FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON D.C. 20426

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Docket No.: P-13124

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UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Copper Valley Electric Association, Inc. Project No. 13124-003

NOTICE OF AVAILABILITY OF ENVIRONMENTAL ASSESSMENT

(December 28, 2012)

In accordance with the National Environmental Policy Act of 1969 and the Federal Energy Regulatory Commission's (Commission or FERC's) regulations, 18 Code of Federal Regulations (CFR) Part 380 (Order No. 486, 52 Federal Register 47897), the Office of Energy Projects has reviewed Copper Valley Electric Association, Inc.'s application for an original license to construct the Allison Creek Hydroelectric Project (FERC Project No. 13124-003). The proposed 6.5-megawatt project would be located on Allison Creek near Valdez, Alaska. The project would not occupy any federal lands.

Staff prepared a draft environmental assessment (EA) which analyzes the potential environmental effects of licensing the project, and 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 draft 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.

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Any comments should be filed within 45 days from the date of this notice. Comments may be filed electronically via the Internet. See 18 CFR 385.2001(a)(1)(iii) and the instructions on the Commission's web site at http://www.ferc.gov/docs-filing/efiling.asp. Commenters can submit brief comments up to 6,000 characters, without prior registration, using the eComment system at http://www.ferc.gov/docs-filing/ecomment.asp. You must include your name and contact information at the end of your comments. For assistance, please contact FERC Online Support. Although the Commission strongly encourages electronic filing, documents may also be paper-filed.

Public

To paper-file, mail an original and seven copies to: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street, NE, Washington, DC 20426.

For further information, contact Kim Nguyen by telephone at 202-502-6105, or by email at kim.nguyen@ferc.gov.

Kimberly D. Bose,
Secretary.

DRAFT

ENVIRONMENTAL ASSESSMENT

FOR HYDROPOWER LICENSE

Allison Creek Hydroelectric Project—FERC Project No. 13124-003

Alaska

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

December 2012

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ACRONYMS AND ABBREVIATIONS

Alaska DEQ	Alaska Department of Environmental Quality
Alaska DFG	Alaska Department of Fish and Game
Alaska SHPO	Alaska State Historic Preservation Officer
Alaska WRD	Alaska Water Resources Department
Allison Creek Hydroelectric Project	Allison Creek Project or project
Alyeska	Alyeska Pipeline Service Company
APE	area of potential effects
APLIC	Avian Power Line Interaction Committee
AWC	Anadromous Waters Catalog
BMP	best management practice
°C	degrees Celsius
cfs	cubic feet per second
CFR	Code of Federal Regulations
Construction Plan	Construction Water Quality Monitoring Plan
Commission	Federal Energy Regulatory Commission
Copper Valley	Copper Valley Electric Association, Inc.
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
DLP	defense of life and property
DO	dissolved oxygen
EA	environmental assessment
ESA	Endangered Species Act
ESCP	Erosion and Sediment Control Plan
ECM	Environmental Compliance Monitor
ECMP	Environmental Compliance Monitoring Plan
°F	degrees Fahrenheit
FERC	Federal Energy Regulatory Commission
Forest Service	U.S. Department of Agriculture, Forest Service
FPA	Federal Power Act
FR	Federal Register
FWS	U.S. Department of the Interior, Fish and Wildlife Service
Hazardous Plan	Hazardous Materials Containment/Fuel Storage Plan
Interior	U.S. Department of the Interior
KOPs	key observation points
msl	mean sea level
MW	megawatt
MWh	megawatt-hour
National Register	National Register of Historic Places
NWI	National Wetland Inventory

NERC	North American Electric Reliability Corporation
NHPA	National Historic Preservation Act of 1966
NMFS	National Marine Fisheries Service
OCMP	Operation Compliance Monitoring Plan
Safety Plan	Public Safety and Access Plan
SCORP	Alaska's Statewide Comprehensive Outdoor Recreation Plan
SD1	Scoping Document 1
SD2	Scoping Document 2
Spill Plan	Spill Prevention, Control, and Containment Plan
Storm Water Plan	Storm Water Pollution Prevention Plan
Vegetation Plan	Vegetation Management Plan
VMT	Valdez Marine Terminal
Waste Plan	Scavenger and Waste Management Plan

EXECUTIVE SUMMARY

Proposed Action

On August 30, 2011, Copper Valley Electric Association, Inc. (Copper Valley) filed an application for an original license to construct and operate its proposed Allison Creek Hydroelectric Project (project). The proposed project would have an installed capacity of 6.5 megawatts (MW) and would be constructed on Allison Creek near the city of Valdez, Alaska. The project would not occupy any federal lands.

Proposed Project Description

Copper Valley proposes to construct: (1) a 16-foot-high, 130-foot-wide diversion structure with a spillway located 10,000 feet upstream of the mouth of Allison Creek and 2,350 feet downstream from the outlet of Allison Lake; (2) an intake at the spillway conveying flows to the powerhouse via a 42-inch-diameter steel penstock buried for about 500 feet and above-ground for about 7,200 feet traversing the existing grade; (3) a 65-foot-wide, 65-foot-long, 48-foot-high powerhouse containing two Pelton-type, horizontal access turbine/generator units with a total installed capacity of 6.5 MW; (4) a 120-foot-long tailrace extending from the west side of the powerhouse to Allison Creek via a concrete channel and the existing creek bed; (5) a 550-foot-long, 24-foot-wide access road; (6) a parking area; (7) a transformer located in a switchyard adjacent to the parking area; (8) a 3.8-mile-long, 34.5-kilovolt transmission line interconnecting to an existing substation; and (9) appurtenant facilities. Copper Valley proposes to operate the project in a run-of-river mode. The project would bypass about 7,500 feet of Allison Creek. The estimated annual generation output for the project is 23,300 megawatt-hours.

Proposed Environmental Measures

Copper Valley proposes the following environmental measures to protect or enhance geologic, aquatic, terrestrial, recreation, and cultural resources.

During construction:

- Use best management practices (BMPs) for controlling erosion and limiting short-term impacts on water quality;
- Implement an Erosion and Sediment Control Plan (ESCP) to protect water quality and include development of a Storm Water Pollution Prevention Plan, a Construction Water Quality Monitoring Plan, and a Blasting Plan;
- Develop and implement an Environmental Compliance Monitoring Plan (ECMP) to document compliance with environmental measures;
- Implement measures to protect wetlands including: minimizing fill footprint, consolidating project facilities to a small area of impact, revegetating slopes and disturbed surfaces to minimize stormwater pollution, planning and

maintaining sediment prevention measures along the toe of all fill areas adjacent to wetlands or waters, preventing sediments from entering fill areas adjacent to wetlands or waters, using only clean sand and gravel for fill, and stockpiling material in developed areas and/or uplands;
- Use natural products and appropriate colors for various project elements to help them blend in with the natural environment; and
- Develop and implement an Avian Protection Plan with provisions for: restricting vegetation clearing from May 1 through July 15; avoiding project activities within 660 feet of active bald eagle nests; limiting activities, blasts, and helicopter traffic from April 10 through August 10; marking and lighting new powerlines and guy wires; designing lighting for any structures or communication towers to reduce bird attraction and potential bird strikes.

During project operation:

- Develop and implement as part of the existing ESCP: a Fire Protection Plan; a Hazardous Materials Containment/Fuel Storage Plan; a Spill Prevention, Control, and Containment Plan; and a Scavengers and Waste Management Plan;
- Operate the project in a run-of-river mode;
- Release a minimum flow of 2 cubic feet per second (cfs) at the diversion structure into Allison Creek at all times when the project is operating to maintain aquatic habitat;
- Maintain a minimum flow of 10 cfs in Reach 3 of the bypassed reach (6,500 feet downstream from the diversion) from June 16 through October 31, and 8 cfs from November 1 through June 15, if the project is operating to maintain fish habitat;
- Provide a ramping rate of 20 cfs per hour in Reach 3 during project startup and shutdown to maintain fish habitat;
- Install and maintain stream gages below the diversion and in Reach 3, and collect and analyze data from these gages to document compliance with minimum flow releases;
- Develop and implement a Biotic Monitoring Plan in two phases to monitor for effects on fish during construction, water temperature alterations, fish stranding, and connectivity of the bypassed reach of Allison Creek;
- Develop and implement a Vegetation Management Plan that includes restoring temporary access routes and other disturbed areas, and managing weed/invasive species;
- Develop a Terrestrial Connectivity Plan to prevent the penstock from becoming a barrier to wildlife movement;

- Implement a Recreation Management Plan that includes installing and maintaining an interpretive sign in Valdez and informational signs in the vicinity of the powerhouse and the temporary access route;
- Develop and implement a Public Safety and Access Plan that includes installing signs to discourage public access to construction areas and Alaska Department of Natural Resources' land near the Valdez Marine Terminal to provide public safety and security; and
- Protect cultural resources in the event that they are inadvertently discovered during project construction and operation.

Alternatives Considered

This draft environmental assessment (EA) considers the following alternatives: (1) Copper Valley's proposal, as outlined above; (2) Copper Valley's proposal with staff modifications (staff alternative); and (3) no action, meaning the project would not be built.

Staff Alternative

Under the staff alternative, the project would be constructed and operated as proposed by Copper Valley with the modifications and additional measures described below. Our recommended modifications and additional environmental measures include, or are based on, recommendations made by federal and state resource agencies that have an interest in resources that may be affected by construction and operation of the proposed project.

Staff recommended modifications and additional measures:

- Develop an Operation Compliance Monitoring Plan (OCMP);
- Provide failsafe provisions to ensure continuous instream flows to Allison Creek in the event of project shutdown;
- Develop a Tailrace Fish Exclusion Plan to protect fish from injury or mortality;
- Notify the Commission, Alaska Department of Fish and Game (Alaska DFG), and the U.S. Fish and Wildlife Service (FWS) within 10 days of an event not in compliance with any license that may be issued that would affect fish and/or wildlife;
- Include the following additional measures in the Vegetation Management Plan: off-site cleaning and inspecting of all equipment related to construction; using native plants and seeds in areas to be revegetated; monitoring the revegetated areas, with measures to address invasive and noxious weeds should they be found;
- Design and construct the transmission line to adhere to the most current Avian Power Line Interaction Committee standards;

- Survey for harlequin duck nests prior to construction-related activities, and if nests are found, flag the nests and avoid the area during the nesting period;
- Develop and implement a Bear Safety Plan;
- Maintain a 1,500-foot vertical and horizontal clearance from mountain goats when using helicopters;
- Adopt the Penstock Location and Grade Plan recommended by FWS and Alaska DFG as fulfilling the purpose of Copper Valley's Terrestrial Connectivity Plan;
- Develop a plan to discourage fishing, hunting, and trapping in the project area by project personnel; and
- Revise the Recreation Management Plan to include: analyzing alternative alignments of the existing Solomon Gulch Trail and providing details on the preferred alternative developed in consultation with the agencies; conducting construction-related activities away from developed recreation sites, particularly along Dayville Road; scheduling heavy construction traffic to avoid peak times of recreational use; minimizing helicopter use to the extent practicable; and using flight paths and staging areas that are least disruptive to recreational users.

No Action Alternative

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

Public Involvement and Areas of Concern

Before filing its license application, Copper Valley conducted pre-filing consultation under the Alternative Licensing Process. The intent of the Commission's pre-filing process is to initiate public involvement early in the project planning process and encourage citizens, governmental entities, tribes, and other interested parties to identify and resolve issues prior to an application being formally filed with the Commission.

After Copper Valley filed its pre-application document, we conducted scoping to determine what issues and alternatives should be addressed. On April 22, 2010, Copper Valley and the Commission distributed a scoping document to interested parties, soliciting comments, recommendations, and information on the project. We held two scoping meetings in Anchorage and Valdez, Alaska, on August 10 and 12, 2010, respectively. Based on discussions during the scoping meetings and written comments filed with the Commission, we issued a second scoping document on March 28, 2011. On August 30, 2011, Copper Valley filed its license application, and on December 9, 2011, we issued a notice that the application was ready for environmental analysis

soliciting motions to intervene, protests, comments, terms and conditions, recommendations, and prescriptions.

The primary issues associated with licensing the project are the protection of water quality, fisheries, recreation, and wildlife resources during construction and operation.

Staff Alternative

Geology and Soils

Constructing the proposed project would temporarily increase soil erosion and sedimentation. Copper Valley's proposal to implement an ESCP, with the proposed BMPs, along with measures to protect wetlands and development of the Vegetation Plan would limit sedimentation and minimize adverse environmental effects.

Aquatic Resources

During project construction and initial operation, hazardous materials could be spilled into Allison Creek and affect water quality. Copper Valley's ESCP, including its proposed BMPs, would provide a mechanism to ensure this risk is minimized. Copper Valley's ECMP includes provisions for an environmental compliance monitor to observe construction activities and monitor turbidity. These provisions would ensure environmental protection during construction.

Operation of the proposed project would affect fisheries and aquatic habitat in Allison Creek. However, limited pool habitat and high gradient limit habitat suitability in the bypassed reach. Waterfalls and cascades also limit upstream access, such that most of the bypassed reach is devoid of fish. Copper Valley's proposal to operate the project in run-of-river mode would protect aquatic resources upstream and downstream of the project. Copper Valley's proposed minimum flows and ramping rates would protect the limited aquatic resources that do occur in the bypassed reach of Allison Creek. Copper Valley's proposed Biotic Monitoring Plan includes provisions to monitor temperature, stream connectivity and fish use (presence/absence) of the bypassed reach. The Biotic Monitoring Plan also includes an adaptive management strategy that will allow for re-evaluation of the proposed minimum flows and ramping rates to ensure stream connectivity and adequate temperature for aquatic resources. Staff's recommended Tailrace Fish Exclusion Plan that includes measures to reduce fish mortality and injury in the tailrace. Staff's recommended OCMP would provide a means for documenting compliance with operational requirements.

Terrestrial Resources

Constructing the project would result in temporary habitat loss totaling about 35.47 acres, and the permanent removal of 3.57 acres of wetlands and wildlife habitat. Copper Valley's Vegetation Management Plan and measures to protect wetlands, along with staff's additional measures to the Vegetation Plan would guide revegetation efforts in disturbed areas and would include measure to ensure prompt, successful revegetation.

Increased human activity at construction sites and increased construction traffic on nearby roads would temporarily disturb wildlife. Operation and maintenance of the proposed project also could disturb wildlife through increased human activity or heavy equipment operation. Copper Valley's Avian Protection Plan and Terrestrial Connectivity Plan would ensure uninhibited wildlife movement through the project and minimize wildlife disturbance during project construction, operation, and maintenance. Staff's recommended Bear Safety Plan would detail procedures for minimizing bear/human interaction and would provide protection for both.

There would also be a potential for adverse interactions between the project's transmission line and raptors and other birds. However, Copper Valley's proposal to develop and implement an Avian Protection Plan, and staff's additional measure to design and construction the transmission line to adhere to the most current Avian Power Line Interaction Committee standards would ensure that any potential effects on avian resources are minimized.

Threatened and Endangered Species

The U.S. Fish and Wildlife Service stated in a letter dated October 14, 2011 that there are no federally listed threatened or endangered species that are known to occur in the project area; however, a candidate species, Kittlitz's murrelet (*Brachyramphus brevirostris*) may occur in the project area. However, the project is not likely to adversely affect the Kittlitz's murrelet due to the long distance between the construction areas and potential habitat

Recreation, Land Use, and Aesthetics

Project construction would have temporary and long-term effects on recreation resources in the project area. Temporary effects include: disturbances to recreational use caused by construction traffic and equipment; location of staging areas near recreation sites or facilities; use of the Solomon Gulch Trail by motor vehicles; and use of helicopters to support construction activity. Long-term effects would include degradation of the recreation experience for trail users, particularly along a one-mile section of the Solomon Gulch Trail where a new transmission line and poles would be installed adjacent to the trail. Copper Valley's proposed Recreation Management Plan and Public Safety and Access Plan which include measures to install and maintain an interpretive

sign in Valdez and informational signs in the vicinity of the powerhouse and the temporary access route, and to deter public access to construction areas near the Valdez Marine Terminal, would reduce these impacts. Including additional measures in the revised Recreation Management Plan such as analyzing alternative alignments of the existing Solomon Gulch Trail, identification of a preferred alternative, and any other proposed recreation enhancements; conducting construction activities away from developed recreation sites; scheduling heavy construction traffic to generally avoid peak times of recreational use; minimizing helicopter use to the extent practical; and using flight paths and staging areas that are least disruptive to recreational users, would further protect recreation resources in the project vicinity.

Construction of the intake/diversion structure, penstock, powerhouse, access routes, and transmission line would result in long-term effects on aesthetic resources, including disturbance to scenic natural areas utilized for recreation and degradation of scenic views. Copper Valley's proposal to minimize and restore vegetation in disturbed areas and use materials and colors for project facilities that blend in with the natural environment would reduce the visual impact of the project. Staff's recommendation to investigate alternative alignments and identify a preferred alternative for the Solomon Gulch Trail, and proposed construction restrictions would further reduce and help mitigate potential effects on recreation use.

Cultural Resources

The Alaska SHPO concluded that the project would have "no adverse effect" on cultural resources in or eligible for inclusion in the National Register of Historic Places. If cultural recourses are inadvertently discovered during project construction and operation, Copper Valley's would protect these resources. A license article for the protection of cultural resources in the event of any inadvertent discovery would document a process for protecting such resources.

No-Action Alternative

Under the no-action alternative, no project would be constructed and environmental conditions would remain the same.

Conclusions

Based on our analysis, we recommend licensing the project as proposed by Copper Valley with some staff modifications and additional measures.

In section 4.2 of the draft EA, we estimate the likely cost of alternative power for each of the three alternatives identified above. Under the no-action alternative, the project would not be constructed and would not produce any power. Our analysis shows that during the first year of operation under the proposed action alternative, project power

would cost $1,327,458, or $56.96 per megawatt-hour (MWh) less than the likely alternative cost of power. Under the staff alternative, project power would cost $1,312,327, or $56.31 per MWh less than the likely alternative cost of power.

We chose the staff alternative as the preferred alternative because: (1) the project would provide a dependable source of electrical energy for the region (23,300 MWh annually); (2) the 6.5 MW of electric capacity comes from a renewable resource that does not contribute to atmospheric pollution, including greenhouse gases; and (3) the recommended environmental measures proposed by Copper Valley, 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.

We conclude that issuing an original license for the project, with the environmental measures we recommend, would not be a major federal action significantly affecting the quality of the human environment.

DRAFT ENVIRONMENTAL ASSESSMENT

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

Allison Creek Hydroelectric Project
FERC Project No. 13124-003—Alaska

1.0 INTRODUCTION

1.1 APPLICATION

On August 30, 2011, Copper Valley Electric Association, Inc. (Copper Valley) filed an application for an original license for the proposed Allison Creek Hydroelectric Project (Allison Creek Project or project). The project would have an installed capacity of 6.5 megawatts (MW) and would be constructed on Allison Creek at river mile (RM) 1.89 about 10,000 feet upstream of the mouth of Allison Creek and 2,350 feet downstream of the outlet of Allison Lake near the city of Valdez, Alaska (Figure 1). The project would generate about 23,300 megawatt-hours (MWh) of energy annually, and would include construction of a new diversion, intake, penstock, powerhouse, concrete tailrace, and transmission line. The project would not occupy any lands of the United States.

1.2 PURPOSE OF ACTION AND NEED FOR POWER

1.2.1 Purpose of Action

The purpose of the proposed Allison Creek Project is to provide a new source of hydroelectric power. Therefore, under the provisions of the Federal Power Act (FPA), the Federal Energy Regulatory Commission (Commission or FERC) must decide whether to issue a license to Copper Valley for the 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.

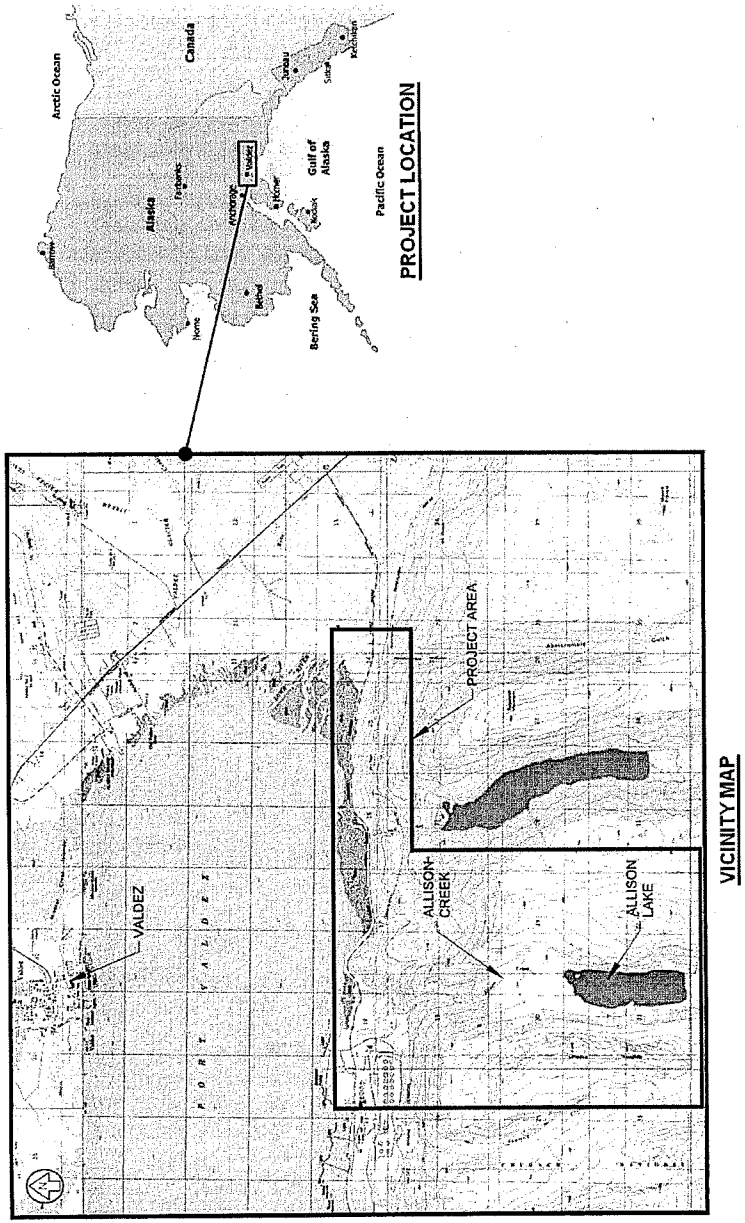

Figure 1. Location of Allison Creek Hydroelectric Project (Source: Copper Valley, 2011a).

Issuing an original license for the Allison Creek Project would allow Copper Valley to generate electricity for the term of the license, making electric power from a renewable resource available to its customers.

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

In this draft EA, we assess the environmental and economic effects of operating the project: (1) as proposed by Copper Valley, and (2) with our recommended measures. We also consider the effects of the no-action alternative. Important issues that are addressed include erosion and sediment control during construction, minimum instream flows for Cascade Creek, vegetation and wetland management, avian protection, and recreation access.

1.2.2 Need for Power

The project would provide hydroelectric generation to meet part of Alaska's power requirements, resource diversity, and capacity needs. The project would have an installed capacity of 6.5 MW and generate about 23,300 MWh per year.

To evaluate the need for the power, we typically use the North American Electric Reliability Corporation's (NERC) annual forecasts of electrical supply and demand nationally and regionally for a 10-year period. The state of Alaska, however, does not fall within a NERC region.

Copper Valley operates a remote isolated electric system, and the only other electric energy alternative available would be from the Copper Valley's Solomon Gulch Hydroelectric Project (FERC No. 2742) or diesel. Typically, the 12-MW Solomon Gulch project provides about 50% of Copper Valley's generation. The remaining 50% is generated with fossil fuel from a cogeneration facility or diesel plants in Glennallen and Valdez. The Allison Creek Project could potentially off-set about 11% of generation needed from diesel.

We conclude that power from the project would help meet a need for power for the Copper Valley isolated electric system in both the short and long-term. The project provides power that displaces generation from non-renewable sources. Displacing the operation of non-renewable facilities may avoid some power plant emissions, thus creating an environmental benefit.

1.3 STATUTORY AND REGULATORY REQUIREMENTS

A license for the Allison Creek Project is subject to numerous requirements under the FPA and other applicable statutes. The major regulatory and statutory requirements are summarized in Table 1 and described below.

Table 1. Major statutory and regulatory requirements for the Allison Creek Hydroelectric Project (Source: Staff).

Requirement	Agency	Status
Section 18 of the FPA (fishway prescriptions)	FWS	FWS reserved authority to prescribe fishways on April 6, 2012.
Section 10(j) of the FPA	FWS, NMFS, Alaska DFG	FWS filed 10(j) recommendations on April 4, 2012. NMFS and Alaska DFG filed on April 6, 2012.
Clean Water Act—water quality certification	Alaska DEC	Waived.
National Historic Preservation Act	Alaska SHPO	No unavoidable adverse impacts to cultural resources.

Notes: FWS – U.S. Department of the Interior, Fish and Wildlife Service
NMFS – U.S. Department of Commerce, National Marine Fisheries Service
Alaska DFG – Alaska Department of Fish and Game
Alaska DEC – Alaska Department of Environmental Conservation
Alaska SHPO – Alaska State Historic Preservation Officer

1.3.1 Federal Power Act

1.3.1.1 Section 18 Fishway Prescriptions

Section 18 of the FPA, 16 U.S.C. § 811, states that the Commission shall require the construction, operation, and maintenance, by a licensee, of such fishways as may be prescribed by the Secretaries of Commerce or Interior.

Interior, by letter dated April 6, 2012, requests that a reservation of authority to prescribe fishways under section 18 be included in any license issued for the project.

1.3.1.2 Section 10(j) Recommendations

Under section 10(j) of the FPA, 16 U.S.C. § 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. 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 statutory responsibilities of such agency.

The National Marine Fisheries Service (NMFS), the Fish and Wildlife Service (FWS), and the Alaska Department of Fish and Game (Alaska DFG) filed timely recommendations[1] under section 10(j) as summarized in Table 12 in section 5.4.1, *Fish and Wildlife Agencies Recommendations*. In section 5.4, we also discuss how we address the agency recommendations 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 May 20, 1999, the Alaska Department of Environmental Conservation (Alaska DEC) filed a letter with the Commission waiving all water quality certifications for FERC jurisdictional hydroelectric projects.[2] As a result, we consider the certification for the proposed Allison Creek Project to be waived.

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. There are no federally listed threatened or endangered species that are known to occur in the project area; however, a candidate species, the Kittlitz's murrelet (*Brachyramphus brevirostris*) may occur in the project area (Copper Valley, 2011c). Our analysis of project impacts on this candidate species is presented in section 3.3.4, *Threatened and Endangered Species*, and our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*.

We conclude that licensing of the Allison Creek Project, as proposed with staff-recommended measures, is not likely to adversely affect federally listed threatened and endangered species, or the candidate species Kittlitz's murrelet.

[1] NMFS filed 10(j) recommendations on April 4, 2012, and FWS and Alaska DFG filed 10(j) recommendations on April 6, 2012. These recommendations were timely filed after the Commission granted an extension of time for filing comments, terms, and conditions on February 24, 2012.

[2] *See* License Application, volume 2, Appendix B.

1.3.4 Coastal Zone Management Act

Under section 307(c)(3)(A) of the Coastal Zone Management Act (CZMA),[3] 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 Magnuson-Stevens Fishery Conservation and Management Act

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

EFH is determined by identifying spatial habitat and habitat characteristics that are required for each federally managed fish species through a cooperative effort by NMFS, regional fishery management councils, and federal and state agencies. There is no essential fish habitat in the vicinity of the project. As such, no consultation with NMFS is required.

1.3.6 National Historic Preservation Act

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

The proposed project's area of potential effects (APE) was inventoried for cultural resources by professional archeologists contracted through Copper Valley in 2009, 2010, and 2011. The results of the inventories found that no cultural resources were located within the APE. On October 17, 2011, Copper Valley sent a letter to the Alaska State Historic Preservation Office (Alaska SHPO) stating that no significant cultural resources were located within the proposed project's APE. The Alaska SHPO returned Copper

[3] 16 U.S.C. § 1456(c)(3)(A) (2006).

Valley's letter with a red "No Historic Properties Affected" stamp, dated November 9, 2011. This letter was filed with the Commission on November 14, 2011. Therefore, the drafting of a programmatic agreement to resolve adverse effects on historic properties will not be necessary.

1.4 PUBLIC REVIEW AND COMMENT

The Commission's regulations (18 Code of Federal Regulations [CFR], section 4.38) require that applicants consult with appropriate resource agencies, tribes, 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, the ESA, the 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 draft 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 April 22, 2010. It was noticed in the Federal Register on April 30, 2010. Two scoping meetings were held on May 10 and 12, 2010, in Anchorage and Valdez, Alaska, respectively, 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 meeting, the following entities provided written comments:

Commenting Entity	Date Filed
NMFS	June 4, 2010
National Park Service, Alaska Region (NPS)	June 14, 2010
Interior	June 15, 2010
Alyeska Pipeline Service Company (Alyeska)	June 15, 2010
Alaska DFG	June 21, 2010
FWS	June 21, 2010

A revised scoping document (SD2), addressing these comments, was issued on March 28, 2011.

1.4.2 Interventions

On December 9, 2011, the Commission issued a notice that it had accepted Copper Valley's application to license the Allison Creek Project, solicited motions to intervene and protest, and solicited comments and final terms and conditions, recommendations,

and prescriptions. The notice set February 7, 2012, as the filing deadline. There were no motions to intervene filed. Several entities filed requests for extension of time. On February 24, 2012, the Commission issued a notice extending the deadline for of comments, final terms and conditions, recommendations, and prescriptions to April 6, 2012. The following entities commented:

Commenting Entity	Date Filed
NMFS	April 5, 2012
FWS	April 6, 2012
Alaska DFG	April 6, 2012

On May 22, 2012, Copper Valley filed reply comments. The May 22, 2012 filing also included modifications to Copper Valley's proposal as well as modifications to final terms and conditions, recommendations, and prescriptions from NMFS, Interior/FSW, and Alaska DFG, as agreed by all parties.

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

2.2.1 Project Facilities

The Allison Creek Project (Figure 2) consists of: (1) a 16-foot-high, 130-foot-wide diversion structure with a spillway located 10,000 feet upstream of the mouth of Allison Creek and 2,350 feet downstream from the outlet of Allison Lake; (2) an intake at the spillway conveying flows to the powerhouse via a 42-inch-diameter steel penstock buried for about 500 feet and above-ground for about 7,200 feet traversing the existing grade; (3) a 65-foot-wide, 65-foot-long, 48-foot-high powerhouse containing two Pelton-type, horizontal access turbine/generator units with a total installed capacity of 6.5 MW; (4) a 120-foot-long tailrace extending from the west side of the powerhouse to Allison Creek via a concrete channel and the existing creek bed; (5) a 550-foot-long, 24-foot-wide access road; (6) a parking area; (7) a transformer located in a switchyard adjacent to the parking area; (8) a 3.8-mile-long, 34.5-kilovolt transmission line interconnecting to an existing substation; and (9) appurtenant facilities.

The proposed project boundary would be limited to the footprint of the diversion structure, penstock, powerhouse, tailrace, access road, and the transmission line. The project would not occupy and lands of the United States.

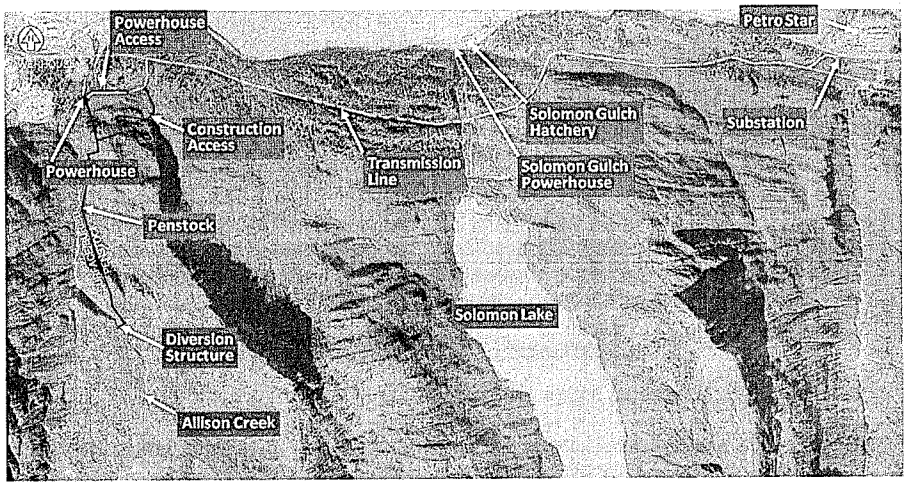

Figure 2. Location of proposed and existing project features for the Allison Creek Project (Source: Copper Valley, 2011a).

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 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

The proposed project would operate run-of-river. The project would have a minimum and maximum hydraulic capacity of 4 cfs and 80 cfs, respectively. All flows greater than the maximum hydraulic capacity will spill over the spillway section. Minimum flow releases will be made at the screen intake.

2.2.4 Proposed Environmental Measures[4]

During construction, Copper Valley's proposed action includes provisions to:

- Use best management practices (BMPs) for controlling erosion and limiting short-term impacts on water quality;
- Implement the Erosion and Sediment Control Plan (ESCP) to protect water quality and include development of a Storm Water Pollution Prevention Plan (Storm Water Plan), a Construction Water Quality Monitoring Plan (Construction Plan), and a Blasting Plan;
- Develop and implement an Environmental Compliance Monitoring Plan (ECMP) to document compliance with environmental measures;
- Implement measures to protect wetlands including: minimizing fill footprint; consolidating project facilities to a small area of impact, revegetating slopes and disturbed surfaces to minimize stormwater pollution, planning and maintaining sediment prevention measures along the toe of all fill areas adjacent to wetlands or waters, preventing sediments from entering fill areas adjacent to wetlands or waters, using only clean sand and gravel for fill, and stockpiling material in developed areas and/or uplands;
- Use natural products and appropriate colors for various project elements to help them blend in with the natural environment; and
- Develop and implement an Avian Protection Plan with provisions for: restricting vegetation clearing from May 1 through July 15; avoiding project activities within 660 feet of active bald eagle nests; limiting activities, blasts, and helicopter traffic from April 10 through August 10; marking and lighting new powerlines and guy wires; designing lighting for any structures or communication towers to reduce bird attraction and potential bird strikes.

During project operation, Copper Valley's proposed action includes provisions to:

- Develop and implement as part of the ESCP: a Fire Protection Plan, a Hazardous Materials Containment/Fuel Storage Plan (Hazardous Plan), and a Spill Prevention, Control, and Containment Plan (Spill Plan), and a Scavengers and Waste Management Plan (Waste Plan);
- Operate the project in a run-of-river mode;

[4] Copper Valley proposes to apply for and comply with the Alaska Pollutant Discharge Elimination System Construction General Permit. Since this is a permit requirement and not a specific environment measure, it is not discussed in the draft EA.

- Release a minimum flow of 2 cubic feet per second (cfs) at the diversion structure into Allison Creek at all times when the project is operating to maintain aquatic habitat;[5]
- Maintain a minimum flow of 10 cfs in Reach 3 of the bypassed reach (6,500 feet downstream from the diversion) from June 16 through October 31, and 8 cfs from November 1 through June 15 if the project is operating to maintain fish habitat;[5]
- Provide a ramping rate of 20 cfs per hour in Reach 3 during project startup and shutdown to maintain fish habitat;[4]
- Install and maintain stream gages below the diversion and in Reach 3, and collect and analyze data from these gages to document minimum flow releases;
- Develop and implement a Biotic Monitoring Plan in two phases to monitor for effects on fish during construction, water temperature alterations, fish stranding, and connectivity of the bypassed reach of Allison Creek;[5]
- Develop and implement a Vegetation Management Plan (Vegetation Plan) that includes restoring temporary access routes and disturbed areas, and managing weed/invasive species;
- Develop a Terrestrial Connectivity Plan to prevent the penstock from becoming a barrier to wildlife movement;
- Implement the Recreation Management Plan (Recreation Plan) that includes installing and maintaining an interpretive sign in Valdez and informational signs in the vicinity of the powerhouse and the temporary access route;
- Develop and implement a Public Safety and Access Plan (Safety Plan) that includes installing signs to discourage public access to construction areas and Alaska Department of Natural Resources' land near the Valdez Marine Terminal to provide public safety and security; and
- Protect cultural resources in the event that they are inadvertently discovered during project construction and operation.

2.2.5 Modifications to Applicant's Proposal—Mandatory Conditions

No mandatory conditions have been provided.

2.3 STAFF ALTERNATIVE

Under the staff alternative, the project would include Copper Valley's proposed measures, as outlined above.

In addition, staff recommends the following modifications and additional measures:

[5] From Copper Valley's May 22, 2012 filing (Copper Valley, 2011b).

- Develop an Operation Compliance Monitoring Plan (OCMP);
- Provide failsafe provisions to ensure continuous instream flows to Allison Creek in the event of project shutdown;
- Develop a Tailrace Fish Exclusion Plan to protect fish from injury or mortality;
- Notify the Commission, Alaska DFG, and FWS within 10 days of an event not in compliance with any license that may be issued that would affect fish and/or wildlife;
- Include the following new measures in the Vegetation Plan: off-site cleaning and inspecting of all equipment related to construction; using native plants and seeds in areas to be revegetated; monitoring the revegetated areas, with measures to address invasive and noxious weeds should they be found;
- Design and construct the transmission line to adhere to the most current Avian Power Line Interaction Committee standards;
- Survey for harlequin duck nests prior to construction-related activities, and if nests are found, flag the nests and avoid the area during the nesting period;
- Develop and implement a Bear Safety Plan;
- Maintain a 1,500-foot vertical and horizontal clearance of mountain goats when using helicopters;
- Adopt the Penstock Location and Grade Plan recommended by FWS and Alaska DFG as fulfilling the purpose of Copper Valley's Terrestrial Connectivity Plan;
- Develop a plan to discourage fishing, hunting, and trapping in the project area by project personnel; and
- Revise the Recreation Plan to include: analyzing alternative alignments of the existing Solomon Gulch Trail and providing details on the preferred alternative developed in consultation with the agencies; and conducting construction-related activities away from developed recreation sites, particularly along Dayville Road; scheduling heavy construction traffic to generally avoid peak times of recreational use; minimizing helicopter use, to the extent practicable; and using flight paths and staging areas that are least disruptive to recreational users.

Proposed and recommended measures are discussed under the appropriate resource sections and summarized in section 5 of the EA.

3.0 ENVIRONMENTAL ANALYSIS

In this section, we present: (1) a general description of the project vicinity; (2) an explanation of the scope of our cumulative effects analysis; and (3) our analysis of the proposed action and other recommended environmental measures. Sections are organized by resource area. Under each resource area, historical and current conditions

are first described. The existing condition is the baseline against which the environmental effects of the proposed action and alternatives are compared, including an assessment of the effects of proposed mitigation, protection, and enhancement measures, and any potential cumulative effects of the proposed action and alternatives. Staff conclusions and recommended measures are discussed in section 5.2, *Comprehensive Development and Recommended Alternative*.[6]

3.1 GENERAL DESCRIPTION OF THE RIVER BASIN

The Allison Creek watershed feeding Allison Creek is located within the coastal Chugach Mountain Range, which intercepts moisture from the Gulf of Alaska and hosts numerous glaciers as a result of heavy, wet snows. The watershed includes Allison Lake, which comprises approximately 247 surface acres and is located at an elevation of approximately 1,364 feet above mean sea level (msl). Allison Creek flows approximately 2.3 miles northward from the outlet of Allison Lake down to tidewater at Port Valdez. The headwaters at the south end of the narrow watershed are fed by glaciated peaks of up to 4,900 feet in elevation. The Allison Creek watershed is approximately six miles in length and up to approximately 1.4 miles wide.

The hydrology of the Allison Creek watershed is typical of coastal, maritime-influenced areas of Alaska, as characterized by two periods of high runoff: a late spring/early summer snowmelt period and a fall rainfall period. Low-water periods usually occur in winter and early spring. The fall months have the highest precipitation; spring has the lowest average. Precipitation storage in the watershed is largely due to three factors: temporary storage and capture of surface flow in Allison Lake, snowfall retention, and glacier influence. Glacier influence denotes the contribution to stream flows, delay of peak seasonal flow, and reduction of year to year flow variability caused by glaciers occupying land surface in the Allison Creek watershed (Fountain and Tangborn, 1985). Snow retention is controlled by the north-facing aspect of the Allison Creek watershed, which delays snowmelt until the summer months.

Allison Creek is a second-order stream, with a dendritic drainage pattern in which the mainstem receives many closely spaced, subparallel tributaries that join it at acute angles. There are no named tributaries to Allison Creek. The drainage density is high, as is typical for a basin with short channel lengths and steep slopes. The first-order streams draining the adjacent steep slopes into Allison Creek increase the overall catchment basin size (from the Allison Lake outlet to lower Allison Creek) by approximately 30 percent (R&M Consultants Inc., 2011a).

[6] Unless otherwise indicated, our information is taken from the application for license for this project (Copper Valley, 2011a).

3.2 SCOPE OF CUMULATIVE EFFECTS ANALYSIS

According to the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (40 CFR §1508.7), a cumulative effect is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over time, including hydropower and other land and water development activities. We've identified no resources that would be cumulatively affected by licensing the Allison Creek Project. The project is located in a very small watershed with very little existing or planned future developmental activity.

3.3 PROPOSED ACTION AND ACTION ALTERNATIVES

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

Only the resources that would be affected, or about which comments have been received, are addressed in detail in this EA. Based on this, we have determined that geology and soils, aquatic, terrestrial, recreation, aesthetic, and socioeconomic resources may be affected by the proposed action and action alternatives. We present our recommendations in section 5.2, *Comprehensive Development and Recommended Alternative*.

3.3.1 Geology and Soils

3.3.1.1 Affected Environment

The Allison Creek basin lies within the Chugach Mountains physiographic province, which forms an extremely rugged barrier along the north coast of the Gulf of Alaska (Wahrhaftig, 1965). The entire range was covered with glacial ice during advances of late Pleistocene-age, as evidenced by the local topography and soil stratigraphy (Coulter et al, 1965). The topography is dominated by the horns, cirques, and "U"-shaped valleys typical of areas which have been subjected to heavy glaciation.

The physical character of the Valdez area consists of a central fjord (Port Valdez) accompanied by subsidiary U-shaped valleys; the valleys are separated by jagged bedrock ridge crests. The regional bedrock is part of the Valdez group consisting of late Cretaceous marine sedimentary/metasedimentary rocks which, in the Valdez area, are dominated by graywacke with lesser amounts of argillite and slate (Palmer, 1981). This

rock occurs in thin beds that typically strike eastwest, dip steeply to the north, and are strongly jointed, folded and extensively faulted.

Intercalated and interlayered metagraywacke and phyllitic argillite dominate the bedrock lithology of the Allison-Sawmill Creeks area, with greenstone occurring as a minor component. These foliose to massive rocks consistently strike east-west and dip steeply northward. Glacially transported debris carried by glaciers roughly parallel to the rock layering has differentially abraded this metamorphic sequence.

Erosion and Mass Soil Movement

The slopes in the project area are composed primarily of coarse-grained soil or bedrock, and are generally considered to be stable. However, disturbance of the vegetation and surficial soils during construction of the penstock and access trail would increase the risk of erosion.

Cobbles and boulders (glacial erratics) should be expected within the glacial moraine deposits as well as within most of the other mapped terrain units. The foundation materials at the diversion structure site generally appear to be moderately permeable; zones of higher permeability material may be present. Additional geotechnical investigation in the diversion structure area is needed.

The soil conditions at the powerhouse site are understood based only on geologic mapping and site reconnaissance. Additional subsurface information is needed for design of the structure.

R&M Consultants Inc. (R&M), in conjunction with Hatch Associates Consultants, Inc. (Hatch), undertook reconnaissance-level geotechnical investigations for the project (R&M Consultants Inc., 2009a; R&M Consultants Inc., 2009b). These investigations included site-wide geological mapping, as well as a seismic refraction survey on the glacial moraine north of Allison Lake.

R&M performed a more detailed site-specific subsurface investigation in July, 2009. This investigation included test holes (rock cores and soil borings) drilled at several locations along the seismic refraction lines to verify existing seismic refraction data. In addition, the 2009 geotechnical investigation assessed foundation soil conditions and seepage potential of the glacial moraine north of the lake. Piezometers were installed to monitor hydraulic properties; this portion of the investigation is ongoing. A final geotechnical findings and recommendations report was issued on March 26, 2010 (R&M Consultants Inc., 2010) and is contained in Volume III – 15.

Proposed Diversion Structure Area

The terrain unit in the upper reach of Allison Creek is interpreted as alluvium and glacial moraine. The glacial moraine contains numerous large boulders up to 30 feet in

diameter at the ground surface. The proposed diversion structure is approximately 2,300 feet downstream of Allison Lake. The outlet is broad and shallow and does not begin down-cutting until roughly 3,500 feet downstream from the lake. A 2008 seismic refraction survey (R&M Consultants Inc., 2009a) detected seismic velocities in excess of 6,500 feet/second ranging in depth from 30 to 50 feet. Test holes were subsequently drilled in 2009 and identified this refraction as dense glacial till.

Proposed Surface/Buried Penstock

The penstock from the diversion to the proposed powerhouse would cross through and over the lower 1,000 feet of the glacial moraine made of glacial till, glaciofluvial outwash, and colluvium, and then into the incised portions of Allison Creek valley and through areas of bedrock. Generally, the materials have high bearing strengths.

During field investigations made by Copper Valley, abundant amounts of large material were exposed on the surface of the moraine, including glacial erratics to 30 feet or greater in diameter. Seismic refraction data and subsequent test-hole explorations indicate that this very coarse material ranges in depth from at least 50 to greater than 100 feet. The material consists of sandy gravel with silt containing cobbles and boulders, and is generally dense to very dense. Bedrock has not been encountered in any of the boreholes drilled to date. Groundwater flow from the frontal face of the moraine indicates that at least parts of it are moderately permeable.

The seismic data also indicate that the down-valley face of the moraine is composed of loose material that may have uncertain slope stability properties. No boreholes were drilled in this area in 2009.

Temporary Construction Access Route

The proposed construction access route alignment begins less than a quarter mile east of the proposed powerhouse site, at approximately elevation 200 feet. It crosses what is mapped as a glacial drift, then traverses across landslide deposits until it reaches the bottom of a steep valley wall. The glacial drift and landslide deposits are generally interpreted to contain dense silty gravels and/or sands with high bearing strengths. The proposed alignment then climbs up the valley wall by switch-backing along benches formed by glacial erosion. The material on the valley wall is interpreted to consist of colluvium overlying bedrock. The steep slopes indicate that the colluvium may be shallow in many areas; however deep pockets of colluvium may occur in troughs in the bedrock.

Proposed Powerhouse Area

The proposed powerhouse site is located near elevation 130 feet on Allison Creek approximately 1,500 feet upstream of the Dayville Road bridge. The stream gradient at

this site is approximately 20–25%, based on a field estimate, and alluvial deposits in the creek include sand, gravel and boulders up to 10 feet across. There is no bedrock exposed in close proximity to this site. The surficial materials at the proposed powerhouse site are mapped as alluvial fan deposits.

3.3.1.2 Environmental Effects

The project is expected to have a minor effect on geology and soils. Pondage behind the diversion structure would not have a major effect on the groundwater regime. No significant changes in the topography are planned, and earthwork volumes are expected to be relatively small. The primary effect would be an increase in the erosion potential in disturbed areas, particularly along the penstock and access trail routes. Because the slopes are generally underlain by coarse-grained soil and bedrock, the construction activities are not expected to have a negative impact on overall slope stability.

Proper construction techniques along with using BMPs and site restoration would ensure slope stability is maintained and severe erosion prevented. Both structural and operational BMPs will be followed during construction. Post-construction ground restoration efforts would stabilize the disturbed areas and prevent unchecked future erosion.

Within the project boundary, construction of the powerhouse, transformer pad, and tailrace would disturb an area of 0.30 acre northwest of the stilling basin and result in the excavation of an estimated 200,000 cubic yards of spoil (Copper Valley, 2011a). In addition, about 0.36 acre of vegetation could be temporarily disturbed by construction of a staging area next to the powerhouse; burial of the penstock behind the powerhouse; burial of the transmission line connecting the project to the existing right-of-way; and construction of a second staging area located on an existing Reclamation-maintained parking area. Construction activities, such as excavation of soil, use of roads and parking areas, and stockpiling of top soil and spoil materials, could potentially cause sediment runoff into the river.

Copper Valley proposes to use BMPs before, during, and after construction with measures such as: installing silt fences, sediment traps, straw bale barriers, fiber rolls, and check dams throughout the construction phase; temporary mulching and/or seeding of disturbed areas; storing hazardous materials, including paints, chemicals, fertilizers, pesticides, fuel, oil, grease, etc. in proper containers within the temporary construction staging area; and containing construction debris and solid waste and disposing them off-site to an approved disposal area in a timely manner. Copper Valley also proposes to implement the ESCP which includes: a Storm Water Plan with measures to control erosion, control dust, manage spoils, dispose of waste, and manage hazardous materials; a Construction Plan to monitor water quality; a Blasting Plan to ensure safe operations prior to any blasting.

Staff Analysis

Copper Valley's use of BMPs and implementation of the ESCP would address potential erosion and sedimentation issues for geology and soils in the project area during construction and initial project operations.

3.3.2 Aquatic Resources

3.3.2.1 Affected Environment

Water Quantity

Field Data

The only historical stream gage information available for Allison Creek is from USGS gage 15225945 – Allison C AB Mouth NR Valdez AK for the period of March 1981 through September 1985. Mean daily flow hydrographs for this gage are presented in Figure 3.

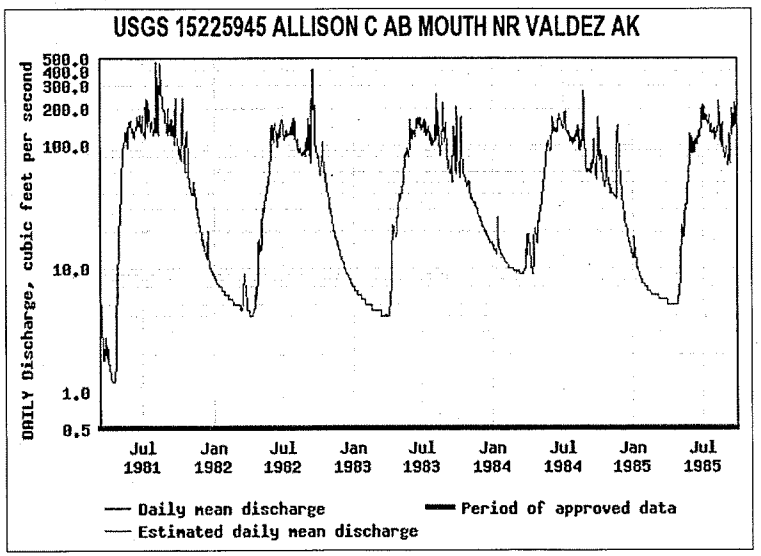

Figure 3. Historical Mean Daily Flow at Lower Allison Creek Near Mouth (Source: Copper Valley, 2011a).

Copper Valley also installed two stream gaging stations on Allison Creek: one on the Lower Allison Creek near the proposed powerhouse site, and the other on the Upper Allison Creek approximately 1,000 feet downstream of the outlet of Allison Lake and 1,200 feet upstream of the proposed diversion structure on Allison Creek. Discharge data collected to date are presented in Table 2. Mean daily flow hydrographs for the upper and lower creek stations are presented in Figure 4 for the period of September 2008 through mid-March 2011.

Table 2. 2008 to 2011 Allison Creek Discharge Measurements (Source: Copper Valley, 2011a).

Upper Allison Creek			Lower Allison Creek		
Date	**Discharge (cfs)**	**Stage (ft)**	**Date**	**Discharge (cfs)**	**Stage (ft)**
8/6/2008	92.06	1.675	No August 08 data		
9/4/2008	61.76	1.296	9/4/2008	74.31	2.35
10/8/2008	23.68	0.692	10/8/2008	45.47	1.97
No May 09 data			5/13/2009	94.18	2.54
6/22/2009	110.9	1.62	6/22/2009	121.62	2.62
7/16/2009	88.6	1.49	7/16/2009	96.93	2.54
8/25/2009	63.79	1.27	8/25/2009	85.51	2.53
10/9/2009	52.59	1.14	10/8/2009	83.12	2.38
6/2/2010	142.8	1.92	7/3/2010	111.94	2.62
No July 10 data			7/13/2010	112.86	2.61
8/12/2010	86.23	1.65	8/12/2010	116.48	2.57
9/14/2010	42.66	1.1	9/14/2010	49.71	2
11/11/2010	14.17	0.66	11/11/2010	19.34	1.71
1/27/2011	12.65	ice	No January 2011 data		
3/14/2011	1.44	ice	3/14/2011	3.67	ice

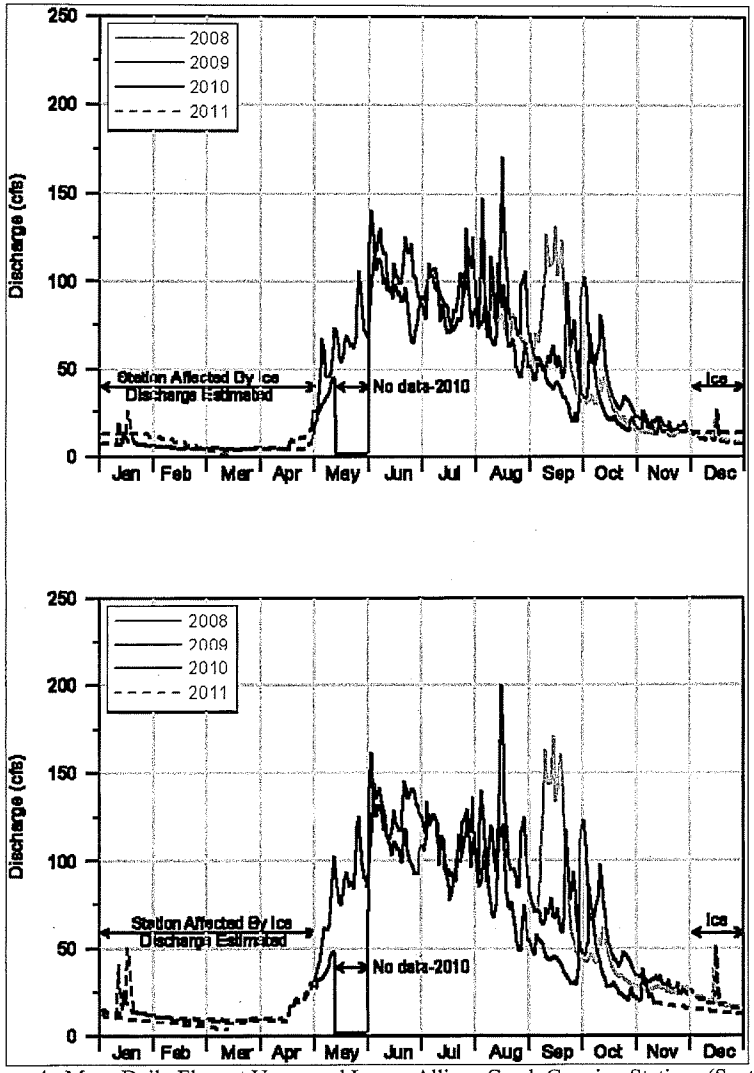

Figure 4. Mean Daily Flow at Upper and Lower Allison Creek Gauging Stations (Sept. 4, 2008 – March 14, 2011) (Source: Copper Valley, 2011a).

The data from these two gaging efforts show an average streamflow of 59.7 cfs in Allison Creek with mean flows increasing annually from June to September. Obtaining reliable streamflow data during the winter months is difficult due to ice effects.

Stream Flow Modeling

In addition to the collection of these data, Copper Valley developed a long-term flow record for Allison Creek using existing data from the Solomon Lake watershed, which was corrected based on the size of the Allison Creek watershed. This procedure produced a 39-year record of average daily flows from 1950 through 1989 yielding an average streamflow of 47.7 cfs. Monthly exceedance data for this period of record is included in Table 3. The hydrograph over the period of record consists of a distinctive pattern of five high-flow months, June through October, and four low-flow months, January through April. May serves as the transition month in the spring and the winter transition can occur in the November/December period. The series of monthly flow duration curves included in Figure 5 demonstrates this characteristic of the Allison Creek hydrograph.

Table 3. Allison Creek Flow Exceedance Table in cubic feet per second (Source: Copper Valley, 2011a).

Exceedance	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0%	50.5	40	80.3	70.3	206.2	431	791.1	451.1	586	420.6	199.7	77.8
10%	9.5	6.6	6.7	11.8	78.1	156	183.7	138.9	189	108.5	40.4	20.8
20%	7.4	5.5	5.4	8.7	63.4	127	156.9	109	134	79.9	28.6	16
30%	6.6	5.1	4.3	7.4	53.7	113	140.2	93.5	101	62.7	23.2	12.2
40%	6.1	4.8	3.9	6.3	46.4	102	126.4	86.2	81.1	50.6	19.3	10.8
50%	5.9	4.5	3.5	5.4	40.3	89.9	115.5	79	66.2	43.6	16.7	9.1
60%	5.6	3.6	3.2	4.5	33.3	79.5	107.4	73.6	56.5	37.9	13.6	8.2
70%	5.3	3.9	3	3.9	25.6	70.6	98.1	67.8	48.4	33.5	11.2	7.2
80%	4.9	3.8	2.8	2.8	19.5	63.4	90	62.1	41.4	27.3	9.1	6.4
90%	4.2	3.4	2.1	1.9	10.1	53.2	79.4	54.3	34.4	21	6.3	5.5
100%	2.3	1.5	1.6	0	3.8	29.7	49.8	3.8	19.8	9.9	1.3	2.8

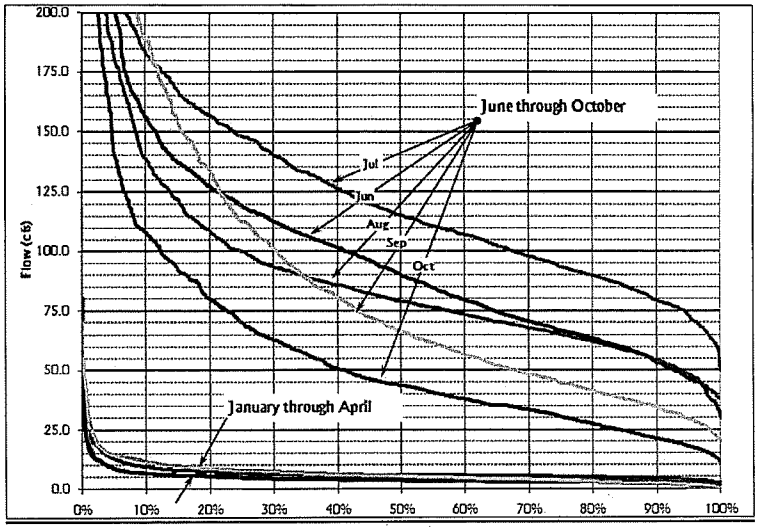

Figure 5. Monthly Flow Duration Curves for Allison Creek (Source: Copper Valley, 2011a).

Water Quality

Two water quality monitoring locations have been established in Allison Creek: one in the upper reach 1,200 feet upstream of the proposed diversion, and one in the lower reach near the proposed powerhouse site. These locations coincide closely with the stream gage installations. Water quality data collected to date are presented in Table 4 (R&M Consultants Inc., 2011b).

In addition, each stream gage mentioned in the previous section contains an integral temperature measurement device. A nearly continuous temperature record has been recorded at 15-minute intervals since August 2008. These data points are presented graphically in Figure 6.

Available data indicate that temperature, pH, and specific conductivity are relatively consistent between upper and lower Allison Creek on any given day, and that these parameters vary in a predictable way within the creek from season to season. Turbidity levels are variable over time in both lower and upper Allison Creek, responding to short-term and seasonal shifts in flow, snow melting, precipitation, and sedimentation.

Table 4. Allison Creek Opportunistic In-Situ Water Quality Data (Source: Copper Valley, 2011a)

Monitoring Location	Date	Temperature (°C)	pH	Specific Conductivity (µS/cm)	Turbidity (NTU's)
Upper Reach	8/6/2008	7.7	7.3	38	7.2
Lower Reach		NA	NA	NA	NA
Upper Reach	9/4/2008 - 9/5/2008	11.6	7.2	46	80
Lower Reach		11.6	7.2	49	150
Upper Reach	10/8/2008	7.2	7.1	47	**
Lower Reach		5.9	7.2	54	260
Upper Reach	2/22/2009	0.6	6.7	23	5.0
Lower Reach		0.9	7.2	35	4.2
Upper Reach	6/22/2009	3.6	7.0	26	4.2
Lower Reach		5.3	7.0	26	3.0
Upper Reach	7/16/2009 - 7/17/2009	10.6	6.5	33	11
Lower Reach		11.6	6.9	33	6.9
Upper Reach	8/25/2009	8.8	7.2	28	17
Lower Reach		8.2	7.4	28	14
Upper Reach	9/17/2009	8.6	6.6	30	13
Lower Reach		9.1	7.0	33	8.5
Upper Reach	10/8/2009 - 10/9/2009	6.5	6.8	26	8.8
Lower Reach		6.3	6.7	32	6.7
Upper Reach	11/25/2009	1.1	6.0	35	4.7
Lower Reach		2.1	6.6	31	2.0
Upper Reach	7/13/2010	NA	NA	NA	NA
Lower Reach		4.6	5.7	26	5.1
Upper Reach	8/12/2010	6.8	6.4	28	5.6
Lower Reach		7.6	5.7	29	0.4
Upper Reach	10/7/2010	NA	NA	NA	NA
Lower Reach		4.4	6.1	28	4.2
Upper Reach	11/11/2010	2.6	6.2	24	3.6
Lower Reach		2.1	6.4	30	4.6
Upper Reach	1/27/2011	0.0	5.0	26	2.7
Lower Reach		NA	NA	NA	NA
Upper Reach	3/14/2011	-0.2	5.4	25	0
Lower Reach		0.9	6.5	40	0

Note: Shaded cells within the table indicate readings that have become questionable when compared to trends over time. Data should be used cautiously, as instrument malfunction is suspected.

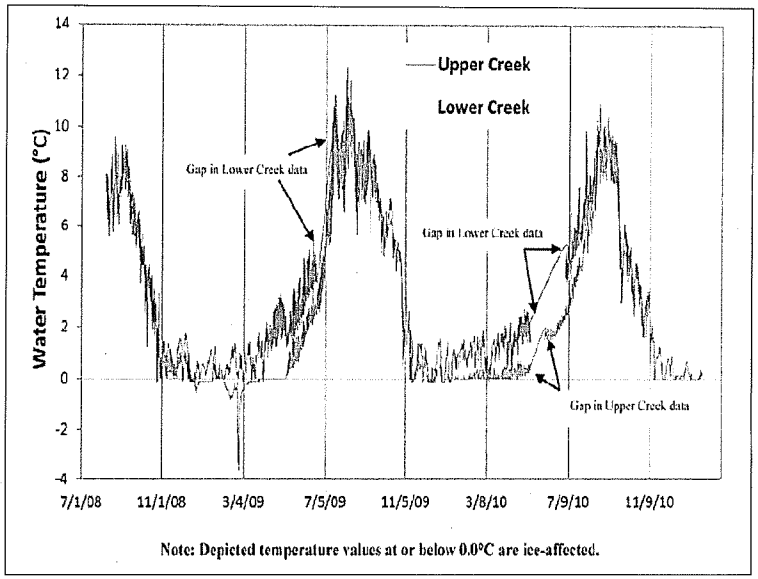

Figure 6. Allison Creek Continuous Temperature Monitoring (Aug 6, 2008 – Jan 27, 2011) (Source: Copper Valley, 2011a).

Physical and chemical parameters such as dissolved oxygen (DO), total dissolved gas, total hardness, chlorophyll, total nitrogen, total phosphorus and fecal coliform concentrations have not been acquired. Based on agency consultation, DO has been specifically excluded as a parameter of concern (Green, 2006).

Fishery Resources

Fish Populations

Seven fish species are likely to occur in freshwater systems in the Port Valdez area. Nearly all streams and tributaries in the Port Valdez area are considered anadromous fish habitat and are known to support pink, sockeye, coho, Dolly Varden, and sometimes chum salmon populations (Alaska DFG, 2010a; Alaska DFG, 2010b). Slimy sculpin and ninespine stickleback are common but other resident species appear to be rare in these waterbodies. In the project area, Allison Lake has not previously known to support fish, however the lower 1,000 feet of Allison Creek upstream from the mouth, has been documented as supporting spawning and rearing pink and chum salmon as well as Dolly Varden and sculpin (USACE, 1981). Furthermore, the Anadromous Waters

Catalog (AWC) notes that coho salmon can be found in large numbers in the very lowest reach of Allison Creek. The anadromous fish populations in these streams are sensitive to disturbance year-round and critically sensitive from late summer through winter, during spawning and overwintering.

Pink salmon are the most abundant salmon species in Prince William Sound, with the wild population averaging 6.65 million fish in 1989–1998 (Morstad et al., 1999). The Solomon Gulch hatchery is located about 2 miles east of Allison Creek on Solomon Gulch and raises mainly pink salmon. Between 1989 and 1995, it was estimated that 75–205 million pink salmon fry were released each year, with 1.6% to 8.9% of these salmon making it back to Solomon Gulch to spawn (Jewett and Blanchard, 1997). Alaska DFG estimates that, in 2006, hatchery returns for Solomon Gulch were approximately 9,176,489 pink salmon and 294,009 coho (Botz et al., 2008). A smaller hatchery run of coho salmon at the Solomon Gulch hatchery also supports a large fishery in August of each year (Coggswell, 2000).

In the late 1970s, the Alaska Petrochemical Company commissioned studies to examine salmon-fry dispersal and freshwater aquatic habitats in the Port Valdez area (Morsell, 1979; Morsell and Perkins, 1979). Although much of the focus of the salmon-fry study was on the marine environment, or on other freshwater streams, Solomon Gulch Creek and Allison Creek were discussed briefly. Morsell and Perkins (1979) provided a summary of estimated salmon escapement in Allison Creek and Solomon Gulch Creek using data derived from other studies:

- Pink salmon escapement in Allison Creek was estimated at 300 in 1971 (Mattson, 1974), 25 in 1973 (Mattson, 1974), and 500 in 1975 (Johnson and Rockwell, 1978)
- Chum salmon escapement in Allison Creek was estimated at 700 in 1975 (Johnson and Rockwell, 1978)
- Pink salmon escapement in Solomon Gulch Creek was estimated at 1,500 in 1975 (Johnson and Rockwell, 1978)
- Chum salmon escapement in Solomon Gulch Creek was estimated at 10 in 1973 (Pirtle, 1977)

From 1960 to 1973, the Alaska DFG sporadically monitored escapement in Allison Creek. Pink salmon reached a high of 1,000 fish in 1969 and a high of 2,660 chum were counted in 1963 (USACE, 1981). Salmon spawning occurred all the way up to the weir, which was probably located ~700 feet upstream from the mouth where the gradient of the stream changes dramatically (the weir is no longer present in the stream).

Jewett and Blanchard (1997) assessed habitat use of juvenile pink salmon from the Solomon Gulch hatchery during a 10-year period from 1985–1995. Salmon escapement and survival estimates were provided but the report focused mainly on habitat use in the

marine environment. The Alaska DFG produces annual estimates of projected and actual chum and pink salmon returns for Solomon Gulch and other Prince William Sound hatcheries.

Dolly Varden, which have been documented in Allison Creek, display a great plasticity in life history strategies that are often distilled into 2 basic forms, anadromous and resident (Alaska DFG, 2008; Northcote, 2010). Dolly Varden alevins emerge from spawning-stream gravel in May and remain in the stream for 2–4 years (Armstrong, 1970). In Prince William Sound, most smolts leave spawning streams in May and June at ages of 2, 3, or 4 years to feed in saltwater, typically returning to overwinter in freshwater streams in fall. Numerous variations in life history exist but each spring adult and immature fish migrate from freshwater and in the fall, at ages 7–9, mature fish return to their natal streams to spawn (Armstrong and Morrow, 1980; Umatani et al., 2008). Management is complicated by the various migration patterns because individual stocks are difficult to recognize, and each lake or stream system may contain mixed stocks of Dolly Varden originating from widely dispersed streams (Currens et al, 2003).

In 1987, Alaska DFG evaluated impacts resulting from the Solomon Gulch project (Roberson, 1987). The report summarizes ambient water temperature, flow, turbidity, and habitat conditions in the creek for pre- and post-hydroelectric installation periods. The study found that temperatures were slightly higher in the creek after the hydroelectric project was built (3.74° C vs. 4.14° C, mean annual temperature, pre- and post-construction, respectively), but that the benefits to fish habitat (e.g., lower turbidity, higher-quality spawning gravels) from construction of the dam at the mouth of Solomon Lake off-set the minor increase in temperature in the creek.

Fish Sampling in Allison Lake and Allison Creek

Between August 2008 and May 2011, ten sampling events were conducted in Allison Lake and/or Allison Creek. Efforts focused on stream and lake fishing, aquatic habitat description, enumeration and description of barriers, and amendments to the Alaska DFG Catalog of Waters Important for the Spawning, Rearing or Migration of Anadromous Fishes (also known as Anadromous Waters Catalog). For the purposes of the proposed project, Allison Creek within the study area can be divided into 5 distinct stream reaches and lake habitats (Figure 7). The goal of the surveys described below was to assess aquatic resources, both biota and habitat, throughout the proposed project area.

A combination of minnow traps, visual observations, seine nets, gill nets, and dip nets were used to sample for fish in Allison Creek and Allison Lake over the course of 3 years from 2008 to 2010. The upper sections (Reaches 4 and 5) of Allison Creek were accessed by helicopter and the lower sections (Reaches 1, 2, and 3) were accessed by foot. Baited minnow traps were placed in a variety of habitats, including pools and riffles in the stream and within the lake in the near-shore and mid-lake locations. In the

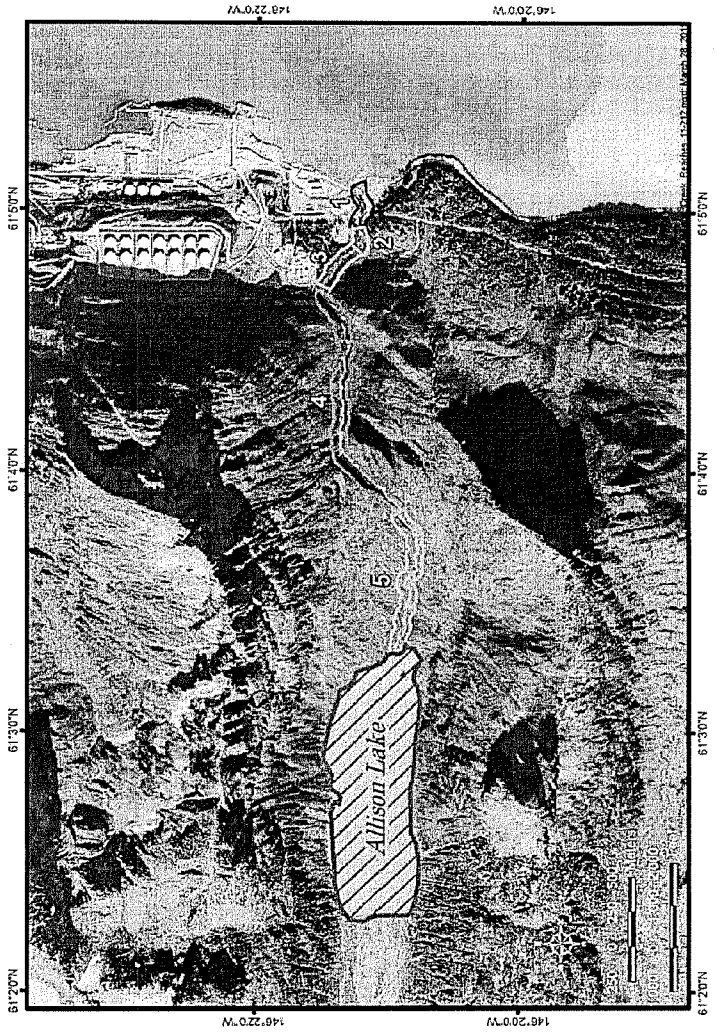

Figure 7. Location of 5 project-related reaches of Allison Creek, as defined by stream habitats, and Allison Lake habitat (Source: Copper Valley, 2011a).

creek and near-shore lake habitats, baited traps were secured to rocks or tree branches on shore. In Allison Lake, minnow traps were either secured with rocks near shore or suspended from floats at varying depths within the mid portions of the lake. Traps were generally left to fish overnight and recovered the following day.

Gill nets of varying length and mesh size were used for fish sampling in Allison Lake. Various habitats within the lake were sampled, including near-shore rocky and gravel habitat, mid-lake deep and shallow water habitats, and steep slopes of the east and west shores near melt-water inflows to the lake. Several passes of seine nets (0.25-inch mesh and variable length) were employed to sample shallow near-shore environments at the north and south end of the lake.

Fish sampling included collection of post-spawning pink salmon in Lower Allison Creek for otolith analyses to determine hatchery origins.

During 2008 and 2009, efforts focused on reconnaissance-level fishing in various sections of the creek and the outlet of the lake, mostly using minnow traps. In consultation with agencies during the spring and summer of 2010, additional sampling efforts in the lake and upper stream were requested to verify that no fish were present. Agencies also requested additional fish habitat data and species-specific distribution data relative to clearly identified barriers to fish passage in the lower creek.

Fish populations are summarized by reach in the following paragraphs. Reaches were identified on the basis of habitat characteristics and included from upstream to downstream: Allison Lake, Upper Allison Creek (Reach 5), Middle Allison Creek (Reach 4), and 3 reaches in Lower Allison Creek (Reaches 1, 2, and 3), as described below.

Allison Lake

After more than 1,717 hours of minnow trapping/gill netting and 6 passes of seine nets in the near-shore environment as well as numerous visual observations, no evidence of fish was found in Allison Lake (Table 5). From these results it can be inferred that no fish are present in Allison Lake due to upstream fish passage barriers in Allison Creek. Further, there is no evidence of any potential remnant pre-glacial populations or planted fish in the area.

Allison Creek

Reach 1

A total of 235 hours of minnow trapping in Reach 1 produced 75 fish over three field seasons (Table 5). Spawning pink salmon were observed in Reach 1 of Allison Creek from August 2008–2010. Spawning coho salmon were observed in lower Allison

Creek in September 2010. No chum salmon were observed during these sampling years. Lower Allison Creek (Reaches 1 and 2) appears to be home to sculpin and rearing Dolly Varden as well as spawning pink, chum, and coho salmon. Due to frequent high flow regimes (i.e., scouring of smaller sediment types) and poor substrate conditions, lower Allison Creek appears to be marginal spawning/incubation habitat. Rearing fish populations are low.

Table 5. Catch per unit effort (CPUE) for minnow trapping and gill netting in Allison Creek and Allison Lake by reach, September 2008–December 2010 (Source: Copper Valley, 2011a).

Reach	Hours-Minutes Fished	Days Fished	Total fish Caught	CPUE (fish/ 24 hour)
1	235:01	9.79	75	7.7
2	291:48	12.15	34	2.8
3	718:48	29.95	134	4.5
4	378:32	15.77	0	0.0
5	143:03	5.96	0	0.0
Lake	1,717:14	71.6	0	0.0

Reach 2

Reach 2 extends from top of the chutes to the Alyeska's pumphouse at the top of Reach 1. Above Reach 1, the steadily increasing gradient in this segment of stream is marked by a series of cascade plunge pools leading up to the base of a steep bedrock formation at the chutes. A total of 292 hours of minnow trap fishing was conducted in Reach 2 of lower Allison Creek in 2008 and 2010 (Table 5). A total of 34 fish were captured. It appears that spawning and rearing habitat for Dolly Varden is limited in this reach of Allison Creek, although the use of steep gradient, low-order tributaries year-round by juvenile Dolly Varden is common (Bramblett et al.,2002; Bryant et al., 2004; Bryant and Lukey, 2005; Bryant, et al. 2009). Furthermore, Copper Valley does not believe that spawning salmon are swimming above the chutes at the upstream extent of Reach 2, as it appears to be a physical and velocity barrier.

Reach 3

Reach 3 begins at the base of a 10.5-foot waterfall that acts as an upstream barrier to Dolly Varden in Allison Creek, and extends downstream about 1,200 feet to the top of a 300-foot-long, high-gradient, bedrock-dominated stream section that's named "the chutes". A total of 717 hours of minnow trapping in Reach 3 produced 134 fish over two field seasons (Table 5). Reach 3 appears to provide habitat for small numbers of rearing

juvenile Dolly Varden. Due to high flows, high gradient, and limited pool habitat, this reach of Allison Creek does not appear to be optimal habitat for rearing fish. Only Dolly Varden were captured in this reach and no salmon (juvenile or adult) were visually observed during the many attempts at observations in pools over two seasons.

Reach 4

The middle reach of Allison Creek is marked by high gradients and high flow throughout. Access to this reach is impossible in most areas, due to dense vegetation, canyonized slopes, and steep gradient. The one helicopter landing area in the middle reach of Allison Creek was sampled on two occasions in 2010. A total of 378 hours of minnow trapping was performed on Reach 4 in 2010, with no fish captured (Table 5). The barrier at the base of Reach 4 prevents access by fish to Reaches 4 and 5. Additionally, multiple barriers exist within Reach 4 that would all serve as obstacles to upstream fish passage.

Reach 5

Copper Valley conducted four distinct fish sampling events in the uppermost reach of Allison Creek between September 2008 and August 2010. A total of 143 hours of minnow trapping took place in Reach 5 during sampling events which took place over three years from 2008–2010 (Table 5). Based on this effort, there is no evidence that fish occur in upper Allison Creek. Previous reports have suggested that there are likely no fish in the upper reaches of Allison Creek and Allison Lake (USACE, 1981). This conclusion is due to stream features that act as barriers to upstream transport of fish. Furthermore, there is no evidence of any potential remnant pre-glacial populations or planted fish in the area.

Otolith Analyses

Pink Salmon

The otoliths of Solomon Gulch hatchery reared salmon are marked during early development and prior to their release into salt-water holding pens by manipulation of water temperatures (Alaska DFG, 2010c). These thermal marks on pink salmon otoliths allow scientists to distinguish hatchery-reared from wild adult salmon and, for the Allison Creek project, allow an assessment of the source of pink salmon that enter lower Allison Creek during spawning runs. On August 7, 2009, during a peak run of pink salmon, 22 spawned-out pinks were collected from lower Allison Creek for extraction and analysis of otoliths. In the case of Allison Creek pink salmon, the most likely hatchery of origin would be the Solomon Gulch hatchery operated by the Valdez Fisheries Development Association. Pink salmon returning to Solomon Gulch hatchery or straying to Allison Creek in 2009 would be part of the 2007 brood year, as pink salmon display a 2-year spawning cycle.

Of the 22 fish analyzed for hatchery marks, 15 (68%) showed clear evidence of origin from the Solomon Gulch hatchery. The other 7 fish appeared to have regular banding patterns near the primordia which would indicate a hatchery origin; however, they could not clearly be distinguished as Solomon Gulch hatchery fish. A search for mark patterns from other hatcheries did not confirm these fish as known hatchery fish. It is possible that these were native Allison Creek spawned fish or that they were the progeny of hatchery fish.

Dolly Varden

Dolly Varden are known to have at least 2 possible distinct life-histories: resident and anadromous types (Alaska DFG, 2008; Northcote, 2010). These types show distinct differences in reproductive strategies, size, coloration, age of maturation, fecundity, and genetic diversity. In general, resident type fishes are potadromous (i.e., they require movement through fresh water systems to complete their life cycle), stunted in size (mean fork length = 135 mm), and younger at maturity (3–5 years) than their anadromous counterparts. A FWS survey of 66 coastal streams in southeast Alaska support this assertion, as adult resident Dolly Varden ranged in size from 80–120 mm, and were found not to exceed 8.1" (Hastings, 2005). Resident fish also have reduced genetic diversity (4 alleles total) compared to the larger and later-to-mature anadromous variety (11 or 19 alleles total). Resident female Dolly Varden produce nearly 30 times fewer eggs than their anadromous cohorts (Ihlenfeldt, 2005).

Copper Valley used chemical analysis of otoliths to determine whether the Dolly Varden in Allison Creek were resident or anadromous. Specifically, it compared the ratios of strontium (Sr) to calcium (Ca) in Dolly Varden otoliths to determine whether or not juvenile fish in Allison Creek were the progeny of sea-run mothers. Twenty Dolly Varden were collected from Allison Creek in December 2010, and the age results suggest that all 20 sampled Dolly Varden were juveniles rearing in lower Allison Creek. T-tests suggest that 8 of 20 fish sampled showed significantly higher ratios ($p = 0.006$) in primordia than in freshwater growth zones of the otolith, indicating that the mothers of these fish were in marine waters during egg formation and that Dolly Varden in Allison Creek likely are the offspring of marine migratory mothers. Dolly Varden with significantly higher primordia than freshwater zone Sr:Ca values appeared in all 3 reaches where Dolly Varden were sampled. Four were found in Reach 3, 3 were found in Reach 2, and 1 was found in Reach 1. Although the occurrence of resident forms cannot be ruled out, the otolith evidence suggests the occurrence of anadromous forms.

Barriers to Fish Passage

The majority of Allison Creek is high gradient (>12%), reaching slopes of greater than 30% in short sections, and is dominated by large bed substrate (i.e., bedrock, boulders, and large cobble). Flow regimes in these very steep and sometimes constrained

sections of stream (e.g., upper Reach 3 and lower and upper Reach 4) are characterized by turbulent flows with continuous rapids, cascade pools, and sizeable waterfalls. Much of the stream is accessible only during low flow periods during the fall/winter.

In July 2009, July 2010, and August 2010, Copper Valley conducted several trips by helicopter, covering the entire length of Allison Creek, with the express purpose of identifying and investigating potential barriers to upstream passage of fish. The initial three barriers (all in Reach 4) were identified in July 2009 and confirmed in 2010. The lowest barrier found in 2009 is a large waterfall over 20 feet high that occurs at the transition between spruce vegetation and an area of lower stream cover dominated by alder and lower scrub. Observers were able to hike to a point adjacent to, but above this barrier in September 2010 to confirm its height. The next barrier identified in July 2009 was also a waterfall about 15 feet high further upstream. Observers were unable to ground-truth this waterfall, but did hover close to it in a helicopter. The third barrier identified in 2009 was the transition area between Reaches 4 and 5: a long set of steep rapids (gradient >35%) which represent a stream velocity barrier, if not an actual waterfall barrier.

Each of these three locations are barriers to fish passage in their own right. In August 2010, Copper Valley identified a previously hidden barrier at the boundary between Reaches 3 and 4. The barrier is a 10.5-foot waterfall. Copper Valley determined that this waterfall is the lowest barrier to fish passage on Allison Creek and is the upstream extent of where Dolly Varden are found on Allison Creek.

The location of passage barriers and project works is shown in Figure 8. Salmon are not found above the chutes, which would be downstream of the proposed powerhouse and tailrace. Resident Dolly Varden exist upstream of the chutes to the 10.5-foot waterfall in Reach 3.

3.3.2.2 Environmental Effects

Water Quantity and Minimum Flow Releases

Copper Valley proposes the following environmental measures:

- Operate the project in run-of-river mode;
- Release a minimum of 2 cfs at the diversion;
- Maintain a minimum flow of 10 cfs in Reach 3 from June 16 through October 31, and 8 cfs from November 1 until June 15 if the project is operating;
- Provide a ramping rate of 20 cfs per hour in Reach 3 to minimize stranding of fish at project start-up in the spring, and during other times where flows are reduced by changes in project operations; and

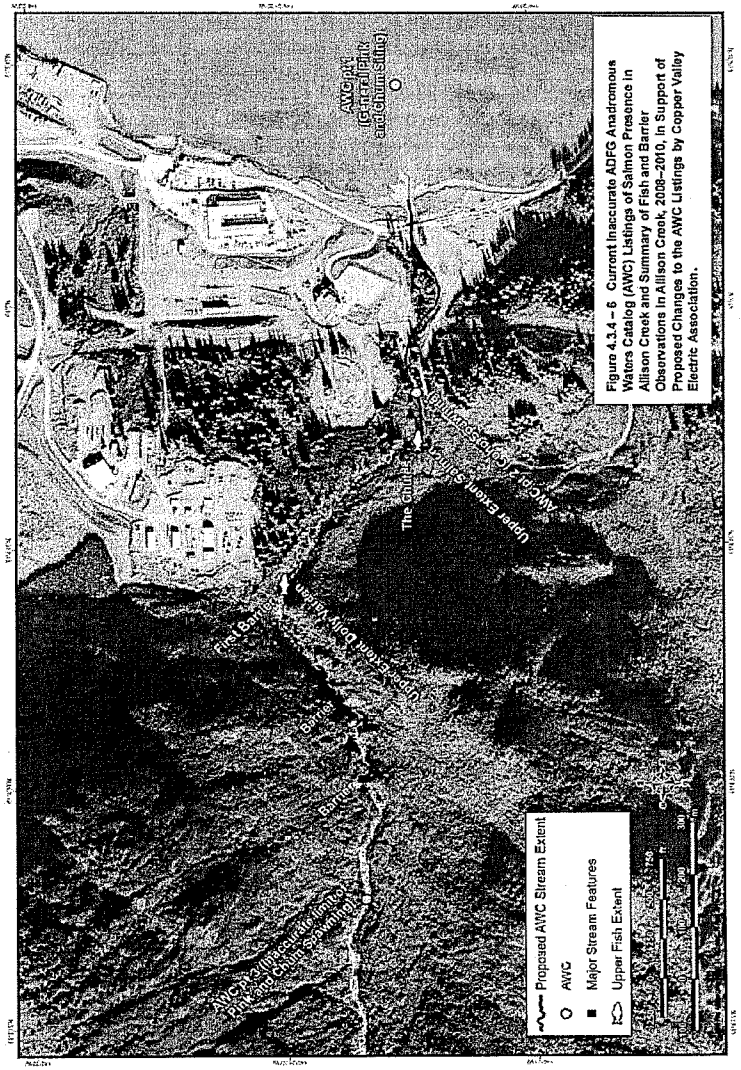

Figure 8. Fish Passage Barriers on Allison Creek (Source: Copper Valley, 2011a)

- Install stream gages immediately below the diversion and in Reach 3 to monitor minimum flows.

These proposed environmental measures are consistent with the 10(j) recommendations submitted by the FWS, NMFS, and Alaska DFG. In addition, FWS and Alaska DFG recommend failsafe provisions to ensure continuous instream flows to Allison Creek in the event of project shutdown, and the implementation of an Instream Flow Monitoring Plan.

Staff Analysis

Operating the project in a run-of-river mode as proposed by Copper Valley would ensure that that all diverted water is returned to the creek below the powerhouse. Project operation would therefore have no effect on the flows or the fishery above the diversion or below the powerhouse. Alyeska's Valdez Marine Terminal's water right to appropriate up to approximately 0.13 cfs would not be affected, as its withdrawal is downstream of the proposed tailrace.

During the low-flow months of January through April, insufficient water would be available at the diversion structure for the project to operate. Flows in Allison Creek during these months are often less than the 4 cfs minimum hydraulic capacity needed to operate the project. All water in Allison Creek would flow naturally through the bypassed reach. Accordingly, no effect on the flows or the fishery within Allison Creek would occur during these months.

Copper Valley proposes to release a minimum flow of 2 cfs at the diversion structure into Allison Creek at all times when the project is operating. From May through December, up to 80 cfs (the maximum hydraulic capacity of the turbine) would be diverted for project operation. Accordingly, flow in the bypassed reach would be reduced by 80 cfs when compared to current conditions. Flow in excess of 80 cfs would pass the diversion into the bypassed reach. In an average water year, approximately 10 cfs in June and 35 cfs in July would pass the diversion into the bypassed reach. Flow in the bypassed reach would be reduced by 80 cfs when compared to current conditions. In an average water year, the project would divert all of the flow in Allison Creek in May and from August until December because average Allison Creek flows are less than 80 cfs in these months. The only flow remaining in the bypassed reach during these months would be the minimum flow release.

Copper Valley proposes to provide a flow from the project diversion that would maintain a flow of 10 cfs in Reach 3 (about 6,500 feet below the diversion) from June 16 through October 31, and 8 cfs from November 1 until June 15 if the project is operating. Given the uncertainty about the relationship of flow and connectivity in Allison Creek, and the lack of information regarding flow losses to infiltration or flow augmentation from tributaries and accretion flow in Allison Creek, it is unknown exactly how much

water Copper Valley may have to release from the diversion to achieve the goal of either 8 or 10 cfs in Reach 3, approximately 500 feet upstream of the proposed project powerhouse tailrace. Accretion flow from the 6,500-foot reach between the diversion and the minimum flow compliance point is estimated to 5-15 cfs. The amount of water Copper Valley would need to release from the diversion would vary, likely between 2 and 10 cfs, depending on the amount of flow in the reach that would be contributed by accretion.

If Copper Valley were to release the minimum flow of 2 cfs from the diversion and this release amount was able to meet the 8 to 10 cfs requirement 6,500 feet downstream in Reach 3, the amount of water in the bypassed reach would be much less than current conditions. If Copper Valley needed to release a higher amount of minimum flow (8 to 10 cfs or possibly higher) to meet the 8 to 10 cfs requirement 6,500 feet downstream, the amount of water in the bypassed reach would also be much less than current conditions. Regardless of the minimum flow that would need to be released to maintain a flow of 8 or 10 cfs in Reach 3, the amount of water in the bypassed reach would be greatly reduced from June through December when the project is operating compared to existing conditions. The proposed minimum flows in the bypassed reach would represent an approximate 80% reduction in flow when compared against the current conditions.

Decreases in natural flow during project operation in Reaches 3 and 4 would reduce the amount of habitat available for resident Dolly Varden and sculpin from May until December. Flow in the bypassed reach would consist of minimum flow releases from the diversion, any flow exceeding the project's 80-cfs capacity, and any accretion flows that may occur.

In developing a method for establishing a minimum flow for protection of aquatic resources, Tennant (1976) suggested that 10 percent of the average annual flow is the minimum instantaneous flow to sustain short-term survival habitat for most aquatic resources. Based on a modeling effort, the average annual flow in Allison Creek is 47.7 cfs. As shown in Table 6, the proposed minimum flows would represent 16.8 or 20.9% of the natural average annual streamflow of Allison Creek depending on the month. The proposed minimum flows represent a significant reduction in the quantity of water that would be present in the project bypassed reach. However, from a biological perspective, the effects of these flow reductions are not likely to be dramatic for a number of reasons. The bypassed reach is marked by high gradients and high flow throughout, which does not provide optimal aquatic habitat. Additionally, the fish populations in the bypassed reach have no recreational value and any losses that may occur would likely be nominal.

Reductions in flow to the bypassed reach could result in the loss of pool connectivity. If pool connectivity is not maintained, rearing Dolly Varden may not be able to move upstream from pool to pool. However, Copper Valley observed connectivity between pools under current low-flow conditions in Allison Creek.

Implementation of ramping rates of no more than 20 cfs per hour would minimize stranding of fish at project start-up in the spring and during other times where flows are reduced by changes in project operations.

Table 6. Percent of average annual flow under proposed minimum flows regime (Source: staff).

Month	Average annual flow (cfs)	Minimum flow in Reach 3 (cfs)	% of average annual flow
May	47.7	8	16.8
June	47.7	8/10	16.8/20.9
July	47.7	10	20.9
August	47.7	10	20.9
September	47.7	10	20.9
October	47.7	10	20.9
November	47.7	8	16.8
December	47.7	8	16.8

It is essential that a licensee be able to demonstrate compliance with all operational requirements of a project. Copper Valley's proposal to install stream gages immediately downstream from the diversion and upstream of the powerhouse (i.e., Reach 3 flow compliance gage) to monitor flows would allow for this task. Compliance with the proposed run-of-river operation, proposed minimum flow releases, and proposed ramping rates would be best achieved through the development of an over-arching OCMP. This monitoring plan would provide a mechanism to document operational compliance. The OCMP would also detail procedures for notifying the Commission, FWS, and Alaska DFG of any non-compliance events. The OCMP would accomplish the goals of the recommended Instream Flow Monitoring Plan; therefore, there would be no need for Copper Valley to implement a separate Instream Flow Monitoring Plan.

FWS and Alaska DFG's recommendation to provide failsafe provisions to allow for continuous instream flows to Allison Creek in the event of project shutdown would be protective of aquatic resources. This measure would ensure a constant delivery of minimum flows to the bypassed reach at all times.

Water Quality

Copper Valley's proposed environmental measures for water quality include: using BMPs during construction; implementing an ESCP; and developing and implementing an ECMP during the construction phase. These proposed environmental measures are consistent with the 10(j) recommendations submitted by the FWS, NMFS, and Alaska DFG.

Additionally, FWS and Alaska DFG recommended that Copper Valley be required to employ a qualified Environmental Compliance Monitor (ECM) prior to the start of project construction. FWS and Alaska DFG stated that the ECM should have a background in the biological sciences with experience in water quality monitoring and erosion/sediment control measures. The ECM would be present on-site throughout the construction phase and would have the power to cease work, to change orders in the field to ensure compliance with the project license, and would file weekly construction reports with the Commission and Alaska DFG. The ECM would be required to take daily turbidity measurements both upstream and downstream of the construction area.

Staff Analysis

Project Construction

Project construction would likely affect turbidity, specific conductivity, and pH of the water downstream of any construction areas. Specific conductivity and pH are properties that tend to reflect the source and composition of surface water, as well as the soils and geology with which it interacts. Short-term shifts in either of these water quality parameters are possible during project construction, most likely as a result of an unintended increase in sediment load to Allison Creek. Turbidity also would be immediately affected in that instance. The most likely phase of construction to cause unintended sedimentation affecting turbidity, specific conductivity, and stream pH would be the installation of the diversion weir. During this construction effort, Allison Creek would most likely experience a short-term shift in all three water quality parameters, regardless of the chosen construction method (e.g. temporary diversion channel, coffer dam and pump operation, etc).

Alyeska is the only consumptive user of Allison Creek water, which they appropriate for potable purposes. Any unexpected increases in creek turbidity as a result of sedimentation during construction could affect their use of the water. Alyeska is required by the Alaska DEC to conduct daily testing of their treated water for turbidity, in addition to numerous other testing requirements. Violations of the turbidity requirement specific to their system have occurred at least once in recent years, therefore Alyeska should be considered sensitive to the turbidity baseline in Allison Creek. Any additional sediment load to Allison Creek during construction could create problems with the daily

turbidity testing required of Alyeska, whether or not it actually caused any issue with the quality of the drinking water.

In response to these anticipated effects, Copper Valley has proposed a number of measures to reduce sedimentation caused by project construction. Planning and designing the installation of the diversion structure to minimize the need to work within flowing water would minimize the frequency and amount of sediment that may enter Allison Creek.

Copper Valley's proposed ESCP would achieve the goal of managing and reducing possible water quality effects to Allison Creek. The ESCP would be an all-encompassing plan that would consolidate the proposed measures minimizing adverse environmental effects. The measures and plans presented in the ESCP would ensure that construction work in all areas of soil-disturbing activities be conducted in accordance with the Alaska Pollutant Discharge Elimination System Construction General Permit. Specific components of the ESCP during project construction include: re-seeding, fertilizing, and watering all disturbed ground with silt and overburden to establish ground cover and minimize stormwater runoff; and developing a Storm Water Plan, a Construction Plan, and a Blasting Plan. An ESCP that is developed in consultation with stakeholders and implemented during ground-disturbing activities would provide measures that are protective of the water quality and fishery of Allison Creek. Any unavoidable increases in stream sedimentation would likely be short-term and have no lasting negative effects on the aquatic resources.

Stream temperature would likely not be affected by project construction. Though temporary construction-phase diversion of the stream is possible during construction, no impoundment of water or other measure is planned that could cause the flowing condition of the water to change to a slow or stilled condition that might have the potential to affect water temperature on warmer days.

Copper Valley proposes to develop and implement an ECMP. This plan would provide for the presence of a qualified Environmental Compliance Monitor (ECM) on-site during all construction phases. The ECM would have the power to order work stoppages and be able to change field orders as deemed necessary to provide compliance with the provisions of any license that may be issued. Given the remote nature of the project, the presence of a qualified ECM on-site would ensure compliance with all recommended environmental measures during construction for aquatic resource protection. The ECM's responsibility to monitor turbidity upstream and downstream of the construction during instream work would provide for evaluation of the effectiveness of erosion and sediment control BMPs. Requiring that the ECM has a background in biological sciences with experience with erosion/sediment control measures would ensure the designated ECM would be able to effectively execute the duties.

Copper Valley has stated that it would allow access to the project site to FWS and Alaska DFG representatives with appropriate prior notice. This would allow FWS and Alaska DFG to observe the implementation and effectiveness of any recommended environmental measures.

Project Operation

Project operation would likely have a negligible or no effect on turbidity, specific conductivity, and pH of the creek water. The primary potential for any change comes from the fact that the diverted water would not contact the soils and geology of the creek bed in its diverted reach. Therefore, the water would not experience the natural alteration in chemistry that otherwise could occur in traveling from the upper to the lower creek. Multi-year water quality monitoring data indicate that these three parameters are generally consistent from the upper to the lower creek, with no large demonstrated variations. Therefore the diverted water would still be expected to closely match the water quality in the lower creek where it would be discharged. No impacts to the fishery related to construction would be expected. Potential temperature effects are discussed below in the Biotic Monitoring Plan section.

Fish Protection Measures

Copper Valley proposed environmental measures for fish protection include: developing and implementing a two-phase Biotic Monitoring Plan that includes provisions for stream temperature monitoring, fish population monitoring, and adaptive management.

These proposed environmental measures are consistent with the 10(j) recommendations submitted by the FWS, NMFS, and Alaska DFG. In addition, FWS, NMFS, and Alaska DFG recommend the development of a Tailrace Fish Exclusion Plan.

Staff Analysis

Biotic Monitoring Plan

Copper Valley's proposed Biotic Monitoring Plan would be implemented in two stages (pre-construction – Phase I, and post construction – Phase II). The proposal for a two phase plan was a result of consultation between Copper Valley, FWS, Alaska DFG, and NMFS that occurred after the agencies filed 10(j) recommendations with the Commission. Phase I would be filed, approved, and implemented prior to land-disturbance as a subset of the ECMP. In its license application, Copper Valley did not provide details as to what Phase I would entail or consist of, nor did they explain how it would differ from or complement the ECMP. Alaska DFG, in a letter filed with the Commission on December 5, 2012, provided clarification and stated that Phase I monitoring would consist of observation of fish use and habitat in the bypassed reach to

describe the current conditions during the summer and fall. These data could be compared to data collected in Phase II to discern possible operational effects on the area's fisheries.

Plans for Phase II would be filed and approved prior the commencement of project operation. Copper Valley did not provide specificity for Phase II; however, the 10(j) recommendations filed by FWS, NMFS, and Alaska DFG, supplemented by Alaska DFG's clarification letter, provide some detail. In particular, Phase II would include provisions for: (1) monitoring to determine if project operations are affecting water temperature in the bypassed reach; (2) assessing the effectiveness of minimum flow releases in maintaining stream connectivity in the bypassed reach; (3) evaluating the proposed minimum flow effects on aquatic habitat via presence/absence surveys (e.g., using minnow traps, small screens, etc.); and (4) developing an adaptive management strategy that could result in modification to the proposed minimum stream flow regime. Phase II monitoring would be conducted annually for at least 5 years after the commencement of project operation.

During project operation, up to 80 cfs of water would be diverted from Allison Creek through the roughly 7,000-foot long, 42-inch diameter steel penstock to the powerhouse. Only a small portion of the penstock would be buried, leaving most of it exposed to the climatic regime of the Valdez area. The project is intended to operate primarily during the spring, summer, and fall/early winter months. A typical worst-case heat gain scenario (i.e., largest temperature range between ambient air outside the pipe and diverted water within the pipe) would be expected to occur in June or early July, when baseline creek water temperatures range as low as 3.6°C (Table 4) and average air temperatures can reach 17.2°C (63°F) (WRCC, n.d.). With a capacity of 80 cfs and a diameter of 42 inches, the velocity of the water in the pipe would be approximately 8.5 feet per second; this translates into a water travel time from diversion to powerhouse of less than 15 minutes. The ability of 63°F air to add any appreciable amount of heat to the water in the pipe would be negligible in this brief amount of time, based on standard relationships for radial heat conduction through a hollow cylinder such as a pipe (Lindeburg, 2001). A standard assumption for warming of water passing through a powerhouse and turbine for a project of this size would be a temperature rise on the order of far less than 1°C. Given the fact that the demonstrated baseline diurnal temperature variation within the creek can span approximately 3°C in June and July, there would be little to no measurable net effect from project operation on the baseline temperature regime within Allison Creek. Fisheries downstream of the project would not be affected.

The 80 to 85 percent reduction of flow in the bypassed reach when the project is operating could result in water temperature increases in the bypassed reach. Lesser quantities of water that would result from project operation would be more likely to be warmed by solar radiation when compared to the natural flow in Allison Creek. Solar heating of water could be exacerbated if lower flows result in a loss of connectivity in the

bypassed reach. Standing water pools would absorb more solar radiation than flowing water which would result in temperature increases. The post-operational monitoring in the Biotic Monitoring Plan would provide a mechanism to ensure that the proposed minimum flow releases provide for stream connectivity in the bypassed reach and that minimum flow releases could be adjusted to maintain connectivity. The temperature monitoring component of the Biotic Monitoring Plan would provide a means of ensuring that water temperatures in the bypassed reach during project operation would not rise to a point that would not adversely affect resident Dolly Varden.

Minimum Flow and Aquatic Habitat Monitoring

This portion of Phase II would evaluate the effectiveness of the proposed minimum flows in maintaining stream connectivity and maintaining aquatic habitat in the bypassed reach. Only a small portion of the bypassed reach supports any fish, as the majority of the bypassed reach lies above the furthest upstream extent of resident Dolly Varden. The approximately 1,200-foot reach between a 10.5-foot high waterfall and the chutes appears to provide habitat for small numbers of rearing juvenile Dolly Varden. The post-operational monitoring in Phase II would provide a mechanism to ensure that the proposed minimum flow releases provide for stream connectivity in this reach and that there is adequate aquatic habitat to maintain a fish population. Stream connectivity and habitat availability would allow resident Dolly Varden to move freely in the reach between the powerhouse and the upper extent of their range (approximately 1200 feet upstream). Such post-licensing monitoring would assess if the proposed minimum flow would be providing the intended biological benefit.

Phase II would also include an adaptive management strategy that may lead to a proposed change to the minimum flow release or other measures based on the results of this monitoring. If observation of the bypassed reach showed that fish were no longer able to use it due to habitat availability or connectivity, a change in the minimum flow or other measures would be considered. Any changes to project operation would have to be proposed as an amendment to any license that may be issued for this project. Staff would analyze the effects of these changes at that time.

Tailrace Fish Exclusion Plan

The project intake would be built in Reach 5 where no fish of any species have been found to occur. Therefore, no screening or other protective measures would be warranted at the project diversion.

The powerhouse and tailrace would both be located entirely above the barrier to anadromous salmon. This design, coupled with the run-of-river operation and lack of perceptible water quality effects downstream of the project/tailrace, would ensure that effects on anadromous salmon populations in lower Allison Creek would be nominal.

Project operation could have adverse effects on the resident Dolly Varden population which exists upstream of the anadromous salmon barrier. These fish could be attracted to the project outfall and may face possible injury if they were to swim into the project's draft tubes. As mitigation, FWS, NMFS, and Alaska DFG recommend the development of a Tailrace Fish Exclusion Plan. This plan would consist of the final tailrace design developed in consultation with FWS, NMFS, and Alaska DFG, which would be filed for Commission approval. This plan would also ensure that the final design minimizes or eliminates adverse effects on resident Dolly Varden in the project bypassed reach and tailrace.

3.3.3 Terrestrial Resources

3.3.3.1 Affected Environment

Vegetation

Allison Creek lies within the Chugach Mountains physiographic province (Wahrhaftig, 1965), which forms an extremely rugged barrier along the north coast of the Gulf of Alaska. Alpine rock and scrub tundra surround Allison Lake, as well as a subalpine area of tall alder scrub at intermediate elevations, and Sitka spruce forest stands at lower elevations. Spruce forests were noted to occur up to about 400 feet of elevation along Solomon Gulch Creek. Copper Valley conducted an impact assessment study for the project area in 2010. The Allison Creek impact assessment area was 4,271 acres in size and included six physiographic zones: coastal, riverine, upland, subalpine, alpine, and lacustrine zones. The coastal zone is limited to areas directly influenced by tidewater and is uncommon in the impact assessment area. Uplands include the lower forested slopes adjacent to the coast mainly composed of coniferous forest. The alpine zone includes mountain heath, barrens, and partially vegetated community types found on mountain crests and ridge tops. Riverine communities include barrens, open water, and shrub vegetation types found commonly throughout the entire impact assessment area.

The subalpine zone is the most common physiographic region and includes the entire area surrounding Allison Lake, primarily steep slopes supporting tall shrub, mixed forb, and mountain heath vegetation types. Lacustrine types include small ponds, but primarily comprise Allison Lake, which has a surface area of approximately 250 acres.

Wetlands

Current National Wetland Inventory (NWI) data for the Port Valdez area shows five wetland types mapped in the Allison Creek drainage and in the Solomon Gulch Creek drainage downstream of Solomon Lake. These include freshwater emergent wetlands and freshwater forested/shrub wetlands (palustrine), freshwater ponds and lakes (lacustrine), and riverine wetlands. The Allison Creek Project is not expected to affect estuarine areas. These NWI wetland types, mapped from aerial photography collected in

1978 and 1979 comprise approximately 320 acres in the project area, and this includes the area for Allison Lake. A wetlands mapping effort was conducted in August 2009 to provide vegetation and wetlands information for the preparation of a Section 404 wetlands permit application for the proposed project. The proposed project is restricted to the lower and middle reaches of Allison Creek and no impacts would occur in the upper Allison Lake basin.

Wildlife Habitat

Copper Valley identified twenty-three wildlife habitat types in their project impact assessment area. The most abundant wildlife habitat is upland and subalpine tall alder scrub, which covers 38% of the impact assessment area. Other habitats that comprise more than 10% of the mapped area include subalpine and alpine dwarf ericaceous scrub (14%) and subalpine and alpine herb meadow (13%). Subalpine and alpine barrens covers 9% of the area, upland Sitka spruce forest 8%, lakes (i.e., Allison Lake) 6%, and rocky cliffs 5%. No other habitat type covered more than 5% of the mapped area.

Wildlife

Birds

Habitats in the project area may be used by at least 73 of the nearly 150 bird species known to occur in the Port Valdez area. The lake and stream habitats are used by several species of waterbirds (waterfowl, loons, and gulls) and shorebirds, and the forest, scrub, and tundra habitats are occupied by many landbird species (primarily passerines) and a few species of raptors and shorebirds.

At least 12 species of raptors potentially breed in or migrate through the project area. Bald eagles commonly breed in Prince William Sound, including Port Valdez (Isleib and Kessel, 1973), and primarily nest in large trees such as Sitka spruce and black cottonwood along the coast, often on or near salmon streams. In winter, bald eagles congregate in coastal habitats, such as Port Valdez, where they depend on open water for major prey including fish and waterbirds. Golden eagles are rare breeders in coastal mountains, but typically nest on alpine cliffs (Isleib and Kessel, 1973) in habitats similar to those in the upper Allison Creek and Solomon Gulch drainages. Other raptor species that likely breed or may be year-round residents in the project area include northern goshawks, red-tailed hawks, Peregrine falcons, great-horned owls, boreal owls, and northern saw-whet owls. Possible breeders also include sharp-shinned hawks, gyrfalcons, merlin, and northern harrier. Osprey (*Pandion haliaetus*) may also occur during migration, but do not nest at Allison Lake and are likely uncommon in the area. Copper Valley conducted a survey for raptor nests in 2009. Two active bald eagle nests were found in forested habitats along Dayville Road near Solomon Gulch, and one old stick nest (suspected golden eagle) was located on a cliff face above Solomon Creek.

Two bald eagle nests were found during the survey. One bald eagle nest was located approximately 275 meters from the proposed transmission line.

Five species of seabirds are commonly recorded in Port Valdez (Dames and Moore 1979a; Hogan and Colgate 1980; Hogan and Irons 1988): pelagic cormorant, common murre, pigeon guillemot, marbled murrelet, and Kittlitz's murrelet. Of these, pelagic cormorants and common murres occur in Port Valdez only during winter (Hogan and Colgate 1980; Hogan and Irons 1988), and do not use inland or terrestrial habitats such as those found in the project area. Pigeon guillemots are present during summer months and commonly breed in Port Valdez (Hogan and Colgate, 1980), but they nest on steep, creviced marine shoreline rock faces and outcroppings (Ewins, 1993), which are habitats that also do not occur in the project area. Marbled and Kittlitz's murrelets use inland terrestrial habitats, such as those found in Port Valdez and in the Allison Creek project area, during breeding and nesting (Nelson, 1997; Day et al., 1999; Kissling et al., 2007).

Waterbirds in the project area include waterfowl, loons, grebes, and larids (gulls and terns). The only waterbird species specifically recorded using the Allison Creek area prior to 2008 field studies were Canada geese. Based on an evaluation of potential waterbird habitats available in the project area, 11 species of waterbirds likely breed and/or occur in the area during migration. Most waterbirds would not be attracted to Allison Lake because of the high elevation, persistent ice cover, and lack of emergent vegetation.

Based on habitats available in the project area, about six species of shorebirds and 50 species of landbirds are likely to occur. Copper Valley conducted surveys for breeding shorebirds and landbirds in 2009 and found that the project area includes fox sparrow, Wilson's warbler, hermit thrush, orange-crowned warbler, golden-crowned sparrow, varied thrush, savannah sparrow, ruby-crowned kinglet, common redpoll, Townsend's warbler, and yellow warbler.

Mammals

Approximately 32 species of land mammals are known or expected to occur in the project area, including mountain goat (which is considered a management indicator species by the U.S. Forest Service), brown and black bears, coyotes, small mammals, and furbearers.

Goat populations in coastal Alaska are limited principally by winter severity (mainly snow depth) and the availability of suitable habitat (Fox et al., 1989), but they have a low reproductive rate and thus are susceptible to predation and overhunting (Fox and Streveler, 1986; Côté and Beaudoin, 1997; Toweill et al., 2004). Mountain goats were surveyed in August 2008, and most of the goats observed in the project area were lone males and only one nanny with a kid was observed. Taken together, the available

evidence does not indicate that the upper Allison Lake basin contains important birthing or rearing habitats for mountain goats.

Both black and brown bears inhabit the project area, with black bears being more numerous. Both species of bears likely use the entirety of the project area, including the upper basin and forested habitats between Allison Creek and Solomon Gulch, although black bears do not use alpine habitats as commonly as do brown bears. Black bears are particularly common in the project area and often were observed foraging in recently snow-free and herbaceous habitats in the lake basin, in lower elevation conifer forests, and along the coast throughout the summer. In their comments filed on April 6, 2012, Alaska DFG stated that bear activity has been commonly reported on and adjacent to Allison Creek within the Alyeska's security area, and that spawning coho salmon are a major attractant to bears between the months of September and October.

The project area supports many important furbearers such as river otter and mink. River otters were observed in estuarine waters adjacent to Allison Creek in June 2009 and river otters were documented in lower Allison Creek in July 2009. River otters probably frequent much of the low-gradient reach of Allison Creek where fish are present and much of the shoreline and forested habitats along Valdez Bay. Mink are likely to occur in Allison Creek primarily where fish are present and in shoreline and forested habitats adjacent to Valdez Bay. Mink were observed in estuarine habitats at the mouth of Allison Creek in June 2009. Although the species occurs in the region, there is little habitat for beaver in the Allison Creek basin. Beavers occur exclusively in association with woody vegetation and fresh water habitats, including streams, rivers, impoundments, and lakes, from sea level to alpine zones. If present, beaver are likely rare in the project area.

Sensitive Species

The Kittlitz's murrelet is a candidate for listing under the ESA, and Alaska populations of the marbled murrelet are considered Birds of Conservation Concern by the FWS. Both are discussed in section 3.3.4, *Threatened and Endangered Species*. Ten other bird species (Canada goose, mallard, harlequin duck, red-throated loon, bald eagle, lesser yellowlegs, marbled murrelet, rufous hummingbird, varied thrush, and Townsend's warbler) in the project area are considered species of concern, as defined by the Memorandum of Understanding between the Commission and the FWS.

Three habitats in the project area are potentially important to rufous hummingbirds, varied thrushes, and Townsend's warblers: upland Sitka spruce forest; upland and subalpine tall alder scrub; and subalpine and alpine dwarf ericaceous scrub. The proposed project would remove 59.8 acres of upland and subalpine tall alder scrub and 6.5 acres of subalpine and alpine dwarf ericaceous scrub, primarily in the diversion structure and penstock footprints, and 13.8 acres of upland Sitka spruce forest, primarily

in the transmission corridor. The small island in Allison Lake presents a unique nesting habitat for one pair of red-throated loons

3.3.3.2 Environmental Effects

Vegetation and Wetlands

The proposed project facilities would permanently remove approximately 3.57 acres of wetlands and wildlife habitat in the footprints of the diversion structure, 42-inch penstock, powerhouse/switchyard area, and permanent access road. Additional temporary habitat loss and habitat alternation would occur during construction and in terrain surrounding the facilities, which would be cleared periodically for regular maintenance, and would total approximately 35.47 acres. Direct affects of the hydropower facilities to wildlife habitat would affect a total of 39.04 acres. The primary habitats affected would be upland and subalpine tall alder scrub (30.60 acres) and subalpine and alpine dwarf ericaceous scrub (6.48 acres). In the streambed of Allison Creek and an adjacent small tributary stream, a total of approximately 1.85 acres of rivers and streams would be affected. Excluding artificial fill, the only other wildlife habitat affected by the hydropower facilities is upland Sitka spruce forest (0.01 acres). Clearing and maintenance of the 100-foot-wide corridor would affect approximately 47 acres of wildlife habitats. The primary wildlife habitat affected by clearing in the transmission corridor would be upland and subalpine tall alder scrub (29 acres). About 14 acres of upland Sitka spruce forest also would be cleared. The corridor crosses over a pond (0.06 acres) and, where the transmission corridor crosses Solomon Gulch and other small creeks, approximately 0.25 acres of river and stream habitat will be affected.

Including the transmission corridor, the proposed project would affect approximately 4.1 acres of water (primarily Allison Creek) and 1.8 acres of wetlands. Copper Valley proposes to develop and implement a Vegetation Plan to mitigate the effects of vegetation removal. In addition, Copper Valley proposes to implement the following measures, to the extent practicable, to minimize affects to wetlands:

- Design the project so that the fill footprint is minimized;
- Consolidate project facilities to small area of impact;
- Revegetate slopes subject to erosion and disturbed surfaces to minimize stormwater pollution;
- Plan and maintain sediment prevention measures along the toe of all fill areas adjacent to wetlands or waters
- Use only clean sand and gravel for fill; and
- Stockpile material in developed areas and/or uplands.

Birds

Project construction and operation may result in direct and indirect habitat loss or alteration, behavioral disturbances, exposure to hazardous material during construction, attraction of scavengers, increased subsistence hunting and trapping pressure due to improved access from project construction, and mortality events due to collision with the project transmission line.

Habitat loss and alteration for birds would occur during the construction period for all species affected and most such loss and alteration is permanent. Most of the non-riparian habitats that would be affected by the project are abundant in the basin. In terms of percent loss in the mapped area, no upland habitat would be reduced in availability by more than 0.05%. Habitat loss is unlikely to affect the abundance of any bird species, which occur primarily in the upper basin, upstream of the diversion structure. For raptors, seabirds, and all other landbirds, the effects of habitat loss are anticipated to be negligible. Regionally, the bird species affected by habitat loss associated with the project are common and their habitats widespread. The small area of riverine habitat loss in the Allison Creek basin should result in negligible effects on the abundance of these species in the region. The need for year-round access to the diversion structure and upper penstock area during project operation may result in some level of ongoing behavioral disturbance of birds. Because the temporary penstock access road would not be maintained after construction, long-term access would be via helicopter. The frequency of required access has not been described but would be anticipated to require no more than several visits annually and effects on birds would be negligible. To prevent disturbance of nesting bald eagles, known active nests would be avoided by any helicopter flights by a distance of at least 660 feet during the operation period.

Another concern would be the attraction of scavengers to the project area. Ravens and gulls may be attracted to human activities and facilities during both construction and operation periods, but attraction would be greatest when human foods and garbage are present, primarily during the construction phase. Attraction to the construction site and increased interaction with humans creates the potential for mortality from control measures (i.e., killing problem animals), vehicle strikes, or ingestion of toxic substances. Copper Valley proposes to develop a Waste Plan which would provide guidance for construction workers that prohibits the feeding of wildlife. It would also include modern garbage-handling procedures to minimize the occurrence of attraction and habituation of wildlife. In addition, Copper Valley would require contractor personnel training for the Waste Plan. Nonetheless, artificial food sources are powerful attractants and project construction may attract some ravens or gulls. No negative effects from the slight increase in the local abundance of ravens and gulls are anticipated, should it occur.

Fuels and explosives would be used and stored in the project area and accidental spills or inappropriate handling procedures may pose some risk of contamination for

birds. The construction contract would require the contractor to control, contain, and remove any spill occurrence during construction. Any reportable spills would be reported as required. Copper Valley's Hazardous Plan would control, contain, and remove any spill occurrence during construction, and detail measures to control discharges of such materials into project waters. Appropriate response would limit impacts of any accidental spills and very few individual mammals would be affected. Overall impacts of spills are likely to be minor.

The improved access provided by project construction may facilitate increased recreational hunting and subsistence activity in the Allison Creek basin. The only bird species present in the basin that typically would be subject to harvest are grouse, ptarmigan, ducks, and geese. None of these species is abundant in the Allison Creek basin and the basin is unlikely to become an important location for harvest due to the limited availability of game birds. Increased harvest facilitated by improved access is anticipated to have negligible impacts on birds.

For birds, the proposed project would pose some risk of collisions with project facilities, primarily transmission powerlines and towers. The proposed inland route of the transmission corridor, following the pipeline rather than Dayville Road, should minimize strikes by birds flying inland from the coast. All species may be susceptible to strikes, but in the project area murrelets may be the species of greatest concern due to their status as candidate species under the ESA. Red-throated loons in Allison Lake, like murrelets in the upper basin, make foraging flights between nest sites and feeding areas in marine waters and may also be susceptible to strikes (potential impacts to murrelets and red-throated loons are discussed further in section 3.3.4 *Threatened and Endangered Species*, below). Bald eagles also are susceptible to electrocution by power poles that are not designed appropriately.

To reduce any potential effects the project would have on birds, Copper Valley proposes to develop and implement an Avian Protection Plan which includes provisions to: restrict vegetation clearing from May 1 through July 15; limit activities on the ground, helicopter traffic, and any potential blasting that may be required from April 10 through August 10, or earlier if pairs are present; and avoid project activities within 660 feet of active bald eagle nests.

Copper Valley's Avian Protection Plan would also include marking and lighting new powerlines and guy wires; and designing lighting for any structures or communication towers to reduce bird attraction and the potential for bird strikes.

FWS and Alaska DFG recommended that the construction of the transmission line conform to the most current version of the "Suggested Practices for Raptor Protection" by the Avian Power Line Interaction Committee (APLIC) to minimize or avoid the risk of electrocution to raptors and other birds.

Copper Valley also proposed a Safety Plan which includes abandoning, restoring, and installing a gate across the temporary construction access route, and posting "No Trespassing" signs in an effort to reduce unauthorized access in the project area. Alaska DFG recommended that Copper Valley restrict project construction personnel from hunting, fishing, and trapping on the project site for the protection of wildlife.

Mammals

Potential effects to mammals include: direct and indirect habitat loss due to the construction and operation of project facilities; behavioral disturbance during project construction and operation; exposure to hazardous materials during construction; behavioral habitation and attraction of scavengers; inhibition of free passage across the project's penstock; and increased recreational and subsistence hunting pressure due to improved access to the project area.

Habitat loss for mammals would occur during the construction period for all species and most such loss is permanent. In terms of percent loss in the basin, the habitats most affected by the project are all riparian and these habitats are important for black and brown bears, river otters, and mink. The proposed project would affect one habitat that was designated as essential for river otter and mink and high value for bears, which will be 0.05% less available in the basin post-construction. Unlike bears, which use a variety of habitats, both river otters and mink probably occur primarily in riparian and other shoreline habitats and they may be somewhat more affected than bears by the loss of riparian habitat in the basin. As with bears, however, the important habitats for river otters and mink are adjacent to river reaches that have fish, entirely downstream of the barriers to fish passage, where little loss of riparian habitats would occur. The project would not affect any habitats designated as high-value for mountain goats, porcupine, collared pika, red squirrel, voles, or shrews. The proposed project would affect primarily upland and subalpine tall alder scrub and upland Sitka spruce forest, but only 0.04% of each habitat would be affected. Only 0.01% of available subalpine and alpine dwarf ericaceous scrub in the basin would be affected. These upland, subalpine, and alpine habitats are important for bears, porcupine, red squirrels, ground squirrels, and voles and shrews, but loss attributable to the project is unlikely to be significant.

Behavioral disturbance of mammals may result during July through September of each of the three proposed construction seasons. Project personnel would be housed off-site and helicopters would be used by construction crews to access the project site. Activities during the first year include clearing the temporary construction access route, the powerhouse access road and powerhouse footprints and initial construction of the powerhouse. During the second year, the penstock site would be cleared, stream diversions and penstock construction would be initiated, and the diversion structure would be built. During the third year, the penstock, powerhouse, and transmission line would be completed. No estimates of helicopter traffic rates, vehicle traffic rates, or on-

site numbers of personnel would be available until closer to final design, but all of these activities may result in disturbance of local mammals.

Project construction in riparian habitats could cause disturbance of bears and river otters, but these species probably occur primarily in fish-bearing reaches downstream of most project construction activity. Some disturbance of bears, river otters, and mink may occur in riparian habitats near the powerhouse, where Dolly Varden are present, and just upstream of reaches with salmon. Behavioral disturbance and displacement are likely to have negligible effects on bears, river otters, and mink.

Among mammals, behavioral disturbance would be of particular concern primarily for mountain goats. Reports of observations of mountain goats in the Allison Lake basin confirm low levels of use by mixed groups in mid-summer.

FWS and Alaska DFG recommended that use of helicopters near these areas needs to be minimized to reduce potential affects to mountain goats and that if goats are observed, a 1,500-foot vertical or horizontal clearance shall be maintained in order to allow animals to cross freely in areas less steep (i.e., 100-foot elevation change in approximately 2,000 feet).

Fuels and explosives would be used and stored in the project area and accidental spills or inappropriate handling procedures may pose some risk of contamination for mammals. The construction contract would require the contractor to control, contain, and remove any spill occurrence during construction. Any spills would be reported as required. Copper Valley's proposed Hazardous Plan would require the control, contain, and remove any spill occurrence during construction and detail measures to control discharges of such materials into project waters.

Human-animal interactions may occur during both construction and operation, but would occur most frequently during the construction phase, when human activity would be most intensive and wide-ranging. The rate of human-animal interactions is further increased by the attraction of opportunistic predators and scavengers, specifically foxes, coyotes, bears, gulls, and ravens, to areas of human activity. The most prevalent causes of attraction of animals to the construction area would include 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 (DLP)), vehicle strikes, or ingestion of toxic substances, as well as potential injury to humans from animals with rabies or aggressive behavior.

Copper Valley proposes to develop a Waste Plan to curtail the attraction and habituation of scavengers and other wildlife. As discussed above, the Waste Plan would include prohibiting construction workers from feeding wildlife and modern garbage-handling procedures. In addition, Copper Valley would require training for contractor personnel for the Waste Plan. Nonetheless, human food sources and human activities are

powerful attractants and project construction may attract some individual foxes, coyotes, or bears. Control measures, including fox trapping and DLP kills of bears, may be necessary on occasion during construction. Such mortality would be expected to have minor effects on local populations of foxes, coyotes, or bears.

FWS recommended that Copper Valley develop and implement a Bear Safety Plan. The plan would be developed to avoid possible conflicts between bears and humans in the project area during construction and operation. The FWS recommends that the plan include:

- Instructions for project operations when bears are present to minimize possible conflict;
- Instructions to minimize encounters and avoid areas frequented by bears;
- Instructions for keeping construction sites and refuse areas clean of substances that attract bears;
- Installation of bear resistant garbage receptacles and other measures during construction; and
- Procedures to deal with problem bears.

Alaska DFG also recommended a Bear Safety Plan which included the same requirements as the plan recommended by FWS, with additional provisions of consultation with FWS and Alaska DFG, and notification of any bear-human conflicts.

The proposed penstock may inhibit or be a barrier to movements of mammals between habitats on either side of Allison Creek between the proposed diversion structure and the proposed powerhouse. Although no specific movement corridors have been identified, it is likely that large mammals cross between the west and east sides of the basin primarily in the relatively low-gradient terrain within 3, 937 feet of the outlet of Allison Lake. The first 2,625 feet of low-gradient terrain downstream of Allison Lake would be unobstructed by proposed project facilities, while the next 400 meters of the creek valley downstream to the gradient change would lie adjacent to the proposed penstock, a 42-inch-diameter metal pipe, that may be lying on the ground or buried in this location (engineering considerations would determine). Copper Valley also proposes to develop a Terrestrial Connectivity Plan to mitigate any potential effects of the penstock as a barrier to wildlife movement.

FWS and Alaska DFG filed similar recommendations regarding burial of the penstock. FWS recommended that to allow animals to cross freely in areas less steep (i.e., 100-foot elevation change in approximately 2,000 feet) the penstock extending above the powerhouse shall either be buried or elevated. Alaska DFG recommended that Copper Valley file a Penstock Location and Grade Plan six months prior to any land-disturbing or land-clearing activities.

Alaska DFG recommended that Copper Valley restrict project personnel from hunting, fishing, and trapping on the project site to prevent the overharvest of fish and wildlife resources.

To reduce any potential effects the project would have on wildlife, Copper Valley proposes that operation of construction vehicles would be limited to the permitted boundaries within the project area or on designated roads. In addition, equipment servicing and fueling operations would not occur within 100 feet of Allison Lake or Allison Creek, or any drainage channels, wetlands, or other water bodies. Copper Valley would control, contain, and remove any spill occurrence.

To reduce dust and particulate matter in the air, Copper Valley proposes to develop a Storm Water Plan as supplement to the ESCP. This plan would include: watering during dust-producing activities, as needed; stabilizing all exposed earthwork attributable to the project at the earliest date possible to prevent erosion both during and after project completion; implementing and maintaining measures to prevent sediment along the toe of all fill areas adjacent to wetlands or water. These devices would remain in place until fill and exposed earthwork are stabilized and revegetated.

The penstock construction access route would be temporary and maintained only during the construction period. To minimize effects of improved access to the Allison Lake basin under Copper Valley's proposed Safety Plan, the construction route to the penstock would be abandoned and revegetated as necessary after construction, gated to prevent vehicle access, and "No Trespassing" signs would be posted to minimize pedestrian and off-road vehicle access. Copper Valley's Waste Plan would limit or restrict activities that attract animals and associated animal-human interactions.

Sensitive Species

The project would not affect any habitats designated as high-value or essential for the FWS birds of conservation concern. The habitats that would be most affected by the project are rivers and streams and these habitats are either high-value or essential for two species of concern: lesser yellowlegs and harlequin duck. For lesser yellowlegs, the low-gradient reaches of Allison Creek are high-value habitat. For shorebirds, however, all important habitat in this type is located in the low-gradient reach of Allison Creek above the lake and would be unaffected by the proposed project. The loss of riparian habitats would be unlikely to affect the abundance of breeding or migrant lesser yellowlegs in the basin. The low gradient-high flow upper reach of Allison Creek is high quality or essential habitat for harlequin ducks in the Allison basin and 0.61 acres of this habitat lie within the calculated footprint. Changes in flow below the proposed diversion structure may also result in alteration of additional harlequin duck habitat between the diversion structure and the drop-off to the steeper middle reach. The loss or alteration of small areas of stream habitat is unlikely to affect harlequin ducks.

Lesser yellowlegs are not known to nest in the project area and were recorded only during spring migration in the in the partially vegetated glacial outwash area at the head of Allison Lake. No disturbance impacts are anticipated to occur in that area. Disturbance is unlikely to affect lesser yellowlegs, rufous hummingbirds, varied thrushes, or Townsend's warblers. The low-gradient reaches of Allison Creek are highly valuable habitats for the lesser yellowlegs. This habitat is located above the lake and will not be affected by the proposed project. The upland Sitka spruce, upland and subalpine tall alder scrub, and subalpine and alpine dwarf ericaceous scrub that are important to the rufous hummingbirds, varied thrushes, and Townsend's warbler are abundant in the project area.

The need for year-round access to the diversion structure and upper penstock area during project operation may result in some level of ongoing behavioral disturbance of FWS birds of conservation concern. Because the temporary construction access route would not be maintained after construction, long-term access would be via helicopter. The frequency of required access has not been described but would be anticipated to require no more than several visits annually and effects on birds would be negligible. Existing recreational activities, including helicopter supported skiing, snow machines, and all-terrain vehicles, are projected to increase in the Valdez area, and it is likely that human presence would increase in the Allison Lake basin, as in other sites in the region. However, because of security concerns at the Alyeska Marine Terminal, near the mouth of Allison Creek, under Copper Valley's proposal, the construction access trail would be abandoned and restored, gated, and "No Trespassing" signs would inhibit access via the abandoned right-of-way. None of the FWS birds of conservation concern in the Allison Creek basin typically are harvested for recreation or subsistence. None of these species is abundant in the Allison Creek basin and the basin is unlikely to become an important location for harvest due to the limited availability of game birds. Increased harvest facilitated by improved access is anticipated to have negligible impacts on FWS birds of conservation concern.

The greatest concern for avian species is the risk of collision with the project transmission line. To minimize the risks of collision, Copper Valley's Avian Protection Plan would include provisions for the new powerlines and guy wires to be marked and lighted according to best management practices for protection of birds. Any structures or towers would have lighting designed to reduce bird attraction and the potential for bird strikes. In general, the overall effect of mortalities to birds from strikes of powerlines and towers associated with the Allison Creek project is expected to be minor to moderate, depending on tower designs and locations relative to flight paths of birds.

Staff Analysis

Vegetation and Wetlands

Copper Valley's measures to protect wetlands (design the project so that the fill footprint is minimized; consolidate project facilities to small area of impact; revegetate slopes subject to erosion and disturbed surfaces to minimize stormwater pollution; plan and maintain sediment prevention measures along the toe of all fill areas adjacent to wetlands or waters; use only clean sand and gravel for fill; and stockpile material in developed areas and/or uplands) would minimize the effects of the project on vegetation and wetlands.

Copper Valley did not provide any specific measures for their proposed Vegetation Plan. The following measures would be beneficial to include in the Vegetation Plan: (1) clean and inspect all equipment related to construction off-site; (2) use native plants and seeds in areas to be revegetated; and (3) implement a monitoring plan for the revegetated areas with measures to address invasive and noxious weeds should they be found.

Cleaning and inspecting equipment off-site and using native plants would reduce the risk of the introduction and spread of invasive plant species in the project area, while promoting native vegetation. A monitoring plan would ensure the success of these efforts.

Birds

Construction activities may disturb birds. This disturbance could be particularly harmful if it occurs during periods that could be stressful to animals such as during the winter migration period or during breeding season. Few birds would be negatively affected by disturbance during winter, so any increased activities would affect FWS birds of conservation concern primarily during nesting or, for some waterbirds, through brood-rearing and molting.

The improved access provided by project construction may facilitate increased hunting activity in the Allison Creek basin. The only bird species present in the basin that typically would be subject to harvest are grouse, ptarmigan, ducks, and geese. None of these species is abundant in the Allison Creek basin and the basin is unlikely to become an important location for harvest due to the limited availability of game birds. Increased harvest facilitated by improved access is anticipated to have negligible impacts on birds. Overall, the impact on birds of increased human presence, facilitated by improved access, is likely to be negligible.

The measures in Copper Valley's proposed Avian Protection Plan which includes provisions to restrict vegetation clearing from May 1 through July 15; and limit activities

on the ground, helicopter traffic, and any potential blasting from April 10 through August 10, would help keep disturbance to a minimum. The Avian Protection Plan also includes measures for marking and lighting the power lines and guy wires, and designing lighting for any structures or communication towers. These would also reduce bird attraction and minimize the potential for bird strikes. FWS and Alaska DFG further supplemented this proposal by recommending that the transmission line adhere to the most current APLIC standards outlined in their "Suggested Practices for Raptor Protection." Designing and constructing the transmission line in accordance with the most current APLIC standards would minimize the risk of avian collisions and electrocutions. The APLIC standards provide technical information for the design of the transmission line that would ensure that there is adequate separation between energized and grounded components and hardware.

Mammals

Construction activities may disturb mammals. This disturbance could be particularly harmful if it occurs during periods that could be stressful to animals such as during the winter migration period or during breeding season. Behavioral disturbance would affect primarily larger mammal species; small mammals would be displaced by the project footprint but continue to be present in adjacent undisturbed habitats. In general, the most common response to disturbance is avoidance or displacement: affected mammals move to areas where they are undisturbed or where humans are absent. Energy costs associated with startle reactions, escape movements, and other such disturbance responses also may occur. If present in the project area, wolves, wolverine, lynx, deer, and moose are uncommon and few individuals would be affected.

It is expected that the project will have a minimal impact on most wildlife, with the exception of mountain goats, which are extremely susceptible to disturbance by helicopters. Disturbed mountain goats may abandon their subalpine and alpine habitats in the Allison Creek basin, and disperse higher or farther south within the basin, or possibly into an adjacent basin. The affected goats may be displaced from preferred habitats during the July–September construction seasons. It is difficult to predict the distance at which mountain goats may react to project activities, but much of the goat habitat in the basin is more a mile from the proposed temporary access road and penstock areas. Some level of habituation by goats to normal construction activities is to be anticipated, particularly because most construction activities would be predictable and nonthreatening. However, mountain goats can be particularly sensitive to helicopter disturbance, so restrictions on helicopter activities would be appropriate, including restricting flight paths to the lower basin, no farther upstream than the actual diversion structure. With appropriate restrictions of helicopter traffic, impacts related to behavioral disturbance of mountain goats should be minor or moderate during project construction.

Copper Valley's provision in the Avian Protection Plan to limit activities, blasting, and helicopter traffic from April 10 through August 10; and staff's and Interior and

Alaska DFG's recommendation to maintain a 1,500-foot vertical and horizontal clearance when using helicopters would reduce potential effects to mountain goats, if present.

After construction, the need for year-round access to the diversion structure during project operation may result in some level of ongoing behavioral disturbance of mammals. Because the temporary construction access route would not be maintained after the construction period, access for operations and maintenance would be via helicopter. The frequency of required access has not been described, but is anticipated to be no more than several visits annually and effects on mammals would be negligible.

Copper Valley's Storm Water Plan as supplement to the ESCP would help ensure that particulate matter in the air would be kept to a minimum and reduce the risk of introducing sediments. This would help to protect aquatic furbearers. Copper Valley's Hazardous Plan would provide an appropriate response to limit the impacts of any accidental spills to ensure that few individual mammals would be affected. Overall impacts of spills are considered likely to be minor.

Copper Valley's Hazardous Plan and Spill Plan would control, contain, and remove any spill occurrence during construction and detail measures to control discharges of such materials into waters. Adequate absorbent and spill response materials would be kept on site to contain and clean up any accidental fuel spills. Any reportable spills would be reported as required. All debris would be disposed of in compliance with all federal and state laws and requirements.

Control measures, including fox trapping and DLP kills of bears, may be necessary on occasion during construction. Such mortality would be expected to have minor effects on local populations of foxes, coyotes, or bears. The Bear Safety Plan recommended by FWS and Alaska DFG would afford protection to humans and bears and reduce the likelihood of human-bear interactions. The plan would require that the project site remain clear of refuse and other items that would attract bears, and that garbage be properly disposed of in bear-resistant receptacles. Copper Valley's proposal to develop a Waste Plan would also help curb any incidents which would attract scavengers. These measures would adequately ensure that attracting bears and opportunistic scavengers such as foxes and coyotes would be minimized. Proper handling and disposal of waste would in turn decrease the likelihood of resorting to measures of trapping and DLP mortality events that Copper Valley described.

The Penstock Location and Grade Plan, recommended by FWS and Alaska DFG would be adequate to ensure wildlife mobility through the project area. Copper Valley proposes to develop a Terrestrial Connectivity Plan. This plan would be similar to the Penstock Location and Grade Plan recommended by the agencies. The Penstock Location and Grade Plan, together with the Terrestrial Connectivity Plan, would reduce any potential impacts to negligible levels.

Sensitive Species

The effects of the proposed project on sensitive species are expected to be minimal. The three habitats (upland Sitka spruce, upland and subalpine tall alder scrub, and subalpine and alpine dwarf ericaceous scrub) that are important to the rufous hummingbirds, varied thrushes, and Townsend's warbler are abundant in the project area and the loss of forest and ericaceous scrub to the project would be unlikely to affect the abundance of any species of concern. The proposed project would not affect the nesting island on Allison Lake and red-throated loons are likely to continue to nest on this island. Nesting habitats for most species will not be affected; however harlequin ducks nests may be present in the footprint of the diversion structure, upper penstock, or within the area cleared during construction and operation of the project.

Harlequin ducks forage in the upper reach of Allison Creek and several pairs are likely to nest in adjacent habitats, primarily in June. It is possible that harlequin duck nests may occur within the footprint of the proposed diversion structure or upper penstock or within the area cleared during construction and operation of the project. Nesting ducks or brood-rearing ducks may be susceptible to disturbance by construction activities or by periodic clearing. Loon nests are active into July in the region and nesting loons can be particularly vulnerable to disturbance. The red-throated loon nest site, on the small island near the outlet of Allison Lake, is approximately 3,280 feet from the diversion structure. In a survey of species experts, red-throated loons were considered likely to react to human activity on foot at distances greater than 1,640 feet although wide individual variability and considerable habituation also were reported (Ruddock and Whitfield, 2007). During the first and second years of construction activities in July, a loon nest on the island in Allison Lake would be susceptible to failure caused by human disturbance. If loons are present, activities on the island or on shore near the island should be prohibited while the nest is active. Should the nest survive, ground activities may cause the young loons and their parents to move away from the nest island shortly after hatching to inhabit other parts of Allison Lake. In their comments filed April 6, 2012, Alaska DFG stated that while there would be no perceived issues with the nesting habitat described, previous sections of the Copper Valley's Applicant Prepared Draft EA describe red-throated loon activities and flights to feeding areas in marine waters. Due to the terrain, these flights would most likely be directly over project construction activities which could have an impact on nesting success of these birds or their choice of nesting sites. Loons do not tend to be very adaptable and are extremely selective in nest site selection. While habitat loss may be unlikely to directly affect loons, short term construction (three years) may affect the selection of a nesting site at Allison Lake and the flyway path taken to marine food sources, which could cause movement of these birds away from Allison Lake.

The sensitive species in the area are not subject to subsistence hunting and trapping pressures, and so will not be affected. The project transmission line presents the greatest potential for affecting sensitive species due to collisions with the powerline.

The measures Copper Valley proposes in the Avian Protection Plan, such as scheduling vegetation clearing between May 1 and July 15; limiting ground activities, blasting, and helicopter traffic between April 10 and August 10; and avoiding construction-related activities within 660 feet of active bald eagle nests, would help keep disturbance to a minimum. Limiting ground activities, blasting, and helicopter traffic between April 10 and August 10 may alleviate the concerns expressed by Alaska DFG regarding the effects of construction-related activities on red-throated loon flight paths over the construction site and its related effect on nesting site selection. While Copper Valley intends to limit ground activities between April 10 and August 10, an additional survey of the project area for harlequin duck nests, specifically the location of the diversion structure and upper penstock prior to any construction activities would further protect harlequin ducks and their nests, flagging any nests that are found and avoided the areas around them during the nesting period would help ensure the success of the nests.

Restricting Access

Copper Valley's Safety Plan (with measures to: abandon, restore, and install a gate across the temporary construction access route; and post "No Trespassing" would adequately protect wildlife from unauthorized access to the project area and these additional pressures to wildlife populations. The Safety Plan is further discussed in section 3.3.5, *Recreation and Land Use*.

The Allison Creek basin is unlikely to become an important location for hunting or trapping due to its high elevation, the limited availability of game animals, and the relatively small total area of the drainage. Nevertheless, the improved access provided by project construction may facilitate increased recreational fishing, hunting, and trapping in the Allison Creek basin. As described above, due to security concerns, the temporary access road to the penstock would be abandoned and gated and "No Trespassing" signs posted to minimize access. Alaska DFG recommended that Copper Valley restrict project personnel from fishing, hunting, and trapping on the project site. Alaska DFG stated that it does not have specified harvest regulations (e.g., bag limits) for specific waterbodies or areas. Personnel working at the site would have enhanced access to the project area. Should the workforce engage in activities such as fishing, hunting, and trapping while on site, the increase in these activities would create the potential for overharvest of fish and wildlife resources in the project area. Alaska DFG stated that its only recourse in the event overharvest of fish and wildlife is to issue an Emergency Order, which would restrict such activities for all users, and that this is not their preferred way to manage the resource. A plan to discourage fishing, hunting, and trapping by project personnel would protect the fish and wildlife resources from overharvest.

3.3.4 Threatened and Endangered Species

3.3.4.1 Affected Environment

Copper Valley filed a letter from FWS on October 18, 2011. FWS stated that there are no threatened or endangered species in the project area. There is one candidate species, Kittlitz's murrelet (*Brachyramphus brevirostris*), which may occur in the project area.

The proposed project would not affect any habitats designated as high-value or essential for Kittlitz's murrelet. Rocky cliffs that are important for Kittlitz's murrelets would not be affected. Kittlitz's murrelets may nest in the project area, but potential nesting habitat for Kittlitz's murrelets is located only at high elevations in the upper basin, approximately 2 miles from the construction site. Due to the distance of potential nesting habitat for Kittlitz's murrelet from the proposed construction site, it is unlikely that nesting murrelets would be disturbed by construction. Murrelet nests may be active in the region between mid-May and late July and daily movements typically occur during crepuscular hours, when visibility is poor. It is unlikely that nesting Kittlitz's murrelets would be disturbed by construction activities.

Staff Analysis

As there are no federally-listed species within the project area, we conclude that the project will have no effect on threatened and endangered species.

Kittlitz's murrelets typically are not harvested for recreation or subsistence. This species is not abundant in the Allison Creek basin and the basin is unlikely to become an important location for harvest due to the limited availability of game birds. Increased harvest facilitated by improved access is anticipated to have negligible impacts Kittlitz's murrelet. The need for year-round access to the diversion structure and upper penstock area during project operation may result in some level of ongoing behavioral disturbance of Kittlitz's murrelet. Because the temporary construction access route would not be maintained after construction, long-term access would be via helicopter. The frequency of required access has not been described but would be anticipated to require no more than several visits annually and effects on birds would be negligible.

Similar risks regarding scavenger attraction and accidental fuel and hazardous material spillage apply to Kittlitz's murrelet. Copper Valley's proposed Waste Plan and Hazardous Plan would mitigate for any potential effects.

Kittlitz's murrelets would be susceptible to collisions with the transmission line during daily movements between nests in uplands and marine foraging habitats. No data are available on flight paths, but the proposed inland route of the transmission corridor, following the pipeline rather than Dayville Road, should minimize strikes by birds flying

inland from the coast. Copper Valley's Avian Protection Plan (marking and lighting new powerlines and guy wires; and designing lighting for any structures or communication towers to reduce bird attraction and the potential for bird strikes) would minimize the risks of collision and reduce bird attraction and the potential for bird strikes. In general, the overall effect of mortalities to birds from strikes of powerlines and towers associated with the Allison Creek project is expected to be minor to moderate, depending on tower designs and locations relative to flight paths of birds.

The project would not affect nesting habitats for Kittlitz's murrelet and project construction and operation are unlikely to disturb this species. Kittlitz's murrelet is not subject to pressure from subsistence hunting, and so would not be expected to be affected by any such activity, which Copper Valley intends to curb with the restoration of the construction access road. The measures proposed by Copper Valley and recommended by FWS and Alaska DFG for the design and construction of the transmission line, as well as the development and implementation of an Avian Protection Plan by Copper Valley should afford the necessary protections to Kittlitz's murrelet. We conclude that the proposed project would have no adverse effect on the candidate species, Kittlitz's murrelet.

3.3.5 Recreation and Land Use

3.3.5.1 Affected Environment

Recreation

The project would be located approximately three miles south of Valdez, Alaska, near Prince William Sound, a region well known for its spectacular natural beauty and diverse recreation opportunities. Principal recreation activities in the region include sightseeing, fishing, hunting, wildlife viewing, motor boating, sailing, kayaking, rafting, camping, hiking, climbing, bicycling, mountain biking, off-road vehicle use, skiing, snowmachining, and other winter sports. A recreation resources report prepared by Copper Valley for the project further describes these activities.[7]

The proposed project area is located near the south shore of Port Valdez, an arm of Prince William Sound. Much of the proposed project would be located on relatively undisturbed state-owned land adjacent to the Chugach National Forest. The project area is also adjacent to the Trans-Alaska Pipeline and its terminus at the Valdez Marine Terminal (VMT), a secured, heavy industrial facility which serves as the principal shipping port for Alaskan crude oil. The pipeline and VMT are operated by Alyeska. Public roads from Valdez, including the Richardson Highway and Dayville Road, circle

[7] See the Recreation and Aesthetic Resources Report, Allison Creek Project (Copper Valley Electric Association, 2011a).

the eastern portion of Port Valdez and provide access to the VMT as well as several recreation sites and facilities along the south shore. Allison Creek is immediately adjacent to the VMT, approximately 15 miles by road from Valdez. The majority of Port Valdez lies to the west of Valdez and is surrounded by rugged, mountainous terrain that is not accessible by road. As a result, most recreational use in the area occurs within or to the east of Valdez and east of the VMT.

Fishing by boat and from shore is among the most popular recreational activities in the Port Valdez region, including the project area, particularly when salmon return in the summer to spawn. Port Valdez supports the largest recreational fishery in Prince William Sound and the largest pink salmon commercial fishery in Alaska.[8] Two areas near the project, the Allison Creek Campground and the Solomon Gulch Fish Hatchery, are developed for fishing access, although fishing from shore occurs at many locations along the Dayville Road. Those fishing by boat are often seeking salmon, rock fish, ling cod, halibut, or salmon shark. Fishing derbies commonly occur. Some freshwater fishing occurs in area lakes and streams, including ice fishing in winter, but these are not prominent uses.

A variety of boating activity occurs in Port Valdez, including fishing and pleasure boating (motor and sail), kayaking, and a wide range of commercial boating, such as fishing charters and excursions. Larger cruise ships discontinued service to Valdez in 2003, although it is possible such use could return in the future. The nearest designated small-boat launch facilities are in Valdez, and kayaks can feasibly be launched at various locations along Dayville Road. Boating is prohibited within 0.5 mile of the VMT facility, which effectively precludes the use of the Allison Creek Campground, near the project boundary, as a put-in or take-out point for kayakers.

Dayville Road is popular for sightseeing and wildlife viewing. Much of the road affords unobstructed views of Port Valdez and the surrounding mountains, as well as excellent opportunities for wildlife watching, including marine mammals, seabirds, waterfowl, upland birds, and terrestrial wildlife. In summers, large numbers of returning salmon can be seen near the Solomon Gulch Fish Hatchery, where bears that feed on the salmon have also become a significant local attraction. However, the human interest in bear watching has created a safety management challenge for the city of Valdez. The City has taken an active role in addressing the potential for human-bear conflict as well as mitigating traffic incidents as people driving on Dayville Road stop to gawk at bears. About 3.7 miles east of the hatchery, Dayville Road intersects with the Richardson Highway, a designated scenic byway that begins in Valdez and extends 368 miles north to Fairbanks.

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[8] Tens of millions of pink salmon may return to Port Valdez in a single season. See Alaska Department of Fish and Game website: http://www.adfg.alaska.gov (Sportfishing/Information by Area/Prince William Sound).

Road cycling, touring, and mountain biking occur on area roads and trails. Organized races also end or pass through the Valdez area. Most unpaved trails are better suited to hiking, which is also a predominant recreational use in the project area. The Solomon Gulch Trail (described below) is a favored destination for local trail users and would be intersected by the proposed project's transmission line. The trail is also used occasionally by mountaineers to access the higher terrain and summits of the Chugach Mountains.

Camping is popular in the summer months, with most visitors utilizing recreational vehicles, such as campers, trailers, and motorhomes. Public and private campgrounds may sometimes fill to capacity in summer. Tent camping in the backcountry is an occasional use in the project area, including in the upper Allison Creek basin.

Winter activities include skiing (alpine and cross-country), snowboarding, snowshoeing, dog-sledding, and snowmachining. The City grooms about 20 miles of ski trails in winter. A small ski area with a rope tow operates in season off the Richardson Highway, five miles from Valdez. Guidebooks describe specific ski routes and local users have advocated for improved access to skiable terrain. The Solomon Gulch Trail is used by skiers and snowmachines in winter and both have been known to visit Allison Lake and the upper basin of Allison Creek. The Valdez region also offers high-quality heli-skiing and ice climbing opportunities in winter. Avalanche danger is a serious threat in some areas, including the lower portion of Allison Creek and the slopes above Allison Lake.

Some hunting occurs in the region, typically bear, mountain goat, and waterfowl, but research by Copper Valley indicates that hunting is only an occasional use in the project area.

Several developed recreation sites and facilities in the vicinity of the project support these activities and include the following trails: Solomon Gulch Trail; Valdez/Dayville Road Bike Path; Shoup Bay Trail; Dock Point Trail; Mineral Creek Trails; Keystone Canyon/Abercrombie Pack Trail; Valdez Goat Trail and Wagon Road; and Historic Valdez Trail.

All of these trails are maintained by the city of Valdez. Only the Solomon Gulch Trail and Valdez/Dayville Road Bike Path pass through the immediate project area. The Solomon Gulch Trail extends approximately two miles to Solomon Lake from a trailhead parking area on Dayville Road adjacent to the Allison Point Campground. The trail utilizes portions of the Trans-Alaska Pipeline corridor and a service road leading to the lake and a dam that serves the Solomon Gulch Project. The proposed transmission line for the Allison Creek Project would be constructed immediately adjacent to the trail and service road and would parallel the trail for approximately one mile. The pipeline is located underground through this section. It is important to note that the Solomon Gulch

Trail is a required project feature under the existing license for the Solomon Gulch Project.[9] The Solomon Gulch project is also owned and operated by Copper Valley.

The Valdez/Dayville Road Bike Path (also called the DOT Bike Path) is a 15-mile paved trail that begins in Valdez and follows the Richardson Highway and Dayville Road to the path's end at the Allison Point Campground. Other unofficial and unmaintained trails also exist in the vicinity and are noted in the recreation resources report cited above; however, none would be directly affected by the project.

Campgrounds

There are three campgrounds near the project area: Allison Point Campground, Valdez Glacier Campground, and Shoup Bay State Marine Park. The city of Valdez maintains Allison Point and Valdez Glacier Campgrounds. Allison Point is accessed from Dayville Road and has more than 50 campsites with public restrooms, drinking water, trash bins, fire rings, and short paths to the water. The campground is open late May through late September and is also a popular salmon fishing and day-use area. The campground is located near the proposed transmission line and within 0.6 mile of the proposed powerhouse on Allison Creek. The upper basin around Allison Lake is occasionally used for backcountry camping and can be accessed by cross-country hikers from the Solomon Lake area. Valdez Glacier Campground is a large, developed campground located east of the airport and well outside the immediate project area. Shoup Bay State Marine Park, located on the north shore of Port Valdez five miles west of Valdez, provides small boat anchorage, cabins, campsites, and a trail connecting to Valdez. It is the only state park in the vicinity, but is well outside the project area. In addition to these, several private campgrounds exist in the Valdez area, and additional backcountry tent camping occurs on other nearby state and federal lands.

Day-use Areas

There are three day-use areas near the project. The Allison Point Campground provides day use facilities and fishing access, in addition to overnight camping. At the

[9] The Solomon Gulch Trail is a project feature and key component of the Recreation Plan approved as a part of the license issued on June 21, 1978, for the Solomon Gulch Project (P-2742). On March 18, 1997, the Commission approved an amendment to the Recreation Plan for that project allowing a realignment of a lower, deteriorating section of trail that was originally accessed from a trailhead near the Solomon Gulch powerhouse (opposite the fish hatchery). The lower trail was rerouted from a new access point near Allison Point, then followed the Trans-Alaska Pipeline corridor for approximately one mile before reconnecting with the upper portion of the existing trail.

Solomon Gulch Fish Hatchery, a large parking area with approximately 70 spaces is available for fishing and wildlife viewing. In summer, the hatchery is a popular location to watch bears feed on the salmon returning to Solomon Gulch and other creeks to spawn. Bears can also be seen at the mouth of Allison Creek. Along Dayville Road, wide shoulders, several pull-outs, and overlooks with benches are utilized for wildlife viewing and scenic enjoyment. Much of the road is close to the shoreline and offers expansive views of Port Valdez and the surrounding region. Other day-use opportunities in the vicinity include the museums, interpretive sites, parks, and other community facilities located in Valdez.

Boat Access

There are three boat access areas near the project. The Valdez Small Boat Harbor, with more than 500 slips is the principal boat harbor in the Valdez region. It is operated by the city and offers boat slips, rentals, excursions, charters, water taxis, and associated amenities. Demand for slips is high and a waiting list is maintained. A local whitewater destination on Valdez Glacier Creek is accessed by a raft and kayak put-in about five miles east of Valdez, with a take-out at the Richardson Highway. Small boats can feasibly be launched from near the fish hatchery and elsewhere along Dayville Road.

Other Dispersed Use

Substantial opportunities for dispersed recreational use also exist in the project area. These include areas utilized for fishing, hunting, wildlife viewing, hiking, berry-picking, mountaineering, backcountry camping, and winter activities such as skiing and snowshoeing.

The lower portion of Allison Creek is generally inaccessible to recreational users. The lower creek passes near the VMT where security concerns and restricted access discourage or preclude public use. Only the mouth of the creek at Port Valdez is accessible by walking a narrow strip of public tidelands from outside the VMT. Steep, rugged terrain along the lower reaches of Allison Creek also discourages significant recreational use, including fishing along the creek. As noted previously, the upper basin near Allison Lake is accessible from the Solomon Lake area by experienced cross-country travelers. Allison Lake is not known to be a significant fishing destination.

Current Recreational Use

Alaska's Statewide Comprehensive Outdoor Recreation Plan (SCORP)[10] indicates that hiking and sport fishing are, respectively, the two most popular outdoor recreation activities in the state. While maintaining existing recreation facilities is a high priority among Alaskans, there is also strong interest in developing new trail opportunities, especially in wildland settings. The SCORP elaborates on recreation preferences and key issues, but does not contain data or recommendations specific to Valdez or the Prince William Sound region.

In 2010, Alaska DFG recorded 21,420 anglers and 50,722 sport fishing days in Valdez Arm.[11] Of these, 42 percent fished from shore and the rest fished by boat. Coho and pink salmon accounted for a major proportion of the species caught. Dayville Road is an important access area for shore-based fishing near Valdez.

Copper Valley attempted to further quantify current recreational use in the project area by: reviewing the Solomon Gulch Trail's visitors log; reviewing campsite rental data for the Allison Point Campground; conducting interviews with knowledgeable individuals; and soliciting feedback at public meetings. Estimating current use was difficult since most recreational activities in the area are not tracked. However, based on the above, Copper Valley's Recreation and Aesthetic Resources Report concluded that bear viewing and fishing were the principal activities along Dayville Road. The area receives substantial recreational use by residents and tourists from late spring through the summer season, but is relatively quiet in fall and winter when several feet of snow can accumulate near sea level.

Solomon Gulch Trail data referenced in the report included counts of approximately 700 to 1,000 trail users per year over the past decade, the vast majority of them hikers. The counts relied on a trail log that is unlikely to capture all trail use. Nevertheless, these numbers suggest that average trail use is well below capacity. As for camping activity, the report also noted that, even in peak seasons of 2008 and 2010 (for which data were available), campsites were often available at the Allison Point Campground. On average, just over half the campsites were occupied each night during August, the busiest month of the season. Nearly all were camping with recreational vehicles, with very few utilizing tents.

No additional recreation use data has been identified for the project area.

[10] The SCORP also goes by the title Alaska's Outdoor Legacy: 2009-2014 and is published by the Alaska Department of Natural Resources.

[11] Alaska Sport Fishing Survey, 2010. See Alaska Department of Fish and Game website: http://www.adfg.alaska.gov (navigate to Sportfishing/Information by Area/Prince William Sound/Fishing Information/Harvest Info).

Land Use

The city of Valdez is home to approximately 4,500 year-round residents and supports a range of land uses that could be expected for a city of this size, as well as extensive harbor facilities. The Alaska Marine Highway System's ferries also serve the community. Areas east of Valdez and the VMT also support a variety of land uses, including major and minor developments. The Valdez Airport is located approximately three miles east of Valdez, separated from the town by a large wetland and intertidal area called Duck Flats. South of the airport is the Old Valdez townsite that was destroyed by the 1964 Alaska earthquake, tsunami, and a subsequent fire. The city was rebuilt at its current location. Intermittent residential development extends southeastward beyond the airport almost to Dayville Road. An oil refinery (Petro Star) is located on Dayville Road, midway between the fish hatchery and Richardson Highway, a designated Alaska scenic byway. The proposed new transmission line would connect to a switchyard adjacent to the refinery. Adjacent to the hatchery, the Copper Valley operates the existing Solomon Gulch project. The powerhouse for Solomon Gulch is located immediately across Dayville Road from the hatchery and a transmission line leads eastward just south of the road. The new transmission line for the Allison Creek project would utilize the existing Trans-Alaska Pipeline corridor that traverses the forested slopes above the hatchery, approximately 0.3 mile away at its nearest point.

Most of the land surrounding Port Valdez and lying west of Valdez and the VMT is wild and undeveloped. As noted in the previous section, recreation is a prominent land use in coastal areas from Valdez to the VMT. Land use activity is regulated by the city of Valdez, and on state lands, by the Alaska DNR. The state discontinued its coastal management program in July 2011. Most of the remaining undeveloped lands around the east part of Port Valdez are either state-owned or part of Chugach National Forest. There are no designated wilderness areas or wild and scenic rivers in the vicinity of the proposed project.

3.3.5.2 Environmental Effects

Recreation

Construction and operation of the proposed project would result in both temporary and long-term effects on recreation resources in the project area. The project would not eliminate or displace existing recreation resources or significantly impede access to existing facilities and opportunities. However, the quality of the recreational experience for some activities, such as hiking and sightseeing, would be degraded by the presence of a new transmission line and other project facilities. Most of the predominant recreation activities in the area—fishing, boating, camping, and wildlife viewing—would be generally unaffected, except during construction when increased traffic, equipment and material hauling, and the use of helicopters would create potential distractions to recreation users. Use of the bike path would be similarly affected.

The Solomon Gulch Trail would be affected during the development phase by construction vehicles utilizing the initial one-quarter-mile portion of the trail, which doubles as a service road, between the trailhead on Dayville Road and the Trans-Alaska Pipeline corridor. At the pipeline corridor, trail users turn left; construction traffic for the project would turn right to access the proposed powerhouse site. Project operation and maintenance would also require ongoing vehicle use of the trail and service road, although such use would be infrequent. Because this portion of the trail already functions as a service road, the impact of a small number of additional vehicles on the trail would be minor.

Due to steep terrain and difficult access, the project would have little or no effect on recreation resources along the lower reach of Allison Creek, including the entire reach from the diversion to the powerhouse. However, the project would generate both temporary and long-term effects on recreation resources in the upper basin of Allison Creek and along a portion of the Solomon Gulch Trail by altering the character of the recreation experience in those areas. It is likely that some construction activity in the upper basin would be supported by the use of helicopters, both in the vicinity of the intake/diversion structure and in areas below that point. The noise and visibility of the helicopters, as well as general construction activity, would generate some disturbance to recreational use over the anticipated three-year construction period, but only when recreational users are present in the upper basin. In summer, the completed dam, intake/diversion structure, and upper portion of the penstock corridor would likely be visible to backcountry recreationists who may be viewing the project from above, either near the lake or on the slopes and ridges above the basin. From various vantage points, these facilities could become part of the foreground view, thereby altering one's sense of recreating in an undisturbed natural area. Because recreational use is relatively light in the upper basin and most of the project would be located in less accessible areas well below Allison Lake, the long-term impact would be minor. The first 500 feet of penstock below the dam would be buried and revegetated, further reducing the effect on recreation. In the future, if a new trail were to be developed in the upper basin, as discussed in comments by the NPS and others, more substantial use would likely occur within view of the project. If such a trail were constructed in the future, measures may be available to reduce the visual impact of the project, as discussed in section 3.3.7, *Aesthetic Resources*. In winter, project facilities in the upper basin would typically be covered by snow, which would limit the visual effect for winter recreation users.

Copper Valley proposes two approaches for the construction of the project: construction of a temporary access route on the steep slopes above the powerhouse site, or use of helicopters to transport materials and construction personnel to upper Allison Creek. Copper Valley did not indicate which alternative approach was preferred and intends to leave that decision to the construction contractor. If the temporary access route is not constructed, then the impacts of helicopter use would further diminish the recreation experience for users in the upper basin, but only during the construction

period. If the temporary access route is constructed, it could potentially provide informal access to hunters or other users who may be drawn to the area for recreational purposes. Due to safety concerns and security issues at the VMT, Copper Valley proposes that the access route, if constructed, would remain closed to the public. The effect of a closure would be minimal since this portion of the lower basin currently receives little or no recreational use, while increased access for recreation could conflict with security concerns at the VMT.[12]

Copper Valley operations and maintenance vehicles for the Solomon Gulch project and Alyeska vehicles monitoring the Trans-Alaska Pipeline both share the service road and a one-mile section of the Solomon Gulch Trail with hikers. The transmission line associated with the project would follow nearly four miles of the pipeline right-of-way, including the one-mile portion that also functions as a trail. The Trans-Alaska Pipeline is buried underground in this area which helps to maintain the natural character of the trail. The visibility of the transmission line along this section of the trail could significantly degrade the character of the recreational experience for trail users. New poles and an overhead line would be installed where none currently exist. This is principally a visual effect and is further addressed in section 3.3.7, *Aesthetic Resources*.

Staff Analysis

Potential project effects on recreation can be summarized as: temporary effects of construction activity, including helicopter use, on recreation users in the project area; longer-term effects on those using the upper Allison Creek Basin; and longer-term effects on those using the Solomon Gulch Trail.

Copper Valley does not propose measures to address temporary effects of construction activity and helicopter use, although it does propose, through the development and implementation of a Safety Plan, to install signs to discourage recreational users from encroaching onto VMT property and from using the temporary construction access route, in the event this access route is constructed. Given the infrequent use that occurs on the lower portion of Allison Creek, installing appropriate signing would be a reasonable means of addressing these concerns. If the temporary construction access is built, the applicant also proposes to close off access once the project is completed and provide for its restoration in order to impede or discourage future access by recreation users.

Temporary construction impacts on users could be further minimized by: conducting these activities away from developed recreation sites, particularly along

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[12] Copper Valley stated that Alyeska officials indicated "a strong desire to limit recreation activities at Allison Creek." Alyeska also does not allow public access to lands it owns and manages in the lower part of the drainage.

Dayville Road; scheduling heavy construction traffic to avoid peak times of recreational use; limiting helicopter use to the minimum necessary to complete each project element; and utilizing flight paths and staging areas that are least disruptive to recreational users, including those who may be fishing, camping, or sightseeing along Dayville Road.

To address longer-term impacts on recreational use of the upper basin of Allison Creek, where the intake/diversion structure and a portion of the penstock corridor would be visible to users, Copper Valley proposes, for aesthetic purposes, to restore disturbed areas; trim, rather than remove vegetation in order to encourage faster recovery; and utilize natural products and appropriate colors for various project elements to help them blend in with the natural environment. These measures would also help reduce impacts if, in the future, the Solomon Gulch Trail were extended to the Allison Lake area. Copper Valley does not propose measures to address impacts to the Solomon Gulch Trail, where a new overhead transmission line would parallel the trail for approximately one mile, significantly altering the trail experience. The impact becomes more significant in light of the fact that the trail is a project feature subject to the terms of an existing license for the Solomon Gulch Project. If feasible, rerouting a portion of the trail away from the transmission line could help reduce the impact. Because these are primarily visual impacts, the issue is further addressed in section 3.3.7, *Aesthetic Resources*.

FWS commented that Copper Valley should consult with the resource agencies on its Recreation Plan at least six months prior to initiating any land disturbing activities, and should allow 30 days for agency comment before plans are submitted to the Commission. As discussed in section 3.3.5, a revised Recreation Plan may be required subsequent to license issuance. Consultation with resource agencies, as suggested, would help minimize impacts on both fish and recreation resources.

Future Demand for Recreation

Copper Valley believes that future demand for recreation opportunities near Valdez, including the project area, will be limited and that demand is unlikely to grow substantially in the coming years. Copper Valley cites stagnant tourism, declining population and economic growth in Valdez, and similar conditions in Fairbanks, which is the largest source of in-state travel to Valdez. Depressed employment and economic conditions in areas outside Alaska might also portend poor growth in the years to come. Copper Valley believes, therefore, that existing facilities are more than adequate to meet both current and anticipated demand for recreation.

While existing facilities may be adequate over the short term, there is little evidence to support the claim that recreational demand will not increase over the 30- to 50-year term of a license. Increased demand would be driven in part by population

growth and increased tourism. According to 2010 Census data[13], the population of Valdez decreased slightly from 4,036 in 2000 to 3,976 in 2010, but was also up four percent from the 2009 estimate of 3,819. A similar trend has occurred in Fairbanks, while the statewide population has increased each year since 2000. Small increases were also projected for Valdez in 2011 and 2012. Copper Valley's research indicates that the population trend since 2000 has been affected by a declining workforce associated with the VMT and Trans-Alaska Pipeline, and discontinuation of cruise ship service to Valdez. Employment in other sectors, such as health care, has recently increased. In light of these relatively short-term fluctuations, it is not possible to project whether the population of Valdez will increase or decrease considerably over the term of a license.

Copper Valley provides information on several indicators for tourism activity in the Valdez area, including ferry and air traffic visitation and lodging tax revenues. The information suggests sluggish growth over the past decade, but is not sufficient to conclude that growth in tourism (and therefore, recreation demand) will remain low over the term of a license.

The NPS commented that recreation demand is also affected by new trends and changing preferences and participation rates in recreational activities, which could also lead to increased use, for example, of the Solomon Gulch Trail.

Port Valdez continues to support a vibrant sport fishery and the City of Valdez has determined that an expansion of the boat harbor is needed. Lodging tax revenues have increased significantly since 2000 and campgrounds are heavily utilized in summer. Bear viewing has become an increasingly important tourist activity. The applicant's recreation report also notes continuing strong interest in winter recreation.

Therefore, a significant demand exists for recreation opportunities in the vicinity of the project. This demand could potentially increase over the term of a license. Although the applicant did not propose measures to address this potential demand or to mitigate for all project effects, measures may be available which could be included in a revised Recreation Plan. As discussed below, on-site opportunities may be limited, thus off-site measures may also need to be considered.

Recreational Suitability of the Project Area

The affected areas along Allison Creek are not well suited to the development of new recreational opportunities, primarily due to steep terrain and security concerns at the adjacent VMT facility. The road-accessible portion of lower Allison Creek is on land utilized by the VMT. The point where Allison Creek crosses under Dayville Road is

[13] U.S. Census Bureau, 2010 Census. The City of Valdez has disputed these figures and claims a population of 4,353 on its website.

marked by a security checkpoint staffed 24 hours per day. Only authorized persons and vehicles may enter the site.

Copper Valley described the area surrounding the creek and proposed project site as steep, rising rapidly from sea level to 200 feet and then more gradually climbing to approximately 1,300 feet elevation at the site of the proposed project diversion structure. This steep and sloping terrain is densely vegetated with Sitka spruce forest stands at lower elevations and tall alder scrub at intermediate elevations. Seasonal avalanche and landslide hazards are significant. Avalanche hazard evaluation and mapping completed for the proposed project concluded that the Allison Creek basin has widespread avalanche potential.[14] Further, analysis of the proposed temporary construction access route conducted for the project's geological survey indicates that the terrain consists of historic landslide deposits, although it is unclear whether this is an active and ongoing threat. The proposed access route leading up a steep slope from near the powerhouse site would be exposed to avalanche and possibly landslide hazards, further diminishing the appeal for new recreational development in this area.

For these reasons, the lower Allison Creek area (below the diversion) is not conducive to the development of new recreation opportunities or facilities at this time. However, the upper basin, including the area around Allison Lake, could potentially support new trail access from the Solomon Gulch Trail. A trail at this location was not further evaluated or proposed by the applicant. There is not sufficient evidence to indicate a demand currently exists for new trail opportunities in this area. The need for, and feasibility of, such a trail could be investigated at a later date if the demand for new trails in the project area increases during the term of a license. The NPS commented that operation of the VMT and oil pipeline could substantially change or be discontinued during the license term, which could potentially open up lower Allison Creek to increased opportunities for recreational use, and that the license should include a reopener provision requiring the licensee to reexamine public access policies. Again, future recreation opportunities, including access, could be explored by the applicant or others at a later date and proposals brought forward to the Commission if circumstances change.

Much of the proposed transmission line would share the Trans-Alaska Pipeline corridor, including the one-mile segment that is also utilized by the Solomon Gulch Trail. Other than possibly rerouting a portion of this shared trail segment, further trail development along the transmission line or pipeline corridor would not provide a significant new recreation opportunity for the public.

Recreation needs and opportunities were identified by Copper Valley's consultant during interviews with the local recreation community. Suggestions for needed facilities

[14] Fesler, D. 2009. The Allison Lake hydro project snow avalanche hazard evaluation and mapping study.

ranged from interpretive signs, a shelter, restrooms, bear-viewing information kiosk, and trail improvements, to enhanced access to the Chugach Mountains, including winter access for skiers and snowmachines. In its Recreation Plan, Copper Valley proposes no new enhancements within the project boundary and only a single, off-site interpretive sign at an overlook near the Valdez Civic Center. Copper Valley expressed a willingness to partner on bear-safety signing at the hatchery, but offered no specific proposal. If recreation enhancements were to be required under a license for this project, these types of amenities would clearly benefit the public and help mitigate the effects of the project. Further, if security or access issues preclude recreation enhancements within the project boundary, then off-site measures could be considered. Potential measures are further discussed in section 3.3.7.

Land Use

The proposed project would add a transmission line to approximately four miles of the existing Trans-Alaska Pipeline corridor. The proposal would also result in increased traffic and a new powerhouse in close proximity to the VMT. Alyeska has not objected to this use, provided that increased public access to the area adjacent to the VMT is avoided. Appropriate easements or other right-of-way would be acquired by Copper Valley, as needed, to develop and operate the project. The balance of the project area above the powerhouse would occupy undeveloped land owned by the State of Alaska. The effects of converting this land to energy development would be minor from a land use perspective. Copper Valley has also indicated that a primary purpose of the project is not to stimulate new growth, but to offset a portion of current diesel power generation with cleaner, lower-cost hydropower for its customers.

No other effects on land use in the project area have been identified.

3.3.6 Cultural Resources

3.3.6.1 Affected Environment

Section 106 of the National Historic Preservation Act

Section 106 of the NHPA, as amended, requires the Commission to evaluate potential effects on properties listed or eligible for listing in the National Register prior to an undertaking. An undertaking means a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a federal agency, including, among other things, processes requiring a federal permit, license, or approval. In this case, the undertaking is the proposed issuance of an original license for the project. Potential effects associated with this undertaking include project-related effects associated construction or with the day-to-day operation and maintenance (O&M) of the project after issuance of an original license.

Historic properties are cultural resources listed or eligible for listing on the National Register. Historic properties represent things, structures, places, or archeological sites that can be either Native Alaskan or Euro-American in origin. In most cases, cultural resources less than 50 years old are not considered eligible for the National Register. Cultural resources also have to have enough internal contextual integrity to be considered historic properties. For example, dilapidated structures, heavily disturbed archeological sites, and isolated artifacts, may not have enough contextual integrity to be considered eligible.

Section 106 also requires that the Commission seek concurrence with the Alaska SHPO on any finding involving effects or no effects on historic properties, and allow the Advisory Council on Historic Preservation an opportunity to comment on any finding of adverse effects on historic properties.

Area of Potential Effects

The APE for the proposed project includes lands for the construction of: (1) a low 100-foot-wide, 10-foot-high diversion structure on Allison Creek at elevation 1300 feet msl; (2) a 7,600-foot-long, 42-inch-diameter above ground and buried penstock; (3) a 40-foot by 40-foot powerhouse along Allison Creek at elevation 1300 feet msl; (4) a 150-foot long tailrace; (5) a 3.8 mile-long transmission line leading to a switchyard adjacent to the Petro Star facility; (6) a 1000-foot-long access road to the powerhouse; and (6) a temporary 4500-foot-long trail for construction access to the penstock.

Cultural Context[15]

Pre-Contact and Ethnography of Native Alaskans

Native Alaskan groups inhabited Prince William Sound when continental glaciers retreated from the area after the Pleistocene era. However, due to relatively steep and unstable shorelines, no evidence for these early aboriginal inhabitants has been located. The aboriginal inhabitants of the area were adapted to a coastal environment, utilizing the

[15] Information for the Cultural Context section is derived from cultural resources survey reports provided by Copper Valley's professional cultural resource contractor, Northern Land Use Research, Inc. The reports are: Cultural Resources in the Vicinity of Allison Lake Hydroelectric Project, Alaska (Sterns and Brown, November 2009), Cultural Resources Reconnaissance Survey, Allison Creek Hydroelectric Project Alaska (Stern, October 2010, Revised, March 2011), 2011 Cultural Resources Reconnaissance Survey, Allison Creek Hydroelectric Project, Alaska (Blanchard, September 2011). The Culture Context text and associated bibliography in these cultural resources reports provides greater details on the source of references from which this information was originally derived.

limited pocket beaches and mouths of salmon streams, exploiting cod, halibut, and salmon, along with shellfish, seals, whales, birds, and small mammals. The preservable material culture associated with these groups consisted of chipped stone tools, usually made from slate, including points, bifaces, blades, flakes, and ulna-shaped scrapers used for hunting, fishing, and shelter construction. Grinding slabs were also used for food preparation, both for meat and plant resources. Native copper occurring in the area was also cold hammered and used for points, awls, and beads. When the British, Spanish, and Russians explored Prince William Sound in the second half of the 18th century, native peoples associated with the greater Pacific Eskimo tradition were occupying the coastal areas and lower Copper River basin. The principal native group in and around Prince William Sound were associated with the Alutiiq culture which spanned from the lower Copper River basin across Prince William Sound to the Kodiak islands. These Alaska Native groups at the time of contact were master kayakers and fishermen. Nineteenth century native villages in Prince William Sound included, Chenega, Kiniklik, Tatitlek, and Nuchek. In the outer reaches of Prince William Sound and upper basin of the Copper River lived Athabaskan speakers affiliated with the Dena'ina culture.

Euro-American Occupation

By the close of the 18th century, Russians were well-established in Prince William Sound. In the 1790s, the Russians established a trading post at Nuchek, which at the time was the largest Eskimo settlement in the region. The fur trade (involving sea otters and seals) was the biggest attraction for Europeans to coastal Alaska, but penetration into the interior up the Copper River was limited due to hostilities of the Athabaskans. The Russian influence among the natives was strong in the Prince William Sound area, and with the establishment of the Russian Orthodox religion and related customs, native practices of the Alutiiq Eskimos changed dramatically. Some intermarriage between the two groups also occurred, with many natives having Russian last names. With the purchase of Alaska by the United States in 1867, Americans began exploring and settling within the area, especially after copper mining and commercial fishing were established in the region. Additional U.S. explorations up the Copper River were accomplished in the 1880s. When gold was discovered in the Klondike and elsewhere at the close of the 19th century, the settlements of Valdez and Cordova prospered as point of departure to the Klondike, Fairbanks, and Forty Mile gold fields utilizing the Copper River and associated trails as routes into the Alaska interior and elsewhere. Valdez was now a year-round open water port, and with the establishment of Fort Liscum nearby in the late 1890s, became a telegraph communications center within Alaska and the lower 48 states. Allison Creek became one of the main sources of water for Fort Liscum at the time. The Richardson Highway was later established, linking Valdez to Fairbanks. Other military roads were also developed in the Prince William Sound area connecting Fort Liscum, Valdez, and Cordova with other settlements in the Alaskan interior. When a railroad was built linking Seward to Fairbanks, and submarine telephone cables replaced the telegraph, Fort Liscum was essentially bypassed, and was closed in 1922. Valdez also suffered a

decline, as well. Valdez later reestablished itself when the Trans-Alaska Pipeline system was put into operation in the 1970s and 1980s, and where the town became the endpoint for the pipeline. Since smallpox epidemics of the early 1800s, which decimated nearly half of the Eskimo population, followed by other epidemics in the early 1900s, Prince William Sound also experienced several megadisasters later in the 20th century, including the Good Friday Earthquake of 1964 and more recently the *Exxon Valdez* oil spill in 1989. The Good Friday Earthquake and associated tsunami nearly wiped out the town of Chenega, and wreaked havoc with other communities along Prince William Sound. The Exxon Valdez oil tanker ran aground not far from the Tatitlek, spilling some 11 million gallons of crude oil, which created a devastating oil slick stretching across Prince William Sound to lower Cook Inlet and out to Kodiak Island. The Exxon Valdez disaster provided a better understanding of the pre-contact culture history of the Prince William Sound area through cultural resource investigations stemming from the disaster.

Cultural Resource Investigations and Cultural Resources Identified

Cultural resources investigations by Copper Valley's archeological contractor were conducted within the proposed project's APE in 2009, 2010, and 2011, including archival searches, reconnaissance and systematic pedestrian surveys. The results of the investigations showed that no cultural resources were within the project's APE. However, a portion of the Trans-Alaska Pipeline, on its way to Valdez, is adjacent to the APE, where the proposed project's transmission line would be placed. The pipeline has recently been considered eligible for the National Register. Fort Liscum is also nearby, but no built resources or other vestiges from the fort are within the APE.

3.3.6.2 Environmental Effects

Potential effects of the proposed project on cultural resources within the APE could result from construction activities and use and maintenance of project facilities. However, no cultural resources have been located in any portion of the proposed project's APE. The Trans-Alaska Pipeline, a historic property, lies near the location where the proposed transmission line would be placed; however, the pipeline would not be affected by any construction activity associated with the transmission line, nor would O&M of the proposed project affect the pipeline.

Based on the results of the cultural resource investigations cited above, Copper Valley in October 2011 sent copies of the cultural resource reports to the Alaska SHPO, and asked for their concurrence that the proposed project would not affect significant cultural resources. In November of 2011, the Alaska SHPO concurred with a finding that no historic properties would be affected by the project.

In their final license application, Copper Valley proposed four measures to safeguard against adverse effects to cultural resources if inadvertent discoveries are made. They include: protection measures involving ground disturbing activities,

treatment of hazardous materials and petroleum, oil, and lubricants, illicit artifact collection, and measures to protect discovery of human remains and burials (Copper Valley, 2011a).

Staff Analysis

Commission staff agrees with the findings made by Copper Valley and their professional contractor, and concurs with the Alaska SHPO that no historic properties would be affected by the proposed project. Based on our analysis, there would be no unavoidable adverse impacts to cultural resources if the proposed project would be licensed.

Copper Valley proposed protection measures for cultural resources in the event that they are inadvertently discovered during construction or operation of the proposed project. Although no historic properties were located within the proposed project's APE, a standard license article for the protection of cultural resources in the event of any inadvertent discovery would provide protection of these resources. In these situations, the licensee would be required to stop all activities at the discovery site, and consult with the SHPO on what particular measures are needed to resolve any adverse effects to historic properties. These particular measures could include measures proposed by Copper Valley.

3.3.7 Aesthetic Resources

3.3.7.1 Affected Environment

The project would be located in a scenic, largely undeveloped area above the south shore of Port Valdez and at the base of the Chugach Mountains. These rugged mountains are flanked by Sitka spruce forest at the lower elevations and rise to sharp, snowy summits four to five thousand feet above sea level. A number of peaks and the Allison Creek and Solomon Gulch basins are prominent from Valdez and the Richardson Highway. This dramatic natural landscape provides an important scenic backdrop to the Valdez community, and is integral to the multiple recreation and tourism activities occurring in the region, such as boating, fishing, camping, and sightseeing. The project area is also in close proximity to the VMT, the Trans-Alaska Pipeline, a refinery, fish hatchery, and the existing Solomon Gulch project, all of which are significant factors in the overall aesthetic character of the area. The project would generally be located at the interface of these distinctly developed and undeveloped environments.

The project area is most visible from Port Valdez, the city of Valdez, a portion of the Richardson Highway (a designated scenic byway), and from the Solomon Gulch Trail. Views from Valdez and the highway are at a distance of several miles, while the proposed transmission line would immediately parallel the trail for about one mile. Along Dayville Road, at the Allison Point Campground, and at the fish hatchery, local

topography and forest cover generally obscure the project area from view. Occasional recreational use of the upper basin of Allison Creek would be within view of a portion of the project near the dam and intake/diversion structure.

Industrial activities, boating, and motor vehicle traffic are existing sources of light, glare, and noise in the eastern Port Valdez area, although the sounds of nature (e.g., flowing water, wind, seabirds and other wildlife) are predominant in the project area.

3.3.7.2 Environmental Effects

Copper Valley identified five key observation points (KOPs) in the vicinity of the project which were used to evaluate potential effects on visual resources. Three KOPs were selected in the Valdez area to represent views that many people would experience when looking south across Port Valdez toward the project area. The three sites are: the Alaska Marine Highway ferry dock, the Valdez Convention and Civic Center, and a scenic pullout along the Richardson Highway. Most of the project area would be within view of these three KOPs. Features most likely to be visible are portions of the penstock corridor, the temporary construction access route (if constructed), and possibly the powerhouse. The clearing width of the penstock corridor would be approximately 15 feet. The most visible section from Valdez would be below 500 feet elevation and would have a similar appearance to the existing penstock corridor for the Solomon Gulch project, approximately 1.6 miles to the east. However, the penstock would pass through more scrub vegetation and less forest than the Solomon Gulch penstock. It would remain visible from Valdez over much of the year, then recede in winter as the snowpack increases. The temporary construction access route, if built, would vary in width from 20 to 40 feet and may be prominent for several years due to disturbed soils and vegetation across steep slopes facing the Valdez community. Copper Valley proposes to minimize clearing and construction widths, then would revegetate and restore the access route once the project is constructed.

The two remaining KOPs that were selected for study are much closer to the project. One is located at the Allison Point Campground on Dayville Road, and the other at a point on the Solomon Gulch Trail, where the transmission line would share the Trans-Alaska Pipeline corridor with the trail. Most project features would be undetectable from the campground, Dayville Road, and other nearby recreation sites due to intervening topography and vegetation. The cleared area for a new 550-foot spur road to the powerhouse would also vary in width from 20 to 40 feet, depending on the amount of fill or excavation required. The road is somewhat isolated from areas accessible to the public and is expected to be mostly hidden from view.

A more significant visual impact would result from the proposed location of a new overhead transmission line adjacent to a one-mile section of the Solomon Gulch Trail. The trail is a required project feature under an existing license for the Solomon Gulch Project. The proposed transmission line would directly affect the visual quality and user

experience on this trail. Measures designed to address the effects of the Allison Creek Project on the trail would also need to be consistent with the license terms for the Solomon Gulch Project. However, Copper Valley did not propose any measures to reduce the impact. Effects on the trail and possible mitigating measures are further discussed in the analysis below.

In the upper basin of Allison Creek, the dam and intake/diversion structure would be visible to some recreation users; however this would be a minor effect due to the small number of visitors and the location of the intake/diversion structure approximately 0.5 mile below Allison Lake. A buried section of the penstock just below the dam would be revegetated. If a new trail is constructed into the basin in the future, measures may be available to further reduce the visual effect of the project (e.g., vegetative screening, careful routing of the trail).

From most vantage points, the powerhouse would be at least partly obscured by existing vegetation. However, due to its sizable footprint and height, the 65-foot-wide, 65-foot-long, by 45-foot-tall powerhouse would likely be visible from both Valdez and Port Valdez, but should blend in with existing facilities at the VMT. Copper Valley proposes to treat the exterior of the powerhouse to further reduce the visual contrast with its surroundings. The NPS recommends appropriate paint colors and vegetative screening for the same purpose. From a distance, the proposed 3.8-mile transmission line would blend into the forested background, with the poles typically no taller than the trees. In addition, the transmission line would be located within the Trans-Alaska Pipeline corridor which is not visible from the three KOPs noted above. Visual effects would be similar for boaters in Port Valdez, although the powerhouse and the cleared corridors for the penstock and access route, as well as the penstock itself, would become more prominent as the viewing distance decreases.

The entire project would be visible from the air. Scenic flights occur in the Valdez area; however, when viewed from above, adjacent developments, such as the VMT, fish hatchery, and refinery, would continue to be the more dominant structural features on the landscape, thus the effect on these aerial views would be minor.

Temporary effects on aesthetic resources would occur during the construction phase of the project, including increased traffic, material and equipment hauling, construction lighting, and noise from the use of equipment and helicopters. Copper Valley proposes no permanent lighting and would limit construction lighting to only that which is necessary.

Staff Analysis

The primary visual effects of the project would be twofold: the visual impact of locating a new overhead transmission line adjacent to the Solomon Gulch Trail; and the

impact of the penstock and the cleared corridors for the penstock and temporary access route as viewed from Valdez and Port Valdez.

Copper Valley believes the visual impact of the new transmission line on the Solomon Gulch Trail to be minor, due to the presence of the Trans-Alaska Pipeline. However, the pipeline is buried underground and does not affect the visual quality of the trail corridor in the way that an overhead transmission line would. Although the Solomon Gulch Trail is not in a pristine setting and shares a service road corridor with maintenance vehicles, it is the only maintained trail in the project area that provides recreational access to the Chugach Mountains. The trail offers scenic views and year-round access to hikers, skiers, snowmachine users, and others. The trail is also a key component of an approved Recreation Plan for the nearby Solomon Gulch project.[16] Additionally, the protection of scenic values was a factor in the issuance of a license for that project. The proposed transmission line for the Allison Creek project would directly affect the visual quality of a recreational resource that is also a project feature under the existing license for Solomon Gulch.

Originally, the lower section of trail began near the Solomon Gulch powerhouse and climbed steeply, utilizing wooden stairs, ladders, and ropes to negotiate the most difficult sections. These structures deteriorated over time. Following a site inspection in 1994, the Commission requested that one of the ladders (or stairways) be replaced or the trail be rerouted to address what was considered to be a public safety hazard. The licensee[17] proposed, and the Commission approved in March 1997, an amendment to the Recreation Plan that would accommodate rerouting the trail along the Trans-Alaska Pipeline (with Alyeska's consent). This increased the total length of the trail from 1.4 miles to 2.0 miles. The new route included a new trailhead location near Allison Point and connected with the existing upper trail section below Solomon Lake.[18] New signing was installed and the old trail structures were removed. A short section of the old trail

[16] The trail is identified in the Recreation Plan as a "hiking trail," although it is also utilized by other types of users.

[17] The licensee for the Solomon Gulch Project in 1994 was the Alaska Energy Authority (AEA). The original license was issued to Copper Valley in June 1978. The license was transferred by the Commission to AEA in May 1982, then to Four Dam Pool Agency in January 2002, and back to Copper Valley in January 2009. Copper Valley also operated the project under contract prior to 2009.

[18] Three alternatives were also suggested by the licensee, including repair of the existing trail and trail structures; location of a new trail route that would be 0.2 mile longer but would eliminate two of the three stairways; and construction of the trail along an old overgrown road that generally parallels the oil pipeline. The first was rejected by the applicant for safety reasons and the others were not preferred by the applicant due primarily to the cost of new trail construction.

near the pipeline was retained as a viewpoint. The City of Valdez agreed to reserve at least five parking spaces at the new trailhead for day use, including trail users.

When the amendment to the Recreation Plan was approved in 1997 to accommodate a relocation of the trail, Commission staff did not anticipate the construction of an overhead transmission line along the new route. As proposed now, the transmission line would affect the visual quality of the trail corridor and degrade the user experience. Rerouting or burying the transmission line may be very costly and have other associated impacts; therefore, it is appropriate to consider relocating the trail, or a substantial portion of the trail, so that it is not within direct view of the proposed transmission line. A trail relocation that maintains or improves the trail user experience would also be consistent with the approved Recreation Plan for the Solomon Gulch project, although a new route may require Commission approval of an amendment to that plan. If modifications to the proposed transmission line route and a new trail location are not feasible, alternative off-site measures could be considered. An analysis of this issue could be conducted by Copper Valley and a specific proposal made to address the project's effect on the trail. This information could be contained in a revised Recreation Plan filed with the Commission for review and approval.

The existing penstock corridor of the Solomon Gulch project is visible from Valdez during much of the year. The proposed project would establish a second such corridor, approximately 15 feet wide, above Allison Creek and would be the most conspicuous, permanent project feature visible from Valdez. The temporary access route, if built, would also be conspicuous from Valdez. Following the construction phase (approximately two and a half years), the access route would be closed and restored, becoming less visible over time. The most visible sections of both corridors would be generally below 500 feet in elevation. Above an elevation of 500 feet, most of the penstock corridor would be hidden by topography. Below 500 feet, the 42-inch diameter penstock would also be apparent because it would need to be maintained relatively free of taller vegetation. The penstock and cleared corridor would result in a strong visual contrast with the present natural condition. The construction access route would also result in a strong visual contrast, and although temporary, the effect could last for many years. These effects would be similar for all three of the KOPs in Valdez.

Visibility of the project and the visual contrast with existing conditions would be somewhat mitigated by distance (three to four miles), as well as the presence of the VMT and other developments along the south shore. Additional measures could be implemented, such as reducing the visibility of the penstock and other project features by avoiding high-contrast colors and carefully locating facilities, utilizing native vegetation and other natural landscape features to lessen the effect. The long-term visual impact of the temporary access route would be further mitigated by re-contouring and reshaping the hillside when construction is complete. Native vegetation could be restored to approximate pre-development conditions per the ESCP.

Except for helicopter noise, temporary effects from construction would be minor if construction activities are conducted away from developed recreation sites, particularly along Dayville Road, and heavy construction traffic is scheduled to avoid peak times of recreational use. The impact of helicopter noise could be reduced by limiting helicopter use to the minimum necessary to complete each project element, and by using flight paths and staging and landing areas that are least disruptive to recreational users, including those who may be fishing, camping, or sightseeing along Dayville Road.

3.3.8 Socioeconomics

3.3.8.1 Affected Environment

The proposed project is located in the Valdez-Cordova census area of Alaska. Between 2000 and 2010, the Valdez–Cordova census area experienced a 5.5% decrease in population (U.S. Census, 2010). As of the 2010 census, the population of the Valdez–Cordova census area was approximately 9,636 and the population of Valdez was 3,076. The general population for the census area since 1960 is shown in Table 7.

Valdez is Alaska's northernmost ice-free port and employment is concentrated in several industries located on Port Valdez. A large proportion of Valdez residents are employed by the pipeline and seafood industries. The VMT and the terminus of the Trans-Alaska Pipeline System are located in Valdez. Alyeska and Crowley Marine Services are the primary employers of the area and Alyeska recently accounted for roughly 30 percent of wage and salary income for Valdez (Copper Valley, 2011a). Other top employers in Valdez include Valdez City Schools; City of Valdez; Providence Valdez Medical Center; TCC, LLC; Safeway, Inc.; State of Alaska (excluding); University of Alaska; and Doyon Universal Services.

Table 7. General population for the Valdez-Cordova Census Area[19]

Year	Population
1960	2,844
1970	3,098
1980	8,348
1990	9,952
2000	10,195
2010	9,636

[19] U.S. Census Bureau.

Copper Valley reports that the Valdez community has suffered a decline in jobs over the last decade due in part to the decline in employment at Alyeska and the fact that the cruise ship industry stopped serving Valdez in 2004. The construction employment industry and leisure and hospitality sector have also lost employment over the years. Despite the decline in these industries, healthcare employment has recently increased and the local hospital, Providence Valdez Medical Center, remains a major employer looking to expand operations (Copper Valley, 2011a). In recent years, wage and salary employment has declined and the average annual wage in Valdez approached $50,000 in 2006. The Valdez average annual wage as of 2008 remained 20 percent above the statewide average of $41,340.

3.3.8.2 Environmental Effects

Construction of the project is expected to last three to four years, generally beginning seasonally in mid-July and ending in mid-October, depending on weather constraints each year. Most construction personnel would reside in the City of Valdez in permanent housing. Copper Valley intends to employ local Valdez residents as feasible; however, some construction personnel and other workers may be brought in from other Alaska communities. Due to the seasonal nature of significant industries in Valdez (e.g., fishing, other construction), it is not anticipated that the proposed project would draw a large population of out-of-area workers. Most seasonally employed construction personnel would reside locally in Valdez, the closest city to the project, and would commute daily to the project site.

The City of Valdez has sufficient permanent and temporary housing available to meet the needs of the project. The project would not displace or increase population near the project, nor displace or relocate any residences or business establishments. Impacts on local businesses during construction would include an increase in customers and an increase in local revenue from additional construction personnel employed seasonally and housed locally in Valdez.

The construction of the project would also reduce Copper Valley's dependence on expensive diesel fuel. Hydropower electricity would lower energy costs for consumers by reducing dependence on the rising cost of diesel fuel used for electric power.

Under the no-action alternative, no project would be constructed and environmental conditions would remain the same.

Staff Analysis

Construction of the project facilities would require up to 75 construction workers, many of whom would be recruited from the local area or surrounding region. These workers are expected to be active in the area, seasonally, during a three to four-year period and would spend a portion of their wages earned during construction in the

vicinity of the project. Most construction workers and management personnel either live permanently or would be housed temporarily in the Valdez area during the most intensive construction season(s). It is likely that project construction would create a short-term demand for local goods and services through the spending of workers and for equipment parts and maintenance. This would generate increased sales to local material suppliers and other businesses.

It is unlikely that staffing for operations and maintenance would provide much, if any, discernible economic benefit to the region.

3.4 NO-ACTION ALTERNATIVE

Under the no-action alternative, the Allison Creek 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 from nonrenewable fuels.

4.0 DEVELOPMENTAL ANALYSIS

In this section, we look at the Allison Creek's use of Allison Creek 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.*,[20] the Commission compares the current project cost to an estimate of the cost of obtaining the same amount of energy and capacity using a 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

[20] 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.

alternative power. If the difference between the cost of alternative power and total project cost is negative, the project produces power for more than the cost of alternative power. This estimate helps to support an informed decision concerning what is in the public interest with respect to a proposed license. However, project economics is only one of many public interest factors the Commission considers in determining whether, and under what conditions, to issue a license.

4.1 POWER AND DEVELOPMENTAL BENEFITS OF THE PROJECT

Table 8 summarizes the assumptions and economic information we use in our analysis. This information, except as noted, was provided by Copper Valley in its license application. We find that the values provided by Copper Valley are reasonable for the purposes of our analysis. Cost items common to all alternatives include: taxes and insurance costs; estimated future capital investment required to maintain and extend the life of plant equipment and facilities; licensing costs; and normal operation and maintenance cost.

Table 8. Parameters for the economic analysis of the Allison Creek Hydroelectric Project (Source: Copper Valley, 2011a, as modified by staff).

Parameter	Value
Period of analysis (years)[a]	30
Initial construction cost ($)[b]	$28,706,000
Federal tax rate (%)	0[c]
Local tax rate (%)	0[c]
Licensing cost ($)	$3,400,000
Operation and maintenance ($/year)	$492,000
Energy value ($/MWh)[b]	$219
Interest rate (%)[b]	7

[a] Regardless of the potential license term (30, 40 or 50 years), we perform a 30-year economic analysis.

[b] Cost from Copper Valley, 2011a.

[c] Copper Valley is a non-profit corporation, and is therefore exempt from federal and state taxes.

4.2 COMPARISON OF ALTERNATIVES

Table 9 summarizes the installed capacity, annual generation, cost of alternative power, estimated total project cost, and the difference between the cost of alternative

power and total project cost for each of the action alternatives considered in this EA: Copper Valley's proposal and the staff alternative.

Table 9. Summary of annual cost of alternative power and annual project cost for the action alternatives for the Allison Creek Hydroelectric Project (Source: staff).

	Copper Valley's Proposal	Staff Alternative
Installed capacity (MW)	6.5	6.5
Annual generation (MWh)	23,300	23,300
Annual cost of alternative power	$5,103,000	$5,103,000
($/MWh)	$219	$219
Annual project cost	$3,775,542	$3,790,628
($/MWh)	$162.04	$162.69
Difference between the cost of alternative power and project cost	$1,327,458	$1,312,327
($/MWh)	$56.96	$56.31

4.2.1 No-action Alternative

Under the no-action alternative, the project would not be constructed.

4.2.2 Copper Valley's Proposal

Under Copper Valley's proposal, the project would have an installed capacity of 6.5 MW, and generate an average of 23,300 MWh of electricity annually. The average annual cost of alternative power would be $5,103,000, or $219/MWh. The average annual project cost would be $3,775,542, or about $162.04/MWh. Overall, the project would produce power at a cost which is $1,327,458, or $56.96/MWh, less than the cost of alternative power.

4.2.3 Staff Alternative

The staff alternative includes the same developmental features as Copper Valley's proposal and therefore would have the same capacity and energy attributes. Table 10 shows the staff-recommended additions, deletions, and modifications to Copper Valley's proposed environmental protection and enhancement measures and the estimated cost of each.

Based on an installed capacity of 6.5 MW and an average annual generation of 23,300 MWh, the cost of alternative power would be $5,103,000, or $219/MWh. The annual project cost would be $3,790,628 or about $162.69/MWh. Overall, the project would produce power at a cost that is $1,312,327, or $56.31/MWh, less than the cost of alternative power.

4.3 COST OF ENVIRONMENTAL MEASURES

Table 10 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. Measures with minimal or no costs are not analyzed.

Table 10. Cost of environmental mitigation and enhancement measures considered in assessing the environmental effects of constructing and operating the proposed Allison Creek Hydroelectric Project (Source: staff).

Enhancement/Mitigation Measures	Entity	Capital Cost (2010$)	Annual Cost (2010$)[a]	Levelized Annual Cost[b] (2010$)
Geology and Soil Resources				
Implement the ESCP to protect water quality and including a Storm Water Plan, a Construction Plan, and a Blasting Plan, Fire Protection Plan, Hazardous Plan, Spill Plan, and Waste Plan.	Copper Valley, Alaska DFG, NMFS, FWS, Staff	$410,000[c]	$0	$40,305
Aquatic Resources				
1. Install stream gages.	Copper Valley, Alaska DFG, NMFS, FWS, Staff	$250,000[c]	$0	$24,576
2. Provide minimum flow standards and release.	Copper Valley, Alaska DFG, NMFS, FWS, Staff	$20,000[c]	$0	$1,966
3. Develop an OMCP.[e]	Staff	$25,000[d]	$10,000[d]	$12,458
4. Provide failsafe provisions for minimum flows during project shutdown.	Alaska DFG, FWS, Staff	$50,000[d]	$0	$4,916
5. Develop and implement an ECMP.	Copper Valley, FWS, NMFS, Alaska DFG, Staff	$12,000[c]	$25,000 for years 1 & 2[d]	$6,104
6. Develop a Tailrace Fish Exclusion Plan.	FWS, NMFS, Alaska DFG, Staff	$25,000[d]	$0	$2,458

Enhancement/Mitigation Measures	Entity	Capital Cost (2010$)	Annual Cost (2010$)[a]	Levelized Annual Cost[b] (2010$)
7. Develop and implement a Biotic Monitoring Plan.	Copper Valley, FWS, NMFS, Alaska DFG, Staff	$50,000[c]	$25,000[d]	$34,840
Terrestrial Resources				
1. Develop and implement a Vegetation Plan including restoration of access routes.	Copper Valley, Staff	$100,000[d]	$0	$9,830
2. Additional measures to be included in the Vegetation Plan (off-site cleaning, using native plants, and monitoring).	Staff	$5,000[d]	$0	$492
3. Develop and implement an Avian Protection Plan	Copper Valley, Alaska DFG, FWS, Staff	$70,000[c]	$0	$6,881
4. Design and construct the transmission line to current APLIC standards (to be included in the Avian Protection Plan).	Alaska DFG, FWS, Staff	$20,000[d]	$0	$1,170
5. Develop a Terrestrial Connectivity Plan/Penstock Location and Grade Plan.[f]	Copper Valley, Alaska DFG, FWS, Staff	$20,000[c]	$0	$1,966
6. Develop and implement a Bear Safety Plan.	FWS, Alaska DFG, Staff	$5,000[d]	$0	$492

Enhancement/Mitigation Measures	Entity	Capital Cost (2010$)	Annual Cost (2010$)[a]	Levelized Annual Cost[b] (2010$)
Cultural Resources				
Protect cultural resources when they are inadvertently discovered.	Copper Valley, Staff	$20,000[c]	$0	$1,966
Recreation and Aesthetic Resources				
1. Implement the Recreation Plan.	Copper Valley, FWS, NPS, Staff	$15,000[c]	$1,500[c]	$7,899
2. Revise the Recreation Plan to include additional measures.	FWS, NPS, Staff	$35,000[d]	$500[d]	$8,865
3. Develop and implement a Safety Plan.	Copper Valley, Staff	$10,000[c]	$0	$983

[a] Annual costs typically include operational and maintenance costs and any other costs which occur on a yearly basis.
[b] All capital and annual costs are converted to equal annual costs over a 30-year period to give a uniform basis for comparing costs.
[c] Costs provided by Copper Valley in the license application and modified by staff.
[d] Cost estimated by staff.
[e] Compliance monitoring recommended in the OCMP would be partially achieved through the proposed installation of stream gages.
[f] Copper Valley proposed the Terrestrial Connectivity Plan while Alaska DFG, FWS, and staff proposed the Penstock Location and Grade Plan which fulfills the same function.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 COMPARISON OF ALTERNATIVES

In this section, we compare the development and non-developmental effects of Copper Valley's proposal, Copper Valley's proposal as modified by staff, and the no-action alternative.

We estimate the annual generation of the project under the three alternatives identified above. Our analysis shows that the annual generation would be 23,300 MWh for the proposed action and the staff alternative.

We summarize the environmental effects of the different alternatives in Table 11.

Table 11. Comparison of alternatives for the Allison Creek Hydroelectric Project (Source: staff).

Resource	No-Action Alternative	Proposed Action	Staff-Recommended Alternative
Geology and Soils	No effect.	Temporary erosion where vegetation is disturbed at the powerhouse construction site during and immediately following construction. Potential for downstream channel adjustment during initial project operations and minor related sedimentation.	Same as proposed action.
Aquatic Resources	No effect.	Run-of-river operation would provide a stable aquatic environment both upstream and downstream of the project. A minimum flow as measured in Reach 3 of 10 or 8 cfs (depending on time of year), and adherence to ramping rates would maintain aquatic habitat. Development of a Hazardous Plan would provide protection for water quality. The provision of an on-site ECM would protect aquatic resources during project construction. Development and implementation of a Biotic Monitoring Plan would ensure fish use and connectivity of the bypassed reach and maintenance of adequate water temperatures to support resident fisheries.	In addition to proposed action, assurance of flow, run-of-river operations, and a minimum flow failsafe provision would provide protection for aquatic resources though implementation of an OMCP. Development of a Tailrace Fish Exclusion Plan would protect fish from swimming upstream into the draft tube.

Resource	No-Action Alternative	Proposed Action	Staff-Recommended Alternative
Wildlife	No effect.	Increased risk of avian collision and electrocution from the transmission line would be minimized by an Avian Protection Plan and adhering to BMPs. Development of a Terrestrial Connectivity Plan would prevent penstock being a barrier to wildlife movement. Development of a Waste Plan would decrease attraction of scavengers and other wildlife. Development of a Hazardous Plan and Spill Plan would protect wildlife from accidental exposure to harmful materials in the event of spills.	Same as proposed action including: design and construct transmission line to APLIC standards which would increase protection to birds; develop a Penstock Location and Grade Plan as fulfilling the Terrestrial Connectivity Plan which would improve wildlife movement; develop and implement a Bear Safety Plan which would ensure safety of project personnel and wildlife; conduct additional Harlequin duck surveys prior to construction which would ensure safety and success of nests; implement mountain goat avoidance measures during construction which would minimize disturbance to mountain goats; develop a plan to discourage hunting, fishing, and trapping by project personnel on site which would protect wildlife.

Resource	No-Action Alternative	Proposed Action	Staff-Recommended Alternative
Vegetation	No effect.	Temporary loss of 35.47 acres of vegetation and permanent loss of 3.57 acres of vegetation. Increased potential for noxious weed establishment; however, the effects would be minimized and some enhancement would occur through a Vegetation Plan which would control existing infestations and provide for long-term noxious weed monitoring and management.	Same as proposed action with additional measures for the Vegetation Plan.
Recreation and Land Use	No effect.	Impacts to user experience along Solomon Gulch Trail due to new transmission line, and in upper basin of Allison Creek due to new dam and other project facilities. Temporary disturbance to recreational visitors during construction.	Same as proposed action, except implementation of a revised Recreation Plan to include potential rerouting of Solomon Gulch Trail (or other commensurate measures) would reduce impacts and provide long-term enhancement of recreational experience.

Resource	No-Action Alternative	Proposed Action	Staff-Recommended Alternative
Aesthetics	No effect.	Adverse visual impacts of the penstock, powerhouse, and cleared corridors for penstock and temporary access route; visual impact of the new transmission line adjacent to Solomon Gulch Trail; minor long-term effects on recreation users in the upper basin of Allison Creek due to the presence of project facilities; minor short-term effects from dust, equipment, and traffic during construction; and temporary effects of helicopter noise on recreation users.	Same as proposed action, but reduced visual effects through potential rerouting of Solomon Gulch Trail or other commensurate measures to protect/enhance recreation experience and reduced disturbance through measures addressing timing and location of construction activities and helicopter use.
Socioeconomics	No effect.	Short-term economic benefit through employment of up to 75 construction workers and a local increase in spending on equipment and supplies during construction. Minor long-term economic effect from ongoing project operation and maintenance, and potentially lower electricity costs to consumers.	Same as proposed action.

5.2 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 licensing the Allison Creek Project. We weigh the costs and benefits of our recommended alternative against other proposed measures.

Based on our independent review of agency and public comments filed on this project and our review of the environmental and economic effects of the proposed project and its alternatives, we selected the staff alternative 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; (2) the 6.5-MW of electric capacity would come from a renewable resource that 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.

Based on our environmental analysis of Copper Valley's proposal, as discussed in section 3, and the costs discussed in section 4, we conclude that the following environmental measures proposed by Copper Valley would protect and enhance environmental resources and would be worth the cost. Therefore, we recommend including these measures in any license issued for the project.

During project construction, Copper Valley's environmental measures would include provisions to:

- Use BMPs for controlling erosion and limiting short-term impacts on water quality; [21]
- Implement the ESCP to protect water quality and include development of: a Storm Water Pollution Prevention Plan, a Construction Water Quality Monitoring Plan, and a Blasting Plan;

[21] Using BMPs during construction should be incorporated into the revised ESCP.

- Develop and implement an ECMP to document compliance with environmental measures;
- Implement measures to protect wetlands including: minimizing fill footprint, consolidating project facilities to small area of impact, revegetating slopes and disturbed surfaces to minimize stormwater pollution, planning and maintaining sediment prevention measures along the toe of all fill areas adjacent to wetlands or waters, preventing sediments from entering fill areas adjacent to wetlands or waters, using only clean sand and gravel for fill, and stockpiling material in developed areas and/or uplands;
- Use natural products and appropriate colors for various project elements to help them blend in with the natural environment; and
- Develop and implement an Avian Protection Plan with provisions for: restricting vegetation clearing from May 1 through July 15, avoiding project activities within 660 feet of active bald eagle nests, limiting activities; blasts; and helicopter traffic from April 10 through August 10, marking and lighting new powerlines and guy wires, and designing lighting for any structures or communication towers to reduce bird attraction and bird strikes.

During project operation, Copper Valley's proposed action includes provisions to:

- Develop and implement as part of the ESCP: a Fire Protection Plan, a Hazardous Plan, a Spill Plan, and Waste Plan;
- Operate the project in a run-of-river mode;
- Release a minimum flow of 2 cfs at the diversion structure into Allison Creek at all times when the project is operating to maintain aquatic habitat;
- Maintain a minimum flow of 10 cfs in Reach 3 from June 16 through October 31, and 8 cfs from November 1 through June 15 if the project is operating to maintain fish habitat;
- Provide a ramping rate of 20 cfs per hour in Reach 3 during project startup and shutdown to maintain fish habitat;
- Install and maintain stream gages below the diversion and in Reach 3, and collect and analyze data from these gages to document minimum flow releases;
- Develop and implement a Biotic Monitoring Plan in two phases to monitor for effects on fish during construction, water temperature alterations, fish stranding, and connectivity of the bypassed reach of Allison Creek;
- Develop and implement a Vegetation Plan that includes restoring temporary access routes and disturbed areas, and managing weed/invasive species;
- Develop a Terrestrial Connectivity Plan to prevent the penstock from becoming a barrier to wildlife movement;

- Implement the Recreation Plan that includes installing and maintaining interpretive sign in Valdez and informational signs in the vicinity of the powerhouse and the temporary access route;
- Develop and implement a Public Safety and Access Plan that includes installing signs to discourage public access to construction areas and Alaska Department of Natural Resources' land near the Valdez Marine Terminal to provide public safety and security; and
- Protect cultural resources in the event that they are inadvertently discovered during project construction and operation.

5.2.1 Additional Staff-Recommended Measures

We recommend the measures described above, and 12 additional staff recommended measures and modifications. They include:

- Develop an OCMP;
- Provide failsafe provisions to ensure continuous instream flows to Allison Creek in the event of project shutdown;
- Develop a Tailrace Fish Exclusion Plan to protect fish from injury and mortality;
- Notify the Commission, Alaska DFG, and FWS within 10 days of an event not in compliance with any license that may be issued that would affect fish and/or wildlife;
- Include the following additional measures in the Vegetation Plan: off-site cleaning and inspecting of all equipment related to construction; using native plants and seeds in areas to be revegetated; monitoring the revegetated areas, with measures to address invasive and noxious weeds should they be found;
- Design and construct the transmission line to adhere to the most current APLIC standards;
- Survey for harlequin duck nests prior to construction-related activities, and if nests are found, flag the nests and avoid the area during the nesting period;
- Develop and implement a Bear Safety Plan;
- Maintain a 1,500-foot vertical and horizontal clearance of mountain goats when using helicopters;
- Adopt the Penstock Location and Grade Plan recommended by FWS and Alaska DFG as fulfilling the purpose of Copper Valley's Terrestrial Connectivity Plan;
- Develop a plan to discourage fishing, hunting, and trapping in the project area by project personnel; and
- Revise the Recreation Plan to include: analyzing alternative alignments of the existing Solomon Gulch Trail and providing details on the preferred alternative developed in consultation with the agencies; conducting

construction-related activities away from developed recreation sites, particularly along Dayville Road; scheduling heavy construction traffic to generally avoid peak times of recreational use; minimizing helicopter use to the extent practicable; and using flight paths and staging areas that are least disruptive to recreational users.

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

Operation Compliance Monitoring Plan

Copper Valley proposes a number of operational constraints for the project including: run-of-river operation, minimum flow releases, and ramping rates. With the exception of stream gage installation, Copper Valley did not specify how it would monitor compliance with these operational constraints. FWS, NMFS, and Alaska DFG recommended that Copper Valley develop a plan to document compliance with the various operational provisions. We agree that a method for documenting compliance with recommended run-of-river operation, minimum flows releases, and ramping rates would be needed. Implementation of an OCMP for the project would provide a mechanism for Copper Valley to collect and record data needed to document minimum flows and ramping rates in the bypassed reach, and run-of-river operation. Such a plan should identify reporting criteria and a schedule for reporting, project generation monitoring, and maintenance of a data log. We recommend that Copper Valley consult with FWS, NMFS, and Alaska DFG in developing the OCMP and file the final version with the Commission for approval. We conclude that development of an OCMP would be worth the estimated levelized annual cost of $12,458.

Instream Flow Failsafe Provisions

Sudden project shutdown could lead to dewatering of the bypassed reach resulting in fish stranding and mortality. FWS and Alaska DFG recommend that a failsafe flow delivery mechanism be built into the project diversion. We agree that this measure is needed to protect aquatic resources in the case of sudden project shutdown. We recommend that Copper Valley design failsafe provisions into the minimum flow release mechanism to allow for continuous instream flows to Allison Creek in the event of project shutdown. This measure would ensure a constant delivery of minimum flows to the bypassed reach at all times and would protect aquatic resources. We conclude that providing instream flow failsafe provisions would be worth the estimated levelized annual cost of $4,916.

Tailrace Fish Exclusion Plan

The proposed powerhouse could have adverse effects on the Dolly Varden which inhabit the reach downstream of the powerhouse (tailrace). These fish could be attracted to the tailrace and face possible injury if they swim up into the project draft tube. FWS, NMFS, and Alaska DFG recommend the development of a Tailrace Fish Exclusion Plan that would include the design and construction of a tailrace barrier in consultation with FWS, NMFS, and Alaska DFG, which would be filed for Commission approval. Designing the tailrace barrier in consultation with the resource agencies would minimize or eliminate adverse effects on Dolly Varden in the project tailrace. We conclude that development a Tailrace Fish Exclusion Plan would be worth the estimated levelized annual cost of $2,458.

Notification of Non-compliance Events

FWS and Alaska DFG recommend that Copper Valley be required to notify the Commission, FWS, and Alaska DFG within 10 days of any non-compliance event that could affect fish and/or wildlife resources. The agencies state that notification in the case of non-compliance events is necessary so that resource agencies can recommend mitigation actions and effectively manage environmental resources. We recommend that Copper Valley notify the Commission, Alaska DFG, and FWS within 10 days of any non-compliance events that could affect fish and/or wildlife resources to assess potential impacts to these resources so they can be mitigated effectively. This measure would likely have no additional cost.

Vegetation Management Plan (Vegetation Plan)

Copper Valley proposes to develop and implement a Vegetation Plan, but did not provide specific measures that would be included. We recommend that Copper Valley revise the Vegetation Plan to include: cleaning and inspecting equipments off-site to protect against the introduction of invasive species; using native plants and seeds in areas to be revegetated; and developing a monitoring plan for the revegetated areas to ensure that the effort was a success and that invasive species are not present, with measures to address invasive and noxious weeds should they be found.

These measures would reduce the risk of the introduction and spread of invasive plant species in the project area, while promoting native vegetation. A monitoring plan would ensure the success of these efforts. These measures would have estimated levelized annual cost of $492 and would be worth the cost.

Harlequin Duck Nest Survey

Harlequin ducks forage in the upper reach of Allison Creek and several pairs are likely to nest in adjacent habitats, primarily in June. It is possible that harlequin duck

nests may occur within the footprint of the proposed diversion structure or upper penstock or within the area cleared during construction and operation of the project. Nesting ducks or brood-rearing ducks may be susceptible to disturbance by construction activities or by periodic clearing. We recommend that Copper Valley conduct an additional survey of the project area for harlequin duck nests, specifically the location of the diversion structure and upper penstock, prior to any construction activities. Any nests that are found should be flagged and the areas around it avoided during the nesting period. We estimate that this will have a minimal cost and conclude that the benefits to harlequin ducks and their nests would justify the cost.

Bear Safety Plan

Copper Valley proposed to develop a Waste Plan to reduce the risk of attracting scavengers and other wildlife to the project site. The Waste Plan would include regulations prohibiting construction workers from feeding wildlife and modern garbage-handling procedures. In addition, Copper Valley would require a Waste Plan training program for contractor personnel. FWS, Alaska DFG, and staff recommend that Copper Valley develop and implement a Bear Safety Plan which 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.

The measures will reduce the risk of bear-human encounters and thus ensure the safety of the bear populations in the project area as well as the safety of workers on-site. We estimate that the estimated levelized annual cost of this measure would be $492 and conclude that the benefits to the safety of humans and bears would justify the cost.

Mountain Goat Avoidance

FWS, Alaska DFG, and staff recommend maintaining a 1,500-foot vertical and horizontal clearance from observed mountain goats when using helicopters. This measure would decrease the potential of disturbing mountain goats in the project area. The cost of this measure would be negligible.

Penstock Location and Grade Plan

Copper Valley proposes to develop a Terrestrial Connectivity Plan to prevent the penstock from being a barrier to wildlife movement. FWS and Alaska DFG recommended a Penstock Location and Grade Plan which would include measures to bury or elevate the penstock. The measures proposed by FWS and Alaska DFG to be incorporated in a Penstock Location and Grade Plan appear to meet the objectives that Copper Valley outlined for its proposed Terrestrial Connectivity Plan. As the

Terrestrial Plan has not yet been developed, we recommend that Copper Valley implement the Penstock Location and Grade Plan recommended by FWS and Alaska DFG. The measures in this plan would facilitate movement of wildlife through the project area. We find that the estimated levelized annual costs of $1,966 for the Plan would justify the cost.

Plan to Discourage Fishing, Hunting, and Trapping during Construction

Copper Valley proposes to abandon, gate, and restore the temporary construction access road and post "No Trespassing" signage after construction is complete to deter unauthorized access to the site, which would reduce fishing, hunting, and trapping pressure. However, Copper Valley does not propose any measures to address the effects of the project workforce on existing fish and wildlife populations.

As stated in section 3.3.3, *Terrestrial Resources,* improved access of project personnel to the project area may lead to excessive fishing, hunting, and trapping, particularly because Alaska DFG has no harvest regulations that limit the number of fish and wildlife that could be taken. Excessive harvest could place the populations at risk and result in Alaska DFG issuing an Emergency Order restricting fish and wildlife harvest to all users in the area.

Alaska DFG recommends that hunting, trapping, and fishing by project personnel be prohibited to protect existing aquatic and terrestrial resources due to the ease of access by construction personnel while in the project area. We recommend that Copper Valley develop a plan to discourage construction personnel from fishing, hunting, and trapping during construction. This could include posting "No Hunting, Fishing, or Trapping" signage within the construction areas. We estimate that there would be no additional cost involved in developing this plan at the construction site.

Recreation Management Plan (Recreation Plan)

Copper Valley proposes to install and maintain an interpretive sign in Valdez, and informational signs in the vicinity of the powerhouse and the temporary access route (as discussed above) to discourage public access during construction and operation of the project.

Copper Valley does not propose measures to address temporary construction impacts to recreation or the visual impact of a new transmission line on the Solomon Gulch Trail. To address the impact of the proposed transmission line on the Solomon Gulch Trail, staff recommends that the applicant consult with the Alaska Division of Parks and Outdoor Recreation, the City of Valdez, the NPS, and other stakeholders to evaluate alternative routes for the trail and identify a preferred route that substantially

reduces visual impacts of the proposed transmission line. The new trail route and trailhead location should be included in a revised Recreation Plan.

The revised Recreation Plan should include a detailed trail description, map, and cost information for the proposed route. The NPS recommended that Copper Valley also ensure appropriate management and maintenance of the trail, while accommodating increased use over the term of a license. Staff supports this recommendation because it clarifies Copper Valley's responsibility to manage and maintain project-related facilities.

If no alternative feasible route for the trail can be identified, measures should be proposed that address recreation and aesthetic impacts associated with locating the transmission line along the trail, such as placing the line underground or providing other commensurate recreation opportunities in the project area. Because these measures are likely to affect the existing Solomon Gulch trail, which is a required recreation feature of the nearby Solomon Gulch project, Copper Valley an amendment may be needed to the Solomon Gulch Recreation Plan prior to submitting the revised Recreation Plan for the Allison Creek project. Both the revised Recreation Plan for Allison Creek and any proposal to amend the Solomon Gulch Recreation Plan should be accompanied by a revised project boundary proposal for each project, in order to clarify the location of recreational features and to avoid overlapping boundaries between the two projects.

To reduce the temporary impacts of construction on recreation resources, we recommend conducting construction activities away from developed recreation sites, particularly along Dayville Road; scheduling heavy construction traffic to generally avoid peak times of recreational use; limiting helicopter use to the minimum necessary to complete each project element; and using flight paths and staging areas that are least disruptive to recreational users. The estimated levelized annual cost of $17,747 would be worth the cost.

B. Measures Not Recommended

Some of the measures proposed by Copper Valley and recommended by other interested parties would not contribute to the best comprehensive use of Allison Creek water resources, do not exhibit sufficient nexus to the project environmental effects, or would not result in benefits to non-power resources that would be worth their cost. The following discusses the basis for staff's conclusion not to recommend such measures.

Annual Project Review Meeting

FWS and Alaska DFG recommended that Copper Valley coordinate and consult with agency representatives for the need of an annual project review meeting and conduct such meetings as needed. FWS and Alaska DFG stated that an annual meeting would be an effective means to review fish and wildlife issues and to ensure compliance with license stipulations. We recommend that Copper Valley consult with FWS and

Alaska DFG on developing environmental post-licensing plans and measures. We also recommend that the Biotic Monitoring Plan include requirements for consultation with FWS and Alaska DFG. Requiring a separate annual meeting would be redundant. Therefore, we do not recommend this measure be included in any license that the Commission may issue for the project.

Mitigation Escrow Account

FWS and Alaska DFG recommended that Copper Valley establish a $50,000 interest-bearing mitigation escrow account for unanticipated effects on fish, wildlife, and water quality resources. FWS and Alaska DFG state that this fund is necessary to address the effects of unforeseen events on project-area resources. While it is possible for the funds to be used to enhance aquatic resources in Allison Creek, the recommended fund does not include any specific measures. Without specific measures, we cannot evaluate the benefits and costs of the measures or their relationship to the project. Therefore, we conclude that we have no basis for recommending a mitigation escrow account. We note that the Commission has a standard fish and wildlife reopener article to account for unanticipated effects on fish and wildlife.

C. Conclusion

Based on our review of the agency and public comments filed on the project and our independent analysis pursuant to sections 4(e), 10(a)(1), and 10(a)(2) of the FPA, we conclude that licensing the Allison Creek Project, as proposed by Copper Valley, with staff-recommended modifications and additional measures, would be best adapted to a plan for improving or developing Allison Creek waterway.

5.3 UNAVOIDABLE ADVERSE EFFECTS

Minor amounts of sediment would enter Allison Creek as a result of construction of the project, even with implementation of our recommended control measures, resulting in short-term effects on aquatic biota. During the early stages of project operation, changes in the flow dynamics of the tailrace area may cause minor downstream channel adjustments, which could result in a short-term, minor increase in sedimentation. Copper Valley's proposed ESCP would limit the potential for long-term changes in the streambanks and associated erosion potential. Placement of a cofferdam during tailrace excavation would result in the temporary removal of aquatic habitat within the cofferdam area.

Construction of the proposed project would result in the permanent removal of 3.57 acres of vegetation at the powerhouse site, a minor long-term effect, and the temporary removal of 35.47 acres of vegetation at other locations, such as the proposed transmission line corridor and the two staging areas, a minor short-term effect. Most of these areas were previously disturbed during construction of the intake and powerhouse.

Grading and equipment use would result in removal of topsoil and soil compaction that would result in a short-term, minor adverse effect. These effects would be minimized with implementation of the ECSP and Vegetation Plan.

Visibility of the penstock, powerhouse, and the cleared corridor for the penstock would remain moderately conspicuous from Valdez and Port Valdez for the life of the project. The temporary construction access road would remain visible during the construction period and for some years afterward until the area is fully restored and mature native vegetation is reestablished. If an alternate route for the Solomon Gulch Trail is not identified and implemented, the transmission line, as proposed, would result in long-term impacts the trail user experience. Project facilities in the upper basin of Allison Creek would remain visible to recreation users over the life of the project.

Construction activities by small work crews would generate noise and dust that could disturb wildlife and dispersed recreational visitors in the immediate project area, representing a minor, short-term effect during the construction period. The project would also result in minor increases in traffic and visual disturbance during construction and minor aesthetic effects during project operation. The project could cause an increase in sound as a result of powerhouse operations; however, these potential effects would be minimized by implementation of measures recommended by staff.

5.4 FISH AND WILDLIFE AGENCY RECOMMENDATIONS

Under the provisions of section 10(j) of the FPA, each hydroelectric license issued by the Commission shall include conditions based on recommendations provided by federal and state fish and wildlife agencies for the protection, mitigation, and enhancement of fish and wildlife resources affected by the project. In response to our REA notice, the following fish and wildlife agencies submitted recommendations for the project: NMFS (letter filed April 4, 2012), FWS (letter filed April 6, 2012), and Alaska DFG (letter filed April 6, 2012).

Section 10(j) of the FPA states that whenever the Commission believes that any fish and wildlife agency recommendation is inconsistent with the purposes and the requirements of the FPA or other applicable law, the Commission and the agency will attempt to resolve any such inconsistency, giving due weight to the recommendations, expertise, and statutory responsibilities of such agency. Table 12 lists the federal and state recommendations filed pursuant to section 10(j) and indicates whether the recommendations are included under the staff alternative. Environmental recommendations that we consider outside the scope of section 10(j) have been considered under section 10(a) of the FPA and are addressed in the specific resource sections of this document.

We recommend all 17 recommendations that we consider to be within the scope of section 10(j). Table 12 indicates the basis for our preliminary determinations concerning measures that we consider inconsistent with section 10(j).

Table 12. Fish and wildlife agency recommendations for the Allison Creek Hydroelectric Project (Source: staff).

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted? and Basis for Preliminary Determination of Inconsistency
1	Bypassed reach minimum flow release	Alaska DFG, NMFS, FWS	Yes		Adopted
2	Diversion Instream Flow Release Plan	Alaska DFG, NMFS, FWS	Yes	$26,542	Adopted. Will be accomplished through the operation compliance monitoring plan.
3	Ramping rates	Alaska DFG, NMFS, FWS	Yes		Adopted
4	Stream gage installation, monitoring, and recording	Alaska DFG, NMFS, FWS	Yes		Adopted
5	Notification of non-compliance event	Alaska DFG, FWS	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Negligible	Adopted
6	Biotic Monitoring Plan	Alaska DFG, NMFS, FWS	Yes	$34,840	Adopted
7	Instream flow failsafe provisions	Alaska DFG, FWS	Yes	$4,916	Adopted
8	Tailrace Fish Exclusion Plan	Alaska DFG, NMFS, FWS	Yes	$2,458	Adopted
9	Environmental compliance monitor	Alaska DFG, FWS	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$6,104	Adopted

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted? and Basis for Preliminary Determination of Inconsistency
10	Notification and timing of instream work	Alaska DFG, NMFS, FWS	Yes	Negligible	Adopted
11	ESCP	Alaska DFG, NMFS, FWS	Yes	$36,864	Adopted
12	Turbidity monitoring during construction	Alaska DFG, NMFS, FWS	Yes		Adopted
13	Develop a Spill Plan.	Alaska DFG, NMFS, FWS	Yes		Adopted
14	Locating clearings and roads 100 feet from the high water mark of Allison Creek.	Alaska DFG, NMFS, FWS	Yes	Negligible	Adopted
15	Construct transmission line to most current APLIC standards.	Alaska DFG, FWS	Yes	$1,170	Adopted
16	Develop and implement a Bear Safety Plan.	Alaska DFG, FWS	Yes	$492	Adopted
17	Burial of penstock to allow wildlife crossing/Penstock Location and Grade Plan[a]	Alaska DFG, FWS	Yes	$1.966	Adopted
18	Helicopter maintaining a 1,500 vertical or horizontal clearance in the presence of mountain goats	Alaska DFG, FWS	Yes	Negligible	Adopted

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted? and Basis for Preliminary Determination of Inconsistency
19	Annual Project Review Meeting	Alaska DFG, FWS	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Negligible	Not adopted. Would be achieved through consultation on plans and monitoring provisions in the Biotic Monitoring Plan.
20	Access to site by Alaska DFG employees to project site upon appropriate advance notification.	Alaska DFG	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	Negligible	Adopted
21	Establish a $50,000 interest escrow account to mitigate unanticipated impacts to fish, wildlife, and aquatic resources.	Alaska DFG, FWS	No, not a specific measure to protect, mitigate, or enhance fish and wildlife resources.	$4,961	Not adopted. We have insufficient information to determine the benefits and costs of the as-yet unidentified mitigation measures. Implementation of any future as-yet unidentified measures as a result of the unanticipated effects would require prior Commission approval after the filing of an application to amend the license.

No.	Recommendation	Agency	Within the Scope of Section 10(j)	Annualized Cost	Adopted? and Basis for Preliminary Determination of Inconsistency
22	Restrict access and land use to minimize impacts to resources (prohibition of project employees, contractors, and subcontractors from hunting, fishing, and trapping in the project area).	Alaska DFG	Yes	Negligible	Adopted

[a] Copper Valley proposed to develop a Terrestrial Connectivity Plan to minimize effects of the penstock as a barrier to wildlife movement; however, no specific measures were provided. FWS recommended that the penstock extending above the powerhouse either be buried or elevated to allow animals to cross freely in areas less steep. Alaska DFG recommended that Copper Valley develop a Penstock Location and Grade Plan which identified terrain where the penstock could be buried. FWS and Alaska DFG's recommendations appear to fulfill the purpose of the proposed Terrestrial Connectivity Plan, making the development of the proposed Terrestrial Connectivity Plan redundant.

5.5 CONSISTENCY WITH COMPREHENSIVE PLANS

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

Alaska Administrative Code. 2012. 5 AAC § 39.222 Policy for the management of sustainable salmon fisheries. Juneau, Alaska.

Alaska Administrative Code. 2003. 5 AAC § 75.222 Policy for the management of sustainable wild trout fisheries. Juneau, Alaska.

Alaska Department of Fish and Game. 2006. Management plan for invasive Northern Pike in Alaska. Anchorage, Alaska. 2006.

Alaska Department of Fish and Game. 2011. Alaska Anadromous Waters Catalog – South Central Region. Anchorage, Alaska. June 1, 2011.

Alaska Department of Natural Resources. Alaska's Outdoor Legacy: Statewide Comprehensive Outdoor Recreation Plan (SCORP): 2009-2014. Anchorage, Alaska.

Bureau of Land Management. 1981. South central Alaska water resources study: Anticipating water and related land resource needs. Anchorage, Alaska. October 1, 1981.

National Park Service. The Nationwide Rivers Inventory. Department of the Interior, Washington, D.C. 1993.

U.S. Fish and Wildlife Service, et al. 2008. Alaska shorebird conservation plan. Version II. Anchorage, Alaska. November 2008.

U.S. Fish and Wildlife Service. 2009. Alaska seabird conservation plan. Anchorage, Alaska. 2009.

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

Construction of the Allison Creek Hydroelectric Project would have the following short-term, minor effects: increase in soil erosion and sedimentation;

temporary removal of aquatic habitat within the cofferdam area during in-water construction; temporary removal of 0.36 acre of vegetation; increased disturbance to wildlife and dispersed recreational visitors in the immediate project vicinity from increased human presence from construction crews; increased traffic related to crews and equipment; and increased noise and dust; and aesthetic degradation from construction equipment and activities. During project operation, the change in flow characteristics below the dam could potentially cause minor channel adjustments that would result in minor, short-term increases in sedimentation. Project operation would also result in a minor long-term aesthetic effect from project structures, including potential noise effects. Our recommended environmental measures would minimize these effects.

On the basis of our independent analysis, the issuance of an original license for the Allison Creek Hydroelectric Project, as proposed with staff modifications and additional recommended environmental measures, would not constitute a major federal action significantly affecting the quality of the human environment.

7.0 LITERATURE CITED

ABR. 2011. Biological resources in the Allison Creek hydroelectric project area: 2008-2011 studies and impact analysis. Report for Hatch, Seattle, WA, by ABR, Inc., Fairbanks, AK.

ADFG. 2008. Alaska Wildlife Notebook Series—Dolly Varden. Viewed online May 2011 at: http://www.adfg.alaska.gov/static/education/wns/dolly_varden.pdf
2010a. Catalog of waters important for the spawning, rearing or migration of anadromous fishes. Accessed online May 2011 at: http://www.sf.adfg.state.ak.us/SARR/awc/index.cfm/
2010b. Alaska Department of Fish & Game — Fish Distribution Database. Accessed online November 3, 2008 at: http://www.sf.adfg.state.ak.us/SARR/FishDistrib/FDD_ims.cfm
2010c. Alaska Department of Fish & Game — Mark lab: Otolith and thermal marking laboratory. Viewed online May 2011 at: http://tagotoweb.adfg.state.ak.us/OTO/

Alaska State Historic Preservation Office. Stamped Letter from Robert Wilkinson, CEO, Copper Valley Electric Association, Inc to Judy Bittner, Alaska SHPO. October 17, 2011.

Armstrong, R. 1970. Age, food, and migration of Dolly Varden smolts in Southeastern Alaska. Journal of the Fisheries Research Board of Canada 27, 991–1004.

Armstrong, R. 1971. Age, food and migration of sea-run cutthroat trout, Salmo clarki, at

Eva Lake, southeastern Alaska. Transactions of the American Fisheries Society, 100, 302-306.

Armstrong, R. H., & J. E. Morrow. 1980. The Dolly Varden char, Salvelinus malma. Carrs: Salmonid fishes of the genus Salvelinus. Dr. W. Junk Publishers, The Hague, 99-140. E.K. Balon (ed.). Netherlands.

Blanchard (Blanchard, M.). 2011. 2011 Cultural Resources Reconnaissance Survey, Allison Creek Hydroelectric Project, Alaska. Report prepared for Hatch Associates Consultants, Inc. Northern Land Use Research Inc. September 2011.

Botz, J., R. Brenner, G. Hollowell, B. Lewis, & S. Moffitt. 2008. 2006 Prince William Sound area finfish management report. Alaska Department of Fish and Game, Fishery Management Report No. 08-30. Anchorage, AK.

Bramblett, R. G., M. D. Bryant, B. E. Wright, & R. G. White. 2002. Seasonal use of small tributary and mainstem habitats by juvenile steelhead, coho salmon, and Dolly Varden in a Southeastern Alaska drainage basin. Transactions of the American Fisheries Society, 131, 498–506.

Bryant, M. D., N. D. Zymonas, & B. E. Wright. 2004. Salmonids on the fringe: Abundance, species composition, and habitat use of salmonids in high-gradient headwater streams, Southeast Alaska. Transactions of the American Fisheries Society, 133, 1,529–1,538.

Bryant, M.D. & M.D. Lukey. 2005. Movement of Dolly Varden and cutthroat trout in high gradient headwater streams with implications for fish passage standards. Progress Report for USDA Forest Service in 2005 Tongass Monitoring and Evaluation Report, Appendix A. 25 pp.

Bryant, M.D., M.D. Lukey, J.P. McDonell, R.A. Gubernick, & R.S. Aho. 2009. Seasonal movement of Dolly Varden and cutthroat trout with respect to stream discharge in a second-order stream in southeast Alaska. North American Journal of Fisheries Management, 29, 1728-1742.

Coggswell, S. 2000. Tatitlek coho salmon release, Exxon Valdez Oil Spill restoration project annual report (restoration project 98127). Alaska Department of Fish and Game, Habitat and Restoration Division, Anchorage, AK.

Copper Valley Electric Association, Inc. 2011a. License Application. August, 2011.

Copper Valley Electric Association, Inc. 2011b. Letter from Robert Wilkinson, CEO of Copper Valley Electric Association, Inc to the Commission. May 22, 2012.

Copper Valley Electric Association, Inc. 2011c. Letter from Robert Wilkinson, CEO of Copper Valley Electric Association, Inc to Judy Bittner, Alaska SHPO. October 17, 2011.

Currens, K. P., K. E. Griswold, G. H. Reeves. 2003. Relations between Dolly Varden populations and between coastal cutthroat trout populations in Prince William Sound. Exxon Valdez Oil Spill Restoration Project Final Report (Restoration Project 98145), USDA Forest Service, Pacific Northwest Research Station, Corvallis, OR.

Fountain, A.G., & Tangborn, W.V. 1985. The effect of glaciers on streamflow variations. Water Resources Research, Vol 21 (4), 579-586.

Green Power Development. 2006. Allison Lake hydroelectric project, FERC P-12530, revised study plan, revision #2. February 28, 2006.

Jewett, S.C., & A. Blanchard. 1997. Habitat utilization of juvenile hatchery pink salmon (Oncorhynchus gorbuscha) in Port Valdez, Alaska: 1989–95. Institute of Marine Science, School of Fisheries and Ocean Sciences, University of Alaska Fairbanks, Fairbanks, AK.

Hastings, K. 2005. Long-term persistence of isolated fish populations. Chapter 4, Long-term persistence of isolated fish populations in the Alexander Archipelago. U.S. Fish and Wildlife Service, Juneau, Alaska.

Ihlenfeldt, N. 2005. An annotated bibliography: above barrier resident Dolly Varden (Salvelinus malma) and related studies. Technical Report No. 05-05. Alaska Department of Natural Resources, Office of Habitat Management and Permitting. Juneau, Alaska. 46 pp.

Johnson, R. L., & J. Rockwell, Jr. 1978. List of streams and other water bodies along the trans-Alaska oil pipeline route. Alaska Pipeline Office, U.S. Department of the Interior.

Lindeburg, Michael R. 2001. Mechanical engineering reference manual. Eleventh Edition, p. 34-8.

Mattson, C. R. 1974. Valdez pipeline terminus salmon evaluation studies – pink and chum salmon fry observations, May–June 1974. National Marine Fisheries Service, Auke Bay, AK.

Morsell, J. W. 1979. Freshwater aquatic habitats of the Valdez area. Report by Dames

and Moore for Alaska Petrochemical Company, Anchorage, AK.

Morsell, J. W. & G. Perkins. 1979. Salmon fry dispersion in eastern Port Valdez. Report by Dames and Moore for Alaska Petrochemical Company, Anchorage, AK.

Morstad, S., D. Sharp, J. Wilcock, T. Joyce, & J. Johnson. 1999. Prince William Sound management area 1998 annual finfish management report. Regional Information Report 2A99-20. ADFG, Division of Commercial Fisheries Management and Development, Anchorage, AK.

Northcote, T. G. 2010. Controls for trout and char migratory/resident behavior mainly in stream systems above and below waterfalls/barriers: a multidecadal and broad geographic review. Ecology of Freshwater Fish, 19, 487–509.

Pirtle, R.B. 1977. Historical pink and chum salmon estimated spawning escapements from Prince William Sound, Alaska streams, 1960–1975. Alaska Department of Fish and Game Technical Data Report No. 35.

R&M Consultants, Inc. 2011a. 2008-2011 water use study: Allison Creek hydroelectric project. Prepared for Hatch Associates Consultants.

R&M Consultants, Inc. 2011b. 2008-2011 water quality study Allison Creek hydroelectric project. Prepared for Hatch Associates Consultants.

Roberson, K. 1987. Solomon Gulch hydroelectric project evaluation. Prince William Sound Data Report #1987-02. Alaska Department of Fish and Game, Division of Commercial Fisheries, Glennallen, AK.

Stern (Stern, R.O.). 2011. Cultural Resources Reconnaissance Survey, Allison Creek Hydroelectric Project, Alaska. Report prepared for Hatch Associates Consultants, Inc. Northern Land Use Research, Inc. October 2010. Revised March 2011.

Stern and Bowers (Stern, R.O. and P.M. Bowers). 2009. Cultural Resources in the Vicinity of Allison Lake Hydroelectric Project, Alaska. Report prepared for Hatch Acres – Water and Wind Power. Northern Land Use Research, Inc. November 2009.

Tennant, D.L. 1976. Instream flow regimens for fish, wildlife, recreation, and related environmental resources. Fisheries 1(4):6-10.

Umatani, Y., A. Takaomi & K. Maekawa. 2008. Variation in migratory history of Dolly Varden in a stream with an artificial dam in the Shiretoko Peninsula, Hokkaido,

Japan. Environmental Biology of Fishes, 83, 37–44.

USACE. 1981. Southcentral Railbelt Area, Alaska (hydroelectric power), interim feasibility report and final environmental impact statement, Valdez and Copper River Basin.

Western Regional Climate Center. (WRCC) (n.d). Valdez, Alaska (Station 509685) Period of Record Monthly Climate Summary. Information retrieved on http://www.wrcc.dri.edu.

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