Addendum to Appendix N

Essential Fish Habitat Assessment

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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

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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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