

Final Environmental Assessment

Old Harbor Hydroelectric Project
FERC Project No. 13272-004
Alaska
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Public Availability and Contact Information: This Finding of No Significant Impact (FONSI), and Environmental Assessment (EA) are available at: <https://www.energy.gov/nepa/doe-environmental-assessments>.

For more information on this FONSI or EA, please contact the Office of Clean Energy Demonstrations at: ocedoversight@hq.doe.gov.

Proposed Action

The United States Department of Energy (DOE) is proposing to authorize the expenditure of federal funds by the Alutiiq Tribe of Old Harbor (Alutiiq Tribe) to construct, operate, and maintain the 262-kilowatt (kW) Old Harbor Hydroelectric Project (the Project) located near the town of Old Harbor, Kodiak Island Borough, Alaska. The Project would divert water from the East Fork of Mountain Creek to a tributary of Lagoon Creek for hydroelectric generation. The hydropower development would include: (1) a new 100-foot-long, 4 to 8 foot diversion weir to be constructed on the East Fork of Mountain Creek with an integrated 3-foot-high spillway; (2) a new 10,150-foot-long buried penstock that would transfer water from the Mountain Creek basin to the proposed project powerhouse in the Lagoon Creek basin; (3) a flow control mechanism to be installed between the diversion and powerhouse to control the volume of flow diverted at the intake; (4) a 30-foot by 35-foot by 16-foot-high powerhouse containing one 262-kW Pelton turbine; (5) a water bypass system in the powerhouse to route flows to the tailrace during turbine maintenance to limit rapid changes in flow that could harm fish and aquatic invertebrates downstream of the project; (6) a 2,300-foot-long tailrace to convey water from the powerhouse to the nearby 3.9-acre Swimming Pond; and (7) a 1,100-foot-long enhanced riverbed channel that would convey water from Swimming Pond to the natural channel of the Lagoon Creek Tributary. The Project would have an annual generation of 2,900,000 kilowatt-hours.

The Project would also involve constructing and maintaining: (1) an approximately 2.2-mile-long by 10-foot-wide project access trail between the intake and powerhouse; (2) an approximately 5,720-foot-long by 24-foot-wide access road extending from the powerhouse to an existing road; (3) a 1.2-mile-long, 12.47-kilovolt overhead transmission line from the powerhouse to the existing power distribution system in the city of Old Harbor; and (4) appurtenant facilities.

The intake and a portion of the penstock would be located on approximately 7.74 acres of federal land within the Kodiak National Wildlife Refuge managed by the U.S. Fish and Wildlife Service

(FWS) and approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska.¹ On March 13, 2026, FWS issued a 40-year right-of-way (ROW) permit to the Alutiiq Tribe.² The ROW permit authorizes the construction and maintenance project access and utility features on FWS-owned lands.

National Environmental Policy Act Review

The decision whether to provide federal financial assistance constitutes a major Federal action, which requires DOE to conduct an environmental review under the National Environmental Policy Act (NEPA), as amended (42 U.S.C. 4321–4347). In accordance with the Council on Environmental Quality’s (CEQ) Memorandum to the Heads of Federal Departments and Agencies, issued on February 19, 2025, and with Executive Order 14154 issued on January 20, 2025, DOE is conducting this environmental review accordance with DOE’s NEPA implementing procedures consistent with the text of NEPA, E.O. 14154, and the CEQ memorandum. DOE is using the NEPA process to inform its decision whether to provide funding to the Alutiiq Tribe to support the Project.

Pursuant to NEPA, the *Final Environmental Assessment, Old Harbor Hydroelectric Project—FERC Project No. 13272-004, Alaska* (FERC EA) was prepared by the Federal Energy Regulatory Commission (FERC). FERC concluded that completing the Project would not result in significant adverse impacts to the human environment. As such, FERC issued a FONSI concurrently with the EA on October 28, 2015. On April 29, 2016, FERC issued a 50-year original license for the Old Harbor Project.³ DOE was not a cooperating agency in the preparation of the FERC EA. Subsequently, DOE has conducted an independent review of the FERC EA and has determined that the actions analyzed in FERC’s EA and DOE’s proposed action are substantially the same. The FERC EA meets the standards for a sufficient environmental assessment under the DOE’s NEPA procedures; therefore, DOE is relying on the FERC EA.

Required Consultations and Other Reviews

Floodplains and Wetlands

¹ Because the project will occupy lands of the United States, section 23(b)(1) of the FPA, 16 U.S.C. § 817(1), requires that it be licensed.

² On October 24, 2024, FWS issued an EA that analyzes additional resource issues outside the scope of the FERC EA, including the effects of geotechnical surveys and road construction on brown bears occurring in the project area. FWS determined that issuing a special use permit for geotechnical surveys on the Kodiak National Wildlife Refuge did not constitute a major Federal action significantly affecting the quality of the human environment. A special use permit was subsequently issued by FWS to the Alutiiq Tribe to conduct geotechnical surveys of the Kodiak National Wildlife Refuge from January 1, 2025, through April 30, 2025.

³ *Alaska Village Electric Cooperative, Inc.*, 155 FERC ¶ 62,075 (2016).

The Project is not located within a federally designated floodplain, and the Project would have no effect on wetlands within a federal property. The Project does not constitute a wetland or floodplain action and therefore requirements of DOE's Floodplain and Wetland Environmental Review Requirements (10 CFR 1022) do not apply.

National Historic Preservation Act

No historic properties were located during reconnaissance investigations conducted in 1997 and 2009 of the project's area of potential effects (APE). On September 11, 2011, the Alaska State Historic Preservation Office (Alaska SHPO) concurred with the finding that no historic properties would be affected by the proposed project.

Since 2011, the project APE has been updated to include project access roads and tailwater channel corridors. On March 13, 2025, based on an analysis of recorded archaeological sites in the project area, DOE staff requested concurrence with the determination that no historic properties would be affected by minimal revisions to the project APE. Alaska SHPO did not respond to DOE's request, thus fulfilling DOE's requirements under section 106 of the NHPA.⁴

Endangered Species Act

Two federally listed species could occur in marine habitats located 0.75 miles downstream of the project: the northern sea otter (*Enhydra lutris kenyoni*) and Steller's eider (*Polysticta stelleri*). FERC staff concluded licensing the project, with staff-recommended protection measures, was not likely to adversely affect the northern sea otter and Stellar's eider. By letter dated January 20, 2012, FWS concurred with the determination that the proposed project is not likely to adversely affect the northern sea otter and Stellar's eider, thus concluding informal consultation.

On July 9, 2026, DOE staff accessed FWS's Information for Planning and Conservation (IPaC) database to review any revisions in federally listed species at the project. Based on report data acquired from IPaC, the northern sea otter and Steller's eider continue to have the potential to occur in the project area. Critical habitat for the northern sea otter continues to occur in the project area. No additional federally listed species with the potential to occur in the project area were included in the IPaC report. Therefore, the requirements of section 7 of the Endangered Species Act (ESA), 16 U.S.C. §§ 1531–1544, remain fulfilled and no further action is necessary.

Public Involvement

During preparation of the FERC EA, FERC coordinated and consulted with relevant federal, state, local, and tribal agencies regarding the proposed project. These agencies provided feedback and assistance regarding compliance with applicable laws and regulations, permits and authorizations, actions to mitigate impacts, and other project specifics. FERC issued a scoping document for the

⁴ 36 CFR § 800.3(c)(4). If the SHPO fails to respond within 30 days of receipt of a request for review of a determination, the agency may proceed to the next step of the process.

proposed project on September 21, 2009. In addition, scoping meetings were held on October 22, 2009, in Anchorage, Alaska to request comments from the public, federal and state resource agencies, and other stakeholders.

Finding of No Significant Impact

Based on the information presented in the FERC EA, DOE finds that providing funding to the Alutiiq Tribe for the proposed project would not constitute a major federal action that would significantly affect the quality of the physical, biological, or human environment, within the meaning of NEPA. The preparation of an environmental impact statement is therefore not required, and DOE is issuing this FONSI.

Vincent Quarles
Programs and Project Management Director
Office of Clean Energy Demonstrations
U.S. Department of Energy

Date: August 13, 2026

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Alaska Village Electric Cooperative, Inc.

Project No. 13272-004-AK

NOTICE OF AVAILABILITY OF FINAL ENVIRONMENTAL ASSESSMENT

(October 28, 2015)

In accordance with the National Environmental Policy Act of 1969, Title XI of the Alaska National Interest Lands Conservation Act, and the Federal Energy Regulatory Commission's (Commission) regulations, 18 CFR Part 380 (Order No. 486, 52 FR 47,897), the Office of Energy Projects has reviewed the application for an original license to construct the Old Harbor Hydroelectric Project, and has prepared a final environmental assessment (EA) with the cooperation of the U.S. Fish and Wildlife Service (FWS).

The proposed 525 kilowatt (kW) project would be constructed on the East Fork of Mountain Creek and transfer water into a powerhouse on the Lagoon Creek Tributary, near the town of Old Harbor, Kodiak Island Borough, Alaska. The project intake and a portion of the penstock would be located on approximately 7.74 acres of federal land that is part of the Kodiak National Wildlife Refuge and approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska.

The final EA contains Commission staff's analysis and response to comments filed on the draft EA issued on May 7, 2015. The FWS staff reviewed the analysis of the potential environmental impacts of the proposed hydroelectric project. The final EA concludes that licensing the project, with appropriate environmental protective measures, would not constitute a major federal action that would significantly affect the quality of the human environment.

A copy of the final EA is available for review at the Commission in the Public Reference Room or may be viewed on the Commission's web site at www.ferc.gov using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, contact FERC Online Support at FERCOnlineSupport@ferc.gov or toll-free at 1-866-208-3676, or for TTY, 202-502-8659.

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

Project No. 13272-004-AK

Please contact Adam Beeco (Commission Staff) by telephone at (202) 502-8655, or by email at adam.beeco@ferc.gov, if you have any questions concerning the hydroelectric licensing process or contact Diana Biesanz (FWS Staff) by telephone at (907) 786-3426 or by email at diana_biesanz@fws.gov, if you have questions concerning the right-of-way permit.

Kimberly D. Bose,
Secretary.

FINAL ENVIRONMENTAL ASSESSMENT

Old Harbor Hydroelectric Project—FERC Project No. 13272-004

Alaska

Federal Energy Regulatory Commission
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ACRONYMS AND ABBREVIATIONS

Alaska Fish and Game	Alaska Department of Fish and Game
ANILCA	Alaska National Interest Lands Conservation Act
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
ATV	all-terrain vehicle
AVEC	Alaska Village Electric Cooperative, Inc
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
D2SI	Division of Dam Safety and Inspections
EA	Environmental Assessment
EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
°F	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FWS	U.S. Department of the Interior, Fish and Wildlife Service
HPMP	Historic Properties Management Plan
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
msl	mean sea level
MWh	megawatt-hour
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NMFS	National Marine Fisheries Service
National Register	National Register of Historic Places
PCE	primary constituent elements
Refuge	Kodiak National Wildlife Refuge
RM	river-mile
SHPO	State Historic Preservation Officer
TCP	traditional cultural property

EXECUTIVE SUMMARY

Proposed Action

On November 1, 2013, the Alaska Village Electric Cooperative, Inc (AVEC) applied to the Federal Energy Regulatory Commission (Commission) for a license to construct, operate, and maintain its proposed 525-kilowatt (kW) Old Harbor Hydroelectric Project (Old Harbor Project or project) No. 13272-004.

On November 14, 2014, AVEC applied to the U.S. Fish and Wildlife Service (FWS) for a utility systems right-of-way permit for the portion of the project that would occupy the Kodiak National Wildlife Refuge (Refuge).

The project would be constructed on the East Fork of Mountain Creek and transfer water into a powerhouse on Lagoon Creek Tributary, near the town of Old Harbor, Kodiak Island Borough, Alaska (Figure 1). The project intake and a portion of the penstock would be located on approximately 7.74 acres of federal land within the Refuge managed by FWS and approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska.

Project Description and Proposed Facilities

AVEC proposes to install two Pelton 262-kW turbines, with the first turbine installation occurring at the time of initial construction and the second turbine being installed when “demand warrants an additional turbine.” In this EA, we project that the first turbine should meet AVEC’s energy demands for the next 40 years. Section 13 of the FPA states that the “...licensee shall within the time fixed in the license complete and put into operation such part of the ultimate development as the Commission shall deem necessary to supply the reasonable needs of the then available market...” Because it could be 40 years before demand warrants the addition of the second turbine, this EA only examines the project with the installation of the first turbine, which we refer to as the proposed action. If and when there is an established need for additional power, AVEC could apply for a license amendment to increase power production at the project. The amendment application would be noticed for public comment, and depending upon the extent of the amendment request, analyzed under a National Environmental Policy Act (NEPA) process.

The project would divert water from the East Fork of Mountain Creek and transport it across the basin boundary to Lagoon Creek Tributary, a tributary of Lagoon Creek, for hydroelectric generation. The proposed project is designed to accommodate two turbines with a total maximum hydraulic capacity of 11.8 cubic feet per second (cfs) (i.e., diversion intake, penstock, tailrace, and constructed channel); however, with only

one turbine installed the project would divert a maximum of 5.9 cfs. Although this EA only analyzes the proposed project with a single turbine and maximum hydraulic capacity of 5.9 cfs, all other project features are being analyzed as proposed.

The hydropower development would include: (1) a new 100-foot-long, 4 to 8 foot diversion/cut off weir to be constructed on the East Fork of Mountain Creek with an integrated 3-foot-high spillway; (2) a new 10,150-foot-long buried penstock that would transfer water from the Mountain Creek basin to the proposed project powerhouse in the Lagoon Creek basin; (3) a flow control mechanism to be installed between the diversion and powerhouse to control the volume of flow diverted at the intake; (4) a 30-foot by 35-foot by 16-foot-high powerhouse containing one 262-kW Pelton turbine; (5) a water bypass system in the powerhouse to route flows to the tailrace during turbine maintenance to limit rapid changes in flow that could harm fish and aquatic invertebrates downstream of the project; (6) a 2,300-foot-long tailrace to convey water from the powerhouse to a nearby Swimming Pond; and (7) a 1,100-foot-long enhanced riverbed channel ("constructed channel") that would convey water from Swimming Pond to the natural channel of the Lagoon Creek Tributary.

The project would also involve constructing and maintaining: (1) an approximately 2.2-mile-long by 10-foot-wide project access trail between the intake and powerhouse; (2) an approximately 5,720-foot-long by 24-foot-wide access road extending from the powerhouse to an existing road; (3) a 1.2-mile-long, 12.47-kilovolt overhead transmission line from the powerhouse to the existing power distribution system in the City of Old Harbor; and (4) appurtenant facilities. The project would have an annual generation of 2,300,000 kilowatt-hours.

Project Operation

The project would continuously divert between 1 cfs and 5.9 cfs as long as flows are available, and would not be used for peaking operations. The estimated average annual flow of East Fork of Mountain Creek at the point of diversion is 9.8 cfs. When East Fork Mountain Creek flows are above 5.9 cfs, flows that are not diverted would remain in the East Fork of Mountain Creek. When flows are below 1 cfs the project would not operate, leaving flows in the East Fork of Mountain Creek.

A flow control valve in the penstock would restrict the quantity of water diverted to what is necessary for power production. In the event of project shutdown, the proposed bypass system at the powerhouse would ensure flow continuation to Lagoon Creek Tributary to protect aquatic resources.

Proposed Environmental Measures

Design and Operation Related Measures

- Design the tailrace in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond;
- Design the constructed channel to include substrate, large woody debris, and other habitat suitable for salmon spawning and rearing, and fish passage between Lagoon Creek Tributary and Swimming Pond;
- Build the constructed channel during a period that Alaska Fish and Game deems protective of coho salmon;
- Install bird diverters on the power line and guy wires to prevent bird strikes; and
- Outfit power poles with perch posts designed to prevent bird electrocution.

Administrative Measures

- Employ an environmental compliance monitor during project construction to ensure and document compliance with the provisions of a license; and
- Throughout the term of a license, if deemed necessary by an agency or AVEC, hold an annual project review meeting to discuss the project, any reports, and compliance with license articles.

Geology and Soils

- Pile overburden and soil from excavations outside of wetlands and in such a way as to limit erosion;
- Develop a storm water pollution prevention plan for the collection and routing of storm water during construction activities to minimize erosion; and
- Develop an erosion and sedimentation control plan to decrease erosion and sedimentation during construction and operation of the project, including turbidity monitoring during construction.

Aquatic Resources

Water Quantity

- Limit water diversion rates from the East Fork of Mountain Creek during upramping and downramping to 5 cfs per hour to prevent rapid flow fluctuations and protect aquatic resources in Lagoon Creek Tributary.

Water Quality

- Develop a fuel and hazardous substance spill plan to prevent petroleum product spills from impacting aquatic resources.

Fisheries Resources

- Develop a fish exclusion plan in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond.

Terrestrial Resources

- Establish construction timing windows for avoiding disturbances during bird nesting seasons;
- Monitor and report to the FWS any newly established bald eagle nests;
- Postpone blasting within 0.5 mile and construction work within 660 feet of any identified bald eagle nests until after coordination with the FWS;
- If blasting is required within 0.5 mile of an eagle nest, conduct blasting during November-January to avoid the bald eagle breeding season;
- Develop a bear safety plan with protocols to minimize bear encounters during construction and maintenance activities;
- Minimize the use of helicopters or airplanes near mountainsides adjacent to East Fork of Mountain Creek to avoid potential impacts to mountain goats and, if mountain goats are observed, maintain a 1,500-foot vertical or horizontal clearance to the extent that it can be accomplished safely;
- Revegetate excess soil piles and disturbed areas with a native seed mix recommended by the Plant Materials Center, Alaska Division of Agriculture;

and

- Develop an invasive species management plan prior to commencement of any construction activities.

Recreation and Land Use

- Install gates to limit motor vehicle use of the intake access trail and the existing ATV trail to authorized vehicles only to minimize traffic-related erosion; and
- Install signs at the powerhouse to inform the public about access on the Refuge.

Cultural Resources

- In the case of discovering a historic property during construction of the project (or human remains associated with the Native American Graves Protection and Repatriation Act of 1990), AVEC would consult with the both the Alaska State Historic Preservation Officer (SHPO), FWS, and Village of Old Harbor to address any potential effects.

Alternatives Considered

This final environmental assessment (EA) analyzes the effects of the proposed action and recommends conditions for any license or right-of-way permit issued for the project. This final EA considers the following alternatives: (1) AVEC's proposal, as outlined above; (2) AVEC's proposal with Commission staff modifications (staff alternative); and (3) no action or a denial of license, meaning AVEC would not construct the project, and environmental resources in the project area would not be affected.

Staff Alternative

Under the staff alternative, the proposed project would be constructed and operated with AVEC's proposed measures, as outlined above. The staff alternative also includes all of FWS's mandatory section 4(e) conditions.¹ The staff modifications and additional measures are outlined below:

- Develop a constructed channel habitat design and monitoring plan that: (1) incorporates AVEC's proposal to design the constructed channel to provide suitable salmon spawning and rearing habitat; and (2) includes annual monitoring

¹ Unless specifically noted (i.e., conditions 29, 41, and 53), each 4(e) condition applies only to FWS owned and managed lands.

of the channel for a 3-year period following the commencement of project operation to evaluate the effectiveness of the design at providing spawning and rearing habitat;

- Develop a ramping rate plan to establish protocols for ensuring compliance with the proposed ramping rate limitation of 5 cfs per hour;
- Include in the proposed fuel and hazardous substance spill plan: (1) a spill prevention control and countermeasure section developed in consultation with FWS (FWS condition 32); (2) a pre-project sampling and analysis section for hazardous substances, developed in consultation with FWS (FWS condition 38); and (3) a requirement to avoid placing oil/diesel storage facilities in the right-of-way permit area (FWS condition 53);
- Develop a vegetation management plan to guide AVEC's proposed revegetation of disturbed areas and control of invasive species, and monitor for the effectiveness of the proposed measures (FWS condition 30);
- Develop an avian protection plan that provides a specific design for AVEC's proposed measures to minimize avian electrocutions and collisions consistent with current avian protection guidelines;
- Avoid vegetative clearing between May 1 and August 1, in order to protect nesting birds, unless authorized in writing by the Refuge Manager (FWS condition 37);
- Avoid construction of permanent facilities within 0.25 mile of an established bald eagle nest tree (FWS condition 46);
- Report bear-human conflicts to the FWS and Alaska Fish and Game (FWS condition 45), prohibit all food waste storage in the right-of-way permit area (FWS condition 41), and implement mitigation measures if bear-denning sites might be affected by construction activity (FWS condition 50) to minimize the potential for human-bear interactions;
- Consult with FWS about specific locations, installation, maintenance, and monitoring of the gates (which may be located outside the Refuge) across the intake access trail and the existing ATV trail, and consult with the FWS to design additional protection measures if unauthorized uses or vandalism are noted (FWS condition 29); and
- Develop procedures, in the event of an inadvertent discovery of cultural resources at the project, for determining the discovery's eligibility for the National Register

of Historic Places (National Register) and crafting a historic properties management plan, if necessary.

Public Involvement and Areas of Concern

Before filing the license application for the Old Harbor Project, AVEC conducted pre-filing consultation under the integrated licensing process. The intent of the Commission's pre-filing process is to initiate public involvement early in the project planning process and to encourage citizens, government entities, Indian tribes, and other interested entities to identify and resolve issues prior to a license application being formally filed with the Commission. During pre-filing, Commission staff conducted scoping to determine what issues and alternatives should be addressed. A scoping document (SD1) for the proposed project was distributed to interested agencies and others on September 21, 2009. In addition, scoping meetings were held on October 22, 2009, in Anchorage, Alaska to request comments from the public, federal and state resource agencies, and other stakeholders. Revised scoping document (SD2), addressing the written and oral comments received, was issued on January 4, 2010.

On May 7, 2015, the Commission, in cooperation with FWS, issued a draft EA for the Old Harbor Project. Appendix B summarizes the comments that were filed in response to the draft EA, includes our responses to those comments, and indicates where we made modifications to the final EA.

The primary issues associated with licensing the project are the effects of construction-related erosion and sedimentation on water quality, fish, and invertebrates; effects of project diversion on water quality and quantity downstream of the diversion on East Fork of Mountain Creek; effects of increased flows on fish and aquatic invertebrates in Swimming Pond and Lagoon Creek Tributary; impacts to wildlife habitat from clearing of wetland and upland habitats and spread of invasive plant species; and the potential for the transmission line to cause avian mortality from electrocution and collisions.

Staff Alternative

Geology and Soils

The land-disturbing activities associated with construction of the project could cause erosion and sedimentation into Lagoon Creek Tributary. Project operation would also result in more flow into the Lagoon Creek Tributary, which could result in increased bank erosion. The staff-recommended erosion, sediment, and storm water control plan, as proposed by AVEC, would require AVEC to develop specific measures to prevent erosion based on site-specific conditions. Under the plan, AVEC would provide detailed descriptions, conceptual drawings, and the specific location of all control measures and

monitor sediment levels in the stream.

The turbidity monitoring requirements of the plan would enable AVEC to identify and respond to any increase in downstream turbidity level during project construction.

Aquatic Resources

Water Quantity

Project-related water diversions would affect the natural flow regime in the East Fork of Mountain Creek and downstream in the mainstem of Mountain Creek upstream of river-mile (RM) 3 where Mountain Creek flows subsurface for much of the year. During May through July, when streamflows peak, a diversion of 5.9 cfs would reduce flows at RM 3 by about 2 to 12 percent. During August through April, a 5.9 cfs diversion would reduce flows at RM 3 by up to approximately 25 percent.

Project operation would increase flows from Swimming Pond to Lagoon Creek Tributary, creating perennial flow in a channel that currently has ephemeral flows. An approximately 11,000-foot-long constructed channel would convey flows from Swimming Pond to Lagoon Creek Tributary.

Water Quality

Construction of the diversion structure and intake facilities would cause short-term adverse effects on water quality in the East Fork of Mountain Creek, and construction of the tailrace and constructed channel would cause short-term adverse effects on water quality in Swimming Pond and Lagoon Creek Tributary. When building the constructed channel, excavation equipment would be operated in the ephemeral channel but not in Swimming Pond or in the perennial section of Lagoon Creek Tributary. The proposed environmental compliance monitor could stop work or implement additional measures as needed based on water quality monitoring in construction areas. Monitoring turbidity as part of the staff-recommended erosion, sediment, and storm water control plan would allow AVEC to quickly identify and respond to any increase in downstream turbidity level during project construction.

Water temperatures in Swimming Pond and Lagoon Creek Tributary would likely decrease in spring and summer when the project is operating as project outflows would be colder than typical temperatures in these waterbodies. Under natural conditions, water temperatures in Swimming Pond and Lagoon Creek Tributary sometimes exceed current state water temperature standards for spawning and rearing in the summer. The addition of colder project flows would provide an environmental benefit by decreasing the likelihood that water temperatures in Swimming Pond and Lagoon Creek Tributary would exceed current state water temperature standards.

Total dissolved gases could increase in water being transferred in the project penstock. However, the proposed perched or boulder-field-type tailrace would allow dissolved gas concentrations to balance with the atmosphere before discharge to Swimming Pond, preventing dissolved gas supersaturation.

Fisheries Resources

The project would divert water from the East Fork of Mountain Creek in a reach where fish have not been found. However, project operation would cause a long-term reduction in aquatic invertebrate habitat in the East Fork of Mountain Creek due to a decrease in wetted streambed area. However, because of the small volumes diverted relative to mainstem flows, impacts on aquatic invertebrates and habitat in the East Fork of Mountain Creek are not expected to translate into measurable effects on downstream fish populations.

Construction could have short-term impacts on fish in Swimming Pond and Lagoon Creek Tributary. Increased turbidity could physically stress and/or alter the behavior of fish. Movement of fish between Swimming Pond and Lagoon Creek Tributary would be blocked when the cofferdam in Swimming Pond is in place. However, constructing the project during a period recommended by Alaska Fish and Game as protective of fisheries resources would minimize any impacts. The proposed environmental compliance monitor would ensure that best management practices are implemented and would stop work or implement additional measures as needed.

Project operation could decrease water temperature while increasing the overall volume of aquatic habitat in Swimming Pond and Lagoon Creek Tributary. The addition of flows could also increase sedimentation and alter channel morphology in Lagoon Creek Tributary. The proposed flow control mechanism and water bypass system, as well as the staff-recommended ramping rate plan, would ensure that downstream releases from the project comply with the proposed ramping rate limitation of 5 cfs per hour and protect downstream aquatic resources from rapid changes in flow.

The addition of cooler project waters to the Swimming Pond would improve conditions for salmonids during the summer. The potential negative effect of colder temperatures on growth of juvenile coho and Dolly Varden in Lagoon Creek Tributary would likely be offset by the positive effects of increased habitat. Sticklebacks, which have been found in Swimming Pond, also would benefit from cooler summer temperatures and increased habitat availability.

Fish in Swimming Pond, including coho salmon and Dolly Varden, could be attracted to flows in the tailrace. Proper design of the proposed perched or boulder-field-type tailrace would prevent fish from leaving Swimming Pond and entering the tailrace.

The constructed channel would be designed to include habitat suitable for salmon spawning and rearing and to provide fish passage to Swimming Pond. The staff-recommended constructed channel habitat design and monitoring plan would include a provision for consultation among AVEC, Alaska Fish and Game, and other interested entities on the design, construction, and monitoring of the constructed channel. Monitoring the constructed channel at least annually during the first three years of project operation, as part of the constructed channel habitat design and monitoring plan, would provide data to discern whether the constructed channel is operating as intended. If the constructed channel is not functioning as intended, then annual monitoring would provide information needed to plan any improvements to the channel.

Terrestrial Resources

The project would result in the clearing of 5 acres of wetland habitat and 64 acres of upland habitat, affecting wildlife species using that habitat. Revegetating disturbed areas with certified weed-free native plant species and implementing of an invasive species management plan, as proposed by AVEC, and monitoring the success of the measures, as recommended by staff and specified by the FWS, would minimize long-term impacts to terrestrial habitat and associated wildlife species.

Construction activities could disturb nesting birds, including the bald eagle. Clearing vegetation outside the nesting season and providing buffers around eagle nests, as proposed by AVEC and specified by the FWS, would minimize impacts to birds. Restrictions on helicopter use near mountain goats, as proposed by AVEC, would minimize disturbance of goats.

Large birds, including bald eagles, could be electrocuted if power poles are not properly designed. Outfitting the power poles with perch posts, as proposed by AVEC, or other measures consistent with current avian protection guidelines, would minimize or eliminate electrocution hazards. Developing an avian protection plan that includes specific design for the measures, as recommended by staff, would ensure that proposed measures are adequate to protect birds.

The presence of construction and maintenance workers, and food and garbage could result in increased encounters between bears and humans, potentially causing injuries to humans and bears, or killing or relocation of problem animals. Implementation of a bear safety plan, as proposed by AVEC, would ensure safety of workers and wildlife.

Threatened and Endangered Species

Discharge of sediments and other contaminants into marine habitats as a result of

project construction could affect foraging habitat for the federally listed Steller's eider and northern sea otter. Implementing the proposed storm water pollution prevention and fuel and hazardous substance spill plans and erosion control measures, and revegetation of disturbed areas would minimize potential effects on the marine environment.

Recreation and Land Use

The proposed project would occupy approximately 15.1 acres of land and affect a slightly larger area during construction, most of which is undeveloped and used for conservation.²

Current recreational and land use practices in the proposed project area include hiking, ATV excursions, hunting, sport fishing, sightseeing, and camping. Existing recreation facilities or improvements to support current recreation in the project area are limited to an ATV trail and a lightly used footpath. ATV use is prohibited on Kodiak National Wildlife Refuge lands and any lands under conservation easement administered by the FWS.

Refuge lands, including those with conservation easements, are open to the public. Access to Old Harbor Native Corporation's lands is restricted by the corporation. Visitors wishing to recreate, including hunting and fishing, on Old Harbor Native Corporation's lands must first apply, meet the terms of the application, and pay a fee depending on the type of recreational activity. Lands owned by the City of Old Harbor are open to the public. Under the project proposal, access to the proposed project lands would be improved by the addition of the powerhouse road and intake foot trail. The proposed installation and maintenance of signs to inform visitors about public access and regulations governing activities on the Refuge and conservation lands would help to educate the public and protect Refuge resources. The proposed installation of a gate on the intake access trail and one gate on the existing ATV trail to prevent unauthorized vehicle traffic into the Refuge would help protect Refuge resources. Increased law enforcement may be necessary to ensure visitors to the project adhere to Refuge regulations. Consulting with FWS about the specific locations of the gates, maintaining the gates, and monitoring the conditions of signs, gates, barriers, and access trails annually would safeguard the Refuge from unauthorized access to the Refuge. Promptly

² Specifically, the project would occupy approximately 1.85 acres of land within the Kodiak National Wildlife Refuge solely managed by the FWS; approximately 5.89 acres within the Kodiak National Wildlife Refuge, managed by FWS, which is also subject to a conservation easement administered by the State of Alaska; approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska; approximately 2.90 acres of Old Harbor Corporation land; and approximately 1.21 acres of land within the City of Old Harbor.

reporting any damage or evidence of unauthorized uses to the Refuge and consulting with the Refuge on the need and design of any additional protection measures would enable AVEC and FWS to adapt and address any changes at the project.

Cultural Resources

No known historic properties would be affected by the proposed project. However, AVEC may discover cultural resources during project construction, operation, or a related project activity. To protect historic properties, staff recommends a measure that would include consultation with the Alaska SHPO, FWS, and Village of Old Harbor to resolve any adverse effects to historic properties.

Environmental Justice

Old Harbor is one of Kodiak Island's six Alutiiq villages and is primarily inhabited by an Alutiiq population. According to the 2010 U.S. Census, the current population of Old Harbor is approximately 218 persons. About 88 percent of the current population is American Indian and Alaska Native (191 residents).

Construction and operation of the project are not expected to have a disproportionate adverse effect on minority populations. Because the Old Harbor community consists of such a high population of minorities, any negative effects of the projects would be shared equally across all community members.

Subsistence Resources

Providing the opportunity for continued subsistence use by local residents is one of the purposes of Kodiak Refuge, as stated in Title III of the Alaska National Interest Lands Conservation Act of 1980 (ANILCA) as amended. Title VIII of ANILCA further provides that rural Alaska residents engaged in subsistence use of resources be allowed to continue using Refuge resources for traditional purposes. Subsistence uses, as defined in ANILCA, means the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter or sharing for personal or family consumption; and for customary trade.

The improved access to the Swimming Pond area and into the Refuge via the intake access trail would likely encourage increased use in these areas and subsequently improve opportunities for subsistence practices.

No-Action Alternative

Under the no-action alternative, the project would not be built, environmental resources in the project area would not be affected, and the renewable energy that would be produced by the project would not be developed.

Conclusion

Based on its analysis, Commission staff recommends licensing the project as proposed by AVEC, with the staff modifications, described above under Alternatives Considered.

In section 4.2 of the EA, Commission staff estimate the likely cost of alternative power for the two alternatives identified above. Under AVEC's proposal, the average annual project cost would be \$683,000 or about \$297/megawatt-hour (MWh). The average annual cost of alternative power would be \$328,000 or about \$143/MWh. Overall, the project would produce power at a cost which is \$355,000, or \$154/MWh, more than the cost of alternative power.

Under Commission staff's recommended proposal, the average annual project cost would be \$683,850 or about \$297/MWh. The average annual cost of alternative power would be \$328,000 or about \$143/MWh. Overall, the project would produce power at a cost which is \$355,850, or \$154/MWh, more than the cost of alternative power.

Commission staff chose the staff alternative as the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (2,300 MWh annually); (2) the 262 kW of electric capacity would come from a renewable resource that does not contribute to atmospheric pollution; and (3) the recommended environmental measures proposed by the AVEC, as modified by staff, would adequately protect and enhance environmental resources affected by the project. The overall benefits of the staff alternative would be worth the cost of the proposed and recommended environmental measures.

On the basis of its analysis, Commission staff concludes that issuing an original license for the project, with the environmental measures it recommends, would not be a major federal action affecting the quality of the human environment.

FINAL ENVIRONMENTAL ASSESSMENT

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

U.S. Fish and Wildlife Service
U.S. Department of the Interior
1011 E. Tudor Road, MS-211
Anchorage, Alaska 99518

Old Harbor Hydroelectric Project FERC Project No. 13272-004 Alaska

1.0 INTRODUCTION

1.1 APPLICATION

On November 1, 2013, the Alaska Village Electric Cooperative, Inc (AVEC) applied to the Federal Energy Regulatory Commission (Commission) for an original, minor license to construct, operate, and maintain its proposed 524-kilowatt (kW) Old Harbor Hydroelectric Project (Old Harbor Project or project) No. 13272-004.

On November, 14, 2014, AVEC applied to the U.S. Fish and Wildlife Service (FWS) for a utility systems right-of-way permit for the portion of the project that utilizes Kodiak National Wildlife Refuge (Refuge).

The project would be constructed on the East Fork of Mountain Creek and transfer water into a powerhouse on the Lagoon Creek Tributary, near the town of Old Harbor, Kodiak Island Borough, Alaska (Figure 1). Some project facilities (the intake and a portion of the penstock) would be located on approximately 7.74 acres of federal lands of the Refuge managed by the FWS and approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska (Figure 2).

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the proposed Old Harbor Project is to provide a new source of hydroelectric power. Therefore, under the provisions of the Federal Power Act (FPA),

the Commission must decide whether to issue a license to AVEC for the Old Harbor Project and what conditions should be placed on any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation, or water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection of, mitigation of damage to, and enhancement of fish and wildlife resources; (3) the protection of recreational opportunities; and (4) the preservation of other aspects of environmental quality.

Issuing an original license for the Old Harbor Project would allow AVEC to construct the project and generate electricity for the term of a license, making electric power from a renewable resource available to its customers.

This final environmental assessment (EA) evaluates the effects associated with construction and operation of the proposed project, alternatives to the proposed project, and makes recommendations to the Commission on whether to issue a new license, and if so, recommends terms and conditions to become a part of any license issued.

This EA also provides important information for FWS to determine whether to issue a utility systems right-of-way permit for use of Refuge lands.

In the final EA, we assess the environmental and economic effects of constructing, operating, and maintaining the Old Harbor Project: (1) as proposed by AVEC (proposed action) and (2) with our recommended measures (staff alternative).³ We also consider the effects of the no-action alternative. Important issues that are addressed include construction and operation effects on aquatic and terrestrial resources.

³ Unless specifically stated otherwise, all references to ‘staff,’ ‘we,’ or ‘our’ indicate the Commission Staff.

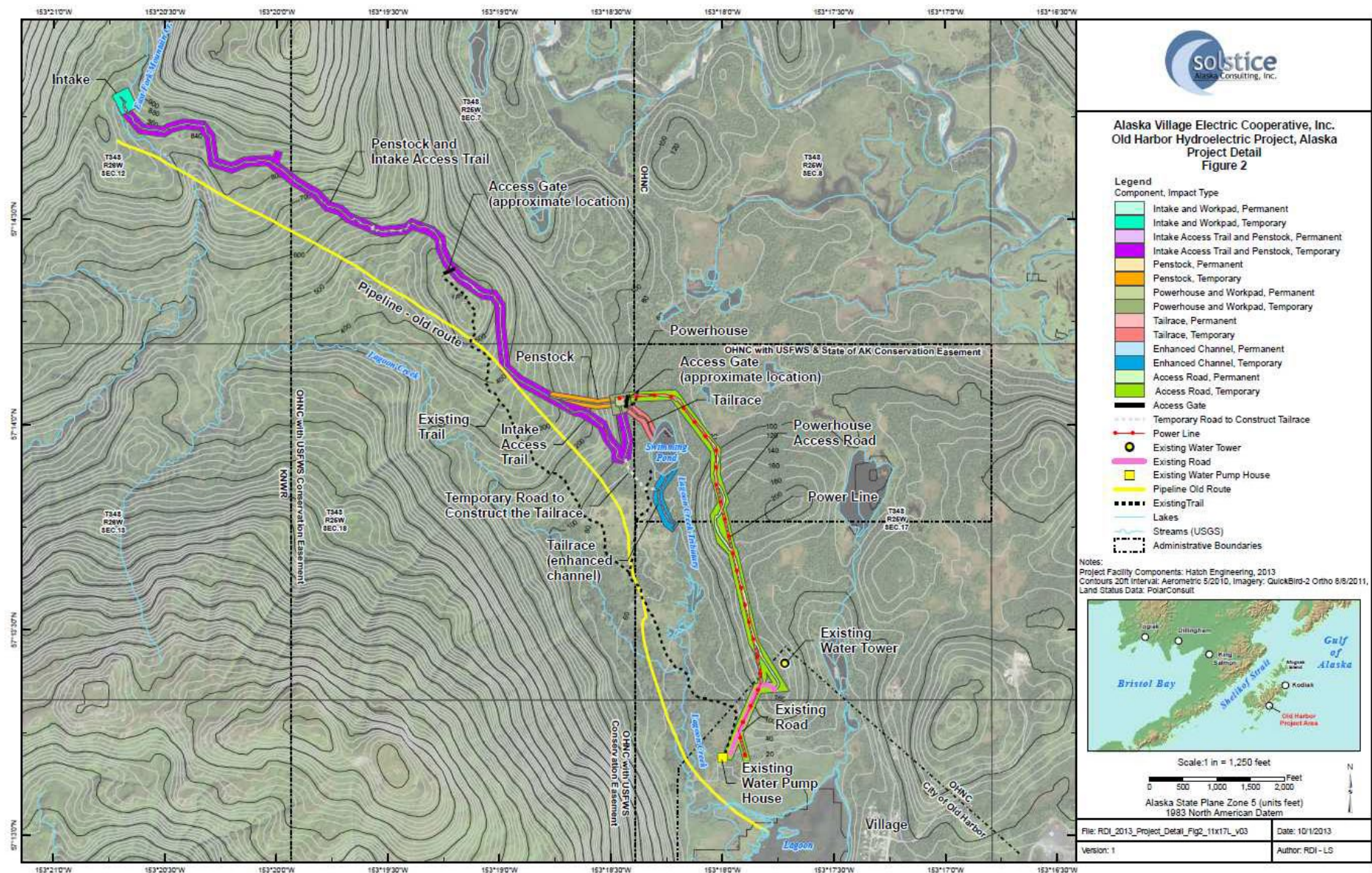


Figure 1. Location of the proposed Old Harbor Project (Source: Old Harbor license application).

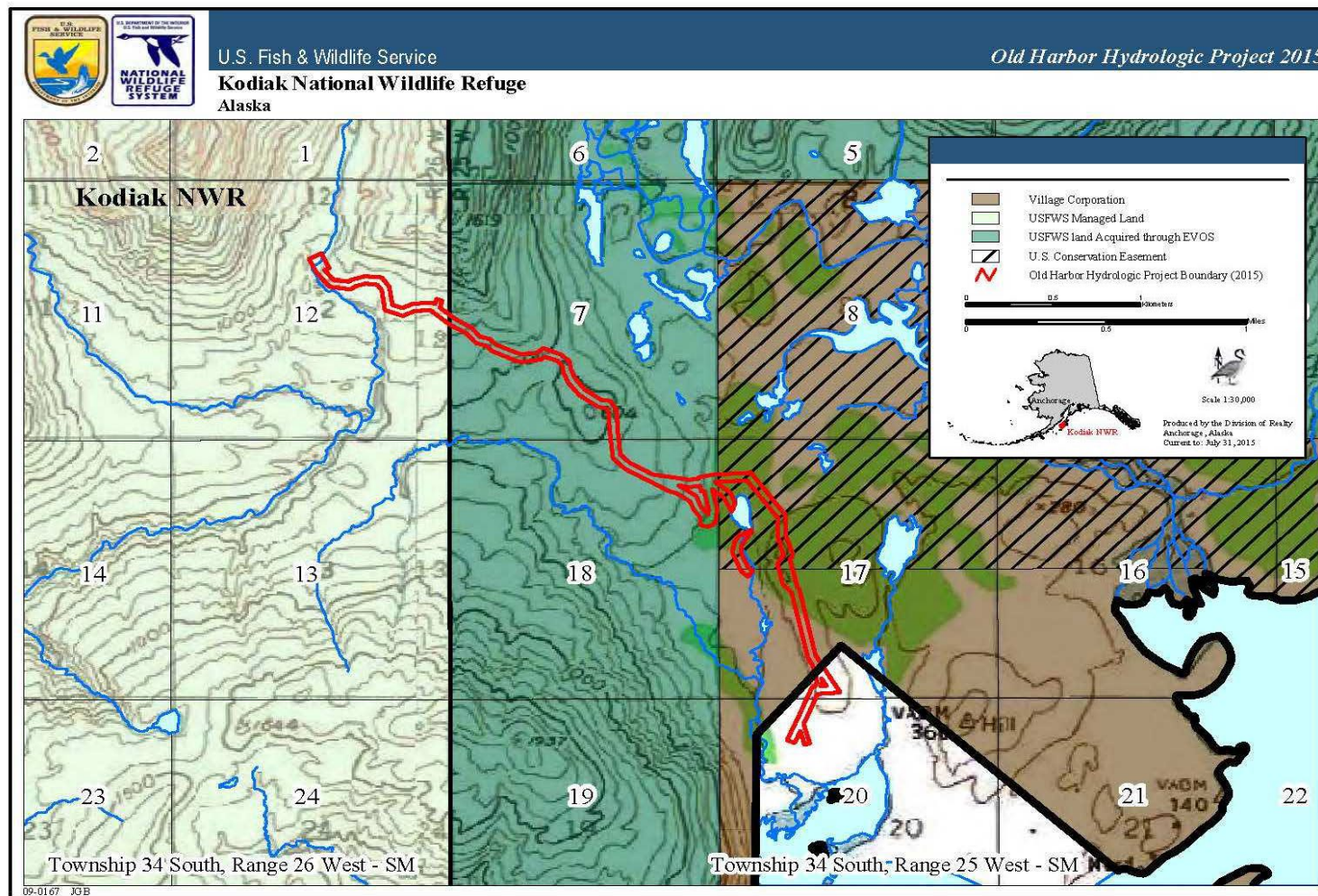


Figure 2. Project area land ownership map.

1.2.2 Need for Power

The purpose of the Old Harbor Project is to construct a hydroelectric facility to provide power to the community of Old Harbor. Old Harbor, like most rural Alaskan communities, relies on a small set of diesel generators and barged-in diesel fuel to supply its power needs. In 2010, the AVEC power plant consumed 58,000 gallons of diesel fuel to generate 807,000 kilowatt hours (kWh). Fuel for electric generation was brought into the community on three separate barges at an average cost of \$3.19 per gallon.

Currently, fuel must be barged in 2 to 3 times per year during periods of extremely high tides. When a shipment is missed, usually because of weather or suppliers not being available at high tide, any remaining supply is restricted to generators and public buildings, and residents must bring in fuel in 55 gallon drums on their fishing boats from the City of Kodiak to heat their homes. This added handling can increase the amount of fuel spilled.

The estimated average annual generation with two 262 kW turbines is 3,520,000 kWh of energy. With a single unit installed, the project would initially be capable of generating an average of about 2,300,000 kWh of energy.

Based on information from the Alaska Energy Authority, Old Harbor's energy demand from 2008 through 2012 grew at 5.9 percent. AVEC estimates future energy demand to average about 2.5 percent. If these estimates are accurate, the 2,300,000 kWh of average annual generation from the project's initial generating unit would be capable of meeting AVEC's energy demands for the next 40 years.⁴

Besides the project's ability to meet future energy growth, the project's hydroelectric generation would reduce hydrocarbon use, reduce the potential for fuel spills or contamination during transport, storage, or use of diesel fuel, and improve air quality. The project would also eliminate about 600 tons of carbon dioxide emissions each year.

We conclude that power from the Old Harbor Project would help meet a need for power in the Old Harbor community in both the short and long-term. The project would displace generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some emissions, thus creating an environmental benefit.

⁴ The development of industries, such as fish processing, could add a significant new power load. However, at this time, changes in system load from specific industry development are too speculative to analyze.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A license for the proposed project is subject to numerous requirements under the FPA and other applicable statutes. Below we discuss the status of complying with the statutes.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

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

No fishway prescriptions, or request for reservation of authority to prescribe fishways under section 18 of the FPA, have been filed.

1.3.1.2 Section 4(e) Federal Land Management Conditions

Section 4(e) of the FPA provides that any license issued by the Commission for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. The project occupies 7.74 acres of federal land administered by the FWS and approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska.

The FWS filed final conditions on October 21, 2015 (Appendix C) pursuant to section 4(e) of the Federal Power Act.⁵ These conditions are described under section 2.2.5, *Modifications to Applicant's Proposal – Mandatory Conditions*.

1.3.1.3 Section 10(j) Recommendations

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. The Commission is required to include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and

⁵ FWS filed preliminary 4(e) conditions on September 10, 2015.

statutory responsibilities of such agency.

On November 20, 2014, Alaska Department of Fish and Game (Alaska Fish and Game) filed recommendations under section 10(j), as summarized in Table 5-1, in section 5.4.1, *Recommendations of Fish and Wildlife Agencies*.⁶ In section 5.4, we also discuss how we address the agency recommendation and comply with section 10(j).

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act (CWA), a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. On July 14, 2014, the Alaska Department of Environmental Conservation issued a letter waiving its right to issue a 401 water quality certificate for licensing the Old Harbor Project.⁷

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) 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. Table 1-1 displays the federally listed species that may be found in the project area:

Table 1-1. Federally-listed threatened and endangered species that may occur in the project area.

Common Name	Scientific Name	Status
Steller's eider	<i>Polysticta stelleri</i>	Threatened
Southwest distinct population segment of northern sea otter	<i>Enhydra lutis kenyoni</i>	Threatened

Our analyses of project effects on threatened and endangered species are presented in section 3.3.4, *Threatened and Endangered Species*.

We conclude that licensing the project, as proposed with staff-recommended

⁶ Alaska Fish and Game timely filed, on August 11, 2014, recommendations under section 10(j). However, after further consultation with AVEC, Alaska Fish and Game filed updated section 10(j) recommendations on November 20, 2014.

⁷ The Alaska Department of Environmental Conservation letter was filed with the Commission on July 16, 2014.

measures, would not likely adversely affect the two federally listed species or designated critical habitat for the northern sea otter. Impacts to marine habitats from hazardous substances or erosion associated with the project would be unlikely, and if impacts did occur, they would have a negligible effect on use of the habitat by the Steller's eider and northern sea otter. Further, eider collisions with the transmission line would also be unlikely.

By letter dated January 20, 2012 (filed November 1, 2013) (USFWS, 2012), the FWS concurred with AVEC's determination that the proposed project would not be likely to adversely ESA-listed species and critical habitat. Our recommended measures to protect these species are consistent with AVEC's proposal that was reviewed by the FWS. Therefore, we agree with the FWS that requirements of section 7 of the ESA have been satisfied.

1.3.4 Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

On July 7, 2011, by operation of Alaska State law, the federally approved Alaska Coastal Management Program expired, resulting in a withdrawal from participation in the CZMA's National Coastal Management Program. The CZMA Federal consistency provision, section 307, no longer applies in Alaska.

1.3.5 National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).⁸

⁸ In the case that human remains are discovered on federal lands, and that such remains are native and not associated with a crime, the Native Graves Protection and Repatriation Act of 1990 (NAGPRA) would be implemented by the federal land manager where the remains were located. With this proposed project, the FWS would have jurisdiction under NAGPRA and would secure the remains and contact the Village of Old Harbor who would be the likely descendants.

No historic properties were located within the project's area of potential effects (APE) and as a result, the proposed project would have no effect on such properties. The Alaska State Historic Preservation Office (SHPO) was consulted and concurred with the finding that no historic properties would be affected by the proposed project. Commission staff also concurs with this finding. FWS is evaluating the information and will include their findings in a separate FWS decision document. In the case of any future historic property being inadvertently discovered by project construction, or ongoing operation and maintenance activities, the Commission would require AVEC to consult with FWS and Alaska SHPO, as appropriate, to resolve any potential adverse effect to such properties through the development and implementation of a historic properties management plan (HPMP). Commission staff would make AVEC carry-out such contingencies through a license article for any original license for this project.

1.3.6 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). Freshwater EFH in Alaska includes "all streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon." Consultation is required for the Old Harbor Project because Pacific salmon, including coho salmon and possibly pink and chum salmon, are found in the project area. AVEC included an EFH assessment, which was reviewed by NMFS, in their final license application.

Based on our analysis of the proposed action in this EA as specified in the license application, we conclude that licensing the project would not be likely to adversely affect EFH for coho, pink, and chum salmon in Mountain Creek or Lagoon Creek Tributary (see section 3.3.2, *Aquatic Resources*).

1.3.7 Alaska National Interest Lands Conservation Act

The proposed Old Harbor Hydroelectric Project would install infrastructure on federal lands managed by the FWS. Therefore, the proposed project must be evaluated in relation to the management purposes and resource values of refuge lands. In addition, the project has a utility component. Therefore, AVEC must apply to the FWS for right-of-way under the Alaska National Interest Lands Conservation Act (ANILCA) Title XI, Transportation and Utility Systems. Rights-of-way are issued according to both the ANILCA XI and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997. Before a right-of-way can be issued across the Refuge, it must be determined that the project is

compatible with the purposes of the refuge pursuant to Section 4(d)(2) of the National Wildlife Refuge System Administration Act. AVEC must obtain right-of-way on refuge land prior to construction of this project. (AVEC may request approval from the Refuge Manager to begin construction prior to the issuance of the ROW. If this request is approved, a Special Use Permit will be issued by the Refuge.)

On August 19, 1941, President Franklin D. Roosevelt signed Executive Order 8857 establishing Kodiak National Wildlife Refuge “. . . for the purpose of protecting the natural feeding and breeding ranges of the brown bears and other wildlife on Uganik and Kodiak islands . . .” Kodiak Refuge was established in its current configuration in the ANILCA in 1980. As identified in Section 303(5) (B) of ANILCA, Kodiak Refuge purposes include:

- (i) To conserve fish and wildlife populations and habitats in their natural diversity, including but not limited to salmonids, marine birds and mammals, migratory birds, and large mammals (including their restoration to historic levels);
- (ii) To fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
- (iii) To provide, in a manner consistent with purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents; and
- (iv) To ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the Refuge.

In addition to the above noted purposes of Kodiak Refuge, the refuge is managed for special values. These special values include the Kodiak Brown Bear, Kodiak Refugium and associated glacial lakes, Ayakulik-Red, Karluk, Sturgeon, and Dog Salmon drainages, Uganik Lake, Three Saints Bay, Mount Glottof Research Natural Area, Afognak Island Sitka spruce forest, and coastal marine habitats.

Operation and management of Kodiak Refuge is guided by a wide array of laws, treaties, and executive orders, and policies. Among the most important are the National Wildlife Refuge System Administration Act, as amended by the National Wildlife Refuge System Improvement Act, the Refuge Recreation Act, the Endangered Species Act of 1976, and the Wilderness Act of 1964.

The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee (Refuge Administration Act) serves as the "organic act" for the National Wildlife Refuge System. The act, as amended, consolidated the various categories of lands administered

by the Secretary of the Interior (Secretary) through the FWS into a single National Wildlife Refuge System. The act establishes a unifying mission for the Refuge System, and a process for determining compatible uses of refuges, among other important direction. This act states, first and foremost, the mission of the National Wildlife Refuge System be focused singularly on wildlife conservation.

This act identifies six priority wildlife-dependent recreation uses, clarified the Secretary's authority to accept donations of money for land acquisition, and placed restrictions on the transfer, exchange or other disposal of lands within the Refuge System. Most importantly, this act reinforces and expands the compatibility standard of the Refuge Recreation Act. The Refuge Administration Act authorizes the Secretary, under such regulations as he may prescribe, to "permit the use of any area within the System for any purpose, including but not limited to hunting, fishing, public recreation and accommodations, and access whenever he determines that such uses are compatible with the major purposes for which such areas were established."

Under the Comprehensive Conservation Plan (CCP) for the Kodiak Refuge, lands affected by the proposed project are categorized as Minimal Management for which the following is an overview of the guidance:

Minimal Management is designed to maintain the natural environment with very little evidence of human-caused change. Habitats should be allowed to change and function through natural processes. Administration will ensure that the resource values and environmental characteristics identified in the Plan are conserved. Public uses, economic activities, and facilities should minimize disturbance to habitats and resources. Ground- disturbing activities are to be avoided whenever possible (USFWS 2008).

1.3.8 Executive Order 11988 Floodplain Management

Executive Order 11988 requires that Federal executive branch agencies⁹ avoid construction or management practices that would adversely affect floodplains unless that agency finds that there is no practicable alternative, and the proposed action includes all practicable measures to minimize harm to or within the floodplain. Operation of the proposed hydroelectric facility would require building a water diversion structure and small powerplant within the floodplains of Mountain and Lagoon Creeks. In accordance with Executive Order 11988 and NEPA, alternatives to the proposed action were considered and mitigation measures have been included to minimize effects to the floodplain.

⁹ It should be noted that the Commission is not an executive branch agency.

1.3.9 Executive Order 11990 Wetlands Protection

Executive Order 11990 requires that Federal executive branch agencies¹⁰ avoid construction or management practices that would adversely affect wetlands unless that agency finds that there is no practicable alternative, and the proposed action includes all practicable measures to minimize harm to the wetlands. Although designed to minimize disturbance of wetlands, construction of the proposed hydroelectric facility would require 0.75 acre of wetlands to be permanently affected and 3.63 acres to be temporarily affected. In accordance with Executive Order 11990 and NEPA, alternatives to the proposed action were considered and mitigation measures have been included to minimize effects to the wetlands.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations, 18 C.F.R. 4.38, require that applicants consult with appropriate resource agencies and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, ESA, NHPA, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations.

1.4.1 Scoping

Before preparing this EA, we conducted scoping to determine what issues and alternatives should be addressed. A scoping document (SD1) was distributed to interested agencies and others on September 21, 2009. It was noticed in the Federal Register on September 28, 2009. A scoping meeting was held on October 22, 2009, in Anchorage, Alaska, to request oral comments on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these are part of the Commission's public record for the project. In addition to comments provided at the scoping meetings, the following entities provided written comments:

<u>Commenting Entities</u>	<u>Date Filed</u>
Alaska Fish and Game	October 16, 2009
U.S. Fish and Wildlife Service	November 20, 2009

A revised Scoping Document (SD2), addressing these comments, was issued on January 4, 2010.

1.4.2 Interventions and Comments

¹⁰ It should be noted that the Commission is not an executive branch agency.

On June 10, 2014, the Commission issued a notice that AVEC had filed an application for an original license for the Old Harbor Project. This notice set August 11, 2014, as the deadline for filing comments, protests, and motions to intervene. In response to the notice, the FWS filed comments on the application on August 8, 2014, and Alaska Fish and Game filed comments, a motion to intervene, and 10(j) recommendations on August 11, 2014. On November 20, 2014, Alaska Fish and Game filed their modified 10(j) recommendations. On September 10, 2015, FWS filed their 4(e) conditions.

1.4.3 Comments on Draft EA

On May 7, 2015, the Commission issued a draft EA for the Old Harbor Project. Comments on the draft EA were due by June 8, 2015. Comments on the draft EA were filed by the following entities:

<u>Commenting Entity</u>	<u>Date Filed</u>
AVEC	June 8, 2015
Alutiiq Tribe of Old Harbor	June 8, 2015
City of Old Harbor	June 8, 2015 and June 30, 2015
Old Harbor Native Corporation	June 8, 2015
State Senator Gary Stevens	June 30, 2015
US Senator Lisa Murkowski, US Senator Dan Sullivan, and US Congressman Don Young	July 17, 2015

Appendix B summarizes the comments that were filed, includes our responses to those comments, and indicates where we made modifications to the final EA.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

The no-action alternative is license denial. Under the no-action alternative, the project would not be built and environmental resources in the project area would not be affected.

2.2 APPLICANT'S PROPOSAL

AVEC proposes to install two Pelton 262-kW turbines, with the first turbine installation occurring at the time of initial construction and the second turbine being installed when "demand warrants an additional turbine." We project that the first turbine would meet AVEC's energy demands for the next 40 years (see section 1.2.2 *Need for Power*). Section 13 of the FPA states the "licensee shall within the time fixed in the license complete and put into operation such part of the ultimate development as the

Commission shall deem necessary to supply the reasonable needs of the then available market.” Therefore, because it could be 40 years before demand warrants the addition of the second turbine, this EA only examines the project with the installation of the first turbine, which we refer to as the proposed action. If and when there is an established need for additional power, AVEC could apply for a license amendment to increase power production at the project. The amendment application would be noticed for public comment, and depending upon the extent of the amendment request, analyzed under a National Environmental Policy Act (NEPA) process.

2.2.1 Project Facilities

The proposed project would consist of an intake, penstock, powerhouse, tailrace and constructed channel, access road and trail, and transmission line.

The proposed project is designed to accommodate two turbines with a total maximum hydraulic capacity of 11.8 cfs (i.e., diversion intake, penstock, tailrace, and constructed channel). Although this EA only analyzes the proposed project with a single turbine and maximum hydraulic capacity of 5.9 cfs, all other project features are being analyzed as proposed.

Intake

The intake would consist of a concrete, or other suitable material, diversion/cut off weir with integral spillway that would divert water from the East Fork of Mountain Creek. The weir would range in height from approximately 4 feet at the spillway to 8 feet elsewhere and would span approximately 100 feet across the creek floodplain. A below grade transition with an above-ground air relief inlet pipe would convey water to a buried penstock. Once constructed, the intake would fill to the level of the spillway (about 4 feet) and flows higher than the amount of water diverted would the pass over the spillway.

Penstock

A 10,150-foot-long penstock would be constructed consisting of 7,400 feet of 18 to 20-inch-diameter polyethylene pipe leading to 2,750 feet of 16-inch-diameter steel pipe leading to the project powerhouse. The entire pipe would be buried 1 to 5 feet underground.

Powerhouse

The powerhouse would consist of an approximately 30-foot by 35-foot by 16-foot high metal building. The building would be designed to house two 262-kW Pelton turbines, a 480-volt, three-phase synchronous generator, and switchgear for two turbines. A water

bypass system in the powerhouse would be used to route flows to the tailrace during turbine maintenance. To control the volume of flow diverted at the intake and to limit rapid changes in flow downstream of the project, AVEC proposes to install a flow control mechanism between the diversion and powerhouse.

Tailrace

The tailrace¹¹ would be constructed with approximately 85 feet of steel, plastic, or concrete culvert and would convey the project flows approximately 0.1 mile from the powerhouse to the nearby pond, known as Swimming Pond.¹² AVEC proposes to work with Alaska Fish and Game to develop a fish exclusion plan for the tailrace to prevent fish access to the tailrace channel.

Constructed Channel

The tailwater would travel 500 feet within Swimming Pond and approximately 0.2 miles within a constructed channel of Lagoon Creek Tributary. This constructed channel would be in the place of the existing ephemeral section of Lagoon Creek Tributary where the channel is poorly delineated and unequipped to contain additional flows. This constructed channel would end in a groundwater upwelling where Lagoon Creek Tributary becomes a distinct natural channel. Lagoon Creek Tributary flows into Lagoon Creek, which then empties into the 82-acre, tidally influenced Salt Lagoon. Salt Lagoon drains through a culvert into the Sitkalidak Strait. The constructed channel would be designed to hold at least 15 cubic feet per second (cfs).

Access Road and Trail

An approximately 2.2-mile-long by 10-foot-wide project access trail would be constructed between the intake and the powerhouse and an approximately 5,720-foot-long by 24-foot-wide powerhouse access road would extend from powerhouse to the existing community drinking water tank access road.

¹¹ In their response to comments filed September 24, 2014, AVEC stated (based on comments from Alaska Fish and Game filed August 11, 2014) that the enhanced streambed channel should not be included as part of the tailrace.

¹² Swimming Pond is an approximately 3.9 acre pond with an estimated maximum depth of 15 feet, estimated mean depth of 8 feet, and approximate shoreline length of 1,665 feet. Its presumed flushing rate is 32 hours. The level of Swimming Pond correlates with ground water in the area and fluctuates without any apparent inflow or outflow, except during high run off events.

Transmission Line

A 1.2-mile-long, 12.47-kilovolt (kV) three-phase overhead power line would be constructed from the powerhouse to the existing power distribution system in Old Harbor.

2.2.2 Project Safety

As part of the licensing process, the Commission would review the adequacy of the proposed project facilities. Special articles would be included in any license issued, as appropriate. Commission staff would inspect the licensed project both during and after construction. Inspection during construction would concentrate on adherence to Commission-approved plans and specifications, special license articles relating to construction, and accepted engineering practices and procedures. Operational inspections would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance.

2.2.3 Project Operation

To operate the initial unit, AVEC proposes to divert natural flows up to 5.9 cfs (maximum turbine capacity), year round from the East Fork of Mountain Creek basin to Lagoon Creek Tributary basin through a penstock and into the powerhouse. Water would then exit the powerhouse and enter the tailrace which feeds into the Swimming Pond and into Lagoon Creek Tributary.

Any flows greater than the flows diverted for power, would spill over the diversion weir and stay within East Fork of Mountain Creek. AVEC would operate the project automatically and primarily in standalone mode as the community's primary source of electrical generation. A water bypass system in the powerhouse would be used to route flows to the tailrace during turbine maintenance. To control the volume of flow diverted at the intake and to limit rapid changes in flow downstream of the project, AVEC proposes to install a flow control mechanism between the diversion and powerhouse.

2.2.4 Proposed Environmental Measures

Design and Operation Related Measures

- Design the tailrace in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond;

- Design the constructed channel to include substrate, large woody debris, and other habitat suitable for salmon spawning and rearing, and fish passage between Lagoon Creek Tributary and Swimming Pond;
- Build the constructed channel during a period that Alaska Fish and Game deems protective of coho salmon;
- Install bird diverters on the power line and guy wires to prevent bird strikes; and
- Outfit power poles with perch posts designed to prevent bird electrocution.

Administrative Measures

- Employ an environmental compliance monitor during project construction to ensure and document compliance with the provisions of a license; and
- Throughout the term of a license, if deemed necessary by an agency or AVEC, hold an annual project review meeting to discuss the project, any reports, and compliance with license articles.

Geology and Soils

- Pile overburden and soil from excavations outside of wetlands and in such a way as to limit erosion;
- Develop a storm water pollution prevention plan for the collection and routing of storm water during construction activities to minimize erosion; and
- Develop an erosion and sedimentation control plan to decrease erosion and sedimentation during construction and operation of the project, including turbidity monitoring during construction.

Aquatic Resources

Water Quantity

- Limit water diversion rates from the East Fork of Mountain Creek during upramping and downramping to 5 cfs per hour to prevent rapid flow fluctuations and protect aquatic resources in Lagoon Creek Tributary.

Water Quality

- Develop a fuel and hazardous substance spill plan to prevent petroleum product spills from impacting aquatic resources.

Fisheries Resources

- Develop a fish exclusion plan in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond.

Terrestrial Resources

- Establish construction timing windows for avoiding disturbances during bird nesting seasons;
- Monitor and report to the FWS any newly established bald eagle nests;
- Postpone blasting within 0.5 mile and construction work within 660 feet of any identified bald eagle nests until after coordination with the FWS;
- If blasting is required within 0.5 mile of an eagle nest, conduct blasting during November-January to avoid the bald eagle breeding season;
- Develop a bear safety plan with protocols to minimize bear encounters during construction and maintenance activities;
- Minimize the use of helicopters or airplanes near mountainsides adjacent to East Fork of Mountain Creek to avoid potential impacts to mountain goats and, if mountain goats are observed, maintain a 1,500-foot vertical or horizontal clearance to the extent that it can be accomplished safely;
- Revegetate excess soil piles and disturbed areas with a native seed mix recommended by the Plant Materials Center, Alaska Division of Agriculture; and
- Develop an invasive species management plan prior to commencement of any construction activities.

Recreation and Land Use

- Install gates to limit motor vehicle use of the intake access trail and the existing

ATV trail to authorized vehicles only to minimize traffic-related erosion; and

- Install signs at the powerhouse to inform the public about access on the Refuge.

Cultural Resources

- In the case of discovering a historic property during construction of the project (or human remains associated with the Native American Graves Protection and Repatriation Act of 1992), AVEC would consult with the both the Alaska State Historic Preservation Officer (SHPO), FWS, and Village of Old Harbor to address any potential effects.

2.2.5 Modifications to Applicant's Proposal – Mandatory Conditions

The FWS filed the following mandatory conditions (Appendix C), which are evaluated in this final EA. We consider 13 of the 57 conditions to be administrative and therefore not analyzed in the final EA.

The following section 4(e) conditions¹³ are resource-specific:

- Condition 29 requires the licensee to consult with FWS about the locations, installations, and maintaining of gates (which may be located outside the Refuge) to prevent unauthorized access to the Refuge, including annual monitoring.
- Condition 30 requires a vegetation management plan.
- Condition 31 requires an environmental compliance monitor during the construction phase of the project.
- Condition 32 requires a spill prevention plan.
- Condition 33 requires a storm-water pollution prevention plan.
- Condition 37 restricts vegetative clearing between May 1 and August 1.
- Condition 38 requires a pre-project sampling and analysis plan of hazardous substance.
- Condition 41 requires food wastes not to be stored in the right-of-way permit area.
- Condition 45 outlines specific requirements for human-wildlife interactions.
- Condition 46 prohibits the disturbance and destruction of eagle nests, and prohibits permanent facilities within 0.25 mile of an established nest.

¹³ Unless specifically noted (i.e., conditions 29, 41, and 53), each 4(e) condition applies only to FWS owned and managed lands (Figure 2).

- Condition 50 requires implementation of mitigation measures if bear-denning sites might be affected by construction activities.
- Condition 51 requires initial construction activities to occur in wintertime conditions when the ground is frozen.
- Condition 53 prohibits oil/diesel storage facilities in the right-of-way permit area.

2.3 STAFF MODIFICATIONS TO APPLICANT'S PROPOSAL

Under the staff alternative, the proposed project would be constructed and operated with AVEC's proposed measures, as outlined above. The staff alternative also includes all of FWS's mandatory section 4(e) conditions. The staff modifications and additional measures are outlined below:

- Develop a constructed channel habitat design and monitoring plan that: (1) incorporates AVEC's proposal to design the constructed channel to provide suitable salmon spawning and rearing habitat; and (2) includes annual monitoring of the channel for a 3-year period following the commencement of project operation to evaluate the effectiveness of the design at providing spawning and rearing habitat;
- Develop a ramping rate plan to establish protocols for ensuring compliance with the proposed ramping rate limitation of 5 cfs per hour;
- Include in the proposed fuel and hazardous substance spill plan: (1) a spill prevention control and countermeasure section developed in consultation with FWS (FWS condition 32); (2) a pre-project sampling and analysis section for hazardous substances, developed in consultation with FWS (FWS condition 38); and (3) a requirement to avoid placing oil/diesel storage facilities in the right-of-way permit area (FWS condition 53);
- Develop a vegetation management plan to guide AVEC's proposed revegetation of disturbed areas and control of invasive species, and monitor for the effectiveness of the proposed measures (FWS condition 30);
- Develop an avian protection plan that provides a specific design for AVEC's proposed measures to minimize avian electrocutions and collisions consistent with current avian protection guidelines;
- Avoid vegetative clearing between May 1 and August 1, in order to protect nesting birds, unless authorized in writing by the Refuge Manager (FWS condition 37);

- Avoid construction of permanent facilities within 0.25 mile of an established bald eagle nest tree (FWS condition 46);
- Report bear-human conflicts to the FWS and Alaska Fish and Game (FWS condition 45), prohibit all food waste storage in the right-of-way permit area (FWS condition 41), and implement mitigation measures if bear-denning sites might be affected by construction activity (FWS condition 50) to minimize the potential for human-bear interactions;
- Consult with FWS about specific locations, installation, maintenance, and monitoring of the gates across the intake access trail and the existing ATV trail, and consult with the FWS to design additional protection measures if unauthorized uses or vandalism are noted (FWS condition 29); and
- Develop procedures, in the event of an inadvertent discovery of cultural resources at the project, for determining the discovery's eligibility for the National Historic Register and crafting a historic properties management plan, if necessary.

3.0 ENVIRONMENTAL ANALYSIS

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The project would be located near the town of Old Harbor on Kodiak Island, Alaska, which is approximately 300 miles southwest of Anchorage, Alaska. Kodiak Island is the second largest island in the United States.¹⁴ Kodiak Island is a mountainous island with a climate that is dominated by a strong marine influence with frequent cloud cover and fog, heavy precipitation, cool summers, and relatively warm winters.

The proposed diversion structure located on the East Fork of Mountain Creek would be approximately 7 miles from the mouth of Mountain Creek where Mountain Creek drains into Barling Bay Creek joining Barling Bay Creek near its confluence with tide water. The highest elevation in the Mountain Creek basin is 3,500 feet. Mountain Creek is short, steep, and exhibits a relatively rapid response to weather changes.

Lagoon Creek Tributary, the point of project discharges, is a spring-fed tributary that connects via an ephemeral channel to Swimming Pond. Flows from this tributary continue into the 4.51-mile-long Lagoon Creek with headwaters at an elevation of approximately 700 feet mean sea level (msl).

¹⁴ <http://www.city.kodiak.ak.us/Home/Pages/home2.aspx> retrieved January 29, 2015.

Major land uses in the area include the conservation of fish and wildlife, their habitats, and wildlife-oriented recreation by the FWS on Refuge lands managed by the FWS and those within the conservation easement held by FWS on Old Harbor Native Corporation lands. Old Harbor Native Corporation owns much of the land around the village of Old Harbor and allows permitted recreation. Land within and surrounding the project area is primarily undeveloped.

Most of the employment in the town of Old Harbor is public sector workers and fishermen.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing National Environmental Policy Act of 1969 (40 CFR, section 1508.7), cumulative effect is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts 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. Through scoping, agency consultation, and Commission staff's independent analysis we've identified no resources that would be cumulatively affected by licensing the Old Harbor Project. The project is located in very small watersheds with very little existing or planned future developmental activity other than the proposed project.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effects of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the site-specific environmental issues.

Only the resources that would be affected are addressed in this EA. Based on this, we have determined that geology and soils, aquatic resources, terrestrial resources, recreation and land use, cultural resources, environmental justice, and subsistence resources may be affected by the proposed action and action alternatives. We have not identified any substantive issues related to aesthetic resources. We present our recommendations in section 5.1, *Comprehensive Development and Recommended Alternative*.

3.3.1 Geology and Soils

3.3.1.1 Affected Environment

General

The project is located within the Kodiak Mountains portion of the Pacific Border Ranges Physiographic Province of Alaska (Wahrhaftig, 1965). The area is characterized by glaciated peaks with summit altitudes between 2,000 and 4,000 feet. This region is considered to be generally free of permafrost except where isolated masses of permafrost may occur at high altitudes and in lowland areas where ground insulation is high, such as peat bogs and swamps (Ferrains, 1965).

The upper part of the project area (from the powerhouse to the intake) is typical of the mountainous regions of Kodiak Island. Active erosion is evident at the base of the steep talus slopes. The soils are shallow (1 to 2 feet deep) over slate and sandstone. The small depressions and valleys in the area fill with water and peat to form wetlands (U.S. Department of the Interior, Map MF 674). In the lowlands, beginning at the access trail to the powerhouse, the area consists of alluvial deposits overlain by several feet of a mixed organic and gravel soil. Wetlands are also common in these areas with moss and peat overlying soil and gravel. Active erosion is not evident in these areas.

Seismology

Southcentral Alaska, including the Kodiak Island area, is located in an area of active seismicity caused by the subduction of the Pacific Plate of the earth's crust under the North American Plate. The collision of these plates produces motion in Southcentral Alaska along several active faults. The Contact Fault, which trends northeast to southwest, is present within 10 miles of the project.

Potential Geological and Soil Hazards

Landslides, avalanches, and erosion are a concern in mountainous areas of Kodiak Island, including Old Harbor. Although landslides and avalanches may occur on lesser slopes, they typically occur on slopes greater than 50 percent (27 degrees) (Wildfirenews.com 2005). Damage from these hazards occurs on the slopes as well as areas at the base of the slopes where the rubble and snow accumulate. Erosion may occur along stream banks and along steep slopes forming taluses.

3.3.1.2 Environmental Effects

Land-disturbing activities associated with construction of the project could cause erosion and sedimentation. During operation, the additional flow being diverted to Lagoon Creek could also increase erosion.

AVEC proposes the following measures to reduce potential effects on geological and soil resources:

- Pile overburden and soil from excavations outside of wetlands and in such a way as to limit erosion;
- Develop a storm water pollution prevention plan for the collection and routing of storm water during construction activities to minimize erosion; and
- Develop an erosion and sedimentation control plan to decrease erosion and sedimentation during construction and operation of the project, including turbidity monitoring during construction.

Alaska Fish and Game recommends (10(j) recommendation 11) that AVEC consult fish and wildlife agencies and develop a plan to control erosion and sediment that includes measures to control slope instability, revegetate disturbed areas, and minimize the quantity of sediment introduced into Lagoon Creek resulting from project construction. Alaska Fish and Game also recommends (10(j) recommendation 12) that AVEC take daily water samples during construction and analyze them for turbidity. Alaska Fish and Game recommends the water samples be taken daily in Lagoon Creek and tributaries, both upstream and downstream of all construction activities and discharge points for overland flows that cross construction areas and discharge into Lagoon Creek or tributaries. To control storm water pollution, FWS condition 33 specifies that excavation dewatering and storm-water sedimentation control measure be used to meet the requirements of a Construction General Permit issued by the U.S. Environmental Protection Agency or the Alaska Department of Environmental Conservation. To the erosion and sedimentation control plan, FWS condition 51 specifies that initial construction activities must occur in wintertime conditions when the ground is frozen to minimize sedimentation and other potential adverse effects to wetlands.

In a letter filed on September 23, 2014, AVEC stated that it agrees with Alaska Fish and Game's sediment and erosion recommendations.

Commission Staff Analysis

Land-disturbing activities associated with construction of the proposed project could cause erosion and sedimentation, including increased erosion of stream banks along Lagoon Creek and Lagoon Creek Tributary. The proposed release of more flow into Lagoon Creek Tributary and Lagoon Creek could increase the potential for bank erosion of the silty soils along the streams. The steep slopes and large amount of basin precipitation make the streams especially prone to added erosion effects if a control plan is not in place and properly implemented. AVEC's proposal and Alaska Fish and

Game's recommendation to develop an erosion and sediment control plan and monitor turbidity during project construction would allow AVEC to quickly identify and respond to any increases to turbidity and ensure that any effects from the construction and operation of the project on erosion and sedimentation would be minimized.

We discuss the need for a revegetation plan in Section 3.3.4, Terrestrial Resources, and make our recommendation regarding revegetation measures in Section 5.2, Comprehensive Development and Recommended Alternative.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Water Quantity

Mountain Creek

Mountain Creek is approximately 12.35 miles long from its headwaters to Barling Bay. Its headwaters are at about 1,800 feet msl elevation and drainage area is approximately 8 square miles. Mountain Creek is divided into four sub-basins: 1) East Fork drainage (3.43 miles long with drainage area of 2.80 square miles); 2) West Fork drainage (3.26 miles long with drainage area of 1.79 square miles); 3) Lower drainage (2.75 miles long with drainage area of 2.70 square miles); and 4) Mouth drainage (2.91 miles long with drainage area of 0.60 square miles). Mountain Creek empties into the tidally-influenced reach of Barling Bay Creek anywhere from 0 to 300 feet upstream of the mouth of Barling Bay Creek, depending on the current courses of the two streams' channels (Figure 3).

A synthetic hydrology dataset for East Fork of Mountain Creek was constructed using data from gages on Mountain Creek, East Fork of Mountain Creek, and twelve other sites on Kodiak Island (Polarconsult, 2010). Standardized flow (cfs/square mile) was higher and more variable for East Fork of Mountain Creek than for most other locations analyzed. Three potential explanations were offered: 1) East Fork of Mountain Creek is located in southeast Kodiak Island, which tends to be wetter than other areas of the island; 2) data used to predict flow for East Fork of Mountain Creek were collected during wetter-than-average years; and 3) the flow rating curves have poor precision at low flows. To compensate for positive bias and high variability in East Fork of Mountain Creek data, East Fork of Mountain Creek data were adjusted downward using U.S. Geological Survey (USGS) flow data from other Kodiak Island sites as a benchmark for correction factors. AVEC presented these adjusted data in their final license application (FLA) as their best estimate of East Fork of Mountain Creek flow (Figure 4).

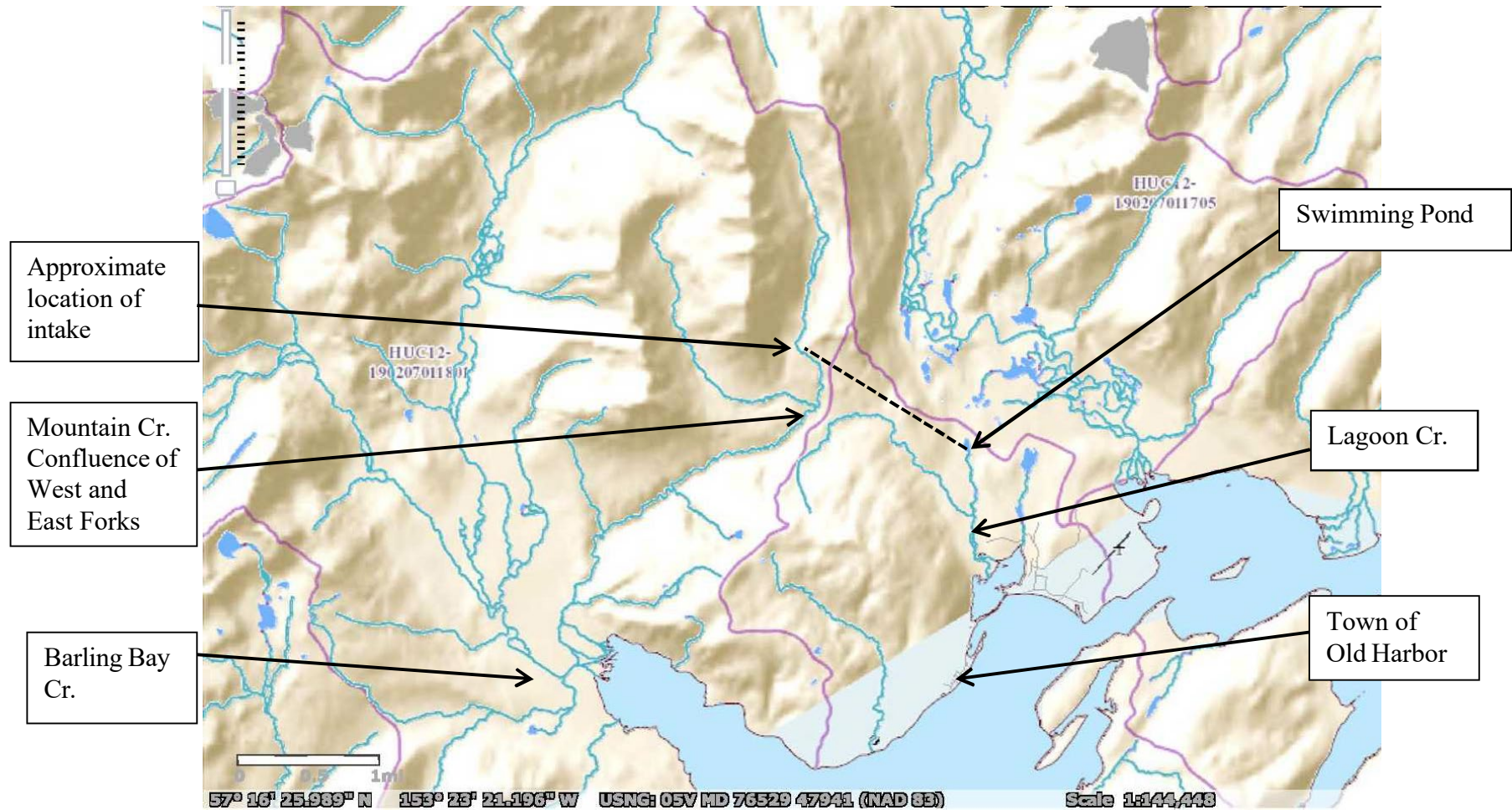


Figure 3. Approximate location of proposed project in relation to surrounding natural features, including Barling Bay-Mountain Creek and Lagoon Creek watersheds. Purple lines denote watershed boundaries. Figure 1 shows exact locations of project features. (Source: USGS National Hydrography Dataset <http://viewer.nationalmap.gov/viewer/nhd.html?p=nhd>, accessed on November 25, 2014).

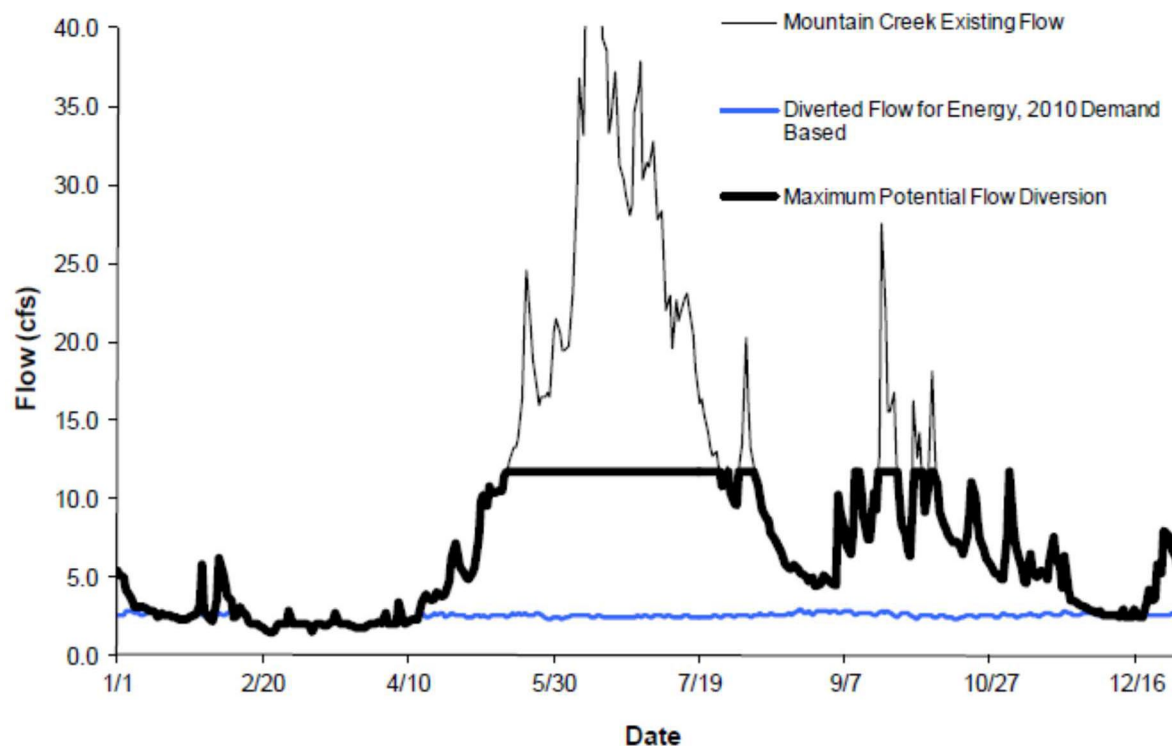


Figure 4. Median daily flow estimated at proposed intake site on East Fork of Mountain Creek, flow proposed for diversion under 2010 energy demands, and maximum potential flow diversion (11.8 cfs) proposed by the applicant with two turbines in operation. This environmental analysis considers operation of only one turbine with a maximum flow diversion of 5.9 cfs (Source: AVEC, 2013).

Stream flow in East Fork of Mountain Creek at the site of the proposed intake ranges from approximately 3 to 100 cfs with a mean annual flow of approximately 14.2 cfs (AVEC, 2013). The estimated average monthly stream flow ranges from 2 to 37 cfs with higher flows in May through July and September through October (Figure 4; Table 3-1). The East Fork contributes approximately 40 to 50 percent and the West Fork contributes approximately 50 to 60 percent of their combined flows (ADNR, 1996). Flows at the site of the proposed diversion on East Fork of Mountain Creek provide approximately 10 to 12 percent of the flow on Mountain Creek at the point that is considered to be the upper extent for anadromous fish distribution (AVEC, 2013).

In the mainstem of Mountain Creek the upper reaches have higher flow than lower reaches (Figure 5). The lower three miles of Mountain Creek, from the canyon to the mouth, typically lack surface flow from mid- to late-summer through the fall because water exiting the canyon flows subsurface within 0.3 miles. Mountain Creek flows into Barling Bay Creek, which has a drainage area of approximately 16 miles and maintains surface flow throughout the summer and fall (AVEC, 1998, Polarconsult, 2010; Table 3-1).

Table 3-1. Average monthly flow, average maximum potential water diverted, and average diversion based on 2010 demands (cfs) estimated for proposed intake site on East Fork of Mountain Creek (Source: AVEC, 2013, methods detailed in Polarconsult, 2010; modified by Commission Staff).

Month	Average Existing Flow at Intake	Average Maximum Potentially Diverted by One Turbines	Average Maximum Potentially Diverted by Two Turbines	Average Diverted Based on 2010 Demand
January	3.1	3.1	3.1	2.6
February	2.6	2.6	2.6	2.2
March	2.0	2.0	2.0	2.0
April	3.5	3.5	3.5	2.4
May	13.7	5.9	10.6	2.5
June	37.0	5.9	11.8	2.5
July	19.7	5.9	11.6	2.5
August	8.1	5.9	7.6	2.6
September	10.2	5.9	8.9	2.7
October	9.0	5.9	8.5	2.5
November	5.4	5.4	5.4	2.6
December	3.8	3.8	3.8	2.5

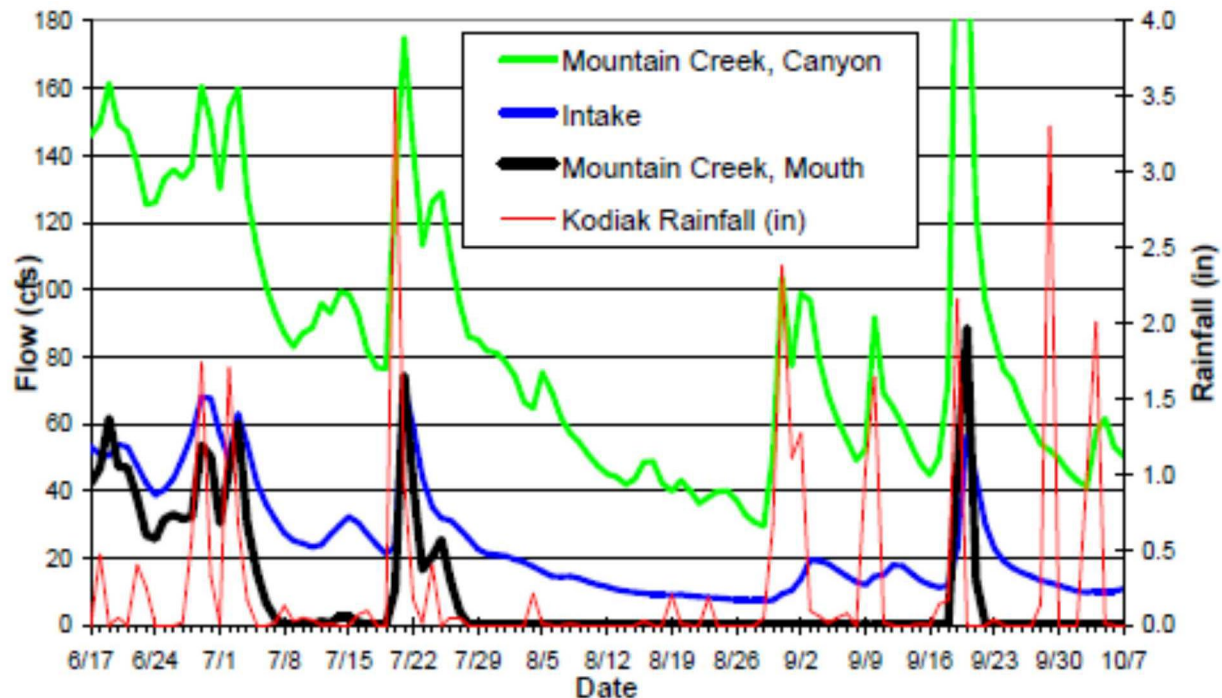


Figure 5. Streamflow measures (1998) at the proposed intake location on East Fork of

Mountain Creek and the mouth and canyon on Mountain Creek. Note that 1998 was the wettest year on record since 1931 (Source: Polarconsult, 2010).

Lagoon Creek

The Lagoon Creek drainage is located west of the city of Old Harbor, with headwaters at approximately 700 feet msl elevation. The drainage consists of the approximately 0.80-mile-long Lagoon Creek Tributary, which would receive project flows, and the approximately 4.51-mile-long mainstem Lagoon Creek.

Lagoon Creek Tributary drains seasonally from Swimming Pond, an approximately 3.9-acre pond with an estimated maximum depth of 15 feet, estimated mean depth of 8 feet, and approximate shoreline length of 1,665 feet. Swimming Pond has no inflow or outflow except during high runoff events, and its level fluctuates with ground water levels (Figure 6).

Lagoon Creek Tributary is primarily spring-fed, resulting in consistent flows that rise with precipitation inputs (ADNR 1996). Beaver activity has created ponding in the middle reaches of Lagoon Creek Tributary. Lagoon Creek empties into the tidally-influenced Salt Lagoon, which is also fed by a second small creek. Salt Lagoon occupies about 82 acres and drains through a culvert into the Sitkalidak Strait. During low tides Salt Lagoon drains rapidly through the culvert, while during high tides water flows back into Salt Lagoon through the culvert.

Quantitative flow data are largely unavailable and only a few flow measurements are available for Lagoon Creek Tributary. On October 16, 2010, discharge at the point of groundwater upwelling approximately 1,000 feet downstream from Swimming Pond was 0.3 cfs; discharge below the beaver dam in lower reaches was 3.2 cfs; and discharge near the mouth of the Lagoon Creek mainstem was 5.3 cfs.



Figure 6. Photo of intermittent outlet channel (denoted by red line) on south side of

Swimming Pond (Love, 2011)

Water Quality

The Alaska Water Quality Standards designate freshwater and marine uses for which water quality must be protected and designate levels of degradation that may not be exceeded as a result of human activity (Table 3-2; Alaska Administrative Code Title 18, Chapter 70, revised April, 2012). No waterbodies associated with this project are listed as Section 303(d) impaired by the State of Alaska (Alaska DEC, 2014). There are no existing designated uses of water from Mountain Creek. Surface water from Lagoon Creek is the drinking water source for Old Harbor.

Mountain Creek

AVEC (2013) states that attempts to monitor temperature over time have been unsuccessful and so water temperature data for Mountain Creek are lacking. Water temperature was 43 degrees Fahrenheit (°F) and dissolved oxygen was 6.8 parts per million (ppm) in a grab sample taken near the proposed intake location in August, 1996 (Polarconsult, 1996, Alaska DEC, 2012). These values are within the State's water quality standards. Other previous measurements for metals, biochemical oxygen demand, nitrate, nitrite, and phosphorus have been within state drinking water quality standards (Table 3-2; Polarconsult, 1996, Alaska DEC, 2008).

Lagoon Creek

AVEC recorded water temperature from August, 2010 to August, 2011 in Swimming Pond and Lagoon Creek Tributary at the beaver pond near the groundwater upwelling area (Figure 7). Temperatures ranged from 17 to 73 °F at the surface and 32 to 72°F at the bottom of Swimming Pond. Measurements below freezing in winter suggest that the temperature logger was measuring air rather than water temperature for part of the year. Water temperatures at the beaver pond in Lagoon Creek Tributary ranged from 33 °F in February to 60 °F in July. Summer water temperatures were approximately 40 to 55 °F and winter temperatures were approximately 33 to 40 °F. Winter temperatures were fairly stable and consistently above freezing, suggesting groundwater influence.

Table 3-2. Water quality standards for freshwater relevant to the proposed project (Source: Alaska DEC, 2012).

Constituent	Criteria	
	Growth and propagation of fish, shellfish, other aquatic life, and wildlife	Drinking Water
Turbidity	May not exceed 25 nephelometric turbidity units (NTU) above natural conditions. For all lake waters, may not exceed 5 NTU above natural conditions.	May not exceed 5 NTU above natural conditions when the natural turbidity is 50 NTU or less, and may not have more than 10% increase in turbidity when the natural turbidity is more than 50 NTU, not to exceed a maximum increase of 25 NTU.
Temperature	May not exceed 20 °C (68 °F) at any time. The following maximum temperatures may not be exceeded, where applicable: migration routes 15 °C (59 °F); spawning areas 13 °C (55 °F); rearing areas 15 °C (59 °F); egg & fry incubation 13 °C (55 °F). For all other waters, the weekly average temperature may not exceed site-specific requirements needed to preserve normal species diversity or to prevent appearance of nuisance organisms.	May not exceed 15 °C (59 °F).
Dissolved Gas	DO must be greater than 7 milligrams per liter (mg/l) in waters used by anadromous or resident fish. In no case may DO be less than 5 mg/l to a depth of 20 cm in the interstitial waters of gravel used by anadromous or resident fish for spawning (see note 2). For waters not used by anadromous or resident fish, DO must be greater than or equal to 5 mg/l. In no case may DO be greater than 17 mg/l. The concentration of total dissolved gas may not exceed 110% of saturation at any point of sample collection.	DO must be greater than or equal to 4 mg/l.

Table 3-2, continued.

Constituent	Criteria	
	Growth and propagation of fish, shellfish, other aquatic life, and wildlife	Drinking Water
pH	May not be less than 6.5 or greater than 8.5. May not vary more than 0.5 pH unit from natural conditions	
Sediment	The percent accumulation of fine sediment in the range of 0.1 millimeter (mm) to 4.0 mm in the gravel bed of waters used by anadromous or resident fish for spawning may not be increased more than 5% by weight above natural conditions (as shown from grain size accumulation graph). In no case may the 0.1 mm to 4.0 mm fine sediment range in those gravel beds exceed a maximum of 30% by weight (as shown from grain size accumulation graph). In all other surface waters no sediment loads (suspended or deposited) that can cause adverse effects on aquatic animal or plant life, their reproduction or habitat may be present.	No measurable increase in concentration of settleable solids above natural conditions, as measured by the volumetric Imhoff cone method.

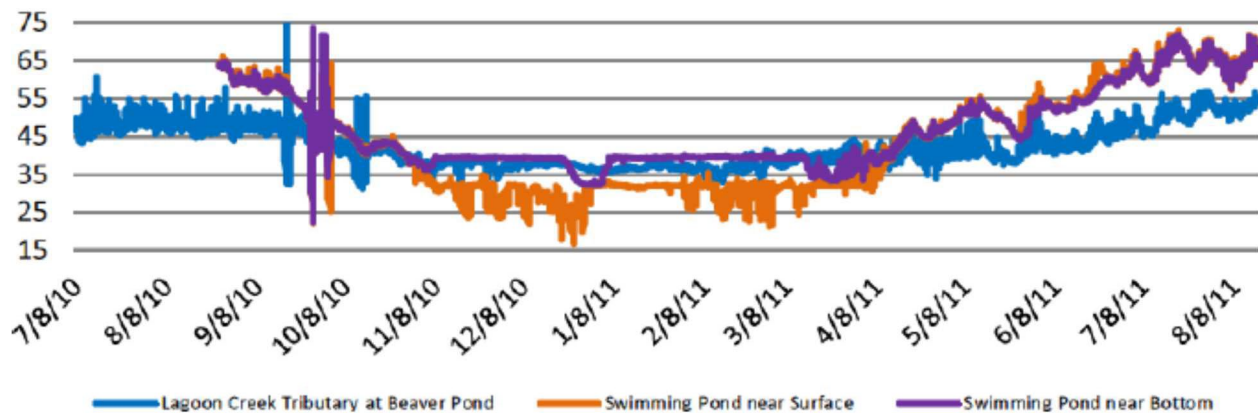


Figure 7. Water temperature (°F) in Swimming Pond and Lagoon Creek Tributary (Source: AVEC, 2013).

Love (2011) reported additional water quality data gathered during fish surveys in Lagoon Creek. At Swimming Pond, water temperature was 41°F and dissolved oxygen was 11.5 to 12.2 mg/L in a grab sample taken in October, 2010. In Lagoon Creek Tributary, water temperature was 40 to 42 °F, dissolved oxygen was 10.0 to 11.7 mg/L, and pH was 6.12 to 6.15 in grab samples taken in October, 2010. In August, 1996, water temperature sample was 53 °F and dissolved oxygen concentration was 7.5 ppm (Polarconsult, 1996).

In the summer, water temperatures in Swimming Pond sometimes exceeded State water quality standards for drinking water, aquaculture, and for the growth and propagation of fish, shellfish, other aquatic life, and wildlife (Table 3-2). Water temperatures in Lagoon Creek Tributary always met State water quality standards, with the exception of one day in July, 2010, when the maximum temperature criterion for drinking water was exceeded. Alaska DEC (2008, 2012) reported that values measured for temperature, dissolved oxygen, metals, biochemical oxygen demand, nitrate, nitrite, and phosphorus met state drinking water quality standards.

Fisheries Resources

Mountain Creek

Seasonal lack of surface flow limits fish distribution in Mountain Creek. The headwaters are steep and hydrologically responsive to precipitation. The east and west forks converge at an elevation of approximately 500 feet, below which Mountain Creek drops through a steep canyon for 2 miles. Immediately below the canyon, about 3 river miles from the mouth, the channel changes from a high-gradient, bedrock- and boulder-dominated system to a low-gradient, gravel-dominated system where the stream flows subsurface in summer to fall, creating a barrier to fish.

Coho salmon (*Oncorhynchus kisutch*), pink salmon (*Oncorhynchus gorbuscha*), and Dolly Varden (*Salvelinus malma*) occur in the lowest three miles and chum salmon (*Oncorhynchus kisutch*) occur in the lowest two miles of Mountain Creek (Alaska Fish and Game, 2013). Alaska Fish and Game considers the limit for anadromous fish habitat to be near where the flow runs subsurface for much of the year. During salmon surveys in August and September, 1996, and in August and October, 1998, no fish were found above about three miles upstream of the mouth of Mountain Creek because there was no surface flow above this point. Fish have not been found in the vicinity of the proposed intake (Love, 2011, AVEC, 2013).

No recreational or commercial fishing occur in East Fork of Mountain Creek. East Fork of Mountain Creek flows into Barling Bay Creek, which has surface flow throughout the summer and fall and supports large populations of Pacific salmon. Commercial fishing occurs in the ocean around Kodiak Island and so freshwater fish production in Mountain Creek may support commercial fisheries in the region.

Lagoon Creek

Aquatic habitat characteristics in the Lagoon Creek system are considered to be excellent for juvenile salmon rearing. Swimming Pond is seasonally connected to Lagoon Creek Tributary by an ephemeral and undefined outflow channel (Figure 7) that flows to a groundwater upwelling zone with a defined channel, about 1,100 feet from Swimming Pond. Just downstream, a perennial section less than 0.5 mile long is characterized by low energy and low flow pools with mud, silt, and sand substrate. Riparian vegetation is dominated by alder, willow, and poplar, which shade the stream and contribute woody debris to the channel. Lagoon Creek Tributary's middle reaches are influenced heavily by a large beaver dam and associated ponds. In the short (less than 0.5 mile) section between the beaver dam and Lagoon Creek Tributary's confluence with Lagoon Creek, the stream has a meandering, pool and riffle morphology with substrate dominated by silt/sand in pools and gravel/cobble in riffles. Riparian vegetation in the lower section is largely herbaceous, with less shading and woody debris inputs than in upper reaches (Love, 2011).

The mainstem of Lagoon Creek does not have consistent spring input and occasionally goes dry. During fish surveys in 1996, a 1-mile-long section of Lagoon Creek lacked surface flow (Love, 2011, AVEC, 2013). Nonetheless, juvenile rearing habitat is described as abundant and is estimated to be three to five times more abundant in Lagoon Creek than in Lagoon Creek Tributary.¹⁵

¹⁵ In a letter filed to the Commission on October 30, 2014, Alaska Fish and Game stated "Based on additional information obtained from discussions with staff with specific knowledge of the Lagoon Creek watershed, there appears to be three to five

Lagoon Creek and Lagoon Creek Tributary support Dolly Varden and spawning coho, chum, and pink salmon (Alaska Fish and Game, 2013). Coho, chum, and pink salmon all spawn in late-summer to fall and rely on adequate stream flows and substrate to support spawning and egg incubation over the winter. Detailed, site-specific data about abundance, distribution, life history characteristics, and habitat for fish in Lagoon Creek Tributary are not available.

Love (2011) described the results of juvenile trapping and visual spawning surveys in Lagoon Creek Tributary and Swimming Pond, in August and October, 2010. They identified Dolly Varden and stickleback (species not reported) in Swimming Pond. There was no surface flow, and therefore no fish, from Swimming Pond to the groundwater upwelling zone. They found juvenile coho and Dolly Varden from the groundwater upwelling zone downstream to the mouth of Lagoon Creek Tributary and in Lagoon Creek. They described Lagoon Creek as a productive rearing habitat for coho salmon. They did not observe live adult fish during visual spawning surveys but did find approximately 150 carcasses on the banks of Lagoon Creek within 400 feet of the mouth. The carcasses were difficult to identify but thought to be chum salmon. They did not observe chum or pink salmon.

No recreational or commercial fishing occurs in Swimming Pond or Lagoon Creek Tributary. Commercial fishing occurs in the ocean around Kodiak Island and so freshwater fish production in Lagoon Creek may support commercial fisheries in the region.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with the NMFS on actions that may adversely affect EFH. Salmon EFH includes all “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (50 CFS 600.10). Swimming Pond, Lagoon Creek Tributary, and Saltwater Lagoon provide EFH for anadromous salmonids. These waterbodies are described as providing excellent spawning and rearing habitat for coho salmon and pink and chum salmon and also to provide habitat for chum and pink salmon (Alaska Fish and Game, 2014, NOAA Fisheries, 2014).

times more rearing area in Lagoon Creek than in the tributary.”

3.3.2.2 Environmental Effects

Operation Effects on Water Quantity in East Fork of Mountain Creek and Mountain Creek

AVEC proposes to construct a diversion/cut off weir in East Fork of Mountain Creek to divert water for project operation. The weir would not create any significant impoundment of water and excess water would flow over the spillway. The project would divert all water available up to the hydraulic capacity of 5.9 cfs.

During project operation, water diversions at the project intake would affect the natural flow regime in East Fork of Mountain Creek and in the mainstem of Mountain Creek upstream of the reach at RM3 where Mountain Creek flows subsurface for much of the year (Figure 8). Given a proposed diversion rate of up to 5.9 cfs, all streamflow would be removed at the intake location for much of the winter and spring (Figure 4). This would dewater East Fork of Mountain Creek potentially to the confluence with West Fork Mountain Creek. It is not known if tributary or groundwater inputs exist that would provide flow in East Fork of Mountain Creek between the diversion site and the confluence with West Fork Mountain Creek.

AVEC asserts that project impacts on flow in the lower reaches of Mountain Creek, which provide seasonal habitat for anadromous salmon, would be negligible. AVEC does not propose environmental flows or other measures to protect aquatic habitat and fish in Mountain Creek.

Commission Staff Analysis

The proposed diversion occurs at high elevation and would remove all flows from East Fork of Mountain Creek for much of the winter and spring; however, the proposed diversion represents a small percent of water available at the upper end of the anadromous reach in Mountain Creek. The consequences of proposed water withdrawals on stream flow downstream at the canyon on Mountain Creek vary depending on season. In May through July, when natural flow peaks, the proposed maximum diversion of 5.9 cfs would reduce flows at the canyon by about 2 to 12 percent. During August through April, the proposed diversion would reduce flows at the canyon by up to approximately 25 percent (Figure 8). Because of the small volumes diverted relative to mainstem flows, and apparent influence of ground water – surface water interactions, we do not expect major changes in the hydrograph for the lower reaches of Mountain Creek that support anadromous fish.

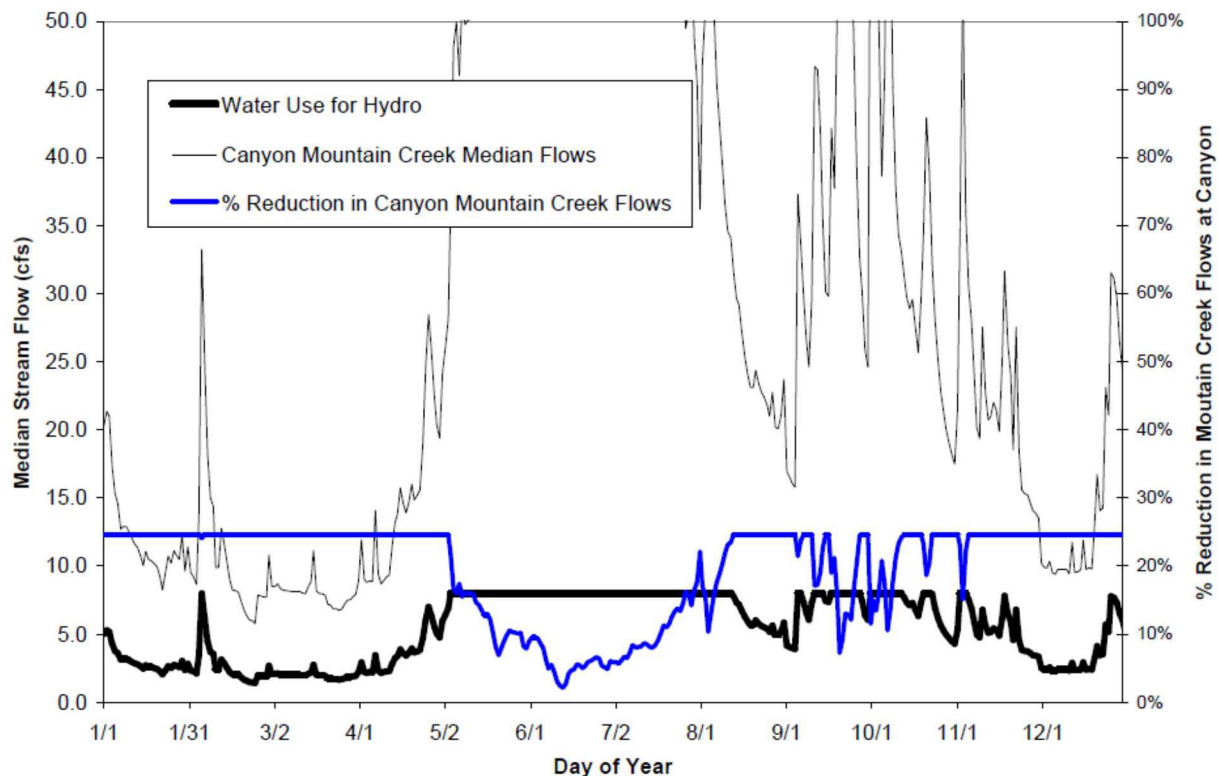


Figure 8. Hydrograph for East Fork of Mountain Creek, and percent reduction for proposed project withdrawals. Estimated hydrograph for Mountain Creek at the canyon, estimated water withdrawal from East Fork of Mountain Creek for the project with two turbines (maximum 11.8 cfs) operating, and consequences for stream flow in terms of percent reduction in stream flow at the Mountain Creek canyon. (Source: Polarconsult, 2010).

Operation Effects on Water Quantity in Swimming Pond, Lagoon Creek Tributary, and Lagoon Creek

AVEC proposes to construct a 10,150-foot-long penstock and transfer water from the intake at 850 feet elevation in the Mountain Creek watershed to the powerhouse at 85 feet msl elevation in the Lagoon Creek watershed. AVEC would construct a tailrace culvert and channel to convey project flows approximately 700 feet from the powerhouse to Swimming Pond.

Operation of the project and diversion of water would cause long-term increases in flow in Swimming Pond, Lagoon Creek Tributary, and Lagoon Creek (Table 3-3). Swimming Pond, which has no apparent outflow for much of the year currently, would have a perennial inflow and outflow carrying project flows of up to 5.9 cfs. There are no proposed or recommended environmental measures related to the additional flow through Swimming Pond.

During project operation, water diversions at the project intake would affect the natural flow regime in the Mountain Creek and Lagoon Creek drainages. The project would divert all flows up 5.9 cfs (project flows would not follow electrical demand in Old Harbor and there would be no peaking). Project flows would increase discharge in Lagoon Creek Tributary and would cause the currently-ephemeral reach of Lagoon Creek to become perennial.

AVEC proposes to build a bypass at the powerhouse to route project flows to the tailrace during planned or unintentional shutdowns. AVEC did not provide detailed design or operations information about the bypass system in their FLA.

In a letter filed with the Commission on October 30, 2014, Alaska Fish and Game expressed concern that project flows be adequately controlled. In response, AVEC proposed to install a flow control valve in the penstock to restrict the quantity of water diverted. In addition, AVEC proposed to limit ramping rates to 5 cfs per hour.

Commission Staff Analysis

The proposed project would increase surface outflows from Swimming Pond to Lagoon Creek Tributary. Project flows would presumably flow into and out of Swimming Pond as surface flow, and would increase flows in the headwaters of Lagoon Creek Tributary by the amount of water diverted (between 1 and 5.9 cfs). This increase in surface flow between Swimming Pond and Lagoon Creek Tributary would create perennial flow in an area that currently has a small, undefined channel with ephemeral flows (Figure 6). Using flow measurements of 0.3 cfs taken at the downstream end of the proposed constructed channel on October 16, 2010 as a benchmark, project flows would increase discharge in Lagoon Creek and Lagoon Creek Tributary substantially (Table 3-3).

Table 3-3. Estimated increase in stream flow on Lagoon Creek Tributary and Mainstem for maximum project flows (+5.9 cfs). “Natural stream flow” represents AVEC measurements on October 16, 2010.

	Natural stream flow	+5.9 cfs
Tributary groundwater upwelling zone	0.3	6.2
Tributary below beaver dam	3.2	9.1
Mainstem near mouth	5.3	11.2

Shutdowns at hydropower projects occur in both planned and unintentional maintenance situations. Rapid changes in streamflow could affect aquatic resources in Lagoon Creek Tributary adversely. Effects of flow fluctuations on stream habitat can include stream bank destabilization, changes in sediment size distribution, and changes in abundance and community structure of aquatic invertebrates (Kroger, 1973, Brusven et

al., 1974, Gislason, 1980, Parasiewicz et al., 1996). Effects of flow fluctuation on fish include dewatering of redds and related increases in egg mortality, stranding (Hunter 1992), and blockage of migratory corridors (Bain et al 1988). Emergent fry can be particularly sensitive to fluctuating flow conditions and may be forced into main channel habitats where they are subject to increased predation (Underwood and Bennett 1992).

Under present conditions, fish are regularly stranded in Swimming Pond due to the ephemeral nature of the outflow channel. While project operations would decrease the amount of time that Swimming Channel is isolated from Lagoon Creek Tributary, fish stranding in Swimming Pond could still occur during periods of low flow.

A flow control mechanism would ensure that proposed flow levels are not exceeded. After project operations commence, a bypass system that routes project flows to the tailrace would provide for continuity of flow downstream when the turbine must be shut down for maintenance or other reasons. During powerhouse start-up following either an intentional or unintentional powerhouse shutdown, or during flow changes, adhering to ramping rates of 5 cfs per hour would avoid rapid dewatering of Lagoon Creek Tributary and minimize associated adverse effects on aquatic resources. A plan to monitor flows and ramping rates for the project would help ensure that project flows and ramping rates do not exceed these limits.

Construction Effects on Water Quality in East Fork of Mountain Creek, Swimming Pond, and Lagoon Creek Tributary

Excavation in or near waterbodies would occur during construction. Construction of the diversion structure and intake facilities would cause short-term adverse effects on aquatic resources in East Fork of Mountain Creek, and construction of the tailrace and constructed channel would cause short-term adverse effects on aquatic resources in Swimming Pond and Lagoon Creek Tributary.

To protect aquatic resources during construction, AVEC proposes to implement best management practices; develop storm water pollution prevention and erosion and sediment control plans; limit motor vehicle use of the intake access trail; pile overburden outside of wetlands and in such a way as to prevent erosion; use a cofferdam to prevent water in Swimming Pond from flowing into the Lagoon Creek Tributary during construction; revegetate excess soil piles and disturbed areas with native seed mix; develop a fuel and hazardous substance spill plan; and conduct construction work during a period recommended by Alaska Fish and Game to avoid conflicts with spawning and rearing requirements of fish. When building the constructed channel, AVEC proposes to operate excavation equipment in the ephemeral channel but not in Swimming Pond or in the perennial section of Lagoon Creek Tributary. AVEC also proposes to employ a qualified environmental compliance monitor during project construction to ensure compliance with license requirements.

AVEC proposes to develop and implement a fuel and hazardous spill plan to reduce potential effects of accidental spill. FWS conditions 32, 38, and 53 specify that the fuel and hazardous spill plan must include a spill prevention control and countermeasure section, include a pre-project sampling and analysis of hazardous substances, and include a prohibition on storing oil/diesel facilities in the right-of-way area.

Commission Staff Analysis

Even with AVEC's proposed measures to minimize erosion and control stormwater, construction would be likely to cause a short-term increase in turbidity from disturbance of the substrate in East Fork of Mountain Creek, Swimming Pond, and Lagoon Creek Tributary. Short-term increases in turbidity could exceed the state standards for drinking water or for the growth and propagation of fish, shellfish, other aquatic life, and wildlife (Table 3-2). Sediment deposition on redds could decrease egg to larvae survival, and increased turbidity could affect salmon downstream of construction sites by increasing physiological stress (Redding et al., 1987) and lowering feeding success (Barrett et al., 1992). Elevated turbidity levels downstream of construction sites would be temporary and normal levels should return a short time after sediments flush through higher velocity areas or deposit in lower velocity areas.

A spill prevention control and countermeasure plan is required to be in place for any facility where unburied storage capacity exceeds 1,320 gallons of oil or a single container has a capacity in excess of 660 gallons.¹⁶ The spill prevention plan proposed by AVEC would provide a reference to procedures and notifications in case of spills to reduce the possibility of oil or other hazardous substances reaching the Refuge or the Mountain Creek or Lagoon Creek systems if a spill occurs. FWS condition 53 would prohibit AVEC from locating oil or diesel storage facilities in the right-of-way permit area. FWS condition 38 would require AVEC to develop a pre-project sampling and analysis plan of hazardous substances (unless waived by the Refuge Manager). FWS condition 32 would require AVEC to have sorbent material in sufficient quantity on hand at all times. Incorporating FWS conditions 53, 38, and 32 into the development and implementation of the spill plan after consultation with Alaska Fish and Game, FWS, and other interested agencies would minimize the potential for petroleum products to enter the project waters in the event of a spill.

At a minimum, an effective plan would include: (1) a spill prevention control and countermeasure section (FWS condition 32); (2) a pre-project sampling and analysis section for hazardous substances, (FWS condition 38); (3) a requirement to avoid placing oil/diesel storage facilities in the right-of-way permit area (FWS condition 53); (4) an

¹⁶ 40 C.F.R. §112.1 of the U.S. Environmental Protection Agency's regulations.

outline of AVEC's procedures for reporting and responding to releases of hazardous substances; (5) an outline of AVEC's procedures for timely identification and remediation of spills; (6) the identification and maintenance of a cache of spill cleanup equipment sufficient to contain any spill from the proposed project; (7) a provision for AVEC to provide a report specifying the location of spill clean-up equipment and the location, type, and quantity of oil and hazardous substances stored in the proposed project area; and (8) a provision for AVEC to inform Alaska Fish and Game, FWS, and other requesting agencies as to the nature, time, date, location, and action taken for any spill affecting the project.

AVEC's proposal to employ an environmental compliance monitor would help to ensure that the proposed best management practices, storm water pollution prevention plan, erosion and sediment control plan, and fuel and hazardous substances spill plan are implemented to protect water quality. Limiting motor vehicle use of the intake access trail, piling overburden outside of wetlands, revegetating disturbed areas, and using a cofferdam during construction in Swimming Pond also would minimize effects of erosion and sedimentation. Because all construction-related adverse effects cannot be avoided, conducting construction work during a period recommended by Alaska Fish and Game would help to avoid harm to fish. The environmental compliance monitor would have the authority to stop work or implement additional measures (including modifying the frequency or location of measures specified in the plans for storm water pollution prevention, erosion and sedimentation prevention, and spill of hazardous substances), as needed based on water quality monitoring, which would enable a timely response to any water quality issues identified during construction.

Operation Effects on Water Quality in Swimming Pond and Lagoon Creek Tributary

Transfer of water from high to low elevation in the penstock could cause dissolved gas supersaturation in project outflows. AVEC proposes to design the tailrace in consultation with Alaska Fish and Game, and use a perched or boulder-field-type tailrace that would allow gas concentrations in project outflows to equilibrate with the atmosphere.

Higher flows would likely influence erosion and deposition rates in Lagoon Creek Tributary, which could affect turbidity and presence of fines on spawning substrates.

Project operations could alter water temperature in Swimming Pond and Lagoon Creek Tributary. Water temperatures near the intake on East Fork of Mountain Creek and in Swimming Pond are similar in winter, so a temperature shift in Swimming Pond in winter is not expected. In spring and summer, Swimming Pond and Lagoon Creek Tributary tend to be warmer than water near the intake site, so we expect water temperatures to decrease in Swimming Pond and Lagoon Creek Tributary. The few

available data for East Fork of Mountain Creek suggest that diverted water would be around 40 to 45 °F in summer, while Swimming Pond would be approximately 55 to 70°F and Lagoon Creek Tributary would be approximately 45 to 55°F.

Cold, highly-aerated outflows from the tailrace would likely increase dissolved oxygen concentrations in Swimming Pond, particularly in summer when Swimming Pond is subject to high water temperature.

AVEC asserted in the FLA that water temperature and water quality impacts to Lagoon Creek Tributary would be moderated because flows would be routed through the tailrace and Swimming Pond before entering Lagoon Creek Tributary.

Commission Staff Analysis

The addition of up to 5.9 cfs to the headwaters of Lagoon Creek Tributary would change its hydrologic regime and the channel would experience a period of adjustment. Sedimentation would be most pronounced during and immediately after project construction. Effects on water quality would probably not persist beyond the initial period of channel adjustment, when higher flows could alter historical erosion and deposition patterns. Beaver ponds in the middle reaches of Lagoon Creek Tributary would trap fine sediments and buffer impacts on water quality from erosion in the upper reach. We do not anticipate sediment levels to be elevated long-term.

Water temperatures in Swimming Pond and Lagoon Creek Tributary would be likely to decrease in spring and summer when project outflows would be colder than ambient temperatures in receiving waters. Water temperatures in Swimming Pond and Lagoon Creek Tributary sometime exceed State water quality standards for spawning and rearing in the summer, under natural conditions. Addition of colder project flows would decrease the likelihood that water temperatures in Swimming Pond and Lagoon Creek Tributary would exceed state water quality standards (Table 3-2).

Total dissolved gases could increase in water being transferred in the penstock. A perched or boulder-field-type tailrace would alleviate concerns about dissolved gas supersaturation. The addition of cold, oxygen-saturated water to Swimming Pond would be likely to improve conditions for salmonids, particularly in summer when dissolved oxygen levels decrease naturally. Proposed project operations would not be likely to affect dissolved gas levels below Swimming Pond.

Construction Effects on Fisheries Resources in Lagoon Creek Tributary

Increased turbidity could cause physiological stress in fish and alter behavior of drift-feeding fish. In addition, the movement of fish between Swimming Pond and Lagoon Creek Tributary would be blocked when the cofferdam in Swimming Pond is in

place. To minimize impacts of fish, AVEC proposes to do construction work during a period recommended by Alaska Fish and Game as protective of fisheries resources.

Commission Staff Analysis

Completion of construction work during a period recommended by Alaska Fish and Game to minimize effects on fish and aquatic habitat would reduce effects of sedimentation and potential impacts on aquatic habitat and connectivity. The temporary use of a cofferdam would minimize turbidity and sedimentation in Swimming Pond and Lagoon Creek Tributary during construction.

AVEC's proposal to employ an environmental compliance monitor during construction would help to ensure that the proposed best management practices and storm water pollution prevention and erosion and sediment control plans are implemented to protect fisheries resources. The environmental compliance monitor would have the authority to stop work or implement additional measures as needed.

Operation Effects on Fisheries Resources in Mountain Creek

The proposed project operation would divert all available water from East Fork of Mountain Creek up to the project's maximum hydraulic capacity of 5.9 cfs. This removal of water would potentially adversely affect aquatic habitat in East Fork of Mountain Creek.

Commission Staff Analysis

The project would divert water from the East Fork of Mountain Creek in a reach where fish have not been found. Proposed project operations would remove all flows on East Fork of Mountain Creek between the diversion and the confluence with West Fork Mountain Creek for up to about six months each year for one turbine (Figure 4). Aquatic invertebrates and aquatic habitat in East Fork of Mountain Creek would be affected by removal of these flows.

The proposed diversion represents a small percent of water available at the upper end of the anadromous reach in Mountain Creek. The consequences of the proposed diversion on stream flow downstream at the canyon on Mountain Creek vary with season. In May through July, when natural flow peaks, the proposed maximum diversion of 5.9 cfs would reduce flows at the canyon by about 2 to 12 percent. During August through April, the proposed diversion would reduce flows at the canyon by up to approximately 25 percent (Figure 8). Because of the small volumes diverted relative to mainstem flows, the impacts on aquatic invertebrates and aquatic habitat in East Fork of Mountain Creek would not be expected to translate into measurable effects on fish populations in the anadromous reach downstream.

Operation Effects on Fisheries Resources in Swimming Pond, Lagoon Creek Tributary, and Lagoon Creek

Project operations would alter the flow regime in Lagoon Creek Tributary (Table 3-2) and could affect sediment transport, dissolved oxygen, and water temperature in Swimming Pond, Lagoon Creek Tributary, and mainstem Lagoon Creek. AVEC proposed measures to address potential impacts of flow and water quality on fisheries resources, including installing a flow control mechanism between the intake and the powerhouse to limit project flows; installing a water bypass system in the powerhouse to maintain flows downstream during turbine maintenance; limiting ramping rates to 5 cfs per hour; and designing the tailrace in consultation with Alaska Fish and Game so that project flows are aerated before entering Swimming Pond.

AVEC proposes to develop a tailrace fish exclusion plan in consultation with Alaska Fish and Game to prevent fish from entering the tailrace and becoming injured or killed by swimming into the outlet structure and being struck by the project turbine. The tailrace would be approximately 700 feet long and would route project flows from the powerhouse to Swimming Pond. Fish screens at the powerhouse would restrict fish from passing above the tailrace and into the powerhouse. AVEC has agreed with Alaska Fish and Game's recommendation to design a perched or boulder-field-type tailrace.

The introduction of project flows from Mountain Creek to Lagoon Creek Tributary would cause the upper ephemeral reach of Lagoon Creek Tributary to become more perennial. To accommodate increased flows, AVEC proposes to build a constructed channel on Lagoon Creek Tributary from Swimming Pond approximately 1,100 feet to the area of groundwater upwelling where Lagoon Creek Tributary forms a distinct channel.¹⁷

The constructed channel would be approximately 1,100 feet long, 2-5 feet deep and 8 feet wide with a 3-foot-wide meandering thalweg. The channel would be sloped at 0.4 percent and designed to accommodate a 1.5 year recurrence flow of 15 cfs without bed movement. AVEC would include habitat attributes in the constructed channel that are suitable for salmon spawning and rearing. Gravel of appropriate size for salmon spawning would be used to line the channel and cobbles and logs would be placed to create small pools. AVEC has agreed to develop final design plans for the constructed channel in consultation with Alaska Fish and Game, and has agreed to do all construction work during a time period recommended by Alaska Fish and Game to be protective of aquatic resources. AVEC did not propose ongoing maintenance or monitoring in the

¹⁷ AVEC refers to this constructed section of stream as an "enhanced" channel while we refer to it here as a "constructed" channel because it would differ significantly from the current undefined channel.

constructed channel section of Lagoon Creek Tributary.

Commission Staff Analysis

Fisheries surveys have reported robust populations of spawning and rearing coho salmon in Lagoon Creek Tributary. In spring and summer, Swimming Pond and Lagoon Creek Tributary tend to be warmer than water near the intake site, so we expect water temperatures to decrease in Swimming Pond and Lagoon Creek Tributary. Adult coho return to the Lagoon Creek system in late summer to fall and spawning occurs in fall to winter when water temperature would not be expected to be influenced significantly by project operations. Spring and summer water temperatures would remain cooler in Lagoon Creek tributary due to cold water inflows from the project.

Project-related changes in flow volume and water temperature could affect salmon spawning and rearing habitat in Swimming Pond and Lagoon Creek Tributary but population-level effects on juvenile abundance would be unlikely. Project operation could increase sedimentation, decrease water temperature, alter channel morphology, and increase overall availability of aquatic habitat (NOAA Fisheries, 2011). AVEC's proposal to install a flow control mechanism would ensure that project flows meet license stipulations and would allow ramping rates to be limited to 5 cfs per hour. AVEC's proposal to install a water bypass system in the power house would ensure continuity of flow downstream of the project during turbine maintenance. These measures would prevent adverse effects of rapid changes in flow on aquatic resources.

During freshwater life stages, the feeding, physiology, and behavior of salmon can be affected strongly by water temperature (McCullough, 1999). Decreased water temperatures could decrease the growth and productivity of juvenile salmon and their food sources in Lagoon Creek Tributary. Our analysis of temperature effects is limited by the scarcity of temperature data for East Fork of Mountain Creek. The few available data suggest that diverted water would be around 40 to 45 °F in summer, while Swimming Pond would be approximately 55 to 70 °F and Lagoon Creek Tributary would be approximately 45 to 55 °F. Mixing of cooler project waters would improve conditions for salmonids in Swimming Pond in summer. In addition, routing of project flows through Swimming Pond would likely attenuate project effects on temperature in Lagoon Creek Tributary. Flows to Lagoon Creek Tributary would likely be in the range of 45 to 55 °F, which is within the optimal range of 40 to 60 °F for coho embryos and larvae and near the optimal range of 54 to 57 °F for coho fry and smolts (North Pacific Fishery Management Council, 2012). Therefore, we do not expect temperature changes in Swimming Pond, Lagoon Creek Tributary, or Lagoon Creek to have adverse effects on salmon.

Higher flows in Lagoon Creek Tributary and mainstem Lagoon Creek would increase the availability of spawning and rearing habitat. Any potential negative effects

of colder temperatures on juvenile growth would likely be offset by positive effects of increased habitat space. In addition, Alaska Fish and Game has noted that juvenile coho are mobile and will seek out abundant suitable habitat in other areas of the Lagoon Creek basin.¹⁸ Alaska Fish and Game commented that temperature and biological monitoring would not effectively inform an assessment of project effects and so they rescinded earlier 10(j) recommendations that the applicant conduct temperature and biological monitoring.¹⁹

Fish in Swimming Pond, including coho salmon and Dolly Varden, could be attracted to tailrace discharge flows and enter the proposed 700-foot-long tailrace channel rather than using habitat nearby. If fish screens malfunctioned, fish could enter the powerhouse and be subject to injury or mortality from turbine blade strike.

AVEC's proposal to develop a fish exclusion plan and design a perched or boulder-field-type tailrace in consultation with Alaska Fish and Game would alleviate concerns about fish entering the tailrace. Precluding fish from entering the tailrace channel would minimize the threat of stranding in the tailrace because fish would not have to migrate back to Swimming Pond in situations where the tailrace is dewatered.

Construction of a larger channel would be needed to route project flows from Swimming Pond to the existing channel on Lagoon Creek Tributary. The constructed channel would alter physical habitat and hydrologic connectivity between the two waterbodies.

Construction of this new channel would provide an opportunity to enhance fish habitat. Substrate suitable for coho spawning and incubation could help support these life stages in Lagoon Creek Tributary. Large woody debris is an important element of habitat for juvenile coho, Dolly Varden, and other species because it provides flow refugia and cover. Pools of sufficient depth are important habitat elements for juvenile coho rearing.

Development of a written plan would facilitate consultation between AVEC, Alaska Fish and Game, and other interested entities on the design and construction of the channel between Swimming Pond and the existing channel in Lagoon Creek Tributary. Monitoring of the constructed channel at least annually during the first three years after project operations begin would provide data to discern whether the constructed channel is routing project flows and providing aquatic habitat as intended. If the constructed channel is not functioning as anticipated, for example if substantial scouring of spawning substrates, bank failures, or sediment deposition in pools occurs, then the monitoring plan

¹⁸ Letter filed by Alaska Fish and Game to the Commission on October 30, 2014.

¹⁹ Original 10(j) letter submitted by Alaska Fish and Game was filed August 11, 2014.

would provide information needed to plan improvements to the channel.

Essential Fish Habitat

AVEC submitted an EFH assessment for the project as part of the FLA and stated that NMFS reviewed their EFH assessment; however, NMFS did not file comments with the Commission. Effects of project construction and operation on fish habitat were discussed in detail in Section 3.3.2.2.

Commission Staff Analysis

EFH in Mountain Creek would not be negatively impacted because the proposed diversion represents only a small percent of water available in the anadromous reach in Mountain Creek. Because of the small volumes diverted relative to mainstem flows we do not expect major changes in the hydrograph for the lower reaches of Mountain Creek that support anadromous fish.

Short-term, construction-related impacts on EFH in Swimming Pond and Lagoon Creek Tributary would consist of erosion, deposition, and transport of sediment. Construction-related impacts would be minimized by implementing AVEC's proposed measures (see *Construction Effects on Water Quality in East Fork of Mountain Creek, Swimming Pond, and Lagoon Creek Tributary*).

In Swimming Pond, the project would decrease summer water temperatures, increase summer dissolved oxygen levels, increase water inflows and outflows, and increase connectivity to Lagoon Creek Tributary. These changes would likely benefit salmon and Dolly Varden, because summer temperatures and dissolved oxygen sometimes naturally reach levels deemed unsuitable for salmonids.

Decreases in water temperature and increases in the quantity of juvenile habitat in Lagoon Creek Tributary are not likely to have a net negative impact on EFH in the larger Lagoon Creek drainage. Temperature changes in Lagoon Creek Tributary are likely to be small (see *Operation Effects on Water Quality in Swimming Pond and Lagoon Creek Tributary*) and will be attenuated by the routing of project flows through Swimming Pond and a large beaver pond in Lagoon Creek Tributary. Coho salmon are known to seek out suitable habitat and Lagoon Creek Tributary is thought to provide less than 25 percent of the total habitat for juvenile rearing that is available in the Lagoon Creek drainage.²⁰ Therefore, the proposed project is not likely to adversely affect EFH in the Mountain Creek or Lagoon Creek drainages.

²⁰ In a letter filed to the Commission on October 30, 2014, Alaska Fish and Game states that "there appears to be 3-5 times more rearing area in Lagoon Creek than in the tributary."

3.3.3 Terrestrial Resources

3.3.3.1. Affected Environment

Vegetation

The majority of the project area is dominated by upland plant communities (ABR, Inc., 2014). These communities are dominated by mature open canopy broadleaf forest stands of paper birch and balsam poplar on low-lying floodplains and closed tall alder interspersed with graminoid-forb meadows on the convex surfaces of rolling terrain at the base of the mountains. Riparian areas are dominated by black cottonwoods, with an understory of willow and alder.

About 12 acres of wetlands are found in the immediate project area, including various meadow and shrub-scrub habitat types (ABR, Inc., 2014). The most abundant wetland habitats include seasonally flooded broadleaf shrub/emergent scrub (4.62 acres), dominated by tall alder shrub and a dense herbaceous understory, and permanently flooded emergent meadow (2.17 acres) dominated by sedge species.

Invasive Plant Species

Invasive plant species that are known to occur near the project area include Canada thistle, orange hawkweed, fall dandelion, oxeye daisy, and common tansy.

Rare Plant Species

Four rare plant species are known to occur in the project vicinity (Table 3-4). Although none of these species were located during an August 2010 survey of areas in and near the project area, they have the potential to occur in the project area.

Table 3-4. Rare plants found near Old Harbor during August 2010 survey (Source: AVEC, 2013; Alaska Natural Heritage Program, 2013).

Family	Taxon	Locality	Habitat
Asteraceae	<i>Arnica mollis</i> Hooke hairy arnica	Kodiak Island, southeast region of island and vicinity of Old Harbor, lower Big Creek valley	beaver ponds and stream channels in tall cottonwood-alder stand, growing in sand at margin of old channel
Cyperaceae	<i>Eleocharis nitida</i> slender spikerush	Old Harbor, vicinity of airstrip above “new town,” northeast end of strip	small heath-Sphagnum bogs below strip, growing in shallow pond
Isoetaceae	<i>Isoetes occidentalis</i> L. F. Hend. western quillwort	southeast region of island, lower Big Creek Valley	graminoid-forb wet meadow, muddy lakeshore, uncommon
Boraginaceae	<i>Plagiobothrys orientalis</i> (L.) I.M.Johnst. Oriental popcornflower	Kodiak. southeast coast of island, vicinity of Old Harbor Village, area of “old town” and abandoned airstrip	disturbed open vegetation on old gravel airstrip, scattered

Wildlife

Mammal species that may be in the project vicinity include Kodiak brown bear, Sitka black-tailed deer, mountain goat, red fox, river otter, beaver, ermine, little brown bat, tundra vole, and snowshoe hare. Deer, mountain goat, and snowshoe hare are prized by sport and subsistence hunters.

Common bird species include fox sparrow, golden-crowned sparrow, Wilson's warbler, yellow warbler, orange-crowned warbler, common redpoll, golden-crowned kinglet, winter wren, American pipit, and rock and willow ptarmigan.

Sensitive Wildlife Species

The short-tailed albatross, Eskimo curlew, blue whale, humpback whales, and right whale are listed by Alaska Fish and Game as endangered species. None of these species are expected to occur in the project area or in areas potentially affected by the project.

The FWS has identified Birds of Conservation Concern species that represent the FWS's highest conservation priorities (USFWS, 2008). The project would be located within Bird Conservation Region 2 (Western Alaska). Most of the Birds of Conservation Concern in Region 2 are species of loons, cormorants, shorebirds, terns, and murrelets that could be found along coastal areas and in open water. Two species, the lesser yellowlegs and Arctic tern have been located in the Old harbor lagoon (Eskelin, 1998; MacIntosh, 1996).

Bald eagles are common in the refuge and in the town of Old Harbor. In 2011, two active eagle nests were located close to proposed project facilities (Solstice, 2011). One nest was located in a live cottonwood tree in the Big Creek drainage, about 4,300 feet from the proposed penstock location. A second nest was located in a live cottonwood tree in the Lagoon Creek drainage, about 1,900 feet from the access road from the powerhouse to the penstock and within 0.5 mile of the proposed powerhouse and portions of the proposed transmission line and penstock.

3.3.3.2 Environmental Effects

Revegetation of Disturbed Areas and Control of Invasive Species

The loss of vegetation could affect wildlife use of the affected habitat and the habitat disturbance could result in the spread of invasive plant species.

Alaska Fish and Game recommended that AVEC develop measures, as part of an Erosion and Sediment Control Plan, to revegetate all disturbed areas to include:

- Locations of treatment areas
- Plant species and methods to be used
- Planting densities
- Fertilizer formulations
- Seed test results
- Application rates
- Locations type and density of woody plantings
- An implementation schedule
- Details for monitoring and maintenance programs

Alaska Fish and Game also recommended that AVEC develop an invasive species control plan that follows requirements identified by the FWS.

The FWS specifies that AVEC prepare a vegetation management plan (FWS condition 30) to include: (1) a description of best management practices to prevent the spread of invasive species, including provisions to clean (e.g., power wash) and inspect

construction-related equipment and materials off-site prior to entry into the project area to ensure that equipment is free of seeds, spores, or other vegetation material that may introduce invasive species to the project area, including mid-season inspections; (2) provisions for piling overburden and soil from excavations outside of wetlands and in such a way as to prevent erosion; (3) methods and a schedule for revegetating disturbed areas and excess soil piles with native species, including locations of areas to be revegetated, types of native plant materials, native plant species and methods to be used, source of plant materials, planting densities and application rates, fertilizer formulations, use of certified weed-free seeds, and seed test results; (4) a schedule and procedures for controlling invasive plant species listed in the refuge's 2010 Priority Invasive Species List, or any updated list; (5) a monitoring program to evaluate the success of revegetation and invasive plant management efforts, including criteria that define when revegetation and management of target invasive species is successful for two growing seasons after completion of construction and revegetation efforts--if invasive plants are found during the initial 2-year monitoring period, remediation needs to occur and then monitored for another two growing seasons until weed-free conditions are met; and (6) monitoring during annual site maintenance to insure identification and removal of invasive plants within the project area. .

AVEC proposes to restore and revegetate all disturbed areas outside the permanent project footprint, except for areas of exposed rock, gravel surfaces, and the upper segment of the tailrace channel bed between the powerhouse and Swimming Pond. AVEC proposes to reseed all disturbed areas with a native seed mix recommended by the specialists with the Plant Materials Center, Alaska Division of Agriculture as quickly as possible and prepare an invasive species management plan. AVEC has agreed to file and follow an erosion and sediment control plan that includes the revegetation measures and invasive species control measures, as outlined by Alaska Fish and Game.

Commission Staff Analysis

The project would result in the permanent loss of about 1 acre of wetland habitat and 13 acres of upland habitat (Table 3-5). About 4 acres of wetland habitat and 51 acres of upland habitat would be cleared and revegetated.

Table 3-5. Amount of vegetation temporarily and permanently affected by the project
(Source: ABR, Inc. 2014).

Project component	Temporarily affected habitat (acres)			Permanently affected habitat (acres)		
	Wetlands and waters of the US	Upland	Total	Wetlands and waters of the US	Upland	Total
Intake and workpad	0.41	1.46	1.87	0.03	0.09	0.12
Intake access trail and penstock	1.71	29.65	31.37	0.38	6.12	6.5
Penstock	0.2	2.09	2.29	0.03	0.38	0.41
Powerhouse and workpad	0.04	1.23	1.27	0.03	0.6	0.63
Tailrace	0.19	1.6	1.79	0.03	0.2	0.23
Enhanced channel	0.71	2.07	2.78	0.17	0.34	0.51
Power line and access road	0.36	12.78	13.14	0.07	5.16	5.23
Total	3.63	50.88	54.51	0.75	12.89	13.63

The revegetation of disturbed areas (approximately 55 acres) would minimize long-term effects to local wildlife populations, though many species would experience short-term impacts. Revegetation is expected to proceed rapidly. The permanent loss of about 14 acres would have minimal long-term effect on wildlife populations. Because of the small area permanently affected and abundance of undisturbed similar habitat within the surrounding refuge, vegetation and habitat impacts are considered to be minor.

Invasive species can alter wildlife habitat by outcompeting more desirable native species. Invasive species can be spread by disturbance of vegetation and soils during construction. Construction vehicles and heavy equipment may transport invasive plant seeds to the disturbance areas and lead to increases in these undesirable species. Prompt revegetation of disturbed areas and excess soil piles, cleaning and inspecting vehicles to make sure they are weed free, use of weed-free seed mixes, and surveillance for, and control of, invasive species in disturbed areas after construction, as specified by FWS condition 30, would minimize potential for establishment and spread and expedite the development of wildlife habitat. FWS condition 30 would require a monitoring plan to help ensure the long-term success of revegetation and weed management efforts.

Rare Plants

Rare plants could be impacted if they occur in areas of vegetation disturbed by the project. AVEC does not propose any measures and no agency made any recommendations concerning the protection of rare plants.

Commission Staff Analysis

Four species of rare plants (Table 3-4) may occur in the project area. Clearing of vegetation and off-road vehicle use could result in the loss of these species. The magnitude of the potential effects is unknown. Any impacts are expected to be minor because of the existence of large areas of similar habitat in the project vicinity.

Avian Electrocution and Collisions

The proposed transmission lines can result in avian mortality from electrocution and collisions.

Alaska Fish and Game recommends that transmission line power poles conform to guidelines accepted by the FWS as described in the most recent “Suggested Practices for Avian Protection on Power Lines— State of the Art,” a joint document prepared by Avian Power Line Interaction Committee (APLIC) and the FWS. The FWS recommended transmission line design to reduce the possibility of bald eagle electrocution and install markers to reduce collision hazards.

AVEC proposes to outfit power poles with perch posts designed to prevent bird electrocutions. AVEC also proposes to install bird diverter devices to minimize avian collisions, as recommended by the FWS. No specific designs have been developed.

Commission Staff Analysis

The 2.67-kV transmission line (33 to 66 power poles), if not designed properly, has the potential to electrocute raptors and other large bird species (APLIC, 2006). Most electrocutions are associated with lines carrying 69 kV or less because the spacing of hardware is often not sufficient to prevent birds from spanning between conductors or between a conductor and a ground (APLIC, 2006). Several factors influence the risk of bird electrocution or collision, including design of electrical poles and lines, weather, visibility, wingspan, and bird age and experience (APLIC, 2006). It is difficult to evaluate whether AVEC’s proposal to install perch posts would protect raptors and other birds without a specific design. The use of perch posts to encourage birds to perch above energized components, as proposed by AVEC, is not always successful in eliminating electrocutions of birds and may deteriorate over time. Perch deterrent are often needed in

combination with perch guards to prevent birds from perching underneath the artificial perches.

Construction of the new transmission line in accordance with current APLIC standards (2006), as recommended by Alaska Fish and Game, would ensure that there is adequate separation between energized and grounded components and hardware, and would eliminate or minimize the potential for electrocution of large birds.

The 6,550-foot-long transmission line has the potential to prove a hazard to birds using habitats in the project area to moving through the area. Birds can be injured or die from the impact of hitting the line or from electrocution when they contact two conductors simultaneously and complete the electrical circuit (Harness *et al.* 2003). Birds are more susceptible to line collisions if lines cross flight paths or movement corridors (Thompson, 1978, Bevanger 1994). Birds, even those with excellent eyesight (i.e., raptors), can be vulnerable to collisions during low light or adverse weather conditions or when distracted.

Installation of transmission line markers, as proposed by AVEC, would minimize the potential for avian collisions. However, even with line markings, collision would remain a possibility (Bevanger, 1994). Overall impacts are expected to be minimal because of the relative short length of the line and lack of bird concentrations or identified flight paths.

Protection of Nesting Birds

Construction activities have the potential to disturb nesting birds during the construction period (up to two construction seasons), including the bald eagle.

AVEC proposes timing windows for avoiding disturbance during the bird nesting season wherever possible for ground-clearing and vegetation removal in previously undisturbed areas, as recommended by the FWS. Vegetative clearing would be avoided in forest or woodland habitat (i.e., trees present) from April 15 to July 15 and in shrub or open habitat (i.e., shrub cover or marsh pond, tundra, gravel, or other treeless/shrubless ground habitat) from May 1 to July 15. FWS specifies (FWS condition 37) that no vegetative clearing could occur between May 1 and August 1 in order to protect nesting birds, unless authorized in writing by the Refuge Manager.

AVEC proposes to monitor and report to the FWS any newly established bald eagle nests. In the event a bald eagle nest is identified by the environmental compliance monitor, AVEC would avoid blasting within 0.5 mile of the nest and all other work within 660 feet of the nest would be postponed until after consultation with the FWS. If blasting is required within 0.5 mile of an eagle nest, as determined by the environmental compliance monitor, blasting would take place in winter (November-January), well

before/after the breeding season according to the National Bald Eagle Management Guidelines (USFWS, 2007). FWS specifies (FWS condition 46) that disturbance and destruction of eagle nests or nesting trees are prohibited and initial construction of permanent facilities, including roads, drill pads, and storage areas is prohibited within a 0.25 mile of an established nest tree.

Commission Staff Analysis

Construction activities during the spring and summer, including vegetation clearing and grubbing, could result in the destruction of bird nests, eggs, or nestlings or result in the abandonment of nests. The proposed construction window (April 15 to July 15) is consistent with the FWS's guidelines (USFWS, 2009) for the Kodiak Archipelago and would avoid or minimize the take of nesting migratory birds. The restrictions specified by FWS condition 37 (May 1 through August 1), though similar to the proposed schedule, would more be selective of local nesting conditions and would better protect bald eagle nesting.

Two active bald eagle nests were located in 2011, located 1,900 and 4,300 feet from proposed construction activities. Location of eagle nest sites may have changed since 2011. Construction noise and activities could result in abandonment of the nest or interfere with incubation or feeding of young. Eagles are the most sensitive to disturbance during the early stages of the nesting period, which generally begins in early March—courtship, nest selection, egg laying, and incubation. Eagles will readily abandon their nests when disturbed prior to May 15 and disturbance through July 1 may cause nest failure. After that period, fledglings are not as susceptible to minimal disturbance. FWS condition 46 would require that no construction activities or loss of habitat occur within 0.25 mile (1,310 feet) of an established nest tree. Although this distance is larger than the minimum 660-foot-wide buffer zone developed by the FWS to protect nesting eagles from disturbance (USFWS, 2007), it would reduce the possibility of adverse effects, particularly in the generally open habitats in the project area and the remoteness of the area.

Blasting may be required in some locations during construction of the intake access trail and penstock. Blasting could occur in areas of shallow bedrock, where deep cuts are needed, and in areas where material is being extracted. AVEC, however, proposes to avoid blasting within 0.5 mile of an active eagle nest. If blasting would occur within 0.5 mile of an eagle nest as determined by the Environmental Compliance Monitor, blasting would be scheduled to occur in winter (November-January), well before/after the March through August breeding season consistent with National Bald Eagle Management Guidelines (USFWS, 2007). The proposed construction restrictions would avoid or minimize impacts to nesting eagles.

Bear-Human Interactions

The presence of workers during construction and maintenance can increase the chance of human-bear encounters.

AVEC agreed to prepare a bear safety plan, after consultation with the FWS and Alaska Fish and Game, to include protocols to minimize bear encounters during construction and maintenance activities. Alaska Fish and Game recommended that the bear safety plan contain measures to provide instructions for: (1) operating practices when in bear country that minimize possible conflict; (2) minimizing encounters and avoid areas often used by bears, if possible; (3) keeping construction sites and refuse areas clean of substances that attract bears; (4) installing bear-proof garbage receptacles and other measures during construction to prevent bears from obtaining food or garbage; (5) dealing with problem bears; and (6) notification of Alaska Fish and Game of any bear-human conflicts. FWS specifies that all food wastes not be stored in the right-of-way permit area (FWS condition 41). FWS also specifies (FWS condition 45) that: any problems with wildlife must be reported immediately to the Refuge Manager; employees must not feed animals or harass or intentionally approach animals closely enough to disrupt the animal's activity or to endanger human life; taking of animals would not be allowed except in the case of defense of life and property; and in the case of a defense of life and property taking, the applicant shall immediately contact the Alaska Fish and Game and the Refuge Manager, and salvage those parts of the animal required by state regulations. Further, FWS specifies (FWS condition 50) that prior to clearing and construction during the bear denning season, a survey may be conducted by refuge personnel for the purpose of identifying bear denning sites that might be affected by construction activity. If such denning sites are identified, the Refuge Manager would prescribe appropriate mitigation measures to protect human safety and prevent adverse impacts to wildlife.

Commission Staff Analysis

Bears and other predators can be attracted to the construction area in response to human foods and garbage. Attraction to the construction site and increased interaction with humans create the potential for mortality from control measures (i.e., killing problem animals in defense of life or property, vehicle strikes, or ingestion of toxic substances, as well as potential injury to humans from animals with rabies or aggressive behavior). Implementing a bear safety plan, consistent with the measures recommended by Alaska Fish and Game and specified by FWS, would minimize the potential for human-bear interactions, protecting both construction and maintenance workers and wildlife.

Disturbance of Mountain Goats

Project-related helicopter use can disturb mountain goats foraging in the project area.

Alaska Fish and Game recommends that AVEC minimize the use of helicopters or airplanes near mountainsides adjacent to Mountain Creek. If mountain goats are observed, Alaska Fish and Game recommends maintenance of a 1,500-foot vertical or horizontal clearance. AVEC has agreed to minimize the use of helicopters near mountainsides adjacent to Mountain Creek and implement the 1,500-foot clearance if goats are observed, as can be accomplished safely.

Commission Staff Analysis

Helicopters may be used to transport materials and equipment from a staging area in the community to locations along the project alignment. For example, for placement of the penstock, helicopters would likely be used for about 6 hours a day for 10 days as pipe is placed along the alignment. Weather, construction and labor schedules, trail hardness, and contractor preference would generally dictate the amount of helicopter use. Helicopter use could be expected to occur occasionally throughout the duration of the construction period (up to two construction seasons).

Mountain goats are sensitive to disturbance, especially helicopter overflights (Cote, 1996; Foster and Rahe, 1983). Disturbed mountain goats can exhibit panic behavior, be displaced from preferred habitats during the summer construction season, avoid foraging in the area, and increase energy expenditures, ultimately affecting survival or reproduction. Immediate responses of mountain goats to helicopter disturbance are likely influenced by sex, age, season, prior experience, habitat, and characteristics of the helicopter activity (Goldstein et al., 2005). Even overflights between 500 and 1,500 meters (1,640 and 4,920 feet) could elicit responses though less severe or shorter duration than overflights less than 500 meters (Cote, 1996; Foster and Rahe, 1983; Goldstein et al., 2005).

Restrictions on helicopter activities in the vicinity of observed mountain goats, as recommended by Alaska Fish and Game, would minimize potential impacts, but disturbances to mountain goat would still result.

3.3.4 Threatened and Endangered Species

3.3.4.1. Affected Environment

As discussed in section 1.3.3, the federally listed Steller's eider and northern sea otter may occur in the project area.²¹

²¹ The draft EA identified the Kittlitz's murrelet and yellow-billed loon as

Steller's eiders are diving ducks that feed on mollusks and crustaceans in shallow water. In summer, they nest in tundra adjacent to small ponds or within drained lake basins and wetlands. Steller's eiders are known to occur in nearshore waters of Kodiak Island between late September and April, but are not regularly seen near Old Harbor (USFWS, 2012).

Sea otters can be found year-round near Kodiak Island's rocky shoreline and points of land, or in large bays where kelp beds occur (USFWS, 2012). They are also found in areas with soft sand and mud substrates where they forage for clams. Sea otters are most common around the northern shores and southernmost points of Kodiak Island. Sea otters have not been observed close to Old Harbor.

Nearshore waters around Old Harbor were designated as critical habitat under the ESA in 2009 for the sea otters, and are included in Unit 5 (Kodiak, Kamishak, Alaska Peninsula Unit). Unit 5 consists of an estimated 2,607 square miles, collectively, of the nearshore marine environment ranging from the mean high tide line to the 20-meter (65.6-foot) depth contour as well as waters occurring within 100 meters (328.1 feet) of the mean high tide line.

3.3.4.2 Environmental Effects

Steller's Eider

Steller's eiders do not nest on Kodiak Island but may occasionally travel over land to access wintering areas. This would make them potentially subject to collisions with the proposed transmission line. Steller's eiders are known to strike on-land towers and power lines in Alaska (USFWS, unpublished data). Eiders tend to fly low over water and land and collide with towers and lines, especially during poor visibility conditions such as fog and the darkness of night (Day *et al.*, 2002). AVEC's proposal to install bird diverters on the transmission line and guy wires to increase visibility of the line, as discussed in section 3.3.3, *Terrestrial Resources*, would minimize potential impacts. Given the low likelihood that eiders would fly through the project area and the relatively short length of the transmission line, any potential impacts would be unlikely.

None of the project components would be constructed in or near marine habitat. All project components would be located at least 0.75 mile from the marine environment and project flows would flow into Old Harbor saltwater lagoon and not directly into the ocean. However, excavation, transportation of materials, road construction, ground clearing, and placement of fill could generate loose soil. Further, mishandling or spill of

candidates for federal listing. These species are no longer designated as candidate species.

fuel (e.g., refueling of vehicles and equipment) and hazardous materials (e.g., pesticides) could introduce hazardous substances into the environment. During and after construction, contaminants and loose soil may be released into storm water during rain or snowmelt events. Runoff may be washed downstream into the marine environment where sediments and pollutants could impair water quality, and degrade the habitat used by Steller's eider.

Discharge of sediments and other contaminants would be minimized through development and implementation of a storm water pollution prevention plan, including use of best management practices (e.g., use of silt fences), development and implementation of a fuel and hazardous substance spill plan designed to minimize the potential for petroleum products to enter the project waters in the event of a spill, revegetating disturbed areas to stabilize the soil, and design of the access road to reduce erosion. Due to the inland location of the project, we do not anticipate small chemical or fuel spills would reach the marine environment. Therefore, any effects to marine habitats would be unlikely and any potential effects would likely be negligible.

Northern Sea Otter

The northern sea otter has not been observed in the project vicinity, but suitable habitat exists along the coast. In addition, nearshore environments in the project vicinity are designated as critical habitat. The primary constituent elements (PCE) of sea otter critical habitat are:

- 1) shallow, rocky areas less than 2 meters (6.6 feet) in depth where marine predators are less likely to forage, or
- 2) nearshore waters within 100 meters (328.1 feet) from the mean high tide line that may provide protection or escape from marine predators; and
- 3) kelp forests, which occur in waters less than 20 m (65.6 feet) in depth, that provide protection from marine predators, or
- 4) prey resources within the areas identified by PCEs 1, 2, and 3 that are present in sufficient quantity and quality to support the energetic requirements of the species.

As discussed above, given the inland location of the project, implementation of storm water pollution prevention and fuel and hazardous substance spill plans, erosion control measures, and revegetation of disturbed areas would reduce potential effect on the marine environment to negligible levels. Therefore, potential impacts to the northern sea otter and its designated critical habitat would be unlikely.

3.3.5 Recreation and Land Use

3.3.5.1. Affected Environment

The proposed project would occupy approximately 1.85 acres of land within the Refuge solely managed by the FWS; approximately 5.89 acres within the Refuge that is also subject to a conservation easement administered by the State of Alaska); approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska; approximately 2.90 acres of Old Harbor Corporation land; and approximately 1.21 acres of land within the City of Old Harbor.

Refuge lands, including those with conservation easements, are open to the public. Access to Old Harbor Native Corporation's lands is restricted by the corporation. Visitors wishing to recreate, including hunting and fishing, on Old Harbor Native Corporation's lands must first apply, meet the terms of the application, and pay a fee depending on the type of recreational activity. Lands owned by the City of Old Harbor are open to the public.

Current recreational and land use practices in the proposed project area include hiking, ATV excursions, hunting, sport fishing, sightseeing, and camping. Subsistence use on proposed project lands is discussed in section 3.3.8, *Subsistence Resources*. There are only limited existing recreation facilities or improvements to support current recreation in the project area. There is a braided ATV trail leading to the Swimming Pond, and an old and lightly used footpath/ATV trail that branches off the Swimming Pond trail heading northwest (see Figure 1). These trails were established informally by Old Harbor residents and lead to the proposed project lands.

ATV use is prohibited on Kodiak National Wildlife Refuge lands and any lands under conservation easement administered by the FWS.

3.3.5.2 Environmental Effects

AVEC proposes to build a 1.1-mile-long (5,720 foot-long), 24-foot-wide access road between the existing water tank access road near the City of Old Harbor and the proposed powerhouse (see Figure 1). This powerhouse road would be open to public vehicles. The area around the proposed powerhouse is currently only accessible via an ATV trail that is heavily rutted, braided, and includes two in-stream crossings of Lagoon Creek. The powerhouse road is proposed further east of the ATV trail and the ATV trail would be left in place. AVEC proposes to install a gate along the existing trail to prevent unauthorized ATV access to refuge lands. AVEC also proposes to install signs at the powerhouse to inform the public about public access on the Refuge and Old Harbor Native Corporation lands held in a conservation easement

AVEC also proposes to build a 2.2-mile-long (11,500-foot-long), 10-foot-wide access trail between the intake and powerhouse, following the approximate path of the penstock. This trail would connect to the existing trail leading to existing water pump house and would be open to public foot traffic. At the request of the FWS, this intake access trail would be closed to non-project vehicle traffic. Gates would be installed to ensure no unauthorized traffic access the Refuge.

Old Harbor Native Corporations lands that are not currently under a conservation easement require an application, meeting of terms, and a fee to recreate on these lands. As shown by the current property boundaries in Figure 1, to access much of the proposed project lands, visitors need to cross Old Harbor Native Corporation lands. The proposal states that a right-of-way for the powerhouse access road would be obtained and the road would be open to the public.

FWS specifies that AVEC not only install gates to limit motor vehicle use of the intake access trail and the existing ATV trail to authorized vehicles only (as proposed), but that AVEC also consult with FWS about the specific locations of the gates, maintain the gates, and monitor the conditions of signs, gates, barriers, and access trails annually – promptly reporting any damage or evidence of unauthorized uses to the Refuge. If unauthorized uses or vandalism are noted, FWS specifies that the licensee must consult with the Refuge to design additional protection measures.

Commission Staff Analysis

Free, public access is currently available to most of the proposed project lands. Under the current proposal, access to the proposed project lands would be improved by the addition of the powerhouse road and intake foot trail. Installing recreation signs to inform visitors about public access on the Refuge and conservation lands is prudent. Additionally, the proposed installation of two road-gates preventing unauthorized vehicle traffic into the Refuge is also warranted. However, it is also important for these gates to be maintained for the duration of the license, including monitoring the conditions of the gates and promptly reporting any damage or evidence of unauthorized use to Refuge personnel. If trespass or vandalism occurs on refuge lands, other measures may be implemented, including replacing damaged gates or altering the design of the barriers.

3.3.6 Cultural Resources

3.3.6.1 Affected Environment

Section 106 of the NHPA, requires the Commission to take into account the effects of licensing a hydropower project on properties listed or eligible for listing in the National Register and allow the Advisory Council on Historic Preservation (Advisory

Council) a reasonable opportunity to comment if any adverse effects on historic properties are identified within the project's APE.

Historic properties are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. In this document, we also use the term "cultural resources" to include properties that have not been evaluated for eligibility for listing in the National Register. In most cases, cultural resources less than 50 years old are not considered eligible for the National Register. Cultural resources need enough internal contextual integrity to be considered historic properties. For example, dilapidated structures or heavily disturbed archaeological sites may not have enough contextual integrity to be considered eligible. Traditional Cultural Properties (TCPs) are a type of historic property eligible for listing in the National Register because of their association with cultural practices or beliefs of a living community that: (1) are rooted in that community's history or (2) are important in maintaining the continuing cultural identity of the community (Parker and King, 1998). Section 106 also requires that the Commission seek concurrence with the jurisdictional manager on any finding involving effects or no effects on historic properties. For this project, the jurisdictional managers would be FWS for federal lands within the project area and the Alaska State Historic Preservation Officer (Alaska SHPO) for non-federal lands within the project area. If TCPs have been identified, section 106 also requires that the Commission consult with interested Native American tribes or Native Alaskan Villages that might attach religious or cultural significance to such properties.

If existing or potential adverse effects have been identified on historic properties, license applicants need to develop a HPMP to seek to avoid, reduce, or mitigate the effects. Potential effects that may be associated with a hydroelectric project include any project-related effects associated with construction, or the day-to-day operations and maintenance of the project after issuance of an original license.

Cultural Historic Overview

Culturally, Kodiak Island falls within the Arctic physiographic province of Alaska and was initially occupied by transcontinental arctic-adapted peoples generally known as Eskimos. These people would have been ancestral to the present-day Alutiiq, and may have occupied Kodiak Island as early as 7,000 years ago (Dumond 1984, Clark 1984). The initial occupation of Kodiak Island is associated with the Ocean Bay I phase of the Kodiak region (ca. 5000 to 2200 BC), and represents a predominant coastal maritime adaptation where peoples possessed a blade making technology (Dumond 1984). After 2200 BC, the Kodiak Island inhabitants used polished slate tools, defined archaeologically as the Takli culture, and became more culturally distinct from other occupants of the Aleutian Islands, the latter of which continued to use chipped stone tools. By 1200 BC, peoples of Kodiak Island settled into more permanent coastal villages associated with the Kachemak tradition which by around 1,000 AD is considered

to be directly ancestral to the historic Alutiiq. The Alutiiq were Eskimos of the Pacific Tradition who dominated Kodiak Island by the time the Russian were exploring Alaska in the 1760s (Clark 1984). Alutiiq settlements were essentially restricted to the coast; however salmon fishing camps were located further inland. Some of the larger Alutiiq coastal settlements may have been governed by local village chiefs as noted by Russian voyagers in the beginning of the 19th century. The subsistence of the Alutiiq was based mainly on a strategy of pursuing sea mammals (whales and sea otters) in kayaks, dispatching the animals with harpoons. They also fished for halibut, salmon, and hearing. Along with oceanic hunting and fishing, the Alutiiq would on occasion hunt sea birds, and trap of land mammal such as fox. When available, they also collected edible roots and berries. During the 19th century, the Alutiiq lived in nearly 40 villages, however, by 1970 only five were permanently occupied. Prior to the 1964 Good Friday Earthquake, the southern coast of Kodiak Island was occupied by three villages; Akhoik, Kaguyak, and Old Harbor. The town of Old Harbor developed in the proximity of Three Saints Bay, the latter of which had been established by Russians as a post and fortified fort in 1784, after a devastating defeat of the Alutiiq and subsequent massacre at Refuge Rock Island. Prior to Russian occupation and colonization, the Alutiiq had lived within the surrounding area of Old Harbor for several millennia. Since then, the Alutiiq of Old Harbor have incorporated much of the habits and lifestyle of the old Russian culture, but still retain much of their traditional practices. Whaling had been an important industry for the community of Old Harbor until the 1920s when it declined, but continued as a cannery, principally for salmon. Old Harbor was ultimately destroyed by a massive tsunami from the 1964 Good Friday earthquake, but was quickly rebuilt afterwards. In 1968, the Village of Old Harbor was federally recognized as a Native Alaskan tribal government (Old Harbor Tribal Council), and the Old Harbor Native Corporation was incorporated in 1973. AVEC began as an electric service in 1968, servicing the communities of Old Harbor, Nulato, and Hooper Bay. Since then, AVEC has branched out to other rural and native villages (serving both native and non-native Alaskans) throughout Alaska, and area-wise, is considered one of largest retail electric services in the world.

Archaeological research in Kodiak Island began in the early 1930s with the Smithsonian Institution anthropologist Ales Hrdlicka, who conducted excavations at a large village site in Larson Bay (AVEC 2013). Much of the pre-Russian contact archaeological sequences were developed by researchers from the University of Wisconsin in 1960 that were based on excavations along the southeastern coast of Kodiak Island, not far from Old Harbor. Beginning in 1980, Richard Jordan from Bryn Mawr College, did a decades-long project on the social and economic history of Old Harbor and its implications on the Alutiiq culture and history through time. This research is continuing today, and the Old Harbor Native Corporation has been an active sponsor of such work, accounting for more than 100 newly discovered archaeological sites in the Old Harbor area. In 1995, the Alutiiq Museum and Archaeological Repository (funded in

part by the Old Harbor Native Corporation), was established to provide storage from these excavations.

Area of Potential Effects

Pursuant to section 106, the Commission must take into account whether any historic property could be affected by issuance of a new license within a project's APE. The APE is defined as the geographic area or areas that an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. AVEC defined the APE as consisting of all lands within the project boundary and any lands outside of the project boundary where cultural resources may be affected by ground disturbing activities associated with construction and other project-related activities. Essentially, the APE includes all project components and a 100-foot buffer around them. Project components include the intake footprint, intake access trail, penstock, powerhouse footprint, associated primary transmission line, trailrace, and clearing areas. Overall, the APE consists of approximately 15 acres, of which 7.7 are under the jurisdiction of the FWS.

Cultural Resources Investigations

As part of their original license application, filed with the Commission in May of 1999, the Alutiiq Museum and Archaeological Repository conducted a reconnaissance level investigation in 1997 along AVEC's proposed project boundary, which is the same as the present APE described above. In 2009, Northern Land Use Research, Inc. (NLUR) conducted another cultural resources survey of proposed improvements to Old Harbor's water treatment plant and water storage tank. The project area was located about 140 feet from the proposed project's APE. Neither cultural resources inventory located any cultural resources. For this licensing, NLUR conducted another systematic pedestrian survey within the proposed project's APE in August of 2010 and did not locate any archaeological sites or other cultural resources (AVEC 2013).

3.3.6.2 Environmental Effects

On behalf of AVEC, NLUR concluded that it would be unlikely that the proposed project would have any effect on historic properties, due to the fact that no known archaeological site or other cultural resources were located within the proposed project's APE (AVEC 2013). On September 14, 2011, AVEC sent a letter to the Alaska SHPO stating that the proposed project would have no effect to historic properties, and on September 21, 2011, the Alaska SHPO responded back concurring with this finding (AVEC 2013). FWS is completing their analysis under NHPA Section 106 and will include their findings in the FWS decision document for this project. If any potential significant cultural resources (or human remains associated with NAGPRA) would be encountered as a result of any construction or related project activities, AVEC assures

that all work would cease in the immediate area and that the discovery would be evaluated by a qualified archaeologist, and that the Alaska SHPO, FWS, and Village of Old Harbor would be notified.²²

Commission Staff Analysis

The proposed project would not affect any known historic properties; however, there is always a possibility that unknown archaeological resources may be discovered in the future as a result of the project's construction, operation, or project-related activities. Consulting with the Alaska SHPO, FWS, and Village of Old Harbor in the event that a significant cultural resource is inadvertently discovered during construction, operation, or maintenance activities would ensure that any adverse effects to it can be avoided, lessened, or mitigated.

3.3.7 Environmental Justice

3.3.7.1 Affected Environment

Environmental justice is the analysis of how a federal action may impact low-income, minority, or tribal populations (CEQ, 1997). Old Harbor is one of Kodiak Island's six Alutiiq villages and is primarily inhabited by an Alutiiq population. According to the 2010 U.S. Census, the current population of Old Harbor is approximately 218 persons. The population of Old Harbor in 1990 was 284 and in 2000 was 237. About 88 percent of the current population is American Indian and Alaska Native (191 residents), 11 percent white (24 residents), and 1 percent is two or more races (3 residents). This community's ratio of minorities to non-minorities is higher than the rest of the Kodiak Island Borough and the State of Alaska (Table 3-6).

²² The City of Old Harbor, Village of Old Harbor, and Old Harbor Native Corporation are all in full support of the proposed project (See letter from Rick Berns, Mayor of the City of Old Harbor, dated January 12, 2012, in AVEC 2013).

Table 3-6. Old Harbor Demographics

	Total Population	White	American Indian and Alaska Native	Two or More Races	Minority
Alaska	710,231	66.7%	14.8%	7.3%	33.3%
Kodiak Island Borough	13,592	55.3%	13.2%	7.6%	44.7%
Old Harbor	218	11.0%	87.6%	1.4%	89%

3.3.7.2 Environmental Effects

Project construction and operations would contribute directly to the economy by providing employment and earnings, which would also contribute indirectly to the economy through employee purchase of goods and services. More specifically, this additional energy may assist in the economic development of Old Harbor.²³ AVEC also proposes to hire local workers for the construction and maintenance of the project.

Commission Staff Analysis

Construction and operation of the project are not expected to have a disproportionate adverse effect on minority populations. Because the Old Harbor community consists of such a high population of minorities, any negative effects of the projects would be shared equally across all community members. The proposed and alternative transmission alignments do not cross or parallel residential areas.

3.3.8 Subsistence Resources

3.3.8.1 Affected Environment

Providing the opportunity for continued subsistence use by local residents is one of the purposes of the Refuge, as stated in Title III of the ANILCA of 1980 as amended. Title VIII of ANILCA further provides that rural Alaska residents engaged in subsistence use of resources be allowed to continue using Refuge resources for traditional purposes. Subsistence uses, as defined in ANILCA, means the customary and traditional uses by

²³ A letter filed jointly on September 29, 2014 by the City of Old Harbor, Alutiiq Tribe of Old Harbor, and the Old Harbor Native Corporation indicates the need for power is preventing the economic development of Old Harbor, specifically a fish processing plant.

rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter or sharing for personal or family consumption; and for customary trade.

AVEC states in its application that subsistence activities are not common in the project area, but the project area is occasionally used for subsistence harvest of berries, fish, deer, goat, and bear. Most Old Harbor residents do practice a subsistence lifestyle and depend to some extent on subsistence food sources, such as salmon, halibut, crab, seal, deer, rabbit, and bear. Salmon reared in the lower reaches of Mountain Creek may also be used for subsistence purposes.

3.3.8.2 Environmental Effects

AVEC proposes to build a 5,720 foot-long by 24-foot-wide access road between the existing water tank access road and the powerhouse. This powerhouse road would be open to public vehicles. The area around the proposed powerhouse is currently only accessible via an ATV trail that is heavily rutted, braided, and includes two in-stream crossing of Lagoon Creek. AVEC proposes to install a gate along this existing trail to prevent unauthorized traffic and ATV use on the Refuge.

AVEC also proposes to build a 2.1 mile (11,500-foot-long), 10-foot-wide access trail between the intake and powerhouse, following the approximate path of the penstock. This trail would connect to the existing trail leading to the existing water pump house and would be open to public foot traffic. This trail would extend across lands owned by the Old Harbor Native Corporation (held in a conservation easement administered by the FWS) and on to the Refuge. At the request of the FWS, this intake access trail would be closed to non-project vehicle traffic. A gate would be installed to ensure no unauthorized traffic access the Refuge.

Commission Staff Analysis

The proposed powerhouse road would improve the existing public access to the area around the proposed powerhouse, including Swimming Pond. This improved access is likely to increase traffic to the area around the Swimming Pond. The proposed access trail, following the route of the penstock, would also be open to public foot traffic into an area where there is currently very limited access.

The improved access to the Swimming Pond area and into the Refuge via the intake access trail would likely encourage increased use in these areas; therefore, also improving opportunities for subsistence practices.

A reduction in the flow of Mountain Creek is unlikely to have measurable effects on salmon that may be used for subsistence purposes (see section 3.3.2 *Aquatic Resources*).

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the Old Harbor Project would not be constructed. There would be no changes to the physical, biological, or cultural resources of the area and electrical generation from the project would not occur. The power that would have been developed from a renewable resource would have to be replaced with nonrenewable fuels. The noise and air quality impacts of the existing diesel fuel-fired generation system would continue unabated or at increased levels as the local electrical demand increased. The risk of spills of diesel fuels would likewise continue at current or increasing levels. The financial benefits to the residents of Old Harbor in the form of lower electrical rates and to AVEC in terms of project operating revenues would not be realized.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the project's use of the East Fork of Mountain Creek and the Lagoon Creek Tributary for hydropower purposes to see what effect various environmental measures would have on the project's costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp.*,²⁴ the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using the likely alternative source of power for the region (cost of alternative power). In keeping with Commission policy as described in *Mead Corp.*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

For each of the licensing alternatives, our analysis includes an estimate of: (1) the cost of individual measures considered in the EA for the protection, mitigation and enhancement of environmental resources affected by the project; (2) the cost of alternative power; (3) the total project cost (i.e. for construction, operation, maintenance, and environmental measures); and (4) the difference between the cost of alternative power and total project cost. If the difference between the cost of alternative power and total project cost is positive, the project produces power for less than the cost of alternative power. If the difference between the cost of alternative power and total

²⁴ See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (July 13, 1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

project cost is negative, the project produces power for more than the cost of alternative power.

4.1 POWER AND DEVELOPMENTAL BENEFITS OF THE PROJECT

AVEC proposes to install one 262 kW Pelton turbine initially and another 262 kW unit when demand grows. Once the area load grows, the project would generate an average of 2.3 GWh annually with the initial unit installed.

Table 4-1 summarizes the assumptions and economic information we use in our analysis. This information, except as noted, was provided by AVEC in its license application. We find that the values provided by AVEC are reasonable for the purposes of our analysis.

Table 4-1. Parameters for economic analysis of the Old Harbor Project (Source: staff and AVEC).

Economic Parameter	Value
Base year for cost and benefits	2015
Hydro Cost	\$8,155,000
Hydro Loan Interest Rate	3.00%
Discount Rate	3.00%
Hydro Loan Period (years)	20
Inflation Rate	0.00%
Length of Analysis (years)	30
City Energy Needs (kWh per year)	899,000
Load Growth	2.50%
Diesel Fuel Cost (\$ per gal)	4.08
Fuel Cost Growth	0.00%
Diesel Efficiency (kW/gal)	13.95

4.2 COMPARISON OF ALTERNATIVES

4.2.1 No-action Alternative

Under the no-action alternative, the project would not be constructed as proposed and would not produce any electricity. No costs for construction, operation and maintenance, or proposed environmental protection, mitigation, or enhancement measures would be incurred by the applicant. AVEC would continue to use diesel fuel to meet current and projected energy needs.

4.2.2 AVEC's Proposal

Under AVEC's proposal, the project would require construction of a diversion dam/intake, penstock, a powerhouse containing generation facilities, a constructed tailrace, access road and trail, and a transmission line. AVEC proposes various environmental measures to protect, mitigate, and enhance existing environmental resources in the vicinity of project features.

Under AVEC's proposed single unit, the average annual project cost would be \$683,000 or about \$297/megawatt-hour (MWh). The average annual cost of alternative power would be \$328,000 or about \$143/MWh. Overall, the project would produce power at a cost which is \$355,000, or \$154/MWh, *more* than the cost of alternative power.

4.2.3 Staff Alternative

The staff alternative includes the same environmental measures as the proposed project with one additional measure: a monitoring plan for the constructed channel habitat.

The staff's alternative would have an average annual project cost of \$683,850 or about \$297/MWh. The average annual cost of alternative power would be \$328,000 or about \$143/MWh. Overall, the project would produce power at a cost which is \$355,900, or \$154/MWh, *more* than the cost of alternative power.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 4-2 gives the cost of each of the environmental enhancement measures considered in our analysis. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost.

Table 4-2. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of construction and operation of the Old Harbor Project (Source: staff).

Enhancement/Mitigation Measures	Entities	Capital (2013\$)	Annual (2012\$)	Levelized Annual Cost (2012\$)
1. A qualified environmental compliance monitor would be employed during the project construction	AVEC, Alaska Fish and Game, Commission	\$90,000	\$0	\$4,590

	Staff			
2. Motor vehicle use of the intake access trail would be limited to authorized vehicles only to minimize erosion due to traffic	AVEC, Alaska Fish and Game, Commission Staff	\$0	\$0	\$0
3. Overburden and soil from excavations would be piled outside of wetlands and in such a way as to prevent erosion. The excess soil piles would be revegetated with native seed mix recommended by the FWS ^c	AVEC, Commission Staff	\$10,000	\$0	\$510
4. Disturbed areas would be revegetated with native seed mix recommended by the Plant Materials Center, Alaska Division of Agriculture ^c	AVEC, FWS, Commission Staff	\$10,000	\$0	\$510
5. Construct an in channel overflow spillway in the diversion weir	AVEC, Commission Staff	\$0	\$0	\$0
6. Fish passage and large woody debris would be mostly maintained	AVEC, Alaska Fish and Game, Commission Staff	\$0	\$0	\$0
7. Revegetation of banks with native plants and large and small woody debris on areas cleared during channel construction	AVEC, Commission Staff	\$24,000	\$0	\$1,220
8. Construction of channel from Swimming Pond to natural channel would occur during a fishing timing window established by Alaska Fish and Game to protect downstream coho salmon	AVEC, Alaska Fish and Game, Commission Staff	\$0	\$0	\$0
9. Ramping rates would not exceed 5 cfs per hour to prevent large flow fluctuations into Lagoon Creek Tributary ^e	AVEC, Alaska Fish and Game, Commission	\$0 ^a	\$0	\$0

	Staff			
10. A Fish Exclusion Plan would be developed in cooperation with Alaska Fish and Game and other requesting agencies to finalize tailrace designs to prevent fish from accessing the tailrace above Swimming Pond	AVEC, Alaska Fish and Game, Commission Staff	\$0 ^a	\$0	\$0
11. A Fuel and Hazardous Substance Spill Plan would be developed in cooperation with Alaska Fish and Game and other requesting agencies to prevent petroleum product spills from impacting aquatic resources, including pre-project sampling	AVEC, Alaska Fish and Game, FWS, Commission Staff	\$6,000	0	\$306
12. A storm water pollution prevention plan would be used to minimize erosion from construction activities	AVEC, Alaska Fish and Game, Commission Staff	\$11,400	\$0	\$557
13. Best Management Practices would be implemented to decrease erosion and sedimentation during construction activities	AVEC, Alaska Fish and Game, Commission Staff	\$10,000	\$0	\$510
14. An Erosion and Sediment Control Plan would developed in cooperation with Alaska Fish and Game and other requesting agencies to decrease erosion and sedimentation during construction and operation of the project, including turbidity monitoring during construction	AVEC, Alaska Fish and Game, Commission Staff	\$25,000	\$5,000	\$6,275
15. Use the FWS's construction timing windows to avoiding disturbances during bird nesting seasons for ground clearing and vegetation removal in previously undisturbed areas	AVEC, FWS, Commission Staff	\$0	\$0	\$0

16. Monitoring and reporting to the FWS newly established bald eagle nest, which if found would result in blasting within 0.5 mile and construction work within 660 feet of the nest would be postponed until after coordination with the FWS. If blasting is required within 0.5 mile of an eagle nest, blasting would be conducted outside of the breeding season (November-January)	AVEC, FWS, Commission Staff	\$0 ^b	\$0	\$0
17. Avoid construction of permanent facilities within 0.25 mile of an established bald eagle nest tree	FWS, Commission Staff	\$0	\$0	\$0
18. Install bird diverters on the power line and guy wires to prevent bird strikes ^{a, d}	AVEC, Alaska Fish and Game, Commission Staff	\$10,000	\$0	\$510
19. Outfit power poles with perch posts designed to prevent bird electrocution ^{a, d}	AVEC, Alaska Fish and Game, Commission Staff	\$5,000	\$0	\$260
20. A Bear Safety Plan would be developed in cooperation with Alaska Fish and Game and the FWS on protocols to minimize bear encounters during construction and maintenance activities	AVEC, Alaska Fish and Game, FWS, Commission Staff	\$5,000	\$0	\$260
21. An invasive species management plan would be developed prior to commencement of any construction activities and excess soil piles and disturbed areas would be revegetated with a native seed mix in consultation with the Plant	FWS, Alaska Fish and Game, AVEC, Commission Staff	\$5,000	\$0	\$260

Materials Center, Alaska Division of Agriculture ^c				
22. To minimize impacts to mountain goats, AVEC would minimize the use of helicopters or airplanes near mountainsides adjacent to Mountain Creek, and if mountain goats are observed, a 1,500-foot vertical or horizontal clearance would be maintained, as can be accomplished safely	AVEC, Alaska Fish and Game, Commission Staff	\$0	\$0	\$0
23. Gates would be installed across the intake access trail and the existing ATV trail to prevent unauthorized motorized access into the Refuge and conservation lands ^a	AVEC, Alaska Fish and Game, FWS, Commission Staff	\$14,000	\$0	\$710
24. Signs would be installed at the powerhouse to inform the public about access on the Refuge and conservation lands ^a	AVEC, Alaska Fish and Game, Commission Staff	\$3,000	\$0	\$150
25. Monitor the condition of the signs, gates, barriers, and trail annually, promptly reporting any damage or evidence of unauthorized uses to the Refuge	FWS	\$0	\$0	\$0
26. If deemed necessary by agencies or AVEC, AVEC would hold an annual project review meeting to discuss the project and project effects on Lagoon Creek	AVEC, Alaska Fish and Game, Commission Staff	\$0	\$5,000	\$5,000
27. Constructed Channel Habitat Design and Monitoring Plan	Commission Staff	\$10,000	\$2,000 for 3 years, then \$0	\$800
28. Consult with SHPO, FWS, and Village of Old Harbor in the case of discovering a historic property and resolve	AVEC	\$0	\$0	\$0

any potential effects to it.				
^a These costs are included in the overall construction and operation costs of the project. ^b Included as a proposed environmental compliance monitor. ^c Staff recommends and FWS would require that AVEC develop a vegetation management plan, which should not add to the cost of the measure. ^d Staff recommends that AVEC develop an avian protection plan, which should not add to the cost of the measure. ^e Staff recommends that AVEC develop a ramping rate plan, which should not add to the cost of the measure.				

As Table 4-2 shows, if AVEC finances project construction, the proposed Old Harbor Project would have initial annual costs that far exceed the current power value. Although Commission staff does not explicitly account for the effects inflation may have on the future cost of electricity, the fact that hydropower generation is relatively insensitive to inflation compared to fossil-fueled generators is an important economic consideration for power producers and the consumers they serve.

In the FLA, AVEC estimates that 90 percent of the project's construction cost would be funded by grants from the State of Alaska, with the remaining funds financed at AVEC's bonding rate of 3 percent over a 50-year term. By awarding a construction grant to AVEC, the State of Alaska would shift the burden for a certain percentage of the project's construction cost, making the project much more economical for AVEC to build and operate.

Based on the Commission's policy under the Mead decision, it is the applicant who must decide whether to accept any license and the financial risk that entails.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the Old Harbor Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on Commission staff's independent review of the environmental and economic effects of the proposed project and its alternatives, we selected the AVEC's proposal with staff's modifications as the preferred alternative. We recommend this alternative because: (1) issuance of an original hydropower license by the Commission would allow the applicant to build and operate the project as an economically beneficial and dependable source of electrical energy; and (2) the 262-kW of electric capacity available comes from a renewable resource which does not contribute to atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would protect, mitigate and enhance environmental resources affected by building, operating, and maintaining the project.

In the following section, we make recommendations as to which environmental measures proposed by AVEC or recommended by agencies or other entities should be included in any subsequent license issued for the project. In addition to AVEC's proposed environmental measures, we recommend additional staff-recommended environmental measures to be included in any subsequent license issued for the project, and we describe these requirements in the draft license articles in Appendix A.

5.1.1 Measures Proposed by Applicant with Staff Modifications

Based on our environmental analysis of the AVEC's proposal in section 3, and the costs discussed in section 4, we conclude that the following environmental measures proposed by AVEC would protect environmental resources and would be worth the cost. Therefore, we recommend the following environmental measures proposed by AVEC with staff-recommended modifications, which are indicated in ***bold and italics***:

Design and Operation Related Measures

- Design the tailrace in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond;
- Design the constructed channel to include substrate, large woody debris, and other habitat suitable for salmon spawning and rearing, and fish passage between Lagoon Creek Tributary and Swimming Pond;
- Build the constructed channel during a period that Alaska Fish and Game deems protective of coho salmon;
- Install bird diverters on the power line and guy wires to prevent bird strikes, ***as part of an avian protection plan consistent with APLIC (2012) standards***; and
- Outfit power poles with perch posts designed to prevent bird electrocution, ***as***

part of an avian protection plan consistent with APLIC (2008) standards.

Administrative Measures

- Employ an environmental compliance monitor during project construction to ensure and document compliance with the provisions of a license; and
- Throughout the term of a license, if deemed necessary by an agency or AVEC, hold an annual project review meeting to discuss the project, any reports, and compliance with license articles.

Geology and Soils

- Pile overburden and soil from excavations outside of wetlands and in such a way as to limit erosion;
- Develop a storm water pollution prevention plan for the collection and routing of storm water during construction activities to minimize erosion; and
- Develop an erosion and sedimentation control plan to decrease erosion and sedimentation during construction and operation of the project, including turbidity monitoring during construction.

Aquatic Resources

Water Quantity

- Limit water diversion rates from the East Fork of Mountain Creek during upramping and downramping to 5 cfs per hour to prevent rapid flow fluctuations and protect aquatic resources in Lagoon Creek Tributary, ***and prepare a plan to monitor the flows and ramping rates for the project.***

Water Quality

- Develop a fuel and hazardous substance spill plan to prevent petroleum product spills from impacting aquatic resources ***that includes a spill prevention control and countermeasure section developed in consultation with FWS, a pre-project sampling and analysis section for hazardous substances developed in consultation with FWS, and a requirement to avoid placing oil/diesel storage facilities in the right-of-way permit area.***

Fisheries Resources

- Develop a fish exclusion plan in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond.

Terrestrial Resources

- Establish construction timing windows for avoiding disturbances during bird nesting seasons ***and avoid vegetative clearing between May 1 and August 1;***
- Monitor and report to the FWS any newly established bald eagle nests;
- Postpone blasting within 0.5 mile and construction work within 660 feet of any identified bald eagle nests until after coordination with the FWS ***and avoid construction of permanent facilities within 0.25 mile of an established bald eagle nest tree;***
- If blasting is required within 0.5 mile of an eagle nest, conduct blasting during November-January to avoid the bald eagle breeding season;
- Develop a bear safety plan with protocols to minimize bear encounters during construction and maintenance activities ***that includes notifying Alaska Fish and Game and the FWS in the event of any bear-human conflicts and implementing mitigation measures if bear-denning sites might be affected by construction activity;***
- Minimize the use of helicopters or airplanes near mountainsides adjacent to East Fork of Mountain Creek to avoid potential impacts to mountain goats and, if mountain goats are observed, maintain a 1,500-foot vertical or horizontal clearance to the extent that it can be accomplished safely;
- Revegetate excess soil piles and disturbed areas with a native seed mix recommended by the Plant Materials Center, Alaska Division of Agriculture, ***as part of a vegetation management plan and monitor the long-term success of the revegetation;*** and
- Develop an invasive species management plan prior to commencement of any construction activities, ***as part of a vegetation management plan and monitor the success of the invasive species control measures.***

Recreation and Land Use

- Install, ***maintain, and monitor the effectiveness of*** gates to limit motor vehicle use of the intake access trail and the existing ATV trail to authorized vehicles only to minimize traffic-related erosion;
- Install ***and maintain*** signs at the powerhouse to inform the public about access on the Refuge.

Cultural Resources

- In the case of discovering a historic property during construction of the project (or human remains associated with the Native American Graves Protection and Repatriation Act of 1992), AVEC would consult with the Alaska State Historic Preservation Officer (SHPO), FWS, and Village of Old Harbor to address any potential effects.

5.1.2 Additional Staff-Recommended Measures

We recommend the measures described above, and one additional staff-recommended measure: a constructed channel habitat design and monitoring plan.

Below we discuss the basis for our staff-recommended modifications and additional measures.

Constructed Channel Habitat Design and Monitoring Plan

AVEC proposes to design the constructed channel, which would convey project flows between Swimming Pond and the existing Lagoon Creek Tributary, in consultation with Alaska Fish and Game. Although AVEC states that the constructed channel would be approximately 1,100 feet long, 2-5 feet deep, and 8 feet wide with a 3-foot-wide meandering thalweg and that it would include suitable salmon spawning and rearing habitat, much of the design details of the channel still need to be developed. For example, AVEC states that gravel of appropriate size for salmon spawning would be used but does not specify the size. Similarly, AVEC states that cobbles and logs would be placed to create small pools but does not quantify pool dimensions or frequency of large woody debris. We recommend that AVEC develop a constructed channel habitat design and monitoring plan to formalize plans for construction of the new channel and to facilitate consultation with Alaska Fish and Game and other requesting agencies. The plan would describe physical features of the constructed channel including length, width, depth, sinuosity, dominant and subdominant substrate, habitat unit types (pools, riffles), woody debris, streambank vegetation. In addition, the plan would describe how habitat in the constructed channel meets requirements for coho salmon spawning and rearing life

stages.

AVEC states that the constructed channel between Swimming Pond and Lagoon Creek Tributary would be designed to withstand a 1.5-year recurrence flow of 15 cfs without bed movement, and the channel would allow for movement of fish between Lagoon Creek Tributary and Swimming Pond. However AVEC did not propose ongoing maintenance or monitoring of the constructed channel. Currently, this area does not have a defined channel. Creating a new channel to convey project flows of up to 11.8 cfs²⁵ would require substantial excavation and streambed construction in an area with EFH and spawning and rearing coho salmon. In Section 3.3.3, *Terrestrial Resources*, our analysis indicates that effects of construction on erosion, sedimentation, and turbidity would likely be limited to the period of construction and a short time after construction; however, monitoring would be needed to verify that adverse effects are not ongoing and to confirm that the constructed channel is conveying project flows and providing fish habitat as intended. Therefore, we recommend that the constructed channel habitat monitoring plan include a provision to conduct annual monitoring of the constructed channel during the first three years of project operation to identify any effects of project operations on channel form and aquatic habitat. The development of the plan would result in an additional annualized cost of \$5,520, which is a reasonable cost to ensure that the constructed channel is adequately designed to convey project flows and enhance salmon spawning and rearing habitat.

Ramping Rate Plan

AVEC proposes to install a water bypass system in the powerhouse to ensure continuity of flow downstream of the project during shutdown and limit project ramping rates to 5 cfs per hour. These measures would prevent adverse effects of rapid changes in flow on aquatic resources. We assume that the ramping rate of 5 cfs per hour would be spread evenly over the course of an hour. AVEC, however, did not provide specific details on how they would prove compliance with their proposed measures. As discussed in section 3.3.2, *Aquatic Resources*, a compliance monitoring plan would ensure the licensee does not exceed these proposed limits.

We recommend that AVEC prepare a ramping rate plan in consultation with Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The plan would include details about how AVEC would comply with the proposed ramping rate, describe maintenance and calibration procedures for the flow release mechanisms, describe how operations data would be recorded and reported,

²⁵ Although this EA only evaluates the installation of a single turbine with a maximum hydraulic capacity of 5.9 cfs, AVEC proposes to install a second turbine sometime in the future when “demand warrants” that would increase the project’s maximum hydraulic capacity to 11.8 cfs.

include a provision to report deviations, steps to be taken with ramping rate needs to be temporarily modified, and a schedule for implementation.

These measures would ensure that AVEC is in compliance with the operational limits set in their proposal. We do not believe that development of this plan would materially add to the cost of AVEC's proposal.

Revegetation and Invasive Species Control

The revegetation of disturbed areas (55 acres) would minimize long-term effects to local wildlife populations. AVEC proposed to reseed all disturbed areas and excess soil piles with a certified weed-free native seed mix recommended by the specialists with the Plant Materials Center, Alaska Division of Agriculture and FWS, and prepare an invasive species management plan, but did not provide specific measures.

Alaska Fish and Game recommended that AVEC develop measures to revegetate all disturbed areas to include:

- Locations of treatment areas
- Plant species and methods to be used
- Planting densities
- Fertilizer formulations
- Seed test results
- Application rates
- Locations type and density of woody plantings
- An implementation schedule
- Details for monitoring and maintenance programs

Alaska Fish and Game also recommended that AVEC develop an invasive species control plan that follows requirements identified by the FWS.

The FWS specifies that AVEC prepare a vegetation management plan (FWS condition 30) to include: (1) a description of best management practices to prevent the spread of invasive species, including provisions to clean (e.g., power wash) and inspect construction-related equipment and materials off-site prior to entry into the project area to ensure that equipment is free of seeds, spores, or other vegetation material that may introduce invasive species to the project area, including mid-season inspections; (2) provisions for piling overburden and soil from excavations outside of wetlands and in such a way as to prevent erosion; (3) methods and a schedule for revegetating disturbed areas and excess soil piles with native species, including locations of areas to be revegetated, types of native plant materials, native plant species and methods to be used, source of plant materials, planting densities and application rates, fertilizer formulations, use of certified weed-free seeds, and seed test results; (4) schedule and procedures for

controlling invasive plant species listed in the refuge's 2010 Priority Invasive Species List, or any updated list; (5) a monitoring program to evaluate the success of revegetation and invasive plant management efforts, including criteria that define when revegetation and management of target invasive species is successful for two growing seasons after completion of construction and revegetation efforts--if invasive plants are found during the initial 2-year monitoring period, remediation needs to occur and then monitored for another two growing seasons until weed-free conditions are met; and (6) monitoring during annual site maintenance to insure identification and removal of invasive plants detected in the project area.

We recommend that AVEC develop and implement a vegetation management plan for all project lands affected by construction activities that provides more details on the specific measures proposed for revegetating disturbed areas and managing invasive species, consistent with the conditions recommended by Alaska Fish and Game and specified by FWS, as described above. These measures would reduce the risk of the introduction and spread of invasive plant species in the project area, while promoting native vegetation. Monitoring and maintenance of site rehabilitation efforts would ensure the long-term success of vegetation planting and prevent or control the spread of target invasive plant species during construction and beyond. We do not believe that the development of a vegetation management plan would materially add to the cost of AVEC's proposals.

Avian Protection Plan

AVEC proposes to install perch posts on the power poles to minimize the potential for avian electrocutions. We assume that the perch posts are designed to provide birds with a safe perch above dangerous energized components. AVEC, however, did not provide specific design for the perch posts. As discussed in section 3.3.3, *Terrestrial Resources*, anti-perching devices may not be effective without installation of perch guards to prevent perching beneath the installed perches and may deteriorate over time.

As an alternative, design of the power poles with adequate separation between energized components, groundwires, or other metal hardware, consistent with APLIC's *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*, might more effectively protect raptors and other bird species from electrocution. Implementing the design standards typically do not add much to the cost of the transmission line. AVEC estimates that the perch posts could cost about \$5,000.

We recommend that AVEC prepare an avian protection plan that includes design drawings of the power poles that provides for adequate separation of energized conductors, groundwires, and other metal hardware, or other measures to protect birds from electrocution, consistent with APLIC guidelines. We believe that cost would be no more than the \$5,000 (average annualized cost of \$260) estimated by AVEC and would

be worth the benefits to bird species, including bald eagles.

AVEC proposes to install bird diverters on the transmission line and guy wires to minimize the potential for avian collision, including the federally listed Steller's eider and bald eagle. AVEC, however, has not proposed a specific design for the diverters or determined the spacing between diverters. AVEC estimated that the cost of installing bird diverters would be about \$10,000.

Marking the line would make it more visible to birds that might hunt in or move through the project area. Bird flight diverters can include spirals, plates, swivels, or spheres attached to the transmission line or the groundwire. Not all markers are suitable for all lines. Further, the recommended distance between markers can vary. Therefore, as part of the avian protection plan, AVEC should describe the specific flight diverters and distances between diverters consistent with the guidelines set forth in *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC, 2012). We believe that the annualized cost, as estimated by AVEC, of \$510 would be worth the benefits to protected bird species.

Bald Eagle Nest Protection

Construction activities have the potential to adversely affect bald eagle nesting. In recent years, bald eagles have nested within 1,900 feet of the proposed construction area. This distance is beyond the minimum 660-foot protective zone outlined in national bald eagle management guidelines (USFWS, 2007) and the 0.25 mile distance specified in FWS condition 46. The location of eagle nests, however, can change prior to the initiation of project construction. AVEC proposes to postpone construction work that would occur within 660 feet of any identified bald eagle nest until after coordination with the FWS.

The larger buffer prescribed by FWS than proposed by AVEC would reduce the risk to nesting eagles from construction disturbance, particularly in the generally open habitats in the project area where nests are not shielded by vegetation or topography. If construction activities need to occur within 0.25 mile of an active nest, AVEC should consult with FWS concerning measures to minimize potential effects. This measure would not result in additional costs based on the location of known nests, unless eagles relocate their nests closer to project facilities prior to commencement of project construction.

Bear Safety

Alaska Fish and Game recommended that AVEC develop and implement a Bear Safety Plan that would include: (1) instructions for project operations when bears are present to minimize possible conflict; (2) instructions to minimize encounters and avoid

areas frequented by bears; (3) instructions for keeping construction sites and refuse areas clean of substances that attract bears; (4) installation of bear resistant garbage receptacles and other measures during construction; and (5) procedures to deal with problem bears. FWS specifies that: (1) all food wastes must not be stored in the right-of-way permit area (FWS condition 41); (2) problems with wildlife must be reported to the Refuge Director and feeding wildlife or disputing animal activity and take of any animal except in the case of life or property is prohibited (FWS condition 45); and (3) appropriate mitigation measures to protect human safety and protect wildlife, if denning sites are identified (FWS condition 50). AVEC proposes to work with the FWS and Alaska Fish and Game to develop protocols to minimize bear encounters during construction and maintenance activities.

Developing a Bear Safety Plan with the measures recommended by Alaska Fish and Game and specified by the FWS would reduce the risk of bear-human encounters and help protect the bear population in the project area as well as the safety of workers on-site. We recommend that the plan include notification of Alaska Fish and Game, in addition to the FWS, in the event of any bear-human conflicts. We do not believe that development of this plan would add significant cost.

Inadvertent Discovery of Cultural Resources

The proposed project would have no effect to historic properties. However, AVEC may discover cultural resources as a result of the project's construction, operations, or project-related activities. To protect historic properties, staff recommends a measure that addresses the discovery of previously unidentified cultural resources. Staff would include a license article (Article 413) to protect any significant cultural resource or historic property that would be inadvertently discovered during project construction or with any other project-related activities.

5.2 UNAVOIDABLE ADVERSE EFFECTS

Construction and operation of the proposed project would result in temporary construction related increases in erosion and sedimentation of project lands and waters and minimal on-going sediment effects, temporary increases in water turbidity during construction of project facilities, and minor visual effects on surrounding properties.

During construction, the development and implementation of an erosion and sediment control plan should mitigate potential effects to minor levels. Once operational, the additional flow being diverted to Lagoon Creek could cause an increase in bank erosion. With our recommended monitoring and maintenance measures (Alaska Fish and Game 10(j) recommendation 11), these effects should be minimal.

During operation, flows of up to 5.9 cfs for one turbine operations would be diverted from East Fork of Mountain Creek and transferred to another basin. Although fish have not been found in the vicinity of the intake, flow reductions in the reach downstream would reduce aquatic habitat for aquatic invertebrates and fish. The reach downstream of the canyon section of Mountain Creek supports salmon and is considered to be the upper limit for anadromous fish in Mountain Creek. Flows in the anadromous reach could be reduced from 0-25 percent depending on flow conditions in the basin, and so there would be minimal adverse effects on fish populations from project effects.

The addition of cold project flows to Swimming Pond and Lagoon Creek Tributary would lower water temperature by approximately 0-10 degrees with the largest effects on temperature in summer and fall. Decreased water temperature would improve conditions for fish during certain times in summer when water temperature naturally approaches or exceeds water quality standards for temperature. But lower temperatures also could cause reductions in growth rates and productivity of fish and their food sources. Juvenile salmon typically display density-dependent growth, however, and potential effects of lower temperatures would likely be offset by the addition of rearing habitat due to increased flows in Lagoon Creek Tributary and Lagoon Creek.

Construction activities associated with the diversion structure and intake, penstock, powerhouse, access roads, and transmission line would disturb local wildlife populations during the construction period (up to two construction seasons) as a result of increased noise levels and human disturbance. Construction timing restrictions would minimize effects to migratory birds, including the bald eagle. Helicopter use could disturb mountain goats and other wildlife species such as brown bear and deer but flight restrictions would minimize effects. Maintenance activity and use of ATV's could disturb wildlife through the license term. The clearing of about 5 acres (1 acre permanently lost) of wetland vegetation and about 64 acres (12 acres permanently lost) of upland vegetation would have limited short-term and long-term impacts to wildlife habitat and associated wildlife populations. Some rare plant species could be affected. The spread of invasive plant species could impact wildlife habitat. Revegetation of disturbed areas and control of invasive species would minimize effects. The proposed pipeline is mostly buried and would not hinder wildlife movement through the project area. The transmission line could pose a minimal electrocution and collision hazard to birds, but following accepted design practices would minimize effects.

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

5.3.1 Fish and Wildlife Agency Recommendations

Under section 10(j) of the FPA, 16 USC 803(j), each hydroelectric license issued by the Commission must include conditions based on recommendations provided by

federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

In response to our Ready for Environmental Analysis notice, Alaska Fish and Game filed 19 recommendations under section 10(j) of the FPA (letter filed on August 11, 2014; amended November 20, 2014).²⁶ Fourteen of the 18 recommendations are considered within the scope of section 10(j). Table 5-1 summarizes whether or not the recommendations are adopted under the Staff Alternative. We recommend adoption of all the Alaska Fish and Game recommendations.

Table 5-1. Fish and wildlife agency recommendations for the Old Harbor Project (Source: staff).

Recommendation	Agency	Within the scope of section 10(j)	Annualized cost	Adopted?
Project Operation Plan	Alaska Fish and Game	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$0	Yes
Ramping Rates	Alaska Fish and Game	Yes	\$0	Yes
Notification of Non-Compliance Event	Alaska Fish and Game	No, not a specific measure to protect, mitigate, or enhance fish	\$0	Yes

²⁶ On August 19, 2014, the FWS filed recommendations concerning the spread of invasive plant species. Since the FWS did not specify which section of the FPA its recommendation applied, we consider it under section 10(a) and are addressed in the specific resource sections of this document.

		and wildlife resources.		
Powerhouse Bypass System	Alaska Fish and Game	Yes	\$0	Yes
Tailrace Design and Fish Exclusion Plan	Alaska Fish and Game	Yes	\$0	Yes
Environmental Compliance Monitor	Alaska Fish and Game	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$4,590	Yes
Seasonal Limits on Instream Construction	Alaska Fish and Game	Yes	\$0	Yes
Erosion and Sediment Control Plan (including revegetation measures), Invasive Species Control Plan	Alaska Fish and Game	Yes	\$7,555	Yes
Turbidity Monitoring	Alaska Fish and Game	Yes	\$0	Yes
Fuel and Hazardous Substance Spill Plan	Alaska Fish and Game	Yes	\$260	Yes
Annual Project Review Meeting	Alaska Fish and Game	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$5,000	Yes
Access to Site by Alaska Fish and Game Employees	Alaska Fish and Game	No, not a specific measure to protect, mitigate, or	\$0	Yes

		enhance fish and wildlife resources.		
Design Transmission Line to Minimize Avian Electrocution Hazards	Alaska Fish and Game	Yes	\$260	Yes
Bear Safety Plan	Alaska Fish and Game	Yes	\$260	Yes
Protect Mountain Goats from Helicopter Disturbance	Alaska Fish and Game	Yes	\$0	Yes
Penstock Burial to Maintain Wildlife Migration Corridor	Alaska Fish and Game	Yes	\$0	Yes
Restricting Access and Land Use to Minimize Resource Impacts	Alaska Fish and Game	Yes	\$1,120	Yes
Stream Buffers and Location of Facilities	Alaska Fish and Game	Yes	\$0	Yes

5.4 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 U.S.C., § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed six comprehensive plans that are applicable to the Old Harbor Project, located in Alaska.²⁷ No inconsistencies were found.

²⁷ (1) Alaska Department of Natural Resources. Alaska's Outdoor Legacy: Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2009-2014. Anchorage, Alaska; (2) Alaska Department of Fish and Game. 1998. Catalog of waters important for spawning, rearing or migration of anadromous fishes. November 1998. Juneau, Alaska. Six volumes; (3) Alaska Department of Fish and Game. 1998. Atlas to the catalog of waters important for spawning, rearing or migration of anadromous fishes. November 1998. Juneau, Alaska. Six volumes; (4) U.S. Fish and Wildlife Service. 1990. Kodiak National Wildlife Refuge fishery management plan. Department of the Interior, Kodiak, Alaska. August 1990; (5) U.S. Fish and Wildlife Service. 2008. Kodiak National Wildlife Refuge: Revised comprehensive conservation plan. Department of the Interior, Anchorage, Alaska. August 2008; and (6) U.S. Fish and Wildlife Service. Undated. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.

6.0 FINDING OF NO SIGNIFICANT IMPACT

On the basis of the Commission staff's independent analysis, the issuance of an original minor license for the proposed Old Harbor Hydroelectric Project, as proposed, would not constitute a major federal action significantly affecting the quality of the human environment.

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8.0 LIST OF PREPARERS

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APPENDIX A

DRAFT LICENSE ARTICLES

Article 301. *Start of Construction.* The licensee must commence construction of the project works within two years from the issuance date of the license and must complete construction of the project within 5 years from the issuance date of the license.

Article 302. *Contract Plans and Specifications.* At least 60 days prior to the start of any construction, the licensee must submit one copy of its plans and specifications and supporting design document to the Commission's Division of Dam Safety and Inspections (D2SI)-Portland Regional Engineer, and two copies to the Commission (one of these shall be a courtesy copy to the Director, D2SI). The submittal to the D2SI-Portland Regional Engineer must also include as part of preconstruction requirements: a 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 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.

Article 303. *Cofferdam and Deep Excavation Construction Drawings.* Should construction require cofferdams or deep excavations, the licensee must: (1) review and approve the design of contractor-designed cofferdams and deep excavations prior to the start of construction; and (2) ensure that construction of cofferdams and deep excavations is consistent with the approved design. At least 30 days before starting construction of any cofferdams or deep excavations, the licensee must submit one copy to the Commission's Division of Dam Safety and Inspections (D2SI)-Portland Regional Engineer and two copies to the Commission (one of these copies shall be a courtesy copy to the Commission's Director, D2SI), of the approved cofferdam and deep excavation construction drawings and specifications, and the letters of approval.

Article 304. *As-built Drawings.* Within 90 days of completion of construction of the facilities authorized by this license, the licensee must file for Commission approval, revised exhibits A, F, and G, as applicable, to describe and show those project facilities as built. A courtesy copy must be filed with the Commission's Division of Dam Safety and Inspections (D2SI)-Portland Regional Engineer, the Director, D2SI, and the Director, Division of Hydropower Administration and Compliance.

Article 305. *Public Safety Plan.* At least 60 days prior to the start of construction, the licensee must submit one copy to the Commission's Division of Dam Safety and Inspections (D2SI)-Portland Regional Engineer and two copies to the Commission (one of these copies shall be a courtesy copy to the Commission's Director, D2SI) of a Public Safety Plan. The plan must include an evaluation of public safety concerns at the project

site, including designated recreation areas, and assess the need for the installation of safety devices or other safety measures. The submitted plan must include a description of all public safety devices and signage, as well as a map showing the location of all public safety measures. For guidance on preparing public safety plans the licensee can review the *Guidelines for Public Safety at Hydropower Projects* on the FERC website.

Article 306. *Project Modification Resulting from Environmental Requirements.* If environmental requirements under this license require modification that may affect the project works or operations, the licensee must consult with the Commission's Division of Dam Safety and Inspections (D2SI)–Portland Regional Engineer. Consultation must allow sufficient review time for the Commission to ensure that the proposed work does not adversely affect the project works, dam safety, or project operation.

Article 401. *Environmental Compliance Monitor.* At least 30 days before the start of any land disturbance or land clearing activities, the licensee must designate a qualified environmental compliance monitor to be on-site during project construction and have the authority to:

- (1) Issue cease work orders in the field, as applicable and deemed necessary; and
- (2) Document compliance of the licensee with the conditions of the license.

The environmental compliance monitor should have a background in the biological sciences with experience in water quality monitoring and erosion/sediment control measures. The licensee must consult with Alaska Fish and Game and the U.S. Fish and Wildlife Service (FWS) on the details of the environmental compliance monitor, including qualifications, duties, and responsibilities. The licensee must allow a minimum of 30 days for the agencies to comment and to make recommendations prior to finalizing the position details. The selection, responsibilities, and authority of the environmental compliance monitor must also be consistent with FWS Condition 31.

Article 402. *Annual Project Review Meeting.* The licensee must hold project review meetings to discuss the project and project effects on Mountain Creek and Lagoon Creek by March 31 of each year. At a minimum, Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service must be invited to these project meetings. These meeting must be held annually during construction of the project and for the first three years after project operations commence, and every three years thereafter or as deemed necessary by Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The purposes of these meetings are to review results of ongoing monitoring, discuss the effectiveness of required environmental protection plans, and determine any course of actions, as necessary, including the need for continued monitoring, changes to any environmental protection plans or changes in

project structures or operation. By October 31 of each year, the licensee must file with the Commission a report that summarizes the meeting and includes recommendations, if any, to changes to the environmental protection plans or the project. The Commission reserves the right to require changes to the report.

The licensee must allow a minimum of 30 days for the agencies to comment on the summary document 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.

If the licensee and Alaska Fish and Game, National Marine Fisheries Service, and/or U.S. Fish and Wildlife Service mutually agree to any changes in monitoring protocols (including the termination of monitoring), changes in environmental protection plans, or changes to the project or project operations, the licensee must file with the Commission an application to amend the license. Such changes may not be implemented without prior Commission authorization

Article 403. Erosion, Sediment, and Storm Water Control Plan. At least six months before the start of any land-disturbing or land-clearing activities associated with project construction, the licensee must file, for Commission approval, a final erosion, sediment, and storm water control plan. The plan must provide specific descriptions of features incorporated into the final project design and measures that will be employed during construction to erosion, stabilize slopes, and to minimize the quantity of sediment likely to result from site access, project construction, spoil-disposal, and project operation. The plan must include, in addition to the measures required by U.S. Fish and Wildlife (FWS) conditions 33 and 51, at a minimum, the following:

- (1) Descriptions of the soil, and groundwater conditions;
- (2) Preventative measures based on site-specific conditions;
- (3) Detailed descriptions, functional design drawings, and specific topographic location of all control measures, including:
 - a. rip-rap placement;
 - b. stream set back and stabilization of spoil material;
 - c. class of rock that may be used;
 - d. silt fences or other best management practices to be used to control storm water.
- (4) A map showing the location of any construction staging, lay down, and spoil storage areas in relation to project features; and
- (5) Description of turbidity monitoring to be done during project construction in Lagoon Creek Tributary, including:

- a. estimation of a baseline range for natural conditions using pre-construction turbidity samples;
- b. sampling turbidity daily in the existing channel of Lagoon Creek Tributary, at a location approximately 100 ft downstream of the lower end of the constructed channel; and
- c. a plan to cease construction activities, locate sediment sources, and implement appropriate sediment control measures if turbidity exceeds 25 NTU above natural conditions. This plan must include notification and consultation with Alaska Fish and Game, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the Commission if turbidity levels are exceeded.

(6) An implementation schedule.

The plan must be developed after consultation with Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

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

Article 404. Ramping Rate Plan. The licensee must limit changes in project discharge to a ramping rate of no more than 5 cfs per hour, spread evenly over a one hour period (e.g., 1 cfs every 12 minutes). At least 90 days before the start of project operations, the licensee must file for Commission approval, a ramping rate plan that describes how the licensee will document compliance with the required ramping rate limitation.

The plan must include, but not necessarily be limited to, the following:

- (1) A detailed description of how the licensee will document compliance with the required ramping rate;

- (2) a description of any periodic maintenance or calibration procedures necessary to ensure that the flow control valve and water bypass system work properly;
- (3) protocols for recording and maintaining project discharge data;
- (4) a provision to report, as soon as possible, any deviations from the required ramping rate with Alaska Fish and Game, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the Commission;
- (5) the steps to be taken when the ramping rate needs to be temporarily modified if required by operating emergencies beyond the control of the licensee and for short periods of time for project maintenance; and
- (6) a schedule for implementing the plan.

The licensee must prepare the plan after consultation with the Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

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

Article 405. Tailrace and Fish Exclusion Plan. At least six months before the start of project construction, the licensee must file, for Commission approval, a tailrace and fish exclusion plan. The plan must describe and include detailed drawings of how the tailrace facilities will be designed to: (1) reduce attraction flows and prevent fish from entering the tailrace, and (2) route project outflows to minimize risk of gas super-saturation in project outflows.

The licensee must prepare the plan after consultation with Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by

the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan, including the proposed facilities and schedule. Project construction may not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 406. Fuel and Hazardous Substance Spill Plan. At least six months before the start of any land-clearing or land disturbing activities, the licensee must file for Commission approval, a fuel and hazardous substances spills plan to help prevent and minimize any impacts associated with the handling of hazardous substances during project construction and operation.

The plan must include, in addition to the measures required by U.S. Fish and Wildlife conditions 32, 38, and 53, but not necessarily be limited to the following:

- (1) outline AVEC's procedures for reporting and responding to releases of hazardous substances;
- (2) outline AVEC's procedures for timely identification and remediation of spills;
- (3) identify and maintain a cache of spill cleanup equipment sufficient to contain any spill from the proposed project;
- (4) call for AVEC to provide a report specifying the location of spill clean-up equipment and the location, type, and quantity of oil and hazardous substances stored in the proposed project area; and
- (5) require that AVEC inform Alaska Fish and Game, FWS, and other requesting agencies as to the nature, time, date, location, and action taken for any spill affecting the project.

The licensee must prepare the plan in consultation with Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

The Commission reserves the right to require changes to the plan. Project operation may not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 407. Constructed Channel Habitat Design and Monitoring Plan. At least six months before the start of channel construction, the licensee must file, for Commission approval, a constructed channel habitat design and monitoring plan for the approximately 1,100-foot-long constructed channel between Swimming Pond and the existing channel in Lagoon Creek Tributary.

The plan must include, but not necessarily be limited to:

- (1) detailed drawings of the constructed channel from Swimming Pond to the existing channel of Lagoon Creek Tributary;
- (2) a description of physical features of the constructed channel including length, width, depth, sinuosity, dominant and subdominant substrate, habitat unit types (pools, riffles), woody debris, streambank vegetation;
- (3) a description of how habitat in the constructed channel meets requirements for coho salmon spawning and rearing life stages;
- (4) a schedule for building the constructed channel during a period that Alaska Fish and Game deems is protective of coho salmon; and
- (5) a plan to monitor channel geomorphology and fish habitat in the constructed channel between Swimming Pond and the existing channel of Lagoon Creek Tributary for three years once project operations commence. Specifically the monitoring plan should include:
 - a. a description of physical features of the constructed channel including length, width, depth, sinuosity, dominant and subdominant substrate, habitat unit types (pools, riffles), woody debris, streambank vegetation;
 - b. a description of any changes in the channel attributes listed in (5)(a) from prior-year status;
 - c. an assessment of whether any changes in the constructed channel affect the quality of fish habitat or connectivity between Swimming Pond and

Lagoon Creek Tributary;

- d. documentation of any fish in the constructed channel that are observed incidentally during habitat monitoring surveys; and
- e. a schedule of annual meetings for the first three years of project operations to report on the results of monitoring the channel. (Note: this meeting may be in conjunction with the proposed annual meeting, Article 402.) The purpose of these meetings is to determine any course of action to be recommended based on the results of the monitoring, including the need for continued monitoring and changes in project structures or operations. The licensee must prepare the plan and schedule after consultation with the Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service.

The licensee must prepare the plan in consultation with Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

The Commission reserves the right to require changes to the plan. Project operation may not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 408. Avian Protection Plan. At least six months before the start of any land-disturbing or land-clearing activities associated with project construction, the licensee must file, for Commission approval, an avian protection plan to protect birds from electrocution and collision hazards.

The plan must include the following:

- (1) design drawings of the power poles that provides for adequate separation of energized conductors, groundwires, and other metal hardware, or other measures to protect birds from electrocution, consistent with the guidelines provided in Avian Power Line Interaction Committee's (APLIC) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*;

- (2) a detailed description of the devices to be installed on the transmission line to minimize avian collisions, including type of device and spacing between devices, consistent with the guidelines provided in APLIC's *Reducing Avian Collisions with Power Lines: The State of the Art in 2012*;
- (3) provisions for notifying agencies if dead or injured birds are detected; and
- (4) an implementation schedule.

The plan must be developed after consultation with U.S. Fish and Wildlife Service and Alaska Department of Fish and Game. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

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

Article 409. Construction Timing to Protect Nesting Birds. The license must construct the project according to the following restrictions, in addition to the measures required by U.S. Fish and Wildlife (FWS) conditions 37 and 46:

- (1) In the event a bald eagle nest is identified by the environmental compliance monitor, avoid blasting within 0.5 mile of the nest. If blasting is required within 0.5 mile of an eagle nest, blasting must take place in winter (November-January);
- (2) Consult with FWS prior to any construction activities proposed within 0.25 mile of an active eagle nest to determine the need for protective measures; and
- (3) Report any newly established bald eagle nest to the U.S. Fish and Wildlife Service.

Article 410. Bear Safety Plan. At least 6 months before the start of any land-disturbing or land-clearing activities associated with project construction, the licensee

must file for Commission approval, a bear safety plan that includes, in addition to the measures specified in U.S. Fish and Wildlife (FWS) conditions 41, 45, and 50, the following provisions:

- (1) measures for project operations when bears are present to minimize possible conflict;
- (2) measures to minimize encounters and avoid areas frequented by bears;
- (3) measures for keeping construction sites and refuse areas clean of substances that attract bears;
- (4) installation of bear-resistant garbage receptacles and other measures during construction;
- (5) procedures to deal with problem bears; and
- (6) notification of Alaska Department of Fish and Game in the event of any bear-human conflicts.

The plan must be developed after consultation with FWS and Alaska Department of Fish and Game. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee must implement the plan including any changes required by the Commission.

Article 411. Mountain Goat Avoidance. To protect mountain goats during project construction, operation, and maintenance, the licensee must minimize helicopter disturbance by maintaining a 1,500-foot vertical or horizontal clearance from observed mountain goats when in the project area.

Article 412. FERC Form 80 Exemption. There is little or no potential for recreation facilities within the project boundary. Therefore, upon the effective date of the license, the licensee is exempt from 18 § C.F.R. 8.11, the filing of the FERC Form 80 recreation report, for the Old Harbor Hydroelectric Project.

Article 413. Protection of Undiscovered Cultural Resources. If the licensee discovers previously unidentified cultural resources during the course of constructing, maintaining, or developing project works or other facilities at the project, the licensee must stop all land-clearing and land-disturbing activities in the vicinity of the resource and consult with the Alaska SHPO, U.S. Fish and Wildlife Service (if the cultural resource is on lands under their jurisdiction), and Old Harbor Tribal Council (if the cultural resource is aboriginal) to determine the need for any cultural resource studies or measures. If no studies or measures are needed, the licensee must file with the Commission documentation of its consultation with the Alaska SHPO, and depending on the lands involved, with the U.S. Fish and Wildlife Service, and if the finds are aboriginal with Old Harbor Tribal Council, accordingly.

If a discovered cultural resource is determined to be eligible for the National Register of Historic Places (National Register), the licensee must file for Commission approval a HPMP prepared by a qualified cultural resource specialist after consultation with the Alaska SHPO, and other appropriate consulting parties. In developing the HPMP, the licensee must use the Advisory Council on Historic Preservation and the Federal Energy Regulatory Commission's Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects, dated May 20, 2002. The HPMP must include the following items: (1) a description of each discovered property, indicating whether it is listed in or eligible to be listed in the National Register; (2) a description of the potential effect on each discovered property; (3) proposed measures for avoiding or mitigating adverse effects; (4) documentation of consultation; and (5) a schedule for implementing mitigation and conducting additional studies. The Commission reserves the right to require changes to the HPMP.

The licensee must not resume land-clearing or land-disturbing activities in the vicinity of a cultural resource discovered during construction, until informed by the Commission that the requirements of this article have been fulfilled.

Article 414. Use and Occupancy. (a) In accordance with the provisions of this article, the licensee must 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 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 must also have continuing responsibility to supervise and control the use 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 must take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type 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 that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee must require multiple use and occupancy of facilities for access to project lands or waters. The licensee must also ensure, to the satisfaction of the Commission's authorized representative, that the use 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 must: (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 impoundment 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 modification 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 or roads where 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 impoundment. No later than January 31 of each year, the licensee must 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 certification 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 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an 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 project waters at normal 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 60 days before conveying any interest in project lands under this paragraph (d), the licensee must file a letter with the Commission, 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 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 Commission's authorized representative, 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 paragraph (c) or (d) of this article:

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

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed must not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee must 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; and (iii) the grantee must not unduly restrict public access to project waters.

(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 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 must be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article must not apply to any part of the public lands and reservations of the United States included within the project boundary.

APPENDIX B

Response to Comments on the Draft Environmental Assessment

Written comments on the draft EA were filed by the following entities:

<u>Commenting Entity</u>	<u>Date Filed</u>
AVEC	June 8, 2015
Alutiiq Tribe of Old Harbor	June 8, 2015
City of Old Harbor	June 8, 2015 and June 30, 2015
Old Harbor Native Corporation	June 8, 2015
State Senator Gary Stevens	June 30, 2015
US Senator Lisa Murkowski, US Senator Dan Sullivan, and US Congressman Don Young	July 17, 2015

Below we summarize the comments that were filed, include our responses to those comments, and indicate where we made modifications to in the final EA.

Proposed Alternative – Single Turbine vs. Two Turbines

Comment: The City of Old Harbor, the Alutiiq Tribe of Old Harbor, Old Harbor Native Corporation, and AVEC state that the draft EA was unclear and misleading in respect to the proposed alternative, because the draft EA presented the analysis as if only a single turbine was proposed rather than the fact that two turbines were proposed.

Response: We have revised the executive summary, section 1.2 *PURPOSE OF ACTION AND NEED FOR POWER*, and section 2.2 *APPLICANT’S PROPOSAL* in the final EA to clarify the proposed alternative and staff’s reasoning for only analyzing the installation of a single turbine rather than AVEC’s two-turbine proposal.

Comment: Alaska State Senator Gary Steven suggests that we reconsider only authorizing a single turbine for the project. The City of Old Harbor, the Alutiiq Tribe of Old Harbor, the Old Harbor Native Corporation, AVEC, U.S. Senator Lisa Murkowski, U.S. Senator Dan Sullivan, and U.S. Congressman Don Young contend that only authorizing the installation of a single turbine would inhibit the overall economic development of Old Harbor. The City of Old Harbor, AVEC, Senator Murkowski, Senator Sullivan, and Congressman Young list numerous, recently planned or proposed facility and infrastructure projects within the community that would contribute to the energy load growth and they believe would result in the need for the installation of the second turbine earlier than our estimation of 40 years. In addition to general load growth, the City of Old Harbor states that they are working on the development of both a fish processing plant and fish hatchery, which could add significant energy needs to the

current demand. The City of Old Harbor, Alutiiq Tribe, and AVEC estimate the second turbine may be needed within 10 to 20 years.

Response: The city's energy demand in the year 2000 was 664,000 kWh, while AVEC's license application states that the city's current energy demand is 898,952 kWh. This increase in demand represents a 2.0 percent annual growth over the last approximately 15 years. However, our need for power analysis in the EA uses a slightly higher estimated load growth of 2.5 percent, as specified in AVEC's license application. This higher load growth estimate includes many of the energy needs listed in the comment letters filed on the draft EA (i.e., residential needs and lighting, development of additional housing, population growth, and economic development progresses). Using the estimated 2.5 percent load growth, our need for power analysis suggests that the energy demand of the Old Harbor Community will not warrant the need for a second turbine at the proposed project for 30 to 40 years.

We recognize that changes in load growth, either the addition or loss of a large load, could change AVEC's timing for adding the second turbine. Although the City of Old Harbor states that they intend to build a fish processing plant and fish hatchery in the near future, these projects can have a significant range in power needs depending upon their size and operating hours. Because of the variable range in power needs for these types of facilities and a lack of detailed information from AVEC or the Old Harbor community on the expected power needs and timing of installation for these proposed facilities, we have not included these facilities in the need for power analysis.

We continue to believe that our estimate of the need for project power is reasonable based on the application and the information provided to date.

Comment: U.S. Senator Lisa Murkowski, U.S. Senator Dan Sullivan, and U.S. Congressman Don Young contend that FERC previously licensed a 500-kW, two-turbine hydroelectric project for the Old Harbor community on December 12, 2000 that was ultimately never constructed. Senator Murkowski, Senator Sullivan, and Congressman Young state that it is perplexing why FERC would not authorize the current two-turbine project proposal when the community's energy needs are greater now than in the year 2000.

Response: In 2000, FERC issued a license to AVEC for a 500-kW hydroelectric project to supply power to the community of Old Harbor. Although never constructed, the proposed project was to consist of a single 500-kW turbine generator to be installed immediately following license issuance. In contrast, AVEC's current proposal is to install a single 256-kW turbine upon license issuance and a second 256-kW turbine "when demand warrants." Critical to our recommendation to only authorize the single turbine is the estimated timing of the installation of the second turbine, with staff's analysis showing that demand would not warrant it for another 30 or 40 years.

Comment: The City of Old Harbor, the Alutiiq Tribe of Old Harbor, Old Harbor Native Corporation, and AVEC state that by not authorizing a second turbine now, an amendment to the applicant would be required when additional power is needed. The City of Old Harbor, the Alutiiq Tribe, the Old Harbor Native Corporation, and AVEC state that the community and AVEC do not have the resources to go through the amendment process in the near future.

Response: We recognize that there would be an additional cost associated with filing an application to amend the license for the authorization to install a second turbine. However, the cost of a license amendment would be dependent on the extent of changes in the existing environment and project-related resource effects. If the environmental resources at the project have experienced little change between now and when the second turbine is needed, the cost of filing for a license amendment would be minimal.

Cost Burden of Recommended Measures

Comment: The City of Old Harbor and AVEC state that development of the recommended constructed channel habitat design and monitoring plan, inclusion of spawning habitat in the channel design, requiring fish surveys, and conducting 3 years of monitoring would impose an additional cost burden on the licensee, higher than the cost estimated by the Commission, and that this additional burden is unwarranted.

Response: The constructed channel habitat design and monitoring plan is needed to document each physical feature and related feature purpose to be incorporated in the new channel, and to facilitate consultation on its design among AVEC, Alaska Fish and Game, NMFS, FWS, and the Commission, so as to optimize available aquatic habitat.

The introduction of new flow can alter constructed channels in unforeseen ways due to erosion and deposition. Therefore, monitoring for 3 years is needed to confirm that the channel maintains its design features and related habitat value. Annual monitoring for 3 years would be required to document “channel geomorphology and fish habitat in the constructed channel” and “any fish in the constructed channel that are observed incidentally during habitat surveys.” Physical habitat parameters to be surveyed include habitat unit type, length, width, depth, sinuosity, substrate, woody debris, and streambank vegetation but surveys for fish are not recommended.

In the DEA we calculated the annual levelized cost for the constructed channel habitat design and monitoring plan incorrectly as \$5520. This cost should instead be \$800 per year or \$2,400 and this change is reflected in Table 4.2. We presented the capital and annual costs for the constructed channel habitat design and monitoring plan correctly and we feel that these cost estimates are reasonable. We estimated that the cost for design of the constructed channel, including consultation with interested agencies, would be

\$10,000. We envision that the features to be included in the constructed channel (e.g., locations of individual habitat units such as pools and riffles; lengths, widths, and depths of habitat units; substrate characteristics; placement of woody debris) would be described in the plan using a table or map format. This table or map could then be used as a template for entering and displaying data gathered during the subsequent three years of monitoring. We estimated that monitoring the constructed channel will cost \$2,000 per year for 3 years. Monitoring would require technician-level staff competent in stream physical habitat surveys. The intent of this monitoring is solely to document whether physical features of the constructed channel change in ways that could negatively impact migrating or rearing fish.

Revegetation and Invasive Species Control and Monitoring Plan

Comment: AVEC agrees to develop a revegetation and invasive species control and monitoring plan and would monitor disturbed areas annually for invasive species for 2 years following construction.

Response: In addition to AVEC's proposal, we recommend that AVEC monitor for invasive species for 2 years following revegetation if invasive species are detected during the initial 2-year period. This would help ensure the long-term success of revegetation efforts. Given the small size of area involved, the additional cost would be minimal.

Transmission Line Design

Comment: AVEC states that the final design of the transmission line will follow current avian protection guidelines for bird diverters and perch posts. AVEC believes this design is sufficient and an avian protection plan document that provides a specific design is redundant.

Response: AVEC has yet to develop specific designs for the proposed avian protection devices, including proposed spacing for the bird diverters. The Commission and the resource agencies need to have an opportunity to review the adequacy of any structures in protecting birds, particularly federally-listed species. The recommended Avian Protection Plan would just need to include such design drawings and specifications and results of consultation.

Cultural Resources

Comment: AVEC states that only in the event of an inadvertent discovery of cultural resources would they consult with the SHPO to develop procedures for determining the discovery's eligibility for the National Historic Register and crafting a historic properties management plan. AVEC states it does not agree to develop procedures on the chance of encountering cultural resources, since the cultural resources survey completed for the

projected suggested that such encounters would be unlikely.

Response: As AVEC states, the chance of encountering cultural resources would be unlikely; however, there is still a need to have a process in place in the case of discovering unexpected cultural resources. In situations where no cultural resources were found during the licensing process, our standard procedure for new and original licenses is to condition the license with a procedure to protect any cultural resource discoveries during construction or operation of a project. This action ensures our compliance with our responsibilities under section 106 of the National Historic Preservation Act.

Appendix C

U.S. Fish and Wildlife's Recommended 4(e) Conditions Old Harbor Hydroelectric Project, FERC No. 13272

RENT:

1. The Permittee is required to make a rental payment in advance for use and occupancy of lands. The annual rental amount will be established by the U.S. Fish and Wildlife Service (Service) Annual Fee Schedule (Fee Schedule) or by an Office of Valuation Services approved appraisal.
2. Payment(s) shall be payable to the Service and forwarded to the attention of the Chief, Division of Realty and Conservation Planning, 1011 East Tudor Road, MS 211, Anchorage, Alaska 99503. Payment by credit card can be made by calling the Collections Officer at (907) 785-3566.
3. Rental rates may be reviewed and adjusted by the Service at any time not less than five (5) years after the grant of the permit or the last revision of charges. Should the Fee Schedule be adjusted, then the rental rate would be adjusted accordingly. The Service will furnish a notice in writing to the Permittee of intent to impose new charges commencing with the ensuing charge year. The revised charges will be effective unless the Permittee files an appeal according to 50 C.F.R. 29.22.

TERMS AND CONDITIONS:

4. As the Authorized Officer, the Refuge Manager will monitor compliance with right-of-way permit (permit) stipulations on behalf of the Service.
5. This permit is granted pursuant to Title XI and subject to outstanding rights, if any, in third parties.
6. Permittee, by accepting this permit, agrees to the terms and conditions contained in the permit and to requirements of 50 CFR 29 and 36 CFR 43.
7. Unless otherwise provided, the Permittee shall not remove any material, earth, or stone for construction or other purpose, except that stone or earth necessarily removed from the right-of-way in the construction of a project may be used elsewhere along the same right-of-way in the construction of the same project.
8. Prior to beginning any activity authorized under this permit, the Permittee shall submit to the Refuge Manager a plan of development describing all activities anticipated to be carried out under the authority of this right-of-way permit during

the coming year, including but not limited to: clearing, construction, and restoration. The plan shall provide sufficiently detailed information to allow the Refuge Manager to effectively monitor activities to be carried out under the plan. Receipt of the plan will be acknowledged in writing by the Refuge Manager. Once approved, a plan of development will be effective for one year. Subsequent plans of development shall be submitted annually for approval, and shall be received by the Refuge office 60 days before the expiration of the current plan. No activities may be carried out under this permit, unless they are described in a current plan of development.

9. Written notice shall be provided to the Refuge Manager 60 days prior to the beginning of construction. Clearing and construction will not begin until the Permittee, contractors, and key employees attend a pre-construction meeting with the Refuge Manager to discuss the extent of the project, work schedules, equipment and materials involved, staging of materials, and responsibilities of each party.
10. Prior to commencement of any activities authorized by this permit, the Permittee shall provide to the Service, (attention Chief, Division of Realty and Conservation Planning) a surety bond. This bond shall meet the requirements of 31 U.S.C. §§ 9301-9309. The bond will remain in place for the life of the project. The bond amount is calculated to cover the anticipated cost of restoration activities.
11. Permittee shall comply with State and Federal laws applicable to the project within which the permit is granted, and to the lands included in the right-of-way, and lawful existing regulations thereunder.
12. Permittee will not disturb or remove any public land survey monument or project boundary monument; unless Permittee requests and receives from the Service approval of measures Permittee will take to perpetuate the location of aforesaid monument.
13. The Permittee will rebuild and repair such roads, fences, structures, and trails as may be destroyed or altered by construction work and will build and maintain suitable crossings for all roads and trails that intersect the works constructed, maintained, or operated under the permit.
14. Permittee shall pay the United States the full value for all damages to the lands or other property of the United States caused by Permittee, its employees, contractors, or employees of the contractors, outside of permitted activities or areas. Permittee shall indemnify the United States against any liability for damages to life, person or property arising from the use of the lands under the

permit. Where the permit involves lands that are under the exclusive jurisdiction of the United States, the Permittee or its employees, contractors, or agents of the contractors, will be liable to third parties for injuries incurred concerning the right-of-way. Because of the special hazards inherent to the activities authorized, grant of this permit imposes liability without fault for each occurrence of injury and damage to the land and property of the United States up to a maximum of \$5,000,000.00.

15. The Permittee will notify promptly the Chief, Division of Realty and Conservation Planning of the amount of merchantable timber, if any, which will be cut, removed, or destroyed in the construction and maintenance of the project, and will pay the United States in advance of construction such sum of money as the Service may determine to be the full stumpage value of the timber to be so cut, removed, or destroyed.
16. The Chief, Division of Realty and Conservation Planning, and the Refuge Manager shall be kept informed of Permittee's principal place of business and the names and addresses of its principal officers.
17. In the installation, operation, and maintenance of the project, Permittee will not discriminate against any employee or applicant for employment because of race, creed, color, sexual orientation or national origin and shall require an identical provision to be included in all subcontracts.
18. Grant of the permit is subject to the express condition that the exercise thereof will not unduly interfere with the management, administration, or disposal by the United States of the land affected thereby. The Permittee agrees and consents to the occupancy and use by the United States, its grantees, permittees, or lessees, of any part of the right-of-way not actually occupied for the purpose of the granted rights to the extent that it does not interfere with the full and safe utilization thereof by the Permittee. The Permittee also agrees that authorized representatives of the United States will have the right of access to the right-of-way for making inspections and monitoring the construction, operation and maintenance of facilities.
19. The permit herein granted shall be subject to the express covenant that any facility constructed thereon will be modified or adapted, if such is found by the Service to be necessary, without liability or expense to the United States, so that such facility will not conflict with the use and occupancy of the land for any authorized works which may hereafter be constructed thereon under the authority of the United States. Any such modification will be planned and scheduled so as not to interfere unduly with or to have minimal effect upon continuity of energy and delivery requirements.

20. The permit herein granted is only for the specific use described and may not be construed to include the further right to authorize any other use within the right-of-way unless approved in writing by the Service.
21. The Permittee is responsible for ensuring that all persons working for the Permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.
22. By accepting this permit, the Permittee agrees to reimburse the United States for reasonable and documented costs incurred by the Service in processing the permit application, issuing the permit, and monitoring the installation, construction, operation, maintenance, termination and removal of facilities within or adjacent to the right-of-way. Reimbursement of such expenses shall be according to the Collection Agreement executed by the Permittee and the Service.
23. The Permittee is responsible for obtaining all necessary State and Federal permits and submitting copies to the Refuge Manager prior to the start of construction.
24. Upon completion of construction, the Permittee will file two copies each of a certification of completion and as-built drawings of the completed facilities with the Chief, Division of Realty and Conservation Planning, as proof of construction.
25. All or part of this permit may be terminated by the Service, for failure to comply with any or all of the terms or conditions of the grant, or for abandonment. In the event of noncompliance or abandonment, the Service will notify the Permittee in writing of its intention to suspend or terminate the grant 60 days from the date of the notice, stating the reasons therefore, unless before that time the Permittee completes such corrective actions as are specified in the notice. The Service may grant an extension of time within which to complete corrective actions when, in its judgment, extenuating circumstances not within the Permittee's control such as adverse weather conditions, disturbances to wildlife during breeding periods or periods of peak concentration, or other compelling reasons warrant. Failure to take corrective action within the 60 day period will result in suspension or termination of the permit. This procedure shall also apply in case of abandonment, a rebuttable presumption of abandonment is raised by deliberate failure of the Permittee to use for any continuous 2 year period the permit for the purpose for which it was granted or renewed.
26. Within 90 days after abandonment, or upon expiration or other termination of this permit, a restoration plan will be submitted by the Permittee to the Refuge Manager for approval. Termination includes permits that terminate under the terms of the grant. The Refuge Manager will provide guidance to the Permittee

for developing a restoration plan. All structures, facilities, equipment, gravel, utility lines and all other installations covered by this permit will be removed from the right-of-way. Restoration activities will be conducted as specified in the approved restoration plan. Permittee shall restore the land to its original condition to the satisfaction of the Refuge Manager. Final inspection of the site will be by the Refuge Manager or his designee and will be at the expense of the Permittee.

27. The final disposal by the United States of any tract of land traversed by a right-of-way will not be construed to be a revocation of the right-of-way in whole or in part. Such final disposition will be deemed and taken to be subject to such right-of-way unless it has been specifically canceled.
28. Any proposed transfer by assignment, lease, operating agreement or otherwise, of this permit, or any of the rights conferred by this permit, must be filed in triplicate with the Chief, Division of Realty and Conservation Planning. Additionally, it must be supported by written agreement by the transferee to comply with and be bound by the terms and conditions of the original grant and applicable amendments, if any. A \$25.00 nonreturnable service fee must accompany the proposal. No transfer will be recognized until approved in writing by the Service.
29. The licensee shall, after consultation with U.S. Fish and Wildlife Service about specific locations, install and maintain gates across intake access trail and the existing ATV trail to prevent unauthorized motorized access into the Refuge and conservation lands, and install signs at the powerhouse to inform the public about access provisions on the Refuge and conservation lands. The licensee shall also monitor the conditions of the signs, gates, barriers, and the access trails annually, promptly reporting any damage or evidence of unauthorized uses to the Kodiak Refuge. If unauthorized uses or vandalism are noted, the licensee shall consult with the Refuge to design additional protection measures.
30. At least six months before the start of any land-disturbing or land-clearing activities associated with project construction, the licensee shall file, for Federal Energy Regulatory Commission (Commission) and Service approval, a vegetation management plan. The purpose of this plan is to revegetate areas disturbed by project construction and prevent the introduction and spread of invasive species and noxious weeds during project construction and operation.

The plan shall include, but not necessarily be limited to, the following:

- (1) a description of best management practices to be followed to prevent the introduction and spread of invasive plants during project construction and operation, including provisions to clean (e.g., power wash) and inspect all construction-related equipment and materials off-site prior to entry into the

project area to ensure that equipment is free of seeds, spores, or other vegetation material that may introduce invasive species and noxious weeds to the project area, including mid-season inspections;

- (2) procedures for piling overburden and soil from excavations outside of wetlands and in such a way as to prevent erosion;
- (3) methods and a schedule for revegetating disturbed areas and excess soil piles with native species, including locations of areas to be revegetated, types of native plant materials, native plant species and methods to be used, source of plant materials, planting densities and application rates, fertilizer formulations, use of certified weed-free seeds, and seed test results;
- (4) coordination with the refuge manager to determine a schedule and procedures for controlling invasive plant species from the Refuge's 2010 Priority Invasive Species List, or any updated list, and that may become established in revegetated areas or identified during the term of the license;
- (5) a monitoring program to evaluate the success of revegetation and invasive plant management efforts, including criteria that define when revegetation and management of target invasive species is successful for two growing seasons after completion of construction and revegetation efforts. If invasive plants are found during the initial 2-year monitoring period, remediation needs to occur and then monitored for another two growing seasons until weed-free conditions are met;
- (6) monitoring during annual site maintenance to insure identification and removal of invasive plants detected in the project area;
- (7) a reporting schedule for filing monitoring results with the Commission and the U.S. Fish and Wildlife Service; and
- (8) an implementation schedule.

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

on project-specific information.

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

31. During the construction phase of the project, the Refuge will require onsite monitoring of the activities. Monitors will be environmental compliance personnel, either contracted by the Service and funded through a cost reimbursable agreement with the Permittee, or contracted by a third party consultant, approved by the Refuge Manager, and paid for by the Permittee. The number of monitors will depend upon timing of actual work (whether shifts are involved) and whether various sections of the project are to undergo construction at the same time. Monitors shall be on site during all active periods of road and pipeline construction to monitor and support compliance with all permit stipulations and approved plans of development. These monitors will be the main point of contact for the Service and responsible for providing daily written progress reports to the Refuge Manager and Permittee. Monitors will also have the authority to suspend and recommence activities, as appropriate, if the activity deviates from permit stipulations or plans of development. The monitor(s) shall notify the Refuge Manager and Permittee in writing immediately following suspension of work.
32. Fuel storage, cleanup, and spill reporting will be conducted in accordance with the Service, Region 7, Fuel Storage Policy R7-4. Sorbent material in sufficient quantity to handle operation spills shall be on hand at all times for use in the event of an oil or fuel spill. The Permittee's contractor(s) will develop and have on site a Spill Prevention Control and Countermeasure Plan, as applicable. A copy of this plan will be submitted to the Refuge Manager prior to commencement of construction.
33. All excavation dewatering and storm-water sedimentation control will be performed to meet the requirements of permits issued by the U.S. Environmental Protection Agency and the Alaska Department of Environmental Conservation. Copies of these permits and a Storm-Water Pollution Prevention Plan will be submitted to the Refuge Manager prior to any construction. This plan shall include a detailed procedure for construction of stream crossings, including protocol for fluming stream water to prevent disruption of flow during trench excavation.
34. During all phases of construction, seasonal constraints and weather may require temporary suspension of activities within the right-of-way to protect public health or safety or the environment. If the Refuge Manager determines that an immediate

temporary suspension of all or a portion of activities within the right-of-way is necessary, he/she may suspend such activities without administrative proceeding.

35. Permittee shall clear and keep clear the lands within the right-of-way to the extent and in the manner directed by the Refuge Manager; and will dispose of all vegetative and other material cut, uprooted, or otherwise accumulated during the construction and maintenance of the project in such a manner as to decrease the fire hazard and also in accordance with such instructions as the Refuge Manager may specify. Any maintenance clearing activities (i.e. clearing not associated with initial construction of facilities) shall be authorized under the conditions of a specific Refuge Special Use Permit issued by the Refuge Manager. Such permits shall include those mitigation measures necessary to minimize impacts to Refuge resources.
36. Permittee will do everything reasonably within its power, both independently and on request of any duly authorized representative of the United States, to prevent and suppress fires on or near lands to be occupied under this permit, including making available such construction and maintenance forces as may be reasonably obtainable for the suppression of such fires.
37. No vegetative clearing will occur between May 1 and August 1, in order to protect nesting birds, unless authorized in writing by the Refuge Manager.
38. A Pre-project Sampling and Analysis Plan will be conducted (in coordination with the Refuge Manager) by the Permittee prior to any construction to determine the existing levels of benzene, toluene, ethylbenzene, and xylenes (BTEX) or other hazardous substances for comparison with future values as an indication of leaks or spills during the operation of the facilities. This plan may be waived at the discretion of the Refuge Manager.
39. All bulk hazardous material and all hazardous waste containers are not allowed in the right-of-way permit area.
40. Culverts used within the right-of-way permit area will be periodically inspected and maintained as required by the Refuge Manager.
41. All food wastes will not be stored in the right-of-way permit area.
42. All gray and black water or chemical toilet refuse generated at construction or production facilities will not be allowed in the right-of-way permit area.
43. All trash and non-petroleum solid waste generated at construction or production facilities will be hauled off the Refuge and disposed in accordance with 18 AAC

60 (Solid Waste Regulations) and with 18 AAC 62 (Hazardous Waste Regulations).

44. All hazardous wastes (as defined by the Resource Conservation and Recovery Act of 1976, as amended) will be transported and disposed in accordance with regulation requirements and shall not be stored in the right-of-way permit area.
45. Any problems with wildlife shall be reported immediately to the Refuge Manager. The Permittee, contractors, and employees shall not feed animals. Wildlife shall not be harassed or intentionally approached closely enough to disrupt the animal's activity or to endanger human life. There shall be no taking of any animal except in the case of defense of life and property. In the case of a defense of life and property taking, the Permittee shall immediately contact the Alaska Department of Fish and Game and the Refuge Manager, and salvage those parts of the animal required by State regulations.
46. Disturbance and destruction of eagle nests or nesting trees is prohibited. Initial construction of permanent facilities, including roads, drill pads, and storage areas is prohibited within 1/4-mile of an established nest tree.
47. The Permittee shall be responsible for keeping the project area clean. All trash, survey lath, trail markers and other debris shall be picked up and properly disposed of during the job. At the completion of construction, a final cleanup shall be conducted by the Permittee and approved by the Refuge Manager.
48. The Permittee shall comply with the provisions of the Archeological Resources Protection Act (16 U.S.C. 470(a) (a)). The disturbance of archeological or historical sites and the removal of artifacts from Federal land are prohibited. In the event that cultural resources are found during the project, a localized work halt shall be initiated. This will be followed immediately by telephone contact to the Refuge Manager, and concurrent contact with the State Historic Preservation Officer, to evaluate the significance of any findings and establish any protective measures that may be necessary.
49. The Permittee's employees or contractors are prohibited from hunting, fishing, and trapping when access to the area is obtained by vehicle use of the right-of-way, or any other road not open to the general public.
50. Prior to clearing and construction during the bear denning season, a survey may be conducted by Refuge personnel for the purpose of identifying bear denning sites that might be affected by construction activity. If such denning sites are identified, the Refuge Manager will prescribe appropriate mitigation measures to protect human safety and prevent adverse impacts to wildlife.

51. Initial construction activities will occur in wintertime conditions when the ground is frozen to minimize sedimentation and other potential adverse effects to wetlands, unless authorized in writing by the Refuge Manager.
52. Permittee will be responsible for dust control during all project activities.
53. Oil/diesel storage facilities are not allowed in the right-of-way permit area.
54. The Service reserves the right to grant additional rights-of-way or permits for compatible uses on or adjacent to the right-of-way permit area in order to minimize adverse environmental impacts and the proliferation of separate rights-of-way across Federal lands.
55. Consistent with 50 C.F.R. 25.21(h), the Authorized Officer may require permit modifications at any future time to ensure compatibility with the use and occupancy of the land. Additional permit stipulations may be added over the life of the permit based on new information, technologies, or concerns.

End of Conditions.

Appendix D

US Fish and Wildlife Service Determinations, Findings, and Comprehensive Conservation Plan Amendment

The Fish and Wildlife Service (FWS) is required to make a variety of determinations, findings, authorizations and a Comprehensive Conservation Plan (CCP) amendment before the proposed action could be implemented. Following public comment on this environmental assessment (EA), the FWS will make a finding as to whether there is a significant impact likely to result from the proposed action. If a significant impact is likely, an environmental impact statement would be required before a final decision could be made.

In addition to a decision finding on this EA, 43 CFR Part 36, Transportation and Utility Systems [TUSs] In and Across, and Access to, Conservation System Units in Alaska, states in section 36.7:

(2) Each appropriate Federal agency in making its decision shall consider and make detailed findings supported by substantial evidence as to the portion of the TUS within that agency's jurisdiction, with respect to:

- (i) The need for and economic feasibility of the TUS;*
- (ii) Alternative routes and modes of access, including a determination with respect to whether there is any economically feasible and prudent alternative to routing the system through or within an area and, if not, whether there are alternative routes or modes which would result in fewer or less severe adverse impacts upon the area;*
- (iii) The feasibility and impacts of including different TUSs in the same area;*
- (iv) Short and long term social, economic, and environmental impacts of national, State, or local significance, including impacts on fish and wildlife and their habitat and on rural, traditional lifestyles;*
- (v) The impacts, if any, on the national security interests of the United States, that may result from approval or denial of the application for the TUS;*
- (vi) Any impacts that would affect the purposes for which the Federal Unit or area concerned was established;*
- (vii) Measures which should be instituted to avoid or minimize negative impacts;*
- (viii) The short and long term public values which may be adversely affected by approval of the TUS versus the short and long term public benefits which may accrue from such approval; and,*
- (ix) Impacts, if any on subsistence uses.*

Some of these findings would be incorporated into other determinations such as the compatibility determination (refuge purposes), ANILCA 810 evaluation (impacts to subsistence uses), and NHPA Section 106 letter of concurrence (impacts to historic properties). Other topics will be included in the decision document for this EA. If there is a Finding of No Significant Impact on this EA and, based on other findings, the proposed action is chosen for implementation, an amendment to the Kodiak NWR CCP will be prepared concurrently with the final decision. This amendment would reclassify small areas of the refuge from minimal management to intensive management to accommodate the project. Other activities otherwise allowed in intensive management would not be allowed within these areas.

UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Alaska Village Electric Cooperative, Inc.

Project No. 13272-004-AK

NOTICE OF AVAILABILITY OF FINAL ENVIRONMENTAL ASSESSMENT

(October 28, 2015)

In accordance with the National Environmental Policy Act of 1969, Title XI of the Alaska National Interest Lands Conservation Act, and the Federal Energy Regulatory Commission's (Commission) regulations, 18 CFR Part 380 (Order No. 486, 52 FR 47,897), the Office of Energy Projects has reviewed the application for an original license to construct the Old Harbor Hydroelectric Project, and has prepared a final environmental assessment (EA) with the cooperation of the U.S. Fish and Wildlife Service (FWS).

The proposed 525 kilowatt (kW) project would be constructed on the East Fork of Mountain Creek and transfer water into a powerhouse on the Lagoon Creek Tributary, near the town of Old Harbor, Kodiak Island Borough, Alaska. The project intake and a portion of the penstock would be located on approximately 7.74 acres of federal land that is part of the Kodiak National Wildlife Refuge and approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska.

The final EA contains Commission staff's analysis and response to comments filed on the draft EA issued on May 7, 2015. The FWS staff reviewed the analysis of the potential environmental impacts of the proposed hydroelectric project. The final EA concludes that licensing the project, with appropriate environmental protective measures, would not constitute a major federal action that would significantly affect the quality of the human environment.

A copy of the final EA is available for review at the Commission in the Public Reference Room or may be viewed on the Commission's web site at www.ferc.gov using the "eLibrary" link. Enter the docket number excluding the last three digits in the docket number field to access the document. For assistance, contact FERC Online Support at FERCOnlineSupport@ferc.gov or toll-free at 1-866-208-3676, or for TTY, 202-502-8659.

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

Project No. 13272-004-AK

Please contact Adam Beeco (Commission Staff) by telephone at (202) 502-8655, or by email at adam.beeco@ferc.gov, if you have any questions concerning the hydroelectric licensing process or contact Diana Biesanz (FWS Staff) by telephone at (907) 786-3426 or by email at diana_biesanz@fws.gov, if you have questions concerning the right-of-way permit.

Kimberly D. Bose,
Secretary.

FINAL ENVIRONMENTAL ASSESSMENT

Old Harbor Hydroelectric Project—FERC Project No. 13272-004

Alaska

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

U.S. Fish and Wildlife Service
U.S. Department of the Interior
1011 E. Tudor Road, MS-211
Anchorage, Alaska 99518

October 2015

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ACRONYMS AND ABBREVIATIONS

Alaska Fish and Game	Alaska Department of Fish and Game
ANILCA	Alaska National Interest Lands Conservation Act
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
ATV	all-terrain vehicle
AVEC	Alaska Village Electric Cooperative, Inc
cfs	cubic feet per second
Commission	Federal Energy Regulatory Commission
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
D2SI	Division of Dam Safety and Inspections
EA	Environmental Assessment
EFH	essential fish habitat
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
°F	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
FWS	U.S. Department of the Interior, Fish and Wildlife Service
HPMP	Historic Properties Management Plan
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
msl	mean sea level
MWh	megawatt-hour
NAGPRA	Native American Graves Protection and Repatriation Act of 1990
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act of 1966
NMFS	National Marine Fisheries Service
National Register	National Register of Historic Places
PCE	primary constituent elements
Refuge	Kodiak National Wildlife Refuge
RM	river-mile
SHPO	State Historic Preservation Officer
TCP	traditional cultural property

EXECUTIVE SUMMARY

Proposed Action

On November 1, 2013, the Alaska Village Electric Cooperative, Inc (AVEC) applied to the Federal Energy Regulatory Commission (Commission) for a license to construct, operate, and maintain its proposed 525-kilowatt (kW) Old Harbor Hydroelectric Project (Old Harbor Project or project) No. 13272-004.

On November 14, 2014, AVEC applied to the U.S. Fish and Wildlife Service (FWS) for a utility systems right-of-way permit for the portion of the project that would occupy the Kodiak National Wildlife Refuge (Refuge).

The project would be constructed on the East Fork of Mountain Creek and transfer water into a powerhouse on Lagoon Creek Tributary, near the town of Old Harbor, Kodiak Island Borough, Alaska (Figure 1). The project intake and a portion of the penstock would be located on approximately 7.74 acres of federal land within the Refuge managed by FWS and approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska.

Project Description and Proposed Facilities

AVEC proposes to install two Pelton 262-kW turbines, with the first turbine installation occurring at the time of initial construction and the second turbine being installed when “demand warrants an additional turbine.” In this EA, we project that the first turbine should meet AVEC’s energy demands for the next 40 years. Section 13 of the FPA states that the “...licensee shall within the time fixed in the license complete and put into operation such part of the ultimate development as the Commission shall deem necessary to supply the reasonable needs of the then available market...” Because it could be 40 years before demand warrants the addition of the second turbine, this EA only examines the project with the installation of the first turbine, which we refer to as the proposed action. If and when there is an established need for additional power, AVEC could apply for a license amendment to increase power production at the project. The amendment application would be noticed for public comment, and depending upon the extent of the amendment request, analyzed under a National Environmental Policy Act (NEPA) process.

The project would divert water from the East Fork of Mountain Creek and transport it across the basin boundary to Lagoon Creek Tributary, a tributary of Lagoon Creek, for hydroelectric generation. The proposed project is designed to accommodate two turbines with a total maximum hydraulic capacity of 11.8 cubic feet per second (cfs) (i.e., diversion intake, penstock, tailrace, and constructed channel); however, with only

one turbine installed the project would divert a maximum of 5.9 cfs. Although this EA only analyzes the proposed project with a single turbine and maximum hydraulic capacity of 5.9 cfs, all other project features are being analyzed as proposed.

The hydropower development would include: (1) a new 100-foot-long, 4 to 8 foot diversion/cut off weir to be constructed on the East Fork of Mountain Creek with an integrated 3-foot-high spillway; (2) a new 10,150-foot-long buried penstock that would transfer water from the Mountain Creek basin to the proposed project powerhouse in the Lagoon Creek basin; (3) a flow control mechanism to be installed between the diversion and powerhouse to control the volume of flow diverted at the intake; (4) a 30-foot by 35-foot by 16-foot-high powerhouse containing one 262-kW Pelton turbine; (5) a water bypass system in the powerhouse to route flows to the tailrace during turbine maintenance to limit rapid changes in flow that could harm fish and aquatic invertebrates downstream of the project; (6) a 2,300-foot-long tailrace to convey water from the powerhouse to a nearby Swimming Pond; and (7) a 1,100-foot-long enhanced riverbed channel ("constructed channel") that would convey water from Swimming Pond to the natural channel of the Lagoon Creek Tributary.

The project would also involve constructing and maintaining: (1) an approximately 2.2-mile-long by 10-foot-wide project access trail between the intake and powerhouse; (2) an approximately 5,720-foot-long by 24-foot-wide access road extending from the powerhouse to an existing road; (3) a 1.2-mile-long, 12.47-kilovolt overhead transmission line from the powerhouse to the existing power distribution system in the City of Old Harbor; and (4) appurtenant facilities. The project would have an annual generation of 2,300,000 kilowatt-hours.

Project Operation

The project would continuously divert between 1 cfs and 5.9 cfs as long as flows are available, and would not be used for peaking operations. The estimated average annual flow of East Fork of Mountain Creek at the point of diversion is 9.8 cfs. When East Fork Mountain Creek flows are above 5.9 cfs, flows that are not diverted would remain in the East Fork of Mountain Creek. When flows are below 1 cfs the project would not operate, leaving flows in the East Fork of Mountain Creek.

A flow control valve in the penstock would restrict the quantity of water diverted to what is necessary for power production. In the event of project shutdown, the proposed bypass system at the powerhouse would ensure flow continuation to Lagoon Creek Tributary to protect aquatic resources.

Proposed Environmental Measures

Design and Operation Related Measures

- Design the tailrace in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond;
- Design the constructed channel to include substrate, large woody debris, and other habitat suitable for salmon spawning and rearing, and fish passage between Lagoon Creek Tributary and Swimming Pond;
- Build the constructed channel during a period that Alaska Fish and Game deems protective of coho salmon;
- Install bird diverters on the power line and guy wires to prevent bird strikes; and
- Outfit power poles with perch posts designed to prevent bird electrocution.

Administrative Measures

- Employ an environmental compliance monitor during project construction to ensure and document compliance with the provisions of a license; and
- Throughout the term of a license, if deemed necessary by an agency or AVEC, hold an annual project review meeting to discuss the project, any reports, and compliance with license articles.

Geology and Soils

- Pile overburden and soil from excavations outside of wetlands and in such a way as to limit erosion;
- Develop a storm water pollution prevention plan for the collection and routing of storm water during construction activities to minimize erosion; and
- Develop an erosion and sedimentation control plan to decrease erosion and sedimentation during construction and operation of the project, including turbidity monitoring during construction.

Aquatic Resources

Water Quantity

- Limit water diversion rates from the East Fork of Mountain Creek during upramping and downramping to 5 cfs per hour to prevent rapid flow fluctuations and protect aquatic resources in Lagoon Creek Tributary.

Water Quality

- Develop a fuel and hazardous substance spill plan to prevent petroleum product spills from impacting aquatic resources.

Fisheries Resources

- Develop a fish exclusion plan in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond.

Terrestrial Resources

- Establish construction timing windows for avoiding disturbances during bird nesting seasons;
- Monitor and report to the FWS any newly established bald eagle nests;
- Postpone blasting within 0.5 mile and construction work within 660 feet of any identified bald eagle nests until after coordination with the FWS;
- If blasting is required within 0.5 mile of an eagle nest, conduct blasting during November-January to avoid the bald eagle breeding season;
- Develop a bear safety plan with protocols to minimize bear encounters during construction and maintenance activities;
- Minimize the use of helicopters or airplanes near mountainsides adjacent to East Fork of Mountain Creek to avoid potential impacts to mountain goats and, if mountain goats are observed, maintain a 1,500-foot vertical or horizontal clearance to the extent that it can be accomplished safely;
- Revegetate excess soil piles and disturbed areas with a native seed mix recommended by the Plant Materials Center, Alaska Division of Agriculture;

and

- Develop an invasive species management plan prior to commencement of any construction activities.

Recreation and Land Use

- Install gates to limit motor vehicle use of the intake access trail and the existing ATV trail to authorized vehicles only to minimize traffic-related erosion; and
- Install signs at the powerhouse to inform the public about access on the Refuge.

Cultural Resources

- In the case of discovering a historic property during construction of the project (or human remains associated with the Native American Graves Protection and Repatriation Act of 1990), AVEC would consult with the both the Alaska State Historic Preservation Officer (SHPO), FWS, and Village of Old Harbor to address any potential effects.

Alternatives Considered

This final environmental assessment (EA) analyzes the effects of the proposed action and recommends conditions for any license or right-of-way permit issued for the project. This final EA considers the following alternatives: (1) AVEC's proposal, as outlined above; (2) AVEC's proposal with Commission staff modifications (staff alternative); and (3) no action or a denial of license, meaning AVEC would not construct the project, and environmental resources in the project area would not be affected.

Staff Alternative

Under the staff alternative, the proposed project would be constructed and operated with AVEC's proposed measures, as outlined above. The staff alternative also includes all of FWS's mandatory section 4(e) conditions.¹ The staff modifications and additional measures are outlined below:

- Develop a constructed channel habitat design and monitoring plan that: (1) incorporates AVEC's proposal to design the constructed channel to provide suitable salmon spawning and rearing habitat; and (2) includes annual monitoring

¹ Unless specifically noted (i.e., conditions 29, 41, and 53), each 4(e) condition applies only to FWS owned and managed lands.

of the channel for a 3-year period following the commencement of project operation to evaluate the effectiveness of the design at providing spawning and rearing habitat;

- Develop a ramping rate plan to establish protocols for ensuring compliance with the proposed ramping rate limitation of 5 cfs per hour;
- Include in the proposed fuel and hazardous substance spill plan: (1) a spill prevention control and countermeasure section developed in consultation with FWS (FWS condition 32); (2) a pre-project sampling and analysis section for hazardous substances, developed in consultation with FWS (FWS condition 38); and (3) a requirement to avoid placing oil/diesel storage facilities in the right-of-way permit area (FWS condition 53);
- Develop a vegetation management plan to guide AVEC's proposed revegetation of disturbed areas and control of invasive species, and monitor for the effectiveness of the proposed measures (FWS condition 30);
- Develop an avian protection plan that provides a specific design for AVEC's proposed measures to minimize avian electrocutions and collisions consistent with current avian protection guidelines;
- Avoid vegetative clearing between May 1 and August 1, in order to protect nesting birds, unless authorized in writing by the Refuge Manager (FWS condition 37);
- Avoid construction of permanent facilities within 0.25 mile of an established bald eagle nest tree (FWS condition 46);
- Report bear-human conflicts to the FWS and Alaska Fish and Game (FWS condition 45), prohibit all food waste storage in the right-of-way permit area (FWS condition 41), and implement mitigation measures if bear-denning sites might be affected by construction activity (FWS condition 50) to minimize the potential for human-bear interactions;
- Consult with FWS about specific locations, installation, maintenance, and monitoring of the gates (which may be located outside the Refuge) across the intake access trail and the existing ATV trail, and consult with the FWS to design additional protection measures if unauthorized uses or vandalism are noted (FWS condition 29); and
- Develop procedures, in the event of an inadvertent discovery of cultural resources at the project, for determining the discovery's eligibility for the National Register

of Historic Places (National Register) and crafting a historic properties management plan, if necessary.

Public Involvement and Areas of Concern

Before filing the license application for the Old Harbor Project, AVEC conducted pre-filing consultation under the integrated licensing process. The intent of the Commission's pre-filing process is to initiate public involvement early in the project planning process and to encourage citizens, government entities, Indian tribes, and other interested entities to identify and resolve issues prior to a license application being formally filed with the Commission. During pre-filing, Commission staff conducted scoping to determine what issues and alternatives should be addressed. A scoping document (SD1) for the proposed project was distributed to interested agencies and others on September 21, 2009. In addition, scoping meetings were held on October 22, 2009, in Anchorage, Alaska to request comments from the public, federal and state resource agencies, and other stakeholders. Revised scoping document (SD2), addressing the written and oral comments received, was issued on January 4, 2010.

On May 7, 2015, the Commission, in cooperation with FWS, issued a draft EA for the Old Harbor Project. Appendix B summarizes the comments that were filed in response to the draft EA, includes our responses to those comments, and indicates where we made modifications to the final EA.

The primary issues associated with licensing the project are the effects of construction-related erosion and sedimentation on water quality, fish, and invertebrates; effects of project diversion on water quality and quantity downstream of the diversion on East Fork of Mountain Creek; effects of increased flows on fish and aquatic invertebrates in Swimming Pond and Lagoon Creek Tributary; impacts to wildlife habitat from clearing of wetland and upland habitats and spread of invasive plant species; and the potential for the transmission line to cause avian mortality from electrocution and collisions.

Staff Alternative

Geology and Soils

The land-disturbing activities associated with construction of the project could cause erosion and sedimentation into Lagoon Creek Tributary. Project operation would also result in more flow into the Lagoon Creek Tributary, which could result in increased bank erosion. The staff-recommended erosion, sediment, and storm water control plan, as proposed by AVEC, would require AVEC to develop specific measures to prevent erosion based on site-specific conditions. Under the plan, AVEC would provide detailed descriptions, conceptual drawings, and the specific location of all control measures and

monitor sediment levels in the stream.

The turbidity monitoring requirements of the plan would enable AVEC to identify and respond to any increase in downstream turbidity level during project construction.

Aquatic Resources

Water Quantity

Project-related water diversions would affect the natural flow regime in the East Fork of Mountain Creek and downstream in the mainstem of Mountain Creek upstream of river-mile (RM) 3 where Mountain Creek flows subsurface for much of the year. During May through July, when streamflows peak, a diversion of 5.9 cfs would reduce flows at RM 3 by about 2 to 12 percent. During August through April, a 5.9 cfs diversion would reduce flows at RM 3 by up to approximately 25 percent.

Project operation would increase flows from Swimming Pond to Lagoon Creek Tributary, creating perennial flow in a channel that currently has ephemeral flows. An approximately 11,000-foot-long constructed channel would convey flows from Swimming Pond to Lagoon Creek Tributary.

Water Quality

Construction of the diversion structure and intake facilities would cause short-term adverse effects on water quality in the East Fork of Mountain Creek, and construction of the tailrace and constructed channel would cause short-term adverse effects on water quality in Swimming Pond and Lagoon Creek Tributary. When building the constructed channel, excavation equipment would be operated in the ephemeral channel but not in Swimming Pond or in the perennial section of Lagoon Creek Tributary. The proposed environmental compliance monitor could stop work or implement additional measures as needed based on water quality monitoring in construction areas. Monitoring turbidity as part of the staff-recommended erosion, sediment, and storm water control plan would allow AVEC to quickly identify and respond to any increase in downstream turbidity level during project construction.

Water temperatures in Swimming Pond and Lagoon Creek Tributary would likely decrease in spring and summer when the project is operating as project outflows would be colder than typical temperatures in these waterbodies. Under natural conditions, water temperatures in Swimming Pond and Lagoon Creek Tributary sometimes exceed current state water temperature standards for spawning and rearing in the summer. The addition of colder project flows would provide an environmental benefit by decreasing the likelihood that water temperatures in Swimming Pond and Lagoon Creek Tributary would exceed current state water temperature standards.

Total dissolved gases could increase in water being transferred in the project penstock. However, the proposed perched or boulder-field-type tailrace would allow dissolved gas concentrations to balance with the atmosphere before discharge to Swimming Pond, preventing dissolved gas supersaturation.

Fisheries Resources

The project would divert water from the East Fork of Mountain Creek in a reach where fish have not been found. However, project operation would cause a long-term reduction in aquatic invertebrate habitat in the East Fork of Mountain Creek due to a decrease in wetted streambed area. However, because of the small volumes diverted relative to mainstem flows, impacts on aquatic invertebrates and habitat in the East Fork of Mountain Creek are not expected to translate into measurable effects on downstream fish populations.

Construction could have short-term impacts on fish in Swimming Pond and Lagoon Creek Tributary. Increased turbidity could physically stress and/or alter the behavior of fish. Movement of fish between Swimming Pond and Lagoon Creek Tributary would be blocked when the cofferdam in Swimming Pond is in place. However, constructing the project during a period recommended by Alaska Fish and Game as protective of fisheries resources would minimize any impacts. The proposed environmental compliance monitor would ensure that best management practices are implemented and would stop work or implement additional measures as needed.

Project operation could decrease water temperature while increasing the overall volume of aquatic habitat in Swimming Pond and Lagoon Creek Tributary. The addition of flows could also increase sedimentation and alter channel morphology in Lagoon Creek Tributary. The proposed flow control mechanism and water bypass system, as well as the staff-recommended ramping rate plan, would ensure that downstream releases from the project comply with the proposed ramping rate limitation of 5 cfs per hour and protect downstream aquatic resources from rapid changes in flow.

The addition of cooler project waters to the Swimming Pond would improve conditions for salmonids during the summer. The potential negative effect of colder temperatures on growth of juvenile coho and Dolly Varden in Lagoon Creek Tributary would likely be offset by the positive effects of increased habitat. Sticklebacks, which have been found in Swimming Pond, also would benefit from cooler summer temperatures and increased habitat availability.

Fish in Swimming Pond, including coho salmon and Dolly Varden, could be attracted to flows in the tailrace. Proper design of the proposed perched or boulder-field-type tailrace would prevent fish from leaving Swimming Pond and entering the tailrace.

The constructed channel would be designed to include habitat suitable for salmon spawning and rearing and to provide fish passage to Swimming Pond. The staff-recommended constructed channel habitat design and monitoring plan would include a provision for consultation among AVEC, Alaska Fish and Game, and other interested entities on the design, construction, and monitoring of the constructed channel. Monitoring the constructed channel at least annually during the first three years of project operation, as part of the constructed channel habitat design and monitoring plan, would provide data to discern whether the constructed channel is operating as intended. If the constructed channel is not functioning as intended, then annual monitoring would provide information needed to plan any improvements to the channel.

Terrestrial Resources

The project would result in the clearing of 5 acres of wetland habitat and 64 acres of upland habitat, affecting wildlife species using that habitat. Revegetating disturbed areas with certified weed-free native plant species and implementing of an invasive species management plan, as proposed by AVEC, and monitoring the success of the measures, as recommended by staff and specified by the FWS, would minimize long-term impacts to terrestrial habitat and associated wildlife species.

Construction activities could disturb nesting birds, including the bald eagle. Clearing vegetation outside the nesting season and providing buffers around eagle nests, as proposed by AVEC and specified by the FWS, would minimize impacts to birds. Restrictions on helicopter use near mountain goats, as proposed by AVEC, would minimize disturbance of goats.

Large birds, including bald eagles, could be electrocuted if power poles are not properly designed. Outfitting the power poles with perch posts, as proposed by AVEC, or other measures consistent with current avian protection guidelines, would minimize or eliminate electrocution hazards. Developing an avian protection plan that includes specific design for the measures, as recommended by staff, would ensure that proposed measures are adequate to protect birds.

The presence of construction and maintenance workers, and food and garbage could result in increased encounters between bears and humans, potentially causing injuries to humans and bears, or killing or relocation of problem animals. Implementation of a bear safety plan, as proposed by AVEC, would ensure safety of workers and wildlife.

Threatened and Endangered Species

Discharge of sediments and other contaminants into marine habitats as a result of

project construction could affect foraging habitat for the federally listed Steller's eider and northern sea otter. Implementing the proposed storm water pollution prevention and fuel and hazardous substance spill plans and erosion control measures, and revegetation of disturbed areas would minimize potential effects on the marine environment.

Recreation and Land Use

The proposed project would occupy approximately 15.1 acres of land and affect a slightly larger area during construction, most of which is undeveloped and used for conservation.²

Current recreational and land use practices in the proposed project area include hiking, ATV excursions, hunting, sport fishing, sightseeing, and camping. Existing recreation facilities or improvements to support current recreation in the project area are limited to an ATV trail and a lightly used footpath. ATV use is prohibited on Kodiak National Wildlife Refuge lands and any lands under conservation easement administered by the FWS.

Refuge lands, including those with conservation easements, are open to the public. Access to Old Harbor Native Corporation's lands is restricted by the corporation. Visitors wishing to recreate, including hunting and fishing, on Old Harbor Native Corporation's lands must first apply, meet the terms of the application, and pay a fee depending on the type of recreational activity. Lands owned by the City of Old Harbor are open to the public. Under the project proposal, access to the proposed project lands would be improved by the addition of the powerhouse road and intake foot trail. The proposed installation and maintenance of signs to inform visitors about public access and regulations governing activities on the Refuge and conservation lands would help to educate the public and protect Refuge resources. The proposed installation of a gate on the intake access trail and one gate on the existing ATV trail to prevent unauthorized vehicle traffic into the Refuge would help protect Refuge resources. Increased law enforcement may be necessary to ensure visitors to the project adhere to Refuge regulations. Consulting with FWS about the specific locations of the gates, maintaining the gates, and monitoring the conditions of signs, gates, barriers, and access trails annually would safeguard the Refuge from unauthorized access to the Refuge. Promptly

² Specifically, the project would occupy approximately 1.85 acres of land within the Kodiak National Wildlife Refuge solely managed by the FWS; approximately 5.89 acres within the Kodiak National Wildlife Refuge, managed by FWS, which is also subject to a conservation easement administered by the State of Alaska; approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska; approximately 2.90 acres of Old Harbor Corporation land; and approximately 1.21 acres of land within the City of Old Harbor.

reporting any damage or evidence of unauthorized uses to the Refuge and consulting with the Refuge on the need and design of any additional protection measures would enable AVEC and FWS to adapt and address any changes at the project.

Cultural Resources

No known historic properties would be affected by the proposed project. However, AVEC may discover cultural resources during project construction, operation, or a related project activity. To protect historic properties, staff recommends a measure that would include consultation with the Alaska SHPO, FWS, and Village of Old Harbor to resolve any adverse effects to historic properties.

Environmental Justice

Old Harbor is one of Kodiak Island's six Alutiiq villages and is primarily inhabited by an Alutiiq population. According to the 2010 U.S. Census, the current population of Old Harbor is approximately 218 persons. About 88 percent of the current population is American Indian and Alaska Native (191 residents).

Construction and operation of the project are not expected to have a disproportionate adverse effect on minority populations. Because the Old Harbor community consists of such a high population of minorities, any negative effects of the projects would be shared equally across all community members.

Subsistence Resources

Providing the opportunity for continued subsistence use by local residents is one of the purposes of Kodiak Refuge, as stated in Title III of the Alaska National Interest Lands Conservation Act of 1980 (ANILCA) as amended. Title VIII of ANILCA further provides that rural Alaska residents engaged in subsistence use of resources be allowed to continue using Refuge resources for traditional purposes. Subsistence uses, as defined in ANILCA, means the customary and traditional uses by rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter or sharing for personal or family consumption; and for customary trade.

The improved access to the Swimming Pond area and into the Refuge via the intake access trail would likely encourage increased use in these areas and subsequently improve opportunities for subsistence practices.

No-Action Alternative

Under the no-action alternative, the project would not be built, environmental resources in the project area would not be affected, and the renewable energy that would be produced by the project would not be developed.

Conclusion

Based on its analysis, Commission staff recommends licensing the project as proposed by AVEC, with the staff modifications, described above under Alternatives Considered.

In section 4.2 of the EA, Commission staff estimate the likely cost of alternative power for the two alternatives identified above. Under AVEC's proposal, the average annual project cost would be \$683,000 or about \$297/megawatt-hour (MWh). The average annual cost of alternative power would be \$328,000 or about \$143/MWh. Overall, the project would produce power at a cost which is \$355,000, or \$154/MWh, more than the cost of alternative power.

Under Commission staff's recommended proposal, the average annual project cost would be \$683,850 or about \$297/MWh. The average annual cost of alternative power would be \$328,000 or about \$143/MWh. Overall, the project would produce power at a cost which is \$355,850, or \$154/MWh, more than the cost of alternative power.

Commission staff chose the staff alternative as the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (2,300 MWh annually); (2) the 262 kW of electric capacity would come from a renewable resource that does not contribute to atmospheric pollution; and (3) the recommended environmental measures proposed by the AVEC, as modified by staff, would adequately protect and enhance environmental resources affected by the project. The overall benefits of the staff alternative would be worth the cost of the proposed and recommended environmental measures.

On the basis of its analysis, Commission staff concludes that issuing an original license for the project, with the environmental measures it recommends, would not be a major federal action affecting the quality of the human environment.

FINAL ENVIRONMENTAL ASSESSMENT

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

U.S. Fish and Wildlife Service
U.S. Department of the Interior
1011 E. Tudor Road, MS-211
Anchorage, Alaska 99518

Old Harbor Hydroelectric Project FERC Project No. 13272-004 Alaska

1.0 INTRODUCTION

1.1 APPLICATION

On November 1, 2013, the Alaska Village Electric Cooperative, Inc (AVEC) applied to the Federal Energy Regulatory Commission (Commission) for an original, minor license to construct, operate, and maintain its proposed 524-kilowatt (kW) Old Harbor Hydroelectric Project (Old Harbor Project or project) No. 13272-004.

On November, 14, 2014, AVEC applied to the U.S. Fish and Wildlife Service (FWS) for a utility systems right-of-way permit for the portion of the project that utilizes Kodiak National Wildlife Refuge (Refuge).

The project would be constructed on the East Fork of Mountain Creek and transfer water into a powerhouse on the Lagoon Creek Tributary, near the town of Old Harbor, Kodiak Island Borough, Alaska (Figure 1). Some project facilities (the intake and a portion of the penstock) would be located on approximately 7.74 acres of federal lands of the Refuge managed by the FWS and approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska (Figure 2).

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the proposed Old Harbor Project is to provide a new source of hydroelectric power. Therefore, under the provisions of the Federal Power Act (FPA),

the Commission must decide whether to issue a license to AVEC for the Old Harbor Project and what conditions should be placed on any license issued. In deciding whether to issue a license for a hydroelectric project, the Commission must determine that the project will be best adapted to a comprehensive plan for improving or developing a waterway. In addition to the power and developmental purposes for which licenses are issued (such as flood control, irrigation, or water supply), the Commission must give equal consideration to the purposes of: (1) energy conservation; (2) the protection of, mitigation of damage to, and enhancement of fish and wildlife resources; (3) the protection of recreational opportunities; and (4) the preservation of other aspects of environmental quality.

Issuing an original license for the Old Harbor Project would allow AVEC to construct the project and generate electricity for the term of a license, making electric power from a renewable resource available to its customers.

This final environmental assessment (EA) evaluates the effects associated with construction and operation of the proposed project, alternatives to the proposed project, and makes recommendations to the Commission on whether to issue a new license, and if so, recommends terms and conditions to become a part of any license issued.

This EA also provides important information for FWS to determine whether to issue a utility systems right-of-way permit for use of Refuge lands.

In the final EA, we assess the environmental and economic effects of constructing, operating, and maintaining the Old Harbor Project: (1) as proposed by AVEC (proposed action) and (2) with our recommended measures (staff alternative).³ We also consider the effects of the no-action alternative. Important issues that are addressed include construction and operation effects on aquatic and terrestrial resources.

³ Unless specifically stated otherwise, all references to 'staff,' 'we,' or 'our' indicate the Commission Staff.

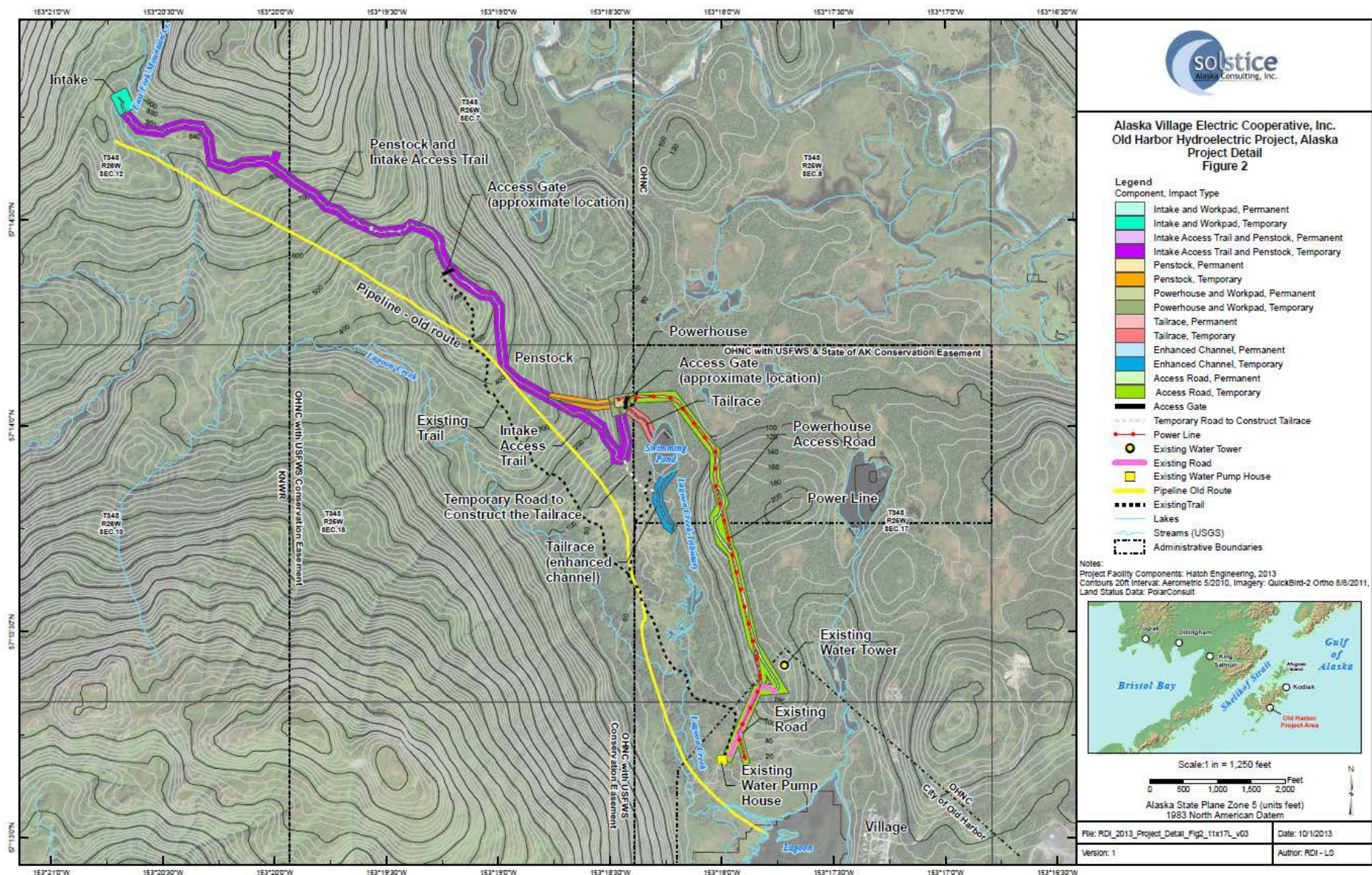


Figure 1. Location of the proposed Old Harbor Project (Source: Old Harbor license application).

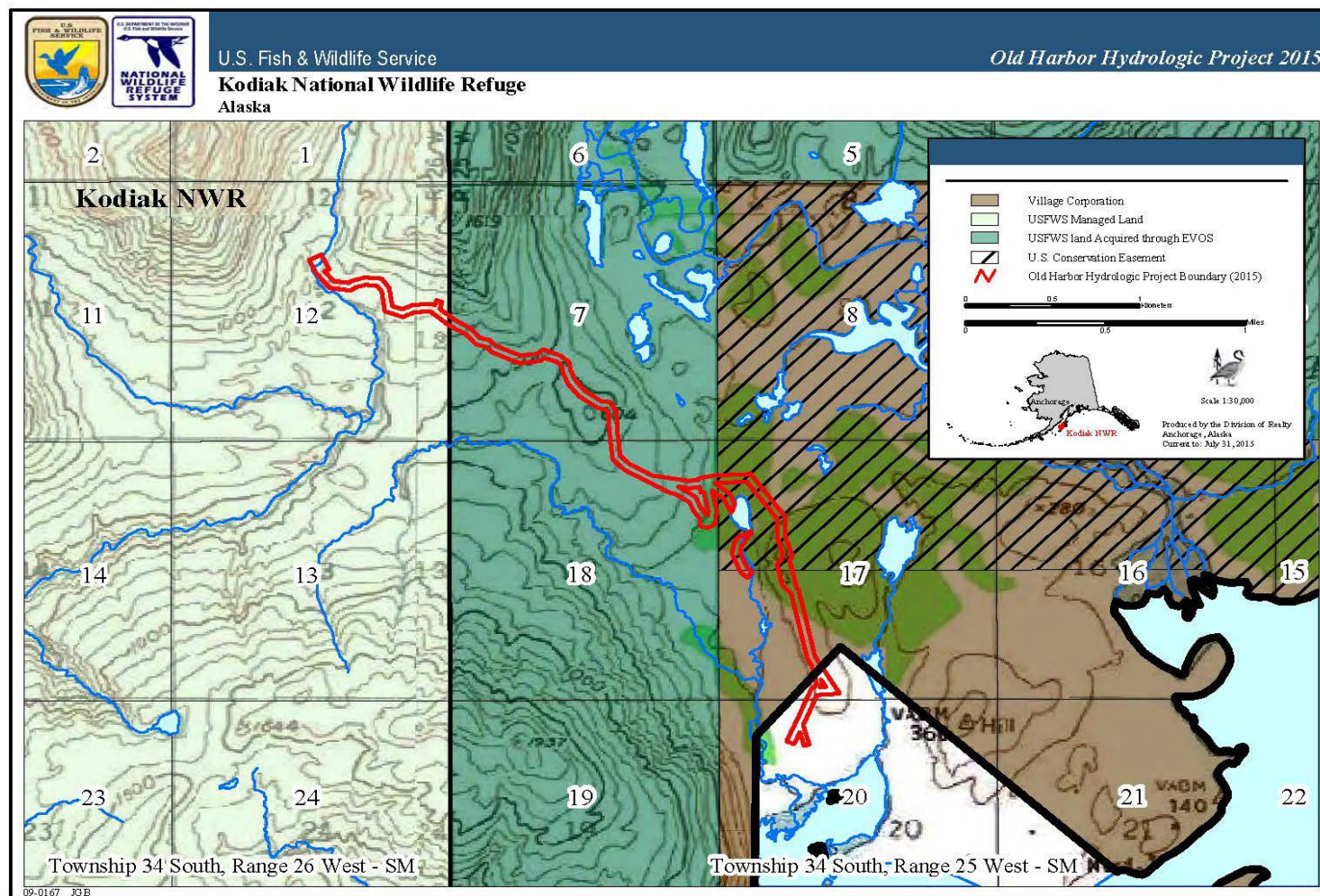


Figure 2. Project area land ownership map.

1.2.2 Need for Power

The purpose of the Old Harbor Project is to construct a hydroelectric facility to provide power to the community of Old Harbor. Old Harbor, like most rural Alaskan communities, relies on a small set of diesel generators and barged-in diesel fuel to supply its power needs. In 2010, the AVEC power plant consumed 58,000 gallons of diesel fuel to generate 807,000 kilowatt hours (kWh). Fuel for electric generation was brought into the community on three separate barges at an average cost of \$3.19 per gallon.

Currently, fuel must be barged in 2 to 3 times per year during periods of extremely high tides. When a shipment is missed, usually because of weather or suppliers not being available at high tide, any remaining supply is restricted to generators and public buildings, and residents must bring in fuel in 55 gallon drums on their fishing boats from the City of Kodiak to heat their homes. This added handling can increase the amount of fuel spilled.

The estimated average annual generation with two 262 kW turbines is 3,520,000 kWh of energy. With a single unit installed, the project would initially be capable of generating an average of about 2,300,000 kWh of energy.

Based on information from the Alaska Energy Authority, Old Harbor's energy demand from 2008 through 2012 grew at 5.9 percent. AVEC estimates future energy demand to average about 2.5 percent. If these estimates are accurate, the 2,300,000 kWh of average annual generation from the project's initial generating unit would be capable of meeting AVEC's energy demands for the next 40 years.⁴

Besides the project's ability to meet future energy growth, the project's hydroelectric generation would reduce hydrocarbon use, reduce the potential for fuel spills or contamination during transport, storage, or use of diesel fuel, and improve air quality. The project would also eliminate about 600 tons of carbon dioxide emissions each year.

We conclude that power from the Old Harbor Project would help meet a need for power in the Old Harbor community in both the short and long-term. The project would displace generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some emissions, thus creating an environmental benefit.

⁴ The development of industries, such as fish processing, could add a significant new power load. However, at this time, changes in system load from specific industry development are too speculative to analyze.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A license for the proposed project is subject to numerous requirements under the FPA and other applicable statutes. Below we discuss the status of complying with the statutes.

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

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

No fishway prescriptions, or request for reservation of authority to prescribe fishways under section 18 of the FPA, have been filed.

1.3.1.2 Section 4(e) Federal Land Management Conditions

Section 4(e) of the FPA provides that any license issued by the Commission for a project within a federal reservation shall be subject to and contain such conditions as the Secretary of the responsible federal land management agency deems necessary for the adequate protection and use of the reservation. The project occupies 7.74 acres of federal land administered by the FWS and approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska.

The FWS filed final conditions on October 21, 2015 (Appendix C) pursuant to section 4(e) of the Federal Power Act.⁵ These conditions are described under section 2.2.5, *Modifications to Applicant's Proposal – Mandatory Conditions*.

1.3.1.3 Section 10(j) Recommendations

Under section 10(j) of the FPA, each hydroelectric license issued by the Commission must include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project. The Commission is required to include these conditions unless it determines that they are inconsistent with the purposes and requirements of the FPA or other applicable law. Before rejecting or modifying an agency recommendation, the Commission is required to attempt to resolve any such inconsistency with the agency, giving due weight to the recommendations, expertise, and

⁵ FWS filed preliminary 4(e) conditions on September 10, 2015.

statutory responsibilities of such agency.

On November 20, 2014, Alaska Department of Fish and Game (Alaska Fish and Game) filed recommendations under section 10(j), as summarized in Table 5-1, in section 5.4.1, *Recommendations of Fish and Wildlife Agencies*.⁶ In section 5.4, we also discuss how we address the agency recommendation and comply with section 10(j).

1.3.2 Clean Water Act

Under section 401 of the Clean Water Act (CWA), a license applicant must obtain certification from the appropriate state pollution control agency verifying compliance with the CWA. On July 14, 2014, the Alaska Department of Environmental Conservation issued a letter waiving its right to issue a 401 water quality certificate for licensing the Old Harbor Project.⁷

1.3.3 Endangered Species Act

Section 7 of the Endangered Species Act (ESA) 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. Table 1-1 displays the federally listed species that may be found in the project area:

Table 1-1. Federally-listed threatened and endangered species that may occur in the project area.

Common Name	Scientific Name	Status
Steller's eider	<i>Polysticta stelleri</i>	Threatened
Southwest distinct population segment of northern sea otter	<i>Enhydra lutis kenyoni</i>	Threatened

Our analyses of project effects on threatened and endangered species are presented in section 3.3.4, *Threatened and Endangered Species*.

We conclude that licensing the project, as proposed with staff-recommended

⁶ Alaska Fish and Game timely filed, on August 11, 2014, recommendations under section 10(j). However, after further consultation with AVEC, Alaska Fish and Game filed updated section 10(j) recommendations on November 20, 2014.

⁷ The Alaska Department of Environmental Conservation letter was filed with the Commission on July 16, 2014.

measures, would not likely adversely affect the two federally listed species or designated critical habitat for the northern sea otter. Impacts to marine habitats from hazardous substances or erosion associated with the project would be unlikely, and if impacts did occur, they would have a negligible effect on use of the habitat by the Steller's eider and northern sea otter. Further, eider collisions with the transmission line would also be unlikely.

By letter dated January 20, 2012 (filed November 1, 2013) (USFWS, 2012), the FWS concurred with AVEC's determination that the proposed project would not be likely to adversely ESA-listed species and critical habitat. Our recommended measures to protect these species are consistent with AVEC's proposal that was reviewed by the FWS. Therefore, we agree with the FWS that requirements of section 7 of the ESA have been satisfied.

1.3.4 Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA), 16 U.S.C. § 1456(3)(A), the Commission cannot issue a license for a project within or affecting a state's coastal zone unless the state CZMA agency concurs with the license applicant's certification of consistency with the state's CZMA program, or the agency's concurrence is conclusively presumed by its failure to act within 180 days of its receipt of the applicant's certification.

On July 7, 2011, by operation of Alaska State law, the federally approved Alaska Coastal Management Program expired, resulting in a withdrawal from participation in the CZMA's National Coastal Management Program. The CZMA Federal consistency provision, section 307, no longer applies in Alaska.

1.3.5 National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires that every federal agency "take into account" how each of its undertakings could affect historic properties. Historic properties are districts, sites, buildings, structures, traditional cultural properties, and objects significant in American history, architecture, engineering, and culture that are eligible for inclusion in the National Register of Historic Places (National Register).⁸

⁸ In the case that human remains are discovered on federal lands, and that such remains are native and not associated with a crime, the Native Graves Protection and Repatriation Act of 1990 (NAGPRA) would be implemented by the federal land manager where the remains were located. With this proposed project, the FWS would have jurisdiction under NAGPRA and would secure the remains and contact the Village of Old Harbor who would be the likely descendants.

No historic properties were located within the project's area of potential effects (APE) and as a result, the proposed project would have no effect on such properties. The Alaska State Historic Preservation Office (SHPO) was consulted and concurred with the finding that no historic properties would be affected by the proposed project. Commission staff also concurs with this finding. FWS is evaluating the information and will include their findings in a separate FWS decision document. In the case of any future historic property being inadvertently discovered by project construction, or ongoing operation and maintenance activities, the Commission would require AVEC to consult with FWS and Alaska SHPO, as appropriate, to resolve any potential adverse effect to such properties through the development and implementation of a historic properties management plan (HPMP). Commission staff would make AVEC carry-out such contingencies through a license article for any original license for this project.

1.3.6 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). Freshwater EFH in Alaska includes "all streams, lakes, ponds, wetlands, and other water bodies currently or historically accessible to salmon." Consultation is required for the Old Harbor Project because Pacific salmon, including coho salmon and possibly pink and chum salmon, are found in the project area. AVEC included an EFH assessment, which was reviewed by NMFS, in their final license application.

Based on our analysis of the proposed action in this EA as specified in the license application, we conclude that licensing the project would not be likely to adversely affect EFH for coho, pink, and chum salmon in Mountain Creek or Lagoon Creek Tributary (see section 3.3.2, *Aquatic Resources*).

1.3.7 Alaska National Interest Lands Conservation Act

The proposed Old Harbor Hydroelectric Project would install infrastructure on federal lands managed by the FWS. Therefore, the proposed project must be evaluated in relation to the management purposes and resource values of refuge lands. In addition, the project has a utility component. Therefore, AVEC must apply to the FWS for right-of-way under the Alaska National Interest Lands Conservation Act (ANILCA) Title XI, Transportation and Utility Systems. Rights-of-way are issued according to both the ANILCA XI and the National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997. Before a right-of-way can be issued across the Refuge, it must be determined that the project is

compatible with the purposes of the refuge pursuant to Section 4(d)(2) of the National Wildlife Refuge System Administration Act. AVEC must obtain right-of-way on refuge land prior to construction of this project. (AVEC may request approval from the Refuge Manager to begin construction prior to the issuance of the ROW. If this request is approved, a Special Use Permit will be issued by the Refuge.)

On August 19, 1941, President Franklin D. Roosevelt signed Executive Order 8857 establishing Kodiak National Wildlife Refuge “. . . for the purpose of protecting the natural feeding and breeding ranges of the brown bears and other wildlife on Uganik and Kodiak islands . . .” Kodiak Refuge was established in its current configuration in the ANILCA in 1980. As identified in Section 303(5) (B) of ANILCA, Kodiak Refuge purposes include:

- (i) To conserve fish and wildlife populations and habitats in their natural diversity, including but not limited to salmonids, marine birds and mammals, migratory birds, and large mammals (including their restoration to historic levels);
- (ii) To fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats;
- (iii) To provide, in a manner consistent with purposes set forth in subparagraphs (i) and (ii), the opportunity for continued subsistence uses by local residents; and
- (iv) To ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in paragraph (i), water quality and necessary water quantity within the Refuge.

In addition to the above noted purposes of Kodiak Refuge, the refuge is managed for special values. These special values include the Kodiak Brown Bear, Kodiak Refugium and associated glacial lakes, Ayakulik-Red, Karluk, Sturgeon, and Dog Salmon drainages, Uganik Lake, Three Saints Bay, Mount Glottof Research Natural Area, Afognak Island Sitka spruce forest, and coastal marine habitats.

Operation and management of Kodiak Refuge is guided by a wide array of laws, treaties, and executive orders, and policies. Among the most important are the National Wildlife Refuge System Administration Act, as amended by the National Wildlife Refuge System Improvement Act, the Refuge Recreation Act, the Endangered Species Act of 1976, and the Wilderness Act of 1964.

The National Wildlife Refuge System Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997, 16 U.S.C. 668dd-668ee (Refuge Administration Act) serves as the "organic act" for the National Wildlife Refuge System. The act, as amended, consolidated the various categories of lands administered

by the Secretary of the Interior (Secretary) through the FWS into a single National Wildlife Refuge System. The act establishes a unifying mission for the Refuge System, and a process for determining compatible uses of refuges, among other important direction. This act states, first and foremost, the mission of the National Wildlife Refuge System be focused singularly on wildlife conservation.

This act identifies six priority wildlife-dependent recreation uses, clarified the Secretary's authority to accept donations of money for land acquisition, and placed restrictions on the transfer, exchange or other disposal of lands within the Refuge System. Most importantly, this act reinforces and expands the compatibility standard of the Refuge Recreation Act. The Refuge Administration Act authorizes the Secretary, under such regulations as he may prescribe, to "permit the use of any area within the System for any purpose, including but not limited to hunting, fishing, public recreation and accommodations, and access whenever he determines that such uses are compatible with the major purposes for which such areas were established."

Under the Comprehensive Conservation Plan (CCP) for the Kodiak Refuge, lands affected by the proposed project are categorized as Minimal Management for which the following is an overview of the guidance:

Minimal Management is designed to maintain the natural environment with very little evidence of human-caused change. Habitats should be allowed to change and function through natural processes. Administration will ensure that the resource values and environmental characteristics identified in the Plan are conserved. Public uses, economic activities, and facilities should minimize disturbance to habitats and resources. Ground-disturbing activities are to be avoided whenever possible (USFWS 2008).

1.3.8 Executive Order 11988 Floodplain Management

Executive Order 11988 requires that Federal executive branch agencies⁹ avoid construction or management practices that would adversely affect floodplains unless that agency finds that there is no practicable alternative, and the proposed action includes all practicable measures to minimize harm to or within the floodplain. Operation of the proposed hydroelectric facility would require building a water diversion structure and small powerplant within the floodplains of Mountain and Lagoon Creeks. In accordance with Executive Order 11988 and NEPA, alternatives to the proposed action were considered and mitigation measures have been included to minimize effects to the floodplain.

⁹ It should be noted that the Commission is not an executive branch agency.

1.3.9 Executive Order 11990 Wetlands Protection

Executive Order 11990 requires that Federal executive branch agencies¹⁰ avoid construction or management practices that would adversely affect wetlands unless that agency finds that there is no practicable alternative, and the proposed action includes all practicable measures to minimize harm to the wetlands. Although designed to minimize disturbance of wetlands, construction of the proposed hydroelectric facility would require 0.75 acre of wetlands to be permanently affected and 3.63 acres to be temporarily affected. In accordance with Executive Order 11990 and NEPA, alternatives to the proposed action were considered and mitigation measures have been included to minimize effects to the wetlands.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations, 18 C.F.R. 4.38, require that applicants consult with appropriate resource agencies and other entities before filing an application for a license. This consultation is the first step in complying with the Fish and Wildlife Coordination Act, ESA, NHPA, and other federal statutes. Pre-filing consultation must be complete and documented according to the Commission's regulations.

1.4.1 Scoping

Before preparing this EA, we conducted scoping to determine what issues and alternatives should be addressed. A scoping document (SD1) was distributed to interested agencies and others on September 21, 2009. It was noticed in the Federal Register on September 28, 2009. A scoping meeting was held on October 22, 2009, in Anchorage, Alaska, to request oral comments on the project. A court reporter recorded all comments and statements made at the scoping meetings, and these are part of the Commission's public record for the project. In addition to comments provided at the scoping meetings, the following entities provided written comments:

<u>Commenting Entities</u>	<u>Date Filed</u>
Alaska Fish and Game	October 16, 2009
U.S. Fish and Wildlife Service	November 20, 2009

A revised Scoping Document (SD2), addressing these comments, was issued on January 4, 2010.

1.4.2 Interventions and Comments

¹⁰ It should be noted that the Commission is not an executive branch agency.

On June 10, 2014, the Commission issued a notice that AVEC had filed an application for an original license for the Old Harbor Project. This notice set August 11, 2014, as the deadline for filing comments, protests, and motions to intervene. In response to the notice, the FWS filed comments on the application on August 8, 2014, and Alaska Fish and Game filed comments, a motion to intervene, and 10(j) recommendations on August 11, 2014. On November 20, 2014, Alaska Fish and Game filed their modified 10(j) recommendations. On September 10, 2015, FWS filed their 4(e) conditions.

1.4.3 Comments on Draft EA

On May 7, 2015, the Commission issued a draft EA for the Old Harbor Project. Comments on the draft EA were due by June 8, 2015. Comments on the draft EA were filed by the following entities:

<u>Commenting Entity</u>	<u>Date Filed</u>
AVEC	June 8, 2015
Alutiiq Tribe of Old Harbor	June 8, 2015
City of Old Harbor	June 8, 2015 and June 30, 2015
Old Harbor Native Corporation	June 8, 2015
State Senator Gary Stevens	June 30, 2015
US Senator Lisa Murkowski, US Senator Dan Sullivan, and US Congressman Don Young	July 17, 2015

Appendix B summarizes the comments that were filed, includes our responses to those comments, and indicates where we made modifications to the final EA.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 NO-ACTION ALTERNATIVE

The no-action alternative is license denial. Under the no-action alternative, the project would not be built and environmental resources in the project area would not be affected.

2.2 APPLICANT'S PROPOSAL

AVEC proposes to install two Pelton 262-kW turbines, with the first turbine installation occurring at the time of initial construction and the second turbine being installed when "demand warrants an additional turbine." We project that the first turbine would meet AVEC's energy demands for the next 40 years (see section 1.2.2 *Need for Power*). Section 13 of the FPA states the "licensee shall within the time fixed in the license complete and put into operation such part of the ultimate development as the

Commission shall deem necessary to supply the reasonable needs of the then available market.” Therefore, because it could be 40 years before demand warrants the addition of the second turbine, this EA only examines the project with the installation of the first turbine, which we refer to as the proposed action. If and when there is an established need for additional power, AVEC could apply for a license amendment to increase power production at the project. The amendment application would be noticed for public comment, and depending upon the extent of the amendment request, analyzed under a National Environmental Policy Act (NEPA) process.

2.2.1 Project Facilities

The proposed project would consist of an intake, penstock, powerhouse, tailrace and constructed channel, access road and trail, and transmission line.

The proposed project is designed to accommodate two turbines with a total maximum hydraulic capacity of 11.8 cfs (i.e., diversion intake, penstock, tailrace, and constructed channel). Although this EA only analyzes the proposed project with a single turbine and maximum hydraulic capacity of 5.9 cfs, all other project features are being analyzed as proposed.

Intake

The intake would consist of a concrete, or other suitable material, diversion/cut off weir with integral spillway that would divert water from the East Fork of Mountain Creek. The weir would range in height from approximately 4 feet at the spillway to 8 feet elsewhere and would span approximately 100 feet across the creek floodplain. A below grade transition with an above-ground air relief inlet pipe would convey water to a buried penstock. Once constructed, the intake would fill to the level of the spillway (about 4 feet) and flows higher than the amount of water diverted would the pass over the spillway.

Penstock

A 10,150-foot-long penstock would be constructed consisting of 7,400 feet of 18 to 20-inch-diameter polyethylene pipe leading to 2,750 feet of 16-inch-diameter steel pipe leading to the project powerhouse. The entire pipe would be buried 1 to 5 feet underground.

Powerhouse

The powerhouse would consist of an approximately 30-foot by 35-foot by 16-foot high metal building. The building would be designed to house two 262-kW Pelton turbines, a 480-volt, three-phase synchronous generator, and switchgear for two turbines. A water

bypass system in the powerhouse would be used to route flows to the tailrace during turbine maintenance. To control the volume of flow diverted at the intake and to limit rapid changes in flow downstream of the project, AVEC proposes to install a flow control mechanism between the diversion and powerhouse.

Tailrace

The tailrace¹¹ would be constructed with approximately 85 feet of steel, plastic, or concrete culvert and would convey the project flows approximately 0.1 mile from the powerhouse to the nearby pond, known as Swimming Pond.¹² AVEC proposes to work with Alaska Fish and Game to develop a fish exclusion plan for the tailrace to prevent fish access to the tailrace channel.

Constructed Channel

The tailwater would travel 500 feet within Swimming Pond and approximately 0.2 miles within a constructed channel of Lagoon Creek Tributary. This constructed channel would be in the place of the existing ephemeral section of Lagoon Creek Tributary where the channel is poorly delineated and unequipped to contain additional flows. This constructed channel would end in a groundwater upwelling where Lagoon Creek Tributary becomes a distinct natural channel. Lagoon Creek Tributary flows into Lagoon Creek, which then empties into the 82-acre, tidally influenced Salt Lagoon. Salt Lagoon drains through a culvert into the Sitkalidak Strait. The constructed channel would be designed to hold at least 15 cubic feet per second (cfs).

Access Road and Trail

An approximately 2.2-mile-long by 10-foot-wide project access trail would be constructed between the intake and the powerhouse and an approximately 5,720-foot-long by 24-foot-wide powerhouse access road would extend from powerhouse to the existing community drinking water tank access road.

¹¹ In their response to comments filed September 24, 2014, AVEC stated (based on comments from Alaska Fish and Game filed August 11, 2014) that the enhanced streambed channel should not be included as part of the tailrace.

¹² Swimming Pond is an approximately 3.9 acre pond with an estimated maximum depth of 15 feet, estimated mean depth of 8 feet, and approximate shoreline length of 1,665 feet. Its presumed flushing rate is 32 hours. The level of Swimming Pond correlates with ground water in the area and fluctuates without any apparent inflow or outflow, except during high run off events.

Transmission Line

A 1.2-mile-long, 12.47-kilovolt (kV) three-phase overhead power line would be constructed from the powerhouse to the existing power distribution system in Old Harbor.

2.2.2 Project Safety

As part of the licensing process, the Commission would review the adequacy of the proposed project facilities. Special articles would be included in any license issued, as appropriate. Commission staff would inspect the licensed project both during and after construction. Inspection during construction would concentrate on adherence to Commission-approved plans and specifications, special license articles relating to construction, and accepted engineering practices and procedures. Operational inspections would focus on the continued safety of the structures, identification of unauthorized modifications, efficiency and safety of operations, compliance with the terms of the license, and proper maintenance.

2.2.3 Project Operation

To operate the initial unit, AVEC proposes to divert natural flows up to 5.9 cfs (maximum turbine capacity), year round from the East Fork of Mountain Creek basin to Lagoon Creek Tributary basin through a penstock and into the powerhouse. Water would then exit the powerhouse and enter the tailrace which feeds into the Swimming Pond and into Lagoon Creek Tributary.

Any flows greater than the flows diverted for power, would spill over the diversion weir and stay within East Fork of Mountain Creek. AVEC would operate the project automatically and primarily in standalone mode as the community's primary source of electrical generation. A water bypass system in the powerhouse would be used to route flows to the tailrace during turbine maintenance. To control the volume of flow diverted at the intake and to limit rapid changes in flow downstream of the project, AVEC proposes to install a flow control mechanism between the diversion and powerhouse.

2.2.4 Proposed Environmental Measures

Design and Operation Related Measures

- Design the tailrace in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond;

- Design the constructed channel to include substrate, large woody debris, and other habitat suitable for salmon spawning and rearing, and fish passage between Lagoon Creek Tributary and Swimming Pond;
- Build the constructed channel during a period that Alaska Fish and Game deems protective of coho salmon;
- Install bird diverters on the power line and guy wires to prevent bird strikes; and
- Outfit power poles with perch posts designed to prevent bird electrocution.

Administrative Measures

- Employ an environmental compliance monitor during project construction to ensure and document compliance with the provisions of a license; and
- Throughout the term of a license, if deemed necessary by an agency or AVEC, hold an annual project review meeting to discuss the project, any reports, and compliance with license articles.

Geology and Soils

- Pile overburden and soil from excavations outside of wetlands and in such a way as to limit erosion;
- Develop a storm water pollution prevention plan for the collection and routing of storm water during construction activities to minimize erosion; and
- Develop an erosion and sedimentation control plan to decrease erosion and sedimentation during construction and operation of the project, including turbidity monitoring during construction.

Aquatic Resources

Water Quantity

- Limit water diversion rates from the East Fork of Mountain Creek during upramping and downramping to 5 cfs per hour to prevent rapid flow fluctuations and protect aquatic resources in Lagoon Creek Tributary.

Water Quality

- Develop a fuel and hazardous substance spill plan to prevent petroleum product spills from impacting aquatic resources.

Fisheries Resources

- Develop a fish exclusion plan in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond.

Terrestrial Resources

- Establish construction timing windows for avoiding disturbances during bird nesting seasons;
- Monitor and report to the FWS any newly established bald eagle nests;
- Postpone blasting within 0.5 mile and construction work within 660 feet of any identified bald eagle nests until after coordination with the FWS;
- If blasting is required within 0.5 mile of an eagle nest, conduct blasting during November-January to avoid the bald eagle breeding season;
- Develop a bear safety plan with protocols to minimize bear encounters during construction and maintenance activities;
- Minimize the use of helicopters or airplanes near mountainsides adjacent to East Fork of Mountain Creek to avoid potential impacts to mountain goats and, if mountain goats are observed, maintain a 1,500-foot vertical or horizontal clearance to the extent that it can be accomplished safely;
- Revegetate excess soil piles and disturbed areas with a native seed mix recommended by the Plant Materials Center, Alaska Division of Agriculture; and
- Develop an invasive species management plan prior to commencement of any construction activities.

Recreation and Land Use

- Install gates to limit motor vehicle use of the intake access trail and the existing

ATV trail to authorized vehicles only to minimize traffic-related erosion; and

- Install signs at the powerhouse to inform the public about access on the Refuge.

Cultural Resources

- In the case of discovering a historic property during construction of the project (or human remains associated with the Native American Graves Protection and Repatriation Act of 1992), AVEC would consult with the both the Alaska State Historic Preservation Officer (SHPO), FWS, and Village of Old Harbor to address any potential effects.

2.2.5 Modifications to Applicant's Proposal – Mandatory Conditions

The FWS filed the following mandatory conditions (Appendix C), which are evaluated in this final EA. We consider 13 of the 57 conditions to be administrative and therefore not analyzed in the final EA.

The following section 4(e) conditions¹³ are resource-specific:

- Condition 29 requires the licensee to consult with FWS about the locations, installations, and maintaining of gates (which may be located outside the Refuge) to prevent unauthorized access to the Refuge, including annual monitoring.
- Condition 30 requires a vegetation management plan.
- Condition 31 requires an environmental compliance monitor during the construction phase of the project.
- Condition 32 requires a spill prevention plan.
- Condition 33 requires a storm-water pollution prevention plan.
- Condition 37 restricts vegetative clearing between May 1 and August 1.
- Condition 38 requires a pre-project sampling and analysis plan of hazardous substance.
- Condition 41 requires food wastes not to be stored in the right-of-way permit area.
- Condition 45 outlines specific requirements for human-wildlife interactions.
- Condition 46 prohibits the disturbance and destruction of eagle nests, and prohibits permanent facilities within 0.25 mile of an established nest.

¹³ Unless specifically noted (i.e., conditions 29, 41, and 53), each 4(e) condition applies only to FWS owned and managed lands (Figure 2).

- Condition 50 requires implementation of mitigation measures if bear-denning sites might be affected by construction activities.
- Condition 51 requires initial construction activities to occur in wintertime conditions when the ground is frozen.
- Condition 53 prohibits oil/diesel storage facilities in the right-of-way permit area.

2.3 STAFF MODIFICATIONS TO APPLICANT'S PROPOSAL

Under the staff alternative, the proposed project would be constructed and operated with AVEC's proposed measures, as outlined above. The staff alternative also includes all of FWS's mandatory section 4(e) conditions. The staff modifications and additional measures are outlined below:

- Develop a constructed channel habitat design and monitoring plan that: (1) incorporates AVEC's proposal to design the constructed channel to provide suitable salmon spawning and rearing habitat; and (2) includes annual monitoring of the channel for a 3-year period following the commencement of project operation to evaluate the effectiveness of the design at providing spawning and rearing habitat;
- Develop a ramping rate plan to establish protocols for ensuring compliance with the proposed ramping rate limitation of 5 cfs per hour;
- Include in the proposed fuel and hazardous substance spill plan: (1) a spill prevention control and countermeasure section developed in consultation with FWS (FWS condition 32); (2) a pre-project sampling and analysis section for hazardous substances, developed in consultation with FWS (FWS condition 38); and (3) a requirement to avoid placing oil/diesel storage facilities in the right-of-way permit area (FWS condition 53);
- Develop a vegetation management plan to guide AVEC's proposed revegetation of disturbed areas and control of invasive species, and monitor for the effectiveness of the proposed measures (FWS condition 30);
- Develop an avian protection plan that provides a specific design for AVEC's proposed measures to minimize avian electrocutions and collisions consistent with current avian protection guidelines;
- Avoid vegetative clearing between May 1 and August 1, in order to protect nesting birds, unless authorized in writing by the Refuge Manager (FWS condition 37);

- Avoid construction of permanent facilities within 0.25 mile of an established bald eagle nest tree (FWS condition 46);
- Report bear-human conflicts to the FWS and Alaska Fish and Game (FWS condition 45), prohibit all food waste storage in the right-of-way permit area (FWS condition 41), and implement mitigation measures if bear-denning sites might be affected by construction activity (FWS condition 50) to minimize the potential for human-bear interactions;
- Consult with FWS about specific locations, installation, maintenance, and monitoring of the gates across the intake access trail and the existing ATV trail, and consult with the FWS to design additional protection measures if unauthorized uses or vandalism are noted (FWS condition 29); and
- Develop procedures, in the event of an inadvertent discovery of cultural resources at the project, for determining the discovery's eligibility for the National Historic Register and crafting a historic properties management plan, if necessary.

3.0 ENVIRONMENTAL ANALYSIS

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The project would be located near the town of Old Harbor on Kodiak Island, Alaska, which is approximately 300 miles southwest of Anchorage, Alaska. Kodiak Island is the second largest island in the United States.¹⁴ Kodiak Island is a mountainous island with a climate that is dominated by a strong marine influence with frequent cloud cover and fog, heavy precipitation, cool summers, and relatively warm winters.

The proposed diversion structure located on the East Fork of Mountain Creek would be approximately 7 miles from the mouth of Mountain Creek where Mountain Creek drains into Barling Bay Creek joining Barling Bay Creek near its confluence with tide water. The highest elevation in the Mountain Creek basin is 3,500 feet. Mountain Creek is short, steep, and exhibits a relatively rapid response to weather changes.

Lagoon Creek Tributary, the point of project discharges, is a spring-fed tributary that connects via an ephemeral channel to Swimming Pond. Flows from this tributary continue into the 4.51-mile-long Lagoon Creek with headwaters at an elevation of approximately 700 feet mean sea level (msl).

¹⁴ <http://www.city.kodiak.ak.us/Home/Pages/home2.aspx> retrieved January 29, 2015.

Major land uses in the area include the conservation of fish and wildlife, their habitats, and wildlife-oriented recreation by the FWS on Refuge lands managed by the FWS and those within the conservation easement held by FWS on Old Harbor Native Corporation lands. Old Harbor Native Corporation owns much of the land around the village of Old Harbor and allows permitted recreation. Land within and surrounding the project area is primarily undeveloped.

Most of the employment in the town of Old Harbor is public sector workers and fishermen.

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing National Environmental Policy Act of 1969 (40 CFR, section 1508.7), cumulative effect is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts 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. Through scoping, agency consultation, and Commission staff's independent analysis we've identified no resources that would be cumulatively affected by licensing the Old Harbor Project. The project is located in very small watersheds with very little existing or planned future developmental activity other than the proposed project.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

In this section, we discuss the effects of the project alternatives on environmental resources. For each resource, we first describe the affected environment, which is the existing condition and baseline against which we measure effects. We then discuss and analyze the site-specific environmental issues.

Only the resources that would be affected are addressed in this EA. Based on this, we have determined that geology and soils, aquatic resources, terrestrial resources, recreation and land use, cultural resources, environmental justice, and subsistence resources may be affected by the proposed action and action alternatives. We have not identified any substantive issues related to aesthetic resources. We present our recommendations in section 5.1, *Comprehensive Development and Recommended Alternative*.

3.3.1 Geology and Soils

3.3.1.1 Affected Environment

General

The project is located within the Kodiak Mountains portion of the Pacific Border Ranges Physiographic Province of Alaska (Wahrhaftig, 1965). The area is characterized by glaciated peaks with summit altitudes between 2,000 and 4,000 feet. This region is considered to be generally free of permafrost except where isolated masses of permafrost may occur at high altitudes and in lowland areas where ground insulation is high, such as peat bogs and swamps (Ferrains, 1965).

The upper part of the project area (from the powerhouse to the intake) is typical of the mountainous regions of Kodiak Island. Active erosion is evident at the base of the steep talus slopes. The soils are shallow (1 to 2 feet deep) over slate and sandstone. The small depressions and valleys in the area fill with water and peat to form wetlands (U.S. Department of the Interior, Map MF 674). In the lowlands, beginning at the access trail to the powerhouse, the area consists of alluvial deposits overlain by several feet of a mixed organic and gravel soil. Wetlands are also common in these areas with moss and peat overlying soil and gravel. Active erosion is not evident in these areas.

Seismology

Southcentral Alaska, including the Kodiak Island area, is located in an area of active seismicity caused by the subduction of the Pacific Plate of the earth's crust under the North American Plate. The collision of these plates produces motion in Southcentral Alaska along several active faults. The Contact Fault, which trends northeast to southwest, is present within 10 miles of the project.

Potential Geological and Soil Hazards

Landslides, avalanches, and erosion are a concern in mountainous areas of Kodiak Island, including Old Harbor. Although landslides and avalanches may occur on lesser slopes, they typically occur on slopes greater than 50 percent (27 degrees) (Wildfirenews.com 2005). Damage from these hazards occurs on the slopes as well as areas at the base of the slopes where the rubble and snow accumulate. Erosion may occur along stream banks and along steep slopes forming taluses.

3.3.1.2 Environmental Effects

Land-disturbing activities associated with construction of the project could cause erosion and sedimentation. During operation, the additional flow being diverted to Lagoon Creek could also increase erosion.

AVEC proposes the following measures to reduce potential effects on geological and soil resources:

- Pile overburden and soil from excavations outside of wetlands and in such a way as to limit erosion;
- Develop a storm water pollution prevention plan for the collection and routing of storm water during construction activities to minimize erosion; and
- Develop an erosion and sedimentation control plan to decrease erosion and sedimentation during construction and operation of the project, including turbidity monitoring during construction.

Alaska Fish and Game recommends (10(j) recommendation 11) that AVEC consult fish and wildlife agencies and develop a plan to control erosion and sediment that includes measures to control slope instability, revegetate disturbed areas, and minimize the quantity of sediment introduced into Lagoon Creek resulting from project construction. Alaska Fish and Game also recommends (10(j) recommendation 12) that AVEC take daily water samples during construction and analyze them for turbidity. Alaska Fish and Game recommends the water samples be taken daily in Lagoon Creek and tributaries, both upstream and downstream of all construction activities and discharge points for overland flows that cross construction areas and discharge into Lagoon Creek or tributaries. To control storm water pollution, FWS condition 33 specifies that excavation dewatering and storm-water sedimentation control measure be used to meet the requirements of a Construction General Permit issued by the U.S. Environmental Protection Agency or the Alaska Department of Environmental Conservation. To the erosion and sedimentation control plan, FWS condition 51 specifies that initial construction activities must occur in wintertime conditions when the ground is frozen to minimize sedimentation and other potential adverse effects to wetlands.

In a letter filed on September 23, 2014, AVEC stated that it agrees with Alaska Fish and Game's sediment and erosion recommendations.

Commission Staff Analysis

Land-disturbing activities associated with construction of the proposed project could cause erosion and sedimentation, including increased erosion of stream banks along Lagoon Creek and Lagoon Creek Tributary. The proposed release of more flow into Lagoon Creek Tributary and Lagoon Creek could increase the potential for bank erosion of the silty soils along the streams. The steep slopes and large amount of basin precipitation make the streams especially prone to added erosion effects if a control plan is not in place and properly implemented. AVEC's proposal and Alaska Fish and

Game's recommendation to develop an erosion and sediment control plan and monitor turbidity during project construction would allow AVEC to quickly identify and respond to any increases to turbidity and ensure that any effects from the construction and operation of the project on erosion and sedimentation would be minimized.

We discuss the need for a revegetation plan in Section 3.3.4, Terrestrial Resources, and make our recommendation regarding revegetation measures in Section 5.2, Comprehensive Development and Recommended Alternative.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Water Quantity

Mountain Creek

Mountain Creek is approximately 12.35 miles long from its headwaters to Barling Bay. Its headwaters are at about 1,800 feet msl elevation and drainage area is approximately 8 square miles. Mountain Creek is divided into four sub-basins: 1) East Fork drainage (3.43 miles long with drainage area of 2.80 square miles); 2) West Fork drainage (3.26 miles long with drainage area of 1.79 square miles); 3) Lower drainage (2.75 miles long with drainage area of 2.70 square miles); and 4) Mouth drainage (2.91 miles long with drainage area of 0.60 square miles). Mountain Creek empties into the tidally-influenced reach of Barling Bay Creek anywhere from 0 to 300 feet upstream of the mouth of Barling Bay Creek, depending on the current courses of the two streams' channels (Figure 3).

A synthetic hydrology dataset for East Fork of Mountain Creek was constructed using data from gages on Mountain Creek, East Fork of Mountain Creek, and twelve other sites on Kodiak Island (Polarconsult, 2010). Standardized flow (cfs/square mile) was higher and more variable for East Fork of Mountain Creek than for most other locations analyzed. Three potential explanations were offered: 1) East Fork of Mountain Creek is located in southeast Kodiak Island, which tends to be wetter than other areas of the island; 2) data used to predict flow for East Fork of Mountain Creek were collected during wetter-than-average years; and 3) the flow rating curves have poor precision at low flows. To compensate for positive bias and high variability in East Fork of Mountain Creek data, East Fork of Mountain Creek data were adjusted downward using U.S. Geological Survey (USGS) flow data from other Kodiak Island sites as a benchmark for correction factors. AVEC presented these adjusted data in their final license application (FLA) as their best estimate of East Fork of Mountain Creek flow (Figure 4).

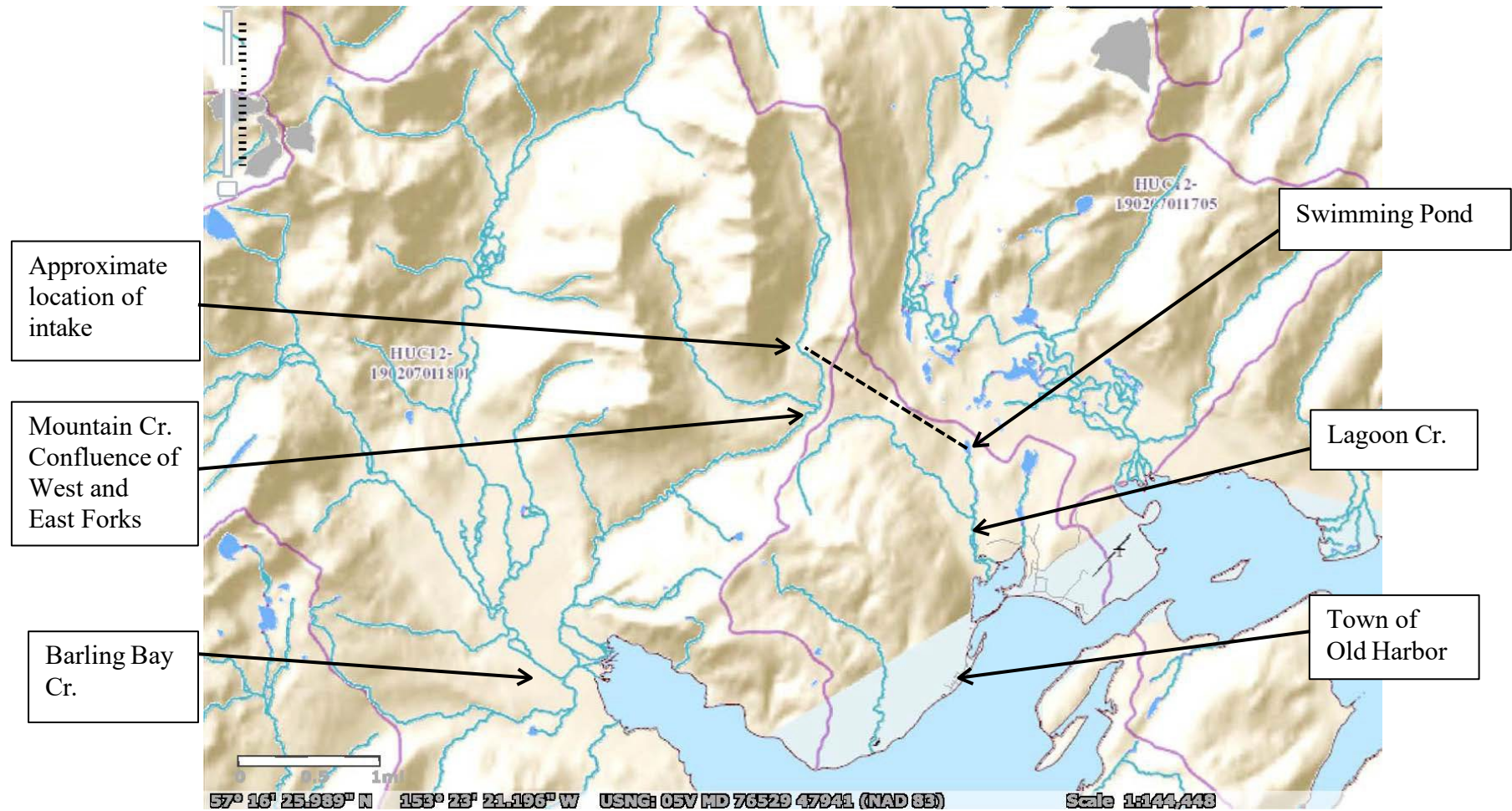


Figure 3. Approximate location of proposed project in relation to surrounding natural features, including Barling Bay-Mountain Creek and Lagoon Creek watersheds. Purple lines denote watershed boundaries. Figure 1 shows exact locations of project features. (Source: USGS National Hydrography Dataset <http://viewer.nationalmap.gov/viewer/nhd.html?p=nhd>, accessed on November 25, 2014).

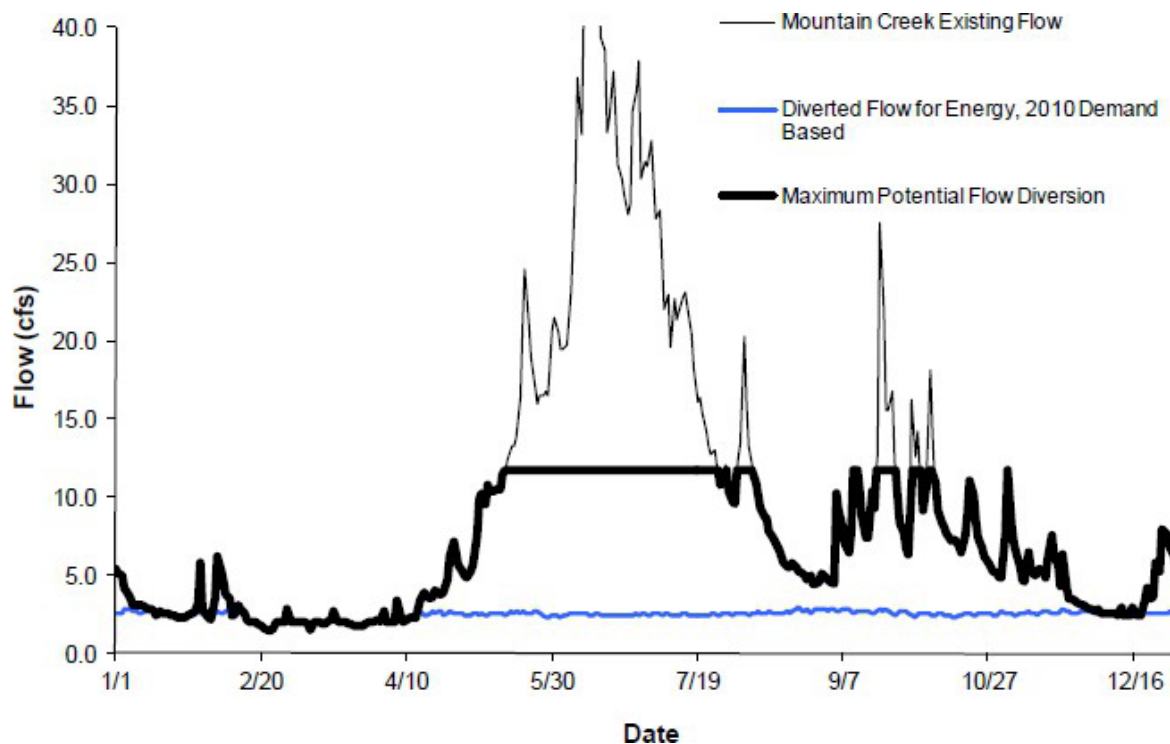


Figure 4. Median daily flow estimated at proposed intake site on East Fork of Mountain Creek, flow proposed for diversion under 2010 energy demands, and maximum potential flow diversion (11.8 cfs) proposed by the applicant with two turbines in operation. This environmental analysis considers operation of only one turbine with a maximum flow diversion of 5.9 cfs (Source: AVEC, 2013).

Stream flow in East Fork of Mountain Creek at the site of the proposed intake ranges from approximately 3 to 100 cfs with a mean annual flow of approximately 14.2 cfs (AVEC, 2013). The estimated average monthly stream flow ranges from 2 to 37 cfs with higher flows in May through July and September through October (Figure 4; Table 3-1). The East Fork contributes approximately 40 to 50 percent and the West Fork contributes approximately 50 to 60 percent of their combined flows (ADNR, 1996). Flows at the site of the proposed diversion on East Fork of Mountain Creek provide approximately 10 to 12 percent of the flow on Mountain Creek at the point that is considered to be the upper extent for anadromous fish distribution (AVEC, 2013).

In the mainstem of Mountain Creek the upper reaches have higher flow than lower reaches (Figure 5). The lower three miles of Mountain Creek, from the canyon to the mouth, typically lack surface flow from mid- to late-summer through the fall because water exiting the canyon flows subsurface within 0.3 miles. Mountain Creek flows into Barling Bay Creek, which has a drainage area of approximately 16 miles and maintains surface flow throughout the summer and fall (AVEC, 1998, Polarconsult, 2010; Table 3-1).

Table 3-1. Average monthly flow, average maximum potential water diverted, and average diversion based on 2010 demands (cfs) estimated for proposed intake site on East Fork of Mountain Creek (Source: AVEC, 2013, methods detailed in Polarconsult, 2010; modified by Commission Staff).

Month	Average Existing Flow at Intake	Average Maximum Potentially Diverted by One Turbines	Average Maximum Potentially Diverted by Two Turbines	Average Diverted Based on 2010 Demand
January	3.1	3.1	3.1	2.6
February	2.6	2.6	2.6	2.2
March	2.0	2.0	2.0	2.0
April	3.5	3.5	3.5	2.4
May	13.7	5.9	10.6	2.5
June	37.0	5.9	11.8	2.5
July	19.7	5.9	11.6	2.5
August	8.1	5.9	7.6	2.6
September	10.2	5.9	8.9	2.7
October	9.0	5.9	8.5	2.5
November	5.4	5.4	5.4	2.6
December	3.8	3.8	3.8	2.5

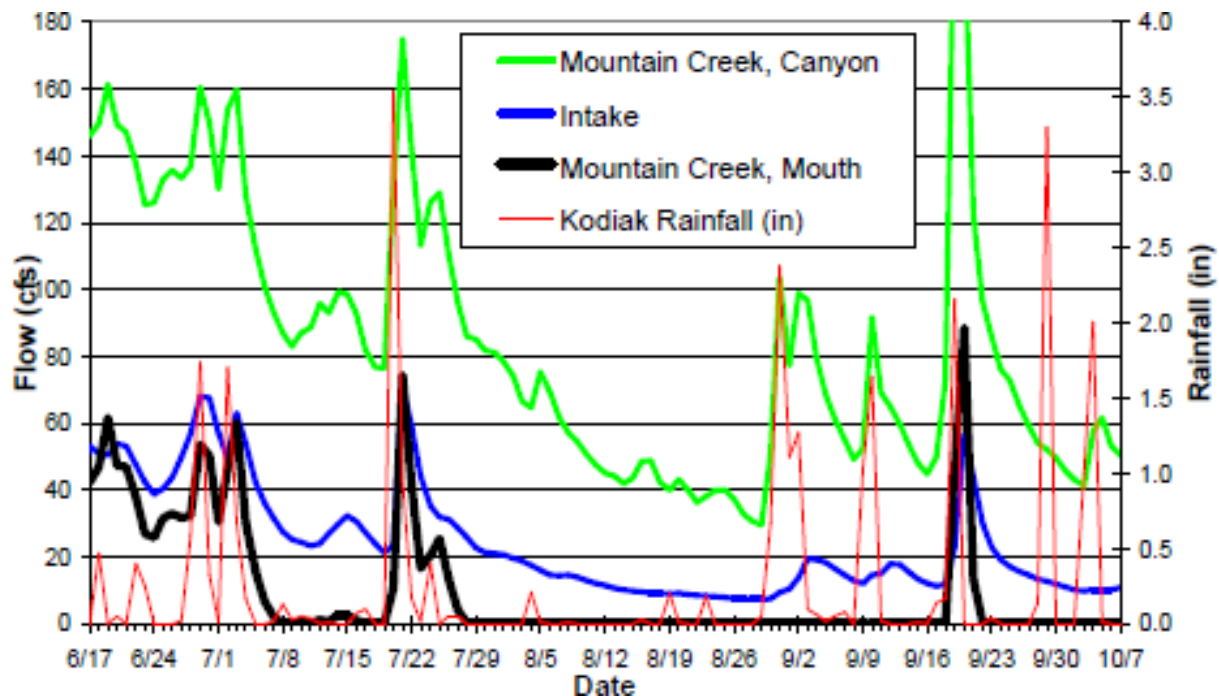


Figure 5. Streamflow measures (1998) at the proposed intake location on East Fork of

Mountain Creek and the mouth and canyon on Mountain Creek. Note that 1998 was the wettest year on record since 1931 (Source: Polarconsult, 2010).

Lagoon Creek

The Lagoon Creek drainage is located west of the city of Old Harbor, with headwaters at approximately 700 feet msl elevation. The drainage consists of the approximately 0.80-mile-long Lagoon Creek Tributary, which would receive project flows, and the approximately 4.51-mile-long mainstem Lagoon Creek.

Lagoon Creek Tributary drains seasonally from Swimming Pond, an approximately 3.9-acre pond with an estimated maximum depth of 15 feet, estimated mean depth of 8 feet, and approximate shoreline length of 1,665 feet. Swimming Pond has no inflow or outflow except during high runoff events, and its level fluctuates with ground water levels (Figure 6).

Lagoon Creek Tributary is primarily spring-fed, resulting in consistent flows that rise with precipitation inputs (ADNR 1996). Beaver activity has created ponding in the middle reaches of Lagoon Creek Tributary. Lagoon Creek empties into the tidally-influenced Salt Lagoon, which is also fed by a second small creek. Salt Lagoon occupies about 82 acres and drains through a culvert into the Sitkalidak Strait. During low tides Salt Lagoon drains rapidly through the culvert, while during high tides water flows back into Salt Lagoon through the culvert.

Quantitative flow data are largely unavailable and only a few flow measurements are available for Lagoon Creek Tributary. On October 16, 2010, discharge at the point of groundwater upwelling approximately 1,000 feet downstream from Swimming Pond was 0.3 cfs; discharge below the beaver dam in lower reaches was 3.2 cfs; and discharge near the mouth of the Lagoon Creek mainstem was 5.3 cfs.



Figure 6. Photo of intermittent outlet channel (denoted by red line) on south side of

Swimming Pond (Love, 2011)

Water Quality

The Alaska Water Quality Standards designate freshwater and marine uses for which water quality must be protected and designate levels of degradation that may not be exceeded as a result of human activity (Table 3-2; Alaska Administrative Code Title 18, Chapter 70, revised April, 2012). No waterbodies associated with this project are listed as Section 303(d) impaired by the State of Alaska (Alaska DEC, 2014). There are no existing designated uses of water from Mountain Creek. Surface water from Lagoon Creek is the drinking water source for Old Harbor.

Mountain Creek

AVEC (2013) states that attempts to monitor temperature over time have been unsuccessful and so water temperature data for Mountain Creek are lacking. Water temperature was 43 degrees Fahrenheit (°F) and dissolved oxygen was 6.8 parts per million (ppm) in a grab sample taken near the proposed intake location in August, 1996 (Polarconsult, 1996, Alaska DEC, 2012). These values are within the State's water quality standards. Other previous measurements for metals, biochemical oxygen demand, nitrate, nitrite, and phosphorus have been within state drinking water quality standards (Table 3-2; Polarconsult, 1996, Alaska DEC, 2008).

Lagoon Creek

AVEC recorded water temperature from August, 2010 to August, 2011 in Swimming Pond and Lagoon Creek Tributary at the beaver pond near the groundwater upwelling area (Figure 7). Temperatures ranged from 17 to 73 °F at the surface and 32 to 72°F at the bottom of Swimming Pond. Measurements below freezing in winter suggest that the temperature logger was measuring air rather than water temperature for part of the year. Water temperatures at the beaver pond in Lagoon Creek Tributary ranged from 33 °F in February to 60 °F in July. Summer water temperatures were approximately 40 to 55 °F and winter temperatures were approximately 33 to 40 °F. Winter temperatures were fairly stable and consistently above freezing, suggesting groundwater influence.

Table 3-2. Water quality standards for freshwater relevant to the proposed project (Source: Alaska DEC, 2012).

Constituent	Criteria	
	Growth and propagation of fish, shellfish, other aquatic life, and wildlife	Drinking Water
Turbidity	May not exceed 25 nephelometric turbidity units (NTU) above natural conditions. For all lake waters, may not exceed 5 NTU above natural conditions.	May not exceed 5 NTU above natural conditions when the natural turbidity is 50 NTU or less, and may not have more than 10% increase in turbidity when the natural turbidity is more than 50 NTU, not to exceed a maximum increase of 25 NTU.
Temperature	May not exceed 20 °C (68 °F) at any time. The following maximum temperatures may not be exceeded, where applicable: migration routes 15 °C (59 °F); spawning areas 13 °C (55 °F); rearing areas 15 °C (59 °F); egg & fry incubation 13 °C (55 °F). For all other waters, the weekly average temperature may not exceed site-specific requirements needed to preserve normal species diversity or to prevent appearance of nuisance organisms.	May not exceed 15 °C (59 °F).
Dissolved Gas	DO must be greater than 7 milligrams per liter (mg/l) in waters used by anadromous or resident fish. In no case may DO be less than 5 mg/l to a depth of 20 cm in the interstitial waters of gravel used by anadromous or resident fish for spawning (see note 2). For waters not used by anadromous or resident fish, DO must be greater than or equal to 5 mg/l. In no case may DO be greater than 17 mg/l. The concentration of total dissolved gas may not exceed 110% of saturation at any point of sample collection.	DO must be greater than or equal to 4 mg/l.

Table 3-2, continued.

Constituent	Criteria	
	Growth and propagation of fish, shellfish, other aquatic life, and wildlife	Drinking Water
pH	May not be less than 6.5 or greater than 8.5. May not vary more than 0.5 pH unit from natural conditions	
Sediment	The percent accumulation of fine sediment in the range of 0.1 millimeter (mm) to 4.0 mm in the gravel bed of waters used by anadromous or resident fish for spawning may not be increased more than 5% by weight above natural conditions (as shown from grain size accumulation graph). In no case may the 0.1 mm to 4.0 mm fine sediment range in those gravel beds exceed a maximum of 30% by weight (as shown from grain size accumulation graph). In all other surface waters no sediment loads (suspended or deposited) that can cause adverse effects on aquatic animal or plant life, their reproduction or habitat may be present.	No measurable increase in concentration of settleable solids above natural conditions, as measured by the volumetric Imhoff cone method.

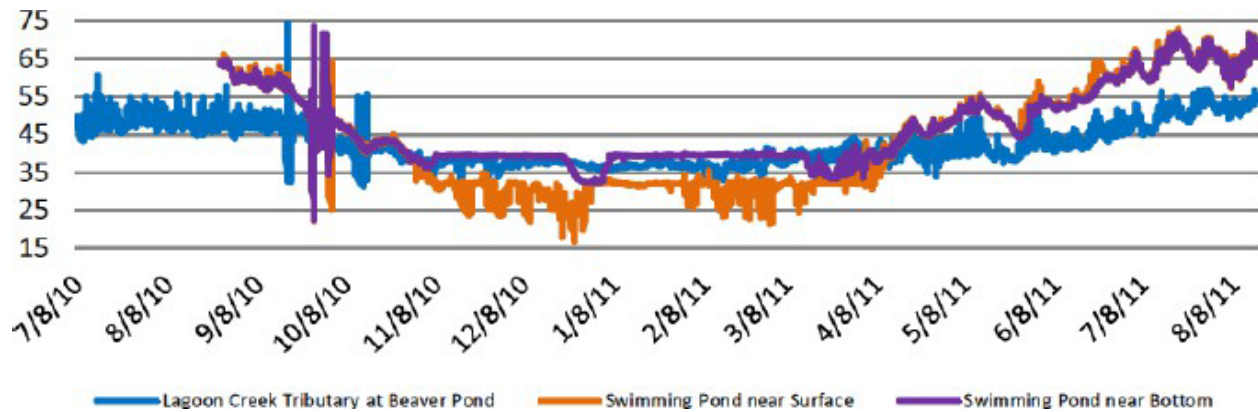


Figure 7. Water temperature (°F) in Swimming Pond and Lagoon Creek Tributary (Source: AVEC, 2013).

Love (2011) reported additional water quality data gathered during fish surveys in Lagoon Creek. At Swimming Pond, water temperature was 41°F and dissolved oxygen was 11.5 to 12.2 mg/L in a grab sample taken in October, 2010. In Lagoon Creek Tributary, water temperature was 40 to 42 °F, dissolved oxygen was 10.0 to 11.7 mg/L, and pH was 6.12 to 6.15 in grab samples taken in October, 2010. In August, 1996, water temperature sample was 53 °F and dissolved oxygen concentration was 7.5 ppm (Polarconsult, 1996).

In the summer, water temperatures in Swimming Pond sometimes exceeded State water quality standards for drinking water, aquaculture, and for the growth and propagation of fish, shellfish, other aquatic life, and wildlife (Table 3-2). Water temperatures in Lagoon Creek Tributary always met State water quality standards, with the exception of one day in July, 2010, when the maximum temperature criterion for drinking water was exceeded. Alaska DEC (2008, 2012) reported that values measured for temperature, dissolved oxygen, metals, biochemical oxygen demand, nitrate, nitrite, and phosphorus met state drinking water quality standards.

Fisheries Resources

Mountain Creek

Seasonal lack of surface flow limits fish distribution in Mountain Creek. The headwaters are steep and hydrologically responsive to precipitation. The east and west forks converge at an elevation of approximately 500 feet, below which Mountain Creek drops through a steep canyon for 2 miles. Immediately below the canyon, about 3 river miles from the mouth, the channel changes from a high-gradient, bedrock- and boulder-dominated system to a low-gradient, gravel-dominated system where the stream flows subsurface in summer to fall, creating a barrier to fish.

Coho salmon (*Oncorhynchus kisutch*), pink salmon (*Oncorhynchus gorbuscha*), and Dolly Varden (*Salvelinus malma*) occur in the lowest three miles and chum salmon (*Oncorhynchus kisutch*) occur in the lowest two miles of Mountain Creek (Alaska Fish and Game, 2013). Alaska Fish and Game considers the limit for anadromous fish habitat to be near where the flow runs subsurface for much of the year. During salmon surveys in August and September, 1996, and in August and October, 1998, no fish were found above about three miles upstream of the mouth of Mountain Creek because there was no surface flow above this point. Fish have not been found in the vicinity of the proposed intake (Love, 2011, AVEC, 2013).

No recreational or commercial fishing occur in East Fork of Mountain Creek. East Fork of Mountain Creek flows into Barling Bay Creek, which has surface flow throughout the summer and fall and supports large populations of Pacific salmon. Commercial fishing occurs in the ocean around Kodiak Island and so freshwater fish production in Mountain Creek may support commercial fisheries in the region.

Lagoon Creek

Aquatic habitat characteristics in the Lagoon Creek system are considered to be excellent for juvenile salmon rearing. Swimming Pond is seasonally connected to Lagoon Creek Tributary by an ephemeral and undefined outflow channel (Figure 7) that flows to a groundwater upwelling zone with a defined channel, about 1,100 feet from Swimming Pond. Just downstream, a perennial section less than 0.5 mile long is characterized by low energy and low flow pools with mud, silt, and sand substrate. Riparian vegetation is dominated by alder, willow, and poplar, which shade the stream and contribute woody debris to the channel. Lagoon Creek Tributary's middle reaches are influenced heavily by a large beaver dam and associated ponds. In the short (less than 0.5 mile) section between the beaver dam and Lagoon Creek Tributary's confluence with Lagoon Creek, the stream has a meandering, pool and riffle morphology with substrate dominated by silt/sand in pools and gravel/cobble in riffles. Riparian vegetation in the lower section is largely herbaceous, with less shading and woody debris inputs than in upper reaches (Love, 2011).

The mainstem of Lagoon Creek does not have consistent spring input and occasionally goes dry. During fish surveys in 1996, a 1-mile-long section of Lagoon Creek lacked surface flow (Love, 2011, AVEC, 2013). Nonetheless, juvenile rearing habitat is described as abundant and is estimated to be three to five times more abundant in Lagoon Creek than in Lagoon Creek Tributary.¹⁵

¹⁵ In a letter filed to the Commission on October 30, 2014, Alaska Fish and Game stated "Based on additional information obtained from discussions with staff with specific knowledge of the Lagoon Creek watershed, there appears to be three to five

Lagoon Creek and Lagoon Creek Tributary support Dolly Varden and spawning coho, chum, and pink salmon (Alaska Fish and Game, 2013). Coho, chum, and pink salmon all spawn in late-summer to fall and rely on adequate stream flows and substrate to support spawning and egg incubation over the winter. Detailed, site-specific data about abundance, distribution, life history characteristics, and habitat for fish in Lagoon Creek Tributary are not available.

Love (2011) described the results of juvenile trapping and visual spawning surveys in Lagoon Creek Tributary and Swimming Pond, in August and October, 2010. They identified Dolly Varden and stickleback (species not reported) in Swimming Pond. There was no surface flow, and therefore no fish, from Swimming Pond to the groundwater upwelling zone. They found juvenile coho and Dolly Varden from the groundwater upwelling zone downstream to the mouth of Lagoon Creek Tributary and in Lagoon Creek. They described Lagoon Creek as a productive rearing habitat for coho salmon. They did not observe live adult fish during visual spawning surveys but did find approximately 150 carcasses on the banks of Lagoon Creek within 400 feet of the mouth. The carcasses were difficult to identify but thought to be chum salmon. They did not observe chum or pink salmon.

No recreational or commercial fishing occurs in Swimming Pond or Lagoon Creek Tributary. Commercial fishing occurs in the ocean around Kodiak Island and so freshwater fish production in Lagoon Creek may support commercial fisheries in the region.

Essential Fish Habitat

The Magnuson-Stevens Fishery Conservation and Management Act requires federal agencies to consult with the NMFS on actions that may adversely affect EFH. Salmon EFH includes all “waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (50 CFS 600.10). Swimming Pond, Lagoon Creek Tributary, and Saltwater Lagoon provide EFH for anadromous salmonids. These waterbodies are described as providing excellent spawning and rearing habitat for coho salmon and pink and chum salmon and also to provide habitat for chum and pink salmon (Alaska Fish and Game, 2014, NOAA Fisheries, 2014).

times more rearing area in Lagoon Creek than in the tributary.”

3.3.2.2 Environmental Effects

Operation Effects on Water Quantity in East Fork of Mountain Creek and Mountain Creek

AVEC proposes to construct a diversion/cut off weir in East Fork of Mountain Creek to divert water for project operation. The weir would not create any significant impoundment of water and excess water would flow over the spillway. The project would divert all water available up to the hydraulic capacity of 5.9 cfs.

During project operation, water diversions at the project intake would affect the natural flow regime in East Fork of Mountain Creek and in the mainstem of Mountain Creek upstream of the reach at RM3 where Mountain Creek flows subsurface for much of the year (Figure 8). Given a proposed diversion rate of up to 5.9 cfs, all streamflow would be removed at the intake location for much of the winter and spring (Figure 4). This would dewater East Fork of Mountain Creek potentially to the confluence with West Fork Mountain Creek. It is not known if tributary or groundwater inputs exist that would provide flow in East Fork of Mountain Creek between the diversion site and the confluence with West Fork Mountain Creek.

AVEC asserts that project impacts on flow in the lower reaches of Mountain Creek, which provide seasonal habitat for anadromous salmon, would be negligible. AVEC does not propose environmental flows or other measures to protect aquatic habitat and fish in Mountain Creek.

Commission Staff Analysis

The proposed diversion occurs at high elevation and would remove all flows from East Fork of Mountain Creek for much of the winter and spring; however, the proposed diversion represents a small percent of water available at the upper end of the anadromous reach in Mountain Creek. The consequences of proposed water withdrawals on stream flow downstream at the canyon on Mountain Creek vary depending on season. In May through July, when natural flow peaks, the proposed maximum diversion of 5.9 cfs would reduce flows at the canyon by about 2 to 12 percent. During August through April, the proposed diversion would reduce flows at the canyon by up to approximately 25 percent (Figure 8). Because of the small volumes diverted relative to mainstem flows, and apparent influence of ground water – surface water interactions, we do not expect major changes in the hydrograph for the lower reaches of Mountain Creek that support anadromous fish.

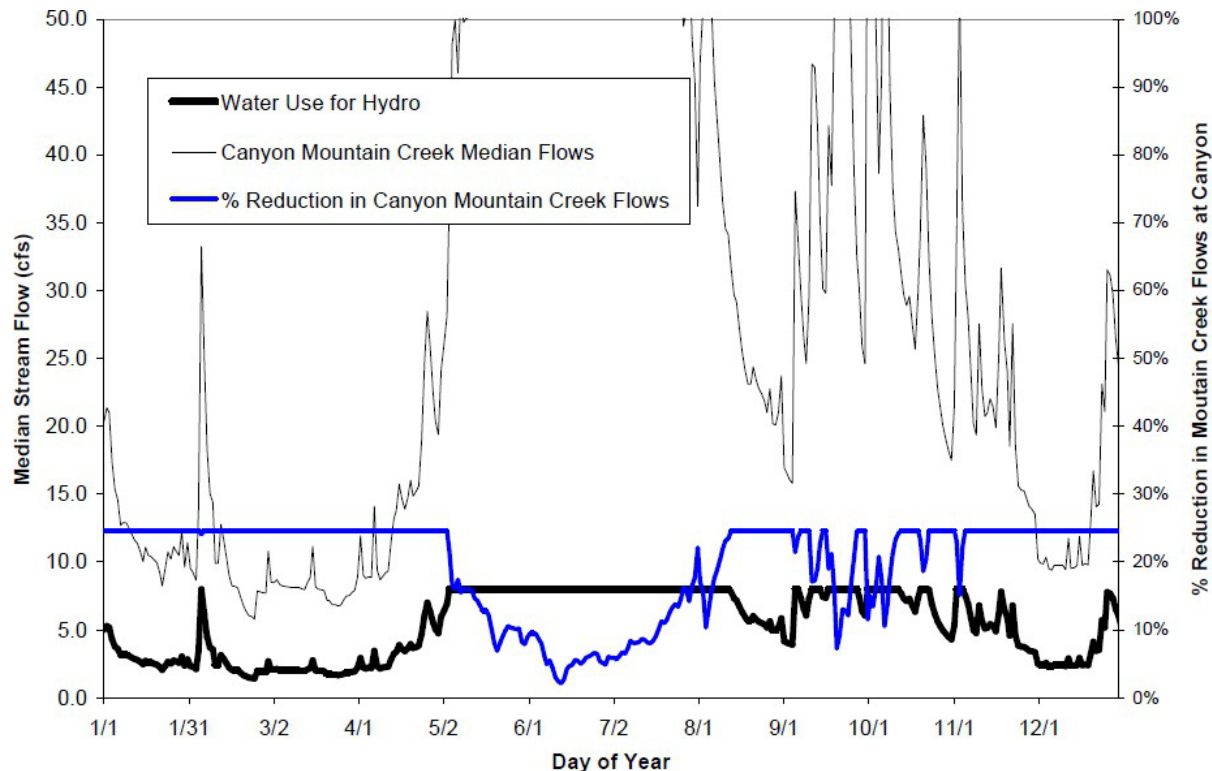


Figure 8. Hydrograph for East Fork of Mountain Creek, and percent reduction for proposed project withdrawals. Estimated hydrograph for Mountain Creek at the canyon, estimated water withdrawal from East Fork of Mountain Creek for the project with two turbines (maximum 11.8 cfs) operating, and consequences for stream flow in terms of percent reduction in stream flow at the Mountain Creek canyon. (Source: Polarconsult, 2010).

Operation Effects on Water Quantity in Swimming Pond, Lagoon Creek Tributary, and Lagoon Creek

AVEC proposes to construct a 10,150-foot-long penstock and transfer water from the intake at 850 feet elevation in the Mountain Creek watershed to the powerhouse at 85 feet msl elevation in the Lagoon Creek watershed. AVEC would construct a tailrace culvert and channel to convey project flows approximately 700 feet from the powerhouse to Swimming Pond.

Operation of the project and diversion of water would cause long-term increases in flow in Swimming Pond, Lagoon Creek Tributary, and Lagoon Creek (Table 3-3). Swimming Pond, which has no apparent outflow for much of the year currently, would have a perennial inflow and outflow carrying project flows of up to 5.9 cfs. There are no proposed or recommended environmental measures related to the additional flow through Swimming Pond.

During project operation, water diversions at the project intake would affect the natural flow regime in the Mountain Creek and Lagoon Creek drainages. The project would divert all flows up 5.9 cfs (project flows would not follow electrical demand in Old Harbor and there would be no peaking). Project flows would increase discharge in Lagoon Creek Tributary and would cause the currently-ephemeral reach of Lagoon Creek to become perennial.

AVEC proposes to build a bypass at the powerhouse to route project flows to the tailrace during planned or unintentional shutdowns. AVEC did not provide detailed design or operations information about the bypass system in their FLA.

In a letter filed with the Commission on October 30, 2014, Alaska Fish and Game expressed concern that project flows be adequately controlled. In response, AVEC proposed to install a flow control valve in the penstock to restrict the quantity of water diverted. In addition, AVEC proposed to limit ramping rates to 5 cfs per hour.

Commission Staff Analysis

The proposed project would increase surface outflows from Swimming Pond to Lagoon Creek Tributary. Project flows would presumably flow into and out of Swimming Pond as surface flow, and would increase flows in the headwaters of Lagoon Creek Tributary by the amount of water diverted (between 1 and 5.9 cfs). This increase in surface flow between Swimming Pond and Lagoon Creek Tributary would create perennial flow in an area that currently has a small, undefined channel with ephemeral flows (Figure 6). Using flow measurements of 0.3 cfs taken at the downstream end of the proposed constructed channel on October 16, 2010 as a benchmark, project flows would increase discharge in Lagoon Creek and Lagoon Creek Tributary substantially (Table 3-3).

Table 3-3. Estimated increase in stream flow on Lagoon Creek Tributary and Mainstem for maximum project flows (+5.9 cfs). “Natural stream flow” represents AVEC measurements on October 16, 2010.

	Natural stream flow	+5.9 cfs
Tributary groundwater upwelling zone	0.3	6.2
Tributary below beaver dam	3.2	9.1
Mainstem near mouth	5.3	11.2

Shutdowns at hydropower projects occur in both planned and unintentional maintenance situations. Rapid changes in streamflow could affect aquatic resources in Lagoon Creek Tributary adversely. Effects of flow fluctuations on stream habitat can include stream bank destabilization, changes in sediment size distribution, and changes in abundance and community structure of aquatic invertebrates (Kroger, 1973, Brusven et

al., 1974, Gislason, 1980, Parasiewicz et al., 1996). Effects of flow fluctuation on fish include dewatering of redds and related increases in egg mortality, stranding (Hunter 1992), and blockage of migratory corridors (Bain et al 1988). Emergent fry can be particularly sensitive to fluctuating flow conditions and may be forced into main channel habitats where they are subject to increased predation (Underwood and Bennett 1992).

Under present conditions, fish are regularly stranded in Swimming Pond due to the ephemeral nature of the outflow channel. While project operations would decrease the amount of time that Swimming Channel is isolated from Lagoon Creek Tributary, fish stranding in Swimming Pond could still occur during periods of low flow.

A flow control mechanism would ensure that proposed flow levels are not exceeded. After project operations commence, a bypass system that routes project flows to the tailrace would provide for continuity of flow downstream when the turbine must be shut down for maintenance or other reasons. During powerhouse start-up following either an intentional or unintentional powerhouse shutdown, or during flow changes, adhering to ramping rates of 5 cfs per hour would avoid rapid dewatering of Lagoon Creek Tributary and minimize associated adverse effects on aquatic resources. A plan to monitor flows and ramping rates for the project would help ensure that project flows and ramping rates do not exceed these limits.

Construction Effects on Water Quality in East Fork of Mountain Creek, Swimming Pond, and Lagoon Creek Tributary

Excavation in or near waterbodies would occur during construction. Construction of the diversion structure and intake facilities would cause short-term adverse effects on aquatic resources in East Fork of Mountain Creek, and construction of the tailrace and constructed channel would cause short-term adverse effects on aquatic resources in Swimming Pond and Lagoon Creek Tributary.

To protect aquatic resources during construction, AVEC proposes to implement best management practices; develop storm water pollution prevention and erosion and sediment control plans; limit motor vehicle use of the intake access trail; pile overburden outside of wetlands and in such a way as to prevent erosion; use a cofferdam to prevent water in Swimming Pond from flowing into the Lagoon Creek Tributary during construction; revegetate excess soil piles and disturbed areas with native seed mix; develop a fuel and hazardous substance spill plan; and conduct construction work during a period recommended by Alaska Fish and Game to avoid conflicts with spawning and rearing requirements of fish. When building the constructed channel, AVEC proposes to operate excavation equipment in the ephemeral channel but not in Swimming Pond or in the perennial section of Lagoon Creek Tributary. AVEC also proposes to employ a qualified environmental compliance monitor during project construction to ensure compliance with license requirements.

AVEC proposes to develop and implement a fuel and hazardous spill plan to reduce potential effects of accidental spill. FWS conditions 32, 38, and 53 specify that the fuel and hazardous spill plan must include a spill prevention control and countermeasure section, include a pre-project sampling and analysis of hazardous substances, and include a prohibition on storing oil/diesel facilities in the right-of-way area.

Commission Staff Analysis

Even with AVEC's proposed measures to minimize erosion and control stormwater, construction would be likely to cause a short-term increase in turbidity from disturbance of the substrate in East Fork of Mountain Creek, Swimming Pond, and Lagoon Creek Tributary. Short-term increases in turbidity could exceed the state standards for drinking water or for the growth and propagation of fish, shellfish, other aquatic life, and wildlife (Table 3-2). Sediment deposition on redds could decrease egg to larvae survival, and increased turbidity could affect salmon downstream of construction sites by increasing physiological stress (Redding et al., 1987) and lowering feeding success (Barrett et al., 1992). Elevated turbidity levels downstream of construction sites would be temporary and normal levels should return a short time after sediments flush through higher velocity areas or deposit in lower velocity areas.

A spill prevention control and countermeasure plan is required to be in place for any facility where unburied storage capacity exceeds 1,320 gallons of oil or a single container has a capacity in excess of 660 gallons.¹⁶ The spill prevention plan proposed by AVEC would provide a reference to procedures and notifications in case of spills to reduce the possibility of oil or other hazardous substances reaching the Refuge or the Mountain Creek or Lagoon Creek systems if a spill occurs. FWS condition 53 would prohibit AVEC from locating oil or diesel storage facilities in the right-of-way permit area. FWS condition 38 would require AVEC to develop a pre-project sampling and analysis plan of hazardous substances (unless waived by the Refuge Manager). FWS condition 32 would require AVEC to have sorbent material in sufficient quantity on hand at all times. Incorporating FWS conditions 53, 38, and 32 into the development and implementation of the spill plan after consultation with Alaska Fish and Game, FWS, and other interested agencies would minimize the potential for petroleum products to enter the project waters in the event of a spill.

At a minimum, an effective plan would include: (1) a spill prevention control and countermeasure section (FWS condition 32); (2) a pre-project sampling and analysis section for hazardous substances, (FWS condition 38); (3) a requirement to avoid placing oil/diesel storage facilities in the right-of-way permit area (FWS condition 53); (4) an

¹⁶ 40 C.F.R. §112.1 of the U.S. Environmental Protection Agency's regulations.

outline of AVEC's procedures for reporting and responding to releases of hazardous substances; (5) an outline of AVEC's procedures for timely identification and remediation of spills; (6) the identification and maintenance of a cache of spill cleanup equipment sufficient to contain any spill from the proposed project; (7) a provision for AVEC to provide a report specifying the location of spill clean-up equipment and the location, type, and quantity of oil and hazardous substances stored in the proposed project area; and (8) a provision for AVEC to inform Alaska Fish and Game, FWS, and other requesting agencies as to the nature, time, date, location, and action taken for any spill affecting the project.

AVEC's proposal to employ an environmental compliance monitor would help to ensure that the proposed best management practices, storm water pollution prevention plan, erosion and sediment control plan, and fuel and hazardous substances spill plan are implemented to protect water quality. Limiting motor vehicle use of the intake access trail, piling overburden outside of wetlands, revegetating disturbed areas, and using a cofferdam during construction in Swimming Pond also would minimize effects of erosion and sedimentation. Because all construction-related adverse effects cannot be avoided, conducting construction work during a period recommended by Alaska Fish and Game would help to avoid harm to fish. The environmental compliance monitor would have the authority to stop work or implement additional measures (including modifying the frequency or location of measures specified in the plans for storm water pollution prevention, erosion and sedimentation prevention, and spill of hazardous substances), as needed based on water quality monitoring, which would enable a timely response to any water quality issues identified during construction.

Operation Effects on Water Quality in Swimming Pond and Lagoon Creek Tributary

Transfer of water from high to low elevation in the penstock could cause dissolved gas supersaturation in project outflows. AVEC proposes to design the tailrace in consultation with Alaska Fish and Game, and use a perched or boulder-field-type tailrace that would allow gas concentrations in project outflows to equilibrate with the atmosphere.

Higher flows would likely influence erosion and deposition rates in Lagoon Creek Tributary, which could affect turbidity and presence of fines on spawning substrates.

Project operations could alter water temperature in Swimming Pond and Lagoon Creek Tributary. Water temperatures near the intake on East Fork of Mountain Creek and in Swimming Pond are similar in winter, so a temperature shift in Swimming Pond in winter is not expected. In spring and summer, Swimming Pond and Lagoon Creek Tributary tend to be warmer than water near the intake site, so we expect water temperatures to decrease in Swimming Pond and Lagoon Creek Tributary. The few

available data for East Fork of Mountain Creek suggest that diverted water would be around 40 to 45 °F in summer, while Swimming Pond would be approximately 55 to 70°F and Lagoon Creek Tributary would be approximately 45 to 55°F.

Cold, highly-aerated outflows from the tailrace would likely increase dissolved oxygen concentrations in Swimming Pond, particularly in summer when Swimming Pond is subject to high water temperature.

AVEC asserted in the FLA that water temperature and water quality impacts to Lagoon Creek Tributary would be moderated because flows would be routed through the tailrace and Swimming Pond before entering Lagoon Creek Tributary.

Commission Staff Analysis

The addition of up to 5.9 cfs to the headwaters of Lagoon Creek Tributary would change its hydrologic regime and the channel would experience a period of adjustment. Sedimentation would be most pronounced during and immediately after project construction. Effects on water quality would probably not persist beyond the initial period of channel adjustment, when higher flows could alter historical erosion and deposition patterns. Beaver ponds in the middle reaches of Lagoon Creek Tributary would trap fine sediments and buffer impacts on water quality from erosion in the upper reach. We do not anticipate sediment levels to be elevated long-term.

Water temperatures in Swimming Pond and Lagoon Creek Tributary would be likely to decrease in spring and summer when project outflows would be colder than ambient temperatures in receiving waters. Water temperatures in Swimming Pond and Lagoon Creek Tributary sometime exceed State water quality standards for spawning and rearing in the summer, under natural conditions. Addition of colder project flows would decrease the likelihood that water temperatures in Swimming Pond and Lagoon Creek Tributary would exceed state water quality standards (Table 3-2).

Total dissolved gases could increase in water being transferred in the penstock. A perched or boulder-field-type tailrace would alleviate concerns about dissolved gas supersaturation. The addition of cold, oxygen-saturated water to Swimming Pond would be likely to improve conditions for salmonids, particularly in summer when dissolved oxygen levels decrease naturally. Proposed project operations would not be likely to affect dissolved gas levels below Swimming Pond.

Construction Effects on Fisheries Resources in Lagoon Creek Tributary

Increased turbidity could cause physiological stress in fish and alter behavior of drift-feeding fish. In addition, the movement of fish between Swimming Pond and Lagoon Creek Tributary would be blocked when the cofferdam in Swimming Pond is in

place. To minimize impacts of fish, AVEC proposes to do construction work during a period recommended by Alaska Fish and Game as protective of fisheries resources.

Commission Staff Analysis

Completion of construction work during a period recommended by Alaska Fish and Game to minimize effects on fish and aquatic habitat would reduce effects of sedimentation and potential impacts on aquatic habitat and connectivity. The temporary use of a cofferdam would minimize turbidity and sedimentation in Swimming Pond and Lagoon Creek Tributary during construction.

AVEC's proposal to employ an environmental compliance monitor during construction would help to ensure that the proposed best management practices and storm water pollution prevention and erosion and sediment control plans are implemented to protect fisheries resources. The environmental compliance monitor would have the authority to stop work or implement additional measures as needed.

Operation Effects on Fisheries Resources in Mountain Creek

The proposed project operation would divert all available water from East Fork of Mountain Creek up to the project's maximum hydraulic capacity of 5.9 cfs. This removal of water would potentially adversely affect aquatic habitat in East Fork of Mountain Creek.

Commission Staff Analysis

The project would divert water from the East Fork of Mountain Creek in a reach where fish have not been found. Proposed project operations would remove all flows on East Fork of Mountain Creek between the diversion and the confluence with West Fork Mountain Creek for up to about six months each year for one turbine (Figure 4). Aquatic invertebrates and aquatic habitat in East Fork of Mountain Creek would be affected by removal of these flows.

The proposed diversion represents a small percent of water available at the upper end of the anadromous reach in Mountain Creek. The consequences of the proposed diversion on stream flow downstream at the canyon on Mountain Creek vary with season. In May through July, when natural flow peaks, the proposed maximum diversion of 5.9 cfs would reduce flows at the canyon by about 2 to 12 percent. During August through April, the proposed diversion would reduce flows at the canyon by up to approximately 25 percent (Figure 8). Because of the small volumes diverted relative to mainstem flows, the impacts on aquatic invertebrates and aquatic habitat in East Fork of Mountain Creek would not be expected to translate into measurable effects on fish populations in the anadromous reach downstream.

Operation Effects on Fisheries Resources in Swimming Pond, Lagoon Creek Tributary, and Lagoon Creek

Project operations would alter the flow regime in Lagoon Creek Tributary (Table 3-2) and could affect sediment transport, dissolved oxygen, and water temperature in Swimming Pond, Lagoon Creek Tributary, and mainstem Lagoon Creek. AVEC proposed measures to address potential impacts of flow and water quality on fisheries resources, including installing a flow control mechanism between the intake and the powerhouse to limit project flows; installing a water bypass system in the powerhouse to maintain flows downstream during turbine maintenance; limiting ramping rates to 5 cfs per hour; and designing the tailrace in consultation with Alaska Fish and Game so that project flows are aerated before entering Swimming Pond.

AVEC proposes to develop a tailrace fish exclusion plan in consultation with Alaska Fish and Game to prevent fish from entering the tailrace and becoming injured or killed by swimming into the outlet structure and being struck by the project turbine. The tailrace would be approximately 700 feet long and would route project flows from the powerhouse to Swimming Pond. Fish screens at the powerhouse would restrict fish from passing above the tailrace and into the powerhouse. AVEC has agreed with Alaska Fish and Game's recommendation to design a perched or boulder-field-type tailrace.

The introduction of project flows from Mountain Creek to Lagoon Creek Tributary would cause the upper ephemeral reach of Lagoon Creek Tributary to become more perennial. To accommodate increased flows, AVEC proposes to build a constructed channel on Lagoon Creek Tributary from Swimming Pond approximately 1,100 feet to the area of groundwater upwelling where Lagoon Creek Tributary forms a distinct channel.¹⁷

The constructed channel would be approximately 1,100 feet long, 2-5 feet deep and 8 feet wide with a 3-foot-wide meandering thalweg. The channel would be sloped at 0.4 percent and designed to accommodate a 1.5 year recurrence flow of 15 cfs without bed movement. AVEC would include habitat attributes in the constructed channel that are suitable for salmon spawning and rearing. Gravel of appropriate size for salmon spawning would be used to line the channel and cobbles and logs would be placed to create small pools. AVEC has agreed to develop final design plans for the constructed channel in consultation with Alaska Fish and Game, and has agreed to do all construction work during a time period recommended by Alaska Fish and Game to be protective of aquatic resources. AVEC did not propose ongoing maintenance or monitoring in the

¹⁷ AVEC refers to this constructed section of stream as an "enhanced" channel while we refer to it here as a "constructed" channel because it would differ significantly from the current undefined channel.

constructed channel section of Lagoon Creek Tributary.

Commission Staff Analysis

Fisheries surveys have reported robust populations of spawning and rearing coho salmon in Lagoon Creek Tributary. In spring and summer, Swimming Pond and Lagoon Creek Tributary tend to be warmer than water near the intake site, so we expect water temperatures to decrease in Swimming Pond and Lagoon Creek Tributary. Adult coho return to the Lagoon Creek system in late summer to fall and spawning occurs in fall to winter when water temperature would not be expected to be influenced significantly by project operations. Spring and summer water temperatures would remain cooler in Lagoon Creek tributary due to cold water inflows from the project.

Project-related changes in flow volume and water temperature could affect salmon spawning and rearing habitat in Swimming Pond and Lagoon Creek Tributary but population-level effects on juvenile abundance would be unlikely. Project operation could increase sedimentation, decrease water temperature, alter channel morphology, and increase overall availability of aquatic habitat (NOAA Fisheries, 2011). AVEC's proposal to install a flow control mechanism would ensure that project flows meet license stipulations and would allow ramping rates to be limited to 5 cfs per hour. AVEC's proposal to install a water bypass system in the power house would ensure continuity of flow downstream of the project during turbine maintenance. These measures would prevent adverse effects of rapid changes in flow on aquatic resources.

During freshwater life stages, the feeding, physiology, and behavior of salmon can be affected strongly by water temperature (McCullough, 1999). Decreased water temperatures could decrease the growth and productivity of juvenile salmon and their food sources in Lagoon Creek Tributary. Our analysis of temperature effects is limited by the scarcity of temperature data for East Fork of Mountain Creek. The few available data suggest that diverted water would be around 40 to 45 °F in summer, while Swimming Pond would be approximately 55 to 70 °F and Lagoon Creek Tributary would be approximately 45 to 55 °F. Mixing of cooler project waters would improve conditions for salmonids in Swimming Pond in summer. In addition, routing of project flows through Swimming Pond would likely attenuate project effects on temperature in Lagoon Creek Tributary. Flows to Lagoon Creek Tributary would likely be in the range of 45 to 55 °F, which is within the optimal range of 40 to 60 °F for coho embryos and larvae and near the optimal range of 54 to 57 °F for coho fry and smolts (North Pacific Fishery Management Council, 2012). Therefore, we do not expect temperature changes in Swimming Pond, Lagoon Creek Tributary, or Lagoon Creek to have adverse effects on salmon.

Higher flows in Lagoon Creek Tributary and mainstem Lagoon Creek would increase the availability of spawning and rearing habitat. Any potential negative effects

of colder temperatures on juvenile growth would likely be offset by positive effects of increased habitat space. In addition, Alaska Fish and Game has noted that juvenile coho are mobile and will seek out abundant suitable habitat in other areas of the Lagoon Creek basin.¹⁸ Alaska Fish and Game commented that temperature and biological monitoring would not effectively inform an assessment of project effects and so they rescinded earlier 10(j) recommendations that the applicant conduct temperature and biological monitoring.¹⁹

Fish in Swimming Pond, including coho salmon and Dolly Varden, could be attracted to tailrace discharge flows and enter the proposed 700-foot-long tailrace channel rather than using habitat nearby. If fish screens malfunctioned, fish could enter the powerhouse and be subject to injury or mortality from turbine blade strike.

AVEC's proposal to develop a fish exclusion plan and design a perched or boulder-field-type tailrace in consultation with Alaska Fish and Game would alleviate concerns about fish entering the tailrace. Precluding fish from entering the tailrace channel would minimize the threat of stranding in the tailrace because fish would not have to migrate back to Swimming Pond in situations where the tailrace is dewatered.

Construction of a larger channel would be needed to route project flows from Swimming Pond to the existing channel on Lagoon Creek Tributary. The constructed channel would alter physical habitat and hydrologic connectivity between the two waterbodies.

Construction of this new channel would provide an opportunity to enhance fish habitat. Substrate suitable for coho spawning and incubation could help support these life stages in Lagoon Creek Tributary. Large woody debris is an important element of habitat for juvenile coho, Dolly Varden, and other species because it provides flow refugia and cover. Pools of sufficient depth are important habitat elements for juvenile coho rearing.

Development of a written plan would facilitate consultation between AVEC, Alaska Fish and Game, and other interested entities on the design and construction of the channel between Swimming Pond and the existing channel in Lagoon Creek Tributary. Monitoring of the constructed channel at least annually during the first three years after project operations begin would provide data to discern whether the constructed channel is routing project flows and providing aquatic habitat as intended. If the constructed channel is not functioning as anticipated, for example if substantial scouring of spawning substrates, bank failures, or sediment deposition in pools occurs, then the monitoring plan

¹⁸ Letter filed by Alaska Fish and Game to the Commission on October 30, 2014.

¹⁹ Original 10(j) letter submitted by Alaska Fish and Game was filed August 11, 2014.

would provide information needed to plan improvements to the channel.

Essential Fish Habitat

AVEC submitted an EFH assessment for the project as part of the FLA and stated that NMFS reviewed their EFH assessment; however, NMFS did not file comments with the Commission. Effects of project construction and operation on fish habitat were discussed in detail in Section 3.3.2.2.

Commission Staff Analysis

EFH in Mountain Creek would not be negatively impacted because the proposed diversion represents only a small percent of water available in the anadromous reach in Mountain Creek. Because of the small volumes diverted relative to mainstem flows we do not expect major changes in the hydrograph for the lower reaches of Mountain Creek that support anadromous fish.

Short-term, construction-related impacts on EFH in Swimming Pond and Lagoon Creek Tributary would consist of erosion, deposition, and transport of sediment. Construction-related impacts would be minimized by implementing AVEC's proposed measures (see *Construction Effects on Water Quality in East Fork of Mountain Creek, Swimming Pond, and Lagoon Creek Tributary*).

In Swimming Pond, the project would decrease summer water temperatures, increase summer dissolved oxygen levels, increase water inflows and outflows, and increase connectivity to Lagoon Creek Tributary. These changes would likely benefit salmon and Dolly Varden, because summer temperatures and dissolved oxygen sometimes naturally reach levels deemed unsuitable for salmonids.

Decreases in water temperature and increases in the quantity of juvenile habitat in Lagoon Creek Tributary are not likely to have a net negative impact on EFH in the larger Lagoon Creek drainage. Temperature changes in Lagoon Creek Tributary are likely to be small (see *Operation Effects on Water Quality in Swimming Pond and Lagoon Creek Tributary*) and will be attenuated by the routing of project flows through Swimming Pond and a large beaver pond in Lagoon Creek Tributary. Coho salmon are known to seek out suitable habitat and Lagoon Creek Tributary is thought to provide less than 25 percent of the total habitat for juvenile rearing that is available in the Lagoon Creek drainage.²⁰ Therefore, the proposed project is not likely to adversely affect EFH in the Mountain Creek or Lagoon Creek drainages.

²⁰ In a letter filed to the Commission on October 30, 2014, Alaska Fish and Game states that "there appears to be 3-5 times more rearing area in Lagoon Creek than in the tributary."

3.3.3 Terrestrial Resources

3.3.3.1. Affected Environment

Vegetation

The majority of the project area is dominated by upland plant communities (ABR, Inc., 2014). These communities are dominated by mature open canopy broadleaf forest stands of paper birch and balsam poplar on low-lying floodplains and closed tall alder interspersed with graminoid-forb meadows on the convex surfaces of rolling terrain at the base of the mountains. Riparian areas are dominated by black cottonwoods, with an understory of willow and alder.

About 12 acres of wetlands are found in the immediate project area, including various meadow and shrub-scrub habitat types (ABR, Inc., 2014). The most abundant wetland habitats include seasonally flooded broadleaf shrub/emergent scrub (4.62 acres), dominated by tall alder shrub and a dense herbaceous understory, and permanently flooded emergent meadow (2.17 acres) dominated by sedge species.

Invasive Plant Species

Invasive plant species that are known to occur near the project area include Canada thistle, orange hawkweed, fall dandelion, oxeye daisy, and common tansy.

Rare Plant Species

Four rare plant species are known to occur in the project vicinity (Table 3-4). Although none of these species were located during an August 2010 survey of areas in and near the project area, they have the potential to occur in the project area.

Table 3-4. Rare plants found near Old Harbor during August 2010 survey (Source: AVEC, 2013; Alaska Natural Heritage Program, 2013).

Family	Taxon	Locality	Habitat
Asteraceae	<i>Arnica mollis</i> Hooke hairy arnica	Kodiak Island, southeast region of island and vicinity of Old Harbor, lower Big Creek valley	beaver ponds and stream channels in tall cottonwood-alder stand, growing in sand at margin of old channel
Cyperaceae	<i>Eleocharis nitida</i> slender spikerush	Old Harbor, vicinity of airstrip above “new town,” northeast end of strip	small heath-Sphagnum bogs below strip, growing in shallow pond
Isoetaceae	<i>Isoetes occidentalis</i> L. F. Hend. western quillwort	southeast region of island, lower Big Creek Valley	graminoid-forb wet meadow, muddy lakeshore, uncommon
Boraginaceae	<i>Plagiobothrys orientalis</i> (L.) I.M. Johnst. Oriental popcornflower	Kodiak. southeast coast of island, vicinity of Old Harbor Village, area of “old town” and abandoned airstrip	disturbed open vegetation on old gravel airstrip, scattered

Wildlife

Mammal species that may be in the project vicinity include Kodiak brown bear, Sitka black-tailed deer, mountain goat, red fox, river otter, beaver, ermine, little brown bat, tundra vole, and snowshoe hare. Deer, mountain goat, and snowshoe hare are prized by sport and subsistence hunters.

Common bird species include fox sparrow, golden-crowned sparrow, Wilson's warbler, yellow warbler, orange-crowned warbler, common redpoll, golden-crowned kinglet, winter wren, American pipit, and rock and willow ptarmigan.

Sensitive Wildlife Species

The short-tailed albatross, Eskimo curlew, blue whale, humpback whales, and right whale are listed by Alaska Fish and Game as endangered species. None of these species are expected to occur in the project area or in areas potentially affected by the project.

The FWS has identified Birds of Conservation Concern species that represent the FWS's highest conservation priorities (USFWS, 2008). The project would be located within Bird Conservation Region 2 (Western Alaska). Most of the Birds of Conservation Concern in Region 2 are species of loons, cormorants, shorebirds, terns, and murrelets that could be found along coastal areas and in open water. Two species, the lesser yellowlegs and Arctic tern have been located in the Old harbor lagoon (Eskelin, 1998; MacIntosh, 1996).

Bald eagles are common in the refuge and in the town of Old Harbor. In 2011, two active eagle nests were located close to proposed project facilities (Solstice, 2011). One nest was located in a live cottonwood tree in the Big Creek drainage, about 4,300 feet from the proposed penstock location. A second nest was located in a live cottonwood tree in the Lagoon Creek drainage, about 1,900 feet from the access road from the powerhouse to the penstock and within 0.5 mile of the proposed powerhouse and portions of the proposed transmission line and penstock.

3.3.3.2 Environmental Effects

Revegetation of Disturbed Areas and Control of Invasive Species

The loss of vegetation could affect wildlife use of the affected habitat and the habitat disturbance could result in the spread of invasive plant species.

Alaska Fish and Game recommended that AVEC develop measures, as part of an Erosion and Sediment Control Plan, to revegetate all disturbed areas to include:

- Locations of treatment areas
- Plant species and methods to be used
- Planting densities
- Fertilizer formulations
- Seed test results
- Application rates
- Locations type and density of woody plantings
- An implementation schedule
- Details for monitoring and maintenance programs

Alaska Fish and Game also recommended that AVEC develop an invasive species control plan that follows requirements identified by the FWS.

The FWS specifies that AVEC prepare a vegetation management plan (FWS condition 30) to include: (1) a description of best management practices to prevent the spread of invasive species, including provisions to clean (e.g., power wash) and inspect

construction-related equipment and materials off-site prior to entry into the project area to ensure that equipment is free of seeds, spores, or other vegetation material that may introduce invasive species to the project area, including mid-season inspections; (2) provisions for piling overburden and soil from excavations outside of wetlands and in such a way as to prevent erosion; (3) methods and a schedule for revegetating disturbed areas and excess soil piles with native species, including locations of areas to be revegetated, types of native plant materials, native plant species and methods to be used, source of plant materials, planting densities and application rates, fertilizer formulations, use of certified weed-free seeds, and seed test results; (4) a schedule and procedures for controlling invasive plant species listed in the refuge's 2010 Priority Invasive Species List, or any updated list; (5) a monitoring program to evaluate the success of revegetation and invasive plant management efforts, including criteria that define when revegetation and management of target invasive species is successful for two growing seasons after completion of construction and revegetation efforts--if invasive plants are found during the initial 2-year monitoring period, remediation needs to occur and then monitored for another two growing seasons until weed-free conditions are met; and (6) monitoring during annual site maintenance to insure identification and removal of invasive plants within the project area. .

AVEC proposes to restore and revegetate all disturbed areas outside the permanent project footprint, except for areas of exposed rock, gravel surfaces, and the upper segment of the tailrace channel bed between the powerhouse and Swimming Pond. AVEC proposes to reseed all disturbed areas with a native seed mix recommended by the specialists with the Plant Materials Center, Alaska Division of Agriculture as quickly as possible and prepare an invasive species management plan. AVEC has agreed to file and follow an erosion and sediment control plan that includes the revegetation measures and invasive species control measures, as outlined by Alaska Fish and Game.

Commission Staff Analysis

The project would result in the permanent loss of about 1 acre of wetland habitat and 13 acres of upland habitat (Table 3-5). About 4 acres of wetland habitat and 51 acres of upland habitat would be cleared and revegetated.

Table 3-5. Amount of vegetation temporarily and permanently affected by the project
(Source: ABR, Inc. 2014).

Project component	Temporarily affected habitat (acres)			Permanently affected habitat (acres)		
	Wetlands and waters of the US	Upland	Total	Wetlands and waters of the US	Upland	Total
Intake and workpad	0.41	1.46	1.87	0.03	0.09	0.12
Intake access trail and penstock	1.71	29.65	31.37	0.38	6.12	6.5
Penstock	0.2	2.09	2.29	0.03	0.38	0.41
Powerhouse and workpad	0.04	1.23	1.27	0.03	0.6	0.63
Tailrace	0.19	1.6	1.79	0.03	0.2	0.23
Enhanced channel	0.71	2.07	2.78	0.17	0.34	0.51
Power line and access road	0.36	12.78	13.14	0.07	5.16	5.23
Total	3.63	50.88	54.51	0.75	12.89	13.63

The revegetation of disturbed areas (approximately 55 acres) would minimize long-term effects to local wildlife populations, though many species would experience short-term impacts. Revegetation is expected to proceed rapidly. The permanent loss of about 14 acres would have minimal long-term effect on wildlife populations. Because of the small area permanently affected and abundance of undisturbed similar habitat within the surrounding refuge, vegetation and habitat impacts are considered to be minor.

Invasive species can alter wildlife habitat by outcompeting more desirable native species. Invasive species can be spread by disturbance of vegetation and soils during construction. Construction vehicles and heavy equipment may transport invasive plant seeds to the disturbance areas and lead to increases in these undesirable species. Prompt revegetation of disturbed areas and excess soil piles, cleaning and inspecting vehicles to make sure they are weed free, use of weed-free seed mixes, and surveillance for, and control of, invasive species in disturbed areas after construction, as specified by FWS condition 30, would minimize potential for establishment and spread and expedite the development of wildlife habitat. FWS condition 30 would require a monitoring plan to help ensure the long-term success of revegetation and weed management efforts.

Rare Plants

Rare plants could be impacted if they occur in areas of vegetation disturbed by the project. AVEC does not propose any measures and no agency made any recommendations concerning the protection of rare plants.

Commission Staff Analysis

Four species of rare plants (Table 3-4) may occur in the project area. Clearing of vegetation and off-road vehicle use could result in the loss of these species. The magnitude of the potential effects is unknown. Any impacts are expected to be minor because of the existence of large areas of similar habitat in the project vicinity.

Avian Electrocution and Collisions

The proposed transmission lines can result in avian mortality from electrocution and collisions.

Alaska Fish and Game recommends that transmission line power poles conform to guidelines accepted by the FWS as described in the most recent “Suggested Practices for Avian Protection on Power Lines— State of the Art,” a joint document prepared by Avian Power Line Interaction Committee (APLIC) and the FWS. The FWS recommended transmission line design to reduce the possibility of bald eagle electrocution and install markers to reduce collision hazards.

AVEC proposes to outfit power poles with perch posts designed to prevent bird electrocutions. AVEC also proposes to install bird diverter devices to minimize avian collisions, as recommended by the FWS. No specific designs have been developed.

Commission Staff Analysis

The 2.67-kV transmission line (33 to 66 power poles), if not designed properly, has the potential to electrocute raptors and other large bird species (APLIC, 2006). Most electrocutions are associated with lines carrying 69 kV or less because the spacing of hardware is often not sufficient to prevent birds from spanning between conductors or between a conductor and a ground (APLIC, 2006). Several factors influence the risk of bird electrocution or collision, including design of electrical poles and lines, weather, visibility, wingspan, and bird age and experience (APLIC, 2006). It is difficult to evaluate whether AVEC’s proposal to install perch posts would protect raptors and other birds without a specific design. The use of perch posts to encourage birds to perch above energized components, as proposed by AVEC, is not always successful in eliminating electrocutions of birds and may deteriorate over time. Perch deterrent are often needed in

combination with perch guards to prevent birds from perching underneath the artificial perches.

Construction of the new transmission line in accordance with current APLIC standards (2006), as recommended by Alaska Fish and Game, would ensure that there is adequate separation between energized and grounded components and hardware, and would eliminate or minimize the potential for electrocution of large birds.

The 6,550-foot-long transmission line has the potential to prove a hazard to birds using habitats in the project area to moving through the area. Birds can be injured or die from the impact of hitting the line or from electrocution when they contact two conductors simultaneously and complete the electrical circuit (Harness *et al.* 2003). Birds are more susceptible to line collisions if lines cross flight paths or movement corridors (Thompson, 1978, Bevanger 1994). Birds, even those with excellent eyesight (i.e., raptors), can be vulnerable to collisions during low light or adverse weather conditions or when distracted.

Installation of transmission line markers, as proposed by AVEC, would minimize the potential for avian collisions. However, even with line markings, collision would remain a possibility (Bevanger, 1994). Overall impacts are expected to be minimal because of the relative short length of the line and lack of bird concentrations or identified flight paths.

Protection of Nesting Birds

Construction activities have the potential to disturb nesting birds during the construction period (up to two construction seasons), including the bald eagle.

AVEC proposes timing windows for avoiding disturbance during the bird nesting season wherever possible for ground-clearing and vegetation removal in previously undisturbed areas, as recommended by the FWS. Vegetative clearing would be avoided in forest or woodland habitat (i.e., trees present) from April 15 to July 15 and in shrub or open habitat (i.e., shrub cover or marsh pond, tundra, gravel, or other treeless/shrubless ground habitat) from May 1 to July 15. FWS specifies (FWS condition 37) that no vegetative clearing could occur between May 1 and August 1 in order to protect nesting birds, unless authorized in writing by the Refuge Manager.

AVEC proposes to monitor and report to the FWS any newly established bald eagle nests. In the event a bald eagle nest is identified by the environmental compliance monitor, AVEC would avoid blasting within 0.5 mile of the nest and all other work within 660 feet of the nest would be postponed until after consultation with the FWS. If blasting is required within 0.5 mile of an eagle nest, as determined by the environmental compliance monitor, blasting would take place in winter (November-January), well

before/after the breeding season according to the National Bald Eagle Management Guidelines (USFWS, 2007). FWS specifies (FWS condition 46) that disturbance and destruction of eagle nests or nesting trees are prohibited and initial construction of permanent facilities, including roads, drill pads, and storage areas is prohibited within a 0.25 mile of an established nest tree.

Commission Staff Analysis

Construction activities during the spring and summer, including vegetation clearing and grubbing, could result in the destruction of bird nests, eggs, or nestlings or result in the abandonment of nests. The proposed construction window (April 15 to July 15) is consistent with the FWS's guidelines (USFWS, 2009) for the Kodiak Archipelago and would avoid or minimize the take of nesting migratory birds. The restrictions specified by FWS condition 37 (May 1 through August 1), though similar to the proposed schedule, would more be selective of local nesting conditions and would better protect bald eagle nesting.

Two active bald eagle nests were located in 2011, located 1,900 and 4,300 feet from proposed construction activities. Location of eagle nest sites may have changed since 2011. Construction noise and activities could result in abandonment of the nest or interfere with incubation or feeding of young. Eagles are the most sensitive to disturbance during the early stages of the nesting period, which generally begins in early March—courtship, nest selection, egg laying, and incubation. Eagles will readily abandon their nests when disturbed prior to May 15 and disturbance through July 1 may cause nest failure. After that period, fledglings are not as susceptible to minimal disturbance. FWS condition 46 would require that no construction activities or loss of habitat occur within 0.25 mile (1,310 feet) of an established nest tree. Although this distance is larger than the minimum 660-foot-wide buffer zone developed by the FWS to protect nesting eagles from disturbance (USFWS, 2007), it would reduce the possibility of adverse effects, particularly in the generally open habitats in the project area and the remoteness of the area.

Blasting may be required in some locations during construction of the intake access trail and penstock. Blasting could occur in areas of shallow bedrock, where deep cuts are needed, and in areas where material is being extracted. AVEC, however, proposes to avoid blasting within 0.5 mile of an active eagle nest. If blasting would occur within 0.5 mile of an eagle nest as determined by the Environmental Compliance Monitor, blasting would be scheduled to occur in winter (November-January), well before/after the March through August breeding season consistent with National Bald Eagle Management Guidelines (USFWS, 2007). The proposed construction restrictions would avoid or minimize impacts to nesting eagles.

Bear-Human Interactions

The presence of workers during construction and maintenance can increase the chance of human-bear encounters.

AVEC agreed to prepare a bear safety plan, after consultation with the FWS and Alaska Fish and Game, to include protocols to minimize bear encounters during construction and maintenance activities. Alaska Fish and Game recommended that the bear safety plan contain measures to provide instructions for: (1) operating practices when in bear country that minimize possible conflict; (2) minimizing encounters and avoid areas often used by bears, if possible; (3) keeping construction sites and refuse areas clean of substances that attract bears; (4) installing bear-proof garbage receptacles and other measures during construction to prevent bears from obtaining food or garbage; (5) dealing with problem bears; and (6) notification of Alaska Fish and Game of any bear-human conflicts. FWS specifies that all food wastes not be stored in the right-of-way permit area (FWS condition 41). FWS also specifies (FWS condition 45) that: any problems with wildlife must be reported immediately to the Refuge Manager; employees must not feed animals or harass or intentionally approach animals closely enough to disrupt the animal's activity or to endanger human life; taking of animals would not be allowed except in the case of defense of life and property; and in the case of a defense of life and property taking, the applicant shall immediately contact the Alaska Fish and Game and the Refuge Manager, and salvage those parts of the animal required by state regulations. Further, FWS specifies (FWS condition 50) that prior to clearing and construction during the bear denning season, a survey may be conducted by refuge personnel for the purpose of identifying bear denning sites that might be affected by construction activity. If such denning sites are identified, the Refuge Manager would prescribe appropriate mitigation measures to protect human safety and prevent adverse impacts to wildlife.

Commission Staff Analysis

Bears and other predators can be attracted to the construction area in response to human foods and garbage. Attraction to the construction site and increased interaction with humans create the potential for mortality from control measures (i.e., killing problem animals in defense of life or property, vehicle strikes, or ingestion of toxic substances, as well as potential injury to humans from animals with rabies or aggressive behavior). Implementing a bear safety plan, consistent with the measures recommended by Alaska Fish and Game and specified by FWS, would minimize the potential for human-bear interactions, protecting both construction and maintenance workers and wildlife.

Disturbance of Mountain Goats

Project-related helicopter use can disturb mountain goats foraging in the project area.

Alaska Fish and Game recommends that AVEC minimize the use of helicopters or airplanes near mountainsides adjacent to Mountain Creek. If mountain goats are observed, Alaska Fish and Game recommends maintenance of a 1,500-foot vertical or horizontal clearance. AVEC has agreed to minimize the use of helicopters near mountainsides adjacent to Mountain Creek and implement the 1,500-foot clearance if goats are observed, as can be accomplished safely.

Commission Staff Analysis

Helicopters may be used to transport materials and equipment from a staging area in the community to locations along the project alignment. For example, for placement of the penstock, helicopters would likely be used for about 6 hours a day for 10 days as pipe is placed along the alignment. Weather, construction and labor schedules, trail hardness, and contractor preference would generally dictate the amount of helicopter use. Helicopter use could be expected to occur occasionally throughout the duration of the construction period (up to two construction seasons).

Mountain goats are sensitive to disturbance, especially helicopter overflights (Cote, 1996; Foster and RaHS, 1983). Disturbed mountain goats can exhibit panic behavior, be displaced from preferred habitats during the summer construction season, avoid foraging in the area, and increase energy expenditures, ultimately affecting survival or reproduction. Immediate responses of mountain goats to helicopter disturbance are likely influenced by sex, age, season, prior experience, habitat, and characteristics of the helicopter activity (Goldstein et al., 2005). Even overflights between 500 and 1,500 meters (1,640 and 4,920 feet) could elicit responses though less severe or shorter duration than overflights less than 500 meters (Cote, 1996; Foster and RaHS, 1983; Goldstein et al., 2005).

Restrictions on helicopter activities in the vicinity of observed mountain goats, as recommended by Alaska Fish and Game, would minimize potential impacts, but disturbances to mountain goat would still result.

3.3.4 Threatened and Endangered Species

3.3.4.1. Affected Environment

As discussed in section 1.3.3, the federally listed Steller's eider and northern sea otter may occur in the project area.²¹

²¹ The draft EA identified the Kittlitz's murrelet and yellow-billed loon as

Steller's eiders are diving ducks that feed on mollusks and crustaceans in shallow water. In summer, they nest in tundra adjacent to small ponds or within drained lake basins and wetlands. Steller's eiders are known to occur in nearshore waters of Kodiak Island between late September and April, but are not regularly seen near Old Harbor (USFWS, 2012).

Sea otters can be found year-round near Kodiak Island's rocky shoreline and points of land, or in large bays where kelp beds occur (USFWS, 2012). They are also found in areas with soft sand and mud substrates where they forage for clams. Sea otters are most common around the northern shores and southernmost points of Kodiak Island. Sea otters have not been observed close to Old Harbor.

Nearshore waters around Old Harbor were designated as critical habitat under the ESA in 2009 for the sea otters, and are included in Unit 5 (Kodiak, Kamishak, Alaska Peninsula Unit). Unit 5 consists of an estimated 2,607 square miles, collectively, of the nearshore marine environment ranging from the mean high tide line to the 20-meter (65.6-foot) depth contour as well as waters occurring within 100 meters (328.1 feet) of the mean high tide line.

3.3.4.2 Environmental Effects

Steller's Eider

Steller's eiders do not nest on Kodiak Island but may occasionally travel over land to access wintering areas. This would make them potentially subject to collisions with the proposed transmission line. Steller's eiders are known to strike on-land towers and power lines in Alaska (USFWS, unpublished data). Eiders tend to fly low over water and land and collide with towers and lines, especially during poor visibility conditions such as fog and the darkness of night (Day *et al.*, 2002). AVEC's proposal to install bird diverters on the transmission line and guy wires to increase visibility of the line, as discussed in section 3.3.3, *Terrestrial Resources*, would minimize potential impacts. Given the low likelihood that eiders would fly through the project area and the relatively short length of the transmission line, any potential impacts would be unlikely.

None of the project components would be constructed in or near marine habitat. All project components would be located at least 0.75 mile from the marine environment and project flows would flow into Old Harbor saltwater lagoon and not directly into the ocean. However, excavation, transportation of materials, road construction, ground clearing, and placement of fill could generate loose soil. Further, mishandling or spill of

candidates for federal listing. These species are no longer designated as candidate species.

fuel (e.g., refueling of vehicles and equipment) and hazardous materials (e.g., pesticides) could introduce hazardous substances into the environment. During and after construction, contaminants and loose soil may be released into storm water during rain or snowmelt events. Runoff may be washed downstream into the marine environment where sediments and pollutants could impair water quality, and degrade the habitat used by Steller's eider.

Discharge of sediments and other contaminants would be minimized through development and implementation of a storm water pollution prevention plan, including use of best management practices (e.g., use of silt fences), development and implementation of a fuel and hazardous substance spill plan designed to minimize the potential for petroleum products to enter the project waters in the event of a spill, revegetating disturbed areas to stabilize the soil, and design of the access road to reduce erosion. Due to the inland location of the project, we do not anticipate small chemical or fuel spills would reach the marine environment. Therefore, any effects to marine habitats would be unlikely and any potential effects would likely be negligible.

Northern Sea Otter

The northern sea otter has not been observed in the project vicinity, but suitable habitat exists along the coast. In addition, nearshore environments in the project vicinity are designated as critical habitat. The primary constituent elements (PCE) of sea otter critical habitat are:

- 1) shallow, rocky areas less than 2 meters (6.6 feet) in depth where marine predators are less likely to forage, or
- 2) nearshore waters within 100 meters (328.1 feet) from the mean high tide line that may provide protection or escape from marine predators; and
- 3) kelp forests, which occur in waters less than 20 m (65.6 feet) in depth, that provide protection from marine predators, or
- 4) prey resources within the areas identified by PCEs 1, 2, and 3 that are present in sufficient quantity and quality to support the energetic requirements of the species.

As discussed above, given the inland location of the project, implementation of storm water pollution prevention and fuel and hazardous substance spill plans, erosion control measures, and revegetation of disturbed areas would reduce potential effect on the marine environment to negligible levels. Therefore, potential impacts to the northern sea otter and its designated critical habitat would be unlikely.

3.3.5 Recreation and Land Use

3.3.5.1. Affected Environment

The proposed project would occupy approximately 1.85 acres of land within the Refuge solely managed by the FWS; approximately 5.89 acres within the Refuge that is also subject to a conservation easement administered by the State of Alaska); approximately 3.24 acres of Old Harbor Native Corporation land that is subject to a conservation easement administered by the FWS and the State of Alaska; approximately 2.90 acres of Old Harbor Corporation land; and approximately 1.21 acres of land within the City of Old Harbor.

Refuge lands, including those with conservation easements, are open to the public. Access to Old Harbor Native Corporation's lands is restricted by the corporation. Visitors wishing to recreate, including hunting and fishing, on Old Harbor Native Corporation's lands must first apply, meet the terms of the application, and pay a fee depending on the type of recreational activity. Lands owned by the City of Old Harbor are open to the public.

Current recreational and land use practices in the proposed project area include hiking, ATV excursions, hunting, sport fishing, sightseeing, and camping. Subsistence use on proposed project lands is discussed in section 3.3.8, *Subsistence Resources*. There are only limited existing recreation facilities or improvements to support current recreation in the project area. There is a braided ATV trail leading to the Swimming Pond, and an old and lightly used footpath/ATV trail that branches off the Swimming Pond trail heading northwest (see Figure 1). These trails were established informally by Old Harbor residents and lead to the proposed project lands.

ATV use is prohibited on Kodiak National Wildlife Refuge lands and any lands under conservation easement administered by the FWS.

3.3.5.2 Environmental Effects

AVEC proposes to build a 1.1-mile-long (5,720 foot-long), 24-foot-wide access road between the existing water tank access road near the City of Old Harbor and the proposed powerhouse (see Figure 1). This powerhouse road would be open to public vehicles. The area around the proposed powerhouse is currently only accessible via an ATV trail that is heavily rutted, braided, and includes two in-stream crossings of Lagoon Creek. The powerhouse road is proposed further east of the ATV trail and the ATV trail would be left in place. AVEC proposes to install a gate along the existing trail to prevent unauthorized ATV access to refuge lands. AVEC also proposes to install signs at the powerhouse to inform the public about public access on the Refuge and Old Harbor Native Corporation lands held in a conservation easement

AVEC also proposes to build a 2.2-mile-long (11,500-foot-long), 10-foot-wide access trail between the intake and powerhouse, following the approximate path of the penstock. This trail would connect to the existing trail leading to existing water pump house and would be open to public foot traffic. At the request of the FWS, this intake access trail would be closed to non-project vehicle traffic. Gates would be installed to ensure no unauthorized traffic access the Refuge.

Old Harbor Native Corporations lands that are not currently under a conservation easement require an application, meeting of terms, and a fee to recreate on these lands. As shown by the current property boundaries in Figure 1, to access much of the proposed project lands, visitors need to cross Old Harbor Native Corporation lands. The proposal states that a right-of-way for the powerhouse access road would be obtained and the road would be open to the public.

FWS specifies that AVEC not only install gates to limit motor vehicle use of the intake access trail and the existing ATV trail to authorized vehicles only (as proposed), but that AVEC also consult with FWS about the specific locations of the gates, maintain the gates, and monitor the conditions of signs, gates, barriers, and access trails annually – promptly reporting any damage or evidence of unauthorized uses to the Refuge. If unauthorized uses or vandalism are noted, FWS specifies that the licensee must consult with the Refuge to design additional protection measures.

Commission Staff Analysis

Free, public access is currently available to most of the proposed project lands. Under the current proposal, access to the proposed project lands would be improved by the addition of the powerhouse road and intake foot trail. Installing recreation signs to inform visitors about public access on the Refuge and conservation lands is prudent. Additionally, the proposed installation of two road-gates preventing unauthorized vehicle traffic into the Refuge is also warranted. However, it is also important for these gates to be maintained for the duration of the license, including monitoring the conditions of the gates and promptly reporting any damage or evidence of unauthorized use to Refuge personnel. If trespass or vandalism occurs on refuge lands, other measures may be implemented, including replacing damaged gates or altering the design of the barriers.

3.3.6 Cultural Resources

3.3.6.1 Affected Environment

Section 106 of the NHPA, requires the Commission to take into account the effects of licensing a hydropower project on properties listed or eligible for listing in the National Register and allow the Advisory Council on Historic Preservation (Advisory

Council) a reasonable opportunity to comment if any adverse effects on historic properties are identified within the project's APE.

Historic properties are defined as any district, site, building, structure, or object that is included in or eligible for inclusion in the National Register. In this document, we also use the term "cultural resources" to include properties that have not been evaluated for eligibility for listing in the National Register. In most cases, cultural resources less than 50 years old are not considered eligible for the National Register. Cultural resources need enough internal contextual integrity to be considered historic properties. For example, dilapidated structures or heavily disturbed archaeological sites may not have enough contextual integrity to be considered eligible. Traditional Cultural Properties (TCPs) are a type of historic property eligible for listing in the National Register because of their association with cultural practices or beliefs of a living community that: (1) are rooted in that community's history or (2) are important in maintaining the continuing cultural identity of the community (Parker and King, 1998). Section 106 also requires that the Commission seek concurrence with the jurisdictional manager on any finding involving effects or no effects on historic properties. For this project, the jurisdictional managers would be FWS for federal lands within the project area and the Alaska State Historic Preservation Officer (Alaska SHPO) for non-federal lands within the project area. If TCPs have been identified, section 106 also requires that the Commission consult with interested Native American tribes or Native Alaskan Villages that might attach religious or cultural significance to such properties.

If existing or potential adverse effects have been identified on historic properties, license applicants need to develop a HPMP to seek to avoid, reduce, or mitigate the effects. Potential effects that may be associated with a hydroelectric project include any project-related effects associated with construction, or the day-to-day operations and maintenance of the project after issuance of an original license.

Cultural Historic Overview

Culturally, Kodiak Island falls within the Arctic physiographic province of Alaska and was initially occupied by transcontinental arctic-adapted peoples generally known as Eskimos. These people would have been ancestral to the present-day Alutiiq, and may have occupied Kodiak Island as early as 7,000 years ago (Dumond 1984, Clark 1984). The initial occupation of Kodiak Island is associated with the Ocean Bay I phase of the Kodiak region (ca. 5000 to 2200 BC), and represents a predominant coastal maritime adaptation where peoples possessed a blade making technology (Dumond 1984). After 2200 BC, the Kodiak Island inhabitants used polished slate tools, defined archaeologically as the Takli culture, and became more culturally distinct from other occupants of the Aleutian Islands, the latter of which continued to use chipped stone tools. By 1200 BC, peoples of Kodiak Island settled into more permanent coastal villages associated with the Kachemak tradition which by around 1,000 AD is considered

to be directly ancestral to the historic Alutiiq. The Alutiiq were Eskimos of the Pacific Tradition who dominated Kodiak Island by the time the Russian were exploring Alaska in the 1760s (Clark 1984). Alutiiq settlements were essentially restricted to the coast; however salmon fishing camps were located further inland. Some of the larger Alutiiq coastal settlements may have been governed by local village chiefs as noted by Russian voyagers in the beginning of the 19th century. The subsistence of the Alutiiq was based mainly on a strategy of pursuing sea mammals (whales and sea otters) in kayaks, dispatching the animals with harpoons. They also fished for halibut, salmon, and hearing. Along with oceanic hunting and fishing, the Alutiiq would on occasion hunt sea birds, and trap of land mammal such as fox. When available, they also collected edible roots and berries. During the 19th century, the Alutiiq lived in nearly 40 villages, however, by 1970 only five were permanently occupied. Prior to the 1964 Good Friday Earthquake, the southern coast of Kodiak Island was occupied by three villages; Akhoik, Kaguyak, and Old Harbor. The town of Old Harbor developed in the proximity of Three Saints Bay, the latter of which had been established by Russians as a post and fortified fort in 1784, after a devastating defeat of the Alutiiq and subsequent massacre at Refuge Rock Island. Prior to Russian occupation and colonization, the Alutiiq had lived within the surrounding area of Old Harbor for several millennia. Since then, the Alutiiq of Old Harbor have incorporated much of the habits and lifestyle of the old Russian culture, but still retain much of their traditional practices. Whaling had been an important industry for the community of Old Harbor until the 1920s when it declined, but continued as a cannery, principally for salmon. Old Harbor was ultimately destroyed by a massive tsunami from the 1964 Good Friday earthquake, but was quickly rebuilt afterwards. In 1968, the Village of Old Harbor was federally recognized as a Native Alaskan tribal government (Old Harbor Tribal Council), and the Old Harbor Native Corporation was incorporated in 1973. AVEC began as an electric service in 1968, servicing the communities of Old Harbor, Nulato, and Hooper Bay. Since then, AVEC has branched out to other rural and native villages (serving both native and non-native Alaskans) throughout Alaska, and area-wise, is considered one of largest retail electric services in the world.

Archaeological research in Kodiak Island began in the early 1930s with the Smithsonian Institution anthropologist Ales Hrdlicka, who conducted excavations at a large village site in Larson Bay (AVEC 2013). Much of the pre-Russian contact archaeological sequences were developed by researchers from the University of Wisconsin in 1960 that were based on excavations along the southeastern coast of Kodiak Island, not far from Old Harbor. Beginning in 1980, Richard Jordan from Bryn Mawr College, did a decades-long project on the social and economic history of Old Harbor and its implications on the Alutiiq culture and history through time. This research is continuing today, and the Old Harbor Native Corporation has been an active sponsor of such work, accounting for more than 100 newly discovered archaeological sites in the Old Harbor area. In 1995, the Alutiiq Museum and Archaeological Repository (funded in

part by the Old Harbor Native Corporation), was established to provide storage from these excavations.

Area of Potential Effects

Pursuant to section 106, the Commission must take into account whether any historic property could be affected by issuance of a new license within a project's APE. The APE is defined as the geographic area or areas that an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. AVEC defined the APE as consisting of all lands within the project boundary and any lands outside of the project boundary where cultural resources may be affected by ground disturbing activities associated with construction and other project-related activities. Essentially, the APE includes all project components and a 100-foot buffer around them. Project components include the intake footprint, intake access trail, penstock, powerhouse footprint, associated primary transmission line, trailrace, and clearing areas. Overall, the APE consists of approximately 15 acres, of which 7.7 are under the jurisdiction of the FWS.

Cultural Resources Investigations

As part of their original license application, filed with the Commission in May of 1999, the Alutiiq Museum and Archaeological Repository conducted a reconnaissance level investigation in 1997 along AVEC's proposed project boundary, which is the same as the present APE described above. In 2009, Northern Land Use Research, Inc. (NLUR) conducted another cultural resources survey of proposed improvements to Old Harbor's water treatment plant and water storage tank. The project area was located about 140 feet from the proposed project's APE. Neither cultural resources inventory located any cultural resources. For this licensing, NLUR conducted another systematic pedestrian survey within the proposed project's APE in August of 2010 and did not locate any archaeological sites or other cultural resources (AVEC 2013).

3.3.6.2 Environmental Effects

On behalf of AVEC, NLUR concluded that it would be unlikely that the proposed project would have any effect on historic properties, due to the fact that no known archaeological site or other cultural resources were located within the proposed project's APE (AVEC 2013). On September 14, 2011, AVEC sent a letter to the Alaska SHPO stating that the proposed project would have no effect to historic properties, and on September 21, 2011, the Alaska SHPO responded back concurring with this finding (AVEC 2013). FWS is completing their analysis under NHPA Section 106 and will include their findings in the FWS decision document for this project. If any potential significant cultural resources (or human remains associated with NAGPRA) would be encountered as a result of any construction or related project activities, AVEC assures

that all work would cease in the immediate area and that the discovery would be evaluated by a qualified archaeologist, and that the Alaska SHPO, FWS, and Village of Old Harbor would be notified.²²

Commission Staff Analysis

The proposed project would not affect any known historic properties; however, there is always a possibility that unknown archaeological resources may be discovered in the future as a result of the project's construction, operation, or project-related activities. Consulting with the Alaska SHPO, FWS, and Village of Old Harbor in the event that a significant cultural resource is inadvertently discovered during construction, operation, or maintenance activities would ensure that any adverse effects to it can be avoided, lessened, or mitigated.

3.3.7 Environmental Justice

3.3.7.1 Affected Environment

Environmental justice is the analysis of how a federal action may impact low-income, minority, or tribal populations (CEQ, 1997). Old Harbor is one of Kodiak Island's six Alutiiq villages and is primarily inhabited by an Alutiiq population. According to the 2010 U.S. Census, the current population of Old Harbor is approximately 218 persons. The population of Old Harbor in 1990 was 284 and in 2000 was 237. About 88 percent of the current population is American Indian and Alaska Native (191 residents), 11 percent white (24 residents), and 1 percent is two or more races (3 residents). This community's ratio of minorities to non-minorities is higher than the rest of the Kodiak Island Borough and the State of Alaska (Table 3-6).

²² The City of Old Harbor, Village of Old Harbor, and Old Harbor Native Corporation are all in full support of the proposed project (See letter from Rick Berns, Mayor of the City of Old Harbor, dated January 12, 2012, in AVEC 2013).

Table 3-6. Old Harbor Demographics

	Total Population	White	American Indian and Alaska Native	Two or More Races	Minority
Alaska	710,231	66.7%	14.8%	7.3%	33.3%
Kodiak Island Borough	13,592	55.3%	13.2%	7.6%	44.7%
Old Harbor	218	11.0%	87.6%	1.4%	89%

3.3.7.2 Environmental Effects

Project construction and operations would contribute directly to the economy by providing employment and earnings, which would also contribute indirectly to the economy through employee purchase of goods and services. More specifically, this additional energy may assist in the economic development of Old Harbor.²³ AVEC also proposes to hire local workers for the construction and maintenance of the project.

Commission Staff Analysis

Construction and operation of the project are not expected to have a disproportionate adverse effect on minority populations. Because the Old Harbor community consists of such a high population of minorities, any negative effects of the projects would be shared equally across all community members. The proposed and alternative transmission alignments do not cross or parallel residential areas.

3.3.8 Subsistence Resources

3.3.8.1 Affected Environment

Providing the opportunity for continued subsistence use by local residents is one of the purposes of the Refuge, as stated in Title III of the ANILCA of 1980 as amended. Title VIII of ANILCA further provides that rural Alaska residents engaged in subsistence use of resources be allowed to continue using Refuge resources for traditional purposes. Subsistence uses, as defined in ANILCA, means the customary and traditional uses by

²³ A letter filed jointly on September 29, 2014 by the City of Old Harbor, Alutiiq Tribe of Old Harbor, and the Old Harbor Native Corporation indicates the need for power is preventing the economic development of Old Harbor, specifically a fish processing plant.

rural Alaska residents of wild renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, or transportation; for the making and selling of handicraft articles out of nonedible byproducts of fish and wildlife resources taken for personal or family consumption; for barter or sharing for personal or family consumption; and for customary trade.

AVEC states in its application that subsistence activities are not common in the project area, but the project area is occasionally used for subsistence harvest of berries, fish, deer, goat, and bear. Most Old Harbor residents do practice a subsistence lifestyle and depend to some extent on subsistence food sources, such as salmon, halibut, crab, seal, deer, rabbit, and bear. Salmon reared in the lower reaches of Mountain Creek may also be used for subsistence purposes.

3.3.8.2 Environmental Effects

AVEC proposes to build a 5,720 foot-long by 24-foot-wide access road between the existing water tank access road and the powerhouse. This powerhouse road would be open to public vehicles. The area around the proposed powerhouse is currently only accessible via an ATV trail that is heavily rutted, braided, and includes two in-stream crossing of Lagoon Creek. AVEC proposes to install a gate along this existing trail to prevent unauthorized traffic and ATV use on the Refuge.

AVEC also proposes to build a 2.1 mile (11,500-foot-long), 10-foot-wide access trail between the intake and powerhouse, following the approximate path of the penstock. This trail would connect to the existing trail leading to the existing water pump house and would be open to public foot traffic. This trail would extend across lands owned by the Old Harbor Native Corporation (held in a conservation easement administered by the FWS) and on to the Refuge. At the request of the FWS, this intake access trail would be closed to non-project vehicle traffic. A gate would be installed to ensure no unauthorized traffic access the Refuge.

Commission Staff Analysis

The proposed powerhouse road would improve the existing public access to the area around the proposed powerhouse, including Swimming Pond. This improved access is likely to increase traffic to the area around the Swimming Pond. The proposed access trail, following the route of the penstock, would also be open to public foot traffic into an area where there is currently very limited access.

The improved access to the Swimming Pond area and into the Refuge via the intake access trail would likely encourage increased use in these areas; therefore, also improving opportunities for subsistence practices.

A reduction in the flow of Mountain Creek is unlikely to have measurable effects on salmon that may be used for subsistence purposes (see section 3.3.2 *Aquatic Resources*).

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the Old Harbor Project would not be constructed. There would be no changes to the physical, biological, or cultural resources of the area and electrical generation from the project would not occur. The power that would have been developed from a renewable resource would have to be replaced with nonrenewable fuels. The noise and air quality impacts of the existing diesel fuel-fired generation system would continue unabated or at increased levels as the local electrical demand increased. The risk of spills of diesel fuels would likewise continue at current or increasing levels. The financial benefits to the residents of Old Harbor in the form of lower electrical rates and to AVEC in terms of project operating revenues would not be realized.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the project's use of the East Fork of Mountain Creek and the Lagoon Creek Tributary for hydropower purposes to see what effect various environmental measures would have on the project's costs and power generation. Under the Commission's approach to evaluating the economics of hydropower projects, as articulated in *Mead Corp.*,²⁴ the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using the likely alternative source of power for the region (cost of alternative power). In keeping with Commission policy as described in *Mead Corp.*, our economic analysis is based on current electric power cost conditions and does not consider future escalation of fuel prices in valuing the hydropower project's power benefits.

For each of the licensing alternatives, our analysis includes an estimate of: (1) the cost of individual measures considered in the EA for the protection, mitigation and enhancement of environmental resources affected by the project; (2) the cost of alternative power; (3) the total project cost (i.e. for construction, operation, maintenance, and environmental measures); and (4) the difference between the cost of alternative power and total project cost. If the difference between the cost of alternative power and total project cost is positive, the project produces power for less than the cost of alternative power. If the difference between the cost of alternative power and total

²⁴ See *Mead Corporation, Publishing Paper Division*, 72 FERC ¶ 61,027 (July 13, 1995). In most cases, electricity from hydropower would displace some form of fossil-fueled generation, in which fuel cost is the largest component of the cost of electricity production.

project cost is negative, the project produces power for more than the cost of alternative power.

4.1 POWER AND DEVELOPMENTAL BENEFITS OF THE PROJECT

AVEC proposes to install one 262 kW Pelton turbine initially and another 262 kW unit when demand grows. Once the area load grows, the project would generate an average of 2.3 GWh annually with the initial unit installed.

Table 4-1 summarizes the assumptions and economic information we use in our analysis. This information, except as noted, was provided by AVEC in its license application. We find that the values provided by AVEC are reasonable for the purposes of our analysis.

Table 4-1. Parameters for economic analysis of the Old Harbor Project (Source: staff and AVEC).

Economic Parameter	Value
Base year for cost and benefits	2015
Hydro Cost	\$8,155,000
Hydro Loan Interest Rate	3.00%
Discount Rate	3.00%
Hydro Loan Period (years)	20
Inflation Rate	0.00%
Length of Analysis (years)	30
City Energy Needs (kWh per year)	899,000
Load Growth	2.50%
Diesel Fuel Cost (\$ per gal)	4.08
Fuel Cost Growth	0.00%
Diesel Efficiency (kW/gal)	13.95

4.2 COMPARISON OF ALTERNATIVES

4.2.1 No-action Alternative

Under the no-action alternative, the project would not be constructed as proposed and would not produce any electricity. No costs for construction, operation and maintenance, or proposed environmental protection, mitigation, or enhancement measures would be incurred by the applicant. AVEC would continue to use diesel fuel to meet current and projected energy needs.

4.2.2 AVEC's Proposal

Under AVEC's proposal, the project would require construction of a diversion dam/intake, penstock, a powerhouse containing generation facilities, a constructed tailrace, access road and trail, and a transmission line. AVEC proposes various environmental measures to protect, mitigate, and enhance existing environmental resources in the vicinity of project features.

Under AVEC's proposed single unit, the average annual project cost would be \$683,000 or about \$297/megawatt-hour (MWh). The average annual cost of alternative power would be \$328,000 or about \$143/MWh. Overall, the project would produce power at a cost which is \$355,000, or \$154/MWh, *more* than the cost of alternative power.

4.2.3 Staff Alternative

The staff alternative includes the same environmental measures as the proposed project with one additional measure: a monitoring plan for the constructed channel habitat.

The staff's alternative would have an average annual project cost of \$683,850 or about \$297/MWh. The average annual cost of alternative power would be \$328,000 or about \$143/MWh. Overall, the project would produce power at a cost which is \$355,900, or \$154/MWh, *more* than the cost of alternative power.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 4-2 gives the cost of each of the environmental enhancement measures considered in our analysis. We convert all costs to equal annual (levelized) values over a 30-year period of analysis to give a uniform basis for comparing the benefits of a measure to its cost.

Table 4-2. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of construction and operation of the Old Harbor Project (Source: staff).

Enhancement/Mitigation Measures	Entities	Capital (2013\$)	Annual (2012\$)	Levelized Annual Cost (2012\$)
1. A qualified environmental compliance monitor would be employed during the project construction	AVEC, Alaska Fish and Game, Commission	\$90,000	\$0	\$4,590

	Staff			
2. Motor vehicle use of the intake access trail would be limited to authorized vehicles only to minimize erosion due to traffic	AVEC, Alaska Fish and Game, Commission Staff	\$0	\$0	\$0
3. Overburden and soil from excavations would be piled outside of wetlands and in such a way as to prevent erosion. The excess soil piles would be revegetated with native seed mix recommended by the FWS ^c	AVEC, Commission Staff	\$10,000	\$0	\$510
4. Disturbed areas would be revegetated with native seed mix recommended by the Plant Materials Center, Alaska Division of Agriculture ^c	AVEC, FWS, Commission Staff	\$10,000	\$0	\$510
5. Construct an in channel overflow spillway in the diversion weir	AVEC, Commission Staff	\$0	\$0	\$0
6. Fish passage and large woody debris would be mostly maintained	AVEC, Alaska Fish and Game, Commission Staff	\$0	\$0	\$0
7. Revegetation of banks with native plants and large and small woody debris on areas cleared during channel construction	AVEC, Commission Staff	\$24,000	\$0	\$1,220
8. Construction of channel from Swimming Pond to natural channel would occur during a fishing timing window established by Alaska Fish and Game to protect downstream coho salmon	AVEC, Alaska Fish and Game, Commission Staff	\$0	\$0	\$0
9. Ramping rates would not exceed 5 cfs per hour to prevent large flow fluctuations into Lagoon Creek Tributary ^e	AVEC, Alaska Fish and Game, Commission	\$0 ^a	\$0	\$0

	Staff			
10. A Fish Exclusion Plan would be developed in cooperation with Alaska Fish and Game and other requesting agencies to finalize tailrace designs to prevent fish from accessing the tailrace above Swimming Pond	AVEC, Alaska Fish and Game, Commission Staff	\$0 ^a	\$0	\$0
11. A Fuel and Hazardous Substance Spill Plan would be developed in cooperation with Alaska Fish and Game and other requesting agencies to prevent petroleum product spills from impacting aquatic resources, including pre-project sampling	AVEC, Alaska Fish and Game, FWS, Commission Staff	\$6,000	0	\$306
12. A storm water pollution prevention plan would be used to minimize erosion from construction activities	AVEC, Alaska Fish and Game, Commission Staff	\$11,400	\$0	\$557
13. Best Management Practices would be implemented to decrease erosion and sedimentation during construction activities	AVEC, Alaska Fish and Game, Commission Staff	\$10,000	\$0	\$510
14. An Erosion and Sediment Control Plan would developed in cooperation with Alaska Fish and Game and other requesting agencies to decrease erosion and sedimentation during construction and operation of the project, including turbidity monitoring during construction	AVEC, Alaska Fish and Game, Commission Staff	\$25,000	\$5,000	\$6,275
15. Use the FWS's construction timing windows to avoiding disturbances during bird nesting seasons for ground clearing and vegetation removal in previously undisturbed areas	AVEC, FWS, Commission Staff	\$0	\$0	\$0

16. Monitoring and reporting to the FWS newly established bald eagle nest, which if found would result in blasting within 0.5 mile and construction work within 660 feet of the nest would be postponed until after coordination with the FWS. If blasting is required within 0.5 mile of an eagle nest, blasting would be conducted outside of the breeding season (November-January)	AVEC, FWS, Commission Staff	\$0 ^b	\$0	\$0
17. Avoid construction of permanent facilities within 0.25 mile of an established bald eagle nest tree	FWS, Commission Staff	\$0	\$0	\$0
18. Install bird diverters on the power line and guy wires to prevent bird strikes ^{a, d}	AVEC, Alaska Fish and Game, Commission Staff	\$10,000	\$0	\$510
19. Outfit power poles with perch posts designed to prevent bird electrocution ^{a, d}	AVEC, Alaska Fish and Game, Commission Staff	\$5,000	\$0	\$260
20. A Bear Safety Plan would be developed in cooperation with Alaska Fish and Game and the FWS on protocols to minimize bear encounters during construction and maintenance activities	AVEC, Alaska Fish and Game, FWS, Commission Staff	\$5,000	\$0	\$260
21. An invasive species management plan would be developed prior to commencement of any construction activities and excess soil piles and disturbed areas would be revegetated with a native seed mix in consultation with the Plant	FWS, Alaska Fish and Game, AVEC, Commission Staff	\$5,000	\$0	\$260

Materials Center, Alaska Division of Agriculture ^c				
22. To minimize impacts to mountain goats, AVEC would minimize the use of helicopters or airplanes near mountainsides adjacent to Mountain Creek, and if mountain goats are observed, a 1,500-foot vertical or horizontal clearance would be maintained, as can be accomplished safely	AVEC, Alaska Fish and Game, Commission Staff	\$0	\$0	\$0
23. Gates would be installed across the intake access trail and the existing ATV trail to prevent unauthorized motorized access into the Refuge and conservation lands ^a	AVEC, Alaska Fish and Game, FWS, Commission Staff	\$14,000	\$0	\$710
24. Signs would be installed at the powerhouse to inform the public about access on the Refuge and conservation lands ^a	AVEC, Alaska Fish and Game, Commission Staff	\$3,000	\$0	\$150
25. Monitor the condition of the signs, gates, barriers, and trail annually, promptly reporting any damage or evidence of unauthorized uses to the Refuge	FWS	\$0	\$0	\$0
26. If deemed necessary by agencies or AVEC, AVEC would hold an annual project review meeting to discuss the project and project effects on Lagoon Creek	AVEC, Alaska Fish and Game, Commission Staff	\$0	\$5,000	\$5,000
27. Constructed Channel Habitat Design and Monitoring Plan	Commission Staff	\$10,000	\$2,000 for 3 years, then \$0	\$800
28. Consult with SHPO, FWS, and Village of Old Harbor in the case of discovering a historic property and resolve	AVEC	\$0	\$0	\$0

any potential effects to it.				
^a	These costs are included in the overall construction and operation costs of the project.			
^b	Included as a proposed environmental compliance monitor.			
^c	Staff recommends and FWS would require that AVEC develop a vegetation management plan, which should not add to the cost of the measure.			
^d	Staff recommends that AVEC develop an avian protection plan, which should not add to the cost of the measure.			
^e	Staff recommends that AVEC develop a ramping rate plan, which should not add to the cost of the measure.			

As Table 4-2 shows, if AVEC finances project construction, the proposed Old Harbor Project would have initial annual costs that far exceed the current power value. Although Commission staff does not explicitly account for the effects inflation may have on the future cost of electricity, the fact that hydropower generation is relatively insensitive to inflation compared to fossil-fueled generators is an important economic consideration for power producers and the consumers they serve.

In the FLA, AVEC estimates that 90 percent of the project's construction cost would be funded by grants from the State of Alaska, with the remaining funds financed at AVEC's bonding rate of 3 percent over a 50-year term. By awarding a construction grant to AVEC, the State of Alaska would shift the burden for a certain percentage of the project's construction cost, making the project much more economical for AVEC to build and operate.

Based on the Commission's policy under the Mead decision, it is the applicant who must decide whether to accept any license and the financial risk that entails.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPREHENSIVE DEVELOPMENT AND RECOMMENDED ALTERNATIVE

Sections 4(e) and 10(a)(1) of the FPA require the Commission to give equal consideration to the power development purposes and to the purposes of energy conservation; the protection, mitigation of damage to, and enhancement of fish and wildlife; the protection of recreational opportunities; and the preservation of other aspects of environmental quality. Any license issued shall be such as in the Commission's judgment will be best adapted to a comprehensive plan for improving or developing a waterway or waterways for all beneficial public uses. This section contains the basis for, and a summary of, our recommendations for relicensing the Old Harbor Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on Commission staff's independent review of the environmental and economic effects of the proposed project and its alternatives, we selected the AVEC's proposal with staff's modifications as the preferred alternative. We recommend this alternative because: (1) issuance of an original hydropower license by the Commission would allow the applicant to build and operate the project as an economically beneficial and dependable source of electrical energy; and (2) the 262-kW of electric capacity available comes from a renewable resource which does not contribute to atmospheric pollution; (3) the public benefits of this alternative would exceed those of the no-action alternative; and (4) the recommended measures would protect, mitigate and enhance environmental resources affected by building, operating, and maintaining the project.

In the following section, we make recommendations as to which environmental measures proposed by AVEC or recommended by agencies or other entities should be included in any subsequent license issued for the project. In addition to AVEC's proposed environmental measures, we recommend additional staff-recommended environmental measures to be included in any subsequent license issued for the project, and we describe these requirements in the draft license articles in Appendix A.

5.1.1 Measures Proposed by Applicant with Staff Modifications

Based on our environmental analysis of the AVEC's proposal in section 3, and the costs discussed in section 4, we conclude that the following environmental measures proposed by AVEC would protect environmental resources and would be worth the cost. Therefore, we recommend the following environmental measures proposed by AVEC with staff-recommended modifications, which are indicated in ***bold and italics***:

Design and Operation Related Measures

- Design the tailrace in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond;
- Design the constructed channel to include substrate, large woody debris, and other habitat suitable for salmon spawning and rearing, and fish passage between Lagoon Creek Tributary and Swimming Pond;
- Build the constructed channel during a period that Alaska Fish and Game deems protective of coho salmon;
- Install bird diverters on the power line and guy wires to prevent bird strikes, ***as part of an avian protection plan consistent with APLIC (2012) standards***; and
- Outfit power poles with perch posts designed to prevent bird electrocution, ***as***

part of an avian protection plan consistent with APLIC (2008) standards.

Administrative Measures

- Employ an environmental compliance monitor during project construction to ensure and document compliance with the provisions of a license; and
- Throughout the term of a license, if deemed necessary by an agency or AVEC, hold an annual project review meeting to discuss the project, any reports, and compliance with license articles.

Geology and Soils

- Pile overburden and soil from excavations outside of wetlands and in such a way as to limit erosion;
- Develop a storm water pollution prevention plan for the collection and routing of storm water during construction activities to minimize erosion; and
- Develop an erosion and sedimentation control plan to decrease erosion and sedimentation during construction and operation of the project, including turbidity monitoring during construction.

Aquatic Resources

Water Quantity

- Limit water diversion rates from the East Fork of Mountain Creek during upramping and downramping to 5 cfs per hour to prevent rapid flow fluctuations and protect aquatic resources in Lagoon Creek Tributary, ***and prepare a plan to monitor the flows and ramping rates for the project.***

Water Quality

- Develop a fuel and hazardous substance spill plan to prevent petroleum product spills from impacting aquatic resources ***that includes a spill prevention control and countermeasure section developed in consultation with FWS, a pre-project sampling and analysis section for hazardous substances developed in consultation with FWS, and a requirement to avoid placing oil/diesel storage facilities in the right-of-way permit area.***

Fisheries Resources

- Develop a fish exclusion plan in consultation with Alaska Fish and Game to prevent fish access to the tailrace and to allow dissolved gas concentrations to equilibrate with the atmosphere before entering Swimming Pond.

Terrestrial Resources

- Establish construction timing windows for avoiding disturbances during bird nesting seasons ***and avoid vegetative clearing between May 1 and August 1;***
- Monitor and report to the FWS any newly established bald eagle nests;
- Postpone blasting within 0.5 mile and construction work within 660 feet of any identified bald eagle nests until after coordination with the FWS ***and avoid construction of permanent facilities within 0.25 mile of an established bald eagle nest tree;***
- If blasting is required within 0.5 mile of an eagle nest, conduct blasting during November-January to avoid the bald eagle breeding season;
- Develop a bear safety plan with protocols to minimize bear encounters during construction and maintenance activities ***that includes notifying Alaska Fish and Game and the FWS in the event of any bear-human conflicts and implementing mitigation measures if bear-denning sites might be affected by construction activity;***
- Minimize the use of helicopters or airplanes near mountainsides adjacent to East Fork of Mountain Creek to avoid potential impacts to mountain goats and, if mountain goats are observed, maintain a 1,500-foot vertical or horizontal clearance to the extent that it can be accomplished safely;
- Revegetate excess soil piles and disturbed areas with a native seed mix recommended by the Plant Materials Center, Alaska Division of Agriculture, ***as part of a vegetation management plan and monitor the long-term success of the revegetation;*** and
- Develop an invasive species management plan prior to commencement of any construction activities, ***as part of a vegetation management plan and monitor the success of the invasive species control measures.***

Recreation and Land Use

- Install, ***maintain, and monitor the effectiveness of*** gates to limit motor vehicle use of the intake access trail and the existing ATV trail to authorized vehicles only to minimize traffic-related erosion;
- Install ***and maintain*** signs at the powerhouse to inform the public about access on the Refuge.

Cultural Resources

- In the case of discovering a historic property during construction of the project (or human remains associated with the Native American Graves Protection and Repatriation Act of 1992), AVEC would consult with the Alaska State Historic Preservation Officer (SHPO), FWS, and Village of Old Harbor to address any potential effects.

5.1.2 Additional Staff-Recommended Measures

We recommend the measures described above, and one additional staff-recommended measure: a constructed channel habitat design and monitoring plan.

Below we discuss the basis for our staff-recommended modifications and additional measures.

Constructed Channel Habitat Design and Monitoring Plan

AVEC proposes to design the constructed channel, which would convey project flows between Swimming Pond and the existing Lagoon Creek Tributary, in consultation with Alaska Fish and Game. Although AVEC states that the constructed channel would be approximately 1,100 feet long, 2-5 feet deep, and 8 feet wide with a 3-foot-wide meandering thalweg and that it would include suitable salmon spawning and rearing habitat, much of the design details of the channel still need to be developed. For example, AVEC states that gravel of appropriate size for salmon spawning would be used but does not specify the size. Similarly, AVEC states that cobbles and logs would be placed to create small pools but does not quantify pool dimensions or frequency of large woody debris. We recommend that AVEC develop a constructed channel habitat design and monitoring plan to formalize plans for construction of the new channel and to facilitate consultation with Alaska Fish and Game and other requesting agencies. The plan would describe physical features of the constructed channel including length, width, depth, sinuosity, dominant and subdominant substrate, habitat unit types (pools, riffles), woody debris, streambank vegetation. In addition, the plan would describe how habitat in the constructed channel meets requirements for coho salmon spawning and rearing life

stages.

AVEC states that the constructed channel between Swimming Pond and Lagoon Creek Tributary would be designed to withstand a 1.5-year recurrence flow of 15 cfs without bed movement, and the channel would allow for movement of fish between Lagoon Creek Tributary and Swimming Pond. However AVEC did not propose ongoing maintenance or monitoring of the constructed channel. Currently, this area does not have a defined channel. Creating a new channel to convey project flows of up to 11.8 cfs²⁵ would require substantial excavation and streambed construction in an area with EFH and spawning and rearing coho salmon. In Section 3.3.3, *Terrestrial Resources*, our analysis indicates that effects of construction on erosion, sedimentation, and turbidity would likely be limited to the period of construction and a short time after construction; however, monitoring would be needed to verify that adverse effects are not ongoing and to confirm that the constructed channel is conveying project flows and providing fish habitat as intended. Therefore, we recommend that the constructed channel habitat monitoring plan include a provision to conduct annual monitoring of the constructed channel during the first three years of project operation to identify any effects of project operations on channel form and aquatic habitat. The development of the plan would result in an additional annualized cost of \$5,520, which is a reasonable cost to ensure that the constructed channel is adequately designed to convey project flows and enhance salmon spawning and rearing habitat.

Ramping Rate Plan

AVEC proposes to install a water bypass system in the powerhouse to ensure continuity of flow downstream of the project during shutdown and limit project ramping rates to 5 cfs per hour. These measures would prevent adverse effects of rapid changes in flow on aquatic resources. We assume that the ramping rate of 5 cfs per hour would be spread evenly over the course of an hour. AVEC, however, did not provide specific details on how they would prove compliance with their proposed measures. As discussed in section 3.3.2, *Aquatic Resources*, a compliance monitoring plan would ensure the licensee does not exceed these proposed limits.

We recommend that AVEC prepare a ramping rate plan in consultation with Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The plan would include details about how AVEC would comply with the proposed ramping rate, describe maintenance and calibration procedures for the flow release mechanisms, describe how operations data would be recorded and reported,

²⁵ Although this EA only evaluates the installation of a single turbine with a maximum hydraulic capacity of 5.9 cfs, AVEC proposes to install a second turbine sometime in the future when “demand warrants” that would increase the project’s maximum hydraulic capacity to 11.8 cfs.

include a provision to report deviations, steps to be taken with ramping rate needs to be temporarily modified, and a schedule for implementation.

These measures would ensure that AVEC is in compliance with the operational limits set in their proposal. We do not believe that development of this plan would materially add to the cost of AVEC's proposal.

Revegetation and Invasive Species Control

The revegetation of disturbed areas (55 acres) would minimize long-term effects to local wildlife populations. AVEC proposed to reseed all disturbed areas and excess soil piles with a certified weed-free native seed mix recommended by the specialists with the Plant Materials Center, Alaska Division of Agriculture and FWS, and prepare an invasive species management plan, but did not provide specific measures.

Alaska Fish and Game recommended that AVEC develop measures to revegetate all disturbed areas to include:

- Locations of treatment areas
- Plant species and methods to be used
- Planting densities
- Fertilizer formulations
- Seed test results
- Application rates
- Locations type and density of woody plantings
- An implementation schedule
- Details for monitoring and maintenance programs

Alaska Fish and Game also recommended that AVEC develop an invasive species control plan that follows requirements identified by the FWS.

The FWS specifies that AVEC prepare a vegetation management plan (FWS condition 30) to include: (1) a description of best management practices to prevent the spread of invasive species, including provisions to clean (e.g., power wash) and inspect construction-related equipment and materials off-site prior to entry into the project area to ensure that equipment is free of seeds, spores, or other vegetation material that may introduce invasive species to the project area, including mid-season inspections; (2) provisions for piling overburden and soil from excavations outside of wetlands and in such a way as to prevent erosion; (3) methods and a schedule for revegetating disturbed areas and excess soil piles with native species, including locations of areas to be revegetated, types of native plant materials, native plant species and methods to be used, source of plant materials, planting densities and application rates, fertilizer formulations, use of certified weed-free seeds, and seed test results; (4) schedule and procedures for

controlling invasive plant species listed in the refuge's 2010 Priority Invasive Species List, or any updated list; (5) a monitoring program to evaluate the success of revegetation and invasive plant management efforts, including criteria that define when revegetation and management of target invasive species is successful for two growing seasons after completion of construction and revegetation efforts--if invasive plants are found during the initial 2-year monitoring period, remediation needs to occur and then monitored for another two growing seasons until weed-free conditions are met; and (6) monitoring during annual site maintenance to insure identification and removal of invasive plants detected in the project area.

We recommend that AVEC develop and implement a vegetation management plan for all project lands affected by construction activities that provides more details on the specific measures proposed for revegetating disturbed areas and managing invasive species, consistent with the conditions recommended by Alaska Fish and Game and specified by FWS, as described above. These measures would reduce the risk of the introduction and spread of invasive plant species in the project area, while promoting native vegetation. Monitoring and maintenance of site rehabilitation efforts would ensure the long-term success of vegetation planting and prevent or control the spread of target invasive plant species during construction and beyond. We do not believe that the development of a vegetation management plan would materially add to the cost of AVEC's proposals.

Avian Protection Plan

AVEC proposes to install perch posts on the power poles to minimize the potential for avian electrocutions. We assume that the perch posts are designed to provide birds with a safe perch above dangerous energized components. AVEC, however, did not provide specific design for the perch posts. As discussed in section 3.3.3, *Terrestrial Resources*, anti-perching devices may not be effective without installation of perch guards to prevent perching beneath the installed perches and may deteriorate over time.

As an alternative, design of the power poles with adequate separation between energized components, groundwires, or other metal hardware, consistent with APLIC's *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*, might more effectively protect raptors and other bird species from electrocution. Implementing the design standards typically do not add much to the cost of the transmission line. AVEC estimates that the perch posts could cost about \$5,000.

We recommend that AVEC prepare an avian protection plan that includes design drawings of the power poles that provides for adequate separation of energized conductors, groundwires, and other metal hardware, or other measures to protect birds from electrocution, consistent with APLIC guidelines. We believe that cost would be no more than the \$5,000 (average annualized cost of \$260) estimated by AVEC and would

be worth the benefits to bird species, including bald eagles.

AVEC proposes to install bird diverters on the transmission line and guy wires to minimize the potential for avian collision, including the federally listed Steller's eider and bald eagle. AVEC, however, has not proposed a specific design for the diverters or determined the spacing between diverters. AVEC estimated that the cost of installing bird diverters would be about \$10,000.

Marking the line would make it more visible to birds that might hunt in or move through the project area. Bird flight diverters can include spirals, plates, swivels, or spheres attached to the transmission line or the groundwire. Not all markers are suitable for all lines. Further, the recommended distance between markers can vary. Therefore, as part of the avian protection plan, AVEC should describe the specific flight diverters and distances between diverters consistent with the guidelines set forth in *Reducing Avian Collisions with Power Lines: The State of the Art in 2012* (APLIC, 2012). We believe that the annualized cost, as estimated by AVEC, of \$510 would be worth the benefits to protected bird species.

Bald Eagle Nest Protection

Construction activities have the potential to adversely affect bald eagle nesting. In recent years, bald eagles have nested within 1,900 feet of the proposed construction area. This distance is beyond the minimum 660-foot protective zone outlined in national bald eagle management guidelines (USFWS, 2007) and the 0.25 mile distance specified in FWS condition 46. The location of eagle nests, however, can change prior to the initiation of project construction. AVEC proposes to postpone construction work that would occur within 660 feet of any identified bald eagle nest until after coordination with the FWS.

The larger buffer prescribed by FWS than proposed by AVEC would reduce the risk to nesting eagles from construction disturbance, particularly in the generally open habitats in the project area where nests are not shielded by vegetation or topography. If construction activities need to occur within 0.25 mile of an active nest, AVEC should consult with FWS concerning measures to minimize potential effects. This measure would not result in additional costs based on the location of known nests, unless eagles relocate their nests closer to project facilities prior to commencement of project construction.

Bear Safety

Alaska Fish and Game recommended that AVEC develop and implement a Bear Safety Plan that would include: (1) instructions for project operations when bears are present to minimize possible conflict; (2) instructions to minimize encounters and avoid

areas frequented by bears; (3) instructions for keeping construction sites and refuse areas clean of substances that attract bears; (4) installation of bear resistant garbage receptacles and other measures during construction; and (5) procedures to deal with problem bears. FWS specifies that: (1) all food wastes must not be stored in the right-of-way permit area (FWS condition 41); (2) problems with wildlife must be reported to the Refuge Director and feeding wildlife or disputing animal activity and take of any animal except in the case of life or property is prohibited (FWS condition 45); and (3) appropriate mitigation measures to protect human safety and protect wildlife, if denning sites are identified (FWS condition 50). AVEC proposes to work with the FWS and Alaska Fish and Game to develop protocols to minimize bear encounters during construction and maintenance activities.

Developing a Bear Safety Plan with the measures recommended by Alaska Fish and Game and specified by the FWS would reduce the risk of bear-human encounters and help protect the bear population in the project area as well as the safety of workers on-site. We recommend that the plan include notification of Alaska Fish and Game, in addition to the FWS, in the event of any bear-human conflicts. We do not believe that development of this plan would add significant cost.

Inadvertent Discovery of Cultural Resources

The proposed project would have no effect to historic properties. However, AVEC may discover cultural resources as a result of the project's construction, operations, or project-related activities. To protect historic properties, staff recommends a measure that addresses the discovery of previously unidentified cultural resources. Staff would include a license article (Article 413) to protect any significant cultural resource or historic property that would be inadvertently discovered during project construction or with any other project-related activities.

5.2 UNAVOIDABLE ADVERSE EFFECTS

Construction and operation of the proposed project would result in temporary construction related increases in erosion and sedimentation of project lands and waters and minimal on-going sediment effects, temporary increases in water turbidity during construction of project facilities, and minor visual effects on surrounding properties.

During construction, the development and implementation of an erosion and sediment control plan should mitigate potential effects to minor levels. Once operational, the additional flow being diverted to Lagoon Creek could cause an increase in bank erosion. With our recommended monitoring and maintenance measures (Alaska Fish and Game 10(j) recommendation 11), these effects should be minimal.

During operation, flows of up to 5.9 cfs for one turbine operations would be diverted from East Fork of Mountain Creek and transferred to another basin. Although fish have not been found in the vicinity of the intake, flow reductions in the reach downstream would reduce aquatic habitat for aquatic invertebrates and fish. The reach downstream of the canyon section of Mountain Creek supports salmon and is considered to be the upper limit for anadromous fish in Mountain Creek. Flows in the anadromous reach could be reduced from 0-25 percent depending on flow conditions in the basin, and so there would be minimal adverse effects on fish populations from project effects.

The addition of cold project flows to Swimming Pond and Lagoon Creek Tributary would lower water temperature by approximately 0-10 degrees with the largest effects on temperature in summer and fall. Decreased water temperature would improve conditions for fish during certain times in summer when water temperature naturally approaches or exceeds water quality standards for temperature. But lower temperatures also could cause reductions in growth rates and productivity of fish and their food sources. Juvenile salmon typically display density-dependent growth, however, and potential effects of lower temperatures would likely be offset by the addition of rearing habitat due to increased flows in Lagoon Creek Tributary and Lagoon Creek.

Construction activities associated with the diversion structure and intake, penstock, powerhouse, access roads, and transmission line would disturb local wildlife populations during the construction period (up to two construction seasons) as a result of increased noise levels and human disturbance. Construction timing restrictions would minimize effects to migratory birds, including the bald eagle. Helicopter use could disturb mountain goats and other wildlife species such as brown bear and deer but flight restrictions would minimize effects. Maintenance activity and use of ATV's could disturb wildlife through the license term. The clearing of about 5 acres (1 acre permanently lost) of wetland vegetation and about 64 acres (12 acres permanently lost) of upland vegetation would have limited short-term and long-term impacts to wildlife habitat and associated wildlife populations. Some rare plant species could be affected. The spread of invasive plant species could impact wildlife habitat. Revegetation of disturbed areas and control of invasive species would minimize effects. The proposed pipeline is mostly buried and would not hinder wildlife movement through the project area. The transmission line could pose a minimal electrocution and collision hazard to birds, but following accepted design practices would minimize effects.

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

5.3.1 Fish and Wildlife Agency Recommendations

Under section 10(j) of the FPA, 16 USC 803(j), each hydroelectric license issued by the Commission must include conditions based on recommendations provided by

federal and state fish and wildlife agencies for the protection, mitigation, or enhancement of fish and wildlife resources affected by the project.

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency shall attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency.

In response to our Ready for Environmental Analysis notice, Alaska Fish and Game filed 19 recommendations under section 10(j) of the FPA (letter filed on August 11, 2014; amended November 20, 2014).²⁶ Fourteen of the 18 recommendations are considered within the scope of section 10(j). Table 5-1 summarizes whether or not the recommendations are adopted under the Staff Alternative. We recommend adoption of all the Alaska Fish and Game recommendations.

Table 5-1. Fish and wildlife agency recommendations for the Old Harbor Project (Source: staff).

Recommendation	Agency	Within the scope of section 10(j)	Annualized cost	Adopted?
Project Operation Plan	Alaska Fish and Game	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$0	Yes
Ramping Rates	Alaska Fish and Game	Yes	\$0	Yes
Notification of Non-Compliance Event	Alaska Fish and Game	No, not a specific measure to protect, mitigate, or enhance fish	\$0	Yes

²⁶ On August 19, 2014, the FWS filed recommendations concerning the spread of invasive plant species. Since the FWS did not specify which section of the FPA its recommendation applied, we consider it under section 10(a) and are addressed in the specific resource sections of this document.

		and wildlife resources.		
Powerhouse Bypass System	Alaska Fish and Game	Yes	\$0	Yes
Tailrace Design and Fish Exclusion Plan	Alaska Fish and Game	Yes	\$0	Yes
Environmental Compliance Monitor	Alaska Fish and Game	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$4,590	Yes
Seasonal Limits on Instream Construction	Alaska Fish and Game	Yes	\$0	Yes
Erosion and Sediment Control Plan (including revegetation measures), Invasive Species Control Plan	Alaska Fish and Game	Yes	\$7,555	Yes
Turbidity Monitoring	Alaska Fish and Game	Yes	\$0	Yes
Fuel and Hazardous Substance Spill Plan	Alaska Fish and Game	Yes	\$260	Yes
Annual Project Review Meeting	Alaska Fish and Game	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	\$5,000	Yes
Access to Site by Alaska Fish and Game Employees	Alaska Fish and Game	No, not a specific measure to protect, mitigate, or	\$0	Yes

		enhance fish and wildlife resources.		
Design Transmission Line to Minimize Avian Electrocution Hazards	Alaska Fish and Game	Yes	\$260	Yes
Bear Safety Plan	Alaska Fish and Game	Yes	\$260	Yes
Protect Mountain Goats from Helicopter Disturbance	Alaska Fish and Game	Yes	\$0	Yes
Penstock Burial to Maintain Wildlife Migration Corridor	Alaska Fish and Game	Yes	\$0	Yes
Restricting Access and Land Use to Minimize Resource Impacts	Alaska Fish and Game	Yes	\$1,120	Yes
Stream Buffers and Location of Facilities	Alaska Fish and Game	Yes	\$0	Yes

5.4 CONSISTENCY WITH COMPREHENSIVE PLANS

Section 10(a)(2) of the FPA, 16 U.S.C., § 803(a)(2)(A), requires the Commission to consider the extent to which a project is consistent with federal or state comprehensive plans for improving, developing, or conserving a waterway or waterways affected by the project. We reviewed six comprehensive plans that are applicable to the Old Harbor Project, located in Alaska.²⁷ No inconsistencies were found.

²⁷ (1) Alaska Department of Natural Resources. Alaska's Outdoor Legacy: Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2009-2014. Anchorage, Alaska; (2) Alaska Department of Fish and Game. 1998. Catalog of waters important for spawning, rearing or migration of anadromous fishes. November 1998. Juneau, Alaska. Six volumes; (3) Alaska Department of Fish and Game. 1998. Atlas to the catalog of waters important for spawning, rearing or migration of anadromous fishes. November 1998. Juneau, Alaska. Six volumes; (4) U.S. Fish and Wildlife Service. 1990. Kodiak National Wildlife Refuge fishery management plan. Department of the Interior, Kodiak, Alaska. August 1990; (5) U.S. Fish and Wildlife Service. 2008. Kodiak National Wildlife Refuge: Revised comprehensive conservation plan. Department of the Interior, Anchorage, Alaska. August 2008; and (6) U.S. Fish and Wildlife Service. Undated. Fisheries USA: the recreational fisheries policy of the U.S. Fish and Wildlife Service. Washington, D.C.

6.0 FINDING OF NO SIGNIFICANT IMPACT

On the basis of the Commission staff's independent analysis, the issuance of an original minor license for the proposed Old Harbor Hydroelectric Project, as proposed, would not constitute a major federal action significantly affecting the quality of the human environment.

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APPENDIX A

DRAFT LICENSE ARTICLES

Article 301. *Start of Construction.* The licensee must commence construction of the project works within two years from the issuance date of the license and must complete construction of the project within 5 years from the issuance date of the license.

Article 302. *Contract Plans and Specifications.* At least 60 days prior to the start of any construction, the licensee must submit one copy of its plans and specifications and supporting design document to the Commission's Division of Dam Safety and Inspections (D2SI)-Portland Regional Engineer, and two copies to the Commission (one of these shall be a courtesy copy to the Director, D2SI). The submittal to the D2SI-Portland Regional Engineer must also include as part of preconstruction requirements: a 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 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.

Article 303. *Cofferdam and Deep Excavation Construction Drawings.* Should construction require cofferdams or deep excavations, the licensee must: (1) review and approve the design of contractor-designed cofferdams and deep excavations prior to the start of construction; and (2) ensure that construction of cofferdams and deep excavations is consistent with the approved design. At least 30 days before starting construction of any cofferdams or deep excavations, the licensee must submit one copy to the Commission's Division of Dam Safety and Inspections (D2SI)-Portland Regional Engineer and two copies to the Commission (one of these copies shall be a courtesy copy to the Commission's Director, D2SI), of the approved cofferdam and deep excavation construction drawings and specifications, and the letters of approval.

Article 304. *As-built Drawings.* Within 90 days of completion of construction of the facilities authorized by this license, the licensee must file for Commission approval, revised exhibits A, F, and G, as applicable, to describe and show those project facilities as built. A courtesy copy must be filed with the Commission's Division of Dam Safety and Inspections (D2SI)-Portland Regional Engineer, the Director, D2SI, and the Director, Division of Hydropower Administration and Compliance.

Article 305. *Public Safety Plan.* At least 60 days prior to the start of construction, the licensee must submit one copy to the Commission's Division of Dam Safety and Inspections (D2SI)-Portland Regional Engineer and two copies to the Commission (one of these copies shall be a courtesy copy to the Commission's Director, D2SI) of a Public Safety Plan. The plan must include an evaluation of public safety concerns at the project

site, including designated recreation areas, and assess the need for the installation of safety devices or other safety measures. The submitted plan must include a description of all public safety devices and signage, as well as a map showing the location of all public safety measures. For guidance on preparing public safety plans the licensee can review the *Guidelines for Public Safety at Hydropower Projects* on the FERC website.

Article 306. *Project Modification Resulting from Environmental Requirements.* If environmental requirements under this license require modification that may affect the project works or operations, the licensee must consult with the Commission's Division of Dam Safety and Inspections (D2SI)–Portland Regional Engineer. Consultation must allow sufficient review time for the Commission to ensure that the proposed work does not adversely affect the project works, dam safety, or project operation.

Article 401. *Environmental Compliance Monitor.* At least 30 days before the start of any land disturbance or land clearing activities, the licensee must designate a qualified environmental compliance monitor to be on-site during project construction and have the authority to:

- (1) Issue cease work orders in the field, as applicable and deemed necessary; and
- (2) Document compliance of the licensee with the conditions of the license.

The environmental compliance monitor should have a background in the biological sciences with experience in water quality monitoring and erosion/sediment control measures. The licensee must consult with Alaska Fish and Game and the U.S. Fish and Wildlife Service (FWS) on the details of the environmental compliance monitor, including qualifications, duties, and responsibilities. The licensee must allow a minimum of 30 days for the agencies to comment and to make recommendations prior to finalizing the position details. The selection, responsibilities, and authority of the environmental compliance monitor must also be consistent with FWS Condition 31.

Article 402. *Annual Project Review Meeting.* The licensee must hold project review meetings to discuss the project and project effects on Mountain Creek and Lagoon Creek by March 31 of each year. At a minimum, Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service must be invited to these project meetings. These meeting must be held annually during construction of the project and for the first three years after project operations commence, and every three years thereafter or as deemed necessary by Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The purposes of these meetings are to review results of ongoing monitoring, discuss the effectiveness of required environmental protection plans, and determine any course of actions, as necessary, including the need for continued monitoring, changes to any environmental protection plans or changes in

project structures or operation. By October 31 of each year, the licensee must file with the Commission a report that summarizes the meeting and includes recommendations, if any, to changes to the environmental protection plans or the project. The Commission reserves the right to require changes to the report.

The licensee must allow a minimum of 30 days for the agencies to comment on the summary document 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.

If the licensee and Alaska Fish and Game, National Marine Fisheries Service, and/or U.S. Fish and Wildlife Service mutually agree to any changes in monitoring protocols (including the termination of monitoring), changes in environmental protection plans, or changes to the project or project operations, the licensee must file with the Commission an application to amend the license. Such changes may not be implemented without prior Commission authorization

Article 403. Erosion, Sediment, and Storm Water Control Plan. At least six months before the start of any land-disturbing or land-clearing activities associated with project construction, the licensee must file, for Commission approval, a final erosion, sediment, and storm water control plan. The plan must provide specific descriptions of features incorporated into the final project design and measures that will be employed during construction to erosion, stabilize slopes, and to minimize the quantity of sediment likely to result from site access, project construction, spoil-disposal, and project operation. The plan must include, in addition to the measures required by U.S. Fish and Wildlife (FWS) conditions 33 and 51, at a minimum, the following:

- (1) Descriptions of the soil, and groundwater conditions;
- (2) Preventative measures based on site-specific conditions;
- (3) Detailed descriptions, functional design drawings, and specific topographic location of all control measures, including:
 - a. rip-rap placement;
 - b. stream set back and stabilization of spoil material;
 - c. class of rock that may be used;
 - d. silt fences or other best management practices to be used to control storm water.
- (4) A map showing the location of any construction staging, lay down, and spoil storage areas in relation to project features; and
- (5) Description of turbidity monitoring to be done during project construction in Lagoon Creek Tributary, including:

- a. estimation of a baseline range for natural conditions using pre-construction turbidity samples;
- b. sampling turbidity daily in the existing channel of Lagoon Creek Tributary, at a location approximately 100 ft downstream of the lower end of the constructed channel; and
- c. a plan to cease construction activities, locate sediment sources, and implement appropriate sediment control measures if turbidity exceeds 25 NTU above natural conditions. This plan must include notification and consultation with Alaska Fish and Game, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the Commission if turbidity levels are exceeded.

(6) An implementation schedule.

The plan must be developed after consultation with Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

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

Article 404. Ramping Rate Plan. The licensee must limit changes in project discharge to a ramping rate of no more than 5 cfs per hour, spread evenly over a one hour period (e.g., 1 cfs every 12 minutes). At least 90 days before the start of project operations, the licensee must file for Commission approval, a ramping rate plan that describes how the licensee will document compliance with the required ramping rate limitation.

The plan must include, but not necessarily be limited to, the following:

- (1) A detailed description of how the licensee will document compliance with the required ramping rate;

- (2) a description of any periodic maintenance or calibration procedures necessary to ensure that the flow control valve and water bypass system work properly;
- (3) protocols for recording and maintaining project discharge data;
- (4) a provision to report, as soon as possible, any deviations from the required ramping rate with Alaska Fish and Game, National Marine Fisheries Service, U.S. Fish and Wildlife Service, and the Commission;
- (5) the steps to be taken when the ramping rate needs to be temporarily modified if required by operating emergencies beyond the control of the licensee and for short periods of time for project maintenance; and
- (6) a schedule for implementing the plan.

The licensee must prepare the plan after consultation with the Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

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

Article 405. Tailrace and Fish Exclusion Plan. At least six months before the start of project construction, the licensee must file, for Commission approval, a tailrace and fish exclusion plan. The plan must describe and include detailed drawings of how the tailrace facilities will be designed to: (1) reduce attraction flows and prevent fish from entering the tailrace, and (2) route project outflows to minimize risk of gas super-saturation in project outflows.

The licensee must prepare the plan after consultation with Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by

the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to make recommendations before filing the plan the Commission. If the licensee does not adopt a recommendation, the filing must include the licensee's reasons, based on project-specific information.

The Commission reserves the right to require changes to the plan, including the proposed facilities and schedule. Project construction may not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 406. Fuel and Hazardous Substance Spill Plan. At least six months before the start of any land-clearing or land disturbing activities, the licensee must file for Commission approval, a fuel and hazardous substances spills plan to help prevent and minimize any impacts associated with the handling of hazardous substances during project construction and operation.

The plan must include, in addition to the measures required by U.S. Fish and Wildlife conditions 32, 38, and 53, but not necessarily be limited to the following:

- (1) outline AVEC's procedures for reporting and responding to releases of hazardous substances;
- (2) outline AVEC's procedures for timely identification and remediation of spills;
- (3) identify and maintain a cache of spill cleanup equipment sufficient to contain any spill from the proposed project;
- (4) call for AVEC to provide a report specifying the location of spill clean-up equipment and the location, type, and quantity of oil and hazardous substances stored in the proposed project area; and
- (5) require that AVEC inform Alaska Fish and Game, FWS, and other requesting agencies as to the nature, time, date, location, and action taken for any spill affecting the project.

The licensee must prepare the plan in consultation with Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

The Commission reserves the right to require changes to the plan. Project operation may not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 407. Constructed Channel Habitat Design and Monitoring Plan. At least six months before the start of channel construction, the licensee must file, for Commission approval, a constructed channel habitat design and monitoring plan for the approximately 1,100-foot-long constructed channel between Swimming Pond and the existing channel in Lagoon Creek Tributary.

The plan must include, but not necessarily be limited to:

- (1) detailed drawings of the constructed channel from Swimming Pond to the existing channel of Lagoon Creek Tributary;
- (2) a description of physical features of the constructed channel including length, width, depth, sinuosity, dominant and subdominant substrate, habitat unit types (pools, riffles), woody debris, streambank vegetation;
- (3) a description of how habitat in the constructed channel meets requirements for coho salmon spawning and rearing life stages;
- (4) a schedule for building the constructed channel during a period that Alaska Fish and Game deems is protective of coho salmon; and
- (5) a plan to monitor channel geomorphology and fish habitat in the constructed channel between Swimming Pond and the existing channel of Lagoon Creek Tributary for three years once project operations commence. Specifically the monitoring plan should include:
 - a. a description of physical features of the constructed channel including length, width, depth, sinuosity, dominant and subdominant substrate, habitat unit types (pools, riffles), woody debris, streambank vegetation;
 - b. a description of any changes in the channel attributes listed in (5)(a) from prior-year status;
 - c. an assessment of whether any changes in the constructed channel affect the quality of fish habitat or connectivity between Swimming Pond and

Lagoon Creek Tributary;

- d. documentation of any fish in the constructed channel that are observed incidentally during habitat monitoring surveys; and
- e. a schedule of annual meetings for the first three years of project operations to report on the results of monitoring the channel. (Note: this meeting may be in conjunction with the proposed annual meeting, Article 402.) The purpose of these meetings is to determine any course of action to be recommended based on the results of the monitoring, including the need for continued monitoring and changes in project structures or operations. The licensee must prepare the plan and schedule after consultation with the Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service.

The licensee must prepare the plan in consultation with Alaska Fish and Game, National Marine Fisheries Service, and U.S. Fish and Wildlife Service. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

The Commission reserves the right to require changes to the plan. Project operation may not begin until the licensee is notified by the Commission that the plan is approved. Upon Commission approval, the licensee must implement the plan, including any changes required by the Commission.

Article 408. Avian Protection Plan. At least six months before the start of any land-disturbing or land-clearing activities associated with project construction, the licensee must file, for Commission approval, an avian protection plan to protect birds from electrocution and collision hazards.

The plan must include the following:

- (1) design drawings of the power poles that provides for adequate separation of energized conductors, groundwires, and other metal hardware, or other measures to protect birds from electrocution, consistent with the guidelines provided in Avian Power Line Interaction Committee's (APLIC) *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006*;

- (2) a detailed description of the devices to be installed on the transmission line to minimize avian collisions, including type of device and spacing between devices, consistent with the guidelines provided in APLIC's *Reducing Avian Collisions with Power Lines: The State of the Art in 2012*;
- (3) provisions for notifying agencies if dead or injured birds are detected; and
- (4) an implementation schedule.

The plan must be developed after consultation with U.S. Fish and Wildlife Service and Alaska Department of Fish and Game. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

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

Article 409. Construction Timing to Protect Nesting Birds. The license must construct the project according to the following restrictions, in addition to the measures required by U.S. Fish and Wildlife (FWS) conditions 37 and 46:

- (1) In the event a bald eagle nest is identified by the environmental compliance monitor, avoid blasting within 0.5 mile of the nest. If blasting is required within 0.5 mile of an eagle nest, blasting must take place in winter (November-January);
- (2) Consult with FWS prior to any construction activities proposed within 0.25 mile of an active eagle nest to determine the need for protective measures; and
- (3) Report any newly established bald eagle nest to the U.S. Fish and Wildlife Service.

Article 410. Bear Safety Plan. At least 6 months before the start of any land-disturbing or land-clearing activities associated with project construction, the licensee

must file for Commission approval, a bear safety plan that includes, in addition to the measures specified in U.S. Fish and Wildlife (FWS) conditions 41, 45, and 50, the following provisions:

- (1) measures for project operations when bears are present to minimize possible conflict;
- (2) measures to minimize encounters and avoid areas frequented by bears;
- (3) measures for keeping construction sites and refuse areas clean of substances that attract bears;
- (4) installation of bear-resistant garbage receptacles and other measures during construction;
- (5) procedures to deal with problem bears; and
- (6) notification of Alaska Department of Fish and Game in the event of any bear-human conflicts.

The plan must be developed after consultation with FWS and Alaska Department of Fish and Game. The licensee must include with the plan documentation of consultation, copies of comments and recommendations on the completed plan after it has been prepared and provided to the agencies, and specific descriptions of how the agencies' comments are accommodated by the plan. The licensee must allow a minimum of 30 days for the agencies to comment and to 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.

The Commission reserves the right to require changes to the plan. Upon Commission approval, the licensee must implement the plan including any changes required by the Commission.

Article 411. Mountain Goat Avoidance. To protect mountain goats during project construction, operation, and maintenance, the licensee must minimize helicopter disturbance by maintaining a 1,500-foot vertical or horizontal clearance from observed mountain goats when in the project area.

Article 412. FERC Form 80 Exemption. There is little or no potential for recreation facilities within the project boundary. Therefore, upon the effective date of the license, the licensee is exempt from 18 § C.F.R. 8.11, the filing of the FERC Form 80 recreation report, for the Old Harbor Hydroelectric Project.

Article 413. Protection of Undiscovered Cultural Resources. If the licensee discovers previously unidentified cultural resources during the course of constructing, maintaining, or developing project works or other facilities at the project, the licensee must stop all land-clearing and land-disturbing activities in the vicinity of the resource and consult with the Alaska SHPO, U.S. Fish and Wildlife Service (if the cultural resource is on lands under their jurisdiction), and Old Harbor Tribal Council (if the cultural resource is aboriginal) to determine the need for any cultural resource studies or measures. If no studies or measures are needed, the licensee must file with the Commission documentation of its consultation with the Alaska SHPO, and depending on the lands involved, with the U.S. Fish and Wildlife Service, and if the finds are aboriginal with Old Harbor Tribal Council, accordingly.

If a discovered cultural resource is determined to be eligible for the National Register of Historic Places (National Register), the licensee must file for Commission approval a HPMP prepared by a qualified cultural resource specialist after consultation with the Alaska SHPO, and other appropriate consulting parties. In developing the HPMP, the licensee must use the Advisory Council on Historic Preservation and the Federal Energy Regulatory Commission's Guidelines for the Development of Historic Properties Management Plans for FERC Hydroelectric Projects, dated May 20, 2002. The HPMP must include the following items: (1) a description of each discovered property, indicating whether it is listed in or eligible to be listed in the National Register; (2) a description of the potential effect on each discovered property; (3) proposed measures for avoiding or mitigating adverse effects; (4) documentation of consultation; and (5) a schedule for implementing mitigation and conducting additional studies. The Commission reserves the right to require changes to the HPMP.

The licensee must not resume land-clearing or land-disturbing activities in the vicinity of a cultural resource discovered during construction, until informed by the Commission that the requirements of this article have been fulfilled.

Article 414. Use and Occupancy. (a) In accordance with the provisions of this article, the licensee must 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 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 must also have continuing responsibility to supervise and control the use 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 must take any lawful action necessary to correct the violation. For a permitted use or occupancy, that action includes, if necessary, canceling the permission to use and occupy the project lands and waters and requiring the removal of any non-complying structures and facilities.

(b) The type 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 that can accommodate no more than 10 water craft at a time and where said facility is intended to serve single-family type dwellings; (3) embankments, bulkheads, retaining walls, or similar structures for erosion control to protect the existing shoreline; and (4) food plots and other wildlife enhancement. To the extent feasible and desirable to protect and enhance the project's scenic, recreational, and other environmental values, the licensee must require multiple use and occupancy of facilities for access to project lands or waters. The licensee must also ensure, to the satisfaction of the Commission's authorized representative, that the use 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 must: (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 impoundment 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 modification 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 or roads where 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 impoundment. No later than January 31 of each year, the licensee must 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 certification 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 water craft at a time and are located at least one-half mile (measured over project waters) from any other private or public marina; (6) recreational development consistent with an 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 project waters at normal 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 60 days before conveying any interest in project lands under this paragraph (d), the licensee must file a letter with the Commission, 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 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 Commission's authorized representative, 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 paragraph (c) or (d) of this article:

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

(3) The instrument of conveyance must include the following covenants running with the land: (i) the use of the lands conveyed must not endanger health, create a nuisance, or otherwise be incompatible with overall project recreational use; (ii) the grantee must 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; and (iii) the grantee must not unduly restrict public access to project waters.

(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 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 must be consolidated for consideration when revised Exhibit G drawings would be filed for approval for other purposes.

(g) The authority granted to the licensee under this article must not apply to any part of the public lands and reservations of the United States included within the project boundary.

APPENDIX B

Response to Comments on the Draft Environmental Assessment

Written comments on the draft EA were filed by the following entities:

<u>Commenting Entity</u>	<u>Date Filed</u>
AVEC	June 8, 2015
Alutiiq Tribe of Old Harbor	June 8, 2015
City of Old Harbor	June 8, 2015 and June 30, 2015
Old Harbor Native Corporation	June 8, 2015
State Senator Gary Stevens	June 30, 2015
US Senator Lisa Murkowski, US Senator Dan Sullivan, and US Congressman Don Young	July 17, 2015

Below we summarize the comments that were filed, include our responses to those comments, and indicate where we made modifications to in the final EA.

Proposed Alternative – Single Turbine vs. Two Turbines

Comment: The City of Old Harbor, the Alutiiq Tribe of Old Harbor, Old Harbor Native Corporation, and AVEC state that the draft EA was unclear and misleading in respect to the proposed alternative, because the draft EA presented the analysis as if only a single turbine was proposed rather than the fact that two turbines were proposed.

Response: We have revised the executive summary, section 1.2 *PURPOSE OF ACTION AND NEED FOR POWER*, and section 2.2 *APPLICANT’S PROPOSAL* in the final EA to clarify the proposed alternative and staff’s reasoning for only analyzing the installation of a single turbine rather than AVEC’s two-turbine proposal.

Comment: Alaska State Senator Gary Steven suggests that we reconsider only authorizing a single turbine for the project. The City of Old Harbor, the Alutiiq Tribe of Old Harbor, the Old Harbor Native Corporation, AVEC, U.S. Senator Lisa Murkowski, U.S. Senator Dan Sullivan, and U.S. Congressman Don Young contend that only authorizing the installation of a single turbine would inhibit the overall economic development of Old Harbor. The City of Old Harbor, AVEC, Senator Murkowski, Senator Sullivan, and Congressman Young list numerous, recently planned or proposed facility and infrastructure projects within the community that would contribute to the energy load growth and they believe would result in the need for the installation of the second turbine earlier than our estimation of 40 years. In addition to general load growth, the City of Old Harbor states that they are working on the development of both a fish processing plant and fish hatchery, which could add significant energy needs to the

current demand. The City of Old Harbor, Alutiiq Tribe, and AVEC estimate the second turbine may be needed within 10 to 20 years.

Response: The city's energy demand in the year 2000 was 664,000 kWh, while AVEC's license application states that the city's current energy demand is 898,952 kWh. This increase in demand represents a 2.0 percent annual growth over the last approximately 15 years. However, our need for power analysis in the EA uses a slightly higher estimated load growth of 2.5 percent, as specified in AVEC's license application. This higher load growth estimate includes many of the energy needs listed in the comment letters filed on the draft EA (i.e., residential needs and lighting, development of additional housing, population growth, and economic development progresses). Using the estimated 2.5 percent load growth, our need for power analysis suggests that the energy demand of the Old Harbor Community will not warrant the need for a second turbine at the proposed project for 30 to 40 years.

We recognize that changes in load growth, either the addition or loss of a large load, could change AVEC's timing for adding the second turbine. Although the City of Old Harbor states that they intend to build a fish processing plant and fish hatchery in the near future, these projects can have a significant range in power needs depending upon their size and operating hours. Because of the variable range in power needs for these types of facilities and a lack of detailed information from AVEC or the Old Harbor community on the expected power needs and timing of installation for these proposed facilities, we have not included these facilities in the need for power analysis.

We continue to believe that our estimate of the need for project power is reasonable based on the application and the information provided to date.

Comment: U.S. Senator Lisa Murkowski, U.S. Senator Dan Sullivan, and U.S. Congressman Don Young contend that FERC previously licensed a 500-kW, two-turbine hydroelectric project for the Old Harbor community on December 12, 2000 that was ultimately never constructed. Senator Murkowski, Senator Sullivan, and Congressman Young state that it is perplexing why FERC would not authorize the current two-turbine project proposal when the community's energy needs are greater now than in the year 2000.

Response: In 2000, FERC issued a license to AVEC for a 500-kW hydroelectric project to supply power to the community of Old Harbor. Although never constructed, the proposed project was to consist of a single 500-kW turbine generator to be installed immediately following license issuance. In contrast, AVEC's current proposal is to install a single 256-kW turbine upon license issuance and a second 256-kW turbine "when demand warrants." Critical to our recommendation to only authorize the single turbine is the estimated timing of the installation of the second turbine, with staff's analysis showing that demand would not warrant it for another 30 or 40 years.

Comment: The City of Old Harbor, the Alutiiq Tribe of Old Harbor, Old Harbor Native Corporation, and AVEC state that by not authorizing a second turbine now, an amendment to the applicant would be required when additional power is needed. The City of Old Harbor, the Alutiiq Tribe, the Old Harbor Native Corporation, and AVEC state that the community and AVEC do not have the resources to go through the amendment process in the near future.

Response: We recognize that there would be an additional cost associated with filing an application to amend the license for the authorization to install a second turbine. However, the cost of a license amendment would be dependent on the extent of changes in the existing environment and project-related resource effects. If the environmental resources at the project have experienced little change between now and when the second turbine is needed, the cost of filing for a license amendment would be minimal.

Cost Burden of Recommended Measures

Comment: The City of Old Harbor and AVEC state that development of the recommended constructed channel habitat design and monitoring plan, inclusion of spawning habitat in the channel design, requiring fish surveys, and conducting 3 years of monitoring would impose an additional cost burden on the licensee, higher than the cost estimated by the Commission, and that this additional burden is unwarranted.

Response: The constructed channel habitat design and monitoring plan is needed to document each physical feature and related feature purpose to be incorporated in the new channel, and to facilitate consultation on its design among AVEC, Alaska Fish and Game, NMFS, FWS, and the Commission, so as to optimize available aquatic habitat.

The introduction of new flow can alter constructed channels in unforeseen ways due to erosion and deposition. Therefore, monitoring for 3 years is needed to confirm that the channel maintains its design features and related habitat value. Annual monitoring for 3 years would be required to document “channel geomorphology and fish habitat in the constructed channel” and “any fish in the constructed channel that are observed incidentally during habitat surveys.” Physical habitat parameters to be surveyed include habitat unit type, length, width, depth, sinuosity, substrate, woody debris, and streambank vegetation but surveys for fish are not recommended.

In the DEA we calculated the annual levelized cost for the constructed channel habitat design and monitoring plan incorrectly as \$5520. This cost should instead be \$800 per year or \$2,400 and this change is reflected in Table 4.2. We presented the capital and annual costs for the constructed channel habitat design and monitoring plan correctly and we feel that these cost estimates are reasonable. We estimated that the cost for design of the constructed channel, including consultation with interested agencies, would be

\$10,000. We envision that the features to be included in the constructed channel (e.g., locations of individual habitat units such as pools and riffles; lengths, widths, and depths of habitat units; substrate characteristics; placement of woody debris) would be described in the plan using a table or map format. This table or map could then be used as a template for entering and displaying data gathered during the subsequent three years of monitoring. We estimated that monitoring the constructed channel will cost \$2,000 per year for 3 years. Monitoring would require technician-level staff competent in stream physical habitat surveys. The intent of this monitoring is solely to document whether physical features of the constructed channel change in ways that could negatively impact migrating or rearing fish.

Revegetation and Invasive Species Control and Monitoring Plan

Comment: AVEC agrees to develop a revegetation and invasive species control and monitoring plan and would monitor disturbed areas annually for invasive species for 2 years following construction.

Response: In addition to AVEC's proposal, we recommend that AVEC monitor for invasive species for 2 years following revegetation if invasive species are detected during the initial 2-year period. This would help ensure the long-term success of revegetation efforts. Given the small size of area involved, the additional cost would be minimal.

Transmission Line Design

Comment: AVEC states that the final design of the transmission line will follow current avian protection guidelines for bird diverters and perch posts. AVEC believes this design is sufficient and an avian protection plan document that provides a specific design is redundant.

Response: AVEC has yet to develop specific designs for the proposed avian protection devices, including proposed spacing for the bird diverters. The Commission and the resource agencies need to have an opportunity to review the adequacy of any structures in protecting birds, particularly federally-listed species. The recommended Avian Protection Plan would just need to include such design drawings and specifications and results of consultation.

Cultural Resources

Comment: AVEC states that only in the event of an inadvertent discovery of cultural resources would they consult with the SHPO to develop procedures for determining the discovery's eligibility for the National Historic Register and crafting a historic properties management plan. AVEC states it does not agree to develop procedures on the chance of encountering cultural resources, since the cultural resources survey completed for the

projected suggested that such encounters would be unlikely.

Response: As AVEC states, the chance of encountering cultural resources would be unlikely; however, there is still a need to have a process in place in the case of discovering unexpected cultural resources. In situations where no cultural resources were found during the licensing process, our standard procedure for new and original licenses is to condition the license with a procedure to protect any cultural resource discoveries during construction or operation of a project. This action ensures our compliance with our responsibilities under section 106 of the National Historic Preservation Act.

Appendix C

U.S. Fish and Wildlife's Recommended 4(e) Conditions Old Harbor Hydroelectric Project, FERC No. 13272

RENT:

1. The Permittee is required to make a rental payment in advance for use and occupancy of lands. The annual rental amount will be established by the U.S. Fish and Wildlife Service (Service) Annual Fee Schedule (Fee Schedule) or by an Office of Valuation Services approved appraisal.
2. Payment(s) shall be payable to the Service and forwarded to the attention of the Chief, Division of Realty and Conservation Planning, 1011 East Tudor Road, MS 211, Anchorage, Alaska 99503. Payment by credit card can be made by calling the Collections Officer at (907) 785-3566.
3. Rental rates may be reviewed and adjusted by the Service at any time not less than five (5) years after the grant of the permit or the last revision of charges. Should the Fee Schedule be adjusted, then the rental rate would be adjusted accordingly. The Service will furnish a notice in writing to the Permittee of intent to impose new charges commencing with the ensuing charge year. The revised charges will be effective unless the Permittee files an appeal according to 50 C.F.R. 29.22.

TERMS AND CONDITIONS:

4. As the Authorized Officer, the Refuge Manager will monitor compliance with right-of-way permit (permit) stipulations on behalf of the Service.
5. This permit is granted pursuant to Title XI and subject to outstanding rights, if any, in third parties.
6. Permittee, by accepting this permit, agrees to the terms and conditions contained in the permit and to requirements of 50 CFR 29 and 36 CFR 43.
7. Unless otherwise provided, the Permittee shall not remove any material, earth, or stone for construction or other purpose, except that stone or earth necessarily removed from the right-of-way in the construction of a project may be used elsewhere along the same right-of-way in the construction of the same project.
8. Prior to beginning any activity authorized under this permit, the Permittee shall submit to the Refuge Manager a plan of development describing all activities anticipated to be carried out under the authority of this right-of-way permit during

the coming year, including but not limited to: clearing, construction, and restoration. The plan shall provide sufficiently detailed information to allow the Refuge Manager to effectively monitor activities to be carried out under the plan. Receipt of the plan will be acknowledged in writing by the Refuge Manager. Once approved, a plan of development will be effective for one year. Subsequent plans of development shall be submitted annually for approval, and shall be received by the Refuge office 60 days before the expiration of the current plan. No activities may be carried out under this permit, unless they are described in a current plan of development.

9. Written notice shall be provided to the Refuge Manager 60 days prior to the beginning of construction. Clearing and construction will not begin until the Permittee, contractors, and key employees attend a pre-construction meeting with the Refuge Manager to discuss the extent of the project, work schedules, equipment and materials involved, staging of materials, and responsibilities of each party.
10. Prior to commencement of any activities authorized by this permit, the Permittee shall provide to the Service, (attention Chief, Division of Realty and Conservation Planning) a surety bond. This bond shall meet the requirements of 31 U.S.C. §§ 9301-9309. The bond will remain in place for the life of the project. The bond amount is calculated to cover the anticipated cost of restoration activities.
11. Permittee shall comply with State and Federal laws applicable to the project within which the permit is granted, and to the lands included in the right-of-way, and lawful existing regulations thereunder.
12. Permittee will not disturb or remove any public land survey monument or project boundary monument; unless Permittee requests and receives from the Service approval of measures Permittee will take to perpetuate the location of aforesaid monument.
13. The Permittee will rebuild and repair such roads, fences, structures, and trails as may be destroyed or altered by construction work and will build and maintain suitable crossings for all roads and trails that intersect the works constructed, maintained, or operated under the permit.
14. Permittee shall pay the United States the full value for all damages to the lands or other property of the United States caused by Permittee, its employees, contractors, or employees of the contractors, outside of permitted activities or areas. Permittee shall indemnify the United States against any liability for damages to life, person or property arising from the use of the lands under the

permit. Where the permit involves lands that are under the exclusive jurisdiction of the United States, the Permittee or its employees, contractors, or agents of the contractors, will be liable to third parties for injuries incurred concerning the right-of-way. Because of the special hazards inherent to the activities authorized, grant of this permit imposes liability without fault for each occurrence of injury and damage to the land and property of the United States up to a maximum of \$5,000,000.00.

15. The Permittee will notify promptly the Chief, Division of Realty and Conservation Planning of the amount of merchantable timber, if any, which will be cut, removed, or destroyed in the construction and maintenance of the project, and will pay the United States in advance of construction such sum of money as the Service may determine to be the full stumpage value of the timber to be so cut, removed, or destroyed.
16. The Chief, Division of Realty and Conservation Planning, and the Refuge Manager shall be kept informed of Permittee's principal place of business and the names and addresses of its principal officers.
17. In the installation, operation, and maintenance of the project, Permittee will not discriminate against any employee or applicant for employment because of race, creed, color, sexual orientation or national origin and shall require an identical provision to be included in all subcontracts.
18. Grant of the permit is subject to the express condition that the exercise thereof will not unduly interfere with the management, administration, or disposal by the United States of the land affected thereby. The Permittee agrees and consents to the occupancy and use by the United States, its grantees, permittees, or lessees, of any part of the right-of-way not actually occupied for the purpose of the granted rights to the extent that it does not interfere with the full and safe utilization thereof by the Permittee. The Permittee also agrees that authorized representatives of the United States will have the right of access to the right-of-way for making inspections and monitoring the construction, operation and maintenance of facilities.
19. The permit herein granted shall be subject to the express covenant that any facility constructed thereon will be modified or adapted, if such is found by the Service to be necessary, without liability or expense to the United States, so that such facility will not conflict with the use and occupancy of the land for any authorized works which may hereafter be constructed thereon under the authority of the United States. Any such modification will be planned and scheduled so as not to interfere unduly with or to have minimal effect upon continuity of energy and delivery requirements.

20. The permit herein granted is only for the specific use described and may not be construed to include the further right to authorize any other use within the right-of-way unless approved in writing by the Service.
21. The Permittee is responsible for ensuring that all persons working for the Permittee and conducting activities allowed by this permit are familiar with and adhere to the conditions of this permit.
22. By accepting this permit, the Permittee agrees to reimburse the United States for reasonable and documented costs incurred by the Service in processing the permit application, issuing the permit, and monitoring the installation, construction, operation, maintenance, termination and removal of facilities within or adjacent to the right-of-way. Reimbursement of such expenses shall be according to the Collection Agreement executed by the Permittee and the Service.
23. The Permittee is responsible for obtaining all necessary State and Federal permits and submitting copies to the Refuge Manager prior to the start of construction.
24. Upon completion of construction, the Permittee will file two copies each of a certification of completion and as-built drawings of the completed facilities with the Chief, Division of Realty and Conservation Planning, as proof of construction.
25. All or part of this permit may be terminated by the Service, for failure to comply with any or all of the terms or conditions of the grant, or for abandonment. In the event of noncompliance or abandonment, the Service will notify the Permittee in writing of its intention to suspend or terminate the grant 60 days from the date of the notice, stating the reasons therefore, unless before that time the Permittee completes such corrective actions as are specified in the notice. The Service may grant an extension of time within which to complete corrective actions when, in its judgment, extenuating circumstances not within the Permittee's control such as adverse weather conditions, disturbances to wildlife during breeding periods or periods of peak concentration, or other compelling reasons warrant. Failure to take corrective action within the 60 day period will result in suspension or termination of the permit. This procedure shall also apply in case of abandonment, a rebuttable presumption of abandonment is raised by deliberate failure of the Permittee to use for any continuous 2 year period the permit for the purpose for which it was granted or renewed.
26. Within 90 days after abandonment, or upon expiration or other termination of this permit, a restoration plan will be submitted by the Permittee to the Refuge Manager for approval. Termination includes permits that terminate under the terms of the grant. The Refuge Manager will provide guidance to the Permittee

for developing a restoration plan. All structures, facilities, equipment, gravel, utility lines and all other installations covered by this permit will be removed from the right-of-way. Restoration activities will be conducted as specified in the approved restoration plan. Permittee shall restore the land to its original condition to the satisfaction of the Refuge Manager. Final inspection of the site will be by the Refuge Manager or his designee and will be at the expense of the Permittee.

27. The final disposal by the United States of any tract of land traversed by a right-of-way will not be construed to be a revocation of the right-of-way in whole or in part. Such final disposition will be deemed and taken to be subject to such right-of-way unless it has been specifically canceled.
28. Any proposed transfer by assignment, lease, operating agreement or otherwise, of this permit, or any of the rights conferred by this permit, must be filed in triplicate with the Chief, Division of Realty and Conservation Planning. Additionally, it must be supported by written agreement by the transferee to comply with and be bound by the terms and conditions of the original grant and applicable amendments, if any. A \$25.00 nonreturnable service fee must accompany the proposal. No transfer will be recognized until approved in writing by the Service.
29. The licensee shall, after consultation with U.S. Fish and Wildlife Service about specific locations, install and maintain gates across intake access trail and the existing ATV trail to prevent unauthorized motorized access into the Refuge and conservation lands, and install signs at the powerhouse to inform the public about access provisions on the Refuge and conservation lands. The licensee shall also monitor the conditions of the signs, gates, barriers, and the access trails annually, promptly reporting any damage or evidence of unauthorized uses to the Kodiak Refuge. If unauthorized uses or vandalism are noted, the licensee shall consult with the Refuge to design additional protection measures.
30. At least six months before the start of any land-disturbing or land-clearing activities associated with project construction, the licensee shall file, for Federal Energy Regulatory Commission (Commission) and Service approval, a vegetation management plan. The purpose of this plan is to revegetate areas disturbed by project construction and prevent the introduction and spread of invasive species and noxious weeds during project construction and operation.

The plan shall include, but not necessarily be limited to, the following:

- (1) a description of best management practices to be followed to prevent the introduction and spread of invasive plants during project construction and operation, including provisions to clean (e.g., power wash) and inspect all construction-related equipment and materials off-site prior to entry into the

project area to ensure that equipment is free of seeds, spores, or other vegetation material that may introduce invasive species and noxious weeds to the project area, including mid-season inspections;

- (2) procedures for piling overburden and soil from excavations outside of wetlands and in such a way as to prevent erosion;
- (3) methods and a schedule for revegetating disturbed areas and excess soil piles with native species, including locations of areas to be revegetated, types of native plant materials, native plant species and methods to be used, source of plant materials, planting densities and application rates, fertilizer formulations, use of certified weed-free seeds, and seed test results;
- (4) coordination with the refuge manager to determine a schedule and procedures for controlling invasive plant species from the Refuge's 2010 Priority Invasive Species List, or any updated list, and that may become established in revegetated areas or identified during the term of the license;
- (5) a monitoring program to evaluate the success of revegetation and invasive plant management efforts, including criteria that define when revegetation and management of target invasive species is successful for two growing seasons after completion of construction and revegetation efforts. If invasive plants are found during the initial 2-year monitoring period, remediation needs to occur and then monitored for another two growing seasons until weed-free conditions are met;
- (6) monitoring during annual site maintenance to insure identification and removal of invasive plants detected in the project area;
- (7) a reporting schedule for filing monitoring results with the Commission and the U.S. Fish and Wildlife Service; and
- (8) an implementation schedule.

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

on project-specific information.

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

31. During the construction phase of the project, the Refuge will require onsite monitoring of the activities. Monitors will be environmental compliance personnel, either contracted by the Service and funded through a cost reimbursable agreement with the Permittee, or contracted by a third party consultant, approved by the Refuge Manager, and paid for by the Permittee. The number of monitors will depend upon timing of actual work (whether shifts are involved) and whether various sections of the project are to undergo construction at the same time. Monitors shall be on site during all active periods of road and pipeline construction to monitor and support compliance with all permit stipulations and approved plans of development. These monitors will be the main point of contact for the Service and responsible for providing daily written progress reports to the Refuge Manager and Permittee. Monitors will also have the authority to suspend and recommence activities, as appropriate, if the activity deviates from permit stipulations or plans of development. The monitor(s) shall notify the Refuge Manager and Permittee in writing immediately following suspension of work.
32. Fuel storage, cleanup, and spill reporting will be conducted in accordance with the Service, Region 7, Fuel Storage Policy R7-4. Sorbent material in sufficient quantity to handle operation spills shall be on hand at all times for use in the event of an oil or fuel spill. The Permittee's contractor(s) will develop and have on site a Spill Prevention Control and Countermeasure Plan, as applicable. A copy of this plan will be submitted to the Refuge Manager prior to commencement of construction.
33. All excavation dewatering and storm-water sedimentation control will be performed to meet the requirements of permits issued by the U.S. Environmental Protection Agency and the Alaska Department of Environmental Conservation. Copies of these permits and a Storm-Water Pollution Prevention Plan will be submitted to the Refuge Manager prior to any construction. This plan shall include a detailed procedure for construction of stream crossings, including protocol for fluming stream water to prevent disruption of flow during trench excavation.
34. During all phases of construction, seasonal constraints and weather may require temporary suspension of activities within the right-of-way to protect public health or safety or the environment. If the Refuge Manager determines that an immediate

temporary suspension of all or a portion of activities within the right-of-way is necessary, he/she may suspend such activities without administrative proceeding.

35. Permittee shall clear and keep clear the lands within the right-of-way to the extent and in the manner directed by the Refuge Manager; and will dispose of all vegetative and other material cut, uprooted, or otherwise accumulated during the construction and maintenance of the project in such a manner as to decrease the fire hazard and also in accordance with such instructions as the Refuge Manager may specify. Any maintenance clearing activities (i.e. clearing not associated with initial construction of facilities) shall be authorized under the conditions of a specific Refuge Special Use Permit issued by the Refuge Manager. Such permits shall include those mitigation measures necessary to minimize impacts to Refuge resources.
36. Permittee will do everything reasonably within its power, both independently and on request of any duly authorized representative of the United States, to prevent and suppress fires on or near lands to be occupied under this permit, including making available such construction and maintenance forces as may be reasonably obtainable for the suppression of such fires.
37. No vegetative clearing will occur between May 1 and August 1, in order to protect nesting birds, unless authorized in writing by the Refuge Manager.
38. A Pre-project Sampling and Analysis Plan will be conducted (in coordination with the Refuge Manager) by the Permittee prior to any construction to determine the existing levels of benzene, toluene, ethylbenzene, and xylenes (BTEX) or other hazardous substances for comparison with future values as an indication of leaks or spills during the operation of the facilities. This plan may be waived at the discretion of the Refuge Manager.
39. All bulk hazardous material and all hazardous waste containers are not allowed in the right-of-way permit area.
40. Culverts used within the right-of-way permit area will be periodically inspected and maintained as required by the Refuge Manager.
41. All food wastes will not be stored in the right-of-way permit area.
42. All gray and black water or chemical toilet refuse generated at construction or production facilities will not be allowed in the right-of-way permit area.
43. All trash and non-petroleum solid waste generated at construction or production facilities will be hauled off the Refuge and disposed in accordance with 18 AAC

60 (Solid Waste Regulations) and with 18 AAC 62 (Hazardous Waste Regulations).

44. All hazardous wastes (as defined by the Resource Conservation and Recovery Act of 1976, as amended) will be transported and disposed in accordance with regulation requirements and shall not be stored in the right-of-way permit area.
45. Any problems with wildlife shall be reported immediately to the Refuge Manager. The Permittee, contractors, and employees shall not feed animals. Wildlife shall not be harassed or intentionally approached closely enough to disrupt the animal's activity or to endanger human life. There shall be no taking of any animal except in the case of defense of life and property. In the case of a defense of life and property taking, the Permittee shall immediately contact the Alaska Department of Fish and Game and the Refuge Manager, and salvage those parts of the animal required by State regulations.
46. Disturbance and destruction of eagle nests or nesting trees is prohibited. Initial construction of permanent facilities, including roads, drill pads, and storage areas is prohibited within 1/4-mile of an established nest tree.
47. The Permittee shall be responsible for keeping the project area clean. All trash, survey lath, trail markers and other debris shall be picked up and properly disposed of during the job. At the completion of construction, a final cleanup shall be conducted by the Permittee and approved by the Refuge Manager.
48. The Permittee shall comply with the provisions of the Archeological Resources Protection Act (16 U.S.C. 470(a) (a)). The disturbance of archeological or historical sites and the removal of artifacts from Federal land are prohibited. In the event that cultural resources are found during the project, a localized work halt shall be initiated. This will be followed immediately by telephone contact to the Refuge Manager, and concurrent contact with the State Historic Preservation Officer, to evaluate the significance of any findings and establish any protective measures that may be necessary.
49. The Permittee's employees or contractors are prohibited from hunting, fishing, and trapping when access to the area is obtained by vehicle use of the right-of-way, or any other road not open to the general public.
50. Prior to clearing and construction during the bear denning season, a survey may be conducted by Refuge personnel for the purpose of identifying bear denning sites that might be affected by construction activity. If such denning sites are identified, the Refuge Manager will prescribe appropriate mitigation measures to protect human safety and prevent adverse impacts to wildlife.

51. Initial construction activities will occur in wintertime conditions when the ground is frozen to minimize sedimentation and other potential adverse effects to wetlands, unless authorized in writing by the Refuge Manager.
52. Permittee will be responsible for dust control during all project activities.
53. Oil/diesel storage facilities are not allowed in the right-of-way permit area.
54. The Service reserves the right to grant additional rights-of-way or permits for compatible uses on or adjacent to the right-of-way permit area in order to minimize adverse environmental impacts and the proliferation of separate rights-of-way across Federal lands.
55. Consistent with 50 C.F.R. 25.21(h), the Authorized Officer may require permit modifications at any future time to ensure compatibility with the use and occupancy of the land. Additional permit stipulations may be added over the life of the permit based on new information, technologies, or concerns.

End of Conditions.

Appendix D

US Fish and Wildlife Service Determinations, Findings, and Comprehensive Conservation Plan Amendment

The Fish and Wildlife Service (FWS) is required to make a variety of determinations, findings, authorizations and a Comprehensive Conservation Plan (CCP) amendment before the proposed action could be implemented. Following public comment on this environmental assessment (EA), the FWS will make a finding as to whether there is a significant impact likely to result from the proposed action. If a significant impact is likely, an environmental impact statement would be required before a final decision could be made.

In addition to a decision finding on this EA, 43 CFR Part 36, Transportation and Utility Systems [TUSs] In and Across, and Access to, Conservation System Units in Alaska, states in section 36.7:

(2) Each appropriate Federal agency in making its decision shall consider and make detailed findings supported by substantial evidence as to the portion of the TUS within that agency's jurisdiction, with respect to:

- (i) The need for and economic feasibility of the TUS;*
- (ii) Alternative routes and modes of access, including a determination with respect to whether there is any economically feasible and prudent alternative to routing the system through or within an area and, if not, whether there are alternative routes or modes which would result in fewer or less severe adverse impacts upon the area;*
- (iii) The feasibility and impacts of including different TUSs in the same area;*
- (iv) Short and long term social, economic, and environmental impacts of national, State, or local significance, including impacts on fish and wildlife and their habitat and on rural, traditional lifestyles;*
- (v) The impacts, if any, on the national security interests of the United States, that may result from approval or denial of the application for the TUS;*
- (vi) Any impacts that would affect the purposes for which the Federal Unit or area concerned was established;*
- (vii) Measures which should be instituted to avoid or minimize negative impacts;*
- (viii) The short and long term public values which may be adversely affected by approval of the TUS versus the short and long term public benefits which may accrue from such approval; and,*
- (ix) Impacts, if any on subsistence uses.*

Some of these findings would be incorporated into other determinations such as the compatibility determination (refuge purposes), ANILCA 810 evaluation (impacts to subsistence uses), and NHPA Section 106 letter of concurrence (impacts to historic properties). Other topics will be included in the decision document for this EA. If there is a Finding of No Significant Impact on this EA and, based on other findings, the proposed action is chosen for implementation, an amendment to the Kodiak NWR CCP will be prepared concurrently with the final decision. This amendment would reclassify small areas of the refuge from minimal management to intensive management to accommodate the project. Other activities otherwise allowed in intensive management would not be allowed within these areas.

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