwater habitat for the salmon fisheries in Alaska includes all streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon in the state. The mainstem unnamed stream, including the project's bypassed reach, and lower reach of the east branch unnamed stream provide EFH for coho salmon (Alaska DFG, 2019; Johnson and Blossom, 2019).

For reasons discussed below in section 5.3.2, *Aquatic Resources*, we have determined that issuing an exemption from licensing for the Kupreanof Microhydro

Project, as proposed with the staff-recommended measures, would have no effect on EFH. Therefore, no further consultation under the Magnuson-Stevens Fishery Conservation and Management Act is required.

4.4 Endangered Species Act

Section 7 of the ESA, 16 U.S.C. § 1536, requires federal agencies to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or result in the destruction or adverse modification of the critical habitat of such species.

On January 28, 2020, staff accessed the U.S. Fish and Wildlife Service's (FWS) Information, Planning, and Conservation (IPaC) System to determine which federally listed species might occur at or near the project. According to the IPaC database, there are no threatened, endangered, or candidate species, or critical habitats, in the project area. [3] Therefore, authorizing the construction and operation of the Kupreanof Microhydro project through an exemption from licensing would have no effect on federally listed species or critical habitats.

4.5 Section 106 of the National Historic Preservation Act

Section 106 of the NHPA, 54 U.S.C. § 306108, requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register). Staff has determined that the project would have no effect on cultural resources in the project area and is requesting concurrence with the Alaska SHPO on this determination.

5.0 ENVIRONMENTAL ANALYSIS

In this section, the general environmental setting in the project area and cumulative effects are described. An analysis of the environmental effects of the proposed action and action alternatives is also included. Sections are organized by resource area (aquatic resources, cultural resources, etc.). Under each resource area, historic and current conditions are first described. The existing condition is the baseline

[3] *See* Interior's official list of threatened and endangered species accessed by staff using the IPaC website (https://ecos.fws.gov/ipac/) on January 28, 2020 and placed into the record for Docket No. P-14862-001 on January 30, 2020.

against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures. Staff conclusions and recommended measures are discussed in section 6.0 of the EA.

Unless noted otherwise, the sources of our information are Mr. Leen's application filed on November 28, 2018, and additional information filed on June 10, 2019, September 24, 2019, and October 1, 2019.

5.1 General Description of the Area

The project would be located on the eastern side of Kupreanof Island in central Southeast Alaska, in the City of Kupreanof. The project would utilize flows from two unnamed tributary streams (hereafter, east branch and west branch unnamed streams) that converge to form the mainstem unnamed stream, which then flows about 525 feet into the marine waters of the Wrangell Narrows.[4] From the confluence of these streams upstream to their headwaters, the east branch is about 1 mile long and the west branch is about 0.5 mile long. This unnamed stream basin drains about 450 acres of land primarily in the Tongass National Forest. The stream basin exhibits an intermittent flow regimen, with periods of no flow occurring primarily in winter and summer, and high flows following snowmelt and rainfall events. The streams in the project area are classified as a moderate gradient (ranging from 1 to 6 percent), mixed control, small channel type[5] with banks consisting of alluvial and colluvial deposits, substrate dominated by cobble and boulders, and stream widths ranging from 3 to 10 feet.

The climate in the basin is considered temperate oceanic, where warm ocean currents moderate temperature extremes resulting in cool summers and mild winters, and abundant precipitation (Forest Service, 2000). In the nearby community of Petersburg, Alaska, average annual precipitation is 112.3 inches, and average annual snowfall is 84.5 inches (Western Regional Climate Center, 2019). Average temperatures at Petersburg

[4] The Wrangell Narrows is a 22-mile-long channel between Kupreanof Island and Mitkof Island in the Alexander Archipelago in Southeast Alaska.

[5] These channel types are characterized as having a moderate gradient (2 to 6 percent), limited sediment deposition processes, channel banks composed of materials limiting channel migration and flood plain development, high flows mostly contained within the active stream channel, and riparian areas seldom extending beyond 100 ft from stream banks.

range from a minimum of 25.9ºF in January to a maximum of 63.4ºF in July (Western Regional Climate Center, 2019).

5.2 Scope of Cumulative Effects Analysis

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 C.F.R., section 1508.7), an action may cause cumulative impacts on the environment if its impacts overlap in time and/or space with the impacts of other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes such actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time, including hydropower and other land and water development activities.

Based on our review of Mr. Leen's application for an exemption from licensing, agency and public comments, and our independent analysis, we have identified no resources that could be cumulatively affected by constructing and operating the Kupreanof Microhydro Project.

5.3 Proposed Action and Alternatives

Only resources that would be affected, or about which comments have been received, are addressed in this EA and discussed in this section. We have not identified any land use, aesthetics, or socioeconomic issues associated with the proposed action. As discussed in section 4.4 *Endangered Species Act*, FWS's IPaC database indicates that no federally listed species nor any proposed or designated critical habitat are expected to occur in the project area. Therefore, we do not assess effects on these resources in this EA.

5.3.1 Geology and Soils

5.3.1.1 Affected Environment

The project is located on the Lindenberg Peninsula of Kupreanof Island. This once-glaciated peninsula is composed of U-shaped valleys, steep walled cirques, scoured uplands, and till covered lowlands (Forest Service, 2000). Surficial geology on the peninsula is predominately composed of Holocene and/or Pleistocene alluvial, colluvial, and glacial deposits (Forest Service, 2000). The soils have generally been described to include strong acidity, extreme friability, low natural fertility, extremely rapid infiltration rates, rapid permeability in their upper layers, and perpetual moistness (Forest Service, 1976). A thick organic mat, with depths ranging from a few inches to over a foot, overlie the soils and provide resistance to sheet erosion (Forest Service, 1976). The proposed

project would be located in a lowland area composed of muskeg[6] and forest which is dominated by somewhat poorly, to poorly drained soils (Forest Service, 1976).

5.3.1.2 Environmental Effects

Constructing the project would require ground disturbance and limited vegetation clearing to install two submerged intake boxes, two sections of buried plastic penstock, the powerhouse, and the tailrace. The entire project would be constructed using hand tools. Project construction would disturb about 30 square feet of land and 10 square feet of streambed. The installation of the tailrace would include placing boulders along the streambank to prevent erosion from the powerhouse discharge. The transmission line would be attached to the underside of an existing boardwalk and trees; therefore, installation would not result in soil disturbance.

To minimize soil erosion following construction, Mr. Leen proposes to restore all disturbed stream contours and streambank areas to pre-construction condition. Mr. Leen also proposes to refill the trenched areas with excavated soils and restore these areas to their original contour.

Our Analysis

Project construction, including land and in-water construction and excavation associated with installing the intakes, penstocks, and the powerhouse has the potential to cause localized erosion and sedimentation if control measures are not in place around work areas. Uncontrolled surface runoff could introduce suspended soil particles into the stream that could degrade water quality by causing turbidity.

Mr. Leen's proposal to, generally, restore any disturbed stream contours and banks to pre-construction condition, and to refill all trenched areas with excavated soils would help to reduce the potential for erosion and sedimentation following project construction. However, Mr. Leen's proposal lacks sufficient detail on the degree of disturbance, the procedures he would use to control erosion during all construction activities resulting in land disturbance, and the specific common best management practices he would implement, such as placing erosion control barriers around work areas prior to the start of ground-disturbing activities. An erosion and sedimentation control plan that includes these details and procedures and would be based on site-specific conditions and final

[6] A regional term for sphagnum bog or peatland.

project designs, would minimize erosion and prevent sediment from entering the stream basin and adversely affecting fish and wildlife.

Once in operation, the project should have little or no effect on geology and soils. Installing boulders in the project's tailrace would reduce the potential of streambank erosion resulting from the powerhouse discharge during project operation.

5.3.2 Aquatic Resources

5.3.2.1 Affected Environment

Water Quantity and Quality

The unnamed stream basin is characterized by poorly drained soils and relatively shallow soil depth to bedrock. Persistent rain throughout most of the year saturates the soil through much of the basin resulting in an abrupt increase in the surface water discharge shortly following precipitation events (Forest Service, 2000). Overall, these conditions contribute to relatively high peak flows and low base flows in the project reach.

The applicant operated a stream gauge weir on the mainstem unnamed stream for 309 days from November 2008 to October 2009.[7] During this period, daily stream flow was highly variable ranging from 0 to 30,000 gpm (0 to 66.84 cfs). This variability is the result of typically little to no flow in the stream punctuated by sudden fluctuations in stream discharge associated with precipitation events (figure 2). For the period of record, flows exceed 350 gpm (0.78 cfs) 50 percent of the time and were 50 gpm (0.11 cfs) or less 37 percent of the time. On June 6, 2018, Alaska DFG estimated a flow of 218 gpm (0.49 cfs) in the east branch of the unnamed stream and 261 gpm (0.58 cfs) in the mainstem indicating, that at the time, the east branch unnamed stream was contributing 84 percent of the total flow in the mainstem.

[7] The stream gauge was located about 40 feet downstream of the confluence of the east and west branches of the unnamed stream.

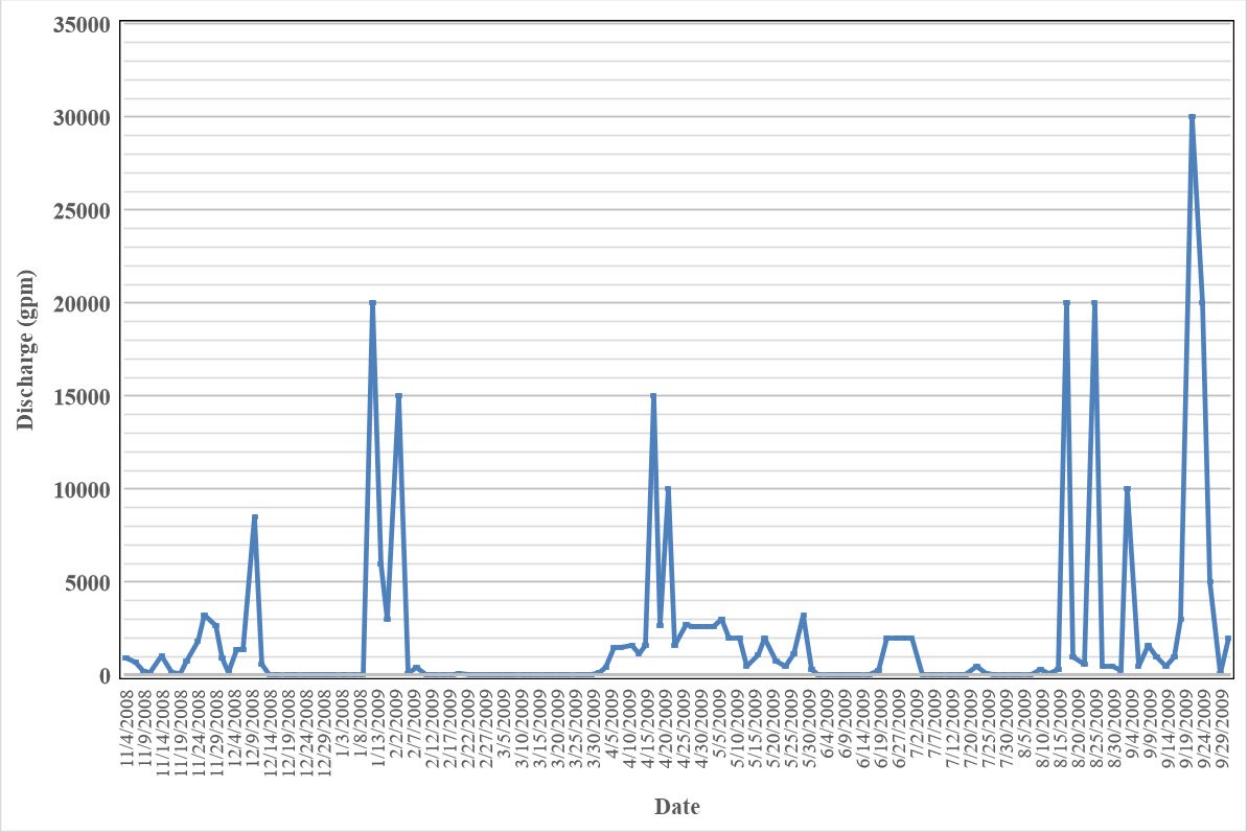

Figure 2. Daily streamflows measured at unnamed stream, November 2008 - October 2009 (Source: application, as modified by staff).

No water quality data were collected in the proposed project area; however, the water quality is likely very good due the lack of development or environmental disturbances in the upper portion of the unnamed stream watershed. Forest Service (1976) generally described water quality within streams and lakes near the project area as high, with low dissolved inorganic substances.

There are no existing water rights or any public or domestic water uses in the stream basin.

Fishery Resources

In June 2018, Alaska DFG conducted a fish survey of the project's bypassed reach and upstream of the intake locations, in the east branch and west branch of the unnamed stream, to characterize the project's fishery resources. A total of 80 fish representing four species were collected (table 1). Coho salmon and cutthroat trout were the most abundant species collected representing 37.5 and 33.8 percent of the total catch,

respectively. Dolly Varden comprised about 21 percent of the total catch and sculpin comprised less than 10 percent of the total catch. More specifically, in the bypassed reach, coho salmon was the most abundant fish representing 42 percent of the catch. In the east branch unnamed stream, cutthroat trout (43 percent) was the most abundant fish caught followed by coho salmon (38 percent). In the west branch unnamed stream, Dolly Varden (78 percent) was the most abundant species collected. All of the coho salmon collected were rearing juveniles. Habitat observations during the June 2018 survey indicated that salmonid spawning habitat was almost entirely absent in the unnamed stream. Because of this lack of spawning habitat, Alaska DFG indicated that juvenile coho salmon inhabiting the unnamed streams likely migrated from Coho Creek[8] to the mouth of Petersburg Creek, south through the Wrangell Narrows, and then into the unnamed stream.

Table 1. Fish species collected in the vicinity of the proposed project (Source: application, as modified by staff).

Species	No. Collected	% Total Abundance
Coho Salmon	30	37.5
Cutthroat Trout	27	33.8
Dolly Varden	17	21.3
Sculpin	6	7.5
Total	80	100

5.3.2.2 Environmental Effects

Mode of Operation

Mr. Leen proposes to operate the project in a run-of-river mode, with outflow equal to inflow.

Our Analysis

The project would not include a dam or impoundment; therefore, it would not have the ability to store water. Operating the project in a run-of-river mode would result in no change in the amount, schedule, or duration of flow in the mainstem unnamed stream downstream of the project tailrace. By operating the project in run-of-river mode, aquatic

[8] Coho creek is a tributary of Petersburg Creek. The mouth of Coho Creek is located about 0.75 mile north of the mouth of the unnamed stream.

habitat in the stream downstream of the powerhouse, including EFH, would be unchanged compared to existing conditions.

Bypassed Reach Flows

When there is sufficient flow to operate, the project would divert flow and bypass about 575 feet of stream, including 525 feet of the mainstem reach of the unnamed stream. Mr. Leen proposes to maintain a minimum flow in the mainstem bypassed reach of 50 gpm (0.11 cfs), or inflow, whichever is less as measured below the confluence of the east and west branch unnamed streams. The project would generate electricity using flows over 50 gpm (0.11 cfs) and up to 350 gpm (0.78 cfs).

No entities recommended any measures regarding a minimum flow in the bypassed reach.

Our Analysis

At streamflows of 50 gpm (0.11 cfs) or less, no water would be diverted by the project and there would be no change in flows in the bypassed reach compared to existing conditions. At stream flows greater than 50 gpm and up to 350 gpm, a minimum flow of 50 gpm would be maintained in the mainstem bypassed reach and the remainder of the flow up to 300 gpm would be diverted for generation. At streamflows above 350 gpm, 300 gpm would be diverted by the project and all remaining flow would pass into the bypassed reach.

Because of the "flashy" nature of the unnamed streams, little to no flow occurs in the proposed bypassed reach during some periods, primarily during late winter and summer. For instance, based on the flow data collected from the mainstem section of the bypassed reach, no flow was detected in the stream during 21 percent of the flow period and flows of 50 gpm or less occurred 37 percent of the time. Higher flows (from 350 to 30,000 gpm [from 0.78 cfs to 66.8 cfs]) occurred 50 percent of the time, mostly following prolonged rain events during spring and fall months.

The fish survey results indicate that despite the highly variable flow regime of the stream, including periods of no flow, the mainstem still supports both resident and anadromous fish. Further, streams with intermittent flow regimes are known to provide suitable rearing habitat for juvenile coho salmon (Wigington et. al., 2006). In these flashy stream systems, the movement of migratory fish such as coho salmon are limited to high flow events. During little to no flow periods, fish in these streams are sustained in residual pools (Wigington et. al., 2006).

Generally, Alaska DFG recommends instream flows that provide flow regimes similar to the magnitude and timing of the natural streamflows in order to maintain seasonal use of fish habitat (Klein et. al., 2018). A comparison of the daily streamflows and predicted streamflows during project operation (while maintaining a minimum flow of 50 gpm), indicates that the overall mean annual flow of the mainstem bypassed reach would be reduced by 11 percent during project operation. Project operation would not affect the magnitude and timing of streamflows of 50 gpm or less. During inflows of 100 to 600 gpm (0.22 to 1.34 cfs), which occurred 22 percent of the time, the daily streamflows in the bypassed reach would be reduced by 50 to 85 percent.[9] At flows greater than 600 gpm (1.34 cfs), the reduction in flow during project operation would range from 1 to 40 percent. Overall, there would be a reduction in flow magnitude in the bypassed reach when inflows are available to operate the project; however, the timing of low and high flow events would not be affected. Thus, the typical seasonal prolonged low flow periods punctuated by shorter-duration peak flow events would continue during project operation. Because there would be no discernable effect on the magnitude of peak flow events, sufficient flow needed for fish movement, including migration of juvenile coho salmon, in and out of the stream would continue during project operation. Therefore, providing a minimum flow of 50 gpm, or inflow, whichever is less, in the mainstem bypassed reach would maintain suitable habitat, including EFH, and stream connectivity, for both resident and anadromous fish.

Fish Protection Measures

When the project is operating, fish could become entrained into the project intake, penstock, and turbine. To prevent entrainment of fish and debris, Mr. Leen proposes to install an angled perforated plate with 0.125-inch diameter holes on each of the intakes.

In its comments filed on December 19, 2019, Alaska DFG stated that fish entrainment would be limited by covering the intakes with perforated inclined plates with holes measuring 0.125-inch in diameter or less and that fish passage should not be affected because the intakes will be submerged in natural pools within the streams.

[9] Based on proposed project operations, daily streamflows in the bypassed reach would be reduced by 50 percent or more during flows of 100 to 600 gpm (0.22 to 1.34 cfs), with a maximum reduction (85%) occurring at a 350 gpm (0.78 cfs) flow.

Our Analysis

Given the low flow passing the through the perforated plates and the small diameter (0.125-inch) holes, fish are not likely to be entrained and be subjected to turbine injury or mortality. For example, Swain and Holtby (1989) reported that stream-rearing juvenile coho salmon had body depths ranging from 0.4 to 0.67 inch. Maekawa (1977) reported a minimum body depth of about 0.2 inch for first year juvenile Dolly Varden and Zimmerman (1965) reported a minimum body depth of 0.39 inch for cutthroat trout. Based on the body size of these juvenile fish, using perforations of 0.125-inch diameter would prevent entrainment of juvenile and adult salmonid species, including rearing coho salmon that may occur in the vicinity of the submerged intakes. An angled screen design would help guide fish and debris over and away from the intake screen face and into the bypassed reach. The design of the project's intakes would allow passing fish to move around the intake boxes during lower flows and over and around the intake boxes during higher flows, and thus, would have no effect on fish passage.

5.3.3 Terrestrial Resources

5.3.3.1 Affected Environment

The project would be located in the Northern Pacific Coastal Forest ecoregion, which is comprised of an extensive archipelago of rugged, forested islands and the mountainous margin of the adjoining mainland. While the Coast Mountains of the mainland attain elevations of up to 10,000 feet and presently support extensive alpine glaciation, in the archipelago the landforms rarely exceed 3,300 feet, and are completely vegetated in forests, muskeg, and subalpine parkland and shrubland. (Forest Service, 1996; Ricketts *et al.,* 1999; Alaska DFG, 2015).

The project would be located near the eastern shore of Kupreanof Island. Within two to three miles northwest and southwest of the project, forested hills rise to elevations between 1,900 and 3,000 feet. Most of the intervening lowlands is dominated by muskeg, except for the stream courses where forest cover again dominates (Forest Service, 1996; Alaska DFG, 2015; Western Regional Climate Center, 2019).

The proposed project would be built along an unnamed stream drainage within an area of old-growth forest wetland dominated by Sitka spruce, western hemlock, and Alaska yellow-cedar, with blueberries, devil's club, lady fern, oak fern, skunk cabbage, *Sphagnum*, and other native mosses and grasses providing typical understory and groundcover elements. The lands within the project boundary fall entirely within this habitat type, encompassing less than an acre (0.865 acre) total.

In May 2018 a Forest Service botanist surveyed the project area for sensitive plants. No sensitive or rare plants were found in the project area. Several non-native plant species, including Japanese knotweed (*Reynoutria japonica*[10]), were observed in the vicinity of the existing residence on private property, near but outside of the project boundary. In June 2019 the applicant reported the Japanese knotweed occurrence had been eradicated.

The project site is located within a forested wetland area classified by the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) database as a freshwater forested/shrub wetland, dominated by conifers and with seasonally saturated soils (PFO4B). This wetland unit extends along the stream course approximately 1.2 miles above the project, as well as below the project roughly a quarter-mile south and a half-mile north along the coastline of the Wrangell Narrows, for a total mapped extent of 159 acres. The NWI classifications indicate that this PFO4B forested/shrub wetland type is common in the area, including four similar or larger examples within 1 to 2 miles of the project site.

Habitat conditions on Kupreanof Island support a wide array of native wildlife, including Alexander Archipelago wolf, black bear, river otter, American marten, moose, Sitka black-tailed deer, beaver, porcupine, squirrels, bats, and other small mammals; bald eagles and other raptors, owls, waterfowl, and both migratory and resident songbirds. Herpetofauna are generally scarce in southeast Alaska, and in the area of Kupreanof Island nearest to the project, no reptiles have been documented. Only two amphibians (rough-skinned newt and western toad) have been confirmed on Kupreanof Island, both of which are pond-breeding species (Forest Service, 1996).

In June 2018 a Forest Service wildlife biologist conducted a site visit and project level analysis, and reported that no rare or sensitive species, nor any nests, dens, or other areas of particular wildlife importance are known to occur within the analysis area (within 500 feet of the project boundary).

5.3.3.2 Environmental Effects

Invasive Plants

Japanese knotweed and other non-native plant species were documented in the project area near the existing residence during the botanical survey in May 2018. A year

[10] Japanese knotweed has also been classified as *Fallopia j.*, and still is frequently referenced as *Polygonum cuspidatum* in many invasive plants guides.

later the applicant reported the knotweed had been eradicated. To prevent the introduction and spread of invasive species, the applicant proposes, during the construction phase, to rinse footwear prior to entering the project area. In its 2018 invasive plants risk assessment for the proposed project area, the Forest Service recommended that the applicant make sure equipment and footwear are clean when entering the site for work, in order to minimize the risk of spreading high priority invasive plants.

Our Analysis

Japanese knotweed is recognized both for its ability to spread by diverse means and for its tenacious capacity to persist at infested sites. The species is highly invasive, and extremely persistent once established, outlasting all but the most thorough eradication efforts (Swearingen *et al*., 2010; Alaska Plant Materials Center 2014). Japanese knotweed can tolerate deep shade and form dense thickets in riparian areas, and also invade wetlands. It outcompetes native plants, clogs waterways, and diminishes habitat quality for fish and wildlife (Swearingen *et al*., 2010; Alaska Plant Materials Center 2014). The rapid spread of Japanese knotweed is facilitated by its ability to reproduce either from seed or vegetatively, the latter including growth of long, spreading rhizomes or resprouting from even tiny fragments of stem or rhizome material (Swearingen *et al*., 2010; Alaska Plant Materials Center 2014). Its propagules can be transported by water, in contaminated fill dirt, or even on the soles of shoes (Swearingen *et al*., 2010).

Given the difficulty in controlling knotweed and other invasive species, taking steps to control the introduction and spread would benefit wildlife and their habitats. The applicant's proposal to rinse off footwear prior to entering the project site during construction would reduce the risk of introducing and spreading invasive species. However, footwear is only one potential means for spreading propagules. Assuring that all equipment used during construction (shovels, spades, etc.) as well as footwear are clean before entering the site for work would further minimize propagation of invasive species. Developing and implementing an invasive plants management plan in consultation with the Forest Service, that describes best management practices and methods to assure equipment and footwear are clean before entering the project site would minimize the risk of establishing invasive plants in the project site or on National Forest System land.

Wetlands

Construction of the proposed project works would disturb approximately 30 square feet of forested wetland. Most of this (about 20 square feet) would be short-term disturbance associated with digging the two sections of trench to bury the penstock, then refilling the trenches with excavated spoils and reestablishing existing contours. About 10 square feet associated with the construction of the turbine/powerhouse pad would be a long-term or permanent conversion from wetland vegetation.

Once operating, project effects on wetlands and associated riparian vegetation would be limited to changes in flow in the bypassed reach. The applicant also proposes to maintain 50 gpm, or inflow if less, in the mainstem bypassed reach to maintain aquatic habitat in the bypass reach.

No agency recommendations regarding wetland resources were received.

Our Analysis

Loss of wetland habitat from construction of the project would be minimal. The turbine/powerhouse pad would require permanent conversion of 0.00025 acre (10 square feet), or approximately 0.00015 percent of the 159-acre forested wetland area. In the near-term another 0.0005 acre (20 square feet) or roughly 0.0003 percent of the wetland area would be temporarily disturbed from installing the project penstocks but should gradually re-establish over time. Given the small area affected and the abundance of similar wetland habitat in the project area, the loss and disturbance of wetland resources are considered negligible. Additionally, implementation of the previously described measures to prevent introduction of non-native invasive plants would favor reestablishment of native rather than weedy species, further limiting potential construction-related project effects to wetland vegetation.

Operationally induced changes in flows and water levels in the bypassed reach could influence the water saturation depth in wetland soils adjoining the reach, if such flow changes were of sufficient magnitude and duration. If the wetland soil's water saturation depth were significantly altered for extended periods of time, this could degrade wetland habitat through gradual changes in vegetation composition. However, available stream flow data and project operation thresholds discussed in 5.3.2 *Aquatic Resources* indicate that only 22-24 percent of the time[11] would project operations reduce

[11] Specifically, 22% of days across the entire period of record (309 days), or 24%

daily streamflow volume in the bypassed reach by 50 percent or more. The duration of such events ranges from 1-6 consecutive days, although during the more critical early growing season (April-June) those periods would not exceed 2-3 consecutive days. Given the limited frequency and duration of large flow reductions (50% or more of volume) in the bypassed reach, it is unlikely that any changes to saturation levels in wetland soils along the reach would be sustained long enough to lead to changes in wetland vegetation composition. Even if a discernible shift in plant composition did occur within some small area along the reach, the bypassed reach itself composes only 4% of the total linear extent of streamways within this 159-acre wetland area. Therefore, the effect of project operation on wetlands in the area would be negligible.

Wildlife

As described in section 5.3.3.1, the project vicinity has extensive intact upland habitats supporting a wide array of native wildlife. However, no rare or sensitive species, nor any nests, dens, or other key wildlife use sites are known to occur within or near the project boundary.

No agency recommendations regarding wildlife resources were received.

Our Analysis

Loss or modification of terrestrial habitats, as discussed above, would be minimal in extent, and primarily short-term in duration. Use of non-powered hand tools to construct the project greatly limits the potential radius for noise and potential wildlife disturbance during the construction phase. When the project is operational, it will largely supplant the prior use of a diesel generator, reducing the existing ambient noise levels in the project area. Maintenance activities, including clearing of debris, snow, and ice from the intakes and penstock, would create only minimal, local, and brief disturbances. Preventing spread of the prior Japanese knotweed infestation, described in the *Invasive Plants* section, will help preserve wildlife habitat quality. Construction and operation of the project should have minimal if any adverse effect on wildlife resources.

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of days during the wetland growing season (April 7 – Oct 31), as defined by the Natural Resource Conservation Service's Climate Analysis for Wetlands Tables (NRCS, 2020).

5.3.4 Recreation Resources

5.3.4.1 Affected Environment

Recreational use of Kupreanof Island is dependent on access which is limited to shorelines and the few roaded areas on the island. Primary uses include fishing, hunting, kayaking, camping, picnicking, beach combing, scenery viewing, and lodging in recreational cabins. Most of Kupreanof Island is within the Tongass National Forest which provides and manages several trails, picnic areas, and small rustic cabins (Forest Service, 2000, 2016).

The project area itself receives little to no recreational visitation because it is primarily on private land, is remote, and has limited access. The closest areas to the project that support recreation are Wrangell Narrows, where sightseeing excursions on boat and recreational fishing occurs, and Petersburg Creek, located about 0.5 mile north of the project site. Wrangell Narrows receives significant use by commercial and recreational fishing vessels and is part of the Alaska Marine Highway. Kupreanof Island does not receive much cruise ship tourism because it lacks docking facilities for large ships; however, smaller tour boats (20-30 people) occasionally visit Petersburg Creek (Forest Service, 2000). Petersburg Creek is relatively popular among commercial outfitters because it traverses the Petersburg Creek-Duncan Salt Chuck Wilderness Area via the Petersburg Trail which runs alongside the creek and is easily accessible from nearby Petersburg by boat. The Wilderness Area boundary is located about 0.5 mile north of the project site. The entire 7 miles of Petersburg Creek, including Petersburg Lake, has been recommended by the Forest Service as suitable for designation as a Wild River under the Wild and Scenic Rivers Act for its outstanding fishery values and is being managed by the Forest Service to maintain these values.

The portion of the project site located within the Tongass National Forest is designated as “Semi-Remote Recreation” in the 2016 Tongass National Forest Land and Resource Management Plan. Semi-Remote Recreation areas are to be managed to maintain “opportunities to experience a moderate degree of independence, solitude and remoteness.” Some motorized use is allowed in these areas as well as small-scale rustic recreation facilities with “an occasional enclave of concentrated development” (Forest Service, 2016, 2000). In addition to recreation, land uses in the project area include timber production, forest management, small residential development, small business operations, and some mining.

The eastern portion of Kupreanof Island, where the project site is located, is highly scenic due to its topographic features. High forested mountains rising over 2,000 feet in

elevation from sea level create dramatic contrasts with the surrounding lowlands and waterways. The Tongass National Forest Land and Resource Management Plan establishes Visual Priority Routes and Use Areas which are defined as "viewpoints from which scenery will be emphasized" (Forest Service, 2016). In the project vicinity, Petersburg Creek and Wrangell Narrows are Visual Priority Routes. Views of the project vicinity from Wrangell Narrows at the mouth of Petersburg Creek are of snowcapped mountains in the background, high forested mountains in the middle ground, and forested lowlands and water in the foreground. Forest Service visual management objectives for the Semi-Remote Recreation designation of the portion of the project site within the Tongass National Forest allow for activities to be evident but subordinate to the landscape (Forest Service, 2016, 2000).

5.3.4.2 Environmental Effects

The applicant is not proposing, nor have any entities recommended, any measures for the protection or enhancement of recreational or aesthetic resources.

Our Analysis

Due to its small size and remote location on mostly private land, the proposed project would have minimal to no effect on recreational uses or visual resources. The construction or operation of the project would not preclude any existing or future recreational access or uses that might occur on the National Forest within or adjacent to the project boundary. Because the project site is either within or surrounded by forest, it would not likely be noticeable to any nearby visitors on the National Forest and would not be visible from any Forest Service-designated Visual Priority Routes such as Petersburg Creek or Wrangell Narrows. The portion of the project that would be located on the National Forest would be consistent with the Forest Service's Semi-Remote Recreation land use designation for the area because any project-related modifications to the environment would be visually subordinate to the surrounding landscape. Since the project is located 0.5 mile outside the boundary of the designated Petersburg Creek-Duncan Salt Chuck Wilderness Area and 0.25 mile outside the proposed Petersburg Creek Wild River management corridor, it would have no impact on Forest Service management objectives for these areas.

5.3.5 Cultural Resources

5.3.5.1 Affected Environment

Section 106 of the NHPA requires that the Commission evaluate the potential effects on properties listed or eligible for listing in the National Register. Such properties

listed or eligible for listing in the National Register are called historic properties. In this document, we also use the term "cultural resources" for properties that have not been evaluated for eligibility for listing in the National Register. Cultural resources represent things, structures, places, or archaeological sites that can be either prehistoric or historic in origin. In most cases, cultural resources less than 50 years old are not considered historic. Section 106 also requires that the Commission seek concurrence with the state historic preservation office (SHPO) on any finding involving effects or no effects on historic properties and allow the Advisory Council on Historic Preservation an opportunity to comment on any finding of effects on historic properties. If Native American (*i.e.*, aboriginal) properties have been identified, section 106 requires that the Commission consult with interested Indian tribes that might attach religious or cultural significance to such properties.

Area of Potential Effects (APE)

Pursuant to section 106, the Commission must consider whether any historic property could be affected by the issuance of an exemption within a project's APE. The APE is determined in consultation with the SHPO and is defined as the geographic area or areas within which an undertaking may directly or indirectly cause alternation in the character or use of historic properties, if any such properties exist. The APE for the proposed project covers 1.71 acres and consists of all areas within the project boundary, as well as areas outside of the project boundary that could be directly affected by project construction or operation, including an approximate 1,500 foot-long segment of the unnamed creek from the proposed diversion site to where it empties into Wrangell Narrows and another 1,100 feet of shoreline along the Wrangell Narrows near the mouth of the creek.

Cultural and Historical Background

Aboriginal Settlement

Human occupation of Southeast Alaska goes back at least 10,000 years ago to the time when the last ice age ended in the early Holocene period. This time period is referred to as the Paleomarine Tradition period in Southeast Alaska because people living during this time depended heavily on marine resources for survival. Flaked stone tools and microblades found during this time period suggest that the people used throwing spears and carved bones. Between 7,500 to 5,000 years ago, flaked stone tool technology began to transition gradually to the use of ground stone technology which included scrapers, choppers, bifacial points and bi-directional microblade cores. With the wetter climate during the late Holocene (5,200 years ago to circa 250), came more permanent

settlements with plank house construction, beach gravel pavements, and rock hearths. Wooden fish weirs for capturing salmon appeared during this period. Copper was first used during the late Holocene and is found in knife blades, arrowheads, jewelry, and other items (Gillispie, 2018).

Prior to the time of Russian and European contact, in southeast Alaska, Kupreanof Island was inhabited by two Tlingit groups: the Kakekwan and the Stikinekwan. The Kakewan occupied the northwestern and western portion of Kupreanof Island and the Stikinekwan occupied Duncan Canal and the eastern portion of the island, including the proposed project area (Forest Service, 2011).

Euro-American Settlement and Occupation

In the late 18th Century, the Russians, Spanish, French, English, and Americans ventured along the southeast coast of Alaska to explore and establish trade networks with the native people for fur and other goods (Forest Service, 1995; Cascade Creek LLC, 2011). After the Russians established forts and trading posts at Sitka in 1799 and at Wrangell in 1834, many Tlingit moved out of their traditional homes and resettled in locations where trade goods would be more readily available (Forest Service, 2011). Once Russia sold Alaska to the United States in 1867, commercial fishing and canning emerged as important industries in Southeast Alaska (Forest Service, 1995; Cascade Creek LLC, 2011). Peter Buschmann, a Norwegian settler, established Petersburg and founded the Icy Strait Packing Company for harvesting halibut (Cascade Creek LLC, 2011). Once gold was discovered in Alaska in the late 1800s, miners came into southeast Alaska. In 1900, the Portage Mountain Mining Company began to mine gold on Kupreanof Island at the head of Duncan Canal (located about 10 miles northwest of the project site). Other mining also occurred in this area throughout the early 1900s. After World War I, fox farming became an important economic driver in southeast Alaska. The first fox fur farms were established on Kupreanof Island in 1918. With the drop of fur prices in the 1930s, however, the fox farming industry dried up and most fox farms were out of business in Southeast Alaska by 1945. Commercial logging began on Kupreanof Island with the establishment of the Tongass National Forest in 1907 (Forest Service, 1995; Cascade Creek LLC, 2011).

The City of Kupreanof, which is within Petersburg Borough and includes the project site, was known as "West Petersburg" before becoming incorporated as a city in 1975 (Forest Service, 2000). Homesteaders were likely the first inhabitants of West Petersburg in 1902. The population increased to over 100 people during the 1920s due to its location at the center of Southeast Alaska's fur farm industry. The first mink fur farm in Alaska was in West Petersburg. After World War II, the population began to decrease

and was down to 26 residents by 1960 as a result of the decline of the fur trade and has remained stable at that level ever since (Forest Service, 2000).

Archaeological and Historic Investigations

Numerous archaeological investigations have been conducted by Forest Service archaeologists on Kupreanof Island over the past several decades, although none have been conducted previously in the immediate project area. These investigations consisted of background searches of archives and historical documentation, surveys, ethnographic studies, and tribal consultation. From the results of these investigations, the Forest Service has identified numerous cultural sites on Kupreanof Island, including cabins, shelters, mines, fur farms, canneries, cemeteries, culturally modified trees, ancient fish traps, petroglyphs, Native villages, forts and seasonal camps. Most of these cultural sites are located along the coastline and concentrated in Kupreanof Island's bays and along the shoreline of narrows and protected waterways (Forest Service, 2000). The project area lies within an area where cultural resources are likely to be found because it is close to the coastline of Wrangell Narrows, a narrow passageway separating Petersburg and Kupreanof (Forest Service, 2000).

On behalf of the applicant, Forest Service archaeologists from the Tongass National Forest conducted a cultural resource survey of the project APE. The survey consisted of a review of the Forest Service's National Heritage Database, cultural resource files and atlases, the Office of History and Archaeology Integrated Business suite, and the Alaska Land records federal plats for information on previous work or known historic properties in the project area. No cultural resources were identified in the project area from these searches. Forest Service archaeologist then conducted a subsurface investigation of the project APE on May 30, 2018. No cultural resources were found (Forest Service, 2019).

5.3.5.2 Environmental Effects

Because no cultural sites have been identified within the APE, the applicant does not propose any measures to protect cultural resources during construction and operation of the proposed project.

Staff Analysis

Construction, operation, and maintenance of the proposed project would have no adverse effects on historic, archeological, or traditional cultural properties, because no such properties have been identified within the project APE. The staff is seeking concurrence with the Alaska SHPO on this determination. Because the project site is in a

coastal area which has been identified by the Forest Service as having "high sensitivity" for containing cultural resources, it is possible that such resources could be discovered during construction or maintenance activities. Including a condition in any exemption that would require Douglas Leen, in the event of discovering such resources, to stop work, consult with the Alaska SHPO, and follow specific protocols and procedures would ensure the proper treatment of these resources. During the term of any exemption, Douglas Leen would occasionally need to implement project modifications that would not require prior Commission approval but could affect cultural resources at the project. Including a condition in any exemption that would require Douglas Leen to notify the Alaska SHPO prior to undertaking any such activities would ensure that cultural resources are not affected.

5.4 No Action Alternative

Under the no-action alternative, the project would not be issued an exemption, the project would not generate electricity, and there would be no effects on environmental resources.

6.0 RECOMMENDED ALTERNATIVE

Based on our independent review and evaluation of the environmental effects of the proposed action, and a no-action alternative, we recommend all of Mr. Leen's proposed measures, and some additional staff-recommended measures as the preferred alternative. Additional measures recommended by staff include: (1) develop and implement an erosion and sedimentation control plan that includes site-specific measures for minimizing soil erosion and sedimentation during project construction; (2) develop an operation compliance monitoring plan for run-of-river operation and maintaining a minimum flow in the bypassed reach; (3) develop and implement an invasive plants management plan in consultation with the Forest Service; (4) consult with the Alaska SHPO and potentially affected Indian tribes prior to implementing any project modifications, including maintenance activities, land-clearing or land-disturbing activities, or changes to project operation or facilities, that do not require Commission approval but could affect cultural resources; and (5) consult with the Alaska SHPO and potentially affected Indian tribes if previously unidentified cultural resources are discovered during the course of constructing, maintaining, or developing project works or other facilities.

We recommend this alternative because: (1) issuing an exemption from licensing for the Kupreanof Project would allow Mr. Leen to construct and operate the project as a beneficial and dependable source of electric energy; (2) the 1.5 kW of electric capacity

would come from a renewable resource that would not contribute to atmospheric pollution; and (3) the recommended environmental measures would protect aquatic resources, terrestrial resources, and any previously unidentified cultural resources.

We recommend the following environmental measures proposed by Mr. Leen for any exemption that would be issued for the proposed project.

- Operate the project in a run-of-river mode, where outflow from the project approximates inflow.
- Maintain a minimum flow of 50 gpm, or inflow, whichever is less, at all times in the bypassed reach of the mainstem unnamed stream.
- Install angled perforated plate screens with 0.125-inch-diameter holes on the intake openings to prevent entrainment of fish and debris.
- Install boulders in the project's tailrace to prevent the powerhouse discharge from eroding the streambank.
- Restore disturbed stream contours, stream banks, and trenched areas to pre-construction condition.
- Rinse footwear prior to entering project area during construction to prevent spread of invasive plants.

Erosion and Sedimentation Control Plan

Project construction has the potential to cause localized erosion and sedimentation if control measures are not put into place around work areas.

To minimize erosion following project construction, Mr. Leen proposes to, generally, restore all disturbed stream contours and streambank areas to pre-construction condition and refill trenched areas with excavated soils and restore these areas to their original contour. Mr. Leen also proposes to install boulders in the project's tailrace to prevent the discharge from the powerhouse from eroding the streambank. However, Mr. Leen's proposal lacks enough detail on the degree of disturbance, the procedures he would use to control erosion during all construction activities resulting in land disturbance, and the specific common best management practices he would implement. Developing and implementing an erosion and sedimentation control plan that contains these details and procedures and based on site-specific conditions and final project designs, would minimize erosion and prevent sediment from entering the stream basin

and adversely affecting fish and wildlife. With effective erosion control measures in place, sediment would not likely enter the unnamed streams. We recommend that prior to project construction, Mr. Leen develop an erosion and sedimentation control plan for Commission approval.

Operation Compliance Monitoring Plan

Mr. Leen proposes to operate the project in run-of-river mode, where outflow from the project approximates inflow. Mr. Leen also proposes to maintain a minimum flow of 50 gpm, or inflow, whichever is less, in the bypassed reach of the mainstem unnamed stream.

An operation compliance monitoring plan would define the means by which Mr. Leen would document compliance with the operational provisions of any exemption and provide a mechanism for reporting flow deviations. An operation compliance monitoring plan would also help the Commission verify that the project is operating in a run-of-river mode and maintaining the required minimum flow into the bypassed reach, thereby facilitating administration of the license exemption and assisting with the protection of resources that are sensitive to deviations from normal operating conditions. Therefore, we recommend that Mr. Leen develop an operation compliance monitoring plan which includes, at minimum, provisions for: (1) monitoring run-of-river operation and minimum flows to document compliance with the operational conditions of any exemption; (2) reporting deviations to the Commission; and (3) maintaining a log of project operations.

Invasive Plants Management Plan

As discussed in section 5.3.3.2, *Invasive Plants, Environmental Effects*, existing infestations of several non-native plant species have been documented near the project boundary, including at least one very invasive species. To limit the potential spread of these invasive species into the project site, Mr. Leen proposes to rinse footwear prior to entering the site during project construction. However, Mr. Leen's proposal does not address other means by which the seeds or other propagules of invasive plant species may be conveyed into the project site, including via tools or other equipment used during construction, or later via footwear or equipment used during the project's operational and maintenance activities. Developing an invasive plants management plan in consultation with the Forest Service would ensure effective means to control and minimize risk of establishing or propagating invasive plant species in the course of constructing, operating, and maintaining the project. Therefore, we recommend that prior to project construction, Mr. Leen develop an invasive plants management plan in consultation with the Forest Service, which includes, at minimum, a description of the methods to be

employed for cleaning equipment and footwear prior to entering the project area to minimize the spread of invasive plant species into the project site, and implement the plan during construction, operation, and maintenance of the project.

Cultural Resources

As we discuss in section 5.3.5.2, the proposed project would not adversely affect historical properties; however, there is a possibility that project-related activities during construction and maintenance could uncover previously unidentified cultural resources. In such an event, the applicant would need to halt all land-clearing and land-disturbing activities and consult with the Alaska SHPO. If previously undiscovered cultural resources are determined to be eligible for listing on the National Register, then the applicant would need to prepare and file for Commission approval, a HPMP prepared in consultation with the Alaska SHPO. It is also possible that future project modifications not requiring prior Commission authorization could uncover previously unknown cultural resources; therefore, prior to conducting such modifications, the applicant would need to consult with the Alaska SHPO. Following such protocols and procedures would ensure that cultural resources are protected.

Unavoidable Adverse Effects

Minor, temporary localized erosion and sedimentation could occur during construction of the project. Implementation of the staff recommended erosion and sedimentation control plan would limit the potential for erosion and sedimentation during and following project construction. Construction of the proposed project would result in the minor, short-term disturbance of about 20 square feet forested wetland vegetation for installation of the penstock and minor, permanent disturbance to about 10 square feet of forested wetland for installation of the powerhouse pad. However, because of the relatively small-scale of these disturbances to vegetation, any adverse effect of these disturbances is negligible.

7.0 FINDING OF NO SIGNIFICANT IMPACT

If the Kupreanof Microhydro Project is exempted from licensing as proposed with the additional staff-recommended measures, the project would be constructed and operated while protecting aquatic resources, terrestrial resources, existing historic resources, and any previously unidentified cultural resources in the project area.

Based on our independent analysis, issuance of an exemption from licensing for the Kupreanof Microhydro Project, as proposed with the additional staff-recommended

measures, would not constitute a major federal action significantly affecting the quality of the human environment.

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9.0 LIST OF PREPARERS

John Matkowski – Project Coordinator, Aquatic Resources (Fish Biologist; M.S. Environmental Science and Policy; B.S., Marine Science).

Peter McBride – Terrestrial Resources, Wetlands, Threatened and Endangered Species (Wildlife Biologist; M.S. Environmental Science, Terrestrial Ecology, B.A. Biology)

Suzanne Novak –Recreation, Aesthetic and Cultural Resources (Outdoor Recreation Planner; M.A. Recreation Resource Management; B.S. Conservation and Resource Development)

Maryam Zavareh – Geology and Soils (Environmental Engineer; M.S. Civil and Environmental Engineering)