DRAFT
PROJECT EFFECTS ANALYSIS
ON
THREATENED, ENDANGERED, AND CANDIDATE SPECIES; SENSITIVE SPECIES; MANAGEMENT INDICATOR SPECIES; MIGRATORY BIRDS; AND SUBSISTENCE SPECIES

FOR

SWEETHEART LAKE HYDROELECTRIC PROJECT

FEDERAL ENERGY REGULATORY COMMISSION PROJECT No. 13563

Tongass National Forest, Juneau Ranger District

Prepared for:

Juneau Hydropower, Inc.

Prepared by:

____________________
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JRHoleman Consulting

Reviewed by:

____________________
Dennis Chester, Wildlife Biologist
U.S. Forest Service

Date: _____________________

Juneau Hydropower Inc.
Draft Project Effects Analysis
September 2013
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ACKNOWLEDGEMENT

Juneau Hydropower, Inc. and JR Holeman Consulting wish to thank and acknowledge the work of Kai Environmental Consulting Services including acquiring technical background information, performing field studies, performing habitat effects analysis, and consulting with agencies and technical staff regarding project effects on wildlife species included in this report.
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**ACRONYMS/DEFINITIONS**

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<th>Definition</th>
</tr>
</thead>
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<tr>
<td>AC</td>
<td>Alternating Current</td>
</tr>
<tr>
<td>Alaska DFG</td>
<td>Alaska Department of Fish and Game</td>
</tr>
<tr>
<td>ANILCA</td>
<td>Alaska National Interest Lands Conservation Act</td>
</tr>
<tr>
<td>B-field</td>
<td>Magnetic Field</td>
</tr>
<tr>
<td>FERC or Commission</td>
<td>Federal Energy Regulatory Commission</td>
</tr>
<tr>
<td>dB</td>
<td>Decibels</td>
</tr>
<tr>
<td>DC</td>
<td>Direct Current</td>
</tr>
<tr>
<td>DPS</td>
<td>Distinct Population Segment</td>
</tr>
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<td>E-field</td>
<td>Electric Field</td>
</tr>
<tr>
<td>EMF</td>
<td>Electro-magnetic Field</td>
</tr>
<tr>
<td>ESA</td>
<td>Endangered Species Act</td>
</tr>
<tr>
<td>Forest Plan</td>
<td>Tongass Land and Resource Management Plan</td>
</tr>
<tr>
<td>Forest Service</td>
<td>U.S. Department of Agriculture Forest Service</td>
</tr>
<tr>
<td>FWS</td>
<td>U.S. Department of Interior Fish and Wildlife Service</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographic Information System</td>
</tr>
<tr>
<td>GMU</td>
<td>Game Management Unit</td>
</tr>
<tr>
<td>JHI</td>
<td>Juneau Hydropower, Inc.</td>
</tr>
<tr>
<td>kV</td>
<td>kilovolt</td>
</tr>
<tr>
<td>iE-field</td>
<td>Secondary Electric Field</td>
</tr>
<tr>
<td>MIS</td>
<td>Management Indicator Species</td>
</tr>
<tr>
<td>MLLW</td>
<td>Mean Low-low Water</td>
</tr>
<tr>
<td>MMPA</td>
<td>Marine Mammal Protection Act</td>
</tr>
<tr>
<td>MW</td>
<td>Megawatt</td>
</tr>
<tr>
<td>Abbreviation</td>
<td>Full Form</td>
</tr>
<tr>
<td>--------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>NMFS</td>
<td>National Marine Fisheries Service</td>
</tr>
<tr>
<td>POG</td>
<td>Productive Old Growth</td>
</tr>
<tr>
<td>Project</td>
<td>Sweetheart Lake Hydroelectric Project</td>
</tr>
<tr>
<td>Project affected area</td>
<td>The area affected by project development, operations, or maintenance which may extend beyond the FERC Project Boundary.</td>
</tr>
<tr>
<td>Project Area</td>
<td>The area within the FERC Project boundary</td>
</tr>
<tr>
<td>RMS</td>
<td>Root Mean Square</td>
</tr>
<tr>
<td>ROV</td>
<td>Remote Operating Vehicle</td>
</tr>
<tr>
<td>USDA</td>
<td>United States Department of Agriculture</td>
</tr>
<tr>
<td>VCU</td>
<td>Value Comparison Unit</td>
</tr>
<tr>
<td>WAA</td>
<td>Wildlife Analysis Area</td>
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</table>
1.0 INTRODUCTION

On December 14, 2009, Juneau Hydropower, Inc. (JHI) received a preliminary permit to study the feasibility of constructing and operating a waterpower generation facility on Lower Sweetheart Lake and Sweetheart Creek, the Sweetheart Lake Hydroelectric Project, Federal Energy Regulatory Commission (Commission or FERC) Project No. 13563 (Project), located approximately 30 air miles and 33 nautical miles southeast of Juneau, Alaska. JHI requested and receive Commission approval of the use of the Commission’s Alternative Licensing Process. Environmental scoping to identify issues was held on September 7, 2011. The original preliminary permit expired on November 30, 2012 and a subsequent preliminary permit issued on April 11, 2013, to allow the completion of environmental studies and prepare an application for an original license. This report is an analysis of the potential Project effects on aquatic and terrestrial wildlife species.

This report includes a description of Project features, proposed measures for mitigation and protection of wildlife resources affected by the Project, and an analyses of Project effects as required by law or by U.S. Department of Agriculture (USDA) Forest Service (Forest Service) policy for all planned, funded, executed, or permitted programs and activities on National Forest System lands. The report also includes a Biological Evaluation of Project effects on threatened, endangered, proposed, and sensitive species; an analysis of Project effects on management indicator species; and migratory birds; and an analysis of Project effects on Alaska National Interest Lands Conservation Act (ANILCA) section 810 Subsistence. Other species of interest to agency stakeholders are addressed in Exhibit E of the Application for License.

The primary guidance used for these analyses is the Forest-wide Standards and Guidelines for Wildlife, in the Tongass Land and Resource Management Plan (herein referred to as the Tongass Forest Plan) (USDA Forest Service, 2008a). In 2012, Kai Environmental Consulting Services, LLC performed a wildlife surveys which documented presence of wildlife within the proposed Project affected area (Kai Environmental, 2012a). The effects analysis within this document does not cover every species discussed in the wildlife survey report. This analysis document includes species identified by the Forest Service used as indicators species, which represent other species and/or their habitat needs.

Comments received by the Alaska Department of Fish and Game (Alaska DFG) and the National Marine Fisheries Service (NMFS) pertaining to fresh and salt water fish are covered under other analysis reports outside the scope of this wildlife analysis. One exception is Pacific herring, which is listed as a candidate species under the Endangered Species Act (ESA). A summary of findings for Pacific herring from the Sweetheart Creek Hydroelectric Project Aquatics Study Report is found within this current document. Although there are several distinct population segments of fish that are listed as threatened or endangered under the ESA and managed by the NMFS, none of these populations utilize Sweetheart Creek for spawning and therefore are not affected by the Project.
Biological Evaluations are intended to help ensure that Forest Service actions do not contribute to a loss of viability of any native or desired non-native plant or animal species or contribute to trends toward federal listing of any species. They provide a process and standard by which to ensure that threatened, endangered, candidate and sensitive species receive full consideration in the decision-making process.

Management Indicator Species (MIS) are vertebrate or invertebrate species whose response to land management activities can be used to predict the likely response of other species with similar habitat requirements. This analysis assesses the effects of the Project on species identified in the Forest Plan, Final Environmental Impact Statement (USDA Forest Service 2008b) and ensures that Forest Plan Standards and Guidelines are met at the Project level.

Executive Order 13186 provides for conservation of migratory birds and their habitats and requires an evaluation of the effects of Federal actions on migratory birds, with an emphasis on species of concern. Agencies are required to support the conservation and intent of migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions.

Section 810 of ANILCA requires the Forest Service, in determining whether to withdraw, reserve, lease, or otherwise permit the use, occupancy, or disposition of National Forest System lands in Alaska, to evaluate the potential effects on subsistence uses and needs, followed by specific notice and determination procedures should there be a significant possibility of a significant restriction of subsistence uses.

2.0 PROJECT DESCRIPTION

The Sweetheart Lake basin includes approximately 35 square miles and occupies 22,429 acres (Figure 1).

The Project would be located on Lower Sweetheart Lake that flows into Sweetheart Creek and then enters Gilbert Bay. The Project features would include:

1. The existing Lower Sweetheart Lake, raised from a surface water elevation of 551 feet (MLLW) and a surface area of 1,414 acres to a new minimum surface water elevation of 576 feet and a new surface area of 1,449 acres creating 33,960 acre feet of dead storage and a maximum water surface elevation of 636 feet with a surface area of 1,702 acres with an active storage of 128,109 acre feet;

2. A new roller compacted concrete dam 111-feet high (from downstream toe to the top of the dam), 280-foot-long, 100-foot thickness at the base constructed at the outlet of Lower Sweetheart Lake;
3. An intake on the dam connecting to a 15X15-foot-diameter, 9,625-foot-long unlined tunnel;
4. A 9-foot-diameter, approximately 870-foot-long penstock installed within the lower portion of the tunnel, with approximately another 150 feet of buried 7-foot diameter penstock and manifold connecting to the powerhouse;
5. A powerhouse containing three new Francis generating units (6.6 MW each) with a total installed capacity of 19.8 MW;

Figure 1: Sweetheart Lake Watershed Map
6. A new natural appearing tailrace discharging flows to Sweetheart Creek;
7. A switchyard with a salmon smolt re-entry pool located adjacent to the powerhouse;
8. A new switchyard and approximately 4,400-foot-long road from the powerhouse to the dock/landing site;
9. A new dock/landing site for boat, seaplane, barge/landing craft and helicopter landing pad, located on the east shore of Gilbert Bay;
10. A quarry adjacent to the marine facilities that will be refilled with tunnel spoil and provide a base for a caretaker facility and a proposed Forest Service cabin;
11. A new 138-kilovolt transmission line that would be a total of 45,900 feet long (25,700 feet of submarine cable in two segments; 15,400 feet of overhead transmission line on Snettisham Peninsula; and 4,800 feet of buried transmission line in two segments);
12. A new 10,400 foot 12.47 kV service transmission line extending from the dam site to the marine facility; and
13. Appurtenant facilities.

**Figure 2** shows the location of the Project boundary and Project facilities described above.
Figure 2: Project boundary and location of Project facilities.
2.1 PROPOSED MITIGATION AND PROTECTION MEASURES

The following are JHI proposed mitigation and protection measures to protect Project affected species from Project effects and when necessary mitigate potential harm to an affected species.

- Establish a marine mammal safety zone of 50 yards around in water construction activities for the protection of marine mammals from the effects caused by in-water construction and submarine transmission line placement.
- Place trained observers on water craft such as barges and shuttle boats to spot and notify construction management personnel of the presence of marine mammals within the safety zone.
- Cease Construction activities while marine mammals are present in the safety zone, slow down and avoid mammals.
- Prepare and implement an in house awareness program to prevent collisions between service boats and marine mammals and to minimize harassment of marine mammals.
- Implement APLIC design criteria for the overhead segment of the 138 kV transmission line where practicable.
- Conduct a preconstruction bald eagle nest survey.
- Maintain clean construction camps with indoor trash containers and food storage lockers and remove garbage from the area as soon as practicable.
- Design Air craft flight paths to avoid potential mountain goat kidding areas from May 15 to June 15.
- Develop an education program designed to prevent human/bear encounters for presentation to construction workers and operating personnel.

3.0 ANALYSIS OF PROJECT EFFECTS

3.1 Description of the Analysis Area

The Project falls within Wildlife Analysis Area (WAA) 2823 of the Tongass National Forest, Juneau Ranger District. Project affected Value Comparison Units (VCUs) include: Lower Sweetheart Lake Basin in VCU 610; Sweetheart Creek, Gilbert Bay and Snettisham Peninsula in VCU 570, and Port Snettisham in VCU 550. In addition, the marine transportation route between Port Snettisham and Juneau is included for discussions regarding marine mammals. Figure 3 shows the location of WAA 2823, Project affected VCUs, and marine transportation route.

The proposed analysis area for the Project includes:

- Lower Sweetheart Lake basin,
- Sweetheart Creek,
- Gilbert Bay,
- Port Snettisham, not including north of Sharp Point,
- Stephens Passage between Port Snettisham and Juneau, including Gastineau Channel
- Stephens Passage south to Seattle along existing barge routes between Seattle and Juneau.
For the purposes of determining how the Project affects specific wildlife species, and their habitat, a desktop Geographic Information System (GIS) exercise was conducted. This exercise used GIS shapefile of the Project footprint and vegetation structure, as defined in Forest Service GIS geodatabases, to determine the area of terrestrial habitat types within affected areas. As many of the species within this report depend on productive old growth (POG), high volume POG and low volume POG were calculated separately for each affected area. Affected areas are estimates assuming terrestrial habitat types are general and dependent upon the accuracy of the GIS data used. Terrestrial environments were not ground-truthed for this exercise.

Table 1 provides the approximate acres of each habitat type within the WAA and by VCU. It should be noted that the total area for VCUs do not add up to the total area in the WAA, as there are other VCUs in the WAA that are not affected by the Project. There are no special interest areas, legacy forest structure or old growth reserves within the analysis area.

Table 1. Estimated area of habitat types within the Project affected Value Comparison Units (VCU). Habitat types are from Forest Service Geo-Information System (GIS) database.

<table>
<thead>
<tr>
<th>Habitat type</th>
<th>VCU 610 (acres)</th>
<th>VCU 550 (acres)</th>
<th>VCU 570 (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>High volume POG</td>
<td>6,375</td>
<td>3,808</td>
<td>5,241</td>
</tr>
<tr>
<td>Low volume POG</td>
<td>11,890</td>
<td>4,164</td>
<td>8,417</td>
</tr>
<tr>
<td>Non-forested</td>
<td>230,950</td>
<td>186,139</td>
<td>63,008</td>
</tr>
<tr>
<td>Unproductive forest</td>
<td>23,282</td>
<td>5,634</td>
<td>7,919</td>
</tr>
<tr>
<td>Forested muskeg</td>
<td>323</td>
<td>297</td>
<td>2,310</td>
</tr>
<tr>
<td>Water</td>
<td>39,955</td>
<td>34,211</td>
<td>34,660</td>
</tr>
<tr>
<td>Young growth – natural</td>
<td>197</td>
<td>75</td>
<td>8</td>
</tr>
<tr>
<td>Young growth – timber harvest</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Unknown</td>
<td>21</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total acres</strong></td>
<td><strong>147,385</strong></td>
<td><strong>32,154</strong></td>
<td><strong>34,719</strong></td>
</tr>
</tbody>
</table>
Figure 3: Value Comparison Units (VCUs) within Wildlife Analysis Area 2823 (WAA) and affected by the Sweetheart Lake Hydroelectric Project.
### 3.1.1 Wildlife Habitat

Table 2 provides an overview of the estimated area of each habitat type affected by the Project and for comparison the preferred coast and alternate forest access road routes considered. Figures 4a and 4b illustrate the habitat types within the inundation zone. Figure 5 illustrates the footprint of the powerhouse, the preferred coast access road and the alternate forest access road, and dock and landing facilities. Figure 6 illustrates the transmission line route and alternative marine route.

**Table 2**: Summary of affected habitats within the Sweetheart Lake analysis area in acres. Habitat types are derived from Forest Service vegetation layer in GIS.

<table>
<thead>
<tr>
<th>PROJECT FEATURES</th>
<th>HABITAT TYPES (Acres)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HV-POG</td>
<td>LV-POG</td>
</tr>
<tr>
<td>Raise Sweetheart Lake elevation from 551 feet to 636 feet</td>
<td>128</td>
<td>160</td>
</tr>
<tr>
<td>RCC Dam</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tunnel</td>
<td>0.11</td>
<td>0.75</td>
</tr>
<tr>
<td>Powerhouse and Facilities</td>
<td>1.23</td>
<td>1.78</td>
</tr>
<tr>
<td>Coast Road (Preferred)</td>
<td>2.99</td>
<td>1.66</td>
</tr>
<tr>
<td>Alternate Forest Road *</td>
<td>16.2</td>
<td>8.4</td>
</tr>
<tr>
<td>Dock and Landing Facilities</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Transmission Line</td>
<td>26.6</td>
<td>17</td>
</tr>
<tr>
<td><strong>TOTAL AFFECTED AREA</strong></td>
<td>158.93</td>
<td>181.19</td>
</tr>
</tbody>
</table>

* Area not included in total affected area.

HV-POG – High volume POG
LV-POG – Low volume POG
FM – Forest Muskeg
UF – Unproductive Forest
NF – Non-Forested
SC 2 = Size Class 2 = Natural young growth from blow down or natural disturbances
SC 3 = Size Class 3 = Natural young growth from blow down or natural disturbances
SC-HS3 = Size Class HS3 = Young growth originating from timber harvest cut more than 50 years ago
IT – Intertidal
ST – Subtidal
Figure 4a: Project inundation zone and underlying vegetation structure (from Forest Service) of Lower Sweetheart Lake (Southern half).
Figure 4b: Project inundation zone and underlying vegetation structure (from Forest Service) of Lower Sweetheart Lake (Northern half).
Figure 5: Proposed facility footprint in east Gilbert Bay for the Sweetheart Lake Project and underlying vegetation structure (from Forest Service).
Figure 6: Proposed preferred transmission line route and alternative marine route for the Sweetheart Lake Project (from Forest Service).

3.2 Project Effects Analysis

This report analyzes Project effects on federally listed threatened, endangered, and candidate species potentially occurring in the Project affected area. It also analyzes Project effects on Forest Service management indicator species (MIS) and species considered sensitive by Alaska DFG. Included are Project effects on migratory birds and Alaska National Interest Lands Conservation Act (ANILCA) section 810 Subsistence. Interest has been expressed regarding project effects on other species found in the Project affected area. These species are not addressed in this report but are included in Exhibit E of the Application for License.
3.2.1 Threatened, Endangered, and Candidate Species

Effects of the Action

The Endangered Species Act (ESA) section 7 implementing regulations (50 CFR 402.02) define “effects of the action” as:

“The direct and indirect effects of an action on the species or critical habitat together with the effects of other activities which are interrelated or interdependent with that action, that will be added to the environmental baseline. The environmental baseline includes the past and present impacts of all federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed federal project in the action area that have already undergone formal or early section 7 consultation, and the impact of State or private actions which are contemporaneous with the consultation process. Indirect effects are those that are caused by the proposed action and are later in time, but still are reasonably certain to occur.”

There are three possible determinations of effects under the ESA:

No Effect: The proposed action or interrelated or interdependent actions will not affect (positively or negatively listed species or their habitat.

May affect, not likely to adversely affect: The proposed action or interrelated or interdependent actions may affect listed species or their habitat, but the effects are expected to be insignificant, discountable, or entirely beneficial.

Insignificant effects relate to the size of the impact and should never reach the scale where a take will occur.

Discountable effects are those that are extremely unlikely to occur. Based on best judgment, one would not 1) be able to meaningful measure, detect, or evaluate insignificant effect; or 2) expect discountable effects to occur.

Beneficial effects are contemporaneous positive effects with no adverse effects to listed species.

May affect, likely to adversely affect: The proposed action or interrelated or interdependent actions may have measurable of significant adverse effects on listed species or their habitat. Such a determination requires formal ESA Section 7 consultation.

Determinations are also required of the effect of a federal action on any designated critical habitat for listed species.
Table 3 provides a list of threatened, endangered, and candidate species that occur in Alaska managed by the Department of Interior Fish and Wildlife Service (FWS) and potential occurrence in the Project affected area. Table 4 provides a list of threatened, endangered, and candidate species managed by the National Marine Fisheries Service (NMFS) and potential occurrence in the Project affected area.

Table 3: Threatened, endangered, and candidate species managed by the Fish and Wildlife Service that occur in Alaska (FWS 2012a)

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>ESA Status</th>
<th>Distribution in Alaska</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eskimo curlew</td>
<td>Numenius borealis</td>
<td>Endangered</td>
<td>Occurred in the arctic and is presumed extinct in Alaska.</td>
</tr>
<tr>
<td>Northern sea otter</td>
<td>Enhydra lutris kenyon</td>
<td>Threatened</td>
<td>The FWS listed only the sea otter populations in southwest Alaska as threatened. The Project would have no effect since it is located entirely outside of the known range of the Southwest Alaska populations and the Southeast Alaska populations are not listed.</td>
</tr>
<tr>
<td>(SW Alaska population)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polar bear</td>
<td>Ursus maritimus</td>
<td>Threatened</td>
<td>Lives only in the arctic. The Project would have no effect on polar bear since it is entirely outside of the known range of the species.</td>
</tr>
<tr>
<td>Short-tailed albatross</td>
<td>Phoebastria albatrus</td>
<td>Endangered</td>
<td>Occupies coastal waters in the Gulf of Alaska and the Aleutian Islands. The Project would have no effect since short-tailed albatross range is outside of the Project affected area.</td>
</tr>
<tr>
<td>Spectacled eider</td>
<td>Somateria fischeri</td>
<td>Threatened</td>
<td>Occupies coastal waters in northern and western Alaska. The Project would have no effect since it is outside of the known range of this species.</td>
</tr>
<tr>
<td>Steller’s eider</td>
<td>Polysticta stelleri</td>
<td>Threatened</td>
<td>Occurs in northern and western Alaska. The Project would have no effect since it is outside of the known range of this species.</td>
</tr>
<tr>
<td>Wood bison</td>
<td>Bison bison athabascae</td>
<td>Threatened</td>
<td>Occurred throughout Alaska and now only found in Canada. The Project would have no effect it is outside of the current range of the species.</td>
</tr>
<tr>
<td>Kittlitz’s murrelet</td>
<td>Brachyramphus brevirostris</td>
<td>Candidate</td>
<td>Occupies marine environments in the general vicinity of glaciers, cirques near glaciers, or recently glaciated areas. The Project would have no effect since it is unlikely the species would occur near the Project area.</td>
</tr>
<tr>
<td>Yellow-billed loon</td>
<td>Gavia adamsii</td>
<td>Candidate</td>
<td>Summer range is in the far north in Alaska within arctic tundra habitats. It may occur in Southeast Alaska during winter migration along the Pacific coastline. The Project would have no effect since there will be very little construction activity during winter months when yellow-billed loons may be present.</td>
</tr>
</tbody>
</table>
There are no listed threatened, endangered, or candidate species managed by the FWS likely to occur in the vicinity of the Project during the periods of construction.

**Table 4:** Threatened, endangered, and candidate species managed by the National Marine Fisheries Service that occur in Alaska (NMFS 2012 a; FWS 2012a)

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>ESA Status</th>
<th>Location Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blue whale</td>
<td><em>Balaenoptera musculus</em></td>
<td>Endangered</td>
<td>These whales are generally found in off-shore (pelagic) marine waters of the Bering Sea, Chukchi Sea, North Pacific Ocean and/or Gulf of Alaska. Critical habitat has been designated for North Pacific right whales in the Bering Sea and the Gulf of Alaska. The Project would have no effect since it is located outside of the likely range for these species.</td>
</tr>
<tr>
<td>Bowhead whale</td>
<td><em>Balaena mysticetus</em></td>
<td>Endangered</td>
<td></td>
</tr>
<tr>
<td>Fin whale</td>
<td><em>Balaenoptera physalus</em></td>
<td>Endangered</td>
<td></td>
</tr>
<tr>
<td>North Pacific right whale</td>
<td><em>Eubalaena japonica</em></td>
<td>Endangered</td>
<td></td>
</tr>
<tr>
<td>Sei whale</td>
<td><em>Balaenoptera borealis</em></td>
<td>Endangered</td>
<td></td>
</tr>
<tr>
<td>Sperm whale</td>
<td><em>Physeter macrocephalus</em></td>
<td>Endangered</td>
<td></td>
</tr>
<tr>
<td>Beluga whale</td>
<td><em>Delphinapterus leucas</em></td>
<td>Endangered</td>
<td>Marine and estuarine areas in Cook Inlet. The Cook Inlet population is the southernmost known population. The Project would have no effect on this species since it is outside of the known range of this species.</td>
</tr>
<tr>
<td>Humpback whale</td>
<td><em>Megaptera novaeangliae</em></td>
<td>Endangered</td>
<td>This species is known to occur in waters adjacent to the Tongass NF and also known to occur in Gilbert Bay. The Project may affect this species.</td>
</tr>
<tr>
<td>Green sea turtle</td>
<td><em>Chelonia mydas</em></td>
<td>Threatened</td>
<td>These species occur in the Gulf of Alaska and some species are found as far west as the Aleutian Islands. Adults are highly migratory, but the details and locations of migrations are largely unknown. Unlikely to occur in Gilbert Bay. The Project would have no effect on these species.</td>
</tr>
<tr>
<td>Leatherback sea turtle</td>
<td><em>Dermochelys coriacea</em></td>
<td>Endangered</td>
<td></td>
</tr>
<tr>
<td>Loggerhead sea turtle</td>
<td><em>Caretta caretta</em></td>
<td>Threatened</td>
<td></td>
</tr>
<tr>
<td>Olive Ridley sea turtle</td>
<td><em>Lepidochelys olivacea</em></td>
<td>Threatened</td>
<td></td>
</tr>
<tr>
<td>Steller sea lion - Eastern AK DPS*</td>
<td><em>Eumetopias jubatus</em></td>
<td>Threatened</td>
<td>The eastern DPS is likely to occur in waters adjacent to the Tongass NF and reported to occur in Port Snettisham.</td>
</tr>
<tr>
<td>Steller sea lion - Western AK DPS*</td>
<td><em>Eumetopias jubatus</em></td>
<td>Endangered</td>
<td></td>
</tr>
</tbody>
</table>
There may be an occasional occurrence by the western DPS. Although critical habitat has been designated for this species, the Project affected would have no effect on critical habitat. The Project may however affect, but not likely to adversely affect this species.

<table>
<thead>
<tr>
<th>Pacific herring</th>
<th><em>Clupea pallasi</em></th>
<th>Candidate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pacific herring are reported to spawn on occasion in Gilbert Bay and Port Snettisham. The Project would have no effect on this species.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*DPS = Distinct Population Segment*

Three threatened, endangered, or candidate species managed by NMFS know to occur in Gilbert Bay and vicinity: humpback whale (endangered), Steller sea lion, Eastern Alaska DPS (threatened), and Pacific herring (candidate).

### Humpback Whale

Humpback whales are common in the marine environment throughout Southeast, Alaska. In general, humpback whales in southeast Alaska are from the central North Pacific Stock, although some modification to population structure may be revised when genetic testing results become available (Allen and Angliss 2012a). Although humpback whales are currently listed as endangered, the NMFS has announced a 90-day finding on a petition to identify the North Pacific population as a DPS and delist the DPS under the Endangered Species Act (ESA) (FR Doc. 2013-21066. Filed 8-28-13).

The abundance of humpback whales that forage off the coast of British Columbia and Southeast Alaska is estimated between 2,883 and 6,414 individuals, with relatively high densities occurring throughout southeast Alaska and northern British Columbia in the summer months. While a population trend for the central North Pacific Stock has not yet been estimated, it is clear that the abundance has increased in southeast Alaska (Allen and Angliss 2012a).

While humpback whales may be found in a variety of marine habitats, their patterns of occurrence likely follow the spatial and temporal changes in types, densities, and distribution of prey (Kreiger and Wing 1986, Baker et al. 1992). In Southeast Alaska, primary prey species include euphausiids (krill), and small schooling fishes such as capelin, Pacific sand lance, walleye pollock and Pacific herring (Kreiger and Wing 1986; Straley 1990).

Humpback whales were observed in Gilbert Bay during Project wildlife studies (Kai Environmental 2012a). An individual humpback whale was observed on June 29, 2012, near Sentinel Point. An individual was also observed on July 3, 2012, in the southern end of Gilbert Bay. On July 15, 2012, at least three humpback whales were observed feeding in Gilbert Bay, and were
active in the bay most of the day. Observations of humpback whales in Gilbert Bay and near the Whiting River by a local cabin owner document their presence as early as April 26, 2009, and as late as September 8, 2007 (D, Maas, personal communication, 2013). While no specific surveys were conducted for marine mammals, personnel have not observed humpback whales in the bay in late fall or winter visits to conduct field seasons.

Critical habitat has not been designated for humpback whales. However, regulations within 200 nautical miles of Alaska prohibit anyone from approaching within 100 yards of a humpback whale (50 CFR Part 224). Potential threats to humpback whales in the North Pacific include elevated sound levels, changes in prey distribution with climate change, vessel strikes, entanglement from commercial fishing gear, and harassment from whale watching boats (Allen and Angliss 2012a).

**Steller Sea Lion**

In Southeast Alaska, most Steller sea lions are considered to be part of the threatened eastern DPS, although the endangered western DPS have been observed in Southeast Alaska (Allen and Angliss 2012b; Allen and Angliss 2012c). Steller sea lions are considered opportunistic foragers as they will switch prey items and relocate based upon seasonal prey availability. In general, they forage on spawning fish, such as salmon and eulachon in the spring, and various other species throughout the year (Winship and Trites 2003; Sigler et al. 2009; Womble et al. 2009).

Potential threats to Steller sea lion populations include: vessel strikes, contaminants, degradation of habitat, illegal hunting, offshore oil and gas exploration, and interactions with fisheries (Allen and Angliss 2012b). On April 18, 2012, NMFS published a proposed rule to have the eastern DPS of Steller sea lion delisted (77 CFR 23209).

As discussed in Kai Environmental’s 2012 Wildlife Study Report for the Project, Steller sea lions likely visit Gilbert Bay while pursuing prey species such as salmon (Kai Environmental 2012a). During field studies for the Project there were no direct observations of Steller sea lions in Gilbert Bay, however sea lions were heard near Port Snettisham during the June 2012, northern goshawk surveys (Kai Environmental 2012c).

Critical habitat has been defined for Steller sea lions include “a terrestrial zone, an aquatic zone, and an air zone that extends 3,000 feet (0.9 km) landward, seaward, and upward, respectively, each major rookery and major haulout in Southeast Alaska” (58 FR 45269). The closest critical habitat to Gilbert Bay is Sunset Island to the south of the Project affected area (31.5 miles) and Benjamin Island to the north of the Project area (57 miles).

A non-major haulout for Steller sea lions has been tentatively located in Port Snettisham: the misnamed Mist Island haulout which is actually a northern shore Port Snettisham haul out (Figure 6). Data provided by the Alaska DFG includes counts and brand sightings (L. Jemison, personal communication, 2013). Sea lions were documented occupying the haulout from January through May, with June through December occupancy being unknown because surveys did not
Activities associated with the Project that may have effect individuals or populations of Steller sea lions include potential vessel strikes from increased boat activity in Port Snettisham and Gilbert Bay and noise from construction and operational activities, disturbance from deployment of the submarine cable, entanglement, and potential EMF from the submarine cable. By implementing mitigation measures described for humpback whale Project construction and operations are expected to have no effect on Steller sea lion.

Analysis of Project Effects

Action Area

The reservoir, tunnel, and powerhouse are not considered as part of the action area affecting humpback whales and Steller sea lions since these features are located far enough from the shoreline of Gilbert Bay to avoid any potential Project effects. The action area includes Project on shore facilities that are located adjacent to Gilbert Bay along the coast road route (preferred alternative), quarry area, dock/land facilities and includes a protection zone of 250 yards into Gilbert Bay. The marine transmission line laying route also has a 50 yard wide marine mammal protection zone on either side of the line crossing Gilbert Bay and Port Snettisham (the preferred route). The overhead transmission line segment located on the Snettisham Peninsula is included in the action area since the construction would include use of a barge serving as a staging area and use of helicopter for placing transmission towers and transporting workers to and from the powerhouse staging area located on the east side of Gilbert Bay.

Materials would be delivered along marine shipping routes between Seattle, Washington and the Gilbert Bay dock/landing facilities and are included in the action area.

Construction

Noise

Humpback Whales

Construction of the Project is expected to occur over a two year period with a peak of activity during May through October of each year. Activities such as noise from blasting, pile
driving, submarine transmission line placement, and increased boat traffic may have an effect on seasonal humpback whale and Steller sea lion activity in Gilbert Bay. Overhead noise from increased fixed wing and helicopter traffic will also occur during the construction seasons. Blasting noise would be short in duration and located away from the shoreline and is not expected to have an effect on humpback whales or Steller sea lions. Aircraft and aircraft noise are not expected to have an effect on humpback whales or stellar sea lions.

A majority of the noise generated from construction activities will occur in the first year between April and June. At the beginning of construction, blasting and excavation at the quarry will occur near the proposed docking facilities at the eastern side of Gilbert Bay for the first three weeks to start construction of the dock and road. Pile driving for the construction of the dock will occur as soon as the initial blasting and material extraction are complete. The coastal road/trail will be constructed using heavy machinery delivered to the site by barge. The tunnel excavation near Sweetheart Creek, using the drill blast method, will also begin during the first construction season. Anticipated noise levels generated from construction activities are presented in Table 3.

**Table 5.** Anticipated noise levels in decibels (dB) from construction activities associated with the Sweetheart Lake Project in Gilbert Bay, Alaska. SEL=sound exposure level. Source: 1. FHWA, 2006; 2. HDR Alaska, Inc. et. al. 2006; and 3. Blackwell and Greene 2002.

<table>
<thead>
<tr>
<th>Action</th>
<th>Anticipated airborne noise (dB)</th>
<th>Anticipated underwater noise (dB SEL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Noise from blasting at quarry</td>
<td>94</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Noise from blasting at tunnel</td>
<td>94</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Noise from impact pile driving at dock</td>
<td>101</td>
<td>85</td>
</tr>
<tr>
<td>Noise from vibratory pile driving at dock</td>
<td>96</td>
<td>164</td>
</tr>
<tr>
<td>Noise from tug maneuvering barge</td>
<td>87</td>
<td>125-149</td>
</tr>
<tr>
<td>Noise from drilling at dam site</td>
<td>85</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Noise from blasting at dam site</td>
<td>94</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Noise from heavy machinery</td>
<td>82-87</td>
<td>Not applicable</td>
</tr>
</tbody>
</table>

Generic sound exposure thresholds for cetaceans have been defined in regulations by NMFS and include two levels of criteria; Level A causing injury and Level B causing disturbance. For cetaceans there is no exposure threshold defined for airborne noise (70 CFR 1871). Level A underwater noise thresholds for cetaceans include 180 dB Root-Mean-Square (RMS) (70 CFR 1871). Level B underwater noise thresholds for cetaceans include 120 dB for continuous noise (i.e. vibratory pile driving) and 160 dB for impulse noise (i.e. impact pile driving) (70 CFR 1871). In a Port of Anchorage study, underwater sound isopleths for impact pile driving showed the distance to the 180 dB isopleth would be 20 meters (65.5 feet) and to the 160 isopleth would be 350 meters (1,148 feet). For underwater sound from vibratory pile driving the distance to the 120 dB isopleth was 800 meters (2,625 feet) (URS 2007). Noise may have an effect on humpback whales by causing injury (Level A) or disturbance (Level B). Disturbance responses may range from abandonment from vital habitat (severe) to startling (mild). Submerged marine mammals,
like the humpback whale, are generally not affected by airborne noise, unless directly under the noise source (Richardson et al. 1995). Therefore airborne noise from construction equipment, aircraft, and from powerhouse operations would not affect humpback whales.

Humpback whales would only be exposed to Level B noise if they were within 2,625 feet of vibrating pile driving or 1,148 feet of impact pile driving during the construction of the Project landing and dock facilities. Humpback whales within these distances would be exposed to underwater sound thresholds that could have an effect on individual humpback whales.

Tug and barge operations include laying of the submarine cable and staging a tug and barge in Gilbert Bay for helicopter sling-loading of the transmission line bases and towers. Underwater noise from tug and barge range from 125 dB for towing a barge through water to 149 dB from maneuvering a loaded barge with multiple tug boats (Blackwell and Greene 2002). Both underwater noise levels exceed the 120 dB for Level B disturbance for humpback whales and therefore could affect individual humpback whales if close enough to the source of the noise.

It is expected that if the noise generating activities occur before whales are in the areas of construction, then whales would avoid the area during the noise generating activities and the Project construction would have no effect. By using trained observers and establishing a marine safety zone of 50 yards around water construction activities it would be possible to determine if whales and other marine mammals are within the area of the safety zone. JHI is committed to slowing down operations and then ceasing construction operations until whales or other marine mammals leave the safety zone. Project construction noise would therefore have no effect on whales and other marine mammals.

**Steller Sea Lions**

Steller sea lions require both terrestrial and aquatic resources for survival in the wild. Behavior reactions among hauled out Steller sea lions could be anticipated at levels more than 100 dB re 20 µPa, although this would depend largely on ambient noise levels as well as the behavior of the animals themselves (Informal consultation letter from James W. Balsiger, Ph.D, NMFS, to Colonel Christopher D. Lestochi, ACOE, March 12, 2013)

JHI plans to shut down operations if Steller sea lions are within 50 yards of project activities. Therefore the Project construction noise would have no effect on Stellar sea lions

**Collisions**

Collisions between boats and humpback whales are a source of injuries and mortality to whales. During Project construction it is expected that boat traffic would increase in Stephens Passage, Port Snettisham and Gilbert Bay, both during construction and during operations. Increased boat activity may lead to an increase of potential “harassment” to humpback whales. The MMPA of 1972, as amended, provides the following definition for “harassment”:
“Under the 1994 Amendments to the MMPA, “harassment” is statutorily defined as, any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild (level A harassment), or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild (level B harassment)”.

Records for large whale ship strikes show that collisions between ships and whales are associated with a wide range of vessel types (Jensen and Silber 2003). Marine vessel traffic including barges, cruise ships ferries, fishing vessels, fishing packers, and pleasure craft in Stephens Passage, is unknown. However, two major barging companies, Alaska Marine Lines and Northland Freight utilize the corridor between Seattle, Washington and Juneau, Alaska. Samson Tug had plans to also service Juneau. Table 6 provides a summary of the annual barge traffic utilizing Stephens Passage and passing across Port Snettisham.

Table 6: Annual barge traffic utilizing Stephens Passage and crossing Port Snettisham. (Source: Alaska Marine Services, Northland Services, and Skookum Sales and Recycling). These figures do not include chartered and untrackable barges coming from Juneau.

<table>
<thead>
<tr>
<th>Entity</th>
<th>barge trips</th>
<th>voyages passing Port Snettisham</th>
</tr>
</thead>
<tbody>
<tr>
<td>AML</td>
<td>95</td>
<td>190</td>
</tr>
<tr>
<td>Northland</td>
<td>78</td>
<td>156</td>
</tr>
<tr>
<td>Skookum Recycling</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>175</strong></td>
<td><strong>350</strong></td>
</tr>
</tbody>
</table>

There is significant vessel traffic already occurring in Port Snettisham. This traffic represents year round travel to and from Juneau to the Snettisham Power facility; commercial fishing vessel traffic; personal use fisher traffic; and recreational vessel traffic that includes yachts and other vessels transiting the inside passage and overnighting in Port Snettisham. Table 7 provides the number of commercial fishing vessel landing days in Port Snettisham in 2012.
Table 7: Commercial fishing vessel landing days in Port Snettisham in 2012.

<table>
<thead>
<tr>
<th>Year</th>
<th>Month</th>
<th>Vessel Date Landings*</th>
</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>2012</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>2012</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>2012</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>2012</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>2012</td>
<td>7</td>
<td>440</td>
</tr>
<tr>
<td>2012</td>
<td>8</td>
<td>374</td>
</tr>
<tr>
<td>2012</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>2012</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>2012</td>
<td>11</td>
<td>3</td>
</tr>
<tr>
<td>2012</td>
<td>Total</td>
<td>859</td>
</tr>
</tbody>
</table>

*the number of landings reflects the number of unique vessel-date landed combinations.

In 2012, ADFG recorded 859 Vessel Date landings, 814 of these occurred in July and August. This represents a vessel date regardless of the number of landings that occurred on any given day. This category eliminates the overstatement of vessel trip by two or more permit holders that could operate on the same vessel.

While personal vessel traffic from recreation users cannot be determined, personal vessel traffic from personal use fisheries at Sweetheart Creek can be estimated from personal use fishing permit reports. Most fishers travel with 4 persons to and from Juneau to Sweetheart Creek. Although ADFG allows only one permit per household, there is no ability to determine how many people of one household assisted a unique permit holder in any given trip. Therefore, in determining the number of vessel trips conducted for the personal use fishery JHI averaged the number of fishers per trip and extrapolate the number of vessels trips based on 2011 data of 164 permit holders. Based on data provided by Alaska DFG show that in 2011 there were 48 trips from Juneau to Sweetheart Creek reported (S. Johnson, personal communication, 2013). These trips are likely to occur in July and August, when sockeye salmon are generally present.

Based on this conservative assumptions, JHI is expected to contribute 9.83% of the vessel traffic coming into and leaving Port Snettisham during the period in which the Sweetheart Lake Hydroelectric facility is being built. It is possible that the facility could be built in one construction season, but it is more likely that construction will take place over two construction seasons. Table 8 is a summary of expected vessel traffic during Project construction.
Table 8: Summary of expected vessel traffic in Port Snettisham during Project construction.

<table>
<thead>
<tr>
<th></th>
<th># of vessel trips per year</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>JHI</td>
<td>104</td>
<td>9.83%</td>
</tr>
<tr>
<td>Com Fish</td>
<td>859</td>
<td>81.19%</td>
</tr>
<tr>
<td>Personal Use Fish</td>
<td>45</td>
<td>4.25%</td>
</tr>
<tr>
<td>Recreation</td>
<td>50</td>
<td>4.73%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1058</strong></td>
<td><strong>100.00%</strong></td>
</tr>
</tbody>
</table>

Most of the barge activity between Juneau and the Project would occur at the beginning of the first construction season and end of the second construction season for mobilization and demobilization of the Project. Light landing craft activity between Juneau and the Project delivering freight during construction is also expected.

While the additional boat traffic between Juneau and the Project and increased activity in Gilbert Bay during construction there may be an increase in potential for collisions with humpback whales. However with the implementation of the proposed mitigation measures to educate boat operators, following NMFS guidelines; and the use of observers the Project may affect, but not likely to adversely affect humpback whales or Steller sea lions.

Entanglement

Unlike submarine cable laying that lays three distinct cables, the Applicant would bundle the three phases of cable into a single cable. Therefore, the submarine transmission line would consist of a single cable bundle between six and seven inches in diameter. The cable bundle would be very stiff and heavy. The size and stiffness of the cable make entanglement virtually impossible. Deployment of the cable bundle would occur on flood tides over the course of 4-5 days in separate locations within Gilbert Bay and Port Snettisham. The completely subtidal submarine cable alternative would take less than one week to deploy (B. Grimm, personal communication, 2013). After deployment, the submarine cable would be resting on the sea floor in deeper water, and would be expected to be buried in bottom sediments over time. Submarine cables are not expected to be an issue regarding entanglement and would have no effect on humpback whales or Steller sea lions.

Project Operation and Maintenance

Electromagnetic Fields

One concern about submarine power cables is the occurrence of electromagnetic fields and their potential effects on aquatic species. Magnetic fields are generated by flow of current and
increase in strength as current increases. Since the power line voltage remains more or less constant with time, changes to the power or load will result in changes to the current, and hence the magnetic field.

In 2012, Kai Environmental performed a literature review to address the potential impacts of EMF on marine species (Kai Environmental 2012b). Submarine cables elicit both electric fields (E-fields) and magnetic fields (B-fields), and in some cases the B-field may generate a secondary induced E-field (iE-field) (Huang 2005; Slater and Schultz 2010). Some studies acknowledge that sheathing and/or insulating two or more lines together would block E-fields, however they also state that B-fields will still be present (CMACS 2003; Slater and Shultz 2010; Copping 2011). Burrying cables may reduce how far B-fields extend within the marine environment (Normandeau, et al. 2011).

The field can be viewed as the combination of an electric field and a magnetic field. The electric field is produced by stationary charges, and the magnetic field by moving charges (current); these two are often described as the sources of the field. The way charges and currents interact with the electromagnetic field is described by Maxwell’s equations and the Lorentz force law.

The Project would place approximately 9,700 feet of submarine cable across Gilbert Bay, at an average depth of 288 feet (NOAA 2009). An additional 16,000 feet of submarine cable would be laid across Port Snettisham, at an average depth of 618 feet (NOAA 2009). While the specifics of the cable have not yet been identified by the Project, the cable will be 138kV AC with 3 lines sheathed together and deployed as a single armored cable bundle.

Marine mammals are generally primarily magnetosensitive, and more likely to detect direct current (DC) cables than AC cables (Schroeder and Scarborough Bull 2011). Fisher and Slater (2010) stated that whales are known to use geomagnetic fields for navigation and that there is statistical evidence to suggest that marine mammals are susceptible to stranding as a result to increased EMF levels. These studies were not conducted on humpback whales specifically, however given the predominantly rocky cliff terrain of the Gilbert Bay terrain, it would be unlikely for a whale to become stranded (Kai Environmental 2012b). Olsson et al. (2010) performed a literature review to determine EMF impacts to marine species for offshore wind and wave power projects. They concluded “There is no information available from research on effects on marine mammals, and also no information suggesting that EMF from marine installations is an issue”.

EMF from the Project operations is expected to have no effect on humpback whales, as E-fields would be blocked and B-field will be reduced. Further, any B-field present at depth is not likely to cause stranding given the rocky terrain along the Gilbert Bay shoreline. Also, B-field emissions would be further reduced as the cable becomes covered in bottom sediments.

**Pacific Herring**

The Southeast Alaska DPS of Pacific herring are a candidate species and are undergoing a status review (73 CFR 19824). Pacific herring are a schooling fish species that occur in coastal...
areas of the Pacific Ocean from the surface to depths of 1,300 feet. There are nine spawning aggregates of the Southeast Alaska DPS, all considered genetically similar. Pacific herring have been documented in Gilbert Bay, briefly mentioned in Table 4.3 in Carls, et al (2008), where 3,910 herring were caught by beach seine hauls some time during 1998 – 2007. Additionally, an unconfirmed observation of herring spawning along the south bank of the mouth of the Whiting River by a commercial fisherman was reported to the Alaska DFG (D. Harris, personal communication, 5/20/2013). A separate report of herring spawn by an Alaska State Trooper was reported to Alaska DFG on the south shoreline of Port Snettisham west of Sentinel Point (D. Harris, personal communication, 5/20/2013). Although, Pacific herring have been observed in Gilbert Bay, very little is known about their occurrence.

Pacific herring feed on small fishes and phytoplankton and zooplankton in nutrient-rich waters associated with oceanic upwelling. Threats to herring populations include overfishing, spawning and rearing habitat degradation, oil spills and ocean contamination, climate change impacts on prey species, and recovery of predator species such as humpback whales and Steller sea lions (NMFS 2012b).

Pacific herring are sexually mature in about 3-4 years of age and spawn every year after reaching maturity. Spawning occurs in the spring in shallow, vegetated areas in intertidal and subtidal zones. Males and females release their milt and eggs into the water column where they mix and fertilize. The eggs are adhesive and adhere to bottom vegetation and substrate. Pacific herring are mass spawners and when spawning are easily seen (Alaska DFG website, September 2013).

Eggs hatch in about two weeks after fertilization and the young larvae drift and swim in ocean currents. Once larvae undergo metamorphosis into their juvenile stage, they rear in sheltered bays and inlets. In the fall the juvenile schools move into deeper waters where they spend the next two to three years. They remain separate from the adult populations until they are mature (Alaska DFG website, September 2013).

Analysis of Project Effects

Action Area

The action area defined for Pacific herring includes the dock/landing facilities and submarine transmission line route.

Pacific herring may occasionally be present and spawn in Gilbert Bay. Because Pacific herring spawn in the spring are easily observed during spawning they may easily be avoided during construction. There is a potential for an insignificant amount of intertidal and subtidal habitat that could be disturbed during construction. This however, is expected to be temporary because once construction is completed conditions would be similar to prior to construction.

It is expected that Project construction and operations would have no effect on Pacific herring.
3.2.2 Sensitive Species

Determinations of Project effects on sensitive species follows the three level of determinations defined in Section 3.2.1 for threatened and endangered species. There are four sensitive species identified by the U.S. Forest Service for the Tongass National Forest in Region 10 (USDA Forest Service 2008a). Sensitive species for the Tongass National Forest are provided in Table 9.

Table 9: Sensitive species for the Tongass National Forest.

<table>
<thead>
<tr>
<th>SPECIES</th>
<th>FWS/NMFS STATUS</th>
<th>PROJECT PRESENCE</th>
<th>PROJECT EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aleutian Tern</td>
<td>N/A</td>
<td>The range of this species does not extend south of Glacier Bay, Alaska. Not likely to occur in the area of the Project.</td>
<td>No Effect</td>
</tr>
<tr>
<td>Black Oystercatcher</td>
<td>N/A</td>
<td>Potential presence and nesting</td>
<td>May affect, but not likely to adversely affect</td>
</tr>
<tr>
<td>Dusky Canada Goose</td>
<td>N/A</td>
<td>Potential fall or spring migrant</td>
<td>No Effect</td>
</tr>
<tr>
<td>Queen Charlotte Northern Goshawk</td>
<td>N/A</td>
<td>Potential presence and nesting</td>
<td>May affect, but not likely to adversely affect</td>
</tr>
</tbody>
</table>

Aleutian Tern

Aleutian tern (Onychoprion aleuticus) may be casual/accidental in Southeast Alaska during spring and summer and not know to occur during fall and winter, with their range not extending south of Glacier Bay (FWS 2012d). They occur in coastal areas west throughout the Aleutians, north to the Chuckchi Sea, east to the Alaska Peninsula and south to Yakutat and Glacier Bay. They nest in coastal colonies.

Analysis of Project Effects

The Aleutian tern is not likely to breed in the Project affected area and therefore the Project would have no effect on the species.

Black Oystercatchers

Black oystercatchers (Haematopus bachmani) have the potential to occur along coastal areas of the Project, and may even nest within the rocky intertidal habitat area. Nesting habitat includes gravel beaches and/or rocky cliffs above the high tide mark (Tessler et al. 2007). Forage species include macroinvertebrates that inhabit rocky intertidal shorelines, such as mussels, clams, limpets, barnacles and chiton.
Black oystercatchers have the potential to breed and inhabit areas near the Project affected area. While no observations were made during summer of 2012 field investigations, they could, however, occur along the entire shoreline of Gilbert Bay. No specific field surveys were conducted for coastal shorelines. However, this species is easily spotted and identified by its appearance and call.

The 2008 Tongass Forest Plan does not have species specific recommendations for black oystercatchers, however general direction for waterfowl and shorebird habitats would apply (USDA Forest Service 2008a).

Project construction could result in loss of potential nesting and foraging habitat include the locations of the proposed dock facility, the approximately one mile long coastal road to the powerhouse, and where the proposed submarine cables cross the shoreline on the east and west sides of Gilbert Bay, as well as where connection would be made with the Snettisham transmission line. The Project would result in a direct loss of 4.75 acres of intertidal habitat for the preferred coastal road and docking facilities. The forest road alternative and dock facilities would result in a loss of 3.2 acres of intertidal habitat. With respect to the transmission line, an additional 1.87 acres of intertidal habitat would be lost under the Project versus 0.13 acres of intertidal habitat that would be lost under the completely submarine alternative.

**Analysis of Project Effects**

The preferred coast road alternative would result in a loss of 4.75 acres of potential nesting and foraging habitat vs. the alternative forest road would result in a loss of 3.2 of potential nesting and foraging habitat. The preferred transmission line route would result in a loss of an additional 1.87 acres nesting and foraging habitat whereas the all marine route would result in a loss of 0.13 acres.

Noise from construction also has the potential to affect black oystercatcher behavior, including avoidance of an area for nesting and nest abandonment. The U.S. Fish and Wildlife Service recommends planning construction outside the May 1 to September 15 window (FWS, 2009b), however timing construction activities along potential black oystercatcher habitat outside of this timeframe is not feasible.

Loss of habitat from the construction of Project features and disturbance from construction activities may affect oystercatcher foraging and nesting activities. Given that much of the shoreline of Gilbert Bay is suitable nesting habitat and that no oystercatchers were observed in the area in 2012, it is expected that the Project would have no effect on black oystercatchers. It is also expected that the Project would comply with the Forest Service general guidelines for waterfowl and shorebirds.

**Dusky Canada Goose**

Dusky Canada Goose (*Branta Canadensis occidentalis*) is a subspecies of Canada geese that nest exclusively on the coast mudflats of the Copper River Delta and winter in Oregon’s
Willamette Valley (Alaska DFG, 2012). They are not known to breed in Southeast Alaska, however they may stop over along the Pacific coast during migration. Foraging habitat would include estuarine tidal flats (Bromley and Rothe 2003). Suitable foraging habitat exists adjacent to the Project area including the tidal flat located along the southern shoreline of Gilbert Bay.

The 2008 Tongass Forest Plan does not have species specific recommendations for Dusky Canada goose, however general direction for waterfowl and shorebird habitats would apply (USDA Forest Service 2008a).

Analysis of Project Effects

Dusky Canada geese may stop over to rest and feed on the estuarine tidal flats in the southern end of Gilbert Bay during spring and fall migrations. This area is located adjacent to the mouth of Sweetheart Creek and the Project affected area. It is expected that the Project would have no effect on Dusky Canada geese because dusky Canada geese are transient and would only be present if stopping over during seasonal migration.

Queen Charlotte Northern Goshawk

The Queen Charlotte Northern Goshawk (Accipiter gentilis laingi) is a distinct subspecies of the northern goshawks; however they are difficult to distinguish from northern goshawks in the field. Within southeast Alaska, goshawks are considered a year-round resident. Although goshawks may nest in a wide range of forest types (Daw et al.1998), mature forests of Sitka spruce and Western hemlock are preferred in Southeast Alaska (Flatten et al. 2002). Therefore high volume and low volume POG are important components of goshawk habitat.

Prey availability and abundance has also been indicated as a limiting factor in goshawk presence. Titus et al. (1999) found that the five most common prey species in Southeast Alaska include Steller’s jay, grouse, varied thrush, red squirrels, and woodpeckers. These species were observed in the Project affected area during 2012 field studies (Kai Environmental 2012a). Non-productive forest types and second-growth stands are also important for goshawk movement and foraging (Alaska DFG, 1996).

The Project occurs within the range and contains potential nesting and foraging habitat for the northern goshawk. Surveys using the Tongass National Forest Project Level Goshawk Inventory Protocol (2009) for northern goshawks were conducted in 2012 for the Project with the following conclusion: “Vegetation structure, prey availability and topography associated with the northern goshawk exist in select areas of the Project site; however, no indication of current or past goshawk presence was evident in any of the surveyed areas” (Kai Environmental 2012a).

Nest protection is outlined in the Forest Plan Standard and Guidelines (USDA Forest Service 2008a) and requires protection of an area not less than 100 acres of productive old growth forest (if it exists) generally centered over the nest tree or probable nest site. The Tongass Forest Plan standards and guidelines also state that between March 15 and August 15 no disturbance will occur within a 600-foot radius of a nest location (USDA Forest Service 2008a).
Analysis of Project Effects

Approximately 158 to 172 acres of high volume POG and 181 to 187 acres of low volume POG would be removed for the Project. These estimates include the reservoir area, powerhouse and switchyard, the preferred coast road and alternative forest road, and the preferred overhead portion of the transmission line and alternative all marine transmission line. Within WAA 2823 there would be approximately 68,857 acres of high and low volume POG remaining for the coast road (68,837 acres under the forest road alternative), so habitat removal would be less than 0.5% of the available habitat within the analysis area.

No evidence of northern goshawk presence was observed during the protocol survey conducted by Kai Environmental Consultants in 2012. However, preferred habitat does exist and therefore it is assumed that northern goshawks could be in the vicinity of the Project. Construction noise, such as blasting activities, pile driving, and helicopter flights may disrupt foraging and nesting building activities. While nesting, construction noise may lead to nest abandonment. Sensitive nesting periods for northern goshawks would be from March 15 to August 15, coinciding when construction activities would be occurring over the course of the two-year construction period.

The 2008 Tongass Forest Plan standards and guidelines would apply. These include maintaining an area not less than 100 acres around a nest site, and monitor up to two consecutive years after there is no further evidence of confirmed or probable nesting. In addition, no disturbance likely to result in nest abandonment within the surrounding 660 feet of a nest site from March 15 to August 15 would be permitted. Since the Project construction season coincides with goshawk nesting season and therefore the potential for disturbance of nesting goshawk, if present, is unavoidable. However, no evidence of nesting was found and no goshawks were observed in the Project affected area during the 2012 surveys. Therefore, it is anticipated that the Project would have no effect on goshawks and would comply with Forest Service standards and guidelines.

The overhead portion of the transmission line located on the Snettisham Peninsula would be designed according to the criteria defined by the Avian Power Line Interaction Committee (APLIC), 2006. These criteria are designed to reduce the potential for avian collision and electrocution of avian species. Therefore is it anticipated that the transmission line may affect, but not likely to adversely affect northern goshawk.

3.2.3 Management Indicator Species

For each Management Indicator Species (MIS), the Project effects on each species are determined by “level of influence” as defined in the Forest Service reference document for wildlife project level analysis (Forest Service, 2009). These four levels of influence by a project include: negligible, minor, moderate and major.

- **Negligible** represents when individuals of a species would not be affected, or the
proposed action would affect an individual but the change would be so small that it would not be measureable or perceptible.

- **Minor** represents when the proposed action would affect individuals but the change would be small. These impacts would not be expected to have long-term effects on species or their habitats, and occasional disturbances to individuals would not cause interference to reproduction or other factors affecting a local population.

- **Moderate** refers to when individuals of the species would be noticeably affected by the proposed action. The effect could have long-term consequences to individuals or their habitat. Frequent response to disturbance can be expected, with negative impacts to feeding, reproduction or other factors affecting short-term population levels.

- **Major** represents when populations would be affected, with long-term consequences to individuals, populations or habitat.

There are 13 wildlife species identified as MIS by USDA for the Tongass National Forest (USDA Forest Service 2008b). Additional information for species occurrence in the Project affected area may be found in Kai Environmental’s 2012 Wildlife Study Report for the Sweetheart Lake Hydroelectric Project (Kai Environmental 2012a).

**Alexander Archipelago Wolf**

Alexander Archipelago wolves (*Canis lupus ligoni*) have large home ranges and use a variety of habitat types. In Southeast Alaska, wolf populations are found on the mainland and larger islands south of Frederick Sound. Wolf populations are closely tied to densities of prey species, mainly Sitka-black tailed deer, mountain goats and beaver (Alaska DFG 2008). While the Project affected area has sufficient deer habitat, especially along Snettisham Peninsula (VCUs 550 and 570) very little deer sign was seen during 2012 field surveys (Kai Environmental 2012a). Mountain goat use of the Project affected area is unknown, but high value winter range habitat exists in the Project affected area. A healthy beaver population occupies Sweetheart Lake and tributary streams (Kai Environmental 2012a).

Alexander Archipelago wolves may occur throughout the Project affected area, although no observations or indicators of wolves were found during the field surveys and no surveys specific to wolves were conducted (Kai Environmental 2012a). Harvest records provided by the Alaska DFG indicate there was a harvest of one wolf during the period of 1999-2008 (Scott 2010).

The 2008 Tongass Forest Plan recommends standards and guidelines for designing project activities to avoid abandonment of wolf dens. Adult wolves give birth and center activities around den with pups in May and June, eventually weaning pups by mid-summer (Alaska DFG, 2008). Dens are generally located in root wads of large living or dead trees and/or moist soils within old-growth forest stands that are less than 150 meters from freshwater (Alaska DFG 2008; Person and Russell 2009). No den sites, or other wolf indices, were identified in the 2012 field surveys (Kai Environmental 2012a).
Analysis of Project Effects

Project effects include direct habitat removal, removal of habitat important for prey species, and increased access and use of the area which may result in increased legal and non-legal harvest. Construction noise may also alter behavior of wolves using the Project affected area.

The Project would include construction of docking facilities and approximately one mile of road on the east side of Gilbert Bay, which may potentially increase access and use of the Gilbert Bay area. The road would not be open for public motorized access, however. A recreational cabin may also be built and administered by the Forest Service. While harvest records show that wolves may be found in the Project affected area, only one wolf was harvested in ten years indicating that current trapping efforts are low (Scott 2010). Low harvest efforts may be due to travel distance and expense, a low population of wolves, or both. The proposed dock and road does not open up a substantial area within the Project affected area and is limited to the vicinity of the southeast shore of Gilbert Bay. It is unlikely these facilities will attract and provide access to trapping grounds, as the travel distance and expense from other communities would be still be limiting. The proposed road would still be in accordance with the 2008 Tongass Forest Plan of maintaining low road densities (USDA Forest Service, 2008a).

Potential denning habitat is present within and adjacent area around the Project. Construction activities would begin as early as April, and noise may temporarily disturb denning pups in May and June. If construction starts prior to the denning season, then adult wolves may avoid the area of construction activities and construct dens elsewhere. Therefore the potential impacts of construction noise on Alexander Archipelago wolves would not be significant.

American Marten

American marten (Martes americana) are widespread in Southeast Alaska. High value habitat types include beach fringe, riparian areas and large tracks of old growth forests less than 1,500 feet in elevation. They are dependent on ground structure for movement and denning. In general, dens are located in cavities of large trees, snags, logs and stumps. Marten sign were observed at Sweetheart Lake during winter wildlife surveys (Kai Environmental 2012a). There is abundant habitat available within the proposed Project region.

The 2008 Tongass Forest Plans calls for providing and conserving marten habitat and for reducing human-caused mortality (USDA Forest Service 2008a). While there are no harvest records for marten for Gilbert Bay, past trapping efforts were most likely low due to the distance and expense associated with accessing the area.

Analysis of Project Effects

The potential Project effects on marten and their habitat by the Project include direct habitat removal, increased access and use of the area which may result in increased harvest and construction noise which may alter behavior.
Trapping of marten within the Project affected area is unknown, but likely to be low given the distance and expense of accessing the area. The Project would improve access, by providing docking facilities and a forest service cabin; however improved access would be limited to the eastern side of Gilbert Bay. Distance and expense to Gilbert Bay would still be a limiting factor for trapping marten, therefore the Project is not expected to improve access enough to where increased trapping of marten would occur, and therefore, the Project affect would be negligible.

Construction is likely to occur over two seasons, and noise and construction activity are likely to cause marten to avoid areas where construction is occurring. Marten have pups that are born in April or May and den for approximately 2 months (Alaska DFG 2008). When marten are not with pups in dens, they would presumably be able to avoid or escape areas directly impacted by construction and construction noise. If construction activities, such as large tree removal and rock blasting, occur during pupping, then construction could impact individual marten and their young. Affects from construction would be considered minor, as the impact would be short lived over the course of the two year construction period and because of the abundance of high quality habitat in the region.

Bald Eagle

Bald eagle (*Haliaeetus leucocephalus*) nests are generally found in old-growth forest in areas near saltwater shorelines and mainland rivers. They forage in productive old-growth and along coastal areas. Fish, marine invertebrates, small mammals and waterfowl are primary species consumed by bald eagles (Alaska DFG 2012). Historical surveys conducted by the FWS show known nesting sites within the Project affected area along the coastline in Gilbert Bay (Figure 6).

Bald eagles were observed throughout the Project affected area, especially near the fish bearing creeks. No bald eagle nest surveys were conducted. Nests sites previously identified in the past were not verified during 2012 field studies. Northern goshawk surveys conducted in June and July of 2012 did not reveal bald eagle nests in the survey grid (Kai Environmental 2012c).

Nesting habitat is available along the entire coast line of Gilbert Bay, including the location of the proposed docking facilities, the proposed road and the proposed transmission line along Snettisham Peninsula.
The 2008 Tongass Forest Plan standards and guidelines require the protection of beach fringe habitat (up to 1000 feet in from coastline) and habitat around nests (USDA Forest Service 2008a).

**Analysis of Project Effects**

Project effects to bald eagles include nest and perching tree removal along the preferred coast road route, forest road alternative, and the overhead transmission line right-of-way; collision.
and/or electrocution from overhead lines; and noise disturbance during construction activities. Project activities are not expected to have an impact on foraging activities of bald eagles, as prey resources would still be abundant within and adjacent to the Project affected area.

For the purpose of this impact analysis, a shoreline buffer zone of 1,000 feet inland was used, and the calculated areas were for high volume POG within that zone. Both the coastal road and forest road alternatives fall within the 1,000 foot coast buffer. A loss of high volume POG for the coastal road would be approximately 30 acres and for the forest road would be approximately 44 acres. Included in this impact area are the powerhouse facilities and the transmission line along Snettisham Peninsula. Habitat loss relative to the remaining available POG within the 1000-foot buffer zone would be approximately 1.6% for the coastal road and 2.3% for the forest road alternative. The POG removed, would be potential nesting trees for bald eagles, particularly near Sweetheart Creek and other fish bearing streams within the Project affected area. Prior to construction activities, such as tree clearing, nest surveys will be conducted to determine if bald eagle nests are present. If active nest exist within the 1,000 shore line buffer zone, a permit from the FWS would be required.

Bald eagles have the potential to be electrocuted by overhead transmission lines on Snettisham Peninsula. However, this is unlikely since the conductor spacing on a 138 kV transmission line are greater than 60 inches, the distance recommended by the APLIC and the transmission line would be designed according to the criteria developed by the APLIC. While no bald eagle nest trees were documented along Snettisham Peninsula during the 2012 northern goshawk field studies, the proposed transmission line does fall within the 1000’ shoreline buffer and POG habitat exists. The Project reduces the amount of overhead transmission lines by burying cable between the powerhouse facilities and the dock on the east side of Gilbert Bay, and by utilizing submarine cable across Gilbert Bay and Port Snettisham. In addition, a T-shaped power pole design was chosen, to reduce the risk of overhead collisions and electrocutions.

The Project construction timeline would include noise disturbing activities such as blasting, drilling, pile driving and helicopter use during the timeframe when bald eagles would be nesting. Bald eagles begin building nests in February, and a majority of the noise from construction would occur from March to June in the first construction year. If nests are occupied when construction begins, construction noise may cause adults to abandon nest. Construction noise would be considered a moderate impact to bald eagles. The FWS National Bald Eagle Guidelines for complying with the Bald and Golden Eagle Protection Act recommend a 660 foot buffer (no construction) from a nest when the activity cannot be seen from the nest, and 330 foot buffer from the nest when the activity can be seen from the nest (FWS 2007).

In addition to construction noise, helicopter activity along Snettisham Peninsula may disturb nesting and foraging bald eagles. Bald eagles generally perch in large trees along the coastline, and helicopters installing the transmission line towers are expected to cross from Gilbert Bay inland to the transmission line corridor on Snettisham Peninsula multiple times a day for three to four months within one construction season, thus flying overhead from where bald eagles may perch or nest. Helicopter activity and noise could disturb eagles while they are
feeding, and could lead to bald eagle nest failures or abandonment. Helicopter use for the installation of transmission lines on Snettisham Peninsula would be considered a moderate level of effect on bald eagles. During operations helicopters would also be used to transport sockeye smolts from the Sweetheart Lake capture facilities to the holding pool near the powerhouse. The FWS National Bald Eagle Guidelines for complying with the Bald and Golden Eagle Protection Act recommend avoid operating aircraft within 1,000 feet of a nest during breeding season (2007). Preconstruction surveys of the helicopter flight pathways could identify nest sites and flight pathways could be designed to avoid nest sites.

**Black Bear**

Black bear (*Ursus americanus*) are common to the area and use estuarine, riparian and forested habitats. Black bear were observed in numerous field surveys within the Sweetheart Lake basin (Kai Environmental 2012a). It is likely they den within the lake basin, as an individual was observed during April of 2012 (Alaska DFG, Kai Environmental 2012a). While black and brown bear ranges don’t commonly overlap, there is suitable habitat for black bear within the Project affected area that is outside of the Sweetheart Lake basin, including the coastal environments of Gilbert Bay and Port Snettisham. Black bears den in rock cavities, hollow trees, excavations and on the ground from sea level to alpine areas (Alaska DFG, 2008).

The 2008 Tongass Forest Plan recommends implementing strategies to prevent the habituation of bears to human foods/garbage and reduce the chance of human/bear incidents (USDA Forest Service 2008a).

*Analysis of Project Effects*

Projects effects to black bear include habitat removal, loss of den habitat, increased access and use may increase mortality, increase in black bear and human interactions related to camp operations and increased noise from construction and operations which may alter behavior.

The Project would result in the permanent loss of approximately 339 acres of high and low volume POG assuming the preferred coastal road alternative. With the forest road alternative the loss of high and low volume POG would be approximately 356 acres. In Gilbert Bay, there is approximately 21,630 acres of high and low volume POG available to black bears in VCU's 550 and 570. Given the amount of available habitat for black bears in the region and the number of bears, habitat removal would be considered minor.

The permanent raising of the Sweetheart Lake level would remove approximately 194 acres of potential black bear denning habitat. Construction of the dam will occur in May and June of the second construction season, therefore the lake level would rise shortly after that when black bears are active and not in dens. This inundation would occur once and remain permanent and is not expected to impact black bears. The proposed fluctuation of lake level annually is expected to raise water levels starting late summer and continuing on through fall, peaking around December and January. Black bears that build a den near the lakeshore (i.e. in rock cavities) would potentially be inundated while hibernating in their den. Black bear do have the ability to awake and use maps.

Juneau Hydropower Inc.

September 2013

Draft Project Effects Analysis

FERC Project No. 13563
from their winter sleep and relocate if disturbed. It is unknown where or in what type of habitat black bears den in the Sweetheart Lake basin, and the fluctuating lake inundation would impact 248 acres of habitat each season. However, after the first year of inundation nearly all or all of the vegetation would have been killed or removed by the flooding of the reservoir creating a barren inundation zone. Dead woody material could remain standing for many years. This potential impact would be considered minor due the large amount of black bear habitat available in the Sweetheart Creek basin.

The Project may increase access and use of the Project at Gilbert Bay, but access to Sweetheart Lake is not expected to increase. Since black bear occurrence is considered less at Gilbert Bay due to the presence of brown bears, an increase in mortality from an increase in human access and use would be considered negligible. Likewise, an increase in black bear/human interactions would also be negligible.

Construction and operation noise may cause black bears to avoid the area where noise occurs. Construction noise at the lake would occur during construction of the dam. Noise associated with operations in Gilbert Bay would be minimal as the Project facilities are lower in elevation near lower Sweetheart Falls. Construction noise at the lake would include blasting and drilling activities and operation of heavy equipment at the outlet of the lake, and construction activities would likely start in April of the first construction season and last two year. Black bear denning habitat is present, and bear sign (presumably black bear) was documented in 2012 field studies close to the outlet of Sweetheart Lake (Kai Environmental 2012b). Construction noise, particularly blasting noise, early in the spring has the potential to disturb denning black bears at Sweetheart Lake, Project effects from construction noise are considered minor because the potential effects would only occur over two construction seasons.

There is a potential for black bear to become habituated to human activity if the construction camps are not maintained as clean camps. Kitchen waste and trash would be kept indoors in secure bear proof containers so the camp is not a source of food for bears. If proper camp maintenance procedures are kept, the potential Project effect would be negligible.

**Brown Bear**

Brown bears (*Ursus arctos*) use a variety of habitats and prefer areas near anadromous fish streams, estuaries and riparian areas. Brown bears are common at Sweetheart Creek during the spring and summer, with Sweetheart Creek and the adjacent riparian areas having a high habitat value. Brown bear were also observed along the coastal areas of Gilbert Bay, and have the potential to occur at Sweetheart Lake (Kai Environmental 2012a). It is unknown if brown bears den within the Project affected area, however den habitat is available. The late summer season appears to be the most limiting period for brown bears, because of competition for fishing resources along salmon streams. It is during this period of time that brown bears build fat reserves essential to hibernating for the winter (USDA Forest Service 2008a).

The 2008 Tongass Forest Plan recommends 500 foot forest buffers around anadromous streams (where forest structure exists) for brown bear foraging (USDA Forest Service 2008a).
addition, the standards and guidelines for bear habitat management include implementing strategies to prevent the habituation of bears to human foods/garbage and reduce chance of human/bear incidents. This includes managing interactions to limit brown bear mortality from illegal kills and defense of life and property (USDA Forest Service 2008a).

*Analysis of Project Effects*

The potential Project effects to brown bear and brown bear habitat include habitat removal, loss of foraging habitat within a 500 foot anadromous stream buffer, potential changes in prey abundance, increased access and use of the area resulting in increased mortality, and increased noise from construction and operations which may alter behavior.

The Project would result in the permanent loss of approximately 190 acres of high and low volume POG throughout the Project area under the proposed coastal road. The forest road alternative would result in a loss of 211 acres of high and low volume POG. An additional 149 acres of high and low volume POG would be altered from the inundation of Sweetheart Lake. Brown bears are more likely to occur and have been observed around Gilbert Bay, so habitat losses are compared to VCU’s 550 and 570 only. The available high and low volume POG in VCU’s 550 and 570 is 21,630 acres. The impact of the Project to high and low volume POG in Gilbert Bay is approximately 51 acres. Therefore, less than 0.5% of the available habitat for brown bears would be impacted by the Project and effects would be considered minor.

The powerhouse facilities and a portion of the proposed road(s) fall within the recommended 500’ riparian/forested buffer along Sweetheart Creek, and vegetation removal is proposed within this buffer zone. Approximately 1.55 acres of high volume POG and 3.45 acres of low volume POG will be removed for the powerhouse facilities and coastal road within the 500’ streamside buffer, for a total of 5.0 acres. If the forest road alternative is considered, an additional 9.74 acres of high and low volume POG would be removed. The lower reach of Sweetheart Creek, where brown bears actively catch fish, is approximately 0.25 mile (roughly measured in Google Earth). Brown bears generally access Sweetheart Creek from the north side, where the powerhouse facilities will be located. The north side of Sweetheart Creek within the 0.25 mile section currently has approximately 15.15 acres of riparian/forested buffer. The proposed coastal road would remove approximately 33% of the available riparian/forested buffer available to brown bear at Sweetheart Creek, which would be considered moderate and not in accordance to standards and guidelines set forth in the Tongass Forest Plan (USDA Forest Service 2008a).

The proposed action improves access to Sweetheart Creek, through the construction of docking facilities, improved foot traffic access from a road and the construction of a public Forest Service cabin for recreational users. Improved access would potentially increase the use of the current personal use fishery at Sweetheart Creek, thus increasing bear/human interactions from competition of the resource. Further, a full-time caretaker will be stationed near the dock in caretaker facilities. This increase in bear/human interactions may increase the likelihood of brown bear mortality, particularly in defense of life situations. The 2008 Tongass Forest Plan standards and guidelines recommend projects minimize such interactions. The Project will minimize interactions at facilities by requiring on-site personnel and facilities to store food in bear...
proof containers and pack out garbage from all field sites (USDA Forest Service 2008a). The impact of mortality through defense of life interactions would be considered minor.

The proposed trap and transport method of moving sockeye smolts from Sweetheart Lake to the holding pool near the switchyard may reduce smolt mortality presently occurring as a result of migration through the steep narrow Sweetheart Creek gorge. Increased smolt survival may increase the number of sockeye returning to Sweetheart Creek below the barrier falls which may also increase brown bear and human activity in the area. On one hand this is a positive Project effect and could potentially improve brown bear conditions before denning. On the other hand it may also increase the potential for bear human interactions. The effect would be negligible if a human/bear interaction education program were implemented and made available to the construction workers, operating personnel, and general public. Also, signage would be placed at key locations along the coastal road advising users to use developed pathways provided by the Project and to avoid approaching bears.

While the overall Project effects on brown bear may be considered minor to moderate, components of habitat removal would not be in accordance with the standards and guidelines set forth in the 2008 Tongass Forest Plan.

**Brown creepers, Hairy woodpeckers and/or Red-breasted sapsuckers**

Brown creepers (*Certhia Americana*) are found in productive old growth forest throughout Southeast Alaska and are considered year round permanent residents. They rely on large diameter POG for nesting and foraging, which are generally defined in the Forest Service size class code of SD67. There is suitable habitat for Brown creepers within the Project, specifically within VCU 570, however no Brown creepers were observed during field surveys (Kai Environmental 2012a).

Hairy woodpeckers (*Picoides villosus*) also rely on POG in the class code SD67 and commonly use snags and dying trees for foraging and nesting. They are a permanent resident throughout Southeast Alaska. As with brown creepers, there is suitable habitat within the Project area, however no hairy woodpeckers were observed during field surveys (Kai Environmental 2012a).

Red-breasted sapsuckers (*Sphyrapicus ruber*) use a variety of forest habitats and require the presence of snags for nesting habitat. They are indicative of low volume old growth forest, which is represented by the Forest Service size class SD4H. There is suitable habitat for Red-breasted sapsuckers in the Project affected area. One Red-breasted sapsucker was observed during 2012 field surveys at Sweetheart Lake (Kai Environmental 2012a).

**Analysis of Project Effects**

Potential Project effects on brown creepers, hairy woodpeckers and/or red-breasted sapsuckers include removal of POG habitat and the potential for noise disturbance from construction which may alter behavior and/or result in nest abandonment.
The Project would remove approximately 70.27 acres of SD4H habitat, identified as important habitat for red-breasted sapsuckers, under the proposed coastal road and approximately 77.43 acres under the forest road alternative. The total SD4H habitat available across all three VCU’s is 4,209 acres. Therefore the Project would remove approximately 2% of red-breasted sapsucker habitat.

Brown creepers and hairy woodpeckers are reliant upon the habitat classification SD67. The total amount of SD67 habitat affected by the Project occurs on Snettisham Peninsula, with an approximate loss of 21 acres of SD67 POG classed habitat. Within VCU 570 and 550 (which represents Snettisham Peninsula) there is a total of 2,030 acres of SD67 habitat class available. Therefore approximately 1% of available habitat for brown creepers and hairy woodpeckers would be removed.

The nesting timeframe for avoiding vegetation removal and other disturbance activities for brown creepers, hairy woodpeckers and red-breasted sapsuckers would be from April 15 to July 15 (FWS, 2009b). The Project construction activities would occur during this timeframe, therefore individuals of each species would affected. These effects would include the potential for nest destruction when vegetation is cleared and nest abandonment from construction noise in adjacent to intact habitat.

Removal of brown creeper, hairy woodpeckers and red-breasted sapsucker habitat would be less than 2% of the available habitat within the Project analysis area and are therefore considered minor. Project effects from construction activities, such as vegetation clearing and noise producing activities during nesting season would also be considered minor, because vegetation removal would occur once during the first construction season and there is an abundance of habitat within the Sweetheart Lake basin and surrounding area.

Mountain Goat

Mountain goats (Oreamnos americanus) occupy cliffs in alpine and subalpine habitats, as well as old growth forests. Mountain goats have high site fidelity to wintering habitat, and in British Columbia used less than 14% of home range in the winter (R. Scott, personal communication, 2012; Poole et al. 2009). In Southeast Alaska, during the winter, mountain goats prefer habitat with topographic variables such as escape terrain (generally steep slopes of broken rocky terrain), south facing slopes for warm solar aspect, and availability of high quality forage. High and low volume POG assist to intercept snow, which helps to provide important winter browse species such as conifers, mosses, lichen, huckleberry, bramble, blueberry, and deer fern (Fox and Smith 1988). The above habitat criteria make most of the northern shoreline of Sweetheart Lake high value mountain goat habitat. While less preferable, there are also smaller areas of potential winter habitat on the southern shoreline of Sweetheart Lake (R. Scott, personal communication, 2012).

There is suitable habitat for mountain goats within and adjacent to the Project affected area, and there is a potential for goats to inhabit the Project affected area during winter months. Mountain goats have been observed in surveys conducted by Alaska DFG in the alpine area.
surrounding the Sweetheart Lake basin during summer months. No goats were observed during winter surveys, nor were there indicators of goats using the Project affected area during the winter (Kai Environmental 2012a). However, surveys were limited in scope due to hazardous conditions, so mountain goat winter habitat use in the Project affected area cannot be ruled out entirely.

Using the Lynn Canal mountain goat resource selection function model, Alaska DFG developed Figure 8 which depicts the predicted relative probability of mountain goat use in the Sweetheart Lake watershed. The model reaffirms that most of the northern shore of Sweetheart Lake would have relatively high use by mountain goats in the winter. There are also moderate uses along the south shore of Sweetheart Lake (Figure 8).

The 2008 Tongass Forest Plan standard and guidelines recommend, where feasible, to maintain important winter habitat for mountain goat (USDA Forest Service 2008a). This includes locating facilities, developments and activities one mile or more from important wintering and kidding habitat. If helicopters or fixed-wing aircrafts are used during construction, a 1,500 foot horizontal or vertical clearance around alpine habitat should be maintained. Additionally, it is recommended flight paths should avoid mountain goat kidding areas from May 15 through June 15, although kidding habitat was not identified for the Project.

**Figure 8:** Predicted relative probability of mountain goat use in the Sweetheart Lake watershed.
Analysis of Project Effects

The Project has the potential to impact mountain goats from loss of winter habitat around the lake, increased access and use may increase mortality, increased noise from construction and operation may alter behavior. Outside winter months, mountain goats utilize alpine habitats, which would not be affected by the Project.

Around Sweetheart Lake, the permanent loss of habitat due to the increase in lake elevation would be approximately 442 acres. Of these 442 acres, there is approximately 288 acres of high and low volume POG that would be affected.

Approximately 150 acres of this POG is within the high value mountain goat habitat identified for the Project affected area (Figure 8). Approximately 36% of the available high value mountain goat habitat around Sweetheart Lake would be lost. This Project effect would be considered moderate, as a significant amount of available winter habitat would be removed.

Noise at the lake would occur during construction of the dam and would include blasting and drilling activities and operation of heavy equipment at the outlet of the lake. However, mountain goats are expected to be more closely associated with alpine areas during construction seasons. Effects of construction noise on mountain goats would be considered negligible since mountain goats will tend to be in the alpine areas during the construction seasons.

Overall Project effects to mountain goats would be moderate, where the Project would remove approximately 150 acres of potential wintering habitat, which is a limiting factor in mountain goat survival. While individual mountain goats may be affected, the Project is not expected to significantly affect the population within the WAA.

Red squirrel

Red squirrels (*Tamiasciurus hudsonicus*) are found in productive old growth forest and young growth stands. They require cone-producing trees for foraging and tree cavities and snags for nesting and denning. There is suitable habitat for Red squirrels throughout the Project affected area.

Red squirrels and denning sites were observed around the Sweetheart Lake basin during the 2012 field studies (Kai Environmental 2012a). Young growth is also important for recruiting new cone-producing tree stands.

Analysis of Project Effects

The Project could potentially impact red squirrels through the removal of POG habitat and young growth habitat. There are 39,895 acres of high and low volume POG (VCUs 550, 570 and 610) and 279.8 acres young growth habitat (VCU 610) available through the Project affected area.

The Project would remove 339 acres of high and low volume POG under the proposed
coastal road and 460 acres of high and low volume POG under the forest road alternative. Lost young growth habitat occurs only at Sweetheart Lake (VCU 610), with 5.5 acres permanently lost by creating the reservoir. The removal of trees in these habitats would affect individual red squirrels. Less than 1% of available high and low volume POG would be removed by the Project, and approximately 2% of available young growth would be removed. Given the remaining available habitat within and adjacent to Project area, Project effects to red squirrel would be considered minor.

River Otter

River otter (*Lutra canadensis*) are generally associated with coastal, estuarine and riverine areas that are adjacent to uplands with POG for cover (Kai Environmental 2012a). Prey resources consist of a variety of intertidal macroinvertebrates and fish, as well as small birds or mammals (Alaska DFG, 2012), which are often consumed under the cover of adjacent uplands vegetation (Kai Environmental 2012a).

River otters generally den in burrows, and they are active during the winter where they dig elaborate tunnels in snow over frozen lakes (Alaska DFG, 2008). River otters were noted in the Project field studies with a direct observation of a river otter above Sweetheart Falls in 2011 (R. Carstensen, personal communication, 2012) and a “staging area” on a bluff between the beach and the proposed powerhouse road (Kai Environmental 2012a).

*Analysis of Project Effects*

The potential Project effects on river otters and their habitat include direct habitat removal, interrupting foraging corridors by the proposed road, increased access and use of the area which may result in increased trapping, and construction noise which may alter behavior.

The Project would result in the permanent loss of approximately 339 acres of high and low volume POG throughout the Project area under the proposed coastal road. The forest road alternative would result in a loss of 460 acres of high and low volume POG. All POG in the Project affected area constitutes 39,895 acres across 3 VCUs. Therefore, the Project, regardless of alternative would remove approximately 1% of the available habitat within the Project affected area. Loss of POG habitat would be considered minor and is not likely to affect the population river otter.

River otters that forage in open intertidal areas move just inside the forest canopy to escape potential predation before consuming prey. Access between these two habitat types may be affected for one mile along the east side of Gilbert Bay by the preferred coast road alternative. The forest road alternative is not expected to affect this transition zone, as it is set further away from the intertidal area. The available shoreline in Gilbert Bay, from Sharp Point on Snettisham Peninsula south to the southern shoreline of Gilbert Bay and then north to the Whiting River, is approximately 7.5 miles (measured in Google Earth). Approximately 13% of the shoreline would be impacted, however once the road is constructed, river otter would be able to resume foraging activities in their usual manner. Therefore the Project effects on foraging area would be considered minor.
Trapping of river otter within the Project affected area is unknown, but likely to be low given the distance and expense of accessing the area. The Project would improve access, by providing docking facilities and a Forest Service cabin; however improved access would be limited to the eastern side of Gilbert Bay. Distance and expense to Gilbert Bay would still be a limiting factor for trapping river otter, therefore the Project is not expected to improve access enough to where increased trapping of river otter would occur. Improved access is expected to have negligible effects on river otters.

Construction is planned over two seasons, and noise and construction activity are likely to cause river otters to avoid areas where construction is occurring. River otters have pups that remain in dens for approximately 2 months during the period of mid-January through June (Alaska DFG, 2008). When river otters are not with pups in dens, they would presumably be able to avoid or escape areas directly impacted by construction and construction noise. If construction activities, such as large tree removal and rock blasting, occur during pupping, then construction could affect individual river otters and their young. Project effects from construction would be considered minor, as the impact would be short lived and over the course of two years.

**Sitka black-tailed Deer**

Sitka black-tailed deer (*Odocoileus hemionus sitkensis*) are found throughout Southeast Alaska, occupying a variety of habitats. Winter range habitat can be a limiting factor in determining deer populations in an area. During winter and early spring, they are restricted to uneven-aged and high volume POG forests less than 800 feet in elevation.

In 2012, a winter range deer habitat study was conducted to determine how well the Project affected area supports populations of Sitka black-tailed deer. The study determined that the Project affected area around Gilbert Bay had high quality deer habitat, and that the quality of habitat decreased as the distance from the coast increased (Kai Environmental 2012a). This was largely due to the snow intercept factor, making the Project affected area around the Sweetheart Lake basin less likely to support deer populations even though the quality of forage species at Sweetheart Lake was not different than Gilbert Bay (Kai Environmental 2012a).

Year round habitat is available throughout the Project affected area, and signs of Sitka black-tailed deer were documented along Snettisham peninsula during the 2012 field season (Kai Environmental 2012a). One Sitka black-tailed deer was reported as harvested from the Project affected area between 1999-2008 (Scott 2010) indicating low population or low utilization.

**Analysis of Project Effects**

The Project would impact Sitka black-tailed deer by removal of high and low volume POG habitat. Tree clearing may affect deer in a number of different ways. Though cleared areas may result in a subsequent increase in summer forage, eventually long term conifer growth becomes too thick and even to provide sufficient light for understory forage. Large cleared areas change the suitability of an area as deer winter habitat and also results in habitat fragmentation, which may
The Project would remove approximately 339 acres of high and low volume POG in Project affected area under the proposed coastal road. Under the forest road alternative approximately 360 acres of high and low volume POG would be removed from the Project affected area. There is approximately 11,065 acres of high and low volume POG in VCUs 550, 570, and 610 under 800 feet in elevation. Therefore, the removal of habitat is approximately 3% of the available habitat and would be considered a minor Project effect.

Along the transmission line corridor, once POG is removed, vegetation will be maintained in a mid-serial stage. Brushing of larger broad-leaved deciduous species, such as alder, will occur approximately every 10 years. While opening up the POG habitat may increase the amount of browse species available for Sitka black-tailed deer, high and low volume habitat is more beneficial as it offers winter range habitat which is limiting for Sitka black-tailed deer. Larger trees intercept snow, allow for winter browse species to be protected under the canopy and protect deer from predation. Therefore removal of POG along the Snettisham Peninsula for the overhead transmission line is considered a loss of 43.6 acres of high value winter habitat. Snettisham Peninsula is within VCU570, where there would be approximately 13,614 acres of high and low volume POG remaining. Therefore loss of winter range habitat along Snettisham Peninsula would be considered a minor Project effect.

The Project would improve access on the eastern shore of Gilbert Bay where the proposed dock, road and powerhouse facilities are located. While the Project affected area has high value deer habitat, particularly around Gilbert Bay, harvest records showed only one harvested deer in a 10 year period (Scott 2010). Deer sign around Gilbert Bay was also lower than expected given the amount of habitat available (Kai Environmental 2012a). Harvest records for all of Unit 1C indicate that very little deer hunting effort occurs on the mainland (Kai Environmental 2012a). In addition, predators such as bear and wolves inhabit the area, and likely keep deer numbers low. Access improvements would be confined to a small portion of the eastern shore of Gilbert Bay, and given the expense and distance to nearby communities, improved access is not expected to increase deer hunting opportunities. Therefore, improved access would be considered negligible.

Overall, Project effects to Sitka black-tailed deer by the Project would be considered minor.

Vancouver Canada Goose

Vancouver Canada geese (Branta canadensis) are found in wetlands, estuary, riparian, and upland areas. They nest in coastal forests, frequently building nests and rearing young in old-growth spruce and hemlock forests, on the margins and island in small ponds, along river banks and in trees (Mowbray et al. 2002; Alaska DFG, 2008). Vancouver Canada geese overwinter in Southeast Alaska along marine waters in grass habitats (Alaska DFG, 2008). There is suitable nesting habitat throughout the Project affected area, and suitable overwintering habitat adjacent to the Project affected area along the south shoreline of Gilbert Bay. No Vancouver Canada geese were observed during 2012 field studies for wildlife.
The 2008 Tongass Forest Plan recommends conducting activities that avoid or minimize disturbance to habitats that important nesting, brooding, rearing and molting areas for Vancouver Canada geese (Forest Service, 2008).

**Analysis of Project Effects**

The Project would remove approximately 51.22 acres of potential nesting habitat in Gilbert Bay for Vancouver Canada geese. If the forest road option is considered, the Project would remove approximately 72.07 acres of potential nesting habitat. Inundation at Sweetheart Lake would remove 288 acres of nesting habitat for Vancouver Canada geese. The U.S. Fish and Wildlife Service recommended timeframe for avoiding vegetation clearing and disturbance of forested habitats for nesting birds is April 15- July 15 (FWS 2009b). Potential nesting habitat at Sweetheart Lake would be removed when the lake level is inundated, which would be outside of nesting timeframe indicted by the U.S. Fish and Wildlife Service. Construction, including Project effects on forested areas, around Gilbert Bay would occur begin in April of the first construction season and continue through till the fall/winter. Therefore the Project would remove potential nesting habitat while Vancouver Canada geese are nesting. In addition, construction noise may disturb nesting Vancouver Canada geese in adjacent areas during nesting season.

The Project is not expected to have significant effect on the habitat in the tidal flats located adjacent to the Project in southern Gilbert Bay. While changes in flow regime may have minor in-stream channel affects, this is not expected to disturb the existing vegetation structure. Habitat in south Gilbert Bay is largely affected by tidal exchange (Kai Environmental 2012a). Therefore, no direct Project effects to overwintering habitat for Vancouver Canada geese are expected.

Overall Project effect on Vancouver Canada geese would be minor, where individuals would be noticeable affected and the Project would remove 51.22 acres of potential nesting habitat. However, no Vancouver Canada geese were observed during the 2012 studies.

### 3.2.4 Migratory Birds

**Affected Environment**

There are approximately 295 species of birds that occur regularly in Alaska, most of which are considered migratory. They migrate from the lower 48 states and Central and South America, to nesting, breeding and rearing grounds in Alaska. Most of these birds only pass through Southeast Alaska on their way to breeding grounds in interior and northern Alaska.

There are 40 bird species of management concern that occur in the Tongass National Forest. Of these 40 species, 10 were documented within the Project affected area during field surveys (Table 7). In addition, the U.S. Fish and Wildlife hosts a list of Bird Species of Conservation Concern, which has approximately 31 species identified for Alaska. Of these, 5 species were verified within the Project affected area. Table 7 includes a modified version of
the list of bird species documented in the 2012 Wildlife Study Report (Kai Environmental 2012a).

There have been no comprehensive studies in the Project affected area, however there is suitable habitat for migratory bird species, including: coastal and tidewater habitats, hemlock/spruce/cedar forested areas, shrub thickets, muskeg, and mixed deciduous/spruce forests. During a 1997 survey, the FWS conducted a winter bird survey in the Sweetheart Creek flats (the tidal flats located at the southern end of Gilbert Bay) and documented 6 species, including: bufflehead, gull, Canada goose, goldeneye, mallard and swan (FWS 2010).

Table 7: Avian species seen or heard during field studies for the Sweetheart Lake Project, near Gilbert Bay, Alaska (Kai Environmental 2012a). Location abbreviations are: L = Sweetheart Lake, B = Gilbert Bay, and SP = Snettisham Peninsula. Highlighted cells represent observed species that are listed as Forest Service or FWS species of concern.

<table>
<thead>
<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Forest Service Species of Concern?</th>
<th>FWS Species of Conservation Concern?</th>
<th>Location in Study Area</th>
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</thead>
<tbody>
<tr>
<td>American Dipper</td>
<td>Cinclus mexicanus</td>
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<td>N</td>
<td>L</td>
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<tr>
<td>American Robin</td>
<td>Turdus migratorius</td>
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<td>L</td>
</tr>
<tr>
<td>Arctic Tern</td>
<td>Stema paradisaea</td>
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<td>Y</td>
<td>B</td>
</tr>
<tr>
<td>Bald Eagle</td>
<td>Haliaeetus leucocephalus</td>
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<td>L, SP, B</td>
</tr>
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<td>Bonaparte's Gull</td>
<td>Chroicocephalus philadelphia</td>
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<td>N</td>
<td>B</td>
</tr>
<tr>
<td>Canada Goose</td>
<td>Branta canadensis</td>
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<td>L, B</td>
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<tr>
<td>Chestnut-backed Chickadee</td>
<td>Poecile rufescens</td>
<td>Y</td>
<td>N</td>
<td>L, SP</td>
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<tr>
<td>Common Goldeneye</td>
<td>Bucephala clangula</td>
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<tr>
<td>Common Loon</td>
<td>Gavia immer</td>
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<tr>
<td>Common Yellowthroat</td>
<td>Geothlypis trichas</td>
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<td>Dark-eyed Junco</td>
<td>Junco hyemalis</td>
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<td>L, SP</td>
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<td>Great Blue Heron</td>
<td>Ardea herodias</td>
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<tr>
<td>Greater Yellowlegs</td>
<td>Tringa melanoleuca</td>
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<td>Harlequin Duck</td>
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<td>Hermit Thrush</td>
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<td>Herring Gull</td>
<td>Lorus argentatus</td>
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<td>Marbled Murrelet</td>
<td>Brachyramphus marmoratus</td>
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<td>Mew Gull</td>
<td>Lorus canus</td>
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<td>Mountain Chickadee</td>
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<td>Northwestern Crow</td>
<td>Corvis caurinus</td>
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<td>Olive-sided Flycatcher</td>
<td>Contopus cooperi</td>
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<td>Orange-crowned Warbler</td>
<td>Oreothlypis celata</td>
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<td>Pacific (Winter) Wren</td>
<td>Trogodiotes pacificus</td>
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<td>Pacific-slope Flycatcher</td>
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<td>Pigeon Guillemot</td>
<td>Cepphus columba</td>
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<tr>
<td>Ptarmigan</td>
<td>Lagopus sp.</td>
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<td>N</td>
<td>L</td>
</tr>
<tr>
<td>Red-breasted Sapsucker</td>
<td>Sphyrapicus ruber</td>
<td>Y</td>
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<tr>
<td>Red-necked Grebe</td>
<td>Podiceps grisegena</td>
<td>N</td>
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<td>B</td>
</tr>
<tr>
<td>Red-Throated Loon</td>
<td>Gavia stellata</td>
<td>N</td>
<td>N</td>
<td>L, B</td>
</tr>
</tbody>
</table>
Analysis of Project Effects

The Project would potentially affect migratory birds by the removal of vegetation resulting in loss of nesting and foraging habitat. Construction and operations noise may also alter migratory bird behavior. There is also a risk of collisions with overhead transmission lines.

The Project with the coastal road results in an approximate impact of 502 acres of terrestrial habitat and 6.35 acres of intertidal habitat. Of the terrestrial habitat, approximately 68% is high and low volume POG. The Project under the forest road alternative results in an approximate impact of 523 acres of terrestrial habitat and 4.8 acres of intertidal habitat. Of the terrestrial habitat for the forest road, approximately 69% is high and low volume POG. Habitat removed by the construction of the dam, tunnel, powerhouse facilities, and dock and habitat submerged by the reservoir inundation would be permanent. Vegetation would be removed from the overhead section of transmission line right-of-way but would be allowed to regrow and maintained in a mid-serial stage.

Other habitat types, besides POG, are important for migratory birds. Waterfowl and shorebirds were frequently observed in Gilbert Bay, and the tide flats in southern Gilbert Bay likely provides important migratory waterfowl habitat. The Project is not expected to alter the vegetation structure or landscape of these areas. However, construction noise may alter behavior of migratory birds and is discussed further below. Rocky coastal habitat associated with the Project affected area also support species such as black oystercatcher.

Removal of habitat during the construction season and construction noise would both impact migratory birds. Most of the habitat removal would occur in the first year, starting as early as April, to brush and grub for the road, clear timber for the powerhouse facilities and clear vegetation for the overhead transmission lines. Blasting activities would also be one of the first construction activities in Gilbert Bay at the quarry. Mobilization of construction equipment into Gilbert Bay would most likely be prior to the timeframe that migratory birds would be returning to the area, given a startup time of April. If habitat is removed prior to birds returning to the Project affected area and establishing nest sites, then effects would be negligible. Removal of vegetation during the nesting season would have moderate effect on migratory birds. Construction noise during the nesting season may also have a minor effect on migratory birds, as adults may abandon nests.
The “incidental, accidental or unintentional take” of migratory birds is prohibited under the Migratory Bird Treaty Act (MBTA), however the FWS attempts to work with industries whose actions may result in bird deaths (FWS 2002). Further mitigation measures for reducing Project effects on migratory birds still need to be established, particularly associated with the potential electrocution of raptors and large birds as well as effects from construction activities and noise during nesting season.

3.2.5 Subsistence

An ANILCA 810 analysis addresses three factors related to subsistence uses: 1) resource distribution and abundance; 2) access to resources; and 3) competition for the use of resources. The evaluation determines whether subsistence uses within the Project affected area may be significantly restricted by the proposed actions.

Gilbert Bay/Sweetheart Creek falls within District 11 of the federal subsistence regulations and there is no subsistence fishing within the district. There is a personal use sockeye fishery managed by the State of Alaska at Sweetheart Creek.

The Project falls within Game Management Unit (GMU) 1C for federal subsistence regulations. Subsistence hunting regulations for GMU 1C include the following resources, which are available to specified rural residents:

- Sitka blacktail deer: rural residents of GMU 1C, 1D, Hoonah, Kake and Petersburg
- Mountain goat: rural residents of Haines, Hoonah, Kake, Klukwan, and Petersburg
- Black bear: rural residents of GMU 1C, 1D, Hoonah, Pelican, Point Baker, Sitka and Tenakee Springs
- Brown bear: rural residents of 1C, Haines, Hoonah, Kake, Klukwan, Skagway, and Wrangell, excluding Gustavus
- Moose: rural residents of GMUs 1, 2, 3, 4 and 5
- Wolves and wolverines: all rural residents

Subsistence trapping regulations include beaver, coyote, red fox, lynx, marten, mink, muskrat, river otter, wolves and wolverine for all rural residents. Subsistence harvest of marine mammals primarily includes harbor seals and sea otters, however sea lions have also been known to be harvested in Southeast Alaska.

Guidance set forth for wildlife analysis for subsistence consider deer the “indicator” for potential subsistence resource affects, and therefore it is the only species addressed in this analysis. Sitka black-tail deer were the only species found to have a possibility of a significant restriction on subsistence users, during the Tongass Forest Plan subsistence analysis (USDA Forest Service 2008b). Standards and Guidelines for Subsistence are outlined in the 2008 Tongass Forest Plan (USDA Forest Service 2008a; pp 4-68 to 4-69). Sitka black-tailed deer are discussed above.
As noted in the 2012 Wildlife Study Report for the Project, one Sitka black-tailed deer was harvested from the Project affected area between the years 1999-2008 (Kai Environmental 2012b; Scott 2010). While it cannot be determined if the harvest was under subsistence or sport hunting regulations, the harvest report lends to the likely low use of the Project affected area by all harvesters. Sitka black-tailed deer sign were only noted in field studies in Gilbert Bay, however there is deer habitat present throughout the Project affected area (Kai Environmental 2012a).

The Project would remove high and low volume POG habitat, which is important for Sitka black-tailed deer. As discussed above, the amount of habitat lost by the proposed project would be minimal when compared to the amount of habitat available. Habitat loss is not expected to impact the distribution or the abundance Sitka black-tailed deer. Access and possibly low deer population densities in the area are likely limiting factors for subsistence hunting use.

Gilbert Bay is approximately 85 miles from Kake, 195 miles from Hoonah and 100 miles from Petersburg by boat. The time and fuel costs may be prohibitive, and deer are most likely more abundant closer to these communities. By providing docking facilities in Gilbert Bay, the Project may improve and potentially increase access to the eastern side of Gilbert Bay. As public access, the dock and proposed road would be available to any one making the trip to Gilbert Bay. The remainder of the Project affected area and adjacent areas would also still remain open for deer hunting. No change as a result of the Project is expected to favor non-rural residents over rural residents for the Sitka black-tail deer in Gilbert Bay.

Analysis of Project Effects

This analysis of the Sweetheart Lake Hydroelectric Project concludes that the proposed action shall not result in a significant restriction of subsistence uses.
4.0 REFERENCES


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