Juneau Access Improvements Project
Draft Supplemental Environmental Impact Statement

2014 Update to Appendix Q
Wildlife Technical Report

Prepared for:

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& Public Facilities
6860 Glacier Highway
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Acronyms and Abbreviations

ACF	Alaska Class Ferry
ADF&G	Alaska Department of Fish and Game
AMHS	Alaska Marine Highway System
BMP	Best Management Practices
CBJ	City and Borough of Juneau
DLP	defense of life or property
DOT&PF	Alaska Department of Transportation and Public Facilities
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FHWA	Federal Highway Administration
FVF	Fast Vehicle Ferry
GMU	Game Management Unit
GPS	Global Positioning System
JAI	Juneau Access Improvements
mi^2	square miles
MIS	Management Indicator Species
NEPA	National Environmental Policy Act
NHS	National Highway System
ORV	off-road vehicle
ROD	Record of Decision
SEIS	Supplemental Environmental Impact Statement
TLRMP	Tongass Land and Resources Management Plan
USACE	U.S. Army Corps of Engineers
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
VHF	very high frequency

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1 Introduction

This 2014 update is to the 2005 *Addendum to Appendix Q Wildlife Technical Report* and 2004 *Wildlife Technical Report.* The December 2004 *Wildlife Technical Report*, was presented as Appendix Q of the Juneau Access Improvements (JAI) Project Supplemental Draft Environmental Impact Statement (EIS). The 2004 report analyzed the potential impacts of Alternatives 2, 2A, 2B, 2C, 3, 4B, and 4D on wildlife habitat and species.

During its development of the JAI Project 2006 Final EIS, Alaska Department of Transportation and Public Facilities (DOT&PF) responded to comments on the Supplemental Draft EIS, incorporated new data and further analysis for some resources, and incorporated additional mitigation measures to reduce impacts to wildlife and habitat. The DOT&PF also made some changes to Alternative 2B and removed Alternatives 2, 2A, and 2C from the range of reasonable alternatives. Many of these changes prompted DOT&PF to update supporting technical reports with addenda, including *Addendum to Appendix Q, Wildlife Technical Report*, which was included in Appendix W of the 2006 Final EIS.

Seven years have passed since the 2006 Final EIS and Record of Decision (ROD) were published, and the Federal Highway Administration (FHWA) and DOT&PF need to update Technical Reports as part of the JAI Project 2014 Draft Supplemental Environmental Impact Statement (SEIS). Updates are needed to reflect changes in regulations, new information related to the potentially affected environment or conditions, updated analysis, evaluation of the newly added Alternative 1B, changes in the design or alignment for Alternatives 2B and 3, and the widening of the recently constructed Glacier Highway Extension between Echo Cove and Sawmill Creek that is common to Alternatives 2B, 3, 4B, and 4D. Three key components that affected changes to the design and alignment of Alternative 2B and 3 since the 2006 ROD are: changes in 2006 during the US Army Corps of Engineers (USACE) permitting process to minimize impacts to wetlands and reduce the extent of rock side cast areas, changes in 2009 based on advanced geotechnical survey information, and changes in 2012 in response to updated bald eagle nest survey data.

The information reported in the 2005 *Addendum to Appendix Q Wildlife Technical Report* and 2004 *Appendix Q Wildlife Technical Report* remains valid with the exception of the following updates:

- Evaluation of additional species including yellow-billed loon, black oystercatcher, Aleutian tern, and dusky Canada goose.
- Additional data collected by the Alaska Department of Fish and Game (ADF&G) on moose, brown bear, wolverine, and mountain goat.
- Evaluation of a new Alternative 1B and alignment/design revisions to Alternatives 2B and 3 with respect to potential impacts to wildlife.
- Updates to old-growth forest designations and impacts to old-growth forest from the project are discussed in the 2014 *Land Use Technical Report*, Appendix DD of this Draft SEIS.
- Overall habitat loss reported for wetlands is updated an included in *2014 Update to Appendix O – Wetlands Technical Report*; see Appendix Z.

1.1 Project Description

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

1.1.1 Alternative 1 – No Action

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

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

1.1.2 Alternative 1B – Enhanced Service with Existing AMHS Assets

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

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

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

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

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

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

1.1.4 Alternative 3 – West Lynn Canal Highway

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

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

1.1.5 Alternatives 4A through 4D – Marine Alternatives

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

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

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

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

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

1.1.5.3 Alternative 4C – Conventional Monohull Service from Auke Bay

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

1.1.5.4 Alternative 4D – Conventional Monohull Service from Berners Bay

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

2 Studies and Coordination

This section supplements Section 2.0 of the 2004 *Wildlife Technical Report* and 2005 *Addendum to Appendix Q Wildlife Technical Report*.

Studies on brown bears, moose, mountain goats, and wolverines were funded by DOT&PF as a condition of the JAI project ROD (FHWA, 2006), which identified Alternative 2B as the selected alternative, and were intended to facilitate ADF&G game management after project construction. The wildlife studies were also discussed during permit negotiations with the USACE. When the JAI Project was enjoined in federal court, the focus of the ADF&G wildlife studies shifted to collecting baseline population and range information, and recommending potential mitigation measures to minimize impacts on those species, should Alternative 2B be constructed. The data from the ADF&G studies are incorporated into this update.

3 Affected Environment

This section supplements Section 3.0 of the 2004 *Wildlife Technical Report* and 2005 *Addendum to Appendix Q Wildlife Technical Report* and updates the federal and state agency changes in species status since publication of the Final EIS in 2006. The U.S. Fish and Wildlife Service (USFWS) has added an Endangered Species Act (ESA) candidate species, the U.S. Forest Service (USFS) Tongass National Forest has updated their Sensitive Species designations and no longer uses a Species of Concern list (USFS, 2008); and the State of Alaska no longer maintains a Species of Special Concern list (ADF&G, 2012). These changes are detailed below.

This section also includes information on brown bears, moose, mountain goats, and wolverines from recent monitoring studies conducted by ADF&G.

3.1 Wildlife Habitats

Agency comments on the 2004 Supplemental Draft EIS requested information regarding old-growth forest reserves within the project study area. The 2014 *Land Use Technical Report* (Appendix DD of this Draft SEIS) describes the large, medium, and small old-growth reserves according to the Tongass National Forest Land and Resource Management Plan (TLRMP) criteria, as well as the old-growth forest within the alignments for all alternatives, and updates Section 3.1.1 of the 2004 *Wildlife Technical Report* and 2005 *Addendum to Appendix Q Wildlife Technical Report*.

Wetland habitats as described in Section 3.1.5 of the 2004 *Wildlife Technical Report* have been updated based on additional wetland delineation field work completed after the JAI Project ROD was issued in 2006. These updates are described in the *2014 Update to Appendix O – Wetlands Technical Report;* see Appendix Z.

3.2 Species Considered for Analysis

Section 3.2 of the 2004 *Wildlife Technical Report* examined 27 wildlife species for potential project impacts. Updates to the ESA, USFS Sensitive Species, USFS Species of Concern, and State of Alaska Species of Special Concern have changed several species designations. Two species that occur in the project area but were not analyzed in the previous studies have been added for analysis of project impacts. Changes and new information are included in the following sections.

3.2.1 Federal and State of Alaska Endangered Species

The yellow-billed loon, which was not included in Section 3.2.1 of the 2004 *Wildlife Technical Report*, was designated as a candidate for ESA listing on March 25, 2009 (USFWS, 2011). Yellow-billed loons are known to occur in the JAI Project area. With status as a candidate species and occurrence in the study area, the yellow-billed loon is now included as a species potentially affected by the JAI Project. No other species has undergone a federal ESA status change since the 2004 *Wildlife Technical Report*. The current State of Alaska's list of endangered species within the project area (ADF&G, 2012) is consistent with the list presented in the previous studies.

3.2.2 Forest Service Management Indicator Species

There were eight Tongass National Forest Management Indicator Species (MIS) identified in Section 3.2.2 of the 2004 *Wildlife Technical Report* as relevant MIS for this project. The TLRMP was updated in 2008 (USFS, 2008); however, no changes were made to the list of MIS. Therefore, no changes to the MIS are included in this analysis.

3.2.3 Forest Service Species of Concern

Moose and brown bear were listed as USFS Species of Concern in the 2004 *Wildlife Technical Report* in Section 3.2.3. However, the 2008 TLRMP no longer uses a Species of Concern list (USFS 2008), so these species have no special designation in the project area as of 2008.

3.2.4 Forest Service Sensitive Species

In the USFS Alaska Region, all USFWS and NMFS Candidate species are included in the list of Sensitive Species. The USFS Alaska Region Sensitive Species list was updated in 2009 (Goldstein et al., 2009). With this update, the black oystercatcher and Aleutian tern were added to the list of Sensitive Species, and the trumpeter swan was removed. Dusky Canada geese (*Branta canadensis occidentalis*) were retained as a Sensitive Species in the 2009 updated list and not previously discussed in the 2004 *Wildlife Technical Report*. Black oystercatchers have been recorded in the project area, and Aleutian terns have a documented breeding range in the Tongass National Forest as far south as Glacier Bay (Arimitsu et al., 2007). Due to its status as a sensitive species and occurrence in the project area, the black oystercatcher is now included as a species potentially affected by the JAI Project. The Aleutian tern and dusky Canada goose are discussed below due to their casual or accidental occurrence in Lynn Canal, but neither species is likely to be affected by the project. No other changes to the USFS Sensitive Species list have occurred to those reported in Section 3.2.4 of the 2004 *Wildlife Technical Report*.

3.2.5 State of Alaska Species of Special Concern

As of August 2011, the State of Alaska no longer maintains a list of Species of Special Concern (ADF&G, 2012). Species that were formally listed and previously analyzed (Section 3.2.5 of the 2004 *Wildlife Technical Report*) without any other past or current state or federal designation include the terrestrial bird species olive-sided flycatcher, gray-cheeked thrush, Townsend's warbler, and blackpoll warbler.

3.3 Species Accounts

Although the alternative alignments have changed, the general descriptions of the 27 species as presented in the 2004 *Wildlife Technical Report* remain valid and are consistent with the 2008 TLRMP Standards and Guidelines. However, habitat figures for the following terrestrial mammals were updated to include habitat down to high-tide line: Alexander Archipelago Wolf and black bear (Figure 1); mountain goat, brown bear, and marten (Figure 2). Additionally, agency comments requested data regarding marten density in the project area. The following information supplements Section 3.3 of the 2004 *Wildlife Technical Report* and Section 3.2 of the 2005 *Addendum to Appendix Q Wildlife Technical Report*.

In its 2006 ROD, FHWA included a commitment to facilitate ADF&G game management following construction of Alternative 2B by requiring DOT&PF to fund population studies of

brown bear, wolverine, and moose for 3 years and mountain goat for 4 years. When the JAI Project was enjoined in federal court, the focus of the ADF&G wildlife studies shifted to collecting baseline population and range information, and recommending potential mitigation measures to minimize impacts on those species, should Alternative 2B be constructed. The following are accounts of brown bear, wolverine, moose, and mountain goat based on the recent ADF&G population studies, and of the species added to the project analysis: black oystercatcher and yellow-billed loon.

3.3.1 Birds

3.3.1.1 Black oystercatcher (Haematopus bachmani)

The information below is taken from Andres and Falxa (1995), unless otherwise noted.

Black oystercatchers are large shorebirds inhabiting rocky intertidal areas along the west coast of North America year-round. These long-lived birds typically occupy the same nesting territories year after year, often along low-sloping gravel or rocky shorelines where intertidal prey is abundant. The breeding and nesting season in Alaska is March through August. Chick survival is typically low due to several natural and human-induced factors, including snow conditions, timing, prey availability, nest predation, and human disturbance (Goldstein et al., 2009). During winter, they often form flocks of hundreds in areas of high mussel density.

Black oystercatchers react to human intrusions with vocalizations, quietly leaving their nest, and/or engaging in displacement behaviors (e.g., feeding, preening). Black oystercatchers are not known to habituate to human intrusions, and sensitivity to humans increases following close negative interactions (e.g., human approaches to nests).

The global population of black oystercatchers is estimated to number fewer than 11,000 individuals. Over half of these nest in Alaska, concentrated primarily in Prince William Sound and the Kodiak Archipelago. There have been no comprehensive surveys for black oystercatchers in Lynn Canal. They have been observed, but are considered uncommon to rare in coastal areas from Taku River to Berners Bay in spring, summer, and fall (eBird, 2013; Juneau Audubon Society, 2007). One to six black oystercatchers at a time have been intermittently recorded in the Auke Bay area during April to June since 1993. One to five black oystercatchers at a time have been intermittently recorded in Berners Bay during April and May since 1991 (eBird, 2013). Three oystercatchers have been recorded once during April 2011 in lower Lutak Inlet near Haines and two oystercatchers once in June 2000 in the upper Chilkoot Inlet (eBird, 2013). Since 1991, they have not been recorded in the Lynn Canal area during winter (late December through late March) (eBird, 2013; Juneau Audubon Society, 2007). Viability of this species remains a concern, and populations in some areas have dramatically declined due to unknown causes (e.g., from 48 pairs to two pairs in Sitka Sound) (Goldstein et al., 2009).

3.3.1.2 Yellow-billed loon (Gavia adamsii)

Except as noted, the following information is from USFWS (2012a).

The yellow-billed loon is the largest of the five loon species, and weighs between 9 and 13 pounds. It is very similar in appearance to the common loon, but has a larger bill that is yellow or

ivory-colored during the summer and blue-gray during the winter. They are considered excellent swimmers and divers, with the ability to swim 650 feet or more underwater (North, 1994).

Yellow-billed loons nest next to freshwater lakes in the arctic tundra of Alaska (Arctic Coastal Plain), northwestern Alaska, St. Lawrence Island, Canada, and Russia. The wintering range includes coastal waters of southern Alaska from the Aleutian Islands to Puget Sound in Washington; the Pacific coast of Asia; the Barents Sea and the coast of the Kola Peninsula; coastal waters of Norway; and possibly Great Britain. All of the marine waters in Lynn Canal are considered habitat for yellow-billed loons (USFWS, 2012b). Non-breeding birds remain in marine waters throughout the year, either in wintering areas or offshore from breeding grounds. There is little data on feeding depths of yellow-billed loons, but published reports indicate that they generally use marine waters up to approximately 130 feet deep within 55 miles of the shore (Jehl, 1970; Haney, 1990).

Although researchers have documented reactions of yellow-billed loons to apparent anthropogenic intrusions at nesting areas (e.g., laying low, vocalizations, swimming away, diving; North 1994), there are no studies to document how yellow-billed loons react to noise or other disturbances in marine waters (Earnst, 2004). Habituation to disturbances is more likely with "predictable, low-level disturbances" (Earnst, 2004).

There have been no comprehensive surveys for yellow-billed loons in Lynn Canal, except for the Berners Bay area (USFWS, 2003). Small numbers of yellow-billed loons (mostly single birds, but also groups of two to four) in Lynn Canal from Auke Bay north to Chilkat Islands State Park (including Berners Bay) have been reported from 1992 to 2012 in every month except August (eBird 2013; USFWS, 2003). There is only one record of a yellow-billed loon in upper Lynn Canal in December 2010 near Skagway (eBird, 2013). Abundance of yellow-billed loons in marine waters from Taku River to Berners Bay is considered very rare to uncommon during spring, fall, and winter, with "no records" listed for summer (Juneau Audubon Society, 2007).

In addition to ESA candidate status, the yellow-billed loon is protected under the Migratory Bird Treaty Act, which prohibits recreational or commercial hunting of this species, and other forms of "take" without a permit. This species has traditionally been harvested for subsistence by Alaska Natives in northern and northwestern Alaska, and a small take is allowed for inadvertent by-catch in subsistence fishing nets (USFWS, 2012c).

3.3.1.3 Aleutian Tern (Onchopnon aleutica)

Except as noted, the following information is taken from USFWS 2006.

The Aleutian tern is a colonial nesting seabird that breeds exclusively in coastal parts of Alaska and eastern Siberia. Aleutian terns are less aggressive in defending their nests than Arctic terns (*Sterna paradisaea*) and are therefore more sensitive to predator and human disturbance. The Aleutian tern has experienced a population decline of nearly 90 percent, which led to its addition to the Alaska Regional Sensitive Species List by the USFS (Goldstein et al., 2009).

The species is known to have a casual or accidental distribution in southeast Alaska during spring and summer and is not known to occur there in the fall and winter. Small numbers of breeding Aleutian terns have been recorded in Glacier Bay, which is considered to be the

southern boundary of their range. There are no records of Aleutian terns in Lynn Canal (eBird 2014). During the breeding season in spring and summer, the Aleutian Tern forages over shallow, oceanic waters, estuaries, rivers, and freshwater ponds. Breeding colonies are located in remote areas, generally palustrine or estuarine emergent wetlands with low growing, herbaceous, vegetation to conceal the nests.

3.3.1.4 Dusky Canada Goose (Branta canadensis occidentalis)

Except as noted, the following information is taken from Bromley and Rothe, 2003.

The dusky Canada goose is one of seven recognized subspecies of Canada goose (Pacific Flyway Council, 1997). This subspecies breeds entirely within the Copper River delta and islands of the Prince William Sound and winters in Oregon and Washington in the Willamette and Columbia River valleys. Their breeding grounds are large expanses of estuarine emergent grasses and sedges that provide high quality forage to rear their goslings. Following the Great Alaska Earthquake of 1964, portions of this habitat within the Copper River delta were lifted in elevation and have transitioned into upland shrub and forest habitat free from salt water intrusion. Management biologists have reported an increase in gosling predation from foxes and raptors due to this habitat transition.

Dusky Canada geese are not known to winter in the project area, but small numbers have been recorded on Vancouver and Queen Charlotte islands. They could potentially use estuarine tide flats in the project area as foraging habitat during migration; however, banding studies have concluded that the geese migrate offshore and make few stops during migration.

3.3.2 Mammals

3.3.2.1 Brown Bear (Ursus arctos)

General information on brown bears in the project area was presented in the 2004 *Wildlife Technical Report*. Population, status, and harvest updates are presented here, as well as results from the ADF&G study of 30 brown bears (17 male, 13 females) captured and Global Positioning System (GPS)-collared near the head of Berners Bay, and tracked from June 2006 to December 2010 (Flynn et al., 2012). The study focused on the Alternative 2B alignment area and the area surrounding the drainages of Berners Bay, although bears were also recorded outside of those areas (Flynn et al., 2012). The estimated population centered on Berners Bay was 44 bears in 2006, 67 bears in 2007, and 60 bears in 2008, with a density of brown bears similar to other areas on the mainland coast between Ketchikan and Skagway.

The GPS collars placed on captured bears collected location records at set intervals two to three times per hour during spring through fall and once a day during hibernation in winter. Based on the GPS locations, male bears had a mean home range of 214 square miles (mi^2), and females had a much smaller mean home range of 57 mi^2. The home ranges included Sawmill, Davies, and Cowee creeks on the south side of Berners Bay, and the Antler, Berners, Lace, and Gilkey rivers and Johnson and Slate creeks on the north side of Berners Bay, as well as other coastal drainages to the north, including the Katzehin River (Figure A1 in Appendix B). The confluence of the major river systems flowing into Berners Bay estuary served as the center of brown bear activity. Twenty-seven of 30 collared bears shared a portion of their home range with the lower estuary (Figures A2 and A3 in Appendix B).

Thirty-two percent of all collared bear locations were within 0.6 mile of Alternative 2B. Of those locations, the highest number occurred during early summer and late summer. The recorded locations also identified brown bear crossings of rivers and creeks. The most brown bear crossings in the Berners Bay study area were at Sawmill Creek, Berners Bay estuary, Slate Creek, Sweeny Creek, and Independence Lake Creek just north of Comet (Figures A4 and A5 in Appendix B).

The study also evaluated habitat use in the Berners Bay study area. By June 1, most bears were out of their dens, and they moved to riparian areas and the estuary in Berners Bay to feed on lush vegetation. In the early summer, brown bears selected estuarine emergent habitats, as well as herbaceous, closed forest, open forest, shrub, and beach habitats. About mid-July, salmon entered the local streams, and most bears sought spawning salmon. Late summer habitat selection included estuarine emergent, open forest, and shrub. Brown bear paths followed river bottoms in all seasons except denning. Brown bears were not recorded in alpine areas. Six dens were found in closed forest areas, averaging 758 feet in elevation. Some bears started seeking out dens in mid-October. Denning bears emerged from dens from early April until late May.

Recent ADF&G harvest data (published online July 13, 2012) show that an average of five brown bears per year (1998 to 2007) were harvested from Game Management Unit (GMU) 1C, which includes much of the southeast Alaska mainland including Berners Bay and most of both sides of Lynn Canal, as well as the Juneau area and south (Scott 2009). An average of 13 bears per year were harvested during the same period from GMU 1D, which includes northern Lynn Canal (above Eldred Rock) and surrounding mainland (Scott 2009). Two brown bears were reported as defense-of-life-or-property (DLP) kills in all of GMU 1 (eastern southeast Alaska) during July 1, 2006 to June 30, 2008 (Scott, 2009).

3.3.2.2 Marten (Martes americana)

In the project study area, marten primarily occur in high-volume old-growth forest habitat (Figure 2). On the east side of the Lynn Canal, this habitat is limited to the old-growth stands in the Berners Bay and Katzehin River areas (Schumacher, personal communication, 2005) and extends from the upper elevation extent of the forest to tidewater (N. Barten, personal communication, 2005). The narrow bands of forest habitat between Berners Bay and the Katzehin River and the Katzehin River and Skagway may be used as travel corridors by marten (N. Barten, personal communication, 2005). The west side of the Lynn Canal has a greater density of old-growth forest habitat, and is likely to have a greater abundance of marten (Schumacher, personal communication, 2005). A marten trapping survey conducted on the Homeshore road system on the northern side of Icy Strait, in an area having old-growth habitat similar to that of the west side of the Lynn Canal, yielded 34 marten per 40,000 acres (Schumacher, personal communication, 2005), which suggests marten population densities are generally low in northern southeast Alaska.

3.3.2.3 Moose (Alces alces)

General information on moose in the project area was presented in the 2004 *Wildlife Technical Report*. Unless otherwise noted, updates and results presented below are from the recent ADF&G moose study focused on the drainages of Berners Bay and the Alternative 2B alignment area (White et al., 2012a).

Small populations of moose occur in Berners Bay and the lower Katzehin River areas. These two populations are discussed in the sections below. The area north of Independence Lake (just north of Comet) to south of the Katzehin River is not considered moose habitat, primarily due to steep terrain and minimal occurrence of moose browse.

Berners Bay Population

From 2005 to 2011, 67 moose (63 females and four males) were captured, collared with GPS or Very High Frequency (VHF)-transmitting collars, and monitored in the Berners, Lace, Antler, and Gilkey river drainages (Figure B1 in Appendix C). Collared moose were recorded along coastal areas around Berners Bay from Davies Creek (Echo Cove area) north to approximately 3 miles north of Slate Cove (Figure B2 in Appendix C). During the study, the population estimates declined from approximately 120 animals to 85 (and as low as 78 during 2009 to 2010), most likely due to deep and long-lasting snow levels during most of the winters. ADF&G's population objective as of 2009 was 80 to 90 moose (Scott, 2010a) and the current population is meeting that objective. The average moose harvest from Berners Bay from 2003 to 2006 was six moose per year (five to eight). Since 2007, the hunt has been closed, due to concerns about the declining population following severe winters between 2006 and 2009.

Most moose activity occurred at elevations below 500 feet during all seasons. Predominant vegetative types important for moose in the Berners Bay area are deciduous shrublands, emergent herbaceous meadows, conifer forest, and unvegetated riparian and upland habitats (White et al., 2007). During summer (June to August), moose used primarily deciduous and riparian habitats. During winter (November to March), moose utilized deciduous habitats the most, but the use of conifer habitat during winter was observed where lower snow depths occurred. Moose diets were composed primarily of shrubs, which are found primarily in deciduous and riparian habitat types, and, to a lesser extent, in emergent meadows.

The areas of highest use by moose during summer and winter in the study area intersect Alternative 2B in the lower reaches of the major Berners Bay drainages (Figures B3 and B4 in Appendix C). Upper Slate Cove and coastal areas from Point St. Mary to at least 5 miles north (study area boundary) are also areas of high or moderate use (Figure B3 in Appendix C). Eight winter distribution surveys during 2006 to 2011 verified high numbers of moose occurring in the lower reaches of the major Berners Bay drainages (Figure B4 in Appendix C).

Katzehin River Population

Based on nine aerial surveys between 2005 and 2011, the Katzehin River population is estimated between 30 and 40 moose. Moose use and distribution is concentrated along the river corridor and delta areas near Alternative 2B (Figures B5 and B6 in Appendix C).

A detailed study of the Katzehin River moose population was beyond the scope of the study objectives, and therefore detailed information is not available regarding habitat type and use. Recent annual harvest for the Katzehin River population is between zero and two moose per year.

3.3.2.4 Mountain Goat (Oreamnos americanus)

General information on mountain goats in the project area was presented in the 2004 *Wildlife Technical Report*. Populations, status, and habitat updates are presented below, as well as other results from the ADF&G study of up to 159 GPS- and/or VHF-collared goats along eastern Lynn Canal from 2005 to 2011 (from White et al., 2012b, unless otherwise noted).

Three genetically distinct populations of mountain goats have been described along eastern Lynn Canal (Shafer et al., 2012). The populations are located in the east Berners Mountains, the Kakuhan Range (comprising Lions Head and Sinclair Mountain), and the Mount Villiard area north of the Katzehin River (Figure D1 in Appendix D). Mountain goats also occur in mountainous areas of western Lynn Canal. Goat population estimates for the three populations near Berners Bay to the Mt. Villiard area declined approximately 47 percent between 2006 through 2010, most likely from 2006–2009 winter severity, but rebounded modestly by 2011.

Nearly all of the 124 collared mountain goats tracked along eastern Lynn Canal migrated from alpine summer ranges (averaging > 3,000 feet) to remain in low elevation (<1,500 feet) forested winter ranges between late October and late April. Some goats spent time below 500 feet in elevation during winter, including near tide line where steep terrain extended to sea level. East of Berners Bay, steep terrain does not consistently extend to sea level, and mountain goats winter at slightly higher elevations on average than other areas of Lynn Canal. Areas of high use during winter occur very close to the coast north of Comet (Figures D2, D3, and D4 in Appendix D). Most of the Berners Bay, Katzehin beach, and Slate Cove to Comet coastal areas are not considered mountain goat habitat due to their distance from steep escape terrain and lack of suitable forage. The diets of mountain goats along eastern Lynn Canal are composed of primarily alpine sedges, lichens, forbs, and ferns from late July to mid-October, with hemlock needles predominating in winter.

Summer (June to September) high alpine habitat for mountain goats along eastern Lynn Canal and Berners Bay occurs at least 0.5 mile from the proposed road alignment of Alternative 2B; therefore, it is not discussed in detail in this report.

The harvest of mountain goats in GMU 1C, which includes areas east and west of Lynn Canal south of Eldred Rock, has ranged from 40 to 60 goats per year from 1999 to 2008 (Scott 2010b). The harvest of mountain goats in GMU 1D, which includes areas east and west of Lynn Canal north of Eldred Rock, has ranged from 22 to 43 goats per year from 1999 to 2008 (Scott 2010b).

3.3.2.5 Wolverine (Gulo gulo)

Wolverines were not included in the 2004 *Wildlife Technical Report* or the 2005 addendum. The commitment in the JAI Project ROD requiring DOT&PF to fund wolverine population studies for three years to assess game management concerns was raised by ADF&G staff following release of the 2006 Final EIS. Information on the ecology and population dynamics of wolverines is limited (Ruggiero et al., 2007) due to their very low population densities and their apparent avoidance of areas of human influence (Banci 1994). The following information (except as noted) is from the ADF&G study of 12 GPS-collared wolverines that were captured in the drainages of Berners Bay and tracked in the eastern Lynn Canal area (Lewis et al., 2012).

Wolverines are found throughout mainland Alaska and some of the islands of Southeast Alaska. Wolverines are a wide-ranging, mostly solitary species that naturally occur at low densities and require large expanses of wilderness (ADF&G, 2008). Movements of 40 miles in a day have been documented (ADF&G, 2008). Home ranges of collared wolverines during late winter to mid-summer averaged 25 mi^2 for females and 188 mi^2 for males in the eastern Lynn Canal area, encompassing marine lowlands and mountainous terrain (Figures E1 and E2 in Appendix E).

Collared wolverines made extensive use of valley sides throughout the Berners Bay area, from river bottoms to treeline and above. These correspond to low- to mid-elevation areas (<3,280 feet) with moderate slopes (30 percent). Wolverines were more likely to use shrub habitats (e.g., avalanche chutes and other shrubby areas) for foraging on small mammals and birds, and unvegetated habitats (e.g., alpine areas) for denning. Litters are born between February and April.

Wolverines are active at any time of day, year round. They are carnivores, and are known to prey on voles, squirrels, snowshoe hares, and birds, and scavenge on larger animals (e.g., moose, deer, mountain goats) (ADF&G, 2008). Sources of animal mortality, such as avalanche chutes, can be important for scavenging wolverines.

A population estimate for wolverines in the study area was not accomplished, although a low density is very likely. Wolverines can be taken legally by hunting or trapping, and from 1999 to 2011, zero to four wolverines were reported harvested from the Berners Bay area each year. During this period, an average of nine wolverines was harvested per year in all of Game Management Units 1C and 1D.

4 Environmental Consequences

Impacts to brown bears, moose, and mountain goats have been addressed previously in the 2004 *Wildlife Technical Report* and the *2005 Addendum to Appendix Q, Wildlife Technical Report*. This section provides new or updated information since the 2004 and 2005 reports. It addresses potential impacts of the JAI Project alternatives on brown bears, moose, mountain goats, wolverines, yellow-billed loons, and black oystercatchers that were not previously identified.

4.1 Alternative 1 – No Action

4.1.1 Birds

4.1.1.1 Black Oystercatcher

Construction Activities

There would be no construction associated with Alternative 1 and, therefore, no construction-related impacts to black oystercatchers.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

There would be no habitat loss for black oystercatchers under the No Action Alternative. As ferry operations would continue similar to existing conditions, there are no anticipated effects on black oystercatchers.

4.1.1.2 Yellow-billed Loon

Construction Activities

There would be no construction associated with Alternative 1 and, therefore, no construction-related impacts to yellow-billed loons.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

There would be no habitat loss for loons under this alternative. Ferry service in Lynn Canal may result in some disturbance of yellow-billed loons. The impacts to yellow-billed loons would primarily be the loons' energetic cost of swimming and diving to avoid ferries. Collisions are unlikely due to their excellent swimming and diving abilities. Short periods of navigation in shallow coastal waters (< 130 feet deep) at existing ferry terminals would likely minimize disturbance to yellow-billed loons (see Jehl 1970 and Haney, 1990). Based on the apparent low numbers of loons present during every month in Lynn Canal, their ability to swim and dive, and the relatively low numbers of ferries, the impact of Alternative 1 on yellow-billed loons would be minimal.

4.1.1.3 Aleutian Tern

Construction Activities

There would be no construction associated with Alternative 1 and, therefore, no construction-related impacts to Aleutian terns.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

There would be no habitat loss for Aleutian terns with Alternative 1. Ferry service in Lynn Canal would not disturb Aleutian terns, as they nest onshore and feed over ocean waters and would

avoid the ferries. However, the project is outside the species' known range and, therefore, it is unlikely that Alternative 1would affect Aleutian terns.

4.1.1.4 Dusky Canada Goose

Construction Activities

There would be no construction associated with Alternative 1 and, therefore, no construction-related impacts to dusky Canada geese.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternative 1B would not result in any habitat loss for dusky Canada geese and disturbance effects from maintenance and marine traffic would like be negligible due to their transient use of the project area during migration.

4.1.2 Mammals

4.1.2.1 Wolverine

Construction Activities

There would be no construction associated with Alternative 1 and, therefore, no construction-related impacts to wolverines.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

There would be no anticipated effects to wolverines under Alternative 1.

4.2 Alternative 1B – Enhanced Service with Existing AMHS Assets

4.2.1 Birds

4.2.1.1 Black Oystercatcher

Construction Activities

Alternative 1B would require no construction and, therefore, there would be no construction-related impact to black oystercatchers.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

There would be no habitat loss for black oystercatchers due to expanded ferry service in Lynn Canal. As ferry navigation routes avoid rocky shorelines, there is no anticipated disturbance from ferry traffic on black oystercatchers.

4.2.1.2 Yellow-billed Loon

Construction Activities

Alternative 1B would require no construction, and would result in no construction-related impact to yellow-billed loons.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Expansion of summer ferry service in Lynn Canal may result in some disturbance to yellow-billed loons. The impacts to yellow-billed loons would primarily be the loons' energetic cost of swimming and diving to avoid ferries. Collisions are unlikely due to their excellent swimming

and diving abilities. Based on the apparent low numbers of loons present during every month in Lynn Canal (see Section 3.3.1.2), and the relatively low numbers of ferries, the disturbance from ferry traffic would likely be very low. The short periods of ferry navigation in shallow coastal waters (< 130 feet deep) at existing ferry terminals would minimize the potential for any disturbance to yellow-billed loons (see Jehl 1970 and Haney, 1990).

4.2.1.3 Aleutian Tern

Construction Activities

There would be no construction associated with Alternative 1B and, therefore, no construction-related impacts to Aleutian terns.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

There would be no habitat loss for Aleutian terns with Alternative 1B. Ferry service in Lynn Canal would not disturb Aleutian terns as they nest onshore and feed over ocean waters and would avoid the ferries. However, the project is outside the species' known range and, therefore, it is unlikely that Alternative 1B would affect Aleutian terns.

4.2.1.4 Dusky Canada Goose

Construction Activities

There would be no construction associated with Alternative 1B and, therefore, no construction-related impacts to dusky Canada geese.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternative 1B would not result in any habitat loss for dusky Canada geese and disturbance effects from maintenance and marine traffic would like be negligible due to their transient use of the project area during migration.

4.2.2 Mammals

4.2.2.1 Wolverine

Construction Activities

Alternative 1B would require no construction, and would result in no construction-related impact to wolverine.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

There would be no anticipated effects to wolverines under Alternative 1B.

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

4.3.1 Overall Habitat Loss

Overall habitat loss reported for wetlands in Section 3.1.5 of the 2004 *Wildlife Technical Report* and Section 4.2.1 of the 2005 *Addendum to Appendix Q Wildlife Technical Report* is now described in the *2014 Update to Appendix O – Wetlands Technical Report*; see Appendix Z.

4.3.2 Old-Growth Forest

Old-Growth Reserve impacts reported in Section 3.1.1 of the 2004 *Wildlife Technical Report* and Section 4.2.2 of the 2005 *Addendum to Appendix Q Wildlife Technical Report* are now described in the 2014 *Land Use Technical Report*, Appendix DD of this Draft SEIS.

4.3.3 Birds

4.3.3.1 Black Oystercatcher

Construction Activities

Construction of the proposed highway and ferry terminal in eastern Lynn Canal would increase noise levels and human activities from lower Berners Bay north to the ferry terminal north of the Katzehin River. Increased noise and human activity during construction could disturb black oystercatchers present in feeding and resting habitat near project activities and cause them to fly or swim away from the disturbance and resume their normal behavior in another location. These short-term displacements would increase the energetic output from disturbance behavior but would be unlikely to affect reproductive success or survival. In addition, road construction in rocky shore habitat could inhibit birds from nesting in rocky shore areas or disturbing the birds after nesting has occurred, thereby decreasing their chances of reproductive success for the season, or resulting in abandonment of nests. Black oystercatchers are uncommon in the project area and as such the impacts described would occur on only a few individuals and would not have a population-level effect on the species.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternative 2B would result in the loss of approximately 28.9 acres of rocky shore habitat. Most of the loss is proposed between Sherman Point and the Katzehin River where no sightings of oystercatchers have been recorded (eBird, 2013). The loss of rocky shore habitat could result in a loss of breeding and feeding habitat for black oystercatchers. Additionally, highway traffic during operations or maintenance activities would disturb black oystercatchers in rocky shore habitats adjacent to the alignment. However, with the low densities of oystercatchers in the Lynn Canal area relative to the amount of rocky shore habitat available outside the project area, any displaced birds would likely move to other unoccupied rocky shore habitat nearby. The loss of habitat and disturbance during operations and maintenance would not have a population-level effect on this species. Ferry navigation would avoid rocky shorelines, so there would be no anticipated disturbance to black oystercatchers from ferry traffic.

4.3.3.2 Yellow-billed Loon

Construction Activities

Construction of the proposed highway and Katzehin ferry terminal would increase noise levels and human activity in these areas. Increased boat activity and noises could disturb yellow-billed loons in nearshore waters, possibly increasing energetic costs of loons to swim or fly away from the disturbance and resume their normal behavior in another location. These short-term displacements would increase the energetic output from disturbance behavior but would be unlikely to affect reproductive success or survival. Low numbers of yellow-billed loons have been documented in Lynn Canal, and construction activities would be unlikely to affect reproductive success or survival.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

The impacts to yellow-billed loons from Alternative 2B traffic would primarily be the loons' energetic cost of swimming and diving to avoid ferries in northern Lynn Canal. Collisions are unlikely due to their excellent swimming and diving abilities and their low occurrence in Lynn Canal. Therefore, any disturbance from ferry or vehicle traffic on loons would be negligible. Only low numbers of yellow-billed loons have been documented in Lynn Canal (see Section 3.3.1.2), and the short periods of ferry navigation in shallow coastal waters (< 130 feet deep) near the existing and proposed ferry terminals would minimize the potential for disturbance to yellow-billed loons (see Jehl 1970 and Haney, 1990).

4.3.3.3 Aleutian Tern

Construction Activities

Construction of the proposed highway and Katzehin Ferry Terminal would increase noise levels and human activity in these areas, especially near palustrine or estuarine emergent wetlands. However, the project is outside the species' known range and, therefore, construction activities would not affect Aleutian terns.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternative 2B would not result in the loss of palustrine or estuarine emergent wetlands, preferred nesting habitat of Aleutian terns. Ferry service in Lynn Canal would not disturb Aleutian terns as they nest onshore and feed over ocean waters and would avoid the ferries. Noise and human presence around the proposed highway may preclude Aleutian terns from colonizing small portions of these habitats adjacent to project facilities. However, the project is outside the species' known range and, therefore, it is unlikely that maintenance and marine and vehicle traffic would affect Aleutian terns.

4.3.3.4 Dusky Canada Goose

Construction Activities

Dusky Canada geese may use estuarine tide flats near Alternative 2B construction activities to rest and feed during migration. Construction activities would likely have a negligible effect on dusky Canada geese because they would only be present for a short period of time during migration and they would likely avoid areas affected by construction noise since estuarine tide flats are abundant outside of the project area.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternative 2B would not result in any habitat loss for dusky Canada geese and disturbance effects from maintenance and vehicle traffic would likely be negligible due to their transient use of the project area during migration.

4.3.4 Mammals

4.3.4.1 Brown Bears

Construction Activities

The construction phase of Alternative 2B has the potential to impact brown bears along east Lynn Canal through noise generation and the presence of attractants such as food and garbage.

Most construction would occur during snow-free months (April through November), with the exception of construction of the large multi-span bridges (i.e. Antler, Lace, and Katzehin river bridges) and Katezhin Ferry Terminal. In-water construction, such as pile driving, would likely occur during winter months, as much as practicable, to maximize the in-water work window to protect out-migrating salmonids and spawning eulachon and low river levels. The noise produced during winter construction has the potential to disturb denning brown bears, which could lead them to abandon their den (Swenson et al., 1997). However, the ADF&G study (Flynn et al., 2012) found that all denning sites visited were in closed forested areas away from the project area. Noise from construction may also cause brown bears to avoid feeding areas in or near the project area during daytime hours when human disturbance is greatest. A shift to nighttime feeding could reduce the bears' feeding efficiency in some areas as light becomes a limiting factor prior to hibernation (Ordiz et al., 2012). However, due to the large home ranges of brown bears in Berners Bay (Flynn et al., 2012) and an abundance of feeding areas away from the project site, it is unlikely that construction noise would significantly impact bear populations along east Lynn Canal.

Brown bears typically avoid humans and highways. However, bears are attracted to human garbage and food supplies, which often brings them into conflict with humans and results in bears being shot and killed in defense of life or property. This is often a problem for remote construction camps and remote campers and hunters (McLellan 1989). Measures to minimize this problem would be implemented during construction.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Salmon spawning is limited to the lower reaches of Sawmill Creek because of a waterfall near the mouth. The proposed highway would be located above this waterfall and avoid the salmon spawning habitat; however, the highway as a potential barrier could prevent bear from feeding on the spawning salmon. Brown bears are known to feed on salmon at the Sawmill Creek estuary, below the highway alignment. The 110-foot-long bridge crossing of Sawmill Creek would be in an area where the stream is 15 feet wide, thereby maintaining a terrestrial corridor along the stream bank for bears to cross under the highway.

Direct habitat loss from the project was addressed in the 2004 *Wildlife Technical Report* and resulted in the loss of less than one percent (0.6 percent) of the available habitat for brown bears. Changes that have occurred along the alignment of Alternative 2B would not substantially change the direct habitat loss reported in the 2004 *Wildlife Technical Report.* The maps from the 2004 *Wildlife Technical Report* were based on general knowledge of brown bear habitat preference and seasonal movements, while the new maps from the ADF&G study provide site-specific data on collared bears within eastern Lynn Canal and Berners Bay over several years. Areas of high overlap include Berners Bay and the Katzehin River valley. Maps of predicted and recorded brown bear use areas that intersect Alternative 2B are now available (see Appendix B of this Update).

According to the 2006 to 2010 ADF&G study, the most brown bear crossings of the Alternative 2B alignment location were at Sawmill Creek, Berners Bay estuary, Slate Creek, Sweeny Creek, and Independence Lake Creek (see Appendix B of this Update). The highway could inhibit the number and/or timing of bear crossings between upland and coastal habitats in those areas. If females with cubs incur reduced access to important food resources, this could affect cub

survival. Under Alternative 2B, four bridges and two under crossings for wildlife are planned for the Berners Bay valley along known brown bear crossings, which may reduce displacement and avoidance of brown bears from crossing to and from coastal beaches and emergent vegetation, salmon, and other food resources in those areas.

Twenty-two bears were reported killed when struck by vehicles in Alaska from 2002 to 2008 (ADF&G et al., 2008), with an unknown number wounded. Traffic speed, volume, wildlife density, habitat, weather, daylight, and road design (e.g., sight-distance, vegetation) are all factors that can affect collision rates with large wildlife (Waller et al., 2005). The four bridges and two under crossings planned for wildlife movement in the Berners Bay valley with Alternative 2B would likely reduce the potential for vehicle collisions with bear in those areas.

4.3.4.2 Moose

Construction Activities

Moose are often attracted to highways to feed on roadside grasses and brush and to escape deep snow. This association with highways is responsible for hundreds of moose being killed in Alaska each year, with an unknown number of others sustaining potentially fatal injuries. DOT&PF publishes statistics each year on the location and circumstances of reported highway vehicle accidents in Alaska, including those involving moose (DOT&PF, 2003).

Noise from construction and human disturbances may cause moose to avoid feeding areas in or near the project area during daytime hours when human disturbance is greatest. However, moose are known to adapt to human disturbances and construction noise, reducing the likelihood that moose would be adversely displaced or disturbed by construction noise and human presence during construction.

The construction of the highway along east Lynn Canal would create a temporary path for moose to escape deep snow or move to different areas. This could cause construction vehicles to collide with moose on the cleared parts of the area under construction, especially near lower Berners Bay and the Katzehin River valley. The impact of vehicle collisions on moose during the construction phase of Alternative 2B is likely to be negligible due to the relatively slow operating speeds of construction vehicles.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Direct habitat loss from the project was addressed in the 2004 *Wildlife Technical Report* and resulted in the loss of less than one percent (0.08 percent) of the available habitat for moose. Changes that have occurred along the alignment of Alternative 2B would not substantially change the direct habitat loss reported in the 2004 *Wildlife Technical Report.* The maps from the 2004 *Wildlife Technical Report* were based on general knowledge of moose habitat preference and seasonal movements, while the new maps from the ADF&G study provide site-specific data on moose collared and tracked along eastern Lynn Canal and Berners Bay. Maps of predicted and recorded areas of use by moose that intersect the Alternative 2B alignment are now available (see Appendix C of this Update). Areas of high overlap between the proposed road corridor and areas of moderate to high predicted use include the lower Berners Bay and Katzehin River valleys. Providing highway access to moderate- to high-use moose habitat could result in increased poaching and collisions of vehicles and moose.

Although moose move 2 to 2.5 times more during summer than winter (White et al., 2012a), the probability of vehicle collisions along roads and highways is higher during the winter. This is due to reduced visibility of moose by drivers (e.g., much less daylight), higher densities of moose at low elevations (e.g., road alignment area below 500 feet), and the reluctance of moose to move off plowed roads (White et al., 2012a). Predicted winter use areas and winter locations of collared moose indicate a greater presence of moose adjacent to Alternative 2B in the lower Berners Bay and Katzehin River valley areas. The four bridges and two under crossings planned for wildlife movement in the Berners Bay valley with Alternative 2B may reduce the potential of vehicle collisions in those moderate- to high-use areas.

4.3.4.3 Marten

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

The mature forest habitat along the shoreline potentially serves as a movement corridor for marten between high-density forest areas in Berners Bay to the Katzehin River drainage. A highway would reduce the size of this corridor of fringe habitat and may reduce movement of marten between these areas (N. Barten and T. Schumacher, personal communication 2005).

4.3.4.4 Mountain Goats

Construction Activities

Mountain goat summer habitat is at high elevations on the east side of Lynn Canal and construction activities that generate noise are unlikely to have an effect on animals during summer months. In the winter, when goats move to lower elevations closer to or within the project area, the noise generated during winter construction of the large multi-span bridges (i.e., Antler, Lace, and Katzehin river bridges) and Katezhin Ferry Terminal may disturb animals nearby. Mountain goats disturbed by construction noise may move away from high quality winter habitat to more marginal areas, which could increase energetic demands on individuals.

Avalanche control activities will likely occur during the spring to ensure the project area is safe for construction of the proposed highway and associated facilities. The control activities could result in mortality to mountain goats because avalanche chutes are in steep habitat preferred by goats, and are occasionally used for forage (White et al., 2012b).

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

In the project study area, mountain goats occur throughout the steep mountain habitat and upper forested slopes on both sides of Lynn Canal (Figure 2). Although goats seldom wander far from steep slopes or cliffs, they are often forced into old-growth forests at low elevations during the winter. Goats may use lower elevations along the proposed highway alignment (Alternative 2B) between Comet and Slate Cove to avoid deep snow conditions (ABR Inc., 2000). However, this is not high quality winter habitat for goats because it lacks steep escape terrain. Using GIS, fragmentation of winter goat habitat was calculated as that from the cut and fill limit to the coastline. Roughly 448 acres of winter goat habitat from Katzehin River to Independence Creek would be fragmented and 693 acres from Antler River to Echo Cove. Fragmentation of this habitat is not likely to impact the area's mountain goat population.

Direct habitat loss was addressed in the 2004 *Wildlife Technical Report* and resulted in the loss of less than one percent (0.6 percent) of the available habitat for mountain goats. Changes that

have occurred along the alignment of Alternative 2B would not substantially change the direct habitat loss reported in the 2004 *Wildlife Technical Report.* The maps from the 2004 *Wildlife Technical Report* were based on general knowledge of mountain goat habitat and seasonal movements, while the new maps from the ADF&G study are based on GPS locations of collared mountain goats within eastern Lynn Canal and Berners Bay over several years. Maps of predicted use areas for mountain goats within and adjacent to the Alternative 2B alignment are now available (see Appendix D of this Update). Summer habitat would not be affected, but the proposed Alternative 2B alignment bisects areas of moderate to high-quality winter mountain goat habitat, especially north of Comet to the Katzehin River (see Appendix D of this Update).

Development of Alternative 2B within or adjacent to moderate- to high-use goat habitat could result in increased poaching, collisions of vehicles and goats, and increased mortality from avalanche control. A new highway along eastern Lynn Canal would provide access to more roadside areas and for the use of off-road vehicles (if allowed by the land managers) in areas that were previously not accessible. This would increase the poaching access to goats in or near the project area.

Due to poor visibility and driving conditions between November and early May, the proposed highway could create the potential for vehicle collisions with mountain goats in moderate–high winter use areas. Areas where goats have crossed the corridor of the Alternative 2B alignment include south of Katzehin River to "Brown" (north of Comet), as well as the mouth of the Berners River and upper Echo Cove (White et al., 2012b).

Avalanche control could result in mortality to mountain goats because avalanche chutes are in steep habitat preferred by goats, and are occasionally used for winter forage (White et al., 2012b). The impacts of the control activities would be reduced through mountain goat surveys of the chutes prior to blasting. The noise from avalanche detonation would be noticeable to mountain goats and other wildlife. Helicopter surveys would be conducted prior to the avalanche control activity to determine whether goats are within the blasting area or avalanche path and possibly to get them to depart the area. Although mountain goats and other wildlife may react to sounds from avalanche detonation, they return to their previous behavior within an hour or so after isolated disturbances. The noise created by the resulting avalanche would be no different than that from naturally occurring avalanches.

4.3.4.5 Wolverine

Construction Activities

Construction of the proposed highway would increase noise levels and human presence in the road corridor. These activities are not likely to have an impact on wolverines or their populations in southeast Alaska. This is due to their low densities near the project area, low site fidelity, and their propensity to avoid areas of human influence (Banci, 1994).

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Wolverines along east Lynn Canal use shrub habitats below 3,280 feet extensively (Lewis et al., 2012). An estimated less than one percent of this habitat would be lost due to the construction of the proposed highway. It is unlikely that this habitat loss would impact wolverine populations, because of their large ranges.

Wolverine populations are especially vulnerable to localized extirpations caused by overharvest due to their low densities and reproductive rates (Hornocker and Hash, 1981; Krebs et al., 2004; Squires et al., 2007). However, local extirpation of wolverines in the entire project area is unlikely because of the location of the highway at the edge of their habitat, and the low site fidelity of wolverines in southeast Alaska (Lewis et al. 2012). Wolverine harvest is controlled by ADF&G trapping regulations. To protect the wolverine population along East Lynn Canal from overharvest if Alternative 2B was constructed, ADF&G could revise its current management strategy by season or highway zone closures, emergency orders, quotas or other such tools. At a minimum, ADF&G intends to recommend a ¼-mile trapping closure be added to the entire coast along the road corridor.

Road-killed animals could become a food source for scavenging wolverines, perhaps increasing their vulnerability to collisions. The Alternative 2B alignment is adjacent to areas with high probability of use by wolverines for much of its length, and wolverines were recorded on both sides of the alignment in the Berners Bay and Point St. Mary peninsula areas. However, due to the very low density of wolverines in the Lynn Canal area (Lewis et al., 2012), and their tendency to avoid areas of human influence, the probability for collisions is likely low.

Avalanche control could result in mortality to wolverines because avalanche chutes are preferred habitat for foraging (Lewis et al., 2012). However, the probability of mortality related to avalanche control for Alternative 2B is likely low due to low wolverine densities in the area.

4.4 Alternative 3 – West Lynn Canal Highway

4.4.1 Overall Habitat Loss

Overall habitat loss reported for wetlands in Section 3.1.5 of the 2004 *Wildlife Technical Report* and Section 4.3.1 of the 2005 *Addendum to Appendix Q Wildlife Technical Report* is now described in the *2014 Update to Appendix O – Wetlands Technical Report*; see Appendix Z.

4.4.2 Old-Growth Forest

Old-Growth Reserve impacts reported in Section 3.1.1 of the 2004 *Wildlife Technical Report* and Section 4.3.2 of the 2005 *Addendum to Appendix Q Wildlife Technical Report* is now described in the 2014 *Land Use Technical Report*, Appendix DD of this Draft SEIS.

4.4.3 Birds

4.4.3.1 Black Oystercatcher

Construction Activities

Construction of the proposed highway and ferry terminals in Lynn Canal would increase noise levels and human activities in southern Berners Bay and the western side of northern Lynn Canal along the alignment. Increased noise and human activity during construction could disturb black oystercatchers present in feeding and resting habitat near project activities and cause them to fly or swim away from the disturbance and resume their normal behavior in another location. These short-term displacements would increase the energetic output from disturbance behavior but would be unlikely to affect reproductive success or survival. In addition, road construction in rocky shore habitat could inhibit birds from nesting in rocky shore areas or disturbing the birds after nesting has occurred, thereby decreasing their chances of reproductive success for the season, or resulting in abandonment of nests. Black oystercatchers are

uncommon in the project area and as such the impacts described would occur on only a few individuals and would not have a population-level effect on the species.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternative 3 would result in the loss of 6.7 acres of rocky shore habitat. Most (4.8 acres) of the loss would occur on the remote west side of Lynn Canal between William Henry Bay and Davidson Glacier outwash, where no observations of oystercatchers have been recorded. The rest of the habitat loss (1.9 acres) would occur in the southern section of highway south of Sawmill Cove. Small numbers of oystercatchers (1 to 6 at a time) have been intermittently recorded around Berners Bay and the Point Bridget area in April and May, and August through October (eBird, 2013). Highway traffic during operations or maintenance activities could disturb black oystercatchers in rocky shore habitats adjacent to the alignment. However, with the low densities of oystercatchers in the Lynn Canal area relative to the amount of rocky shore habitat available outside the project area, any displaced birds would likely move to other unoccupied rocky shore habitat nearby. The loss of habitat would not have a population-level effect on this species. Ferry navigation would avoid rocky shorelines, so there would be no anticipated disturbance to black oystercatchers from ferry traffic.

4.4.3.2 Yellow-billed Loon

Construction Activities

Construction of the proposed highway and ferry terminals on both sides of Lynn Canal would increase noise levels and human activities in those areas. Any increased boat activity and noises could disturb yellow-billed loons in nearshore waters, possibly increasing energetic costs of loons to swim or fly away from the disturbance and resume their normal behavior in another location. These short-term displacements would increase the energetic output from disturbance behavior. Low numbers of yellow-billed loons have been documented in Berners Bay and Lynn Canal, and construction activities would be unlikely to affect reproductive success or survival.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

The impacts to yellow-billed loons would primarily be the loons' energetic cost of swimming and diving to avoid ferries in mid- and northern Lynn Canal. Collisions are unlikely due to their excellent swimming and diving abilities. Only low numbers of yellow-billed loons have been documented in Berners Bay and Lynn Canal (see Section 3.3.1.2), and the short periods of ferry navigation in shallow coastal waters (< 130 feet deep) near the proposed ferry terminals would minimize the potential for any disturbance to yellow-billed loons (see Jehl 1970 and Haney, 1990).

4.4.3.3 Aleutian Tern

Construction Activities

Construction of the proposed highway and ferry terminals would increase noise levels and human activity in these areas, especially near palustrine or estuarine emergent wetlands. However, the project is outside of the species known range and, therefore, construction activities would not affect Aleutian terns.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternative 3 would result in the loss of 7.6 acres of palustrine or estuarine emergent wetlands, preferred nesting habitat of Aleutian terns. Noise and human presence around the proposed

highway may preclude Aleutian terns from colonizing small portions of these habitats adjacent to project facilities. Ferry service in Lynn Canal would not disturb Aleutian terns as they nest onshore and feed over ocean waters and would avoid the ferries. However, the project is outside the species' known range and, therefore, it is unlikely that maintenance and marine and vehicle traffic would affect Aleutian terns.

4.4.3.4 Dusky Canada Goose

Construction Activities

Dusky Canada geese may use estuarine tide flats near Alternative 3 construction activities to rest and feed during migration. Construction activities would likely have a negligible effect on dusky Canada geese because they would only be present for a short period of time during migration, and they would likely avoid areas affected by construction noise since estuarine tide flats are abundant outside of the project area.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternative 3 would result in the loss of 1.5 acres of estuarine emergent wetland, which is potential resting and feeding habitat for dusky Canada geese during migration. Use of marine waters in Southeast Alaska by dusky Canada geese is not well established, so numbers of geese using this habitat would likely be very low. Disturbance effects from maintenance and vehicle traffic would likely be negligible due to their transient use of the project area during migration.

4.4.4 Mammals

4.4.4.1 Brown Bears

Construction Activities

Alternative 3 includes minor widening of the Glacier Highway along Echo Cove, a 2.5-mile extension of the existing highway from Cascade Point to a new ferry terminal at Sawmill Cove, a new ferry terminal at William Henry Bay and a road along west Lynn Canal to Haines. The construction phase of Alternative 3 has the potential to impact brown bears in eastern Berners Bay and along west Lynn Canal through noise generation and the presence of attractants, such as food and garbage.

Most construction would occur during snow free months (April through November), with the exception of construction of the large multi-span bridges (i.e., Sullivan and Endicott river bridges and the Chilkat Inlet crossing), and William Henry Bay and Sawmill Cove ferry terminals. In-water construction, such as pile driving, would likely occur during winter months, as much as practicable, to maximize the in-water work window to protect out-migrating salmonids and spawning eulachon and low river levels. The noise produced during construction has the potential to disturb denning brown bears, which could lead them to abandon their den (Swenson et al. 1997). Brown bear denning patterns on the west side of Lynn Canal are likely similar to those found in the east Lynn Canal study (Flynn et al., 2012). All the dens visited during the east Lynn Canal study were in closed forested areas at higher elevations, far up major river drainages and away from the project area.

Noise from construction may also cause brown bears to avoid feeding areas in or near the project area during daytime hours when human disturbance is greatest. A shift to nighttime feeding

could reduce the bears' feeding efficiency in some areas as light becomes a limiting factor prior to hibernation (Ordiz et al., 2012). However, due to the large home ranges of brown bears and an abundance of feeding areas away from the project site, it is unlikely that construction noise would significantly impact bear populations along west Lynn Canal.

Brown bears typically avoid humans and highways. However, bears are attracted to human garbage and food supplies, which often brings them into conflict with humans and results in bears being shot and killed in defense of life or property. This is often a problem for remote construction camps and remote campers and hunters (McLellan, 1989). Measures to minimize this problem would be implemented during construction.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

According to the ADF&G study, some brown bears have been documented in areas just north of Echo Cove to Sawmill Cove in late summer and autumn (Flynn et al., 2012) near the corridor of the Alternative 3 alignment. This segment of Alternative 3 would not intersect the major areas of predicted or recorded use for the Berners Bay population (Flynn et al., 2012). The 110-foot-long bridge crossing of Sawmill Creek would be in an area where the stream is 15 feet wide, thereby maintaining a terrestrial corridor along the stream bank for bears to cross under the highway.

However, there would likely be seasonal disturbance and displacement of bears using beaches near Sawmill Cove during ferry operations. As described for Alternative 2B, the highway could inhibit the number and/or timing of bear crossings between upland and coastal habitats from Echo Cove to Sawmill Cove (Waller and Servheen, 2005) in association with an extension of the existing Glacier Highway.

Brown bear populations and their seasonal movements were not studied by Flynn et al. (2012) on the west side of Lynn Canal, but their findings on patterns of habitat selection and use are assumed to be similar. Disturbance of brown bears by tourists and other motorists could occur near salmon streams crossed by the Alternative 3 highway along west Lynn Canal.

Vehicle collisions with brown bears, as described in Alternative 2B, would also be a concern along the highway extension of Alternative 3 on the east side of Lynn Canal and the new highway on the west side of Lynn Canal. Collisions with brown bears would likely be rare due to their aversion to roads, and any impact to the populations on the east and west sides of Lynn Canal would be negligible.

4.4.4.2 Moose

Construction Activities

Moose are often attracted to highways to feed on roadside grasses and brush and to escape deep snow. This association with highways is responsible for hundreds of moose being killed in Alaska each year, with an unknown number of others sustaining potentially fatal injuries. DOT&PF publishes statistics each year on the location and circumstances of reported highway vehicle accidents in Alaska, including those involving moose (DOT&PF, 2003).

The construction of the highway along west Lynn Canal would create a temporary path for moose to escape deep snow or move to different areas. This could cause construction vehicles to collide with moose on the cleared parts of the area under construction, especially lower elevation coastal areas and river valleys where they are likely to be found within the project area.

Noise from construction and human disturbances may cause moose to avoid feeding areas in or near the project area during daytime hours when human disturbance is greatest. However, moose are known to adapt to human disturbances and construction noise, reducing the likelihood that moose would be adversely displaced or disturbed by construction noise and human presence during construction.

The impact of vehicle collisions on moose during the construction phase of Alternative 3 is likely to be negligible due to the relatively slow operating speeds of construction vehicles.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

The numbers of moose ADF&G documented in areas just north of Echo Cove to Sawmill Cove are much smaller than the numbers further north in Berners Bay. This is due primarily to the lack of a large riparian area in the Echo Cove to Sawmill Cove area. Although fewer moose are documented in this area, the short highway extension on the east side of Lynn Canal could result in increased poaching and collisions of vehicles and moose. Increased potential for collisions of vehicles and moose would occur primarily in the winter due to reduced visibility of moose by drivers (e.g., much less daylight), and the reluctance of moose to move off plowed roads (White et al. 2012a).

4.4.4.3 Mountain Goats

Construction Activities

Mountain goat distribution and seasonal movements along west Lynn Canal are likely similar to those found along east Lynn Canal (White et al., 2012b). In summer, construction activities that generate noise are unlikely to have an effect on mountain goats located at high elevations during summer months. In the winter when goats move to lower elevations closer to or within the project area, the noise generated by winter construction of the large multi-span bridges (i.e., Sullivan and Endicott river bridges and the Chilkat Inlet crossing), and Henry Bay and Sawmill Cove ferry terminals may disturb animals nearby. Mountain goats disturbed by construction noise may move away from high-quality winter habitat to more marginal areas, which could increase energetic demands on individuals.

Avalanche control activities may occur during the spring to ensure the project area is safe for construction of the proposed highway and associated facilities. The avalanche control activities could result in mortality to mountain goats because avalanche chutes are in steep habitat preferred by goats, and are occasionally used for forage (White et al., 2012b). The impacts of the control activities would be reduced through mountain goat surveys of the chutes prior to blasting. Helicopter surveys would be conducted prior to the avalanche control activity to determine whether goats are within the blasting area or avalanche path and possibly to get them to depart the area. The noise from avalanche detonation would be noticeable to mountain goats and other wildlife. Although mountain goats and other wildlife may react to sounds from avalanche detonation, they return to their previous behavior within an hour or so after isolated disturbances.

The noise created by the resulting avalanche would be no different than that from naturally occurring avalanches.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Impacts to mountain goats were generally addressed in the 2004 *Wildlife Technical Report*. The highway extension of Alternative 3 on the east side of Lynn Canal does not bisect mountain goat habitat, due to its low elevation and lack of suitable forage (White et al. 2012b). The findings of the White et al. (2012b) study indicate that the west Lynn Canal highway may intersect winter mountain goat habitat. However, there is more lowland wintering area between the Chilkat Mountains and Lynn Canal for goats to use as refuge from human disturbance. If any goats did enter the highway corridor, the impacts would be limited to individual animals and would not affect the population as a whole. Therefore, impacts from habitat loss, maintenance, and vehicle traffic for Alternative 3 would likely be negligible.

4.4.4.4 Wolverine

Construction Activities

Construction of highway segments and ferry terminals on both sides of Lynn Canal would increase noise levels and human presence in the Alternative 3 corridor. These activities are not likely to have an impact on wolverines or their populations in southeast Alaska. This is due to their low densities near the project area, low site fidelity, and their propensity to avoid areas of human influence (Banci, 1994).

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

The findings from the recent ADF&G study on wolverines along eastern Lynn Canal (Lewis et al. 2012) can reasonably be extrapolated to the west side of Lynn Canal, due to its similar habitat and known wolverine occurrence. Wolverine populations are especially vulnerable to localized extirpations caused by overharvest due to their low densities and reproductive rates (Hornocker and Hash, 1981; Krebs et al., 2004; Squires et al., 2007). However, local extirpation of wolverines in the entire project area is unlikely because of the location of the highway at the edge of their habitat, and the low site fidelity of wolverines in southeast Alaska (Lewis et al., 2012). Wolverine harvest is controlled by ADF&G trapping regulations. To protect the wolverine population along roads adjacent to Lynn Canal from overharvest, ADF&G could revise its current management strategy by season or highway zone closures, emergency orders, quotas or other such tools.

Road-killed animals could become a food source for scavenging wolverines, perhaps increasing their vulnerability to collisions. The Alternative 3 alignment is adjacent to areas with high probability of use by wolverines for much of its length. Due to the very low density of wolverines in the Lynn Canal area (Lewis et al., 2012) and their tendency to avoid areas of human influence, the probability for collisions is likely low.

4.5 Alternatives 4A and 4C – FVF/Conventional Monohull Service from Auke Bay

4.5.1 Birds

4.5.1.1 Black Oystercatcher

Construction Activities

The construction of a new double-stern berth at the ferry terminal in Auke Bay for Alternative 4A or 4C would increase noise levels and human activities. One to six black oystercatchers at a time have been observed in the Auke Bay area intermittently during April to June since 1993 (eBird, 2013). However, no oystercatchers have been recorded from late December through late March in the Lynn Canal area since 1991 (eBird, 2013). Increased noise and human activity during construction could disturb black oystercatchers present in feeding and resting habitat near project activities and cause them to fly or swim away from the disturbance and resume their normal behavior in another location. These short-term displacements would increase the energetic output from disturbance behavior but would be unlikely to affect reproductive success or survival. In addition, construction in rocky shore habitat could inhibit birds from nesting in rocky shore areas or disturb the birds after nesting has occurred, thereby decreasing their chances of reproductive success for the season, or resulting in abandonment of nests. Black oystercatchers are uncommon in the project area and none have been documented near the Auke Bay ferry terminal. As such, the impacts described would occur on only a few individuals and would not have a population-level effect on the species.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Implementation of Alternatives 4A and 4C would result in the loss of 0.7 acres of rocky shore habitat at the existing ferry terminal in Auke Bay. One to six black oystercatchers at a time have been observed in the Auke Bay area intermittently during April to June since 1993 (eBird, 2013), so disturbance of small numbers of oystercatchers from activities would occur during operations. The loss of rocky shore habitat would result in a loss of potential breeding and feeding habitat for black oystercatchers. However, with the low densities of oystercatchers in the Lynn Canal area relative to the amount of rocky shore habitat available outside the project area, displaced birds would likely move to other unoccupied rocky shore habitat nearby. The loss of habitat would not have a population-level effect on this species. Ferry navigation would avoid rocky shorelines, so there would be no anticipated disturbance of black oystercatchers from ferry traffic.

4.5.1.2 Yellow-billed Loon

Construction Activities

The construction of a new double-stern berth at the ferry terminal in Auke Bay for Alternative 4A or 4C would increase noise levels and human activities. Increased boat activity and noises could disturb yellow-billed loons in nearshore waters, possibly increasing energetic costs of loons to swim or fly away from the disturbance and resume their normal behavior in another location. Low numbers of yellow-billed loons (1–2; once 4) have been recorded intermittently in Auke Bay, primarily during November through March, and rarely in April and May since 1997 (eBird, 2013). Because of their affinity for relatively shallow, protected waters, a few loons in Auke Bay would be disturbed and displaced by construction activities. These short-term

disturbances and displacements would increase the energetic output from disturbance behavior but would be unlikely to affect reproductive success or survival.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Increased winter ferry service from Auke Bay to Haines and Skagway for Alternative 4A or 4C may result in some disturbance of yellow-billed loons. The impacts to yellow-billed loons would primarily be the loons' energetic cost of swimming and diving to avoid ferries. Collisions are unlikely due to their excellent swimming and diving abilities. Based on the apparent low numbers of loons present during every month in Lynn Canal, and the relatively low numbers of ferries, the impact from disturbance would likely be low. The short periods of navigation in shallow coastal waters (< 130 feet deep) near the existing ferry terminals would minimize the potential for any disturbance to yellow-billed loons (see Jehl 1970 and Haney, 1990).

4.5.1.3 Aleutian Tern

Construction Activities

The construction of a double stern berth at the Auke Bay ferry terminal would increase noise levels and human activities in and near palustrine or estuarine emergent wetlands. However, the project is outside of the species known range and, therefore, construction activities would not affect Aleutian terns.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternatives 4A and 4C would not result in the loss of palustrine or estuarine emergent wetlands, preferred nesting habitat of Aleutian terns. Ferry service in Lynn Canal would not disturb Aleutian terns as they nest onshore and feed over ocean waters and would avoid the ferries. However, the project is outside the species' known range and, therefore, it is unlikely that these alternatives would affect Aleutian terns.

4.5.1.4 Dusky Canada Goose

Construction Activities

Construction of a new double-stern berth at the ferry terminal in Auke Bay for Alternative 4A or 4C would not impact resting and feeding habitat that dusky Canada geese might use during migration. Therefore, it is unlikely that construction of Alternatives 4A and 4C would not affect dusky Canada geese.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternative 4A and 4C would not result in any habitat loss for dusky Canada geese and disturbance effects from maintenance and vehicle traffic would like be negligible due to their transient use of the project area during migration.

4.5.2 Mammals

4.5.2.1 Wolverine

Construction Activities

There would be limited construction activities in a developed area to provide a day boat shuttle service from Auke Bay to Haines and Skagway for Alternative 4A or 4C. Because wolverines

normally shun areas with human development, construction activities from these alternatives would have no impact on wolverines.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

The operation of a new fast ferry or monohull shuttle service from Auke Bay to Haines and Skagway would have no impact on wolverines. These alternatives would be completely marine-based and outside of all wolverine habitat.

4.6 Alternatives 4B and 4D – FVF/Conventional Monohull Service from Berners Bay

4.6.1 Overall Habitat Loss

Overall habitat loss reported for wetlands in Section 4.4.1 of the 2005 *Addendum to Appendix Q Wildlife Technical Report* is now described in the *2014 Update to Appendix O – Wetlands Technical Report*; see Appendix Z.

4.6.2 Old-Growth Forest

Section 4.4.2 of the 2005 *Addendum to Appendix Q Wildlife Technical Report is* now described in the 2014 *Land Use Technical Report*, Appendix DD of this Draft SEIS.

4.6.3 Birds

4.6.3.1 Black Oystercatcher

Construction Activities

The construction of the proposed highway extension and ferry terminal in Sawmill Cove and construction of a double stern berth at the Auke Bay ferry terminal would increase noise levels and human activities in and near rocky shore habitat. One to five black oystercatchers have been observed in Berners Bay intermittently during April and May since 2005 (eBird, 2013). Increased noise and human activity during construction could disturb black oystercatchers present in feeding and resting habitat near project activities and cause them to fly or swim away from the disturbance and resume their normal behavior in another location. These short-term displacements would increase the energetic output from disturbance behavior but would be unlikely to affect reproductive success or survival. In addition, construction in rocky shore habitat could inhibit birds from nesting in rocky shore areas or disturb the birds after nesting has occurred, thereby decreasing their chances of reproductive success for the season, or resulting in abandonment of nests. Black oystercatchers are uncommon in the project area and as such the impacts described would occur on only a few individuals and would not have a population-level effect on the species.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternatives 4B and 4D would result in the loss of 1.9 acres of rocky shore habitat in Berners Bay and 0.7 acres of intertidal/subtidal fill at the existing Auke Bay ferry terminal. Black oystercatchers have been recorded in Berners Bay during spring. The loss of rocky shore habitat would result in a loss of potential breeding and feeding habitat for black oystercatchers. Highway traffic during operations or maintenance activities would disturb black oystercatchers in rocky shore habitats adjacent to the alignment. However, with the low densities of oystercatchers in the

Lynn Canal area relative to the amount of rocky shore habitat available outside the project area, displaced birds would likely move to other unoccupied rocky shore habitat nearby. The loss of habitat would not have a population-level effect on this species. Ferry navigation would avoid rocky shorelines, so there would be no anticipated disturbance of black oystercatchers from ferry traffic.

4.6.3.2 Yellow-billed Loon

Construction Activities

The construction of the proposed highway and ferry terminal in Berners Bay and construction of a double stern berth in Auke Bay would increase noise levels and human activity. Increased boat activity and noises could disturb yellow-billed loons in nearshore waters, increasing energetic costs of loons to swim or fly away from the disturbance and resume their normal behavior in another location. These short-term displacements would increase the energetic output from disturbance behavior. Low numbers of yellow-billed loons have been documented in Berners Bay and Lynn Canal, and construction activities would be unlikely to affect reproductive success or survival.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Yellow-billed loons may experience some disturbance both from increased summer service in Lynn Canal from Sawmill Cove across Berners Bay to Haines and Skagway, and from increased winter service from Auke Bay to Haines and Skagway. The impacts to yellow-billed loons would primarily be the loons' energetic cost of swimming and diving to avoid ferries. Collisions are unlikely due to their excellent swimming and diving abilities. Based on the apparent low numbers of loons present during every month in Lynn Canal, and the relatively low numbers of ferries, disturbance would likely be minimal. The short periods of ferry navigation in shallow coastal waters (< 130 feet deep) near the existing and proposed ferry terminals would minimize the potential for disturbance to yellow-billed loons (see Jehl 1970 and Haney, 1990).

4.6.3.3 Aleutian Tern

Construction Activities

The construction of the proposed highway extension and ferry terminal in Sawmill Cove and construction of a double stern berth at the Auke Bay ferry terminal would increase noise levels and human activities in and near palustrine or estuarine emergent wetlands. However, the project is outside of the species known range and, therefore, construction activities would not affect Aleutian terns.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternatives 4B and 4D would not result in the loss of palustrine or estuarine emergent wetlands, preferred nesting habitat of Aleutian terns. Ferry service in Lynn Canal would not disturb Aleutian terns as they nest onshore and feed over ocean waters and would avoid the ferries. Noise and human presence around the proposed highway may preclude Aleutian terns from colonizing small portions of these habitats adjacent to project facilities. However, the project is outside the species' known range and, therefore, it is unlikely that these alternatives would affect Aleutian terns.

4.6.3.4 Dusky Canada Goose

Construction Activities

Construction of a new double-stern berth at the ferry terminal in Auke Bay for Alternative 4B and 4D would not impact resting and feeding habitat that dusky Canada geese might use during migration. Therefore, it is unlikely that construction of Alternatives 4B and 4D would affect dusky Canada geese.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Alternative 4B and 4D would not result in any habitat loss for dusky Canada geese and disturbance effects from maintenance and vehicle traffic would likely be negligible due to their transient use of the project area during migration.

4.6.4 Mammals

4.6.4.1 Brown Bears

Construction Activities

Alternatives 4B and 4D include minor widening of the Glacier Highway along Echo Cove and a 2.5-mile extension of the existing highway from Cascade Point to a new ferry terminal at Sawmill Cove. The construction phase of these alternatives has the potential to impact brown bears in Echo Cove and Berners Bay through noise generation and the presence of attractants, such as food and garbage.

Most construction would occur during snow-free months (April through November), with the exception of in-water construction at the Auke Bay Ferry Terminal. In-water construction, such as pile driving, would likely occur during winter months, as much as practicable, to maximize the in-water work window to protect out-migrating salmonids and spawning eulachon and minimize impacts to existing ferry operations. If winter construction occurs at Sawmill Cove, the noise produced during construction has the potential to disturb denning brown bears, which could lead them to abandon their dens (Swenson et al. 1997), although all the dens visited during the Flynn et al. study were in closed forested areas at higher elevations, far up major river drainages and away from the project area.

Noise from construction may also cause brown bears to avoid feeding areas in or near the Sawmill Cove project area during daytime hours when human disturbance is greatest. A shift to nighttime feeding could reduce the bears' feeding efficiency in some areas as light becomes a limiting factor prior to hibernation (Ordiz et al., 2012). However, due to the large home ranges of brown bears in Berners Bay (Flynn et al., 2012) and an abundance of feeding areas away from the project site, it is unlikely that construction noise would significantly impact bear populations.

Brown bears typically avoid humans and highways. However, bears are attracted to human garbage and food supplies, which often brings them into conflict with humans and results in bears being shot in defense of life or property. This is often a problem for remote construction camps and remote campers and hunters (McLellan, 1989). Measures to minimize this problem would be implemented during construction.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

Brown bears have been documented using areas just north of Echo Cove to Sawmill Cove in late summer and autumn (Flynn et al., 2012). This road alignment along East Lynn Canal would not intersect the major areas of predicted or recorded use for the Berners Bay population (Flynn et al., 2012). However, there would likely be seasonal disturbance and displacement of bears using beaches near Sawmill Cove during construction and/or ferry operations. The highway could inhibit the number and/or timing of bear crossings between upland and coastal habitats in those areas (Waller and Servheen, 2005). The 110-foot-long bridge crossing of Sawmill Creek would be in an area where the stream is 15 feet wide, thereby maintaining a terrestrial corridor along the stream bank for bears to cross under the highway. As this segment of Alternatives 4B and 4D would not intersect the major areas of predicted or recorded use for the Berners Bay population, disturbances to bear crossings would be minor.

Vehicle collisions with brown bears could also be a concern near the Sawmill Cove Ferry Terminal and the short highway extension on the east side of Lynn Canal. As this segment of Alternatives 4B and 4D would not intersect the major areas of predicted or recorded use for the Berners Bay population, vehicle collisions with brown bears are expected to be unlikely.

4.6.4.2 Moose

Construction Activities

Moose are often attracted to highways to feed on roadside grasses and brush and to escape deep snow. This association with highways is responsible for hundreds of moose being killed in Alaska each year, with an unknown number of others sustaining potentially fatal injuries. DOT&PF publishes statistics each year on the location and circumstances of reported highway vehicle accidents in Alaska, including those involving moose (DOT&PF, 2003).

The upgrade/construction of the Glacier Highway to Sawmill Cove would create a temporary path for moose to escape deep snow or move to different areas. This could cause construction vehicles to collide with moose on the cleared parts of the area under construction, especially lower elevation coastal areas and Sawmill Creek valley where they are likely to be found within the project area.

Noise from construction and human disturbances may cause moose to avoid feeding areas in or near the project area during daytime hours when human disturbance is greatest. However, moose are known to adapt to human disturbances and construction noise, reducing the likelihood that moose would be adversely displaced or disturbed by construction noise and human presence during construction.

The impact of vehicle collisions on moose during the construction phase of these alternatives is likely to be negligible due to the relatively slow operating speeds of construction vehicles.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

The numbers of moose documented in areas near the Sawmill Cove ferry terminal are much smaller than the numbers farther north in Berners Bay. This is due primarily to the lack of a large riparian area in the Echo Cove to Sawmill Cove area. Although fewer moose are documented in

this area, the ferry terminal at Sawmill Cove and short highway extension on the east side of Lynn Canal could result in increased poaching and collisions of vehicles and moose.

The potential for increased collisions of vehicles and moose would occur primarily in the winter due to reduced visibility of moose by drivers (e.g., much less daylight), and the reluctance of moose to move off plowed roads (White et al., 2012a).

4.6.4.3 Mountain Goats

Construction Activities

Mountain goat summer habitat is at high elevations along east Berners Bay and construction activities that generate noise are unlikely to have an effect on animals at that time. In the winter goats move to lower elevations and the noise generated by winter construction may disturb these animals. Mountain goats disturbed by construction noise may move away from high-quality winter habitat to more marginal areas, which could increase energetic demands on individuals. However, White et al. (2012) found that mountain goat winter habitat along east Berners Bay and is very limited, so noise impacts to mountain goats would likely be minimal.

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

The proposed short highway segment of Alternatives 4B and 4D does not intersect mountain goat predicted use areas. If any goats did enter the highway corridor, any impacts would be limited to individual animals and would not affect the population as a whole. Therefore, impacts from habitat loss, maintenance, and vehicle traffic for these alternatives would likely be negligible.

4.6.4.4 Wolverine

Construction Activities

Construction would likely result in increased noise levels and human presence along the road corridor and at the new terminal site. These activities are not likely to have an impact on wolverines or their populations in southeast Alaska. This is due to their low densities near the project area, low site fidelity, and their propensity to avoid areas of human influence (Banci 1994).

Habitat Loss and Effects of Maintenance and Marine / Vehicle Traffic

The proposed highway segment of Alternatives 4B and 4D does not intersect wolverine predicted use areas (i.e., shrubland and alpine habitats). If any wolverines did enter the highway corridor, any impacts would be limited to individual animals and would not affect the population as a whole. Therefore, impacts from habitat loss, maintenance, and vehicle traffic would likely be negligible.

5 Mitigation Measures

This section replaces Section 5.0 of the 2005 *Addendum to Appendix Q Wildlife Technical Report*. The following wildlife mitigation measures are commitments from the 2006 ROD and additional measures developed since completion of the ROD to address changes in regulations for particular resources or other changed conditions. All practicable measures to minimize environmental harm have been incorporated into the JAI Project. In many cases, the construction contractor will implement mitigation measures. Ultimately, DOT&PF and FHWA are responsible for ensuring implementation of the mitigation measures described below.

Unless otherwise noted, the following commitments are from the 2006 ROD.

5.1 Amphibians

1. The East Lynn Canal Highway alignment will avoid palustrine emergent wetlands to avoid potential impacts to amphibian breeding areas. Preconstruction survey of the alignment in wetland areas will be conducted to confirm that no amphibian ponds were missed during wetland mapping. Mitigation measure is not included in the 2006 ROD.
2. The potential for habitat damage from unauthorized off-road vehicles (ORVs) could also impact amphibians in wetland areas. For Alternative 2B, the East Lynn Canal Highway alignment in the Berners Bay area inhibits access to estuarine emergent wetlands. The alignment has been moved out of palustrine emergent wetlands to avoid potential impacts to amphibians. These changes also reduce access to easily ORV-traversed wetlands used by amphibians. Mitigation measure is not included in the 2006 ROD.

5.2 Birds

1. In appropriate habitats, nesting surveys for Queen Charlotte goshawk will be conducted prior to construction. Clearing will be avoided in the vicinity of active nests to the extent practicable.
2. Procedures to comply with the Bald and Golden Eagle Protection Act have been revised since the 2006 ROD. Refer to the *2014 Update to Appendix R – Bald Eagle Technical Report;* see Appendix Z for details regarding bald eagle mitigation measures.

5.3 Marine Mammals

1. Pile driving at the ferry terminal and multi-span bridge construction sites will be done with vibratory hammers to the extent possible to minimize impacts to marine mammals. Impact proofing necessary for weight-bearing piles would be accomplished as quickly as possible to reduce acoustic impact.
2. During all piling installations, a trained observer would monitor for the presence of marine mammals and pile driving would be halted if any marine mammal comes within 660 feet of the activity.
3. Refer to the *2014 Update to Appendix S – Steller Sea Lion Technical Report*; see Appendix Z for details regarding Steller sea lion mitigation measures.

5.4 Terrestrial Habitat

1. Only certified seed mixtures will be used to seed exposed soils. Soil from outside the project boundaries will not be imported to the project site. Any soil within the project boundaries identified as containing invasive species will not be transported to other areas of the project.
2. Construction equipment will be steam cleaned prior to use on the project.
3. To the extent practicable, shot rock slopes will be covered with overburden and seeded.

5.5 Terrestrial Mammals

1. Planning and operations for any camps necessary during construction of the project will include Best Management Practices (BMPs) for handling food, trash, and other potential wildlife attractants to reduce impacts.
2. Bridges across streams will be designed to function as wildlife underpasses where practicable.
3. For Alternative 2B, bridges over the Lace and Antler rivers will be extended 50 feet beyond the bank to provide wildlife passage. The north end of the Katzehin River bridge will extend 100 feet beyond the bank.
4. For Alternative 2B, two wildlife underpasses will be constructed at identified brown bear travel corridors on the peninsula between the Lace and Antler rivers.
5. Preconstruction wolf den surveys will be conducted in consultation with the USFWS. Identified active dens will be avoided during clearing to the extent practicable.
6. DOT&PF will fund a long-term monitoring study to determine the effectiveness of wildlife underpasses. This study will be developed based on information gathered during the three-year brown bear study already completed by ADF&G.

The following mitigation measures are not included in the 2006 ROD and are based in part on the additional studies completed by ADF&G related to brown bears, moose, mountain goats, and wolverines:

1. For Alternative 2B, the bridge over Slate Creek is designed to provide clearance to accommodate wildlife crossings and reduce potential for mortality and disturbance to moose and bear populations from the highway activities.
2. Wildlife crossing signage and speed reductions in areas of high brown bear, moose, and mountain goat use, as determined by the ADF&G, would be incorporated into the road design for both operations and construction.
3. In areas of high moose use as identified by the ADF&G, roadside vegetation would include non-palatable species to discourage browsing near the roadways. Roadside alder growth will be regularly cut to reduce browsing by moose and mountain goats, and to maintain adequate sight distances to avoid vehicle collisions with wildlife.
4. The project would incorporate adequate sight lines into the final design to enable drivers to see moose and mountain goats that are in close proximity to the road (particularly relevant in conifer forest areas).

5. During operation and maintenance, helicopter surveys would be conducted prior to avalanche control activity to determine whether mountain goats are within the blasting area or avalanche path and possibly to encourage them to depart the area.
6. No pullouts or parking areas would be constructed in the area between the Lace and Antler rivers to minimize habitat degradation and wildlife disturbance from pedestrians as well as to provide for public safety.
7. Bridges that span waterways or other geographical features likely to be used as wildlife passages would be constructed to facilitate the movement of brown bears. The distance between the proposed bridge abutments/supports and water bodies would be lengthened to provide travel corridors for brown bears and other wildlife.
8. Construction crews would examine the nearby area for the presence of mountain goats prior to blasting and would encourage the goats to depart the area.
9. All personnel on site would be required to attend wildlife awareness training and orientation.
10. DOT&PF would develop a wildlife interaction plan prior to the start of construction for use by all personnel on site during construction. The plan would include topics such as safety measures for on-site personnel, (e.g., use of bear guards and bear spray); proposed storage and disposal of construction materials and trash; wildlife orientation training for on-site personnel; description of the handling of people/wildlife interactions including contingencies in the event wildlife does not leave the site (e.g. hazing by trained staff); description of the layout of temporary buildings and work areas to minimize interactions between humans and bears/moose (e.g., use of electric fencing); and requirement to document and communicate the sighting of bears/moose onsite or in the immediate area to all shift employees.
11. All garbage would be properly disposed of in closed bear-proof containers to avoid attracting bears and other carnivores and scavengers.
12. If possible, snow drifts or piles that could conceal bears would be kept cleared away from around buildings and fences at construction camps.
13. Procedures to control sediment runoff, fugitive dust fallout, and waste water during construction would be followed to avoid or minimize impacts on salmon-spawning streams, which provide important seasonal food for bears.
14. In areas where established wildlife crossings are noted side slopes along the road alignments would be designed to provide easier access across the road for wildlife.

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Attachment A
Updated Table

This attachment includes updated information for the following table that was presented in the 2004 *Wildlife Technical Report*.

Table 3-3 Species Considered For Analysis with Status Under Federal And State Regulations Or Management Concerns

Table 3-3
Species Considered For Analysis And Status Under Federal And State Regulations Or Management Concerns

Species		Federal ESA	USFS Tongass National Forest Sensitive Species[1]
Common Name	**Scientific Name**		
Black Oystercatcher	*Haematopus bachmani*		X
Yellow-billed Loon	*Gavia adamsii*	ESA Candidate[2]	

[1] Goldstein et al. 2009.
[2] USFWS 2011.

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Appendix A

Addendum to Appendix Q Wildlife Technical Report

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Addendum to Appendix Q

Wildlife Technical Report

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1.0 INTRODUCTION

Appendix Q, *Wildlife Technical Report* was completed in October 2004 and released for public review as part of the Supplemental Draft EIS in January 2005. Since then, the preferred alternative has been changed from Alternative 2 to Alternative 2B, and the highway alignment for Alternative 2B has been adjusted.

This addendum describes the changes to the project alternatives and presents changes to analyses of impacts to wildlife and wildlife habitat based on these revisions, public comments, and coordination with cooperating agencies. This addendum incorporates requested information from the Alaska Department of Natural Resources (ADNR) Office of Habitat Management and Permitting (OHMP) regarding old growth forest reserves and analysis of additional information regarding habitat fragmentation of terrestrial mammals, avalanche control measure impacts to mountain goats, discussion on impacts to wolverines, martens, wolves, moose, and amphibians, and an update to the habitat ranges of moose, wolverine, and Sitka black tailed deer. Additional clarification regarding the role of the Federal Subsistence Board, Board of Fisheries, and Board of Game authorities has also been included.

A clarification regarding Executive Order 13786 regarding the Migratory Bird Treaty Act and construction avoidance actions are included in Section 4.1.3 of this addendum and replace discussion included in the October 2004 *Appendix Q Wildlife Technical Report*

The information and alternatives analyses presented in the October 2004 *Appendix Q Wildlife Technical Report* remain valid unless new information is presented in this addendum.

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2.0 STUDIES AND COORDINATION

Agency comments requested clarification of the Federal Subsistence Board, Board of Fisheries and Board of Game authority over the fishery and wildlife resources in the project area. The following is a description of their role in regulating subsistence, and commercial, sport and personal use fishing and hunting.

A number of federal, state, and local agencies have jurisdiction over land management and resource development activities that may affect wildlife habitat. Since most of the project areas are on federal lands, the Federal Subsistence Board would regulate and monitor the harvest of fish and wildlife for subsistence purposes. The Federal Subsistence Board determines which subsistence wildlife species are open to harvest, the areas and communities that are eligible to hunt, as well as harvest limits and seasons, the harvest methods and other harvest regulations. The Board consists of the Alaska Regional Directors from the National Park Service, U.S. Fish and Wildlife Service (USFWS), Bureau of Land Management, Bureau of Indian Affairs and the U.S. Forest Service (USFS).

The Board of Fisheries and the Board of Game are Alaska's regulatory authorities that pass regulations to conserve and develop the fishery and wildlife resources of Alaska. This involves setting seasons, bag limits, methods and means for the state's subsistence, commercial, sport, guided sport and personal use fishing, hunting and trapping. The Alaska Department of Fish and Game (ADF&G) monitors the resources along Lynn Canal and makes recommendations to the Board of Fisheries and Board of Game to adjust fish and game regulations, as necessary, to protect those resources from over-utilization. ADF&G has the authority to limit harvest by issuing emergency orders closing seasons.

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3.0 AFFECTED ENVIRONMENT

The following subsections are additional discussion to be included Sections 3.1.1 and 3.3.3 of the *Appendix Q Wildlife Technical Report* included in the Supplemental Draft EIS.

3.1 Wildlife Habitats

Although the alternative alignments have changed, the general descriptions of old-growth forest, beach fringe, estuary fringe, alpine and subalpine, and wetland habitats presented in the 1997 and the 2004 *Appendix Q Wildlife Technical Report* remain valid. Wetland impacts have been reduced due to alignment changes in Alternative 2B (Figures 1 through 5). Agency comments requested information regarding old-growth forest reserves within the project study area. Section 2.1.1 describes the large, medium, and small old-growth reserves according to the Tongass National Forest Land and Resource Management Plan (TLMP) criteria, as well as the old-growth forest within the alignments for Alternative 2B and Alternative 3.

3.1.1 Old-Growth Forest

The land on both sides of Lynn Canal in the vicinity of project alternatives supports some large areas of high volume old-growth forest, as well as intermittent small areas of high and low volume old-growth forest (See TLMP for further delineation). Old-growth forest in the project area was defined as forest over 150 years old with an average diameter-at-breast-height greater than 9 inches, and timber volume greater than 8,000 board feet (BF) per acre. Old-growth and other forests consist of the following coniferous forest plant series: western hemlock, western hemlock-yellow cedar, Sitka spruce, mixed conifer, mountain hemlock, and Sitka spruce-black cottonwood. The TLMP contains a conservation strategy to maintain a forest-wide system of old-growth forest habitat, identifying a forest-wide system of large, medium, and small old-growth reserves. According to the TLMP criteria, the old-growth reserve system must meet minimum size, spacing, and composition requirements, as follows:

- **Large old-growth reserves** – A large reserve must be 40,000 acres; 20,000 of those acres must be productive old-growth forest (over 8,000 BF per acre). At least 10,000 acres of the productive old-growth forest should be in the high volume class (over 20,000 BF per acre).
- **Medium old-growth reserves** – A medium reserve is 10,000 acres; 5,000 of those acres must be productive old-growth forest. At least 2,500 acres should be in the high volume class.
- **Small old-growth reserves** – Small reserves are required in all value comparison units (VCUs) of the Tongass National Forest. Small reserves must be at least 16 percent of the VCU area, and at least 50 percent of that area must be productive old-growth forest. Each reserve should contain at least 800 acres of old-growth forest, but must contain a minimum of 400 acres of productive old-growth forest.

Evaluating any modification of mapped reserves must include consideration of Non-Development Land Use Designations (LUDs) that maintain the integrity of the old-growth forest ecosystem and contribute to a forest-wide system of reserves. Where the Non-Development LUDs do not fulfill size, spacing, and composition criteria of old-growth habitat reserves, it would be necessary to add or modify old-growth reserves to meet the criteria. The Tongass National Forest LUDs are shown in Figure 6.

There are six intermittent small blocks of high volume old-growth forest at or near the shore between Point Saint Mary and the Katzehin River (Alternative 2B). Two of the small intermittent blocks of high volume old-growth forest are within one mapped small old-growth reserve in the areas of Comet to Met Point (VCU 190), and four intermittent blocks of high volume old-growth are in the mapped small old-growth reserve in VCU 200. There are also several intermittent small blocks of low volume old-growth forest near the shoreline.

There are six small intermittent blocks of high volume old-growth forest on the west side of Lynn Canal in the vicinity of Alternative 3: one between William Henry Bay and Endicott River, four south of Sullivan River delta, and one opposite the middle of Sullivan Island. There are also several intermittent small and large blocks of low volume old- growth near the shoreline.

3.2 Species Accounts

Although the alternative alignments have changed, the general descriptions of the 27 species analyzed as presented in the 1997 and 2004 *Wildlife Technical Reports* remain valid. However, habitat figures for the following terrestrial mammals were updated to include habitat down to high-tide line: Alexander Archipelago Wolf and black bear (Figure 7); mountain goat, brown bear, and marten (Figure 8). Additionally, agency comments requested data regarding marten density in the project area. The information in Section 3.2.1.1 is used to supplement the October 2004 *Appendix Q Wildlife Technical Report*.

3.2.1 Mammals

3.2.1.1 Marten (*Martes americana*)

In the project study area, marten primarily occur in high volume old-growth forest habitat (Figure 8). On the east side of the Lynn Canal, this habitat is limited to the old-growth stands in the Berners Bay and Katzehin River areas (Schumacher, personal communication, 2005) and extends from the upper elevation extent of the forest to tidewater (N. Barten, personal communication, 2005). The narrow bands of forest habitat between Berners Bay and the Katzehin River and the Katzehin River and Skagway may be used as travel corridors by marten (N. Barten, personal communication, 2005). The west side of the Lynn Canal has a greater density of old-growth forest habitat, and is likely to have a greater abundance of marten (Schumacher, personal communication, 2005). A marten trapping survey conducted on the Homeshore Road system on the northern side of Icy Strait, in an area having similar old-growth habitat to that of the west side of the Lynn Canal, yielded 34 marten per 40,000 acres (Schumacher, personal communication, 2005), which suggests marten population densities are generally low in southeast Alaska.

4.0 ENVIRONMENTAL IMPACTS

Most of the discussions of impacts to wildlife and wildlife habitat presented in the October 2004 *Appendix Q Wildlife Technical Report* for Alternatives 2B, 3, 4B and 4D remain valid. However, because of the changes in alignments there are revisions to the number of acres of impacted wildlife habitat from these alignments. The revised acres of impacted wildlife habitat are presented in Table 1.

As requested from public and agency comments, impacts to old-growth reserves, as well the use of beach and estuary habitats by wolves, and how the build alternatives could impact the use of this habitat by wolves are discussed in Section 4.1. Additional information regarding the impacts of habitat fragmentation on bear, mountain goat, and marten is included in Section 4.2 (Alternative 2B). This information updates that presented in Sections 4.2.1 and 4.2.2 of the October 2004 *Appendix Q Wildlife Technical Report* presented in the Supplemental Draft EIS.

4.1 Impacts Common to All Build Alternatives

4.1.1 Overall Habitat Loss

The direct loss of different habitat types within the cut and fill limits of the highway alignment and the footprint of new ferry terminals were calculated using USFS Geographic Information System (GIS) data. These numbers have been updated based on the current alternative alignments. The results for all alternatives and all habitat types are presented in Table 1.

4.1.2 Terrestrial Mammals

Habitat Loss and Effects of Maintenance and Vehicle Traffic

The proposed highway would fragment wolf habitat; however, habitat fragmentation by itself is not likely to impact the regional wolf population (Person, personal communication, 2005). Wolves will move to beach and estuary habitats to prey on fish and marine mammals, and therefore would cross the highway or use it as a pathway to access these areas (Person, personal communication, 2005). There is no data to suggest that the highway would impact this movement (Person, personal communication, 2005). Hunting pressure as a result of increased access is more likely to impact wolves than fragmentation of habitat (Person, personal communication, 2005).

4.1.3 Terrestrial and Marine Birds

The Supplemental Draft EIS incorrectly stated that clearing activities would be avoided during nesting season in areas used by migratory birds to comply with the Migratory Bird Treaty Act (MTBA) (Section 4.1.2.5 of October 2004 *Wildlife Technical Report*). Clearing constraints are revised to be consistent with Executive Order (EO) 13186, which directs federal agencies to avoid or minimize to the extent practicable, adverse impacts to migratory bird resources. In keeping with this EO, preconstruction nest surveys would be conducted for the Queen Charlotte goshawk and trumpeter swans; this is consistent with USFS TLMP management policies. This clarification applies to Sections 4.2.2.3, 4.2.2.5, 4.2.3.3, 4.2.3.5, 4.2.4.3, 4.2.4.5, 4.2.5.3, 4.2.5.5, 4.2.6.3, and 4.2.6.5 of the 2004 *Wildlife Technical Report*.

Table 1
Wildlife Habitat Lost by Alternative (Acres[1,2])

Habitat Type	Alternative 2B	Alternative 3	Alternatives 4A & 4C	Alternatives 4B & 4D
Coastal Fringe Habitat[2,3]				
Beach Fringe	304	219	0	9
Estuary Fringe	71	110	0	32
SUBTOTAL	**375**	**329**	**0**	**41**
Terrestrial Habitat[2]				
Old-Growth Forest	286	286	0	25
Other Forest	128	95	0	0
Meadow/Muskeg and Shrub	13	14	0	2
Rock	1	0	0	0
SUBTOTAL	**428**	**395**	**0**	**27**
Wetlands[2]				
Forested	69	22	0	1
Scrub-shrub	1	1	0	1
Emergent	<1	2	0	0
Salt Marsh	0	2	0	0
SUBTOTAL	**70**	**27**	**0**	**2**
Marine Areas				
Beach Bars	2	5	0	0
Rocky Shores	30	7	0	2
Intertidal/ Subtidal[4]	36	13	1	2
SUBTOTAL	**68**	**25**	**1**	**4**

Notes: [1]Rounded to nearest acre
[2]There is overlap between categories. Terrestrial habitat provides the total for all habitat classifications. The other classifications are subtotals with some overlap.
[3]This area consists of project facilities located with approximately 500 feet of saltwater and include all types of terrestrial and wetland habitats as well as rocky shores and beach bars.
[4]Includes fill and dredge for ferry terminals and highway construction but not sidecasted shot rock.

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

4.2.1 Overall Habitat Loss

As described in Table 1, Alternative 2B would result in a loss of 304 acres of beachfront habitat and 71 acres of estuary fringe. This change from the 2005 *Supplemental Draft EIS* is due to alignment changes. These changes were implemented to reduce impacts to wetland habitats.

Alternative 2B would result in the permanent loss of 428 acres of terrestrial habitat (Table 1). Of this total, approximately 286 acres is classified as old-growth forest. A total of 128 acres of other forest, consisting of small trees or lower tree density, would be lost with Alternative 2B.

Loss of non-forested habitat includes 13 acres of shrub, open meadow, and muskeg communities along major rivers.

Approximately 70 acres of wetlands would also be lost, 69.4 acres of which would be forested wetlands and are included in the old-growth forest category totals (Table 1). Other wetlands filled under Alternative 2B would include 0.7 acre of palustrine scrub-shrub wetlands and 0.2 acre of estuarine emergent wetlands. Wetlands lost as a result of Alternative 2B would occur primarily between Slate Creek and Sherman Point on the east side of Lynn Canal (Figures 2 and 3).

A total of 32 acres of intertidal/subtidal areas would be lost with Alternative 2B, including approximately 2 acres of beach bar and 30 acres of rocky shore habitat. This loss would occur at the Katzehin ferry terminal and locations where the highway comes to the shoreline north of Sherman Point.

4.2.2 Old-Growth Forest

Alternative 2B would result in the loss of 286 acres of old-growth forest, most of which is in the Tongass National Forest. As discussed in Section 3.1.1, the TLMP establishes an old-growth reserve system to manage this important habitat for many terrestrial species. Alternative 2B would impact three mapped small old-growth reserves established under the reserve system:

- **VCU 160** – Alternative 2B would run through a mapped small old-growth reserve in VCU 160 in the Slate Cove area. There is a concentration of blocks of high volume old-growth and a larger amount of low volume old-growth. Within the reserve, Alternative 2B would run through the high volume old-growth forest. The reserve covers 1,454 acres. Alternative 2B would reduce the entire small mapped reserve by about 29.8 acres, and the highway corridor would separate the reserve into two areas. The remaining inland reserve area would be 930.6 acres, and the remaining reserve area on the shoreward side would be 493.6 acres. Alternative 2B would reduce the VCU 160 mapped small old-growth reserve by 2 percent.
- **VCU 200** – Alternative 2B would intersect one mapped small old-growth reserve in VCU 200, located at the south end of Point Saint Mary peninsula adjacent to VCU 160. This reserve consists of much land that is not old-growth, and most of the old-growth forest is medium volume forest. The reserve contains four intermittent small blocks of high volume old-growth near the south tip of the peninsula. Within the VCU 200 reserve, Alternative 2B would run through low volume old-growth and does not affect the high volume old-growth forest blocks in the reserve. The reserve contains 3,306.2 acres. Alternative 2B would reduce the entire small reserve mapped by about 18 acres, and the highway corridor would separate the reserve into two areas. The remaining inland area would be 456.0 acres; the remaining shoreward area would be 2,832.2 acres. Alternative 2B would reduce the VCU 200 mapped small old-growth reserve by 0.5 percent.
- **VCU 190** – Alternative 2B would cross this mapped small old-growth reserve from north of Comet to approximately Met Point. This reserve consists of much land that is not old-growth, and some medium volume old-growth forest. There are two intermittent blocks of high volume old-growth located inland. In the reserve, Alternative 2B would run through medium volume old-growth forest. The reserve covers 1,462.0 acres. Alternative 2B would reduce the size of the reserve by about 20.4 acres, and the highway corridor would separate the reserve into two areas. The remaining inland reserve area would be 1,408.4 acres; the shoreward reserve would be 33.2 acres.

Alternative 2B would reduce the VCU 190 mapped small old-growth reserve by 1.4 percent.

In addition to the mapped old-growth reserves, Alternative 2B would go through old-growth forested areas within lands designated as Non-Development LUDs that are presumed to function as medium and/or large old-growth reserves. The lands within all of these LUDs contain stands of old-growth forest, some of which are high volume, and others are low volume. Alternative 2B would reduce the size of the old-growth forest stands in all VCUs, as well as create a separation of some old-growth forest areas into downslope and upslope areas. Alternative 2B would remove approximately 286 of 76,279 acres of old-growth forest along the east side of Lynn Canal (USFS, 2003). The USFS in consultation with ADF&G and USFWS would adjust the boundaries of affected old-growth reserves if Alternative 2B were implemented.

4.2.3 Terrestrial Mammals

Habitat Loss and Effects of Maintenance and Vehicle Traffic

Salmon spawning is limited to the lower reaches of Sawmill Creek because of a waterfall near the mouth. The proposed highway would be located above this waterfall and avoid the salmon spawning habitat; however, the highway as a potential barrier could prevent bear from feeding on the spawning salmon. Black bears are known to feed on salmon at the Sawmill Creek estuary, below the highway alignment. The 110-foot-long crossing of Sawmill Creek would be in an area where the stream is 15 feet wide, thereby maintaining a terrestrial corridor along the stream bank for bears to cross under the highway.

In the project study area, mountain goats occur throughout the steep mountain habitat and upper forested slopes on both sides of Lynn Canal (Figure 8). Although goats seldom wander far from steep slopes or cliffs, they are often forced into old-growth forests at low elevations during the winter. Goats may use lower elevations along the proposed highway alignment (Alternative 2B) between Comet and Slate Cove to avoid deep snow conditions (ABR Inc., 2000). However, this is not high quality winter habitat for goats because it lacks forest cover. Using GIS, fragmentation of winter goat habitat was calculated as that from the cut and fill limit to the coastline. Roughly 448 acres of winter goat habitat from Katzehin River to Independence Creek would be fragmented and 693 acres from Antler River to Echo Cove. Fragmentation of this habitat is not likely to impact the areas mountain goat population.

The mature forest habitat along the shoreline potentially serves as a movement corridor for marten between high-density forest areas in Berners Bay, to the Katzehin River drainage. A highway would reduce the size of this corridor of fringe habitat that may potentially reduce movement of marten between these areas (N. Barten and T. Schumacher, personal communication, 2005).

4.3 Alternative 3 – West Lynn Canal Highway

4.3.1 Overall Habitat Loss

Under Alternative 3, approximately 395 acres of terrestrial habitat would be lost, including 286 acres of old-growth forest and 95 acres of other forest. A total of 14 acres of non-forest habitat would be lost in the vicinity of the major rivers crossed by Alternative 3, including shrub-scrub, meadows, and muskeg. The loss of this terrestrial habitat represents about 0.5 percent of the 74,470 acres of old-growth forest in the Wildlife Analysis Areas (WAAs) affected by the West Lynn Canal Highway alignment.

Approximately 27 acres of wetlands would also be lost, 22 acres of which would be forested wetlands and are included in the old-growth forest category totals (Table 1). Other wetlands filled under Alternative 3 would include 2.3 acres of palustrine emergent wetlands, 0.7 acre of palustrine scrub-shrub wetlands, and 1.5 acres of estuarine emergent wetlands. Of the total wetland impact resulting from Alternative 3, 1.2 acres of forested wetlands and 0.7 acre of palustrine scrub-shrub wetlands would be on the east side of Lynn Canal between Echo Cove and the Sawmill Cove terminal. Of the 21 acres of wetlands lost with Alternative 3 between William Henry Bay and Davidson Glacier, most are located just north of the Sullivan River (Figures 1 through 5).

Alternative 3 would result in the loss of 5 acres of beach bar and 7 acres of rocky shore habitat. This loss would occur at the Sawmill Cove and William Henry Bay ferry terminals and at locations where the highway comes to the shoreline between William Henry Bay and Haines.

4.3.2 Old-Growth Forest

Alternative 3 would result in the loss of 286 acres of old-growth forest, much of which is in the Tongass National Forest. As discussed in Section 2.1.1, the TMLP establishes an old-growth reserve system to manage this important habitat for many terrestrial species. Alternative 3 would not impact any mapped old-growth reserves (Figure 6). Alternative 3 would go through old-growth forested areas within lands designated as Non-Development LUDs that are presumed to function as medium and/or large old-growth reserves. The lands within all of these LUDs contain stands of old-growth forest, some of which are high volume, and others are low volume. Alternative 3 would reduce the size of the old-growth forest stands in all VCUs, as well as create a separation of some old-growth forest areas into downslope and upslope areas. Continued coordination with USFS will be necessary to determine impacts to old-growth reserves.

4.3.3 Terrestrial mammals

Habitat loss and effects of maintenance vehicle traffic

As stated in Section 3.2.3, goats, periodically, wander into old-growth forest at low elevations during winter. Goats may use areas along the Alternative 3 alignment to avoid deep snow conditions. Figure 8 depicts predicted areas where goats may forage. Using GIS, fragmentation of winter goat habitat was calculated as that from the cut and fill limit to the coastline. Roughly 1,750 acres of winter goat habitat from Pyramid Harbor to William Henry Bay would be fragmented. Fragmentation of this habitat is not likely to impact the area's mountain goat population.

4.4 Alternatives 4B and 4D

4.4.1 Overall Habitat Loss

Alternatives 4B and 4D would result in the loss of 27 acres of terrestrial habitat including 25 acres of old-growth forest habitat and 2 acres of grassland/meadow habitat. Approximately 91 percent of this habitat is located in the coastal fringe. Approximately 2 acres of wetlands would also be lost.

4.4.2 Old-Growth Forest

Alternatives 4B and 4D would result in the loss of 25 acres of old-growth forest, much of which is in the Tongass National Forest. As discussed in Section 2.1.1, the TMLP establishes an old-

growth reserve system to manage this important habitat for many terrestrial species. Alternatives 4B and 4D would not impact any mapped old-growth reserves. The highway segment for these alternatives would go through old-growth forested areas within lands designated as Non-Development LUDs that are presumed to function as medium and/or large old-growth reserves. The lands within all of these LUDs contain stands of old-growth forest, some of which are high volume, and others are low volume. Alternatives 4B and 4D would reduce the size of the old-growth forest stands in all VCUs, as well as create a separation of some old-growth forest areas into downslope and upslope areas. These alternatives would remove approximately 25 of 76,279 acres of old-growth forest along the east side of Lynn Canal (USFS, 2003). Continued coordination with USFS will be necessary to determine impacts to old-growth reserves.

5.0 MITIGATION MEASURES

The Department of Transportation and Public Facilities (DOT&PF) has committed to implementing the following revised wildlife mitigation measures as part of the Juneau Access Improvements Project:

5.1 Amphibians

1. The East Lynn Canal Highway alignment has been moved completely out of palustrine emergent wetlands to avoid potential impacts to amphibian breeding areas. Preconstruction survey of the alignment in wetland areas would be conducted to confirm that no amphibian ponds were missed during wetland mapping.
2. The potential for habitat damage from unauthorized off road vehicles (ORVs) could also impact amphibians in wetland areas. DOT&PF has revised the East Lynn Canal Highway alignment in the Berners Bay area to make access to estuarine emergent wetlands more difficult. The alignment has been moved completely out of palustrine emergent wetlands to avoid potential impacts to amphibians. These changes would also reduce access to easily ORV-traversed wetlands used by amphibians.

5.2 Birds

1. Nesting surveys for trumpeter swan and Queen Charlotte goshawk would be conducted prior to construction in appropriate habitats to avoid disturbing nesting activities during this period.
2. Refer to the Addendum to *Appendix R*, *Bald Eagle Technical Report* for detail regarding bald eagle mitigation measures.

5.3 Marine Mammals

1. Pile driving at the Katzehin Ferry Terminal and multi-span bridge construction sites would be done with vibratory hammers to reduce the intensity of the sound generated.
2. Trained observers would monitor for the presence of marine mammals and construction would be halted if any animals come within 200 meters of the activity.
3. Refer to the Addendum to *Appendix S*, *Steller Sea Lion Technical Report*, for details regarding Steller sea lion mitigation measures.

5.4 Terrestrial Mammals

1. Planning for any camps necessary during construction of the project would include BMPs for handling food, trash, and other potential wildlife attractants to reduce impacts.
2. Bridges across streams would be designed to also function as wildlife underpasses; wildlife underpasses would be located at the two identified major brown bear migration corridors in the isthmus between the Antler and Lace rivers.
3. DOT&PF would coordinate with ADF&G to avoid construction during the months of January through April to the extent practicable at locations that goat monitoring identifies as important for pregnant nannies.
4. DOT&PF recognizes the need for detailed wildlife population and habitat use data in order to revise management of these populations to reflect habitat loss and change in use, loss due to vehicle collisions, and hunting, both legal and illegal. DOT&PF commits to funding detailed population studies, with animal collaring, for goats, moose, brown bears, and

wolverine, as mitigation for indirect impacts to wildlife. In order to coordinate with goat studies conducted under the Kensington Gold Project, the goat study commenced in 2005.

5. Pre-construction wolf den surveys would be conducted within 600 feet of the project construction limits in any areas that consultation with the resource agencies identify as having high potential for wolf dens. Further agency consultation would occur if wolf dens were identified to determine appropriate measures to minimize impacts.

5.5 Terrestrial Habitat

1. Only certified seed mixtures would be used to seed exposed soils.
2. Soil from outside the project boundaries would not be imported to the project site. Any soil within the project boundaries identified as containing invasive species would not be transported to other areas of the project.
3. Construction equipment would be steam cleaned prior to use on the project.

6.0 LIST OF PREPARERS

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Lorraine Marshall	Project Environmental Coordinator, DOT&PF
Angela Schuler	Environmental Scientist URS Corporation B.S. Biology, M.S. Environmental Science Research assistance

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7.0 REFERENCES

ABR, Inc. 2000. A Review of Selected Wildlife Species, Jualin Mine Project, Alaska. Prepared for Coeur Alaska, Inc., by B.A. Anderson, ABR, Inc. – Environmental Research and Services.

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FIGURES

Eight figures, listed below, are provided in this addendum to clarify or illustrate information regarding wetlands classifications, LUDs, wildlife habitat, and habitat fragmentation beyond what was provided in Appendix O, the 2004 W*ildlife Technical Report*. Many of these figures are updated versions of figures originally presented in the 2004 technical report. Figures 1 through 5 are replacement figures for Figures 4-1 through 4-5. Figures 7 and 8 are updated versions of Figures 3-2 and 3-1.

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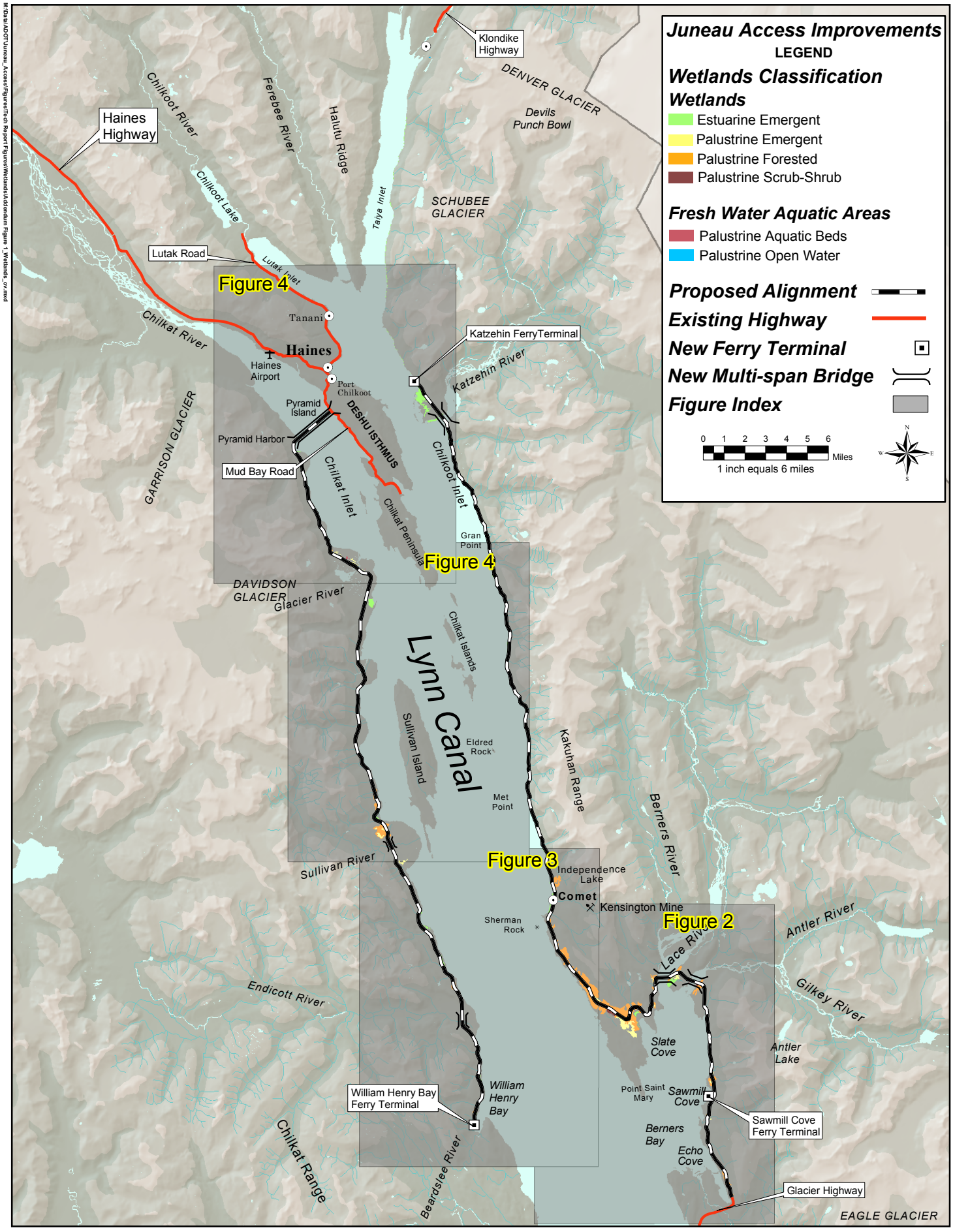

Figure 1
Wetlands Classifications Figure Index

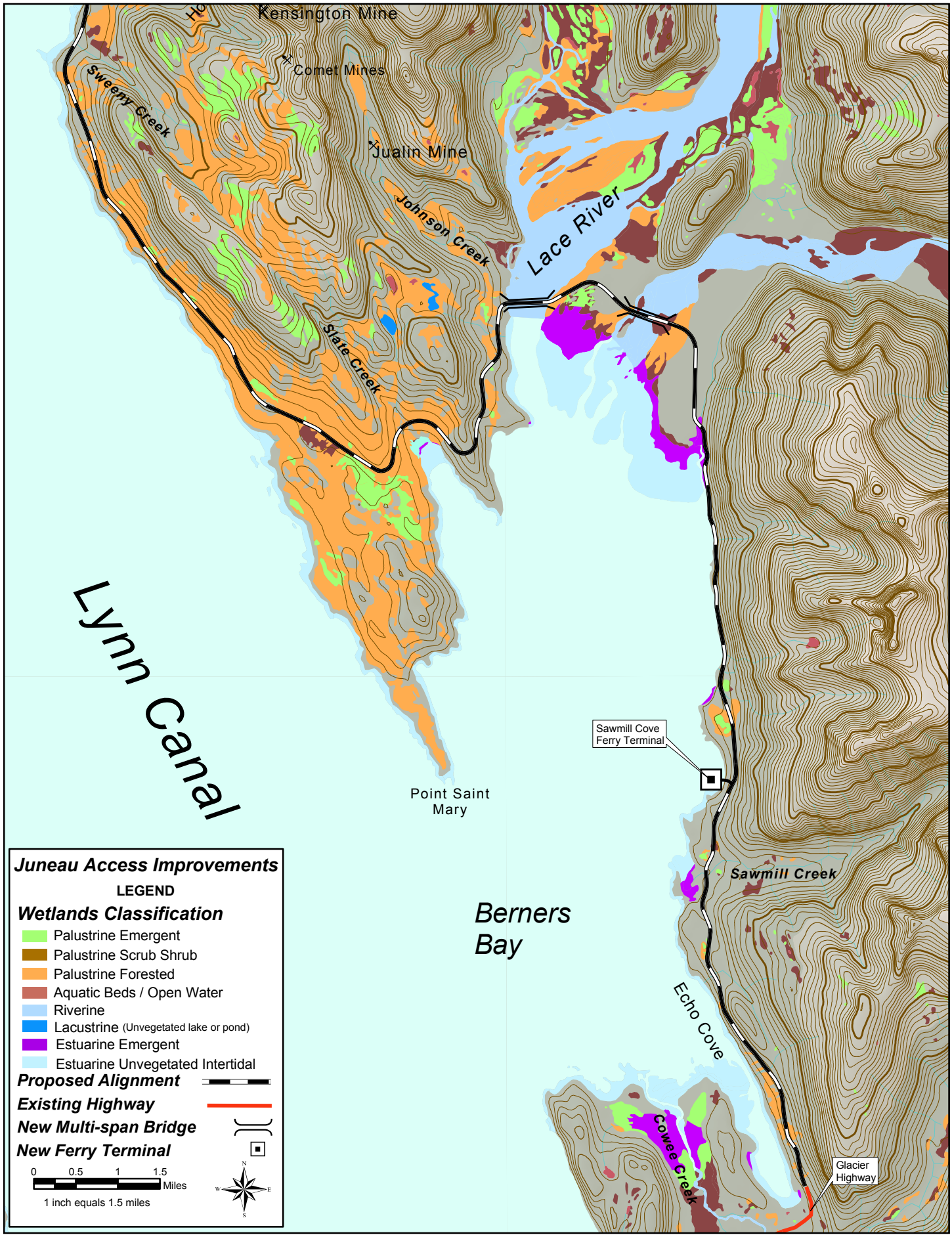

Figure 2
Wetlands Classifications for Berners Bay Area

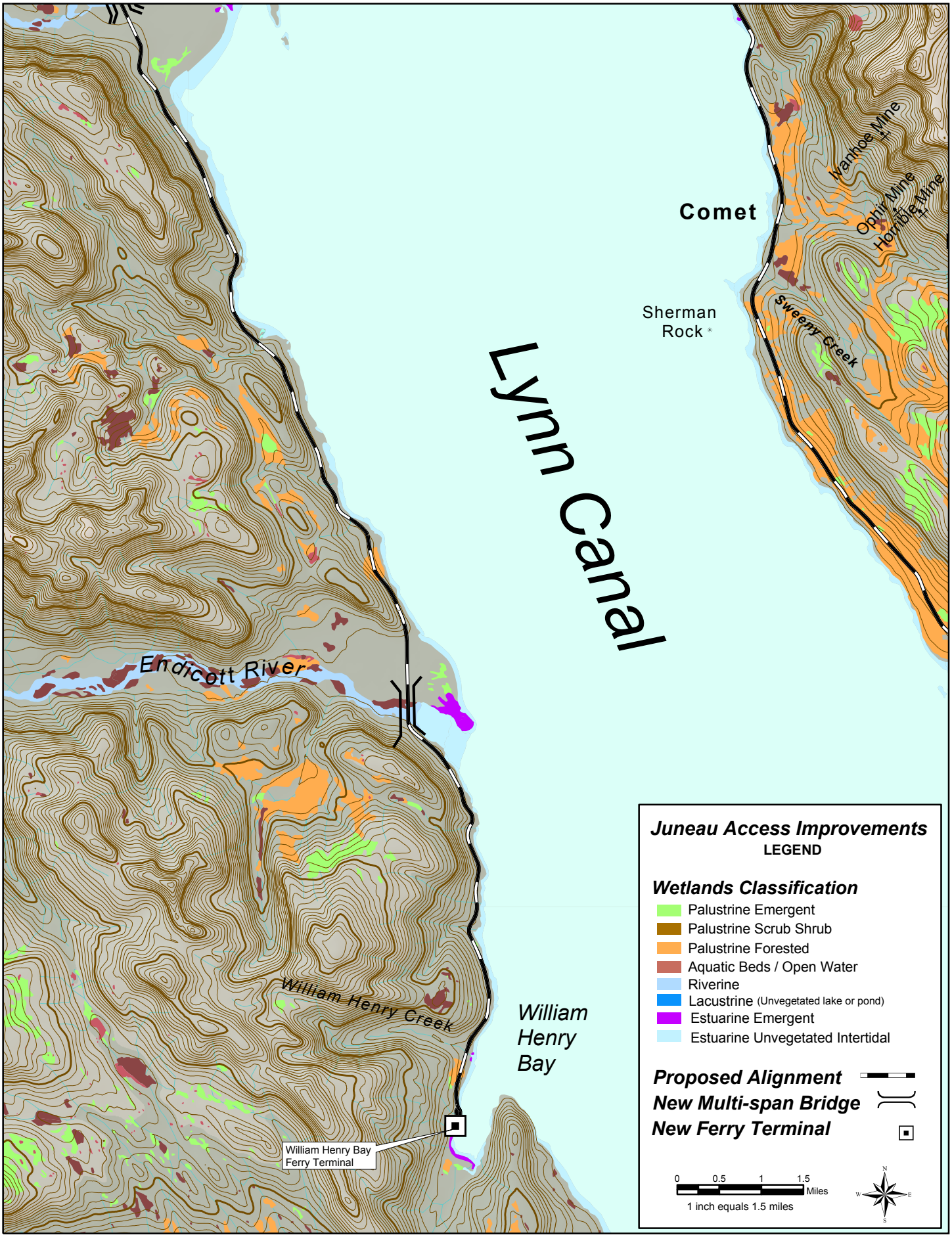

Figure 3
Wetlands Classifications for William Henry Bay Area and Comet Area

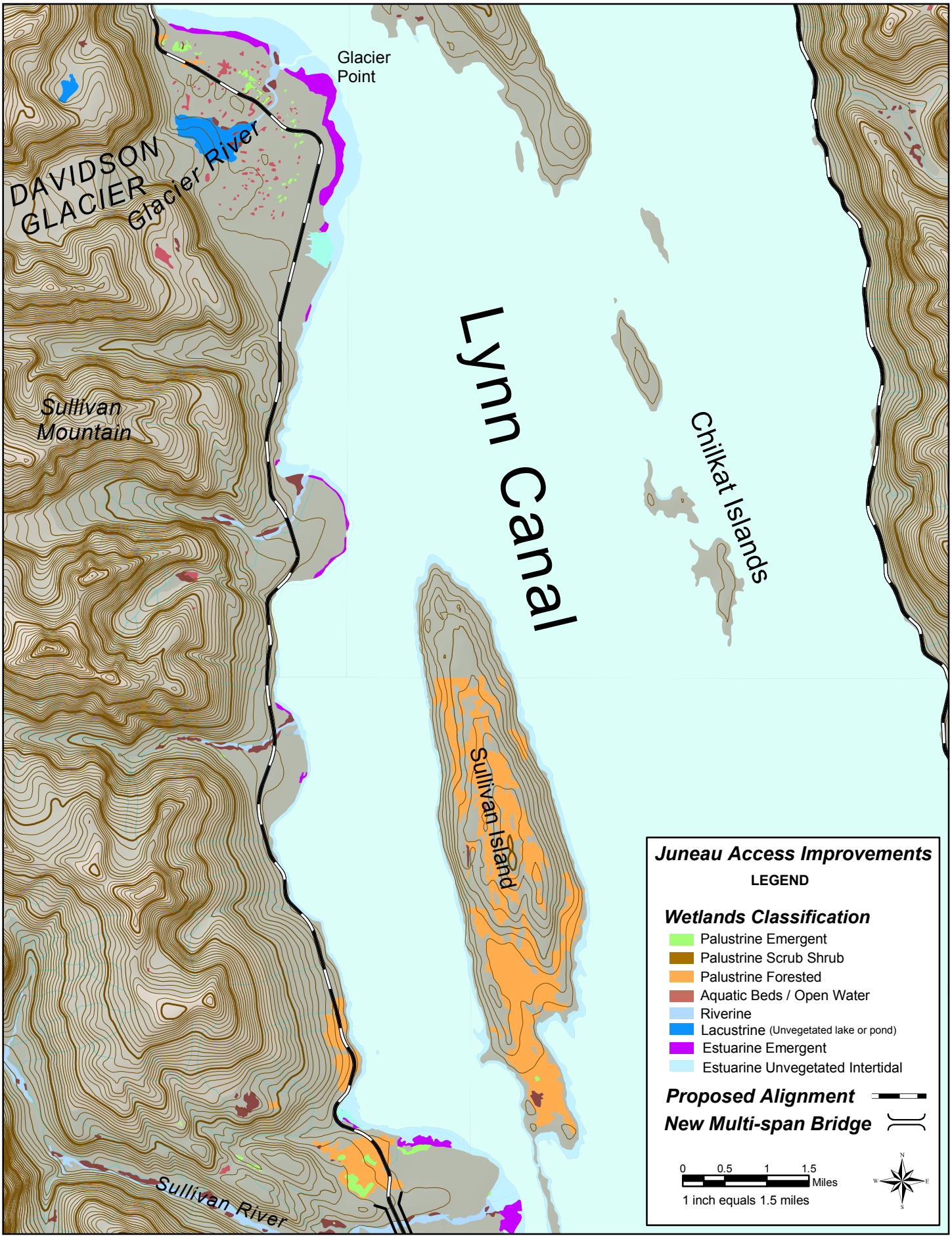

Figure 4
Wetlands Classifications for Sullivan River Area

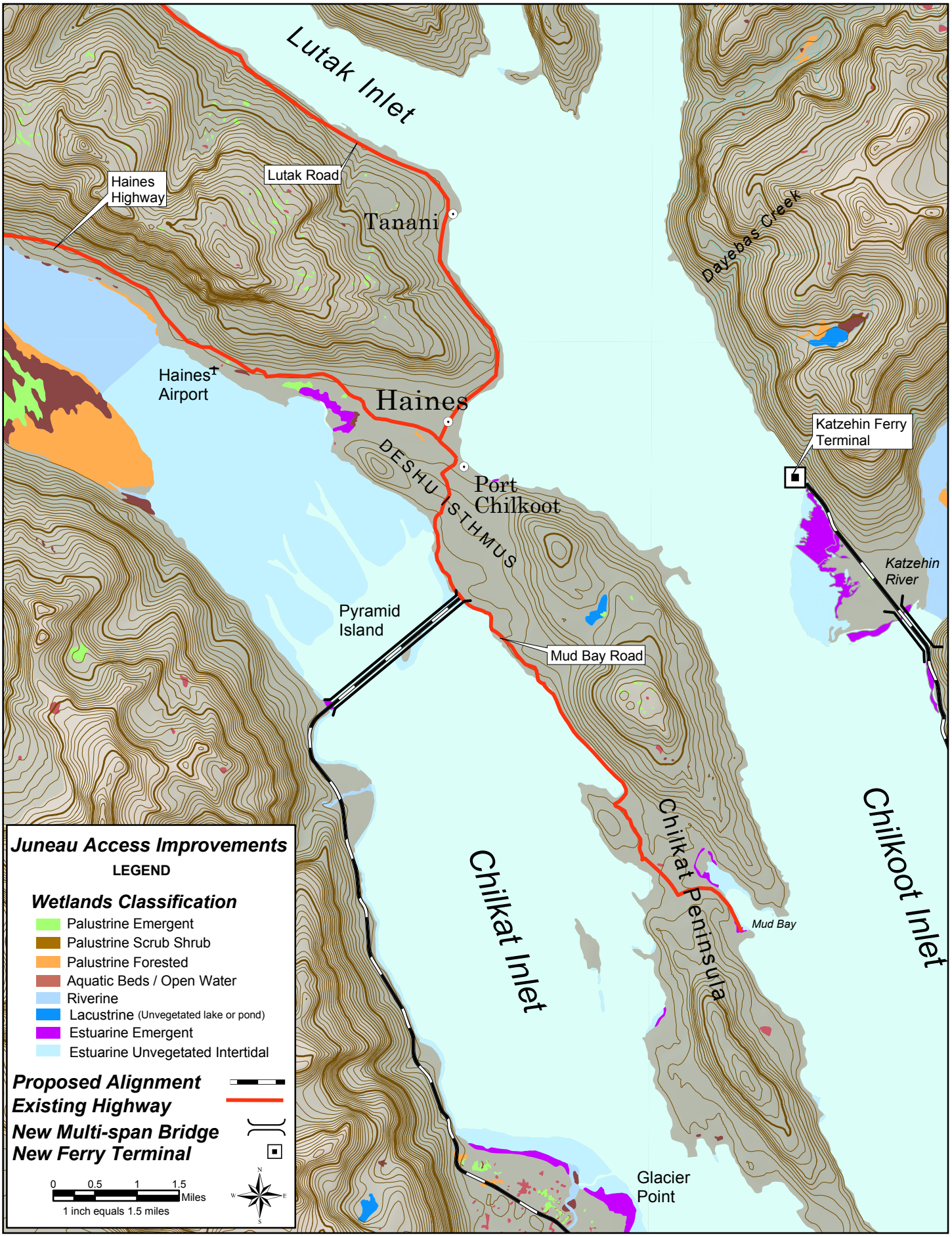

Figure 5
Wetlands Classifications for Haines Area

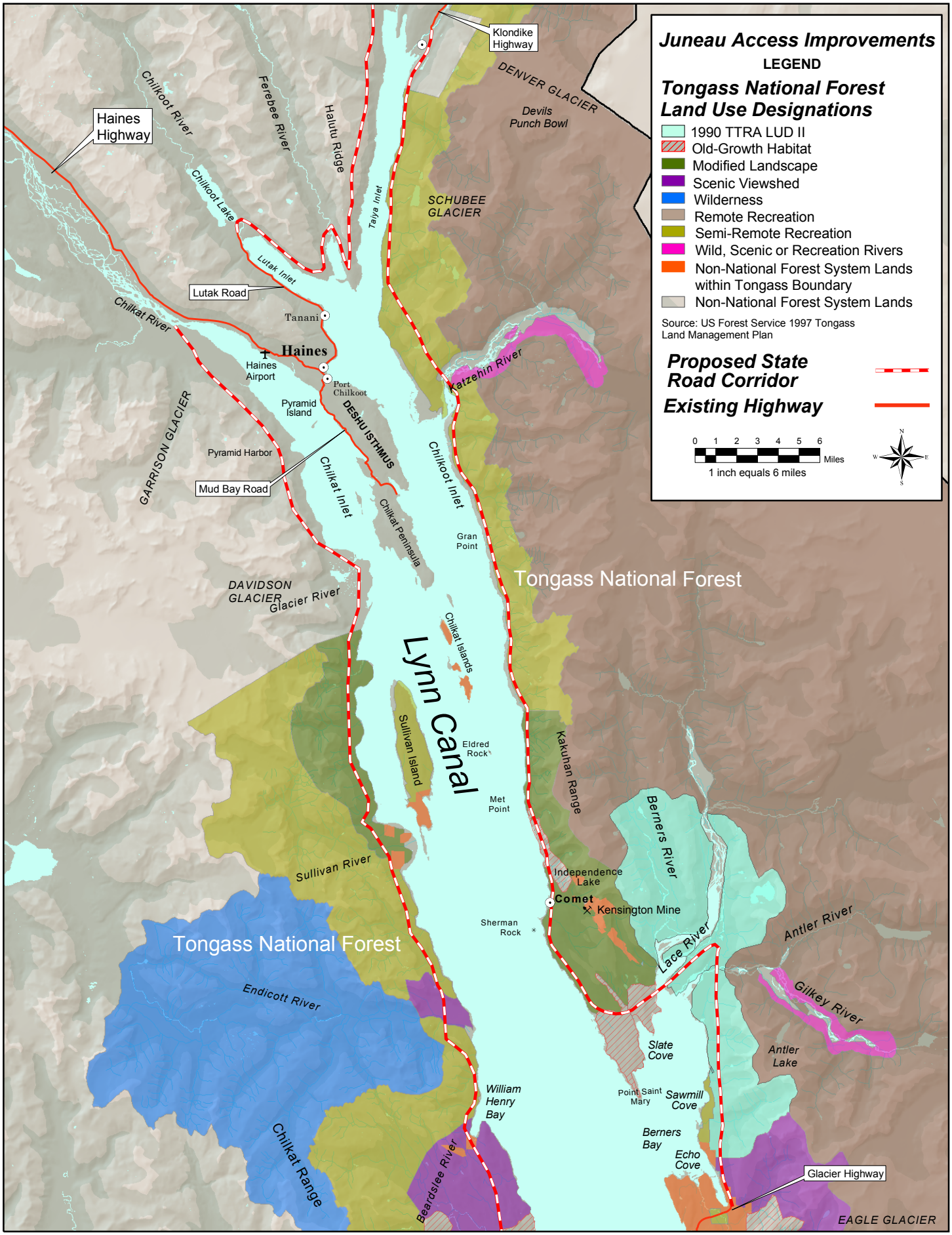

Figure 6
Tongass Land Management Plan Land Use Designations

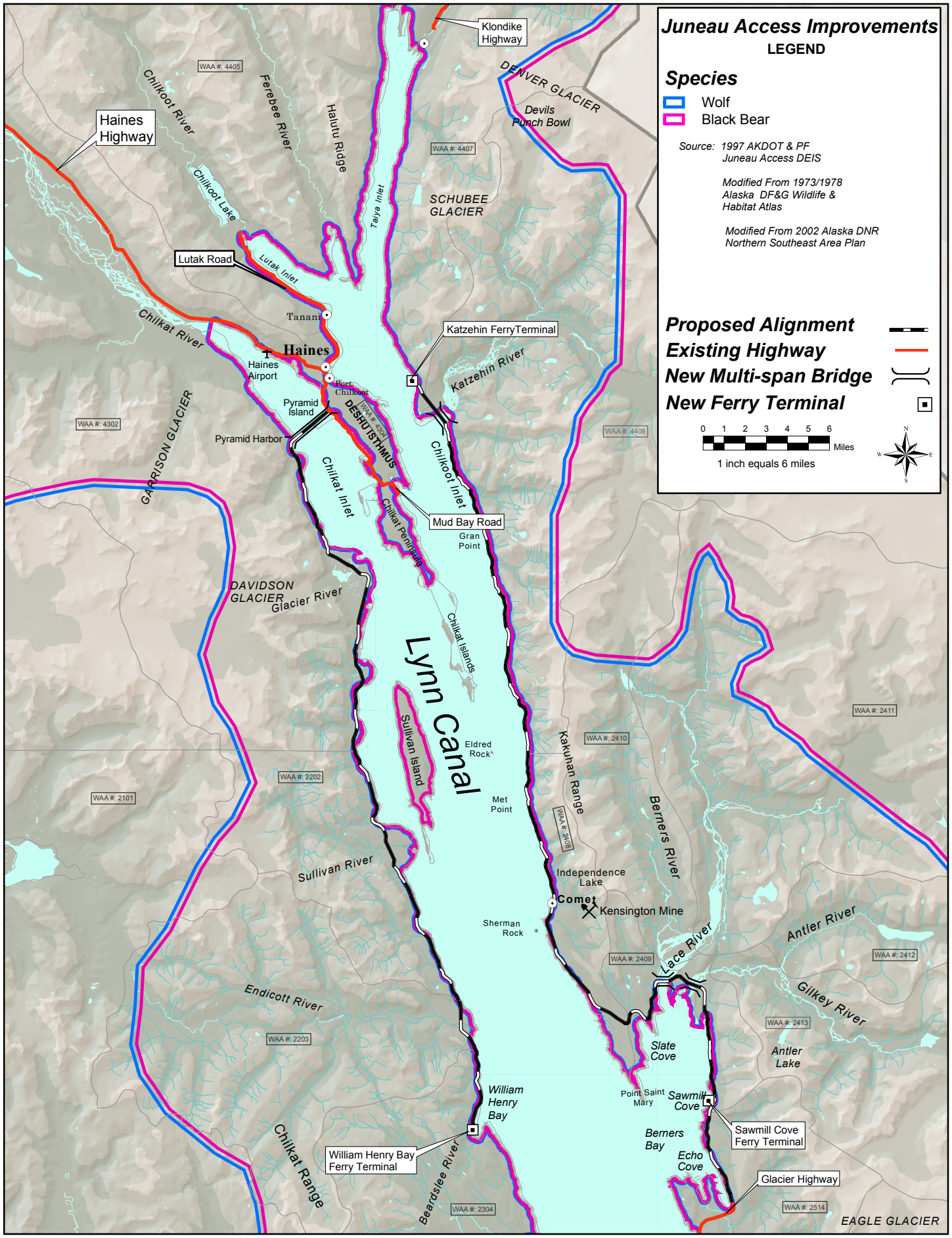

Figure 7
Wolf and Black Bear Habitat in Lynn Canal

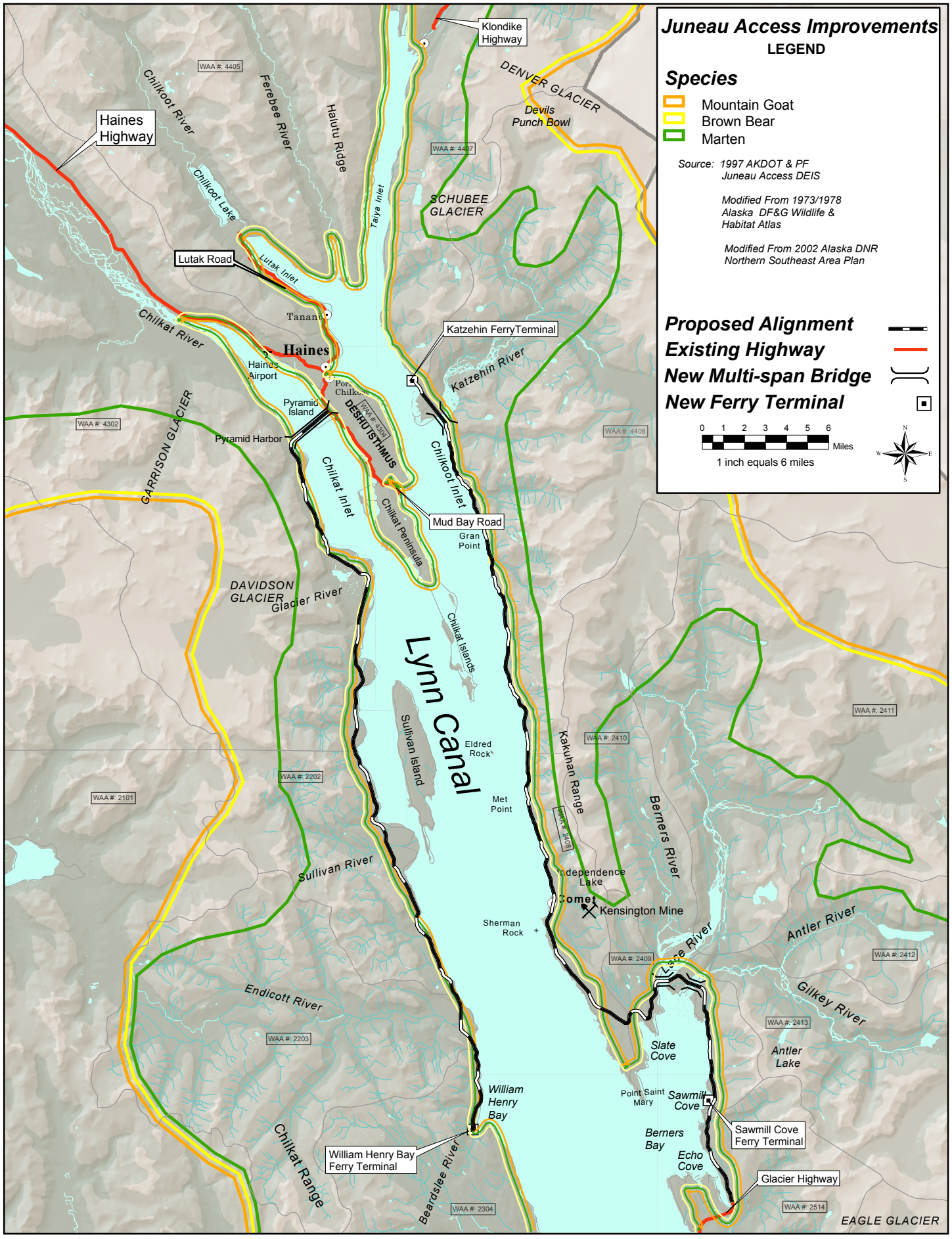

Figure 8
Mountain Goat, Brown Bear and Marten Habitat in Lynn Canal

Appendix B

Brown Bear Maps

Selected figures from Flynn et al. 2012

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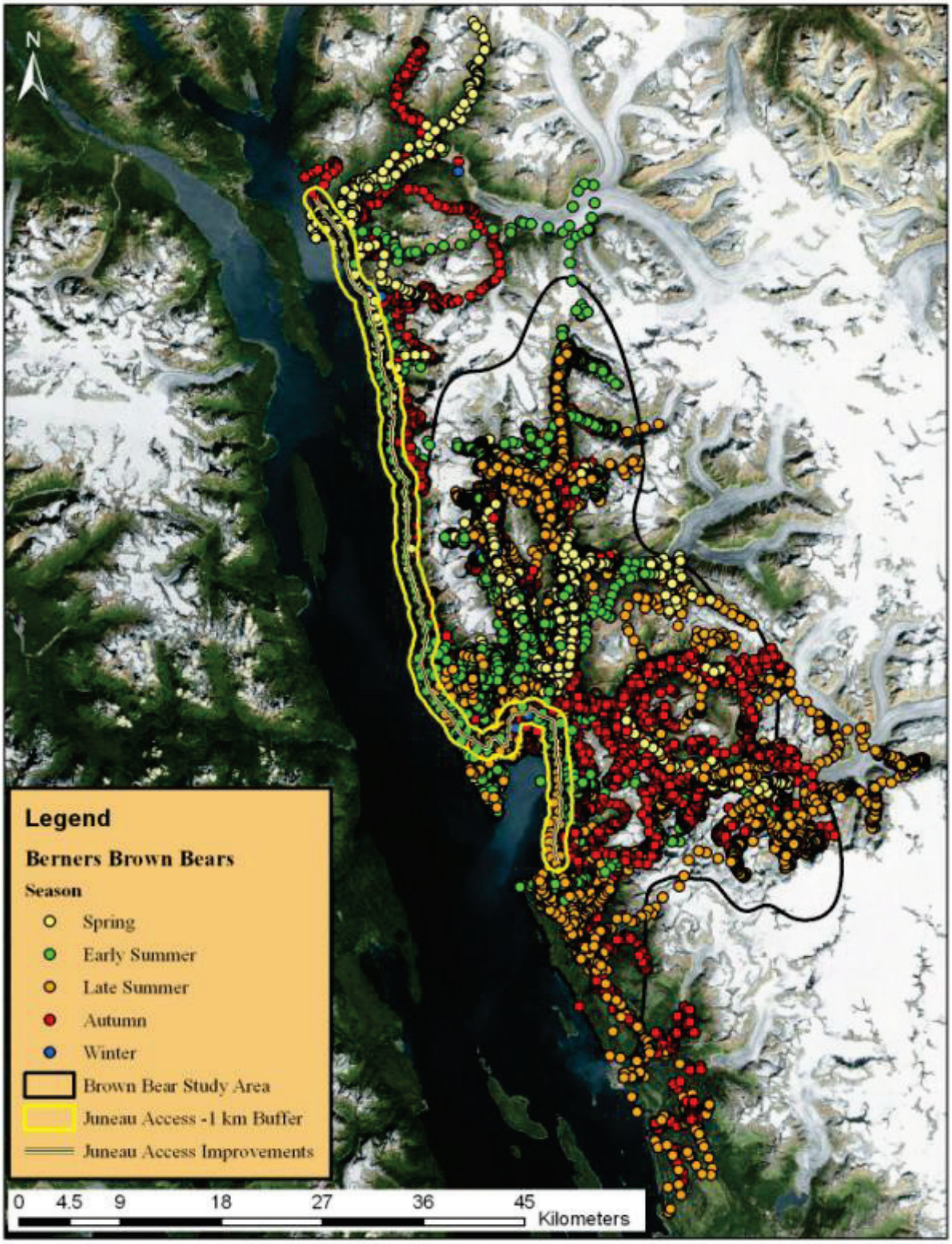

Figure B1. Seasonal brown bear GPS locations collected in the Berners Bay study area 2006 to 2010.

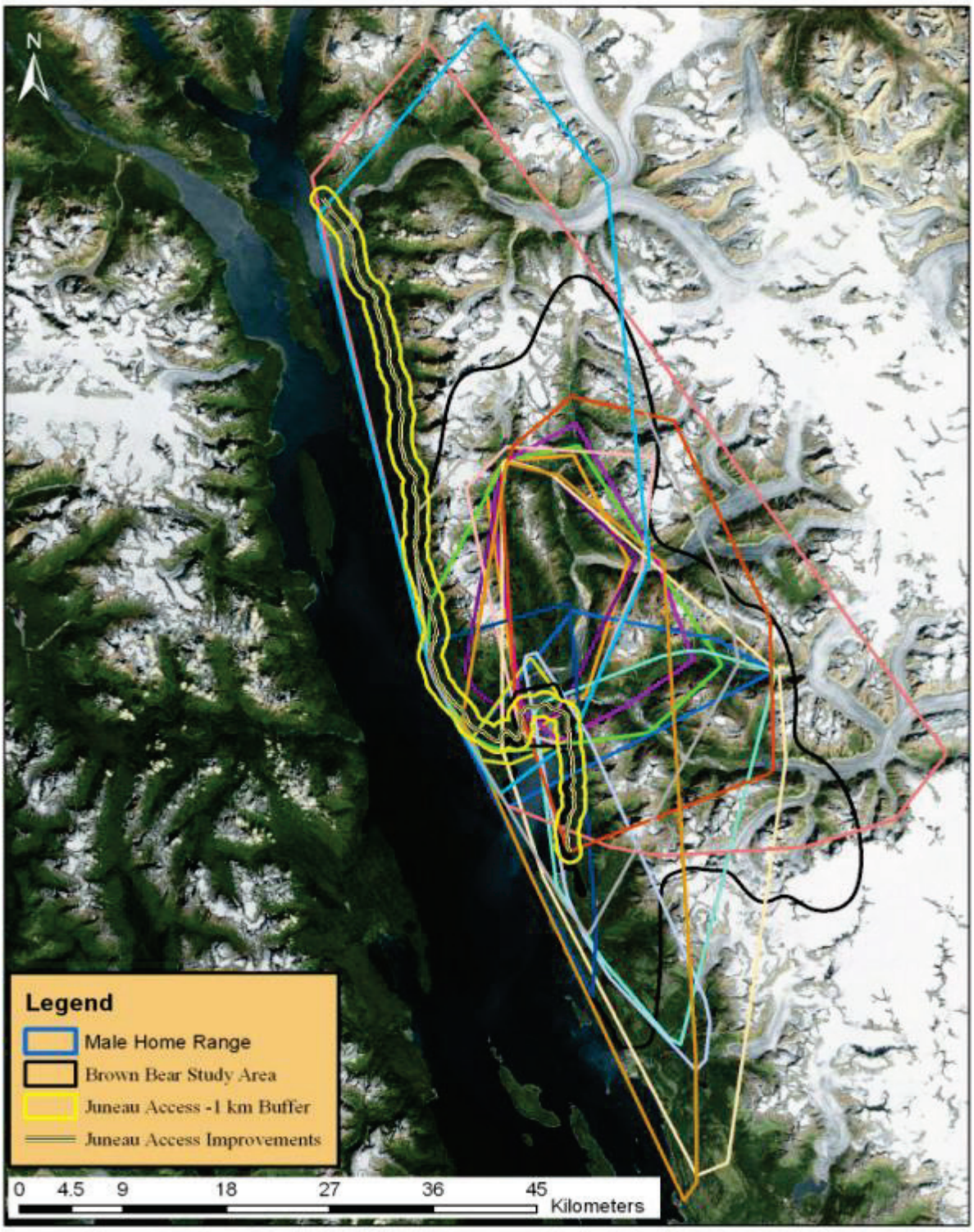

Figure B2. Home ranges (minimum convex polygon) of male brown bears in the Berners Bay study area during 2006 to 2010.

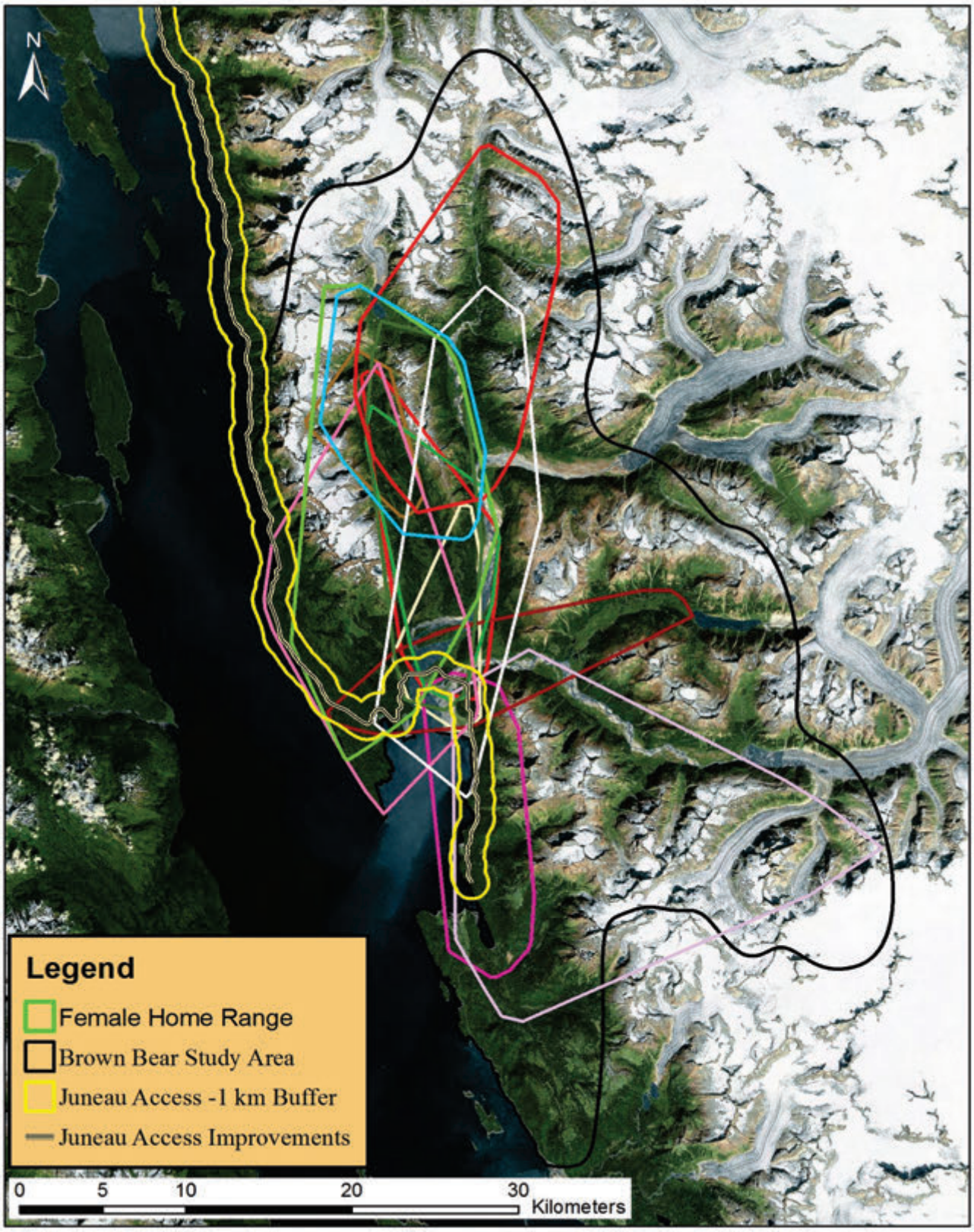

Figure B3. Home ranges (minimum convex polygon) of female brown bears in the Berners Bay study area during 2006 to 2010.

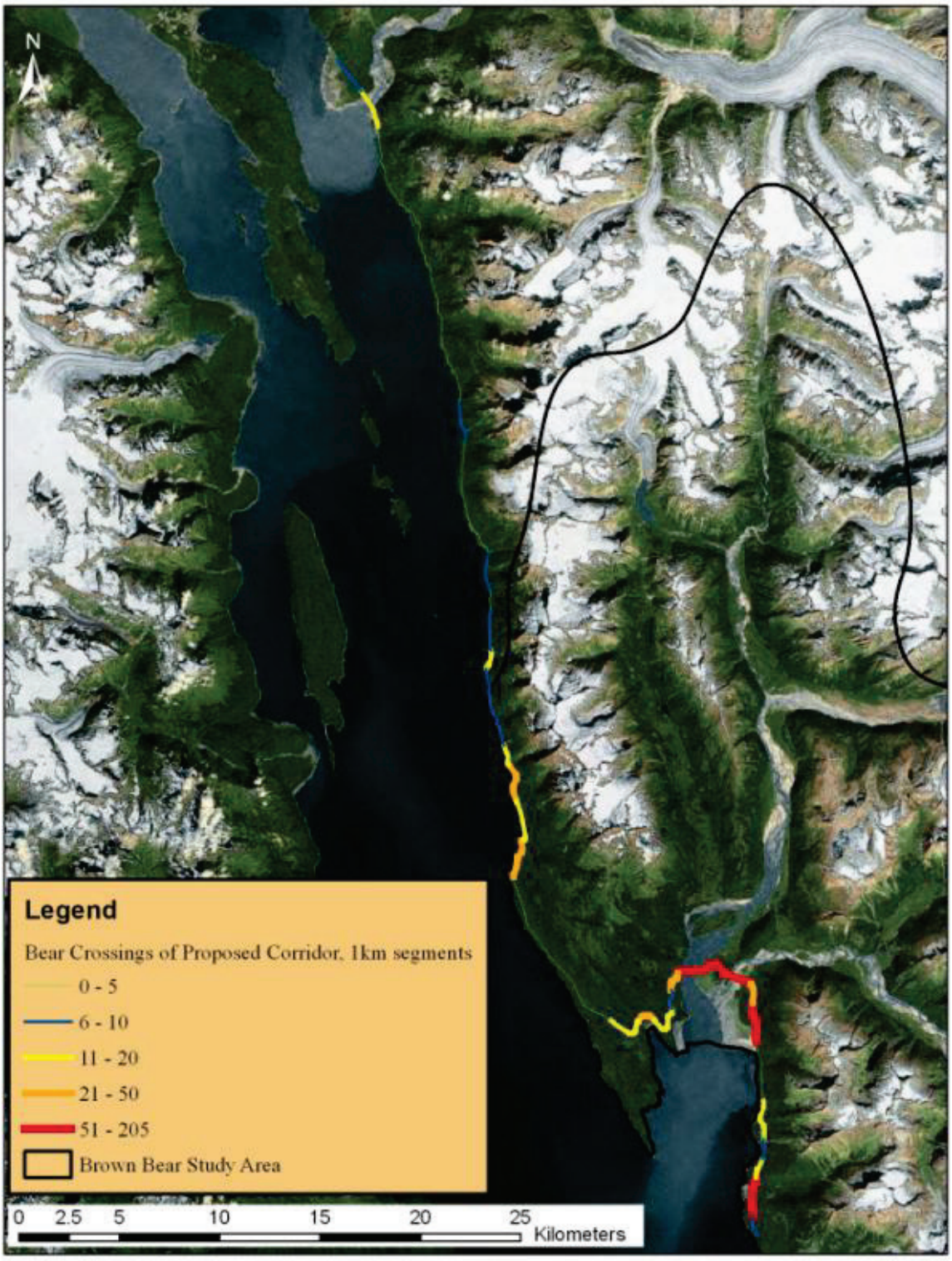

Figure B4. Frequency of brown bear movement paths crossing the proposed Juneau Access Improvements Project road corridor during 2006 to 2010.

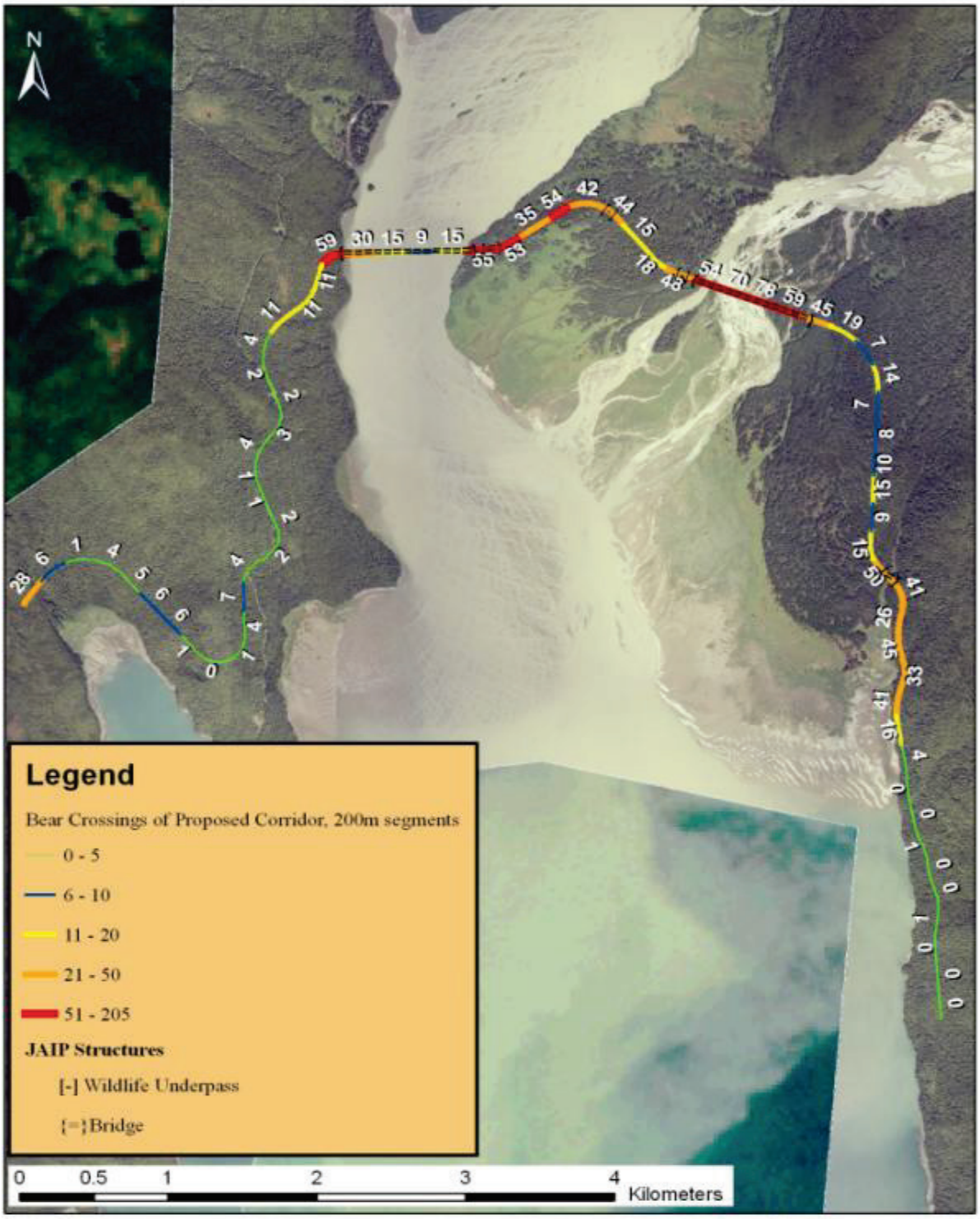

Figure B5. Frequency of brown bear movement paths crossing the proposed Juneau Access Improvements Project road corridor in and near the Berners Bay estuary during 2006 to 2010. The planned underpasses and the bridges are shown.

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Appendix C
Moose Maps
Selected from White et al. 2012a

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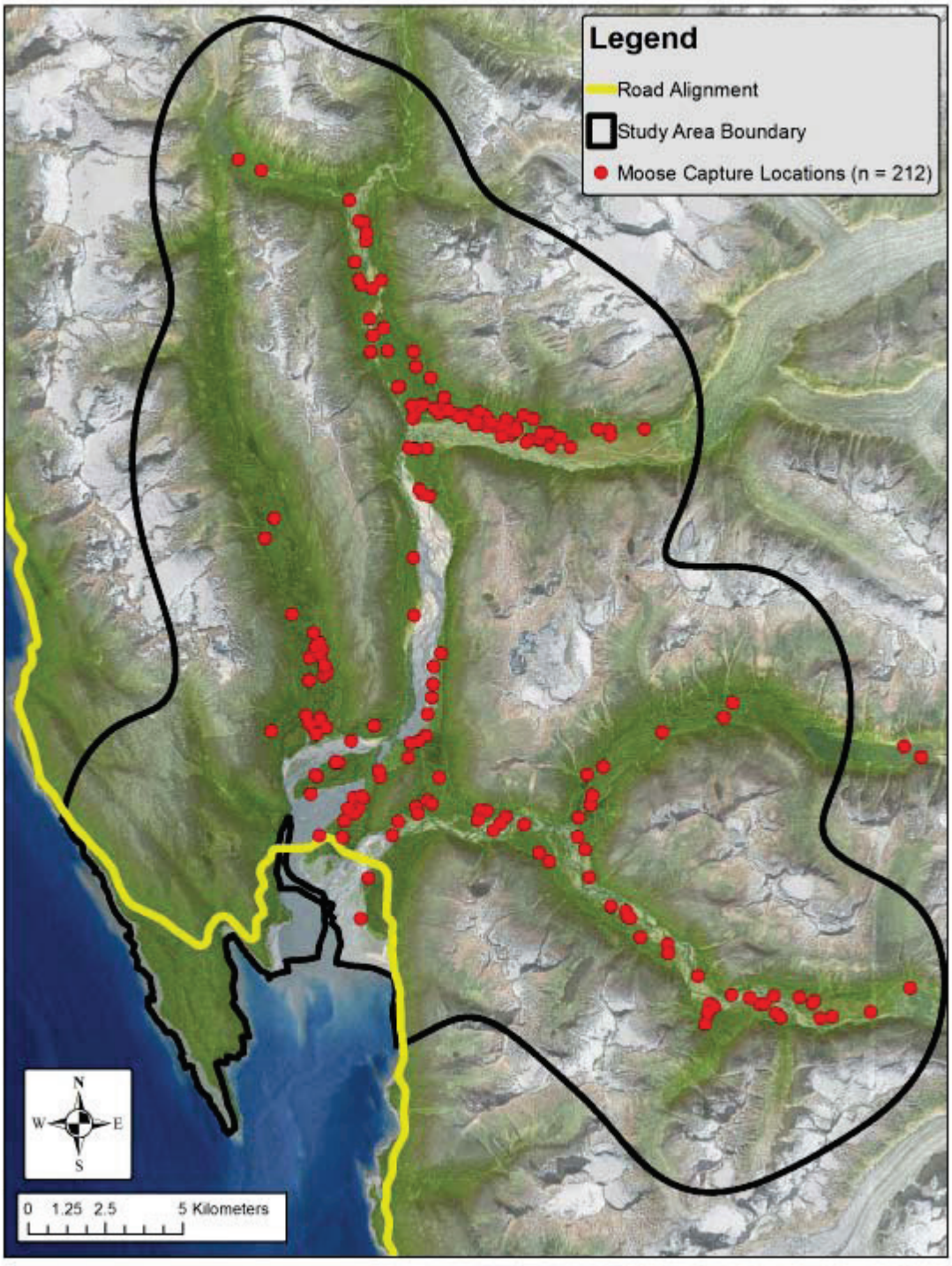

Figure C1: Location of moose captured and monitored in the Berners Bay study area, 2006-2011.

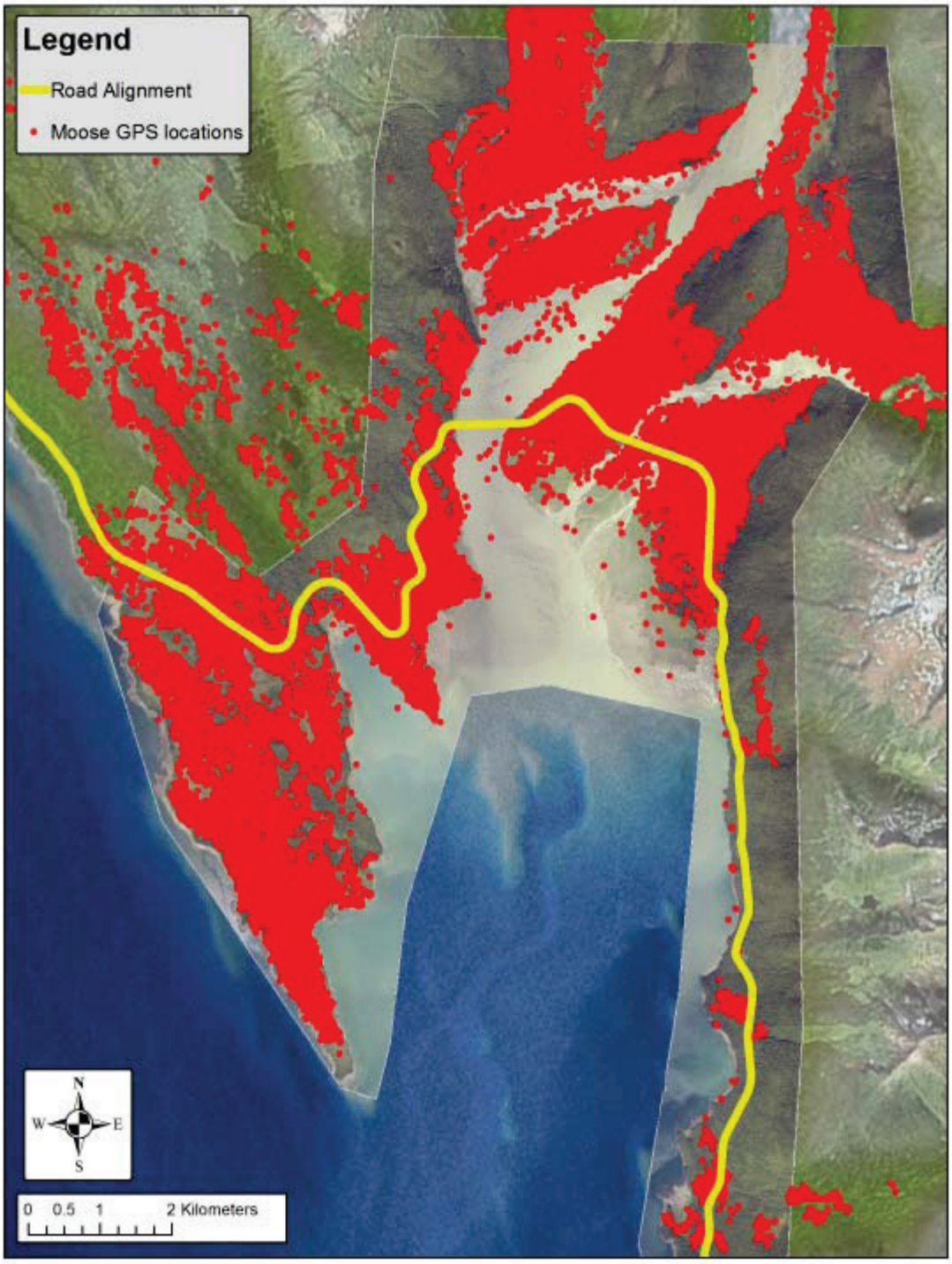

Figure C2: Map depicting all locations collected from GPS radio collared adult female moose in the lower Berners Bay area, 2006-2011

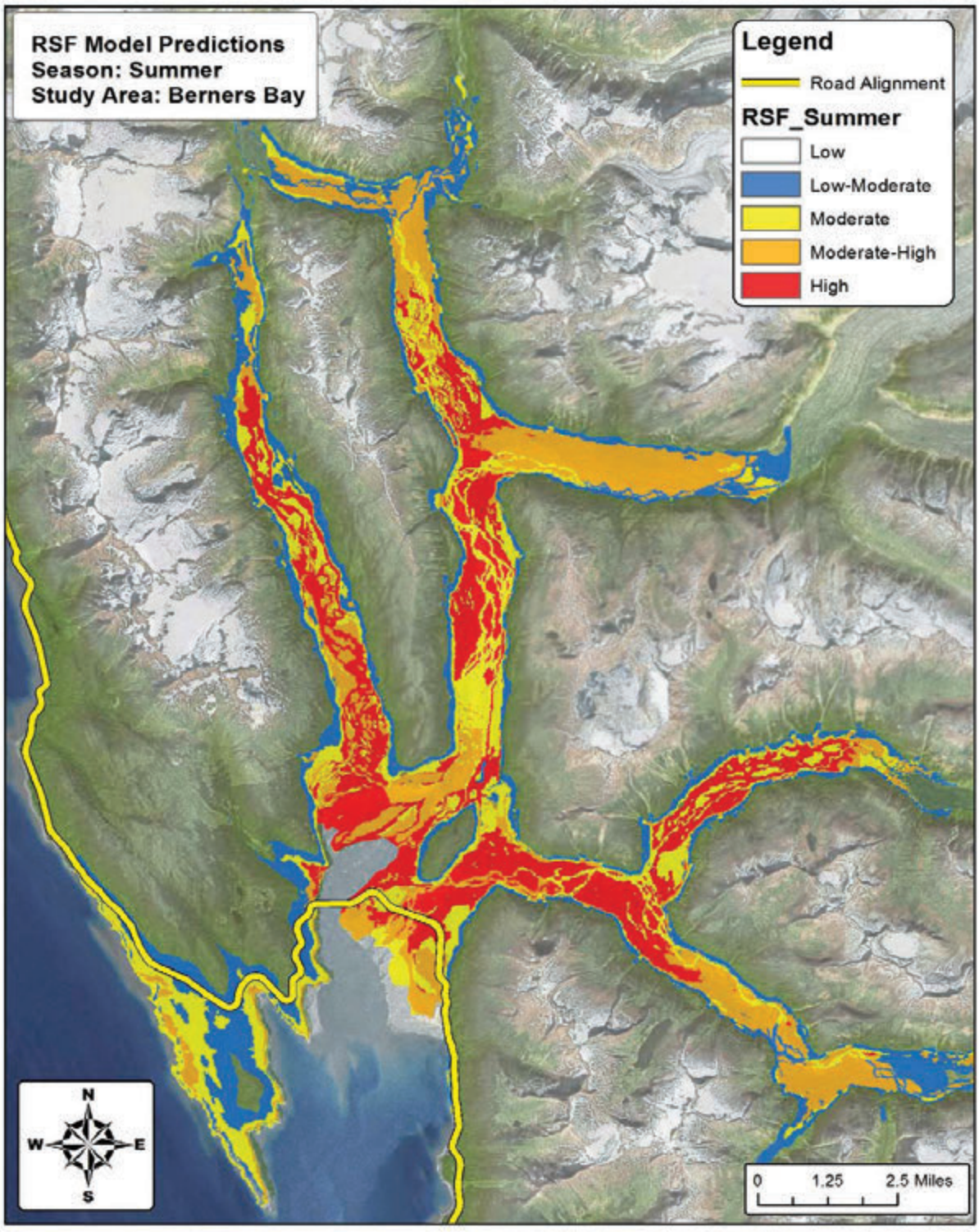

Figure C3: Map predicting relative probability of use for moose during summer in the Berners Bay study area, 2006-2011.

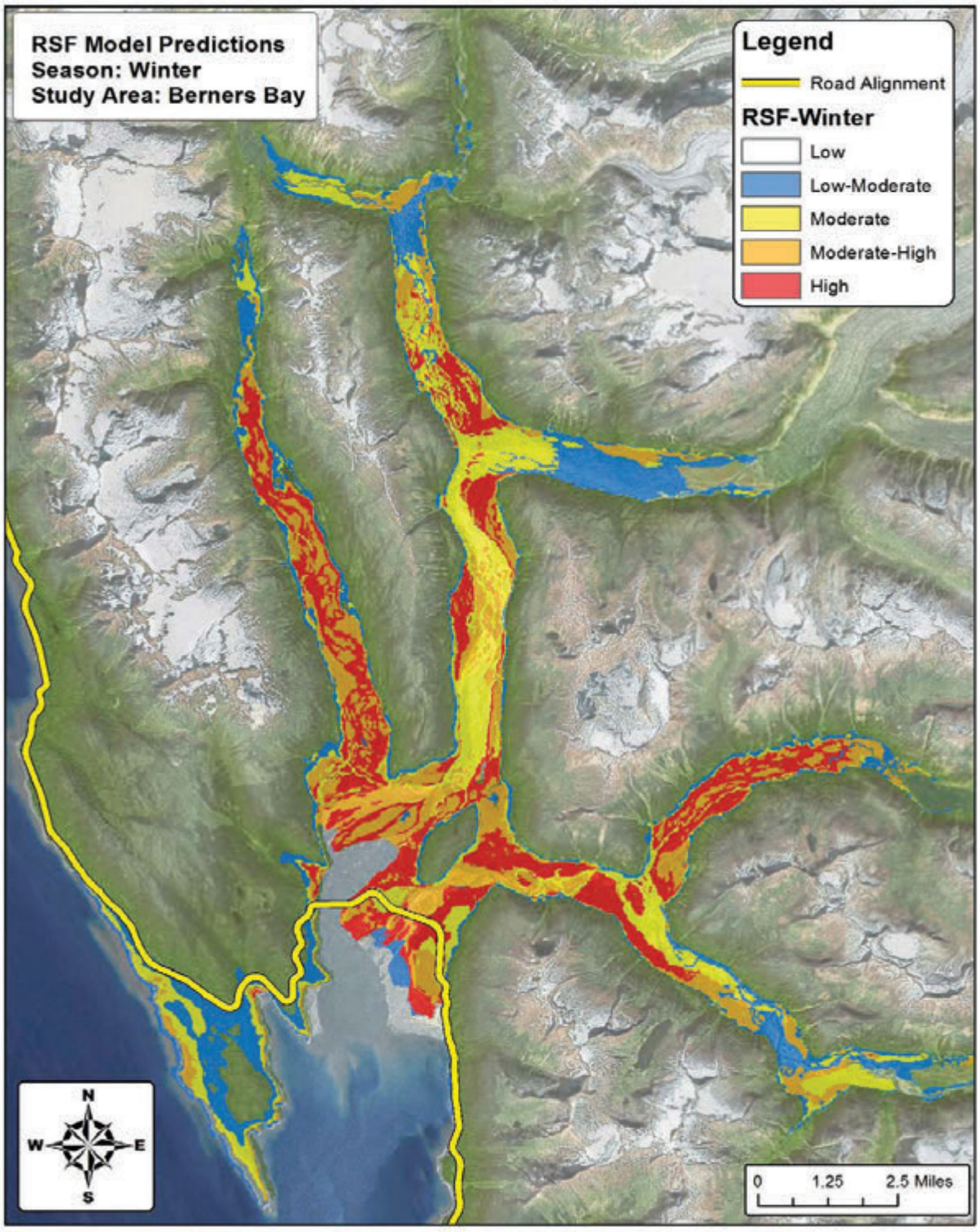

Figure C4: Map predicting relative probability of use for moose during winter in the Berners Bay study area, 2006-2011

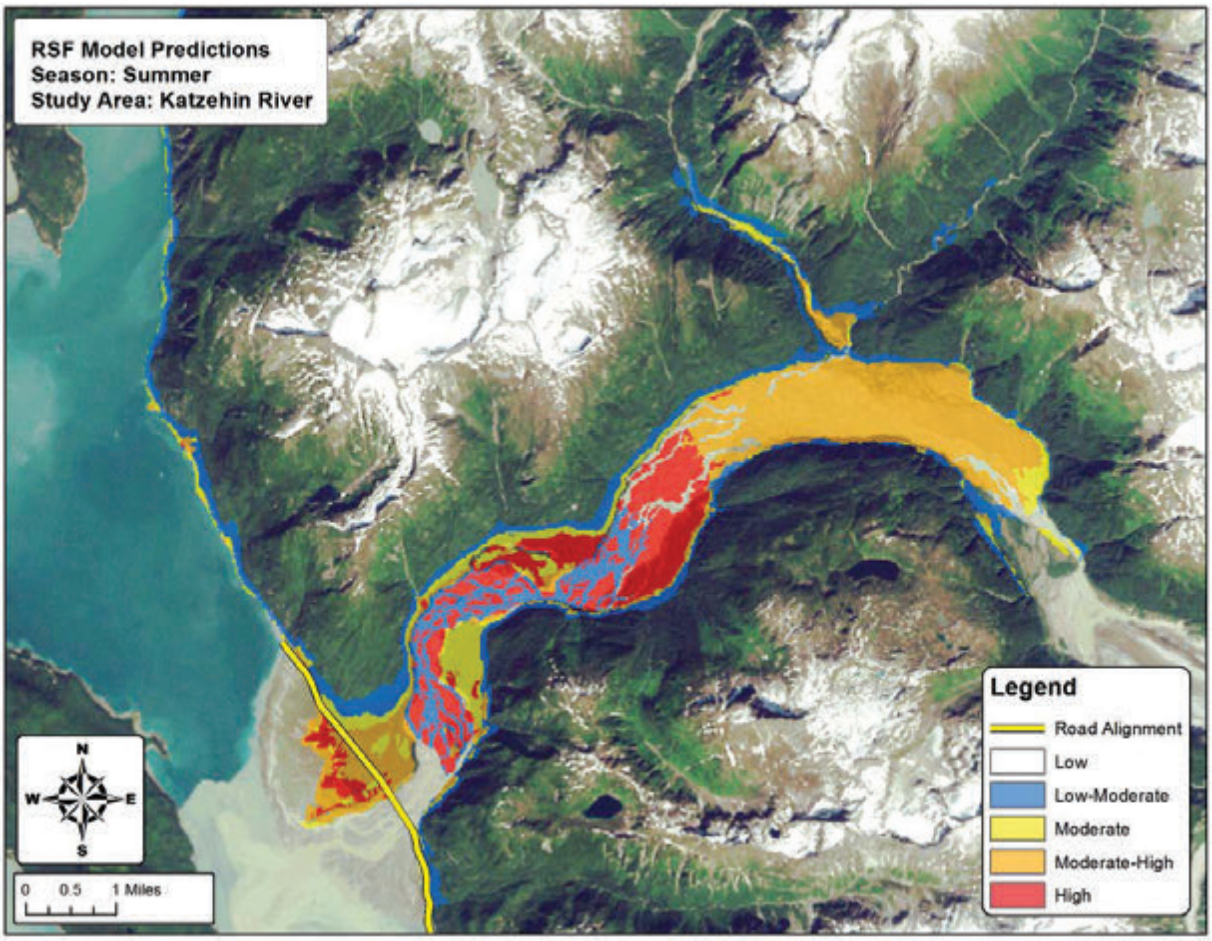

Figure C5: Map predicting relative probability of use for moose during summer in the Katzehin River area

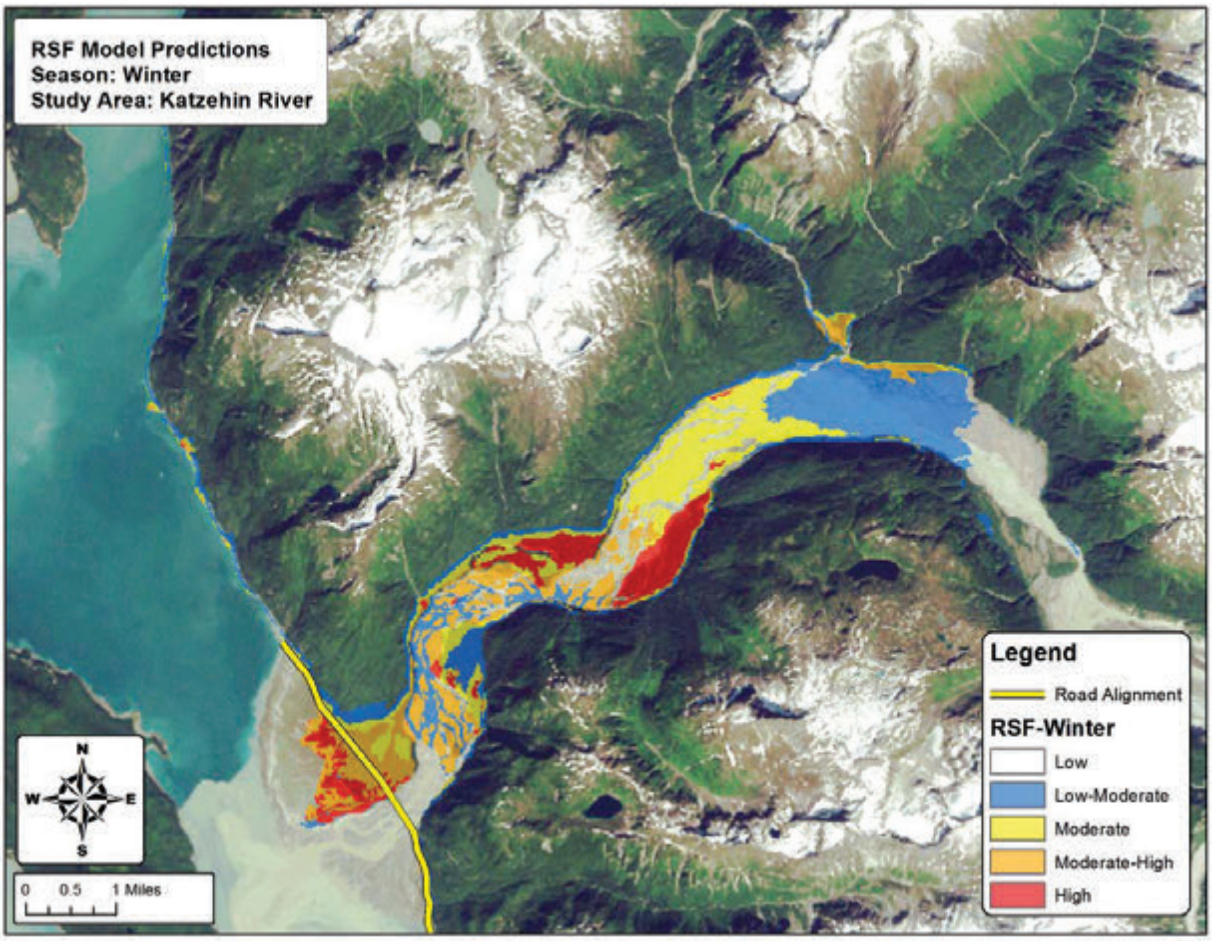

Figure C6: Map predicting relative probability of use for moose during winter in the Katzehin River area

Appendix D

Mountain Goat Maps

Selected from White et al. 2012b

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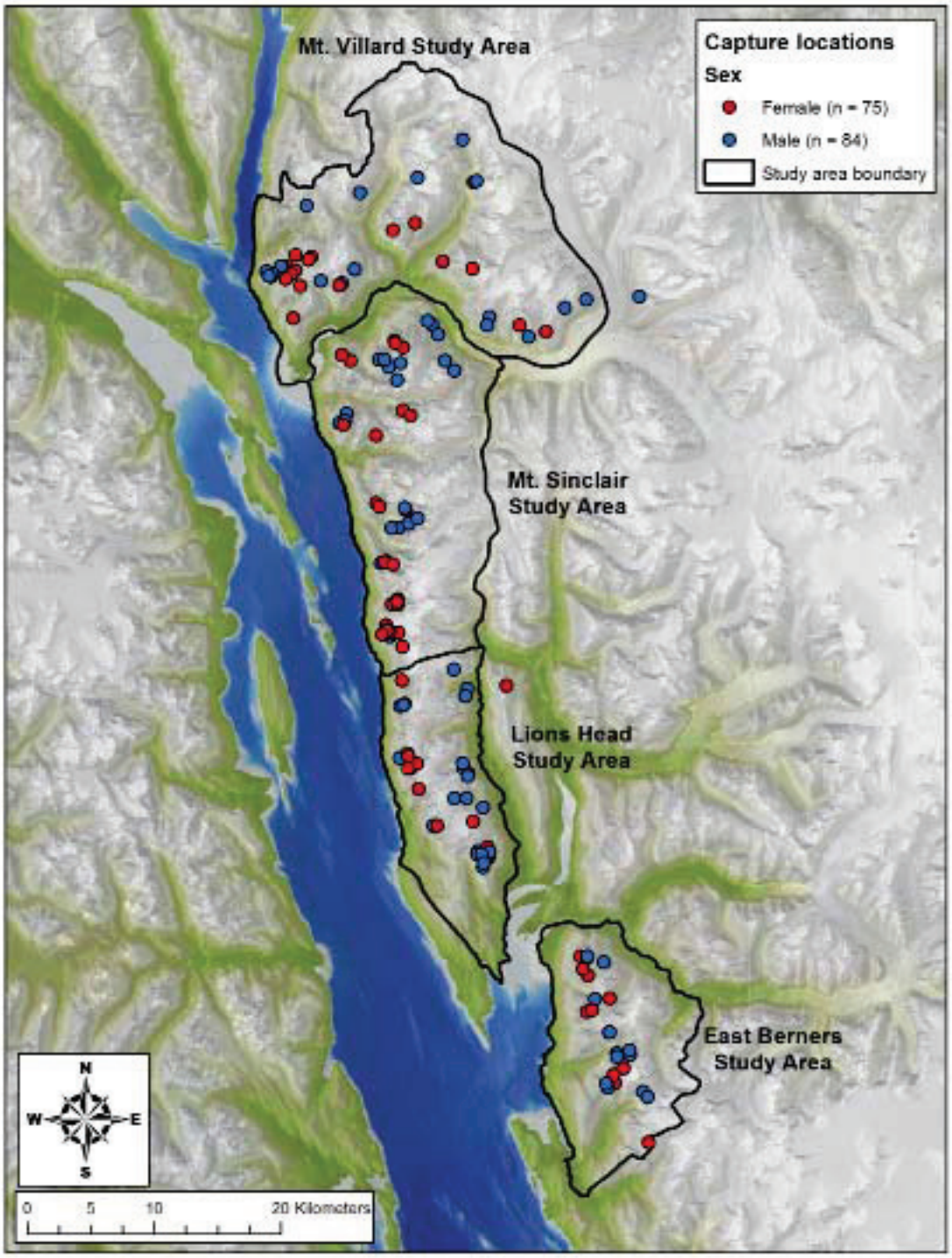

Figure D1: Locations of mountain goats captured and subsequently monitored in the Lynn Canal study area, 2005-2011

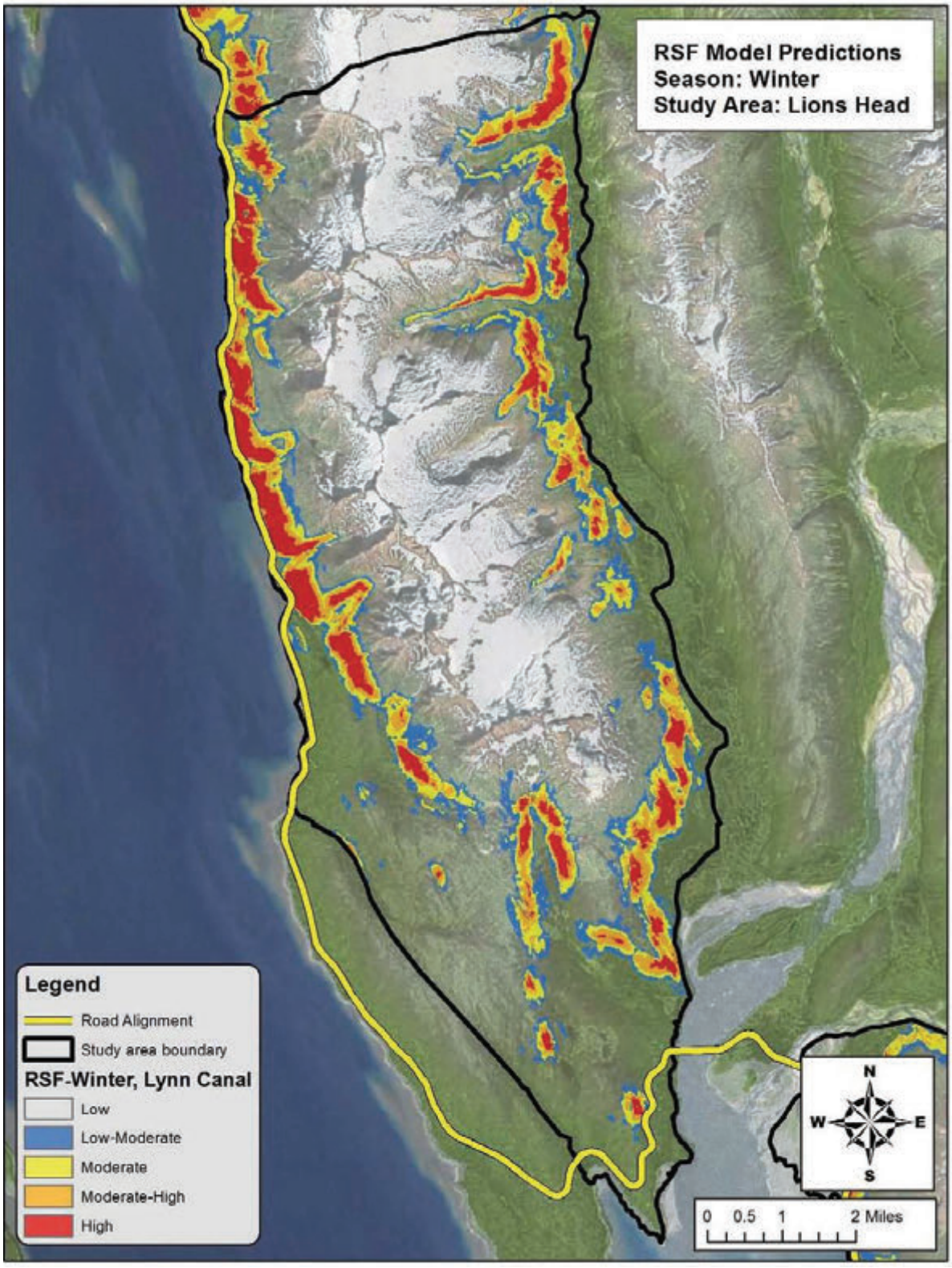

Figure D2: Map predicting relative probability of use for mountain goats during winter in the Lions Head study area

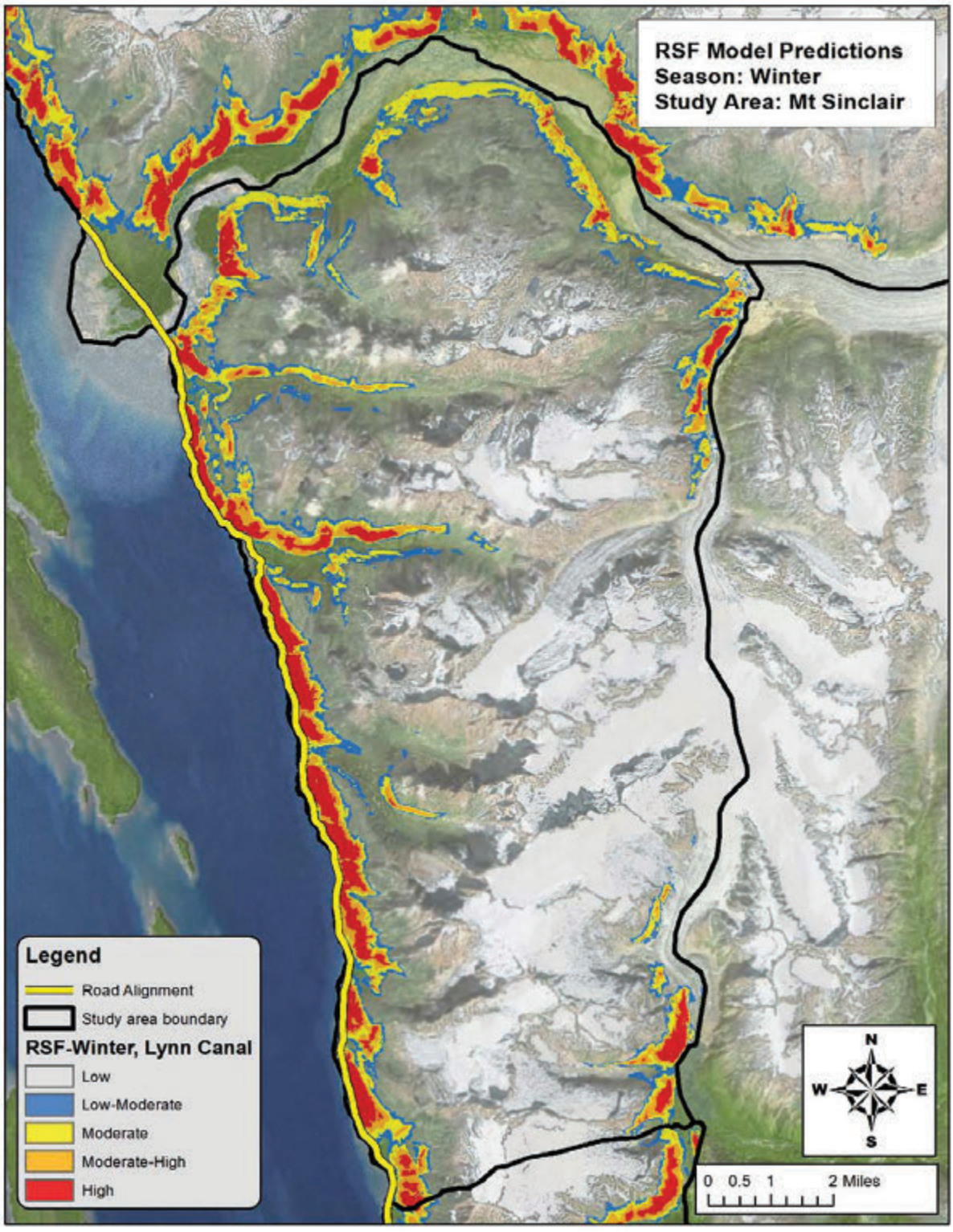

Figure D3: Map predicting relative probability of use for mountain goats during winter in the Mt. Sinclair study area

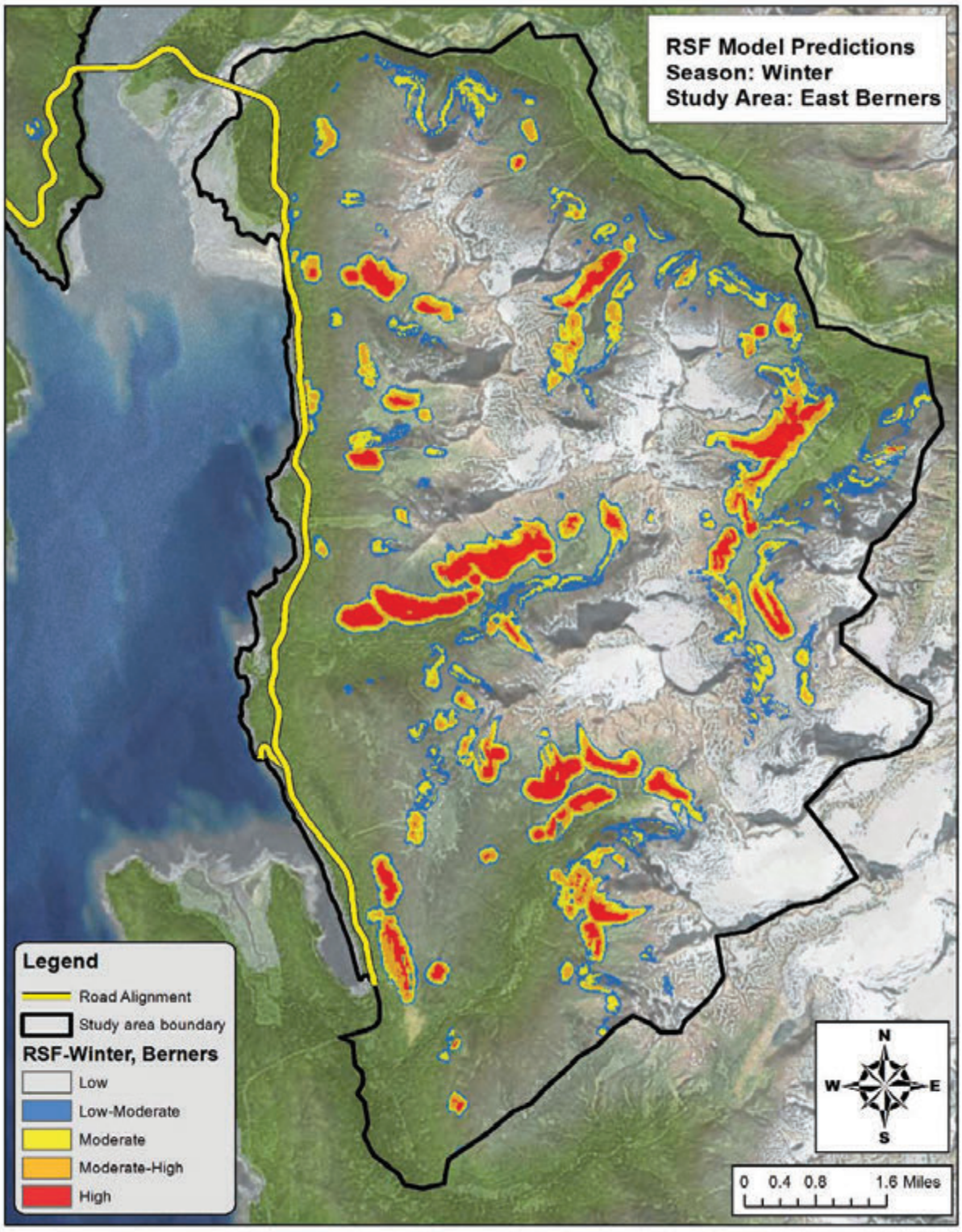

Figure D4: Map predicting relative probability of use for mountain goats during winter in the East Berbers Bay study area

Appendix E

Wolverine Maps

Selected from Lewis et al. 2012

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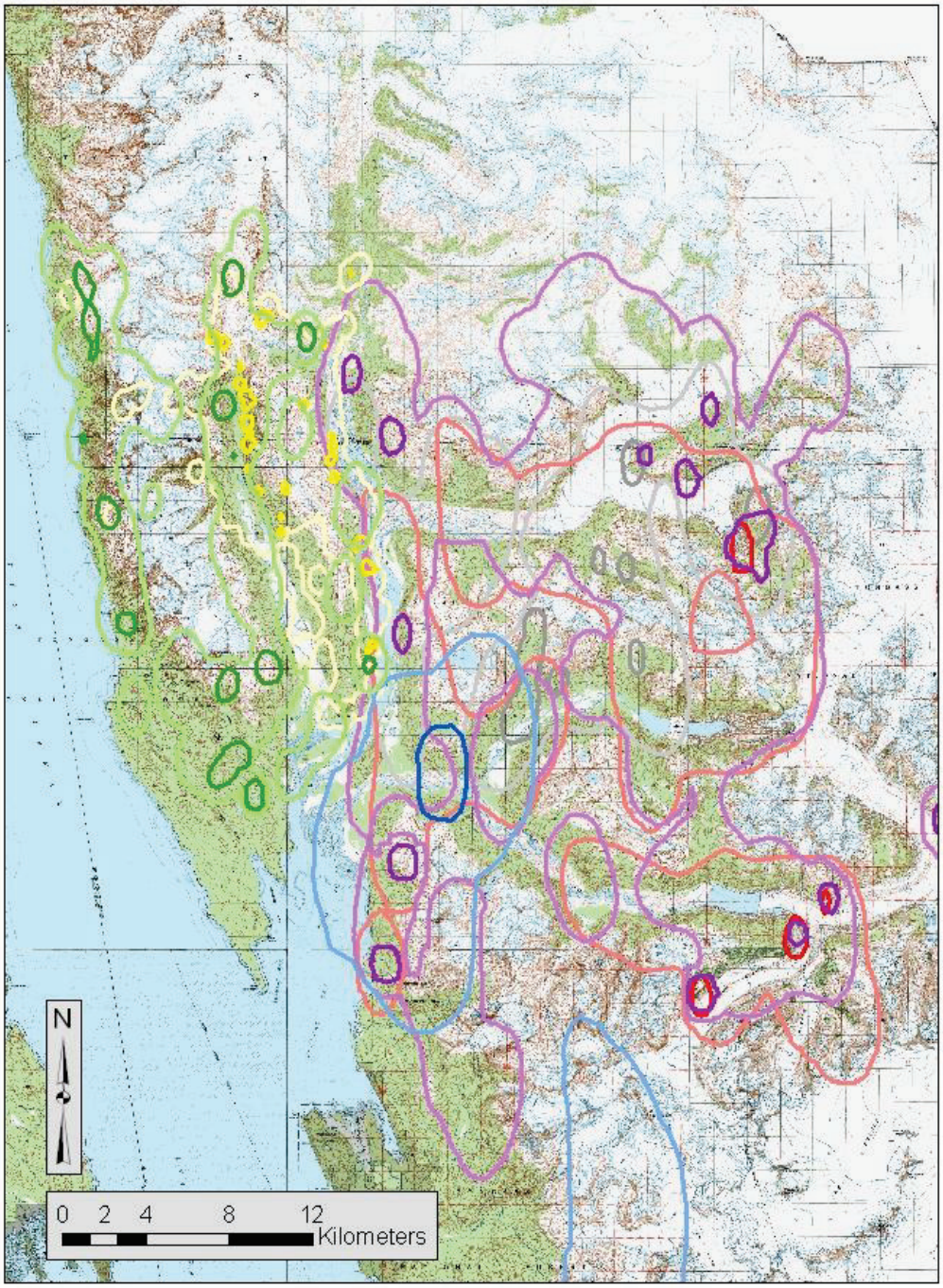

Figure E1. Use areas of 6 male wolverines in Berners Bay, Alaska. Colors indicate different animals: M1 = green; M2 = blue; M3 = yellow; M4 = purple; M5 = red; and, M7 = grey. Note, most of M2's use area is not shown as it is outside the Berners Bay study area.

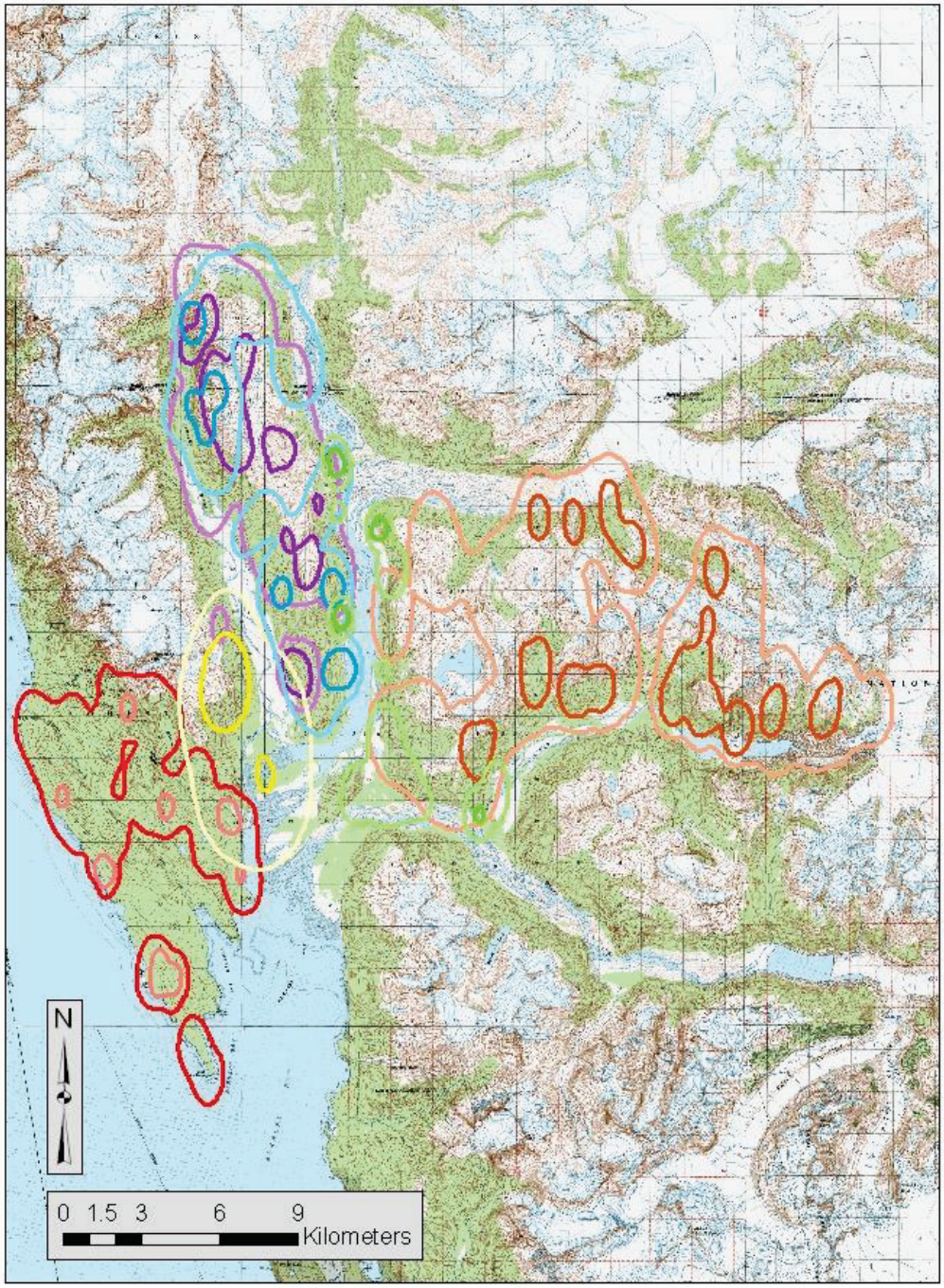

Figure E2. Use areas of 6 female wolverines in Berners Bay, Alaska. Colors indicate different animals: F1 = green; F2 = blue; F5 = yellow; F6 = purple; F7 = red; and, F8 = orange.