Juneau Access Improvements Project
Draft Supplemental Environmental Impact Statement

2014 Update to Appendix N
Essential Fish Habitat Assessment

Prepared for:

Alaska Department of Transportation
& Public Facilities
6860 Glacier Highway
Juneau, Alaska 99801-7999

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Prepared by:

HDR, Inc.
2525 C Street, Suite 305
Anchorage, Alaska 99503

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Acronyms and Abbreviations

ACF	Alaska Class Ferry
AMHS	Alaska Marine Highway System
DOT&PF	Alaska Department of Transportation and Public Facilities
DPS	Distinct Population Segment
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FHWA	Federal Highway Administration
FVF	Fast Vehicle Ferry
JAI	Juneau Access Improvements
NEPA	National Environmental Policy Act
NHS	National Highway System
NMFS	National Marine Fisheries Service
ROD	Record of Decision
SEIS	Supplementary Environmental Impact Statement
USACE	U.S. Army Corps of Engineers

1. Introduction

This report is an update to the December 2004 *Essential Fish Habitat (EFH) Assessment,* which was prepared by the Alaska Department of Transportation and Public Facilities (DOT&PF) as Appendix N of the Juneau Access Improvements (JAI) Project Supplemental Draft Environmental Impact Statement (EIS).

The 2004 *EFH Assessment* identified locations potentially affected by the JAI reasonable project alternatives under evaluation at that time, including Alternatives 2, 2A, 2B, 2C, 3, 4B, and 4D. The potentially affected locations included William Henry Bay, Sawmill Cove, Slate Cove, and a site north of the Katzehin River. The construction of Alternatives 2 through 2C would result in the direct loss of 21.9 (Alternative 2C) to 35 (Alternative 2A) acres of EFH as a result of fill placement for highway and ferry terminal construction and dredging, as well as the modification of subtidal habitat resulting from the sidecasting of shot rock.

Impacts associated with Alternative 2B included 4.76 acres within intertidal and subtidal habitats for the proposed Katzehin Ferry Terminal, as well as 2.74 acres of fill for the Katzehin Ferry breakwater, dredge impacts to 4.4 acres of subtidal habitat for a ferry mooring basin at the terminal site, and 19.40 acres of marine fill throughout other sections of the alignment. This resulted in 31.3 acres of total impact to EFH associated with Alternative 2B.

Alternative 3 resulted in the direct loss of 12.9 acres of EFH as a result of fill for highway and ferry terminal construction and of dredging activities. Alternatives 4B and 4D would result in the loss of 3.2 acres of EFH for dredge and fill at the Sawmill Cove ferry terminal, as would Alternatives 2A and 3.The habitat that would be lost at Sawmill Cove was historically documented as spawning habitat for Lynn Canal pacific herring stock. Ferry maneuvers at Sawmill Cove could increase turbidity in the vicinity of the terminal to the extent that it would affect Pacific herring eggs and larvae at the terminal site.

During the development of the JAI Project 2006 Final EIS, the Federal Highway Administration (FHWA) and DOT&PF responded to comments on the Supplemental Draft EIS, incorporated new data and further analysis for some resources, and incorporated additional mitigation measures to reduce impacts to wildlife and habitat. The FHWA and DOT&PF also made some changes to Alternative 2B and eliminated Alternatives 2, 2A, and 2C from consideration as reasonable alternatives. Many of these changes required updates to supporting technical reports, which DOT&PF prepared and compiled in Appendix W of the 2006 Final EIS. That effort included the 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment,* which was incorporated into Appendix W of the 2006 Final EIS.

The 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment Report* was completed to incorporate additional information from the Kensington Gold Project Final EIS, development plans and permits associated with the Kensington Gold Project, and the Cascade Point Marine Terminal. Further, the addendum updated the impact assessment of Alternative 2B where the highway alignment had been adjusted to avoid all palustrine emergent and most estuarine emergent wetlands and shifted farther upstream at the Antler River crossing to reduce impacts to EFH. Alternative 2, 2A and 2C were determined not reasonable in the 2006 FEIS and were

dropped from consideration and therefore potential impacts beyond the Katzehin River were dropped from this analysis.

The 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment Report* reported that approximately 36.4 acres of intertidal/subtidal habitat would be buried or otherwise affected under Alternative 2B (25.6 acres for the highway construction and 10.8 acres at the Katzehin Ferry Terminal). Alternative 2B included 14.8 acres of submarine rock disposal, but this was not considered an impact to EFH. Because Alternative 2B would end at the Katzehin Ferry Terminal at Katz Point north of the Katzehin River, there would be no effects from side casting or fill placement in Taiya Inlet. In addition, no fills were anticipated below the high tide line south of Comet. The addendum also identified reasonably foreseeable projects that could cause the loss of marine EFH due to the placement of fill in the intertidal and shallow subtidal zones.

Following FHWA's 2006 Record of Decision (ROD) for the JAI project identifying Alternative 2B as the selected alternative, DOT&PF applied for and obtained a permit from the U.S. Army Corps of Engineers (USACE) under Section 404 of the Clean Water Act for anticipated impacts to wetlands and intertidal and subtidal areas (including EFH areas). During negotiations for the permit, the alignment of Alternative 2B was modified to avoid and minimize impacts to wetlands, primarily emergent wetlands, and reduce the extent of rock side cast areas into intertidal and subtidal areas. The USACE Section 404 permit authorized fill in 110.2 acres of Waters of the U.S. with 1,735,00 cubic yards of fill and was issued June 18, 2008, with an expiration date of June 30, 2013.

With more than seven years transpired since the 2006 Final EIS and Record of Decision (ROD) were published, the Federal Highway Administration (FHWA) and DOT&PF recognized the need to update previous technical reports as part of the JAI Project 2014 Draft Supplemental Environmental Impact Statement (SEIS). Updates are needed to reflect changes in regulations, new information related to the potentially affected environment or conditions, updated analysis, evaluation of the newly added Alternative 1B, and changes in the design or alignment for Alternatives 2B and 3. Three key components that affected changes to the design and alignment of Alternative 2B and 3 since the 2006 ROD are: changes during the U.S. Army Corps of Engineers (USACE) permitting process to further avoid and minimize impacts to wetlands and reduce the extent of rock side cast areas, changes based on advanced geotechnical survey information, and recent changes in 2012 in response to updated bald eagle nest survey data.

This 2014 update describes changes to the previous reports. The information reported in the 2004 *Essential Fish Habitat Assessment* and 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment* (Attachment A) remains valid with the exception of the updates contained in this report:

- Additional information on Pacific herring spawning in Berners Bay to address agency scoping comments.
- Evaluation of the new Alternative 1B, and alignment/design revisions to Alternatives 2B and 3 that could have impacts to EFH.

1.1 Project Description

As required by the National Environmental Policy Act (NEPA), this technical report considers the following reasonable alternatives.

1.1.1 Alternative 1 – No Action

The No Action Alternative (Alternative 1) includes a continuation of mainline ferry service in Lynn Canal and incorporates two Day Boat Alaska Class Ferries (ACFs). The Alaska Marine Highway System (AMHS) would continue to be the National Highway System (NHS) route from Juneau to Haines and Skagway, and no new roads or ferry terminals would be built. In addition to the Day Boat ACFs, programmed improvements include improved vehicle and passenger staging areas at the Auke Bay and Haines ferry terminals to optimize traffic flow on and off the Day Boat ACFs as well as expansion of the Haines Ferry Terminal to include a new double bow berth to accommodate the Day Boat ACFs. This alternative is based on the most likely AMHS operations in the absence of any capital improvements specific to the JAI Project.

Mainline service would include two round trips per week in the summer and one per week in the winter with Auke Bay-Haines-Skagway-Haines-Auke Bay routing. During the summer, one Day Boat ACF would make one round trip between Auke Bay and Haines six days per week, and one would make two round trips per day between Haines and Skagway six days per week. The Day Boat ACFs would not sail on the seventh day because the mainliner is on a similar schedule. In the winter, ferry service in Lynn Canal would be provided primarily by the Day Boat ACFs three times per week. The *M/V Malaspina* would no longer operate as a summer day boat in Lynn Canal.

1.1.2 Alternative 1B – Enhanced Service with Existing AMHS Assets

Alternative 1B includes all of the components of Alternative 1, No Action, but focuses on enhancing service using existing AMHS assets without major initial capital expenditures. Similar to Alternative 1, Alternative 1B includes a continuation of mainline ferry service in Lynn Canal; the AMHS would continue to be the NHS route from Juneau to Haines and Skagway; no new roads or ferry terminals would be built; and in addition to the Day Boat ACFs, programmed improvements include improved vehicle and passenger staging areas at the Auke Bay and Haines ferry terminals to optimize traffic flow on and off the Day Boat ACFs as well as expansion of the Haines Ferry Terminal to include a new double bow berth to accommodate the Day Boat ACFs. Service to other communities would remain the same as with the No Action Alternative. Alternative 1B keeps the *M/V Malaspina* in service after the second Day Boat ACF is brought online to provide additional capacity in Lynn Canal. Enhanced services included as part of Alternative 1B are a 20 percent reduction in fares for trips in Lynn Canal and extended hours of operations for the reservation call center.

Mainline service would include two round trips per week in the summer and one per week in the winter with Auke Bay-Haines-Skagway-Haines-Auke Bay routing. During the summer, the *M/V Malaspina* would make one round trip per day seven days per week on a Skagway-Auke Bay-Skagway route, while one Day Boat ACF would make one round trip between Auke Bay and Haines six days per week, and one would make two round trips per day between Haines and Skagway six days per week. The Day Boat ACFs would not sail on the seventh day because the

mainliner would be on a similar schedule. In the winter, ferry service in Lynn Canal would be provided primarily by the Day Boat ACFs three times per week.

1.1.3 Alternative 2B – East Lynn Canal Highway to Katzehin, Shuttles to Haines and Skagway

Alternative 2B would construct the East Lynn Canal Highway (50.8 miles, including 47.9 miles of new highway and widening of 2.9 miles of the existing Glacier Highway) from Echo Cove around Berners Bay to a new ferry terminal 2 miles north of the Katzehin River. Ferry service would connect Katzehin to Haines and Skagway. In addition, this alternative includes modifications to the Skagway Ferry Terminal to include a new end berth and construction of a new conventional monohull ferry to operate between Haines and Skagway. Mainline ferry service would end at Auke Bay. This alternative assumes the following improvements will have been made independent of the JAI Project before Alternative 2B would come on-line: two Day Boat ACFs, improved vehicle and passenger staging areas at the Haines Ferry Terminal to optimize traffic flow on and off the Day Boat ACFs, and expansion of the Haines Ferry Terminal to include two new double bow berths.

During the summer months, one Day Boat ACF would make eight round trips per day between Haines and Katzehin, a second Day Boat ACF would make six round trips per day between Skagway and Katzehin, and the Haines-Skagway shuttle ferry would make two trips per day. During the winter, one Day Boat ACF would make six round trips per day between Haines and Katzehin, and a second Day Boat ACF would make four round trips per day between Skagway and Katzehin. The Haines-Skagway shuttle would not operate; travelers going between Haines and Skagway would travel to Katzehin and transfer ferries.

1.1.4 Alternative 3 – West Lynn Canal Highway

Alternative 3 would upgrade/extend the Glacier Highway (5.2 miles, including 2.3 miles of new highway and widening of 2.9 miles of the existing Glacier Highway) from Echo Cove to Sawmill Cove in Berners Bay. New ferry terminals would be constructed at Sawmill Cove in Berners Bay and at William Henry Bay on the west shore of Lynn Canal, and the Skagway Ferry Terminal would be modified to include a new end berth. A new 38.9-mile highway would be constructed from the William Henry Bay Ferry Terminal to Haines with a bridge across the Chilkat River/Inlet connecting into Mud Bay Road. A new conventional monohull ferry would be constructed and would operate between Haines and Skagway. Mainline ferry service would end at Auke Bay. This alternative assumes the following improvements will have been made independent of the JAI Project before Alternative 3 would come on-line: two Day Boat ACFs, improved vehicle and passenger staging areas at the Haines Ferry Terminal to optimize traffic flow on and off the Day Boat ACFs, and expansion of the Haines Ferry Terminal to include two new double bow berths.

During the summer, two Day Boat ACFs would make six round-trips per day between Sawmill Cove and William Henry Bay (total of 12 trips each direction), and the Haines-Skagway shuttle ferry would make six round-trips per day. During the winter, one Day Boat ACF would make four round-trips per day between Sawmill Cove and William Henry Bay, and the Haines-Skagway shuttle ferry would make four round-trips per day.

1.1.5 Alternatives 4A through 4D – Marine Alternatives

All four marine alternatives would include continued mainline ferry service in Lynn Canal with a minimum of two trips per week in the summer and one per week in the winter with Auke Bay-Haines-Skagway-Haines-Auke Bay routing. Each marine alternative includes a new conventional monohull shuttle that would make two round trips per day between Haines and Skagway six days a week in the summer and a minimum of three round trips per week between Haines and Skagway in the winter. The AMHS would continue to be the NHS route from Juneau to Haines and Skagway. These alternatives assume the following improvements will have been made independent of the JAI Project before the alternative comes on-line: improved vehicle and passenger staging areas at the Auke Bay and Haines ferry terminals to optimize traffic flow on and off the Day Boat ACFs, and expansion of the Haines Ferry Terminal to include new double bow berths.

1.1.5.1 Alternative 4A – Fast Vehicle Ferry Service from Auke Bay

Alternative 4A would construct two new fast vehicle ferries (FVFs). No new roads would be built for this alternative, and the Auke Bay Ferry Terminal would be expanded to include a new double stern berth. A new conventional monohull ferry would be constructed and would operate between Haines and Skagway. The *M/V Malaspina* would no longer operate as a summer day boat in Lynn Canal, and the Day Boat ACFs would no longer operate in Lynn Canal. The FVFs would make two round trips between Auke Bay and Haines and two round trips between Auke Bay and Skagway per day in the summer. During the winter, one FVF would make one round trip between Auke Bay and Haines and one round trip between Auke Bay and Skagway each day.

1.1.5.2 Alternative 4B – Fast Vehicle Ferry Service from Berners Bay

Similar to Alternative 4A, Alternative 4B would construct two new FVFs. This alternative would upgrade/extend Glacier Highway (5.2 miles, including 2.3 miles of new highway and widening of 2.9 miles of the existing Glacier Highway) from Echo Cove to Sawmill Cove in Berners Bay, where a new ferry terminal would be constructed. The Auke Bay Ferry Terminal would be expanded to include a new double stern berth. A new conventional monohull ferry would be constructed and would operate between Haines and Skagway. The *M/V Malaspina* would no longer operate as a summer day boat in Lynn Canal, and the Day Boat ACFs would no longer operate in Lynn Canal. In the summer, the FVFs would make two round trips between Sawmill Cove and Haines and two round trips between Sawmill Cove and Skagway per day. During the winter, one FVF would make one round trip between Auke Bay and Haines and one round trip between Auke Bay and Skagway each day.

1.1.5.3 Alternative 4C – Conventional Monohull Service from Auke Bay

Alternative 4C would use Day Boat ACFs to provide additional ferry service in Lynn Canal. No new roads would be built for this alternative. The Auke Bay Ferry Terminal would be expanded to include a new double stern berth, and the Skagway Ferry Terminal would be expanded to include a new end berth. A new conventional monohull ferry would be constructed and would operate between Haines and Skagway. In the summer, one Day Boat ACF would make one round trip per day between Auke Bay and Haines, and one Day Boat ACF would make one round trip per day between Auke Bay and Skagway. During the winter, one Day Boat ACF

would alternate between a round trip to Haines one day and a round trip to Skagway the next day.

1.1.5.4 Alternative 4D – Conventional Monohull Service from Berners Bay

Alternative 4D would use Day Boat ACFs to provide additional ferry service in Lynn Canal. This alternative would upgrade/extend Glacier Highway (5.2 miles, including 2.3 miles of new highway and widening of 2.9 miles of the existing Glacier Highway) from Echo Cove to Sawmill Cove in Berners Bay, where a new ferry terminal would be constructed. The Auke Bay Ferry Terminal would be expanded to include a new double stern berth, and the Skagway Ferry Terminal would be expanded to include a new end berth. This alternative includes construction of a new conventional monohull ferry that would operate between Haines and Skagway. In the summer, the Day Boat ACFs would make two trips per day between Sawmill Cove and Haines and two trips per day between Sawmill Cove and Skagway. During the winter, a Day Boat ACF would operate from Auke Bay, alternating between a round trip to Haines one day and to Skagway the next day.

2. Regulatory Update

There have been no revisions to the EFH regulations described in Section 1.1 of the 2004 *EFH Assessment* that would affect this project. However, in February 2011, the National Marine Fisheries Service (NMFS) published a document titled *Impacts to Essential Fish Habitat from Non-fish Activities in Alaska* (NMFS 2011). The general purpose of this document was to identify non-fishing activities, such as road building, mining, dredging, and other broad categories that may adversely impact EFH. This document also provides conservation recommendations that can be implemented for specific types of activities to avoid or minimize adverse impacts to EFH and is intended to be utilized by federal action agencies undertaking EFH consultations with NMFS, especially in preparing EFH assessments. As such, this document could be used as a resource for recommending EFH conservation recommendations or permit conditions for the proposed project. The DOT&PF committed to mitigation measures for EFH and resident fish in the JAI ROD dated April 2006. These conservation measures were in part supplied by NMFS and are consistent with those in the *Impacts to Essential Fish Habitat from Non-fish Activities in Alaska* (NMFS 2011).

3. Affected Environment

3.1 EFH Species Information

3.1.1 Pacific Herring

The following updates Section 4.4.6.1 of the 2004 *Essential Fish Habitat Assessment.*

Lynn Canal Stock Status and Trends – On April 27, 2007, the NMFS received a petition to designate the Lynn Canal Stock of Pacific herring (*Clupea pallasi*) as a threatened or endangered distinct population segment (DPS) under the Endangered Species Act (ESA). The petition was submitted by the Juneau Group of the Sierra Club. The Petitioner also requested that critical habitat be designated for Lynn Canal Pacific herring concurrent with the listing. After formal review of the best available scientific and commercial information, NMFS found that listing the Lynn Canal Pacific herring as threatened or endangered under the ESA was *not warranted* because the population does not constitute a species, subspecies, or DPS under the ESA (Federal Register 2008).

Detailed life history information for Pacific herring is found in the 2004 *Essential Fish Habitat Assessment*. The Alaska Department of Fish and Game Southeast Alaska 2009 Herring Stock Assessment Surveys, Fishery Data Series No. 09-72 (Herbert 2009) identified herring spawning at the southern entrance to Berners Bay in Lynn Canal and on the east side of Berners Bay North of Echo Cove. These locations, and other herring spawning areas, were identified in the 2004 *Essential Fish Habitat Assessment* and the 2005 *Addendum to Appendix N– Essential Fish Habitat Assessment.* Potential project effects on the spawning area were evaluated in those documents.

4. Environmental Consequences

Additional text is presented in the following subsections to supplement the discussion of impacts to EFH provided in Section of 5.0 the 2004 *Essential Fish Habitat Assessment* and Section 2.0 of the 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment*. The following evaluates only those alternatives that are new or have been modified; i.e., Alternatives 1B, 2B, and 3.

4.1 Alternative 1B – Enhanced Service with Existing AMHS Assets

Alternative 1B would enhance service with existing AMHS assets, and would not result in the construction of any new highways or ferry terminals. This would have no effects on EFH or associated pacific herring spawning areas.

4.1.1 Increased Vessel Traffic

An increase in the number ferry vessels operated in Lynn Canal could generate more wave and surge effects on shorelines. Vessel wakes can cause an increase in shoreline erosion, affect aquatic habitat, and increase water turbidity. Vessel prop wash can also damage aquatic vegetation and disturb sediments, which may increase turbidity and suspend contaminants (NMFS 2011). Aquatic vegetation commonly functions as EFH. However, effects to EFH from vessel traffic would likely be limited to isolated or localized areas such as ferry terminals where shallow shorelines may exist and where vessel operations occur in near-shore areas. Alternative 1B will operate from existing terminals in Auke Bay, Lutak Inlet and Taiya Inlet and thus would not have additional impacts to EFH beyond existing operational impacts at these locations.

4.2 Alternative 2B – East Lynn Canal Highway to Katzehin, Shuttles to Haines and Skagway

The 2008 USACE Section 404 permit authorized fill in 110.2 acres of Waters of the U.S. with 1,735,000 cubic yards of fill (USACE 2008). This included the following areas:

- Wetland Roadway Fill: 44.4 acres
- Channel Fill: 1.3 acres
- Marine Roadway Fill: 25.6 acres
- Marine Rock Disposal: 14.8 acres
- Ferry Terminal: 3.8 acres
- Ferry Breakwaters: 2.7 acres

As described in the introduction section, three key components that affected changes to the design and alignment of Alternative 2B and 3 since the 2006 ROD are: 1) changes during the USACE permitting process to further avoid and minimize impacts to wetlands and reduce the extent of rock side cast areas; 2) changes based on advanced geotechnical survey information; 3) recent changes in 2012 in response to updated bald eagle nest survey data. There will be no fill placed in anadromous streams including an additional stream crossing found in 2006. Alternative 2B will cross ten streams that are known to support populations of anadromous fish and are considered EFH. The October 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment* determined that Alternative 2B would fill 32 acres and dredge 4.4 acres (36.4 total acres) of intertidal / subtidal EFH. The most recent alignment and design changes for Alternative 2B would result in 25.48 acres of roadway fill, 4.40 acres of intertidal/subtidal dredging, and

6.57 acres of fill for the Katzehin Ferry Terminal and associated breakwaters (36.45 total acres). The overall acreage of EFH impact is approximately the same, however impacts associated with the ferry terminal were reduced and impacts associated with the roadway were increased.

4.2.1 Construction Impacts

4.2.1.1 Effects of Highway Construction

This section updates Section 5.4.1.1 of the 2004 *Essential Fish Habitat Assessment.* During the USACE permitting process, the USACE requested that marine rock disposal occur at a designated disposal site, as opposed to multiple areas throughout Lynn Canal, which resulted in the 14.8-acre authorized disposal site. Since issuance of the permit, less excavation is now required for the JAI Project because of alignment changes related to geotechnical issues, primarily unstable talus slopes. Therefore, the 14.8 acres of marine rock disposal authorized in the 2008 permit, although not considered EFH (USACE 2008), would not be generated under Alternative 2B as described in the previous EFH reports.

The impacts associated with construction activities would be temporary in nature. There would be no change in EFH impact associated with construction activities as previously documented in *Appendix N – Essential Fish Habitat Assessment*, completed in December 2004, and the October 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment*.

4.2.1.2 Stream Crossing Structures

This section updates Section 2.1.1 of 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment.* Under Alternative 2B, modifications to bridge approaches associated with the Antler River, Berners/Lace River, and the Katzehin River result in shorter crossing distances for these multi-span bridges. There would be a 0.55-acre increase in EFH impact on the south bank of the Katzehin River because of the scour protection added to the bridge abutment. Single-span bridges constructed without in-stream piers would still cross the remaining identified anadromous fish streams as previously described.

4.2.1.3 Effects of Ferry Terminal Construction

There would be no change in EFH impact associated with ferry terminal construction, as previously documented in Section 2.1.1 of the 2004 *Essential Fish Habitat Assessment* and the 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment*.

4.2.2 Long-Term Impacts

Section 2.1.2 of the 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment* determined that Alternative 2B would fill 32.05 acres and dredge 4.40 acres (36.45 total acres) of intertidal and subtidal EFH. This was consistent with the 2008 USACE permit acreages as no EFH-related fills were proposed south of Comet, and no changes in the alignment occurred north of Comet between the ROD and USACE permit issuance.

The most recent alignment and design changes for Alternative 2B, made to avoid unstable slope areas, impact approximately the same acreage of intertidal and subtidal EFH. Only slight modifications to the location of the impacts have occurred. The current roadway and ferry

alignment would result in 32.05 acres of marine fill and 4.40 acres of intertidal and subtidal dredging (36.45 total acres). The realignments of Alternative 2B since 2004 have reduced EFH impacts associated with highway fill and crossing structures for the Antler River, Berners /Lace River and the Katzehin River. The long term effects upon EFH from reducing in-water fill would be realized over time for those sections of the alignment at affect EFH.

Construction of the Katzehin Ferry Terminal would cause increased vessel traffic resulting in more wave and surge effects on shorelines located near by. Vessel wakes could cause an increase in shoreline erosion, affect aquatic habitat, and increase water turbidity.

4.2.3 Summary of Alternative 2B Impacts

Section 2.1.3 of the 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment* determined that Alternative 2B would fill 32 acres and dredge 4.4 acres (36.4 total acres) of intertidal/subtidal EFH. The most recent alignment and design changes for Alternative 2B, made primarily to avoid unstable slope areas, do not affect the overall acreage of EFH impact. A total of 32.05 acres of marine fill and 4.40 acres of intertidal and subtidal dredging (36.45 total acres) would impact EFH. This represents virtually no change in impacts to EFH from the 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment*. Table 4-1 provides a summary comparison of EFH impacts associated Alternative 2B and replaces Table 3-7 in the 2005 *Addendum to Appendix N – Essential Fish Habitat Assessment*.

Table 4-1: Fill Below High Tide Line (21.0')

Survey #	Station	To	Station	Length (ft)	Fill	
					S.F.	Acres[1]
Independence Creek	1454+00			---	435	0.01
EIT-36	1489+15		1515+50	2,635	127,000	2.92
EIT-35	1571+50		1575+50	415	16,065	0.37
EIT-34	1581+40		1582+25	85	1,190	0.03
EIT-24 & STN-3	1719+70		1735+58	1,588	151,425	3.48
EIT-22	1804+50		1805+75	125	870	0.02
EIT-21	1831+00		1844+00	1,300	22,840	0.52
STN 6-8	2099+85		2124+30	2,445	314,705	7.22
EIT-21	2503+18		2503+94	76	815	0.02
EIT-21	2551+65		2561+90	1,025	52,250	1.20
EIT-21	2565+50		2581+85	1,635	230,470	5.29
EIT-14	2585+50		2592+30	730	27,455	0.63
EIT-13	2628+50		2637+65	915	137,215	3.15
KATZ 1-4	2761+75		2766+25	450	26,920	0.62
					ALIGNMENT SUB TOTAL	**25.48**
					FERRY TERMINAL AND BREAKWATER FILL	6.57
					KATZEHIN FERRY TERMINAL DREDGE	4.40
					GRAND TOTAL	**36.45**

[1] Does not include potential impacts associated with bridge piers.

4.3 Alternative 3 – West Lynn Canal Highway

Minor alignment and design changes associated with Alternative 3 were introduced to avoid impacts to eagle nest locations along the alignment based on a 2012 survey. The minor alignment and design changes associated with Alternative 3 do not change the number of stream crossings, and as such this alternative would still cross nine streams or waterbodies that are known to support populations of anadromous fish and are considered EFH. There are no additional impacts expected from construction impacts, effects of ferry terminal construction, or long-term impacts as previously described in Section 5.6 of the 2004 *Essential Fish Habitat Assessment*.

5. References

Alaska Department of Transportation and Public Facilities (DOT&PF). 2004. *Appendix N, Essential Fish Habitat Assessment* for the *Juneau Access Improvements Supplemental Draft Environmental Impact Statement.* Juneau, Alaska, December 2004. Available online at http://dot.alaska.gov/sereg/projects/juneau_access/assets/SDEIS_JAN05/Appendix_N.pdf

——. 2005. *Juneau Access Improvements Supplemental Draft Environmental Impact Statement.* Juneau, Alaska. January, 2005. Available online at http://dot.alaska.gov/sereg/projects/juneau_access/assets/SDEIS_JAN05/RevisedCAR_070605.pdf

——. 2006. *Juneau Access Project: Final Environmental Impact Statement.* Juneau, Alaska. Available online at: http://dot.alaska.gov/sereg/projects/juneau_access/documents.shtml#feis.

Federal Register. 2008. *Endangered and Threatened Species; Notice of Finding on a Petition to List the Lynn Canal Population of Pacific Herring as a Threatened or Endangered Species.* Federal Register, Volume 73, No 71. April 11, 2008.

Herbert, K. 2009. *Southeast Alaska 2009 herring stock assessment surveys.* Alaska Department of Fish and Game, Fishery Data Series No. 09-72, Anchorage, AK.

National Marine Fisheries Service (NMFS), Alaska Region. 2011. *Impacts to Essential Fish Habitat from Non-fishing Activities in Alaska.* February 2011. United States Department of Commerce, NOAA, NMFS, 709 W. 9th St., Juneau AK 99802-1668.

U. S. Army Corps of Engineers (USACE), Alaska Region. 2008. *Record of Decision and Permit Evaluation, Lynn Canal and the Berners Bay Watershed.* POA-2006-597-2. June 13, 2008. U.S. Army Engineering District, Alaska.

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Attachment A
2005 Addendum to Appendix N – Essential Fish Habitat Assessment

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Addendum to Appendix N

Essential Fish Habitat Assessment

Prepared by

URS Corporation
2700 Gambell Street, Suite 200
Anchorage, Alaska 99503

OCTOBER 2005

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TABLES

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1.0 AFFECTED ENVIRONMENT

An addendum to Appendix N*, Essential Fish Habitat Technical Assessment Report,* from the Supplemental Draft EIS was completed to incorporate additional information from the Kensington Gold Project Final EIS, development plans and permits associated with the Kensington Gold Project and Cascade Point Marine Terminal. Additional references were reviewed following comments from the public and cooperating agencies received during the Supplemental Draft EIS public comment period. Further, the highway alignment from Alternative 2B has been adjusted to avoid all palustrine emergent and most estuarine emergent wetlands, and shift the Antler River crossing further upstream to reduce impacts to essential fish habitat (EFH). Fill amounts also changed due to highway alignment changes and included in Table 3-7 of this addendum.

1.1 Fill/Side Casting Sites

Because Alternatives 2, 2A, and 2C are no longer project alternatives, EIT 6 and EIT 9, located in Taiya Inlet, are removed from the list of sites identified in Section 4.2.2 as potentially requiring fill placement.

1.2 Pacific Herring

There are many potential factors for the decline of the Lynn Canal herring stock including over-fishing, increased predator populations, disease, habitat alteration/degradation and unfavorable oceanographic conditions. All of these factors (not increased predation by Steller sea lions alone) could be involved to some degree in this decline; however, the magnitude of impact for any given factor is unknown.

1.3 Eulachon

The following paragraphs are provided to supplement text provided in Section 4.4.6.2 of the 2004 *Essential Fish Habit Assessment*.

Moffitt et al. (2002) describes how eulachon begin entering river systems as early as January in southeast Alaska, with water temperature possibly dictating entrance time. However, Spangler and Koski (2003) found that the run in the Antler River in 2002 commenced on April 19 and continued until May 21. They documented that the maximum distance migrated up the Antler River was about 4 kilometers and 99 percent of all observations were found in the lower 2-kilometer section of the river. Mean daily water temperatures during the run varied from 3.03 to 5.45 degrees Celsius (°C) with a mean of 4.16°C for the spawning period. Eulachon were observed to prefer spawning on gravel (2 to 25 millimeters [mm]) and areas of moderate current velocity (0.2-0.6 meters per second [m/s]).

Eulachon eggs hatch after 30 to 40 days at temperatures of 4.4 to 7.2 C°, and the small larvae are quickly carried into the marine environment. Little is known of eulachon life history after the larvae enter the marine environment until they return to spawn. Pre-spawning aggregations of eulachon in Berners Bay attract large numbers of sea lions and the eulachon pulse may be critical to Steller sea lions during a period of high energetic demands (Sigler et al., 2004).

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2.0 ALTERNATIVE ANALYSES

Because of the August 2005 realignment, additional text is presented in the following subsections to supplement the discussion of impacts to EFH provided in Section 5.4 of the 2004 EFH Assessment. Also, a revised Table 3-7 is provided with new fill volumes for intertidal areas.

2.1 Alternative 2B – East Lynn Canal Highway to Katzehin with Shuttles to Haines and Skagway

Alternative 2B would cross nine streams that are known to support populations of anadromous fish: Sawmill Creek, an unnamed creek south of Antler River, Antler River, Berners/Lace River, Slate Creek, Sweeny Creek, Sherman Creek, an unnamed creek north of Comet, and the Katzehin River. Three of these anadromous rivers, the Antler, the Berners/Lace, and the Katzehin, would require multi-span bridges with in-stream piers. Single-span bridges constructed without in-stream piers would cross the remaining identified anadromous fish streams.

2.1.1 Construction Impacts

Stream Crossing Structures

In response to EFH Conservation Recommendations made by the National Marine Fisheries Service (NMFS), the August 2005 realignment of Alternative 2B moves the Antler River crossing upstream to further avoid important eulachon habitat. This realignment reduces the number of in-stream bridge piers and eliminates the need for any in-stream bridge piers in the northern channel, which is documented to have a high density of eulachon spawning.

Effects of Ferry Terminal Construction

Fish passage gaps or large box culverts would be included in the design for the Katzehin Ferry Terminal breakwaters. These additions would reduce impacts to anadromous EFH by providing fish passage close to shore. Pile driving would be limited to a period when larval and juvenile EFH species are not present.

2.1.2 Long-Term Impacts

The August 2005 realignment eliminates potential impacts from highway fill to habitats at EIT 11, a sediment beach, and at EIT 12, a wetland/slough location. The approximate total acreage of intertidal/subtidal habitat that would be buried or otherwise impacted by the Alternative 2B highway is 25.6 acres, an increase of 3.7 acres from the previous alignment. The direct effects on marine EFH from placing in-water fill in specific intertidal and subtidal zones would be realized throughout the 25.6 acres (includes the fill volumes in Table 3-7 plus 2.66 acres of subtidal fill).

Approximately 6.4 acres of intertidal sediment beach and subtidal area at the Katzehin Ferry Terminal location would be buried with fill and would no longer be available for colonization. This is an increase of 2.1 acres from the previous alignment. Dredging for the terminal would impact 4.4 acres (a reduction of 0.1 acre from the previous alignment) of subtidal boulder/cobble/gravel habitat.

2.1.3 Summary of Alternative 2B Impacts

Approximately 36.4 acres of intertidal/subtidal habitat would be buried or otherwise impacted under Alternative 2B (25.6 acres for the highway construction and 10.8 acres at the Katzehin Ferry Terminal). There would be no effects from sidecasting or fill placement in Taiya Inlet north of the Katzehin River.

3.0 CUMULATIVE EFFECTS

The following subsections replace Section 5.9 in the 2004 *Essential Fish Habitat Assessment*.

3.1 Past, Present, and Reasonably Foreseeable Future Effects

The following reasonable foreseeable projects would cause loss of marine EFH due to the placement of fill in the intertidal and shallow subtidal zones:

- Alaska Glacier Seafoods Plant – 0.63 acre of fill for a pad extending into Auke Nu Cove, and an 80-foot by 110-foot pile-supported dock (U.S. Army Corps of Engineers [USACE], 2003).
- Goldbelt Cascade Point Marine Terminal – 1.3 acres of fill for a breakwater and 1.6 acres of dredge for a turning basin (Alaska Department of Natural Resources [ADNR], 2005a).
- Kensington Mine Slate Cove facilities – 2.1 acres of fill for a marine terminal (ADNR, 2005b).
- Otter Creek Hydroelectric Plant – 0.7 acre of fill in intertidal and subtidal habitat for a deep marine jetty and floating dock (Federal Emergency Regulatory Commission [FERC], 2002).

Various hypotheses have been put forward as to why Lynn Canal herring stocks have declined, although none have been substantiated through careful scientific analysis. These hypotheses include one or some combination of the following factors: overfishing, increased predator populations, disease, habitat alteration or degradation (especially in Auke Bay), water pollution, and unfavorable oceanographic conditions (see Attachment C in the 2004 EFH Assessment). Thus, one or more of these factors in Lynn Canal and/or Berners Bay could have affected Pacific herring stocks such that the species' ability to recover has been compromised and the population remains below harvestable levels. Past direct and indirect impacts on Pacific salmon, eulachon, crabs, and sculpin have not been observable at the population level.

Many of the effects from the reasonably foreseeable projects would be short-term and temporary, such as increased turbidity during construction. Other longer-term impacts on water quality could be realized due to effluent from the seafood plant, hydroelectric facility, and mine, and spills from vessels associated with the Cascade Point/Slate Cove improvements. Marine vessel and harbor operations could cause short-term impacts to water quality due to discharges (permitted and unintentional sanitary waste discharge), and unintentional fuel discharge. These water quality changes could result in mortality of individual Pacific herring, crabs, and sculpins. Other future foreseeable or ongoing events occurring within Lynn Canal that have the potential to impact habitat and fish and invertebrates include commercial, sport and subsistence/personal use fishing, and recreation.

3.1.1 Alternative 1 – No Action Alternative

3.1.1.1 Cumulative Effects

The intertidal and shallow subtidal habitat that would be lost as a result of these projects is used by juvenile salmon, particularly pink salmon, during their early marine life stages, as well as by prey species for fish stocks in Lynn Canal. When they first enter marine waters, pink salmon spend most of their time in a few centimeters of water (Groot and Margolis, 1991). Other juvenile salmonids such as chum, coho, and sockeye salmon also use shallow nearshore

habitat for rearing, but not to the same extent as pink salmon. Reasonable foreseeable projects would result in impacts to approximately 8 acres of nearshore habitat used by juvenile salmon. Because much of the Lynn Canal coastline provides suitable rearing habitat for juvenile salmon, this loss would not measurably affect salmon populations in Lynn Canal.

Construction of the dock facility at Slate Creek for the Kensington Gold Project could affect both adult eulachon returning to spawn and juvenile eulachon, depending on timing. Noise and increased boat traffic due to construction could disrupt the migration of some adult eulachon returning to spawn if these activities occur in the April to May spawning period. Avoiding construction during this period could mitigate this effect. Some juvenile eulachon feeding in Berners Bay could be affected by dock construction at Slate Creek; however, these fish are found mostly along the bottom in deeper water (Smith and Saalfeld, 1955). Because construction would impact a small area of eulachon foraging habitat and construction would last for a short period of time, no measurable effects to eulachon populations in Lynn Canal would occur (USFS, 2004).

Approximately 2 acres of potential spawning habitat for Pacific herring at Cascade Point would be lost due to construction of the dock and breakwater. If the filled and dredged area at Cascade Point were entirely lost for spawning, approximately 350 feet of shoreline would be affected (USFS, 2004). This is equivalent to less than 2 percent of the along-shore herring spawning length (approximately three miles) observed in Berners Bay in 2003.

The Kensington Gold Project and Alaska Glacier Seafoods project would increase marine vessel traffic in Lynn Canal. Until recently, treatment of wastewater discharged from marine vessels did not need to meet water quality standards that were completely protective of aquatic life. New compliance regulations effective in 2005 require wastewater discharges to meet Alaska Water Quality Standards (AWQS). Therefore, even though marine vessel traffic and corresponding wastewater discharges may increase under the No Action Alternative, those discharges should not alter water quality in Lynn Canal because of improved wastewater treatment.

3.1.2 Alternative 2B

3.1.2.1 Indirect Effects

Alternative 2B would result in improved access to the east side of Lynn Canal. This is likely to result in increased recreational fishing for anadromous fish along the eastern shoreline of Lynn Canal, as well as the anadromous streams crossed by the alignment. No boat ramps would be constructed along the highway for this alternative. Therefore, Alternative 2B would not increase the number of access points in the project study area for boats other than small, highly portable recreational craft such as kayaks and canoes.

Alternative 2B is projected to result in an increase in non-resident visitors and a small population increase in Juneau, Haines, and Skagway. This would increase the volume of effluent discharged from the wastewater treatment facilities in these communities. This increase would not reduce water quality in the receiving waters because these facilities must meet National Pollution Discharge Elimination System (NPDES) discharge limitations protective of aquatic life.

3.1.2.2 Cumulative Effects

The Alternative 2B highway would be on the shoreline at several locations between Sherman Point and the Katzehin River. This would result in filling 25.6 acres of intertidal and shallow subtidal habitat. An additional 6.4 acres of intertidal and subtidal habitat would be filled for the

proposed Katzehin Ferry Terminal. An additional 4.4 acres of subtidal habitat would be dredged for a ferry mooring basin at the terminal site. Therefore, Alternative 2B would impact about 36.4 acres of intertidal and subtidal habitat.

Alternative 2B in combination with reasonable foreseeable projects would result in the loss of 44 acres of nearshore intertidal and shallow subtidal habitat used by juvenile salmon. Because much of the Lynn Canal coastline provides suitable rearing habitat for juvenile salmon, this loss would not measurably effect salmon populations in Lynn Canal.

The Slate Creek dock facilities for the Kensington Gold Project would impact 2.1 acres of foraging habitat for juvenile eulachon. Short-term loss of benthic resources would occur, but recolonization would be expected. Schooling pelagic species, like herring and eulachon, may temporarily avoid the crew shuttle boat route due to noise, although some acclimation to frequent noise would be expected. Overall, there would be adverse effects on EFH prey resources, although most impacts are expected to be short-term (ADNR, 2005c). Eulachon also use the Katzehin River for spawning. Because the proposed Katzehin Ferry Terminal would be located north of the river delta, it would not impact spawning runs of this species. In addition, the design for the breakwaters at the Katzehin Ferry Terminal would include fish passage gaps or large box culverts to provide fish passage close to shore.

The Pacific herring population in Lynn Canal has been substantially reduced over the past few decades, to the point that it is no longer a viable commercial fishery. Various hypotheses have been put forth as to why the stocks have declined, though none have been substantiated by scientific analysis. These hypotheses include one or some combination of the following factors: overfishing, increased predator populations, disease, habitat alteration/degradation, water pollution, and environmental changes such as unfavorable oceanographic conditions.

Alternative 2B in combination with other reasonable foreseeable projects in the region were evaluated for the potential to impact EFH through changes in water quality. This evaluation considered discharges of sanitary wastewater from marine and ferry terminals as well as marine vessels, leakage of fuels and lubricants from marine vessels, highway stormwater runoff, and catastrophic spills from marine vessels and vehicles using a highway.

Sanitary wastewater would be discharged from the Katzehin terminal into Lynn Canal. These discharges would not substantially alter water quality. Wastewater would go through tertiary treatment using ultraviolet light disinfection prior to discharge and discharges would be at the appropriate distance from shore and depth of water to meet permit guidelines for mixing. Treated wastewater would meet AWQSs protective of aquatic life. There are no plans for wastewater treatment and discharge at the proposed Coeur Slate Cove and Goldbelt Cascade Point marine facilities in Berners Bay. However, Coeur has been permitted for an outfall that will discharge treated domestic wastewater into Lynn Canal. Discharges from this outfall are not expected to substantially alter water quality (ADNR, 2005d). Because discharge of wastewater from ferry terminals proposed for Alternative 2B would not result in substantial water quality changes in Lynn Canal and other reasonable foreseeable marine facilities that would be located there do not include wastewater treatment and discharge facilities, there would be no cumulative water quality impacts from this source.

The highway proposed for Alternatives 2B would be located along the eastern shore of Berners Bay, and at times it would be within 200 feet of the shore. Results of stormwater research by the Federal Highway Administration (FHWA) indicate that stormwater runoff from low to medium traffic volumes (under 30,000 vehicles per day) on rural highways exerts minimal to no impact on the aquatic components of most receiving waters (United States Department of

Transportation [USDOT] & FHWA, 1987). Annual average daily traffic (AADT) on the proposed highway is projected to average 670 vehicles in 2038, which is about 3 percent of the maximum traffic volume considered in the FHWA research.

Studies conducted in Anchorage, Alaska, under the Municipality of Anchorage (MOA) Watershed Management Program similarly concluded that street runoff has minimal impacts to the water quality of receiving waters from most potential pollutants (MOA, 2000). These studies evaluated runoff from residential streets (<2,000 average daily traffic [ADT]) to major arterials (>20,000 ADT), including water quality impacts from snowmelt. The studies showed dissolved concentrations of calcium, chromium, magnesium, and zinc to be below AWQSs and polynuclear aromatic hydrocarbons (PAHs) to be below U.S. Environmental Protection Agency (USEPA) water quality criteria. Only dissolved concentrations of copper and lead were noted to be above their AWQSs; however, modest dilution would likely reduce these concentrations below their AWQSs. Because of the rural setting of Alternative 2B and the predicted low annual ADT, lower concentrations of pollutants would be present in runoff from the highway proposed for this alternative than were found in the Anchorage studies. Based on the results of those studies and FHWA research, runoff from Alternative 2B would not cause water quality impacts in Berners Bay.

Alternative 2B would end Alaska Marine Highway System (AMHS) service at Auke Bay, but would increase shuttle ferry traffic in Chilkoot and Taiya Inlets. Shuttle ferries would be equipped with sanitary waste holding tanks that would be pumped out and the waste would be treated onshore at an appropriate treatment plant or wastewater would be treated onboard to appropriate standards prior to discharge. Therefore, wastewater from these ferries would not impact water quality in Chilkoot and Taiya Inlets, and would not contribute to cumulative water quality impacts.

The potential for introduction of oil into Chilkoot and Taiya Inlets exists from fueling operations at ferry terminals, leakage from ferry decks or other sources from ferry vessels, and spills from marine casualties. The shuttle system would consist of three vessels running between Katzehin, Haines, and Skagway during the summer (ferry traffic would decrease during winter):

- An Aurora class shuttle between Katzehin and Haines with a 34-vehicle capacity;
- A shuttle serving Katzehin and Skagway with a 53-vehicle capacity; and
- A shuttle between Haines and Skagway with a 16-vehicle capacity.

The amount of in-water spillage could range from small amounts of fuel and lubricants up to a catastrophic release of petroleum. The amount of spillage onto ferry decks that discharge overboard could range from a few ounces to approximately 200 gallons. Sources of on-board spills would be fueling operations or vehicle fuel or oil leaks while underway. Fuel is pumped at the rate of 200 gallons per minute; in any event of leakage shutdown of pumping would be immediate and would be completed within a few seconds. (Potential fueling accidental spills could occur at the Lutak or Skagway terminals; fueling would not occur at the Katzehin ferry terminal.) The amount of oil discharged from vehicle tank leaks while on board could be from a few drops to 200 gallons, as fuel tanks in large trucks may be as large as 200 gallons.

The amount of an in-water oil spill from a marine casualty, such as grounding, etc., could range from a few gallons to the maximum fuel capacity of the ferry. The maximum fuel capacities of the three ferries, based on vessel size, are[8]:

- Katzehin-Haines shuttle ferry (34 vehicles, Aurora class), up to 46,000 gallons;
- Katzehin-Skagway shuttle ferry (53 vehicles), up to 74,000 gallons.
- Haines-Skagway shuttle (16 vehicles), up to 9,300 gallons.

Timing of a catastrophic oil spill would be a factor in the degree of impact experienced. For example, weather would affect cleanup, or the size of a spill would be smaller if it were to occur at the end of the voyage when most of the fuel would be expended.

The National Oceanic and Atmospheric Administration (NOAA) believes typical levels of hydrocarbons near AMHS ferry terminals would be very low. Because of requirements for fueling operator training and monitoring, as well as requirements for cleanup equipment on board ferries and spill response plan for fueling operations, fuel introduced into water by leakage from fueling operations or vessel traffic is not likely to impact essential fish habitat in Lynn Canal. The vessels would carry absorbent sheets (50 would pick up approximately 17 gallons) and other absorbent materials such as booms, etc. (AMHS, personal communication, 2005). Currently, vessels carry 50 absorbent sheets (each picks up 1/3 gallon), absorbent booms, and other absorbent material (AMHS, personal communication, 2005). All of the equipment would provide the capacity to pick up approximately up to 100 gallons on deck (Alaska Department of Environmental Conservation [ADEC], personal communication, 2005). Fueling operations are currently monitored by the U.S. Coast Guard and require special training of personnel and periodic equipment inspections (Petro Marine, personal communication, 2005).

A catastrophic oil spill, depending on size, timing, and response speed and capability, could substantially impact essential fish habitat of Chilkoot and Taiya inlets. Currently, the AMHS has an existing contract for spill response in Alaska, Canada and Washington, as part of the ISM and the Safety Management System (AMHS, personal communication, 2005).

3.1.3 Alternative 3

3.1.3.1 Indirect Effects

Alternative 3 would result in improved access to the west side of Lynn Canal. This is likely to result in increased recreational fishing for anadromous fish along the western shoreline of Lynn Canal, as well as the anadromous streams crossed by the alignment. No boat ramps would be constructed along the highway for this alternative. Therefore, Alternative 3 would not increase the number of access points in the project study area for boats other than small, highly portable recreational craft such as kayaks and canoes.

Alternative 3 is projected to result in an increase in non-resident visitors in Juneau, Haines, and Skagway and in population growth in Juneau and Haines. Subsequently, the volume of effluent discharged from the wastewater treatment facilities in these communities would increase. This

[8] The fuel capacities for the 16-, 34-, and 53-vehicle capacity ferries are based on fuel capacities of existing vessels. The *M/V Lituya* is representative of the 16-vehicle vessel, the *M/V Aurora* is representative of the 34-vehicle vessel, and the *M/V Taku* is representative of the 53-vehicle vessel, though the *Taku* can carry 69 vehicles and has a maximum fuel capacity of 74,386 gallons.

increase would not reduce water quality in the receiving waters because these facilities must meet NPDES discharge limitations protective of aquatic life.

3.1.3.2 Cumulative Effects

Alternative 3 would be on the shoreline approximately two miles north of the Endicott River, resulting in the fill of 0.09 acre of intertidal habitat. Construction of the causeway between the proposed bridges over the Chilkat River/Inlet would also fill 4.8 acres of intertidal habitat. The proposed ferry terminals at Sawmill Cove and William Henry Bay would fill and dredge a total of about eight acres of intertidal and shallow subtidal habitat.

Nearshore intertidal and shallow subtidal habitat is used by juvenile salmon, particularly pink salmon, during their early marine life stages, as well as by prey species for fish stocks in Lynn Canal. Alternative 3 in combination with reasonable foreseeable projects would result in the loss of 19.2 acres of this habitat. Because much of the Lynn Canal coastline provides suitable rearing habitat for juvenile salmon, this loss would not measurably effect salmon populations in Lynn Canal.

The Goldbelt Cascade Point Marine Facility and the Sawmill Cove Ferry Terminal proposed for Alternative 3 would have a cumulative impact on existing Pacific herring spawning habitat. The Goldbelt Cascade Point Marine Facility breakwater and dredging would impact approximately 2.9 acres of intertidal and subtidal habitat. The Sawmill Cove Ferry Terminal would require fill and dredge of 3.2 acres of intertidal and subtidal habitat in areas that Pacific herring are known to currently spawn in Berners Bay. Based on a 2003 site survey, the proposed Sawmill Cove terminal site is suitable herring spawning habitat because it supports patches of blade kelp that were sparse but persistent and evenly distributed throughout the subtidal area. There is no eelgrass or stalked kelp. The Cascade Point marine facility would result in a loss of important herring spawning habitat from the dredging of the boat basin and fill associated with the breakwater. Short-term loss of the benthic resources would occur, but some recolonization would be expected. In addition, schooling pelagic fish, like herring, may temporarily avoid the crew shuttle boat route due to noise, although some acclimation to frequent noise events would be expected (ANDR, 2005a). Alternative 3 in combination with reasonable foreseeable activities would impact a total of approximately 6 acres of spawning habitat currently used by Pacific herring in Berners Bay. The footprint of the Sawmill Cove Ferry Terminal is approximately 300 feet of shoreline at mean lower low water, which is equivalent to less than 2 percent of the along-shore herring spawning length observed in Berners Bay in 2003. The footprint of the Cascade Point marine facility in combination with the Sawmill Cove terminal proposed for Alternative 3 would result in the cumulative loss of 4.4 percent of the known along-shore Pacific herring spawning habitat in Berners Bay. This would be a cumulative impact to Pacific herring. Approximately 4.8 acres of this habitat would be lost to terminal filling and dredging at William Henry Bay. However, Pacific herring spawning is currently limited to Berners Bay and no spawning takes place in any of these other locations in Lynn Canal.

The Slate Creek dock facilities for the Kensington Gold Project would impact 2.1 acres of foraging habitat for juvenile eulachon. Short-term loss of benthic resources would occur, but recolonization would be expected. Schooling pelagic species, like herring and eulachon, may temporarily avoid the crew shuttle boat route due to their noise, although some acclimation to frequent noise would be expected. Overall, there would be adverse effects on EFH prey resources, although most impacts are expected to be short-term (ADNR, 2005c).

Alternative 3 in combination with other reasonable foreseeable projects in the region were evaluated for the potential to impact essential fish habitat through changes in water quality. This

evaluation considered discharges of sanitary wastewater from marine and ferry terminals as well as marine vessels, leakage of fuels and lubricants from marine vessels, highway stormwater runoff, and catastrophic spills from marine vessels and vehicles using a highway.

Sanitary wastewater would be discharged from the Sawmill Cove terminal into Berners Bay and from the William Henry Bay terminal into that bay. These discharges would not substantially alter water quality. Wastewater would go through tertiary treatment using ultraviolet light disinfection prior to discharge and discharges would be at the appropriate distance from shore and depth of water to meet permit guidelines for mixing. Treated wastewater would meet AWQSs protective of aquatic life. There are no plans for wastewater treatment and discharge at the proposed Slate Creek and Cascade Point marine facilities in Berners Bay. However, Coeur has been permitted for an outfall that will discharge treated domestic wastewater into Lynn Canal. Discharges from this outfall are not expected to substantially alter water quality (ADNR, 2005d). Because discharge of wastewater from ferry terminals proposed for Alternative 3 would not result in substantial water quality changes in Berners Bay and other reasonable foreseeable marine facilities that would be located there do not include wastewater treatment and discharge facilities, there would be no cumulative water quality impacts from this source.

Alternative 3 would end AMHS service at Auke Bay but would increase shuttle ferry traffic in Lynn Canal and introduce shuttle ferry traffic in Berners Bay. Shuttle ferries would be equipped with sanitary waste holding tanks that would be pumped out and the waste treated onshore at an appropriate treatment plant, or wastewater would be treated onboard to appropriate standards prior to discharge. Therefore, wastewater from these ferries would not impact water quality in Lynn Canal and Berners Bay, and would not contribute to cumulative water quality impacts.

The increased marine vessel traffic in Berners Bay associated with Alternative 3 and reasonable foreseeable projects at Slate Creek and Cascade Point could lead to an increase in total petroleum hydrocarbons (TPHs) in the bay from fuel and lubricant leaks. However, because of the small volume of vessel traffic that would result from Alternative 3 and reasonable foreseeable projects, it is unlikely that hydrocarbon leaks would be large enough to impact essential fish habitat in Berners Bay.

The highway proposed for Alternative 3 would be located along the eastern shore of Berners Bay to Sawmill Cove. Based on the results of stormwater runoff studies conducted by the Municipality of Anchorage and FHWA, runoff from Alternative 3 would not cause water quality impacts in Berners Bay.

The potential for a catastrophic release of petroleum in Berners Bay would increase with Alternative 3 and the reasonable foreseeable projects. Depending on the timing and location of such a spill, it could substantially impact the Pacific herring spawning population in the bay.

3.1.4 Alternatives 4A and 4C

3.1.4.1 Indirect Effects

Alternative 4A is projected to result in an increase in non-resident visitors and in a small amount of population growth in Juneau, Haines, and Skagway. Subsequently, the volume of effluent discharged from the wastewater treatment facilities in these communities would increase. This increase would not reduce water quality in the receiving waters because these facilities must meet NPDES discharge limitations protective of aquatic life.

3.1.4.2 Cumulative Effects

Alternatives 4A and 4C in combination with the reasonable foreseeable expansion of the Alaska Glacier Seafoods Plant would result in the loss of about 1.5 acres of nearshore intertidal and shallow subtidal habitat in Auke Bay. Other marine facilities have been constructed in Auke Bay including the existing Auke Bay ferry terminal, a boat launch ramp, several marinas including fueling facilities, a harbormaster's office, associated parking, and residential and commercial wastewater facilities. Although the acreage of impacted intertidal and subtidal habitat has not been computed, development occurs all along the waterfront of Auke Bay. A large portion of most of the facilities is on the surface of the water away from the nearshore habitat (such as the finger float system of a marina), and parts of the facilities occupy a smaller portion of intertidal or subtidal habitat (such as a staging dock and access ramp). In such instances, the amount of nearshore habitat impacted is not commensurate with the size of the entire development. Because the remaining Auke Bay nearshore intertidal and subtidal habitat and most of the Lynn Canal coastline provides suitable rearing habitat for juvenile salmon, prey species, and crabs, this loss would not measurably affect fish and invertebrate populations in Lynn Canal.

3.1.5 Alternatives 4B and 4D

3.1.5.1 Indirect Effects

Alternative 4B is projected to result in an increase in non-resident visitors and in a small amount of population growth in Juneau, Haines, and Skagway. The same types of increases are also projected for Alternative 4D, but for only Juneau and Haines. Subsequently, the volume of effluent discharged from the wastewater treatment facilities in these communities would increase. This increase would not reduce water quality in the receiving waters because these facilities must meet NPDES discharge limitations protective of aquatic life.

3.1.5.2 Cumulative Effects

Alternatives 4B and 4D in combination with the reasonable foreseeable expansion of the Alaska Glacier Seafoods Plant would result in the loss of about 1.5 acres of nearshore intertidal and shallow subtidal habitat in Auke Bay. Other marine facilities have been constructed in Auke Bay including the existing Auke Bay Ferry Terminal, a boat launch ramp, several marinas including fueling facilities, a harbormaster's office, associated parking, and residential and commercial wastewater facilities. Although the acreage of impacted intertidal and subtidal habitat has not been computed, development occurs all along the waterfront of Auke Bay. A large portion of most of the facilities is on the surface of the water away from the nearshore habitat (such as the finger float system of a marina), and parts of the facilities occupy a smaller portion of intertidal or subtidal habitat (such as a staging dock and access ramp). In such instances, the amount of nearshore habitat impacted is not commensurate with the size of the entire development.

Because the remaining Auke Bay nearshore intertidal and subtidal habitat and most of the Lynn Canal coastline provides suitable rearing habitat for juvenile salmon, prey species, and crabs, this loss would not measurably affect fish and invertebrate populations in Lynn Canal.

Alternatives 4B and 4D would result in the loss of 3.2 acres of intertidal and subtidal habitat from dredging and filling at the proposed Sawmill Cove Ferry Terminal site. Nearshore intertidal and shallow subtidal habitat is used by juvenile salmon, particularly pink salmon, during their early marine life stages, as well as by prey species for fish stocks in Lynn Canal. Alternatives 4B and 4D in combination with reasonable foreseeable projects would result in the loss of about 9 acres

of this habitat. Because much of the Lynn Canal coastline provides suitable rearing habitat for juvenile salmon, this loss would not measurably effect salmon populations in Lynn Canal.

The Goldbelt Cascade Point Marine Facility and the Sawmill Cove Ferry Terminal proposed for Alternatives 4B and 4D would have a cumulative impact on existing Pacific herring spawning habitat. The Goldbelt Cascade Point Marine Facility breakwater and dredging would impact approximately 2.9 acres of intertidal and subtidal habitat. The Sawmill Cove Ferry Terminal would require fill and dredge of 3.2 acres of intertidal and subtidal habitat in areas that Pacific herring are known to currently spawn in Berners Bay. Based on 2003 site surveys, the proposed Sawmill Cove terminal site is suitable habitat for Pacific herring spawning. The Cascade Point marine facility would result in a loss of important herring spawning habitat from the dredging of the boat basin and fill associated with the breakwater. Short-term loss of benthic resources would occur, but some recolonization is expected. However, the construction of the breakwater would result in some permanent loss of benthic resources. In addition, schooling pelagic fish, like herring, may temporarily avoid the crew shuttle boat route due to noise, although some acclimation to frequent noise events would be expected (ADNR, 2005c). Alternatives 4B and 4D in combination with reasonable foreseeable projects would impact a total of approximately 6 acres of spawning habitat currently used by Pacific herring in Berners Bay. The footprint of the Sawmill Cove Ferry Terminal is approximately 300 feet of shoreline at mean lower low water, which is equivalent to less than 2 percent of the along-shore herring spawning length observed in Berners Bay in 2003. The footprint of the Cascade Point marine facility in combination with the Sawmill Cove terminal proposed for Alternatives 4B and 4D would result in the cumulative loss of 4.4 percent of the known along-shore Pacific herring spawning habitat in Berners Bay. This would be a cumulative impact to Pacific herring because the regional population is depressed.

The Slate Creek dock facilities for the Kensington Gold Project would impact 2.1 acres of foraging habitat for juvenile eulachon. Short-term loss of benthic resources would occur, but recolonization would be expected. Schooling pelagic species, like herring and eulachon, may temporarily avoid the crew shuttle boat route due to their noise, although some acclimation to frequent noise would be expected. Overall, there would be adverse effects on EFH prey resources, although most impacts are expected to be short-term (ADNR, 2005c).

Alternatives 4B and 4D in combination with other reasonable foreseeable projects in the region were evaluated for the potential to impact essential fish habitat through changes in water quality. This evaluation considered discharges of sanitary wastewater from marine and ferry terminals as well as marine vessels, leakage of fuels and lubricants from marine vessels, highway stormwater runoff, and catastrophic spills from marine vessels and vehicles using a highway. Sanitary wastewater would be discharged from the Sawmill Cove terminal into Berners Bay. This discharge would not substantially alter water quality. Wastewater would go through tertiary treatment using ultraviolet light disinfection prior to discharge and discharges would be at the appropriate distance from shore and depth of water to meet permit guidelines for mixing. Treated wastewater would meet AWQSs protective of aquatic life. There are no plans for wastewater treatment and discharge at the proposed Slate Creek and Cascade Point marine facilities in Berners Bay. However, Coeur has been permitted for an outfall that will discharge treated domestic wastewater into Lynn Canal. Discharges from this outfall are not expected to substantially alter water quality (ADNR, 2005d). Because discharge of wastewater from the ferry terminal proposed for Alternatives 4B and 4D would not result in substantial water quality changes in Berners Bay and other reasonable foreseeable marine facilities that would be located there do not include wastewater treatment and discharge facilities, there would be no cumulative water quality impacts from this source.

Sanitary waste discharged from AMHS vessels in Lynn Canal must meet AWQSs. Shuttle ferries would be equipped with sanitary waste holding tanks that would be pumped out and the waste treated onshore at an appropriate treatment plant, or wastewater would be treated onboard to appropriate standards prior to discharge. Therefore, wastewater from these ferries would not impact water quality in Lynn Canal and Berners Bay, and would not contribute to cumulative water quality impacts.

The increased marine vessel traffic in Berners Bay associated with Alternatives 4B and 4D and reasonable foreseeable projects at Slate Creek and Cascade Point could lead to an increase in TPHs in the bay from fuel and lubricant leaks. However, because of the small volume of vessel traffic that would result from Alternatives 4B and 4D and reasonable foreseeable projects, it is unlikely that hydrocarbon leaks would be large enough to impact EFH in Berners Bay.

The highway proposed for Alternatives 4B and 4D would be located along the eastern shore of Berners Bay to Sawmill Cove. Based on the results of stormwater runoff studies conducted by the MOA and FHWA, runoff from Alternatives 4B and 4D would not cause water quality impacts in Berners Bay.

The potential for a catastrophic release of petroleum in Berners Bay would increase with Alternatives 4B and 4D and the reasonable foreseeable projects. Depending on the timing and location of such a spill, it could substantially impact the Pacific herring spawning population in the bay.

4.0 DOT&PF PROPOSED CONSERVATION MEASURES

Based, in part, on conservation measures supplied by NMFS, DOT&PF has included additional conservation measures that are applicable to ferry terminal construction and operation that were not identified in Section 6 of *Appendix N Essential Fish Habitat Assessment Technical Report* included in the Supplemental Draft EIS.

Ferry Terminal Construction

- The design for the breakwaters at the Katzehin ferry terminal would include fish passage gaps or large box culverts.
- No in-water work would be conducted from March 15 through June 15 at the Katzehin Ferry Terminal site to protect out-migrating salmonids.

Highway Construction

- No in-water work would be conducted between March 15 and June 15 at the Antler, Lace, and Katzehin rivers to protect out-migrating salmonids and spawning eulachon.

Ferry Operations

- Alternatives 4B and 4D would have only summertime operations from a Berners Bay terminal. If either of these alternatives were selected, seasonal operation would not commence until after the herring spawning period.
- If Alternative 3 were selected, further discussion of other potential operational mitigation would be necessary. Both of these alternatives are based on the year-round operation of shuttle service from the east side of Berners Bay, and a two-week prohibition would be difficult to incorporate into an operational plan.
- All AMHS ferries would have a Spill Response Plan approved by the U.S. Coast Guard.
- Oil-absorbent materials, booms, and other oil spill cleanup equipment, as required by the U.S. Coast Guard-approved Spill Response Plan, would be carried on all ferries for the purpose of cleaning up oil spilled on the ferry deck, preventing spilled oil on the deck discharging overboard into the water, and containing in-water oil spills. The ferries would carry a sufficient amount of cleanup materials to provide the capacity for handling 100 gallons of spilled oil on vessel decks. The cleanup kits required by the Spill Response Plan would contain items such as oil-absorbent materials, booms, absorbent sheets, and other equipment.
- The AMHS would provide for cleanup of catastrophic in-water oil spills that are larger than the cleanup capability of the on-board spill response equipment. This would be accomplished through contracted outside agency responders with expertise and appropriate equipment. In such a spill event, the AMHS would immediately contact notify the outside response agency, the U.S. Coast Guard, and the AMHS response contacts.
- Spare drums would be available at ferry terminals at all times, for immediate replacement on ferries when necessary.
- Booms would be stored at each terminal where fueling occurs.

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5.0 REFERENCES

This section presents references used to update the December 2004 *Essential Fish Habitat Assessment*:

Alaska Department of Environmental Conservation (ADEC). 2005. Personal communication with Scot Tiernan, Division of Spill Prevention & Response, regarding spillage during fueling, sources of spills while underway, and calculation of cleanup capacity of cleanup supplies. August.

Alaska Department of Natural Resources (ADNR). 2005a. Berners Bay 4 (Cascade Point Breakwater & Dock), State I.D. No. AK 0406-14J, Final Consistency Response Concurrence. ADEC, Office of Project Management/Permitting, Alaska Coastal Management Program. April 27, 2005.

ADNR. 2005b. Lynn Canal 31 M. Kensington Mine, Reference No. POA-1990-592-M, State I.D. No. AK 0406-13J. ADEC, Division of Water, Water Non-Point Source Pollution Control Program. May 6, 2005.

ADNR 2005c. Berners Bay 4, Cascade Point Marine Terminal, Reference No. POA-1997-245-2, State I.D. No. AK 0406-14J. ADEC, Division of Water, Water Non-Point Source Pollution Control Program. May 6, 2005.

ADNR 2005d. ADEC 401 Certification of NPDES Permit No. AK-005057-1. ADEC, Division of Water, Wastewater Discharge Program. Memorandum File #1533.62.001, June 17, 2005.

AMHS. 2005. Personal Communication. Wayne Phillips; Larry O'loane, August/September 2005 – fuel capacities of vessels. Paul Johnsen; Captain Kurt Gucker, M/V Fairweather; Patrick Phillips, Nightmate, M/V Fairweather; Sam Daniels, Chief Mate, M/V LeConte; Matanuska Master (unnamed), August 2005 – on-board cleanup kits.

Federal Energy Regulatory Commission (FERC). 2002. Final Environmental Assessment for Hydropower License, Otter Creek Hydroelectric Project, FERC Project No. 11588-001, Alaska.

Groot, C. and L. Margolis. 1991. Pacific Salmon Life Histories. University of British Columbia Press, Vancouver, British Columbia, Canada. 564 pp.

Moffitt, S., B. Marston, and M. Miller. 2002. Summary of Eulachon Resarch in the Copper River Delta, 1998-2002. Report to the Alaska Board of Fisheries. November.

Municipality of Anchorage (MOA) Watershed Management Program. 2000. Receiving Water Chemistry at Select Streams in Anchorage, Alaska: 2000 Data Report. Prepared by CH2M Hill, Inc., Anchorage, Alaska.

Petro Marine. 2005. Personal communication with Roger Baker regarding fuel-pumping operation. August.

Sigler, M.F., J.N. Wombie, J.J. Vollenweider. 2004. Availability to Steller Sea Lions (*Eumetopias jubatus*) of a seasonal prey resource: a respawning aggregation of eulachon (*Thaleichthys pacificus*). Can.J.Fish.Aquat. Sci. 61(8): 1475-1484.

Smith, W. E., and R.W. Saalfeld. 1955. Studies in Columbia River smelt, *Thaleichthys-Pacificus*: Olympia, Washington. Washington Department of Fisheries, Fisheries Research Papers, 3-26.

Spangler R.E. and K.V. Koski. 2003. Ecology of Eulachon (*Thaleichthys pacificus*) in the Antler River, Berners Bay, Southeas Alaska. Session SSL-14: Steller Sea Lion Site Specific Studies – Southeast Alaska.

United States Army Corps of Engineers (USACE). 2003. Public Notice of Application for Permit. Alaska Glacier Seafood Company, Juneau, AK. Reference No M-1999-1426. December 31.

United States Department of Transportation and Public Facilities (USDOT) and Federal Highway Administration (FHWA). 1987. Guidance for preparing and processing Environmental and Section 4(f) documents, FHWA Technical Advisory T6640.8A. October 30.

United States Forest Service (USFS). 2004. Kensington Gold Project Final Supplemental Environmental Impact Statement. Prepared by Tetra Tech. Inc., 143 Union Boulevard, Suite 1010, Lakewood, CO 80228.

TABLES

This section provides a revised edition of Table 3-7, Intertidal Survey Evaluation Summary, that was presented in the December 2004 *Essential Fish Habitat Assessment Technical Report*.

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Table 3-7
Intertidal Survey Evaluation Summary

Section ID (Location)	Site Status	Acres of fill	Survey Date	Survey Time Range (military time) [1]	Tide Level (feet) [2]	Survey Method	Weather	Estimated Total Section Length (feet) [3]	Estimated Length Surveyed (feet)	General Shoreline Classification	Geomorphology: Slope (low [flat]-med-high [steep]); Wave exposure (low-med-high)	General Observations of Intertidal Zone (ITZ)
EIT 1	No longer within alignment	0	26-Aug-03	05:42 - 06:05	1.4 to 0.3	Foot & Boat	Sun	150	50 by foot, 100 by boat	**Sediment Beach** (Boulder, cobble, & sand)	Slope: 30% low, 70% med; Wave: low	Kasidaya Creek. Mussel beds.
EIT 2	No longer within alignment	0	26-Aug-03	06:17 - 06:29	-0.1 to -0.5	Foot & Boat	Sun	250	100 by foot, 50 by boat	**Sediment Beach** (Boulder, cobble, & sand)	Slope: 100% low; Wave: med	Mussels on boulders, lower ITZ.
EIT 3	No longer within alignment	0	26-Aug-03	06:33 - 06:38	-0.5 to -0.7	Foot & Boat	Sun	250	50 combined foot and boat	**Sediment Beach** (Boulder, cobble, & gravel)	Slope: 80% low, 20% med; Wave: med	Dense mussel beds. Typical zonation similar to EIT 2.
EIT 4	No longer within alignment	0	26-Aug-03	06:49 - 06:51	-0.89 to -0.91	Boat	Sun	150	150	**Bedrock Cliff / Vertical Face**	Slope: 100% high	Extremely dense mussel beds, narrow bands of Fucus and barnacles, *Verrucaria*. Typical zonation similar to EIT 3.
EIT 5	No longer within alignment	0	26-Aug-03	06:52 - 06:55	-0.92 to -0.95	Boat	Sun	100	100	**Bedrock Cliff** (Rock face)	Slope: 100% high	Very similar to EIT 4, narrow bands of Fucus and mussels, *Verrucaria*.
EIT 6	No longer within alignment	0	26-Aug-03	07:01 - 07:03	-1.00 to -1.01	Boat	Sun	100	100	**Sediment Beach** (Steep boulders)	Slope: 100% high	Very similar to EIT 4, narrow bands of Fucus and mussels, *Verrucaria*.

Table 3-7 (continued)
Intertidal Survey Evaluation Summary

Section ID (Location)	Site Status	Acres of fill	Survey Date	Survey Time Range (military time) [1]	Tide Level (feet) [2]	Survey Method	Weather	Estimated Total Section Length (feet) [3]	Estimated Length Surveyed (feet)	General Shoreline Classification	Geomorphology: Slope (low [flat]-med-high [steep]); Wave exposure (low-med-high)	General Observations of Intertidal Zone (ITZ)
EIT 7	No longer within alignment	0	26-Aug-03	07:05 - 07:07	-1.02 to -1.03	Boat	Sun	75	75	**Bedrock Cliff & Sediment Beach** (Boulders)	Slope: 80% med, 20% high; Wave: med	Steep boulder beach leading to rock face. Very similar to EIT 5.
EIT 8	No longer within alignment	0	26-Aug-03	07:25 - 07:35	-1.0 to -0.8	Foot	Sun	200	50	**Sediment Beach** (Cobble & gravel)	Slope: 80% med, 20% high; Wave: med	Less Fucus here – may be more protected; sea lion scat on boulder beach/rock outcrop north of site. Dungeness crab shells observed on shore.
EIT 9	No longer within alignment	0	26-Aug-03	07:38 - 07:42	-0.80 to -0.77	Foot	Sun	200	10	**Sediment Beach** (Boulders)	Slope: 100% high	Extensive barnacle cover.
EIT 10	No longer within alignment	0	26-Aug-03	08:32 - 08:44	0.8 to 1.3	Foot	Sun	550	550	**Sediment Beach** (Boulder & cobble)	Wave: med	Numerous very small littorines (*Littorina sitkana*).
EIT 11	Fill into water	3.63 plus 2.74 (break water fill)	26-Aug-03	09:01 - 09:06	2.2 to 2.5	Boat	Sun	500	500	**Sediment Beach** (Boulder, cobble, & gravel)	Slope: 20% med, 80% high	Typical zonation similar to other boulder/cobble sites. Transitions from steep boulder beach to less steep cobble beach. Ferry terminal site, contiguous to south.

Table 3-7 (continued)
Intertidal Survey Evaluation Summary

Section ID (Location)	Site Status	Acres of fill	Survey Date	Survey Time Range (military time) [1]	Tide Level (feet) [2]	Survey Method	Weather	Estimated Total Section Length (feet) [3]	Estimated Length Surveyed (feet)	General Shoreline Classification	Geomorphology: Slope (low [flat]-med-high [steep]); Wave exposure (low-med-high)	General Observations of Intertidal Zone (ITZ)
EIT 12	Uplands	0	26-Aug-03	09:24 - 09:47	3.5 to 5.0	Foot	Sun	1,000	1,000	**Wetland**	N/A	Not intertidal, see photos. Observed grasses, sedges, eagles chattering, and saltwater channels.
EIT 13	Bridge and approaches fill in intertidal zone	2.60	27-Aug-03	07:05 - 07:24	-1.4 to - 1.8	Foot	Cloudy	4,500	All but river. Extent of foot survey: 59° 11' 79", 135° 17' 16" (main river channel)	**Sediment Beach** (Cobble, sand, & gravel)	Slope: 100% low; Wave: low	Broad sandy beach with gravel. Cobbles in places with clumps of Fucus on top. Many tidal channels. Small fish in tidal pools.
EIT 14	Fill down to 11.4 feet	0.09	27-Aug-03	07:26 - 07:36	-1.8 to - 1.9	Foot	Cloudy	550	550	**Sediment Beach** (Cobble, sand, gravel, & mud)	Slope: 100% low; Wave: low	Large stream with waterfall, river otter tracks.
EIT 15	No longer within alignment	0	27-Aug-03	07:50 - 07:55	-2.01 to - 2.00	Foot	Cloudy	250	250	**Sediment Beach** (Cobble, sand, & gravel)	Slope: 100% low; Wave: low	Gravel/cobble beach, numerous interbedded mussels. Long, low angle beach, mussels also on rock face at back of beach. Small fish in tidal pools. King crab carcasses were observed on shore.

Table 3-7 (continued)
Intertidal Survey Evaluation Summary

Section ID (Location)	Site Status	Acres of fill	Survey Date	Survey Time Range (military time) [1]	Tide Level (feet) [2]	Survey Method	Weather	Estimated Total Section Length (feet) [3]	Estimated Length Surveyed (feet)	General Shoreline Classification	Geomorphology: Slope (low [flat]-med-high [steep]); Wave exposure (low-med-high)	General Observations of Intertidal Zone (ITZ)
EIT 16	No longer within alignment	0	27-Aug-03	08:35 - 08:38	-1.21 to -1.24	Boat	Cloudy	600	600	**Bedrock Cliffs** (Platform)	Slope: 20% med, 80% high; Wave: med	Just past Gran Pt. sea lion haulout. Four sea lions (cows) present on site. Could only approach to within 100 feet. No evidence of sea lion disturbance. Typical rocky intertidal zonation.
EIT 17	No longer within alignment	0	27-Aug-03	08:43 - 08:46	-1.0 to -0.7	Boat	Cloudy	400	400	**Bedrock Cliffs**	Slope: 100% high; Wave: med	Typical zonation. Small waterfall.
EIT 18	Fill at 20 feet	0.01	27-Aug-03	08:50 - 08:53	-0.6 to -0.5	Boat	Cloudy	200	200	**Bedrock Cliffs**	Slope: 100% high; Wave: med	Steep boulder beach. Evidence of sea lion use.
EIT 19	Fill at 15.8 feet	0.09	27-Aug-03	09:20 - 09:24	0.7 to 1.0	Boat	Cloudy	300	300	**Bedrock Cliffs**	Slope: 100% high; Wave: med	Steep rock face leading to steep boulder beach. Sea lion observed off bow of boat. Typical zonation.
EIT 20	Fill at 5.5 feet	0.84	27-Aug-03	09:27 - 09:30	1.09 to 1.14	Boat	Cloudy	300	300	**Sediment Beach** (Boulder, cobble, & gravel)	Slope: 100% high; Wave: med	Moderate angle beach. Small creek. Pocket beach w/ gravel, cobbles, and boulders to the south.

Table 3-7 (continued)
Intertidal Survey Evaluation Summary

Section ID (Location)	Site Status	Acres of fill	Survey Date	Survey Time Range (military time) [1]	Tide Level (feet) [2]	Survey Method	Weather	Estimated Total Section Length (feet) [3]	Estimated Length Surveyed (feet)	General Shoreline Classification	Geomorphology: Slope (low [flat]-med-high [steep]); Wave exposure (low-med-high)	General Observations of Intertidal Zone (ITZ)
EIT 21	Fill at 10 feet	3.2	27-Aug-03	09:48 - 10:15	2.4 to 4.3	Foot & Boat	Cloudy	5,500	150 by foot, remainder by boat.	**Sediment Beach** (Boulder, cobble, & gravel)	Slope: 10% low, 90% med; Wave: med	Long site – cobble beach & gravel. South of waterfall. Dense mussels on boulders, dense Fucus on steep boulder beach to south. Small fish in tidal pools.
EIT 22	Fill at 5 feet	1.08	28-Aug-03	06:29 - 06:41	2.3 to 1.3	Boat	Sun	600	600	**Bedrock Cliffs & Sediment Beach** (Boulder & cobble)	Slope: 40% med, 60% high; Wave: med	Mussel spats on boulders.
EIT 23	Fill at 6.6 feet	1.52	28-Aug-03	06:45 - 06:53	1.3 to 0.6	Boat	Sun	600	600	**Bedrock Cliffs & Sediment Beach** (Boulder)	Slope: 20% med, 80% high; Wave: med	Very similar to EIT 22. Steep boulder beach.
EIT 24	Fill at 21 feet	0.11	28-Aug-03	06:55 - 06:58	0.6 to 0.3	Boat	Sun	700	700	**Bedrock Cliffs & Sediment Beach** (Boulder)	Slope: 50% med, 50% high; Wave: med	Very steep boulder beach. Dense coralline algae. Typical zonation.
EIT 25	Fill at 10 feet	4.64	28-Aug-03	07:00 - 07:15	0.2 to -0.7	Boat	Sun	1,500	1,500	**Bedrock Cliffs & Sediment Beach** (Boulder)	Slope: 50% med, 50% high; Wave: med	Beach begins with steep rock face. High angle boulder beach. Slide area. Very similar to EIT 24. Very dense mussel spat at waterline.
EIT 26	Fill at 9.9 feet	1.15	28-Aug-03	07:17 - 07:25	-0.77 to -1.1	Boat	Sun	1,500	1,500	**Bedrock Cliffs & Sediment Beach** (Boulder)	Slope: 80% med, 20% high; Wave: med	Boulder beach with steep outcrops.

Table 3-7 (continued)
Intertidal Survey Evaluation Summary

Section ID (Location)	Site Status	Acres of fill	Survey Date	Survey Time Range (military time) [1]	Tide Level (feet) [2]	Survey Method	Weather	Estimated Total Section Length (feet) [3]	Estimated Length Surveyed (feet)	General Shoreline Classification	Geomorphology: Slope (low [flat]-med-high [steep]); Wave exposure (low-med-high)	General Observations of Intertidal Zone (ITZ)
EIT 27	Alignment moved uphill out of fill	0	28-Aug-03	07:28 - 07:40	-1.2 to -1.4	Foot & Boat	Sun	400	400 combined foot and boat	**Sediment Beach** (Boulder, cobble, & gravel)	Slope: 50% low 50% med; Wave: med	Small fish in ponds.
EIT 28	Fill at 18.8 feet	0.05	28-Aug-03	07:42 - 07:45	-1.8 to -1.9	Boat	Sun	500	500	Bedrock Cliffs & Sediment Beach (Boulder)	Slope: 100% high; Wave: med	Rock outcrop with boulders. Dense coralline algae.
EIT 29	No longer within alignment	0	28-Aug-03	07:50 - 07:55	-2.1 to -2.2	Boat	Sun	750	750	**Sediment Beach** (Boulder)	Slope: 100% med; Wave: med	Dense barnacles; minimal Fucus and *Alaria* spp. – could be more exposed.
EIT 30	No longer within alignment	0	28-Aug-03	07:55 - 08:05	-2.2 to -2.4	Boat	Sun	200	200	**Sediment Beach** (Boulder, cobble, & gravel)	Slope: 50% low, 50% med	Dense mussel spat in lower ITZ.
EIT 31	No longer within alignment	0	28-Aug-03	08:10 - 08:15	-2.45 to -2.50	Boat	Sun	450	450	**Sediment Beach** (Boulder & cobble)	Slope: 100% med; Wave: med	Minimal *Alaria* spp., dense coralline algae.
EIT 32	No longer within alignment	0	28-Aug-03	08:18 - 08:20	-2.52 to -2.52	Boat	Sun	100	100	**Bedrock Cliffs & Sediment Beach** (Boulder)	Slope: 100% high; Wave: med	Very short site. Boulder rock face and typical zonation.
EIT 33	No longer within alignment	0	28-Aug-03	08:20 - 08:21	-2.52 to -2.52	Boat	Sun	100	100	**Bedrock Cliffs**	Slope: 100% high; Wave: med	Very short site. Rock/cliff face. Dense *Alaria* spp. and typical zonation as with EIT 32.

Table 3-7 (continued)
Intertidal Survey Evaluation Summary

Section ID (Location)	Site Status	Acres of fill	Survey Date	Survey Time Range (military time) [1]	Tide Level (feet) [2]	Survey Method	Weather	Estimated Total Section Length (feet) [3]	Estimated Length Surveyed (feet)	General Shoreline Classification	Geomorphology: Slope (low [flat]-med-high [steep]); Wave exposure (low-med-high)	General Observations of Intertidal Zone (ITZ)
EIT 34	No longer within alignment	0	28-Aug-03	08:21 - 08:23	-2.52 to - 2.52	Boat	Sun	200	200	**Bedrock Cliffs**	Slope: 100% high; Wave: med	Very short site. Rock face. Typical zonation.
EIT 35	Fill at 9.3 feet	0.72	28-Aug-03	08:25 - 08:38	-2.52 to - 2.49	Foot & Boat	Sun	300	300 combined foot and boat	**Sediment Beach** (Boulder, cobble, & gravel)	Slope: 100% high; Wave: med	Moderately steep boulder beach. Dense urchins and limpets. Typical zonation. Stream nearby.
EIT 36	Fill at 8.0 feet	4.57	28-Aug-03	08:55 - 09:27	-2.2 to - 1.0	Foot	Sun	2,200	2,200	**Sediment Beach** (Boulder, cobble, & gravel)	Slope: 100% low; Wave: med	Gravel/cobble/boulder beach, low angle beach. Small fish in ponds. Avalanche chute area.
EIT 37	Fill at 13.5 feet	0.47	28-Aug-03	09:28 - 09:41	-1.0 to - 0.30	Foot	Sun	400	400	**Sediment Beach** (Cobble)	Slope: 100% low; Wave: med	Small stream crosses the site. More diversity at the stream.
EIT 38	No fill in intertidal zone	0	28-Aug-03	09:46 - 09:50	-0.05 to - 0.19	Foot	Sun	200	200	**Sediment Beach** (Cobble & gravel)	Slope: 100% low; Wave: med	Mouth of fairly large stream with typical intertidal zonation of other sites. Banks of stream are washed clean – very fast stream.
EIT 39	No longer within alignment	0	28-Aug-03	10:10 - 10:16	1.5 to 1.8	Foot	Sun	800	200	**Sediment Beach** (Cobble)	Slope: 100% low; Wave: med	Boulder/cobble low angle lens fairly exposed.
EIT 40	No longer within alignment	0	28-Aug-03	10:24 - 10:30	2.4 to 2.9	Foot	Sun	500	300	**Sediment Beach** (Cobble)	Slope: 100% low; Wave: med	Cobble, low angle beach.

Table 3-7 (continued)
Intertidal Survey Evaluation Summary

Section ID (Location)	Site Status	Acres of fill	Survey Date	Survey Time Range (military time) [1]	Tide Level (feet) [2]	Survey Method	Weather	Estimated Total Section Length (feet) [3]	Estimated Length Surveyed (feet)	General Shoreline Classification	Geomorphology: Slope (low [flat]-med-high [steep]); Wave exposure (low-med-high)	General Observations of Intertidal Zone (ITZ)
EIT 41	Berners/ Lace rivers	0	Not surveyed (Berners/Lace rivers)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
WHB	Ferry terminal site	4.8	29-Aug-03	07:18 - 08:15	1.5 to -1.7	Foot	Sun	3,000	3,000	**Sediment Beach** (Boulder, cobble, sand, gravel, & rocky outcrops)	Slope: 100% low; Wave: low/med	Ferry terminal site. Extremely rich intertidal area. Sand gravel beach changing to boulders. Sculpins in tidal pools, fish egg mass.
SLA-1	Ferry terminal site	1.1	29-Aug-03	09:09 - 09:43	-2.4 to -1.7	Foot	Sun	1,700	1,300	**Sediment Beach** (Cobble, sand, gravel, & mud)	Slope: 100% low; Wave: med	Ferry terminal site. Mud/silty bottom with occasional boulders/cobbles. Rock outcrop with typical zonation. Crescent gunnels present.
SAW	Ferry terminal site	3.2	29-Aug-03	11:15 - 11:18	3.9 to 4.1	Boat	Sun	3,500	3,500	**Sediment Beach** (Boulder, cobble, sand, & gravel)	Slope: 100% low; Wave: low/med	Ferry terminal site. Typical zonation on rock outcrops and boulders. Minimal life on cobbles at center of beach.
EIT 42	Antler River	0	29-Aug-03 (twice)	11:50 - 11:55 13:30 - 14:00	11.8 to 12.2 14.7 to 16.4	Boat	Cloudy	2,500	N/A	(Antler River)	N/A	Photos taken at low tide and 1 hr prior to high tide.

Table 3-7 (continued)
Intertidal Survey Evaluation Summary

Section ID (Location)	Site Status	Acres of fill	Survey Date	Survey Time Range (military time) [1]	Tide Level (feet) [2]	Survey Method	Weather	Estimated Total Section Length (feet) [3]	Estimated Length Surveyed (feet)	General Shoreline Classification	Geomorphology: Slope (low [flat]-med-high [steep]); Wave exposure (low-med-high)	General Observations of Intertidal Zone (ITZ)
EIT 43	No longer within alignment	0	29-Aug-03	13:04 - 13:06	12.9 to 13.0	Foot	Cloudy	300	300	**Wetland/Tidal Slough**	Slope: 100% low; Wave: low	Wetlands area. Very similar to EIT 44 and 46. Slough with sandy bottom and small fish. No tidal influence. Numerous bear signs (tracks, burrows for roots, scat).
EIT 44	No longer within alignment	0	29-Aug-03	13:01 - 13:03	12.6 to 12.8	Foot	Cloudy	250	250	**Wetland/Tidal Slough**	Slope: 100% low; Wave: low	Wetlands area. Very similar to EIT 45. Small fish present. No tidal influence.
EIT 45	No longer within alignment	0	29-Aug-03	12:53 - 12:55	12.1 to 12.2	Foot	Cloudy	250	250	**Tidal Slough**	Slope: 100% low; Wave: low	Large dead fall. Tidal influence not likely. Small fish and bear sign observed.
EIT 46	No longer within alignment	0	29-Aug-03	12:28 - 12:34	10.0 to 10.5	Foot	Cloudy	500	500	**Tidal Slough**	Slope: 100% low; Wave: low	Tidally influenced slough. Surrounded by saltmarsh grasses. Small fish present.

Notes: Biologists Sue Ban and Rich Kleinleder were field crew on all sites.
[1] AST-Alaska Standard Time
[2] Measurement taken at Taiya Inlet, near Skagway.
[3] Lengths measured from GIS map.

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