Addendum to Appendix O

Wetlands Technical Report

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TABLE OF CONTENTS

Section	Title	Page
1.0	INTRODUCTION	W-245
2.0	ALTERNATIVE ANALYSES	W-247
2.1	Alternative 2B (Preferred): East Lynn Canal Highway to Katzehin with Return Shuttles to Haines and Skagway	W-247
2.1.1	East Lynn Canal Sub-Region 1 — Berners Bay	W-247
2.1.2	East Lynn Canal Sub-Region 2 — Slate Cove to Sherman Point	W-249
2.1.3	East Lynn Canal Sub-Region 3 — Sherman Point to Katzehin River	W-249
2.1.4	East Lynn Canal Sub-Region 4 — Katzehin River	W-250
2.2	Alternative 3: West Lynn Canal Highway	W-250
2.3	Alternatives 4B and 4D: Marine Alternatives – Berners Bay	W-251
3.0	COMPENSATORY MITIGATION FOR IMPACTS TO WETLANDS AND OTHER WATERS OF THE UNITED STATES	W-253

TABLES

Table	Title	Page
Table 4-1	East Lynn Canal – Preferred Alternative 2B Total Impacted Areas (Acres) by Wetland Type and Sub-Region, August 2005 Alignment	W-257
Table 4-2	West Lynn Canal – Alternative 3 Total Impacted Areas (Acres) by Wetland Type and Sub-Region	W-258
Table 4-3	Total Area Wetlands (Acres) and other Waters of the United States Affected by Project Alternatives, August 2005 Alignment	W-259
Table 4-4	Impacts to Functions and Values for Individual Wetlands and Estuarine Sites, East Lynn Canal Alignment, July 2005 Alternative 2B (Preferred) Alignment	W-260
Attachment B-1	Wetland Functions and Values	W-263

FIGURES

Figure	Title	Page
Figure 1	Wetlands – East Lynn Canal Sub-Region 1	W-271
Figure 2	Wetlands – East Lynn Canal Sub-Region 1	W-273
Figure 3	Wetlands – East Lynn Canal Sub-Region 1	W-275
Figure 4	Wetlands – East Lynn Canal Sub-Region 1	W-277
Figure 5	Wetlands – East Lynn Canal Sub-Region 1	W-279
Figure 6	Wetlands – East Lynn Canal Sub-Region 2	W-281
Figure 7	Wetlands – East Lynn Canal Sub-Region 2	W-283
Figure 8	Wetlands – East Lynn Canal Sub-Region 2	W-285
Figure 9	Wetlands – East Lynn Canal Sub-Region 2	W-287
Figure 10	Wetlands – East Lynn Canal Sub-Regions 3 and 4	W-289
Figure 11	Wetlands – East Lynn Canal Sub-Region 4	W-291

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1.0 INTRODUCTION

This addendum reflects comments from resource agencies and changes to the highway alignment for Alternative 2B following the Supplemental Draft EIS public comment period. Changes made by DOT&PF to the highway alignment were done to avoid all palustrine emergent and most estuarine emergent wetlands. The Anlter River crossing was also adjusted resulting in changes to wetland fill quantities and wetland impacts. The construction of the Cascade Point Road also affected the total number of wetland acres that would be impacted by the Juneau Access Improvements Project.

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2.0 ALTERNATIVE ANALYSES

2.1 Alternative 2B (Preferred): East Lynn Canal Highway to Katzehin with Return Shuttles to Haines and Skagway

Due to small adjustments to the Alternative 2B alignment and incorporation of the newly constructed Cascade Point Road between Echo Cove and Sawmill Cove, there are revisions to the number of acres of impacted wetlands and marine areas from this alternative. Construction of the highway under the revised Alternative 2B alignment would require fill and excavation of 102 acres of wetlands and marine areas within the footprint of the proposed highway and the ferry terminal at Katzehin. This total includes 69.8 acres of palustrine wetlands, primarily forested wetlands, 0.2 acre of estuarine emergent wetlands, and 32 acres of non-vegetated marine areas, consisting primarily of rocky shores.

The following subsections replace Section 4.3 in the 2004 *Wetlands Technical Report* and provide footprint acreage information and impacts to wetland functions and values based on the current Alternative 2B alignment.

2.1.1 East Lynn Canal Sub-Region 1 — Berners Bay

Footprint Acreage

The highway from Echo Cove to Sawmill Cove would follow the proposed Cascade Point Road, impacting 1.9 acres of wetlands along this alignment for the Juneau Access Improvements Project primarily to widen the Cascade Point Road (Figures 1, 2, and 3). Portions of eleven individual wetlands would be filled to construct a highway from the mouth of Echo Cove to the Slate Creek drainage. Forested wetlands would be impacted the most (7.7 acres, comprised of 3.7 acres of needle-leaved evergreen and 4.0 acres of deciduous forested wetlands). Most of the forested needle-leaved wetlands (PFO4B) occur between Echo Cove and Sawmill Creek (Figures 1 and 2). Deciduous forested wetlands (PFO1A and PFO1A/PSS1A) are adjacent to the Antler and Lace/Berners rivers (680-2 and 735-4; Figures 4 and 5). Loss of a scrub-shrub/forested wetland would constitute 0.7 acre (340-1; Figure 2). Table 4-1 presents the total fill areas for East Lynn Canal Sub-Region 1. Regular maintenance and operation activities that would occur following the completion of the highway would not be expected to result in the fill of additional wetlands.

Bridges and fill for the highway at the head of Berners Bay will not affect any estuarine emergent (salt marsh) habitat or intertidal flats. The October 2003 realignment of the highway through this area reduced the amount of wetland fill by approximately 3.1 acres for emergent wetlands and 2.9 acres for salt marsh. The December 2003 realignment of the bridge and the highway approach to the bridge was shifted farther upriver to avoid impacts to the salt marsh; this eliminated the remainder of the 4.4 acres potentially affected by the October 2003 alignment (735-1; Figures 4 and 5). The August 2005 realignment of Alternative 2B moves the Antler River crossing further upstream to bypass important eulachon spawning habitat and moves the Lace River crossing approximately 700 feet upstream to place greater distances between the highway and vegetated intertidal habitat (Figures 4 and 5).

Impacts to Wetland Functions and Values

Impacts to functions and values for each individual wetland on the east side of Lynn Canal are presented in Table 4-4. The proposed highway would act as a partial barrier to the flow of shallow groundwater and surface water. Shallow groundwater blocked by the highway bed

would eventually flow to the surface and be diverted by ditches to culverts under the roadbed. This diversion would adequately maintain water's natural down-gradient flow. Culvert end sections or rock dissipaters would be used to disperse high volume/velocity outfall to protect soils and vegetation below culvert outfalls from erosion of adjacent wetlands. The diversion of water into culverts and roadside ditches could disrupt water flow to some downslope wetlands and alter wetland hydrology; however, the high volume of annual rainfall in this region could reduce the magnitude of any impacts to wetland hydrology. Alteration of hydrology because of the roadbed could result in corresponding changes to the vegetation and, over time, affect wetland functions. The extent of this direct effect would depend on the location, but could potentially extend beyond the right-of-way. These effects could be minimized by adequate design of cross-drainage structures and ditching.

The loss of forested wetlands from fill for the highway would modify the groundwater recharge functions, the groundwater discharge/lateral flow functions, and the surface hydrologic control functions of these wetlands. The remaining portions of these forested wetlands, and the wetlands in unaffected areas outside the highway corridor, would continue to provide these functions. Proper ditches and drainage structures under the highway would minimize effects on the hydrologic functions of these wetlands.

The salt marshes (Figures 4, 5, and 6) at the head of Berners Bay adjacent to the Antler, Lace, and Berners rivers and at the head of Slate Cove provide a wildlife habitat function. The Alternative 2B alignment does not directly impact the salt marsh wetlands; however, the highway alignment has the potential to impact terrestrial wildlife movement between the salt marsh areas and adjacent uplands. A further discussion of potential wildlife corridor impacts is included in the 2004 *Wildlife Technical Report.*

It is important to note that the marine intertidal area adjacent to the shoreline from Sawmill Cove to south of the Antler River area is herring spawning habitat (M. Ingle, personal communication, January 2004). There are no direct marine intertidal impacts occurring along this segment of the shoreline for Alternative 2B. A discussion of potential impacts to herring spawning habitat is presented in the *Essential Fish Habitat Assessment*.

Contaminants, including oils, fuels, sediment, and debris can be introduced to the ecosystem during construction activities. These pollutants often settle in wetlands, but can move downstream when re-suspended. The introduction of contaminants and excess sediment loading can be avoided with implementation of Best Management Practices (BMPs). Contaminant concentrations in runoff from the proposed highway would not be expected to exceed Alaska Water Quality Standards (AWQS) or adversely impact the water quality of receiving waters for the long-term. Invasive plant species can also be introduced during construction activities. Alaska Department of Transportation and Public Facilities (DOT&PF) and Federal Highway Administration (FHWA) regulations require construction contractors to utilize specific techniques and procedures to minimize the accidental introduction of foreign plant species carried on construction equipment and to use native or non-invasive plant species for hydro-seeding of exposed embankments. Compliance with these BMPs should minimize the risk of introducing foreign plant species to the highway corridor and thus minimize the chance of causing wildlife habitat loss though this mechanism related to construction activities.

The use of salt treated abrasives (sand and 3-5 percent salt) to improve road conditions could potentially affect roadside vegetation (Stormwater, 2001). High rainfall in this region would minimize any impact from road salt. Most soil and vegetation damage from sand or salt is localized to within 60 feet of the road, with the greatest impacts right next to the pavement (U.S.

Roads, 1997). Salt treated abrasives would be used minimally along the highway route; thus, negligible impacts on adjacent vegetation would be expected.

2.1.2 East Lynn Canal Sub-Region 2 — Slate Cove to Sherman Point

Footprint Acreage

The July 2005 Alternative 2B alignment includes adjustments between Slate Cove and Sherman Point in an effort to further avoid emergent wetlands. The alignment from Slate Cove to Sherman Point would impact only palustrine wetlands; the alignment does not contact the shoreline. Forested wetlands dominate the land cover in this region. Of the 60.5 acres of potential wetland fill in this sub-region, all would occur in forested wetlands (Table 4-1).

Impacts to Wetland Functions and Values

Excavation or fill of wetlands for construction of the highway would intersect the drainage patterns of most of the wetlands in this sub-region. Impacts will include modifying the groundwater recharge functions, the discharge/lateral flow functions, the surface hydrologic control functions, and the sediment retention functions of these wetlands. Expanses of similar habitat in the surrounding areas, and adequate ditching and drainage structures, will moderate losses of any of these functions.

Wildlife habitat for four wetlands in this subsection is rated as a moderate-high value (wetlands 910-2, 955-2, 1185-1, and 1220-1; Figures 6 and 7; Table B-1). The approximate total acreage of these wetlands is 1,343 acres, of which 4 percent (52.4 acres) would be impacted. These wetlands have a moderate-high value because permanent standing fresh or brackish water or permanently flooded emergent marsh is present (emergent wetlands) and the wetlands are adjacent to spruce/hemlock forest or deciduous scrub-shrub (forested and scrub-shrub wetlands), which provides food and water with nearby cover for terrestrial animals such as bear. All other wetlands impacted by Alternative 2B in this sub-region have a moderate-low to low wildlife habitat value (Table B-1 and Appendix D). A further discussion on wildlife habitat impacts is included in the 2004 *Wildlife Technical Report*.

Regional ecological diversity will not likely be substantially affected by the loss of wetlands in this sub-region since these wetlands are very common and widespread throughout the surrounding area. The highway alignment avoids the seasonally flooded emergent/scrub-shrub wetland along this area. Replacement cost is considered high for the forested wetlands.

2.1.3 East Lynn Canal Sub-Region 3 — Sherman Point to Katzehin River

Footprint Acreage

Construction along this segment would affect 1.2 acres of forested wetlands, occurring just north of Sherman Creek, in the southern portion of this sub-region. Estuarine rocky shores and unconsolidated beaches along this sub-region would be affected by direct fill for the highway. The impact of this activity is discussed in the 2004 *Essential Fish Habitat Assessment*. Fill during construction would affect numerous small areas of marine habitat, for a total amount of 24.0 acres.

Impacts to Wetland Functions and Values

The loss of 1.2 acres of forested wetland (1360-1 and 1375-1; Figure 9) near Independence Lake will have minimal effect on groundwater function since the highway would pass through

the lower portion of the wetland. Surface hydrologic control would also likely be modified. Erosion sensitivity of this wetland will be low and not substantially affected by the highway.

The two intertidal marine areas in this sub-region are rated high for fish habitat (1380-1 and 1480-1; Table B-1). Approximately 5.05 acres of 1380-1 and 18.94 acres of 1480-1 would be impacted (Figures 9 and 10). Impacts to fish habitat associated with this fill are discussed in the 2004 *EFH Assessment.*

2.1.4 East Lynn Canal Sub-Region 4 — Katzehin River

Footprint Acreage

Within this sub-region, no palustrine wetlands occur to any extent within the corridor surveyed for the proposed highway (Table B-1). Only 0.21 acre of estuarine emergent wetland, near the proposed Katzehin Ferry Terminal, would be impacted (2750-1; Figures 10 and 11). Rocky shore and beach bar fill areas along this portion of the highway are relatively small; the total affected area would comprise approximately 5.2 acres. Additionally, fill for the Katzehin Ferry Terminal would require approximately 2.7 acres of rocky shoreline habitat for breakwaters and terminal facilities. Approximately 4.4 acres of subtidal would likely have to be dredged, but this area is not included in the total (see the 2004 *Essential Fish Habitat Assessment*).

Impacts to Wetland Functions and Values

Wildlife habitat value for the emergent wetlands is rated as high (wetlands 2750-1; Table B-1). The total impact to this wetland due to fill is approximately 0.21 acre (Figures 10 and 11; sized by aerial photography, and ground elevation surveys). Wildlife habitat is also rated as high for one estuarine beach bar area (2735-2; Table B-1). The estuarine beach bar area is approximately 1.87 acres of which 85 percent (1.59 acres) would be impacted (Table 4-4). These wetlands are rated has having a high wildlife habitat value because Lyngbye's sedge, seaside plantain, seaside arrow-grass, or ditch grass occur, which provides food for migrating waterfowl and terrestrial species such as brown and black bear. A further discussion on wildlife habitat impacts is included in the 2004 *Wildlife Technical Report.*

The salt marshes north of the Katzehin River provide a wildlife habitat function. The Alternative 2B alignment has the potential to impact terrestrial wildlife movement between the salt marsh areas and adjacent uplands (2630-1, 2670-1, 2690-1, and 2735-1; Figures 10 and 11). A further discussion of potential wildlife corridor impacts is included in the 2004 *Wildlife Technical Report.*

The Katzehin Ferry Terminal would impact approximately 3.63 acres of marine intertidal areas with high fish habitat values (2745-T and 2765-1; Table B-1; Figure 11). Impacts to fish habitat associated with this fill are discussed in the 2004 *Essential Fish Habitat Assessment*.

2.2 Alternative 3: West Lynn Canal Highway

Alternative 3 would extend the Glacier Highway from Echo Cove to Sawmill Cove along the proposed Cascade Point Road and would impact 1.9 acres of wetlands along the segment where the Juneau Access Improvements Project would widen the Cascade Point Road.

Most of the footprint acreages and all of the discussions of impacts to wetlands functions and values presented in the 2004 *Wetlands Technical Report* for Alternative 3 remain valid. Only the information pertaining to the footprint acreage of the project segment between Echo Cove and the Sawmill Cove Ferry Terminal needs revision. Fill of wetlands and marine areas from Echo Cove to the Sawmill Cove Ferry Terminal would include 1.2 acres of forested wetlands,

0.7 acre of scrub-shrub/forested wetlands, and 1.9 acres of rocky shore intertidal habitat. Additionally, 1.9 acres of subtidal dredging for the ferry terminal would be required.

The new alignment under Alternative 3 would necessitate a total of 38.2 acres of wetland and marine fill. This total would include 26.4 acres of wetlands and 11.6 acres of marine areas. A small amount of vegetated shallows associated with small ponds would also be filled (0.2 acre).

2.3 Alternatives 4B and 4D: Marine Alternatives – Berners Bay

These build alternatives would also extend the Glacier Highway from Echo Cove to Sawmill Cove and widen the Cascade Point Road. This would impact 1.9 acres of wetlands along the segment where the Juneau Access Improvements Project would widen the Cascade Point Road. All of the discussions of impacts to wetlands functions and values presented in the 2004 *Wetlands Technical Report* for Alternatives 4B and 4D remain valid. The only modification being that construction of the current alignment would require the filling of approximately 1.2 acres of forested wetlands, 0.7 acre of scrub-shrub/forested wetlands and 1.9 acres of marine fill at the Sawmill Cove Ferry Terminal site. In addition, there would be 0.7 acre of subtidal fill for terminal modification at Auke Bay to accommodate a stern berth.

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3.0 COMPENSATORY MITIGATION FOR IMPACTS TO WETLANDS AND OTHER WATERS OF THE UNITED STATES

The preferred alternative, Alternative 2B, would impact approximately 70 acres of wetlands and 32 acres of unvegetated intertidal and subtidal areas. No wetland restoration, enhancement, or creation opportunities have been identified in the watersheds that would be impacted, as there are many similar wetlands in the project area and few have been affected to date. For this reason DOT&PF is proposing a combination of on-site out-of-kind mitigation and in-lieu fee compensation.

The preferred alternative would impact approximately 69.1 acres of palustrine forested wetlands and 0.7 acre of a palustrine scrub/shrub wetland. None of these wetlands are fish habitat, and with the exception of the wetlands on either side of Slate Creek and on the east side of the Lace River, the wetlands that would be impacted do not provide riparian support. All of the wetlands that would be filled function as wildlife habitat, and some are rated as moderate to high for this function. All wetlands in the project area rated high as wildlife habitat would be avoided; however, some of the affected wetlands would potentially become isolated by the proposed highway. This is the case for the estuarine emergent wetlands between the Lace and Antler rivers used by bears. Therefore, DOT&PF proposes to construct a 100-foot-wide wildlife underpass at the location of an identified bear travel corridor near the east bank of the Lace River as on-site out-of-kind compensatory mitigation for impacts to forested and scrub/shrub wetlands. The cost of this underpass is estimated at $440,000. (Six other wildlife underpasses would be constructed to mitigate impacts to wildlife in non-wetland areas.)

The preferred alternative would also impact approximately 0.2 acre of estuarine emergent wetland and 32 acres of unvegetated beach and subtidal habitat. DOT&PF proposes to provide in-lieu fee compensation for these impacts to waters of the U.S., which are also Essential Fish Habitat under the Magnuson-Stevens Fisheries Conservation and Management Act. Based on discussions with resource agencies, DOT&PF proposes to make a payment to the Southeast Alaska Land Trust to be used to acquire property or fund habitat projects to be specified in the Department of Army Section 404 permit.

DOT&PF proposes in-lieu fee payment for impacts to waters of the U.S. as follows:

- Estuarine emergent wetland (approximately 0.2 acre) $60,000/acre
- Non-vegetated intertidal and subtidal areas (approx. 32 acres) $24,000/acre

These per-acre values are based on values used in past DOT&PF projects that involved fee in-lieu payments for impacts to wetlands and waters of the U.S. and increased to account for inflation and ensure a two to one mitigation ratio. Based on the current alignment of the preferred alternative, the in-lieu fee payment for fill in waters of the U.S. would total $780,000.

All palustrine emergent wetlands and all but 0.2 acre of estuarine emergent wetlands have been avoided. Potential wetland impacts have been minimized by alignment changes, extension of bridges and slope steepening. Further minimization is not practicable. Bridging via a pile-supported causeway is estimated to cost $4,400 per lineal foot. The average wetland fill width would be 80 feet, or 544.5 lineal feet per acre. The avoidance cost therefore would be $2.4 million per acre. See the Draft Section 404(b)(1) Analysis in Appendix X for more detail.

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TABLES

The section includes updated versions of the following tables that were presented in the 2004 *Wetlands Technical Report.*

Table 4-1	East Lynn Canal – Preferred Alternative 2B Total Impacted Areas (Acres) by Wetland Type and Sub-Region, August 2005 Alignment
Table 4-2	West Lynn Canal – Alternative 3 Total Impacted Areas (Acres) by Wetland Type and Sub-Region
Table 4-3	Total Area Wetlands (Acres) and other Waters of the United States Affected by Project Alternatives, August 2005 Alignment
Table 4-4	Impacts to Functions and Values for Individual Wetlands and Estuarine Sites, East Lynn Canal Alignment, August 2005 Alternative 2B (Preferred) Alignment
Attachment B-1	Wetland Functions and Values

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Table 4-1
East Lynn Canal – Preferred Alternative 2B
Total Impacted Areas (Acres) by Wetland Type and Sub-Region, August 2005 Alignment

Sub-Region	Classification	Area of Fill Alternative 2B
East Sub-Region 1	**Wetlands**	
	Palustrine Forested	7.4
	Palustrine Scrub-Shrub	0.7
	Sub Total	8.1
East Sub-Region 2	**Wetlands**	
	Palustrine Forested	60.5
	Sub Total	60.5
East Sub-Region 3	**Wetlands**	
	Palustrine Forested	1.2
	Sub Total	1.2
	Marine Areas	
	Rocky Shores	24.0
	Sub Total	24.0
East Sub-Region 4	**Wetlands**	
	Estuarine Emergent	0.2
	Sub Total	0.2
	Marine Areas	
	Beach Bar	1.6
	Rocky Shores	6.4
	Sub Total	8
All East Lynn Canal Sub-Regions	**Wetlands**	
	Palustrine Forested	69.1
	Palustrine Scrub-Shrub	0.7
	Estuarine Emergent	0.2
	Sub Total	70.0
	Marine Areas	
	Beach Bars	1.6
	Rocky Shores	30.4
	Sub Total	32.0
	Sub-Regions Totals	
	Total Wetlands	70.0
	Total Marine Areas	32.0
	Total Acres	102

Note: Acreages do not include riverine areas intersected by the proposed alignments.

Table 4-2
West Lynn Canal – Alternative 3
Total Impacted Areas (Acres) by Wetland Type and Sub-Region

Sub-Region	Classification	Area of Fill (Acres)
West Sub-Region 1	**Wetlands**	
	Palustrine Emergent	1.9
	Palustrine Forested	18.7
	Estuarine Emergent	0.4
	Sub Total	21.0
	Marine Areas	
	Beach Bars	0.09
	Rocky Shores	4.8
	Sub Total	4.9
West Sub-Region 2	**Wetlands**	
	Palustrine Emergent	0.4
	Palustrine Forested	1.1
	Sub Total	1.5
	Fresh Water Aquatic Areas	
	Palustrine Aquatic Beds	0.2
	Sub Total	0.2
West Sub-Region 3	**Wetlands**	
	Palustrine Forested	0.9
	Estuarine Emergent	1.1
	Sub Total	2.0
	Marine Areas	
	Beach Bars	4.8
	Sub Total	4.8
East Sub-Region 1	**Wetlands**	
	Palustrine Forested	1.2
	Palustrine Scrub-Shrub	0.7
	Sub Total	1.9
	Marine Areas	
	Rocky Shores	1.9
	Sub Total	1.9
All West Lynn Canal Sub-Regions (plus East Sub-Region 1)	**Wetlands**	
	Palustrine Emergent	2.3
	Palustrine Forested	21.9
	Palustrine Scrub-Shrub	0.7
	Estuarine Emergent	1.5
	Sub Total	26.4
	Fresh Water Aquatic Areas	
	Palustrine Aquatic Beds	0.2
	Sub Total	0.2
	Marine Areas	
	Beach Bars	4.9
	Rocky Shores	6.7
	Sub Total	11.6
All Sub-Regions (plus East Sub-Region 1)	**Sub-Regions Total**	
	Total Wetlands	26.4
	Total Fresh Water Aquatic Areas	0.2
	Total Marine Areas	11.6
	Total Acres	38.2

Note: Acreages do not include riverine areas intersected by the proposed alignments.

Table 4-3
Total Area Wetlands (Acres) and other Waters of the United States Affected by Project Alternatives, August 2005 Alignment

Wetlands and Other Waters of the U.S	Alternative 2B (Preferred)	Alternative 3	Alternatives 4B and 4D
	East Lynn Canal Highway to Katzehin with Shuttles to Haines and Skagway	West Lynn Canal Highway and Glacier Highway to Sawmill Cove	Glacier Highway to Sawmill Cove
Wetlands			
Palustrine Emergent	0.0	2.3	0.0
Palustrine Forested	69.1	21.9	1.2
Palustrine Scrub-Shrub	0.7	0.7	0.7
Estuarine Emergent	0.2	1.5	0.0
Sub Total	70.0	26.4	1.9
Fresh Water Aquatic Areas			
Aquatic Beds	0.0	0.2	0.0
Sub Total	0.0	0.2	0.0
Marine Areas			
Beach Bar	1.6	4.9	0.0
Rocky Shore Beaches	30.4	6.7	1.9
Sub Total	32	11.6	1.9
Total Acres	102	38.2	3.8

Note: Acreages do not include riverine areas intersected by the proposed alignments.

Table 4-4
Impacts to Functions and Values for Individual Wetlands and Estuarine Sites, East Lynn Canal Alignment, July 2005 Alternative 2B (Preferred) Alignment

Habitat Type	Cowardin Class	Wetland Type	Wetland ID	Total Area	Impacted Area	Impacts to Functions and Values Description (Fill for highway construction unless otherwise noted)
				Acres		
Sub-Region 1 – Echo Cove to Slate Cove						
Wetlands	PFO4B	Forested	115-1	2.70	0.02	This small wetland appears to be fed by groundwater Modification of groundwater recharge, groundwater discharge/lateral flow and surface hydrologic control.
	PFO4B	Forested	135-1	2.44	0.10	This small wetland appears to be fed by groundwater. Modification of groundwater recharge, groundwater discharge/lateral flow and surface hydrologic control.
	PFO4B	Forested	150-1	22.58	0.45	This forested wetland appears to be fed by a groundwater source. Modification of groundwater recharge, groundwater discharge/lateral flow and surface hydrologic control.
	PFO4B	Forested	165-1	44.46	0.38	This wetland appears to be fed by groundwater from hillside. Modification of groundwater recharge, groundwater discharge/lateral flow and surface hydrologic control.
	PFO4B	Forested	190-1	2.24	0.05	This small wetland appears to be fed by groundwater seep. Modification of groundwater recharge, groundwater discharge/lateral flow and surface hydrologic control.
	PFO4B	Forested	195-1	1.88	0.03	Modification of groundwater recharge, groundwater discharge/lateral flow and surface hydrologic control.
	PFO4B	Forested	235-1	3.20	0.21	This small wetland appears to be fed by groundwater seep. Modification of groundwater recharge, groundwater discharge/lateral flow and surface hydrologic control.
	PFO4B	Forested	415-1	67.91	2.51	Modification of groundwater recharge, groundwater discharge/lateral flow and surface hydrologic control.
	PFO1A/PSS1A	Forested/Emergent	735-4	57.01	2.19	Modification of groundwater recharge, groundwater discharge/lateral flow functions and riparian support.
	PFO1A	Forested	680-2	80.99	1.48	Modification of groundwater recharge/discharge functions and riparian support.
	PSS1B/PFO4B	Scrub-Shrub/Forested	340-1	4.51	0.72	Modification of groundwater recharge, groundwater discharge/lateral flow and surface hydrologic control.

Table 4-4 (continued)
Impacts to Functions and Values for Individual Wetlands and Estuarine Sites, East Lynn Canal Alignment, August 2005 Alternative 2B (Preferred) Alignment

Habitat Type	Cowardin Class	Wetland Type	Wetland ID	Total Area (Acres)	Impacted Area (Acres)	Impacts to Functions and Values Description (Fill for highway construction unless otherwise noted)
Sub-Region 2 – Slate Cove to Sherman Point						
Wetlands (continued)	PFO4B	Forested	895-1	88.06	4.77	Modification of groundwater recharge/discharge functions, riparian support, and wildlife habitat.
	PFO4B	Forested	910-2	6.44	0.57	Modification of groundwater recharge/discharge functions, riparian support, and wildlife habitat.
	PFO4B	Forested	955-2	1103.85	37.77	Modification of surface hydrologic control and groundwater recharge functions. Some loss of wildlife habitat functions.
	PFO4B/PSS1B	Forested/Scrub-Shrub	1185-1	205.49	12.24	Modification of groundwater recharge/discharge functions, nutrient transport, riparian support, and wildlife habitat.
	PFO4B/PSS1B	Forested/Scrub-shrub	1220-1	27.40	1.83	Modification of groundwater recharge/discharge functions and wildlife habitat.
	PFO4B	Forested	1260-1	30.07	1.78	Modification of groundwater discharge/recharge functions.
	PFO4B	Forested	1275-1	23.41	1.49	Modification of groundwater discharge/recharge functions.
Sub-Region 3 – Sherman Point to Katzehin River						
Wetlands	PFO4B	Forested	1360-1	33.74	1.08	Modification of groundwater discharge/recharge functions.
	PFO4B	Forested	1375-1	58.76	0.12	Functions not substantially impacted due to small fill area.
Marine Areas	E2RS2N/E2US1N	Rocky Shore/ Unconsolidated Shore	1380-1	NA	5.05	Modification of fish habitat.
	E2RS2N	Rocky Shore	1480-1	NA	18.94	Modification of fish habitat.
Sub-Region 4 – Katzehin River to Skagway						
Wetlands	E2EM1N	Estuarine Emergent	2750-1	NA	0.21	Modification of groundwater recharge/discharge functions, riparian support, and fish and wildlife habitat.
Marine Areas	E2BB1P	Beach Bar	2735-2	1.87	1.59	Modification of wildlife habitat.
	E2RS2N	Rocky Shore	2765-1	NA	6.37	Modification of fish/wildlife habitat.

Notes: The total acreage of a given marine intertidal area is a function of the beach slope and beach length. Because of the continuous nature of these marine types (i.e., rocky shores, beach bars, and unconsolidated shores), and the variability of seaward slope distances, delineation of these marine intertidal boundaries was only conducted in the vicinity of potential impacts.

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Attachment B-1
Wetland Functions and Values

Sub-Regions	Wetland ID	Field Date	Cowardin Class	Estimated Total Wetland Acreage	Impact Area	Groundwater Recharge	Groundwater Discharge/Flow and Lateral Flow	Surface Hydrologic Control	Sediment/ Toxicant Retention	Nutrient Transformation/ Export	Riparian Support	Fish Habitat	Wildlife	Regional Ecological Diversity	Ecological Replacement	Erosion Sensitivity	Notes	Downstream/ Coastal Beneficiary Sites
	WETLANDS																	
Sub-Region 1	115-1	aerial	PFO4B	2.70	0.02	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	125-1	aerial	PFO4B	1.70	0.00	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	135-1	aerial	PFO4B	2.44	0.10	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	150-1	aerial	PFO4B	22.58	0.45	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	165-1	aerial	PFO4B	44.46	0.38	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-High	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	190-1	aerial	PFO4B	2.24	0.05	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-High	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	195-1	aerial	PFO4B	1.88	0.03	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	200-1	aerial	PFO4B	1.28	0.00	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	235-1	aerial	PFO4B	3.20	0.21	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	265-1	aerial	PFO4B	6.11	0.00	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	340-1	7/22/2003	PSS1B/PFO4B	4.51	0.72	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-Low	Very Low	Low	Moderate-High	Moderate-High	Low		Low
	330-1	7/22/2003	PFO4B/PSS1B	1.74	0.00	High to Moderate	High to Moderate	High	Moderate-Low	Moderate	Moderate-Low	Very Low	Low	Moderate-High	Moderate-High	Moderate-Low		Low
	415-1	7/31/2003	PFO4B	67.91	2.51	High to Moderate	High to Moderate	High	Low	Moderate	Moderate-Low	Very Low	Low	Moderate-High	High	Moderate-Low		Low
	800-1	7/28/2003	PFO4B	26.48	0.00	High to Moderate	Low	Moderate-High	High	Low	Low	Very Low	Low	Moderate-High	High	Moderate-Low		Low
	800-3	7/28/2003	PFO4B	12.13	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	830-1	7/28/2003	PFO4B	17.03	0.00	High to Moderate	Low	Moderate-High	High	Low	Low	Very Low	Low	Moderate-High	High	Moderate-Low		Low
	735-4	7/28/2003	PFO1A/PSS1A	57.01	2.19	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-High	Very Low	Moderate-Low	Moderate-High	High	Low		Low
	680-2	7/28/2003	PFO1A	80.99	1.48	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-High	Very Low	Moderate-Low	Moderate-High	High	Low		Low
	735-2	7/28/2003	PEM1S	31.19	0.00	Low	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-High	Very Low	High	High	Low	Low		Low
	420-1	7/31/2003	PEM1B/PSS4B	13.38	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-High	Moderate-Low	Moderate	Low		Low
	440-1	7/31/2003	PEM1B/PSS4B	6.63	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-High	Moderate-Low	Moderate	Low		Low
	320-1	7/22/2003	PEM1B/PSS1B	2.16	0.00	High to Moderate	High to Moderate	Low	Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-High	Moderate	Moderate-High		Low
	330-2	7/22/2003	PEM1B/PFO4B	3.47	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Low	Moderate-High	Moderate-High	Low		Low
	270-1	aerial	PEM1B	0.62	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Low	Moderate	Low		Low
	275-1	aerial	PEM1B	1.39	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Low	Moderate	Low		Low
	800-2	7/28/2003	PEM1B	7.40	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-High	Low	Moderate	Low		Low
	800-4	7/28/2003	PEM1B	1.13	0.00	High to Moderate	Low	High	High	Low	Low	Very Low	Low	Low	Moderate	Low		Low
	830-2	7/28/2003	PEM1B	2.54	0.00	High to Moderate	Low	High	High	Low	Low	Very Low	Low	Low	Moderate	Low		Low
	680-3	aerial	PSS1S/PFL1S	23.64	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-High	Very Low	Moderate-Low	Moderate-High	Low	Moderate-High		Low
	690-2	aerial	PSS1R	2.61	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-High	Very Low	Moderate-Low	Moderate-High	Low	Moderate-High		Low
	735-1	7/28/2003	E2EM1P	52.31	0.00	High to Moderate	High to Moderate	Low	Moderate-High	Moderate	High	Moderate-Low	High	High	High	Low		Low
	MARINE AREAS																	
	370-T	7/31/2003	E2RS2N	2.78	See Notes	Low	Low	Low	Low	NA	NA	High	High	High	Low	Low	Sawmill Cove Ferry Terminal	Low

Attachment B-1 (continued)
Wetland Functions and Values

Sub-Regions	Wetland ID	Field Date	Cowardin Class	Estimated Total Wetland Acreage	Impact Area	Groundwater Recharge	Groundwater Discharge/Flow and Lateral Flow	Surface Hydrologic Control	Sediment/ Toxicant Retention	Nutrient Transformation/ Export	Riparian Support	Fish Habitat	Wildlife	Regional Ecological Diversity	Ecological Replacement	Erosion Sensitivity	Notes	Downstream/ Coastal Beneficiary Sites
	WETLANDS																	
Sub-Region 2	990-1	aerial	PSS4B/PEM1B	39.04	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	High	Moderate-High	Moderate	Low		Low
	1015-1	aerial	PFO4B/PEM1B	2.80	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Low	Low	Moderate-High	Moderate-Low		Low
	1020-1	aerial	PFO4B/PEM1B	6.04	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Low	Low	Moderate-High	Moderate-Low		Low
	895-1	7/31/2003	PFO4B	88.06	4.77	High to Moderate	High to Moderate	Low	Low	Moderate	Moderate-High	Very Low	Moderate-Low	Moderate-High	High	Moderate-Low		Low
	910-2	7/30/2003	PFO4B	6.44	0.57	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	High	Very Low	Moderate-High	Moderate-High	High	Moderate-Low		Low
	955-2	7/30/2003	PFO4B	1103.85	37.77	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	High	High	Very Low	Moderate-High	Moderate-High	High	Moderate-Low		Low
	920-1	aerial	PEM1B/PSS4B	0.58	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-High	Low	Moderate	Low		Low
	950-1	7/30/2003	PEM1B/PSS4B	161.23	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	High	Moderate-High	Moderate	Low		Low
	955-1	7/30/2003	PEM1B/PSS4B	42.84	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	High	Moderate-High	Moderate	Low		Low
	975-1	aerial	PEM1B/PSS4B	1.83	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-High	Low	Moderate	Low		Low
	1010-1	aerial	PEM1B/PSS4B	1.13	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-High	Low	Moderate	Low		Low
	1040-1	aerial	PEM1B/PSS4B	16.55	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-High	Low	Moderate	Moderate-High		Low
	1185-1	7/30/2003	PFO4B/PSS1B	205.49	12.24	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	High	High	Very Low	Moderate-High	Moderate-High	High	Moderate-Low		Low
	1220-1	aerial	PFO4B/PSS1B	27.40	1.83	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-High	Moderate-Low	Moderate-High	Low		Low
	1070-1	aerial	PFO4B/PEM1B	8.45	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-High	Moderate-Low	Moderate-High	Low		Low
	1260-1	7/26/2003	PFO4B	30.07	1.78	High to Moderate	High to Moderate	Low	Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-Low	High	Moderate-Low		Low
	1275-1	aerial	PFO4B	23.41	1.49	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-Low	High	Low		Low
	1110-1	aerial	PEM1B/PSS4B	2.30	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-High	Low	Moderate	Low		Low
	1135-1	aerial	PEM1B/PSS4B	1.02	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Low	Low	Moderate	Low		Low
	1150-1	aerial	PEM1B/PSS4B	4.63	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Moderate-High	Low	Moderate	Low		Low
	1260-2	aerial	PEM1B/PSS4B	1.35	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Low	Low	Moderate	Moderate-High		Low
	1125-1	aerial	PEM1B	0.43	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Low	Low	Moderate	Low		Low
	1185-2	aerial	PEM1B	1.49	0.00	High to Moderate	High to Moderate	Moderate-Low	Moderate-Low	Moderate	Moderate-Low	Very Low	Low	Low	Moderate	Low		Low
	900-1	7/30/2003	E2EM1P	18.05	0.00	High to Moderate	High to Moderate	Low	Moderate-High	High	High	Moderate-Low	High	High	High	Moderate-Low		Low
	MARINE AREAS																	
	900-T	7/30/2003	E2BB1N	3.19	0.00	High to Moderate	High to Moderate	Low	Moderate-High	Moderate	Moderate-High	High	High	High	Low	Low	Slate Creek Ferry Terminal	Low

Attachment B-1 (continued)
Wetland Functions and Values

Sub-Regions	Wetland ID	Field Date	Cowardin Class	Estimated Total Wetland Acreage	Impact Area	Groundwater Recharge	Groundwater Discharge/Flow and Lateral Flow	Surface Hydrologic Control	Sediment/ Toxicant Retention	Nutrient Transformation/ Export	Riparian Support	Fish Habitat	Wildlife	Regional Ecological Diversity	Ecological Replacement	Erosion Sensitivity	Notes	Downstream/ Coastal Beneficiary Sites
Sub-Region 3	**WETLANDS**																	
	1360-1	aerial	PFO4B	33.74	1.08	High to Moderate	High to Moderate	Low	Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-Low	High	High		Low
	1375-1	aerial	PFO4B	58.76	0.12	High to Moderate	High to Moderate	Low	Low	Moderate	Moderate-Low	Very Low	Moderate-Low	Moderate-Low	High	High		Low
	2590-1	aerial	E2EM1N	16.25	0.00	High to Moderate	High to Moderate	Low	Moderate-High	Moderate	High	High	High	High	High	Low		Low
	MARINE AREAS																	
	1300-1	aerial	E2RS2N/E2US	NA	0.00	Low	Low	Low	Low	NA	NA	High	Moderate-Low	High	Low	Low		Low
	1380-1	aerial	E2RS2N/E2US	NA	5.05	Low	Low	Low	Low	NA	NA	High	Moderate-Low	High	Low	Low		Low
	1480-1	aerial	E2RS2N	NA	18.94	Low	Low	Low	Low	NA	NA	High	Moderate-Low	High	Low	Low		Low
Sub-Region 4	**WETLANDS**																	
	3565-1	aerial	PSS4B	0.15	0.00	High to Moderate	Low	High	High	Low	Low	Very Low	Low	Low	Moderate	Low		Low
	3560-1	aerial	PEM1B	0.17	0.00	High to Moderate	Low	High	High	Low	Low	Very Low	Low	Low	Moderate	Low		Low
	2670-1	aerial	E2EM1P	46.11	0.00	High to Moderate	High to Moderate	Low	Moderate-High	High	High	Moderate-Low	High	High	High	Low		Low
	2690-1	aerial	E2EM1P	14.37	0.00	High to Moderate	High to Moderate	Low	Moderate-High	High	High	Moderate-Low	High	High	High	Low		Low
	2630-1	7/27/2003	E2EM1N	39.04	0.00	High to Moderate	High to Moderate	Low	Moderate-High	High	High	High	High	High	High	Low		Low
	2735-1	7/27/2003	E2EM1N	135.04	0.00	High to Moderate	High to Moderate	Low	Moderate-High	Moderate	High	High	High	High	High	Low		Low
	2750-1	aerial	E2EM1N	0.21	0.21	High to Moderate	High to Moderate	Low	Moderate-High	Moderate	High	High	High	High	High	Low		Low
	MARINE AREAS																	
	2745-T	aerial	E2RS2N	NA	0.0	Low	Low	Low	Low	NA	NA	High	Moderate-Low	High	Low	Low		Low
	2765-1	aerial	E2RS2N	NA	6.37	Low	Low	Low	Low	NA	NA	High	Moderate-Low	High	Low	Low		Low
	2800-1	aerial	E2RS2N	NA	0.00	Low	Low	Low	Low	NA	NA	High	Moderate-Low	High	Low	Low		Low
	2985-1	aerial	E2RS2N	NA	0.00	Low	Low	Low	Low	NA	NA	High	Moderate-Low	High	Low	Low		Low
	3000-1	aerial	E2RS2N	NA	0.00	Low	Low	Low	Low	NA	NA	High	Moderate-Low	High	Low	Low		Low
	3300-1	aerial	E2RS2N	NA	0.00	Low	Low	Low	Low	NA	NA	High	Moderate-Low	High	Low	Low		Low
	3580-1	aerial	E2RS2N	NA	0.00	Low	Low	Low	Low	NA	NA	High	Moderate-Low	High	Low	Low		High
	2735-2	7/27/2003	E2BB1P	1.87	1.59	High to Moderate	High to Moderate	Low	Moderate-High	Moderate	Moderate-High	Moderate-Low	High	High	Low	Low		Low
	AQUATIC BEDS (VEGETATED SHALLOWS)/ OPEN WATER																	
	3615-1	7/27/2003	POWH	2.22	0.00	High to Moderate	High to Moderate	Low	Moderate-High	High	Moderate-High	Moderate-Low	High	Moderate-Low	Low	Low		High
	3615-2	7/27/2003	POWH	0.42	0.00	Low	High to Moderate	Low	Moderate-High	High	Moderate-High	Moderate-High	Low	Low	Low	Low		Low
	3615-3	aerial	POWH	0.03	0.00	Low	High to Moderate	Low	Moderate-High	High	Moderate-High	Moderate-High	Low	Low	Low	Low		Low

Notes: E2RS2N, E2US1N, and E2BB1N/P provide minimal hydrologic functions.
Sawmill Cove Ferry Terminal (370-T; E2RS2N): Impacted acreage by Alternatives 3, 4B and 4D = 1.9 acres
July 2003 Station Number+T = ferry terminal location.
See Section 3.0 of *Appendix O Technical Report* for a description of Cowardin Classification and the NWI coding system.
Katzehin Ferry Terminal required subtidal fill of 2.74 acres for breakwater
NA - The total acreage of a given marine intertidal area is a function of the beach slope and beach length. Because of the continuous nature of these marine types (i.e., rocky shores, beach bars, and unconsolidated shores), and the variability of seaward slope distances, delineation of these marine intertidal boundaries was only conducted in the vicinity of potential impacts

Very High, High, or High to Moderate
Moderate-High
Moderate
Moderate-Low
Low or Very Low

FIGURES

This section provides the following updated versions of 11 figures that were originally presented in the 2004 *Wetlands Technical Report*. Figures 1 through 11, respectively, are updated versions of Figures 3 through 9 and Figures 17 and 18 in the 2004 technical report.

Figure 1 Wetlands – East Lynn Canal Sub-Region 1

Figure 2 Wetlands – East Lynn Canal Sub-Region 1

Figure 3 Wetlands – East Lynn Canal Sub-Region 1

Figure 4 Wetlands – East Lynn Canal Sub-Region 1

Figure 5 Wetlands – East Lynn Canal Sub-Region 1

Figure 6 Wetlands – East Lynn Canal Sub-Region 2

Figure 7 Wetlands – East Lynn Canal Sub-Region 2

Figure 8 Wetlands – East Lynn Canal Sub-Region 2

Figure 9 Wetlands – East Lynn Canal Sub-Region 3

Figure 10 Wetlands – East Lynn Canal Sub-Regions 3 and 4

Figure 11 Wetlands – East Lynn Canal Sub-Region 4

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LEGEND

Wetland Classification

Wetlands

- Palustrine Scrub-Shrub
- Palustrine Emergent
- Palustrine Forested
- Estuarine Emergent

Fresh Water Aquatic Areas

- Palustrine Aquatic Beds
- Palustrine Open Water

Marine Areas

- Estuarine Rocky Shores
- Estuarine Beach Bar

Other Waters of the U.S.

- Riverine
- Estuarine Subtidal

GPS Point GPS Line

U.S. Forest Service Streams (1995)

Routes

East Route

- Current Alignment as of 8/24/2005
- Alignment as of 6/12/2003
- Proposed Ferry Access Roads and Terminals
- Current Daylight Lines as of 8/24/2005

500 250 0 500 1,000 Feet

N E S W

115-1 (PFO4B)
110+05.94
120+00
125-1 (PFO4B)
130+00
150-1 (PFO4B)
135-1 (PFO4B)
150+00
165-1 (PFO4B)
160+00
170+00
180+00
190-1 (PFO4B)
195-1 (PFO4B)
190+00
200+00
200-1 (PFO4B)
210+00
220+00
230+00
235-1 (PFO4B)
240+00
250+00
260+00
275-1 (PEM1B)
270+00
270-1 (PEM1B)
265-1 (PFO4B)

Upland region

Uplands along alignment between Stations ~225+00 and ~230+00

Uplands along alignment between Stations ~243+00 and ~270+00

Echo Cove

Lynn Canal

Juneau Access Improvements

Wetlands
East Lynn Canal
Sub-Region 1

JOB NO: 26219699	DRAWN BY: KMM/PLB	Figure 1
DATE: August 30, 2005	FILE: M:\Data\ADOT\Juneau_Access\Figures\Tech Report Figures\Wetlands\mxd - 0701705\Wetlands Mapbook_v1.mxd	

LEGEND

Wetland Classification

Wetlands

- Palustrine Scrub-Shrub
- Palustrine Emergent
- Palustrine Forested
- Estuarine Emergent

Fresh Water Aquatic Areas

- Palustrine Aquatic Beds
- Palustrine Open Water

Marine Areas

- Estuarine Rocky Shores
- Estuarine Beach Bar

Other Waters of the U.S.

- Riverine
- Estuarine Subtidal

GPS Point GPS Line

U.S. Forest Service Streams (1995)

Routes

East Route

- Current Alignment as of 8/24/2005
- Alignment as of 6/12/2003
- Proposed Ferry Access Roads and Terminals
- Current Daylight Lines as of 8/24/2005

500 250 0 500 1,000 Feet

N E S W

Uplands along alignment between Stations ~345+00 and ~410+00

415-1 (PFO4B)

430+00 420+00 410+00 400+00 390+00 380+00 370+00 360+00 350+00 340+00 330+00 320+00 310+00 300+00 290+00

420-1 (PEM1B/PSS4B)

370-T (E2RS2N)

Sawmill Cove

Sawmill Cove Ferry Terminal

320-1 (PEM1B/PSS1B)

340-1 (PSS1B/PFO4B)

330-1 (PFO4B/PEM1B)

330-2 (PEM1B/PFO4B)

Sawmill Creek

325-1 (R3UB1H)

275-1 (PEM1B)

265-1 (PFO

Uplands along alignment between Stations ~280+00 and ~340+00

Lynn Canal

Juneau Access Improvements

Wetlands
East Lynn Canal
Sub-Region 1

JOB NO: 26219699	DRAWN BY: KMM/PLB	**Figure 2**
DATE: August 30, 2005	FILE: M:\Data\ADOT\Juneau_Access\Figures\Tech Report Figures\Wetlands\mxd - 0701705\Wetlands Mapbook_v1.mxd	

LEGEND

Wetland Classification

Wetlands

- Palustrine Scrub-Shrub
- Palustrine Emergent
- Palustrine Forested
- Estuarine Emergent

Fresh Water Aquatic Areas

- Palustrine Aquatic Beds
- Palustrine Open Water

Marine Areas

- Estuarine Rocky Shores
- Estuarine Beach Bar

Other Waters of the U.S.

- Riverine
- Estuarine Subtidal

GPS Point GPS Line

U.S. Forest Service Streams (1995)

Routes

East Route

- Current Alignment as of 8/24/2005
- Alignment as of 6/12/2003
- Proposed Ferry Access Roads and Terminals
- Current Daylight Lines as of 8/24/2005

500 250 0 500 1,000 Feet

Uplands along alignment between Stations ~455+00 and ~635+00

Uplands along alignment between Stations ~345+00 and ~410+00

460+00 450+00 440+00 430+00 420+00 410+00 400+00 390+00 380+00 370+00 360+00 350+00 340+00 330+00 320+00 310+00

415-1 (PFO4B)

440-1 (PEM1B/PSS4B)

420-1 (PEM1B/PSS4B)

370-T (E2RS2N)

320-1 (PEM1B/PSS1B)

340-1 (PSS1B/PFO4B)

330-1 (PFO4B/PEM1B)

330-2 (PEM1B/PFO4B)

325-1 (R3UB1H)

Sawmill Cove

Sawmill Cove Ferry Terminal

Sawmill Creek

Lynn Canal

Juneau Access Improvements

Wetlands
East Lynn Canal
Sub-Region 1

JOB NO: 26219699	DRAWN BY: KMM/PLB	**Figure 3**
DATE: August 30, 2005	FILE: M:\Data\ADOT\Juneau_Access\Figures\Tech Report Figures\Wetlands\mxd - 0701705\Wetlands Mapbook_v1.mxd	

LEGEND

Wetland Classification

Wetlands

- Palustrine Scrub-Shrub
- Palustrine Emergent
- Palustrine Forested
- Estuarine Emergent

Fresh Water Aquatic Areas

- Palustrine Aquatic Beds
- Palustrine Open Water

Marine Areas

- Estuarine Rocky Shores
- Estuarine Beach Bar

Other Waters of the U.S.

- Riverine
- Estuarine Subtidal

GPS Point GPS Line

U.S. Forest Service Streams (1995)

Routes

East Route

- Current Alignment as of 8/24/2005
- Alignment as of 6/12/2003
- Proposed Ferry Access Roads and Terminals
- Current Daylight Lines as of 8/24/2005

500 250 0 500 1,000 Feet

630+00
640+00
620+00
610+00
600+00
600-1 (R3OWH)
650+00
Uplands along alignment between Stations ~455+00 and ~635+00
Uplands along alignment between Stations ~640+00 and ~667+00
660+00
670+00
680-3 (PSS1S/PFL1S)
680-2 (PFO1A)
680+00
690-1 (R1UBV/R1FLR)
690+00
690-2 (PSS1R)
700+00
Upland region
720+00
Uplands along alignment between Stations ~705+00 and ~745+00
Antler River
735-2 (PEM1S)
740+00
735-4 (PFO1A)
735-1 (E2EM1P)
Upland region
Berners and Lace Rivers

Juneau Access Improvements

Wetlands
East Lynn Canal
Sub-Region 1

JOB NO: 26219699	DRAWN BY: KMM/PLB	**Figure 4**
DATE: August 30, 2005	FILE: M:\Data\ADOT\Juneau_Access\Figures\Tech Report Figures\Wetlands\mxd - 0701705\Wetlands Mapbook_v1.mxd	

Upland region

Uplands along alignment between Stations ~705+00 and ~745+00

710+00

720+00

730+00

740+00

735-2 (PEM1S)

735-4 (PFO1A)

735-1 (E2EM1P)

Upland region

Upland region

760+00

770+00

780+00

790+00

800+00

810+00

830+00

840+00

850+00

Antler River

Berners Bay

Berners and Lace Rivers

780-1 (E1UBL)

Uplands along alignment between Stations ~800+00 and ~810+00

800-1 (PFO4B)

800-2 (PEM1B)

800-3 (PFO4B)

800-4 (PEM1B)

830-2 (PEM1B)

830-1 (PFO4B/PEM1B)

LEGEND

Wetland Classification

Wetlands

- Palustrine Scrub-Shrub
- Palustrine Emergent
- Palustrine Forested
- Estuarine Emergent

Fresh Water Aquatic Areas

- Palustrine Aquatic Beds
- Palustrine Open Water

Marine Areas

- Estuarine Rocky Shores
- Estuarine Beach Bar

Other Waters of the U.S.

- Riverine
- Estuarine Subtidal

GPS Point

GPS Line

U.S. Forest Service Streams (1995)

Routes

East Route

- Current Alignment as of 8/24/2005
- Alignment as of 6/12/2003
- Proposed Ferry Access Roads and Terminals
- Current Daylight Lines as of 8/24/2005

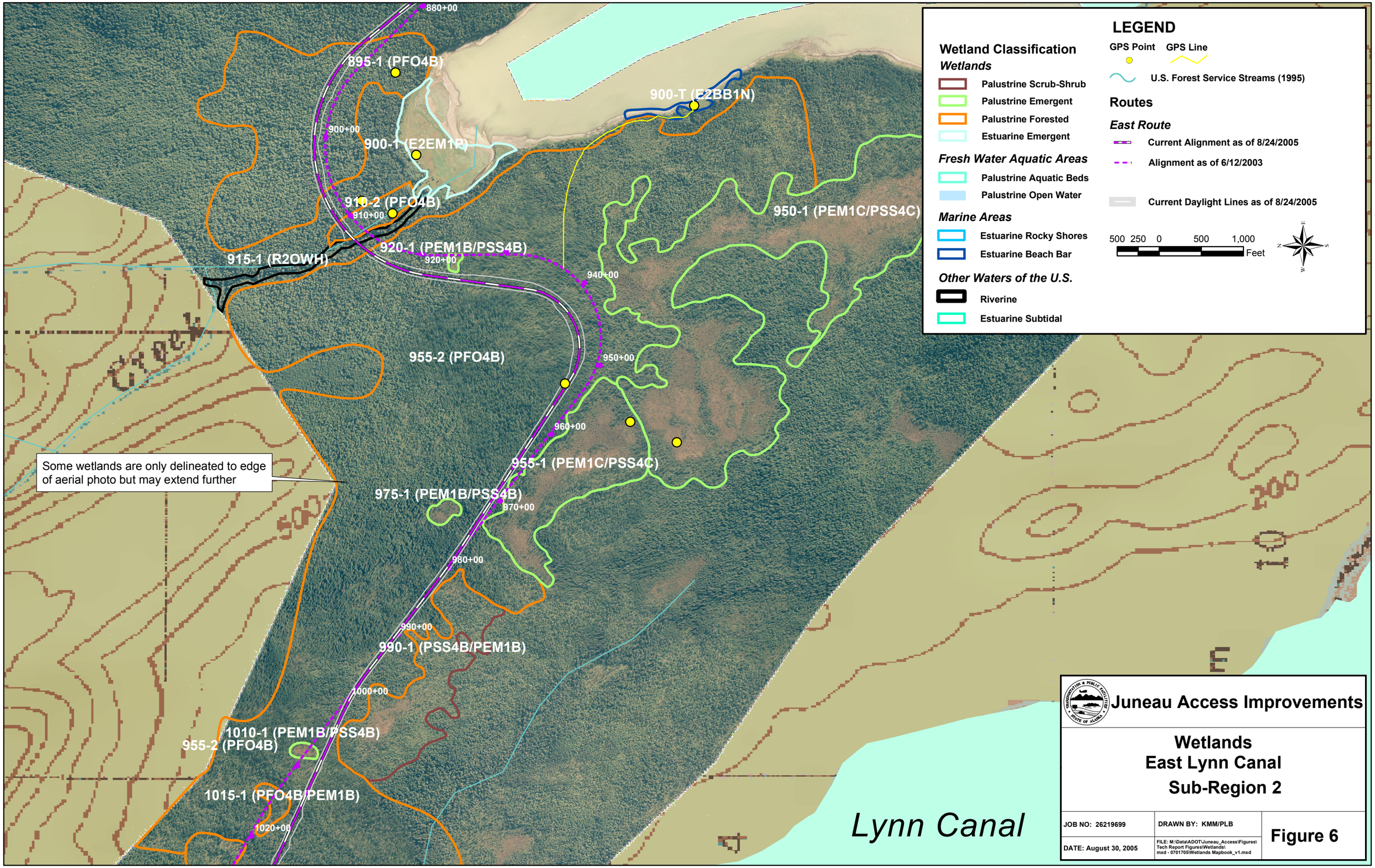
500 250 0 500 1,000 Feet

N

Juneau Access Improvements

Wetlands
East Lynn Canal
Sub-Region 1

JOB NO: 26219699	DRAWN BY: KMM/PLB	Figure 5
DATE: August 30, 2005	FILE: M:\Data\ADOT\Juneau_Access\Figures\Tech Report Figures\Wetlands\mxd - 0701705\Wetlands Mapbook_v1.mxd	



Juneau Access Improvements

Wetlands
East Lynn Canal
Sub-Region 2

JOB NO: 26219699	DRAWN BY: KMM/PLB	Figure 6
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LEGEND

Wetland Classification

Wetlands

- Palustrine Scrub-Shrub
- Palustrine Emergent
- Palustrine Forested
- Estuarine Emergent

Fresh Water Aquatic Areas

- Palustrine Aquatic Beds
- Palustrine Open Water

Marine Areas

- Estuarine Rocky Shores
- Estuarine Beach Bar

Other Waters of the U.S.

- Riverine
- Estuarine Subtidal

GPS Point GPS Line

U.S. Forest Service Streams (1995)

Routes

East Route

- Current Alignment as of 8/24/2005
- Alignment as of 6/12/2003
- Proposed Ferry Access Roads and Terminals
- Current Daylight Lines as of 8/24/2005

500 250 0 500 1,000 Feet

Some wetlands are only delineated to edge of aerial photo but may extend further

1015-1 (PFO4B/PEM1B)

1020+00

1020-1 (PFO4B/PEM1B)

955-2 (PFO4B)

1030+00

1040-1 (PEM1B/PSS4B)

1040+00

1050+00

1060+00

955-2 (PFO4B)

1070+00

1070-1 (PFO4B/PEM1B)

1080+00

955-2 (PFO4B)

1090+00

1100+00

Upland region

1110-1 (PEM1B/PSS4B)

1110+00

1120+00

955-2 (PFO4B)

1125-1 (PEM1B)

1130+00

Upland region

1135-1 (PEM1B/PSS4B)

1140+00

1150-1 (PEM1B/PSS4B)

1150+00

1160+00

Upland region

Lynn Canal

Juneau Access Improvements

Wetlands
East Lynn Canal
Sub-Region 2

JOB NO: 26219699	DRAWN BY: KMM/PLB	**Figure 7**
DATE: August 30, 2005	FILE: M:\Data\ADOT\Juneau_Access\Figures\Tech Report Figures\Wetlands\mxd - 0701705\Wetlands Mapbook_v1.mxd	

LEGEND

Wetland Classification

Wetlands

- Palustrine Scrub-Shrub
- Palustrine Emergent
- Palustrine Forested
- Estuarine Emergent

Fresh Water Aquatic Areas

- Palustrine Aquatic Beds
- Palustrine Open Water

Marine Areas

- Estuarine Rocky Shores
- Estuarine Beach Bar

Other Waters of the U.S.

- Riverine
- Estuarine Subtidal

GPS Point GPS Line

U.S. Forest Service Streams (1995)

Routes

East Route

- Current Alignment as of 8/24/2005
- Alignment as of 6/12/2003
- Proposed Ferry Access Roads and Terminals
- Current Daylight Lines as of 8/24/2005

500 250 0 500 1,000 Feet

955-2 (PFO4B)

1125-1 (PEM1B)

1130+00

1135-1 (PEM1B/PSS4B)

1140+00

1150-1 (PEM1B/PSS4B)

1150+00

1160+00

Some wetlands are only delineated to edge of aerial photo but may extend further

1185-1 (PFO4B/PSS1B)

1170+00

Upland region

1180+00

1185-2 (PEM1B)

1200+00

1220-1 (PFO4B/PEM1B)

1210+00

1220+00

1230+00

1240+00

1250+00

1260-1 (PFO4B)

1260-2 (PEM1B/PSS4B)

1260+00

Upland region

1275-1 (PFO4B)

1270+00

1280+00

1290+00

1300+00

Lynn Canal

Juneau Access Improvements

Wetlands
East Lynn Canal
Sub-Region 2 and 3

JOB NO: 26219699	DRAWN BY: KMM/PLB	**Figure 8**
DATE: August 30, 2005	FILE: M:\Data\ADOT\Juneau_Access\Figures\Tech Report Figures\Wetlands\mxd - 0701705\Wetlands Mapbook_v1.mxd	

LEGEND

Wetland Classification

Wetlands

- Palustrine Scrub-Shrub
- Palustrine Emergent
- Palustrine Forested
- Estuarine Emergent

Fresh Water Aquatic Areas

- Palustrine Aquatic Beds
- Palustrine Open Water

Marine Areas

- Estuarine Rocky Shores
- Estuarine Beach Bar

Other Waters of the U.S.

- Riverine
- Estuarine Subtidal

GPS Point GPS Line

U.S. Forest Service Streams (1995)

Routes

East Route

- Current Alignment as of 8/24/2005
- Alignment as of 6/12/2003
- Proposed Ferry Access Roads and Terminals
- Current Daylight Lines as of 8/24/2005

500 250 0 500 1,000 Feet

1375-1 (PFO4B)

1360-1 (PFO4B)

Uplands along alignment between Stations ~1280+00 and ~1363+00

Sherman Creek

Kensington Mine Facilities

1300-1 (E2RS2N/E2US1N)

Upland region

1380-1 (E2RS2N/E2US1N)

1450+00 1460+00 1440+00 1430+00 1420+00 1410+00 1400+00 1390+00 1370+00 1360+00 1350+00 1340+00 1330+00 1320+00 1310+00 1300+00

Lynn Canal

Juneau Access Improvements

Wetlands
East Lynn Canal
Sub-Region 3

JOB NO: 26219699	DRAWN BY: KMM/PLB	**Figure 9**
DATE: August 30, 2005	FILE: M:\Data\ADOT\Juneau_Access\Figures\Tech Report Figures\Wetlands\mxd - 0701705\Wetlands Mapbook_v1.mxd	

LEGEND

Wetland Classification

Wetlands

- Palustrine Scrub-Shrub
- Palustrine Emergent
- Palustrine Forested
- Estuarine Emergent

Fresh Water Aquatic Areas

- Palustrine Aquatic Beds
- Palustrine Open Water

Marine Areas

- Estuarine Rocky Shores
- Estuarine Beach Bar

Other Waters of the U.S.

- Riverine
- Estuarine Subtidal

GPS Point GPS Line

U.S. Forest Service Streams (1995)

Routes

East Route

- Current Alignment as of 8/24/2005
- Alignment as of 6/12/2003
- Proposed Ferry Access Roads and Terminals
- Current Daylight Lines as of 8/24/2005

500 250 0 500 1,000 Feet

Note the scale change for this figure

Katzehin River

2620-1 (E1UBL)

2630-1 (E2EM1N)

2590-1 (E2EM1N)

1480-1 (E2RS2N)

2500+00 2510+00 2520+00 2530+00 2540+00 2550+00 2560+00 2570+00 2580+00 2590+00 2600+00 2620+00 2630+00 2640+00 2650+00 2660+00 2670+00

Lynn Canal

Juneau Access Improvements

Wetlands
East Lynn Canal
Sub-Region 3 and 4

JOB NO: 26219699	DRAWN BY: KMM/PLB	**Figure 10**
DATE: August 30, 2005	FILE: M:\Data\ADOT\Juneau_Access\Figures\Tech Report Figures\Wetlands\mxd - 0701705\Wetlands Mapbook_v1.mxd	

LEGEND

Wetland Classification

Wetlands

- Palustrine Scrub-Shrub
- Palustrine Emergent
- Palustrine Forested
- Estuarine Emergent

Fresh Water Aquatic Areas

- Palustrine Aquatic Beds
- Palustrine Open Water

Marine Areas

- Estuarine Rocky Shores
- Estuarine Beach Bar

Other Waters of the U.S.

- Riverine
- Estuarine Subtidal

GPS Point GPS Line

U.S. Forest Service Streams (1995)

Routes

East Route

- Current Alignment as of 8/24/2005
- Alignment as of 6/12/2003
- Proposed Ferry Access Roads and Terminals
- Current Daylight Lines as of 8/24/2005

500 250 0 500 1,000 Feet

2630-1 (E2EM1N)

2640+00

2650+00

2660+00

2670+00

Uplands along alignment between Stations~2637+00 and ~2700+00

2680+00

2690+00

2670-1 (E2EM1P)

2690-1 (E2EM1P)

2705-1 (E2EM1P)

2710+00

2720+00

Uplands along alignment between Stations~2720+00 and ~2730+00

2735-1 (E2EM1N)

2730+00

2735-2 (E2BB1P)

2745-T (E2RS2N)

2750-1 (E2EM1N)

2750+00

Katzehin Ferry Terminal

2765-1 (E2RS2N)

2760+00

2770+00

2780+00

Lynn Canal

Juneau Access Improvements

Wetlands
East Lynn Canal
Sub-Region 4

JOB NO: 26219699	DRAWN BY: KMM/PLB	**Figure 11**
DATE: August 30, 2005	FILE: M:\Data\ADOT\Juneau_Access\Figures\Tech Report Figures\Wetlands\mxd - 0701705\Wetlands Mapbook_v1.mxd	