# 4 ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

This chapter describes the likely direct, indirect, and cumulative effects of proposed Juneau Access Improvement (JAI) Project alternatives on the social, economic, physical, and biological environments of Lynn Canal. A substantial amount of the information on the potential environmental effects of project alternatives presented in the 2006 Final Environmental Impact Statement (EIS) remains valid and[1] was carried forward in the Draft Supplemental Environmental Impact Statement (SEIS) as appropriate.

The environmental impact assessment presented in this chapter is based on the following technical reports and updates, as appropriate:

- *Development of Alternative 1B – Enhanced Service with Existing Alaska Marine Highway System (AMHS) Assets*
- *Revenues and Expenditures Report for Lynn Canal, Fiscal Years 2005–2015*
- *Marine Segments Technical Report*
- *Traffic Forecast Report*
- *Technical Alignment Report*
- *User Benefit, Life-cycle Cost, and Total Project Cost Analyses*
- *Land Use and Coastal Management Technical Report (now the Land Use Technical Report)*
- *Visual Resources Technical Report*
- *Socioeconomic Effects Technical Report*
- *Household Survey Report*
- *Snow Avalanche Report*
- *Hydrology and Water Quality Technical Report*
- *Noise Technical Report*
- *Initial Site Assessment Technical Report*
- *Essential Fish Habitat Assessment*
- *Wetlands Technical Report*
- *Anadromous and Resident Fish Streams Technical Report*
- *Wildlife Technical Report*
- *Bald Eagle Technical Report*
- *Steller Sea Lion Technical Report*
- *Air Quality Modeling Memorandum*
- *Karst Technical Report*
- *Cultural Resources Technical Report*

[1] To assist the reviewer, substantive changes to the 2014 Draft SEIS have been highlighted in gray.

The technical reports and their updates contain detailed analyses that are summarized in this chapter. With the exception of the *Household Survey Report*, *Karst Technical Report,* and the *Cultural Resources Technical Report,* all of the above-listed documents were updated or replaced entirely and appended to the 2014 Draft SEIS. This Final SEIS includes updates, revisions, and corrections to those appendices, as well as new appendices that respond to comments on the 2014 Draft SEIS.

This chapter begins with a discussion of the analytical methods used to evaluate potential project impacts. This discussion of methodology is followed by a discussion of the potential direct and indirect impacts of the no-build and build alternatives, the potential cumulative impacts of the proposed project, the relationship between the local short-term uses of the project area and the maintenance and enhancement of long-term productivity, and the irreversible and irretrievable commitments of resources that would be involved in the proposed project.

## 4.1 Methods for Analyzing Impacts

This section presents a summary of the methodologies used for impact assessment. Impacts have been evaluated based on the projected environmental changes caused by the build alternatives relative to Alternative 1 – No Action in 2025 and 2055, the planning years for this impact assessment. The Council on Environmental Quality regulations for implementing the National Environmental Policy Act (NEPA) define direct effects as those caused by the action and that occur at the same time and in the same place as the action (40 Code of Federal Regulations [CFR] 1508.8). Indirect effects are caused by the action and occur later in time or farther removed in distance, but are still reasonably foreseeable (40 CFR 1508.8). Cumulative effects on the environment can result from the direct and indirect effects of an action in combination with other actions over time (40 CFR 1508.7). This chapter addresses direct and indirect impacts potentially resulting from the individual alternatives in Sections 4.2 through 4.7. Construction impacts for all alternatives are discussed in Section 4.8 and cumulative impacts are discussed in Section 4.9.

### 4.1.1 Land Use

The impact assessment approach for land use is the same as the approach that was used for the 2006 Final EIS. Information has been updated based on the *Land Use Technical Report* (Revised Appendix DD). The evaluation of impacts to land uses was based on a comparison of the project alternatives and temporary construction facilities with land use plans and policies. Potential improvements to existing ferry terminal facilities are not addressed in the impact analysis because no land use changes would occur at those locations.

Note: In order to assess the potential impact on land ownership, the land use assessment evaluates a 300-foot-wide corridor where alternatives would traverse federal or State lands, as this is the typical width the Alaska Department of Transportation and Public Facilities (DOT&PF) uses for construction.

**Roadless Areas as a Resource** – Roadless areas are a resource with certain characteristics and with potential for future wilderness designation by Congress. The USFS uses nine "Roadless Area Characteristics," identified in regulations (the Roadless Rule—36 CFR 294.11), to describe the resources or features that are present in the Inventoried Roadless Areas (IRAs). For this assessment, potential impacts of project alternatives on roadless areas were evaluated on the basis of their effects to these characteristics. The nine characteristics are described in

Section 3.1.1.1. Because most characteristics (e.g., topics related to soil, air, water, plants, animals, and recreation) are addressed elsewhere in this Final SEIS (i.e., other than the land use sections), the evaluation is cross-referenced to those specific sections and their impact assessments. Revised Appendix DD (*Land Use Technical Report*) provides additional information on Roadless Areas.

### 4.1.2 Visual Resources

The impact assessment approach for visual resources is the same as the approach that was used for the 2006 Final Environmental Impact Statement (EIS). Information has been updated based on the *2014 Update to Appendix G – Visual Resources Technical Report* (see Appendix Z of the Draft SEIS) and *2017 Errata* to the *2014 Update to Appendix G – Visual Resources Technical Report* (see Appendix Z of this Final SEIS). The visual impact assessment focused largely on the highway alignments included in project alternatives because improved ferry service would not alter landscape quality except in localized areas where new alternative ferry terminals could be constructed. Visual inventories were based on the existing Tongass National Forest database. Potential impacts of project alternatives on visual resources were based on management directives in the 2008 *Tongass Land and Resource Management Plan* (TLRMP), which has been superseded by the 2016 TLRMP. With respect to visual impact assessment, the 2016 TLRMP continues to incorporate the Scenery Management System of the 2008 TLRMP; therefore, the visual resources analysis presented in the 2014 Draft SEIS remains valid. The analysis focuses on the (Scenic Integrity Objectives (SIOs) of Land Use Designations (LUDs) adjacent to the proposed transportation corridor (i.e., the Transportation and Utility Systems [TUSs] LUD of the 2008 TLRMP, represented by the Transportation Systems Corridors [TSCs] of the 2016 TLRMP). A field review was conducted in the summer of 2003 to obtain photographs to develop visual simulations of the alternative highway alignments. The viewpoints for field photography, as well as the final viewpoints for visual simulations, were coordinated with the USFS. The impact assessment compared potential changes in visual quality in sensitive viewsheds resulting from proposed project alternatives.

### 4.1.3 Historical and Archaeological Resources

The method for assessing impacts on historical and archaeological resources is the same as the method that was used for the 2006 Final EIS. This Final SEIS incorporates updated information that has become available since that time. The Area of Potential Effect (APE) of project alternatives was established in consultation with the State Historic Preservation Officer (SHPO). Field surveys were conducted on areas of the APE with a high probability of containing cultural resources. Areas with a low potential for containing cultural resources were surveyed by shoreline observations and aerial photography. FHWA made a determination of the eligibility for the National Register of Historic Places (NRHP) of resources found during the field surveys. Potential disturbance or visual modification that could impact the cultural integrity of resources eligible for or on the NRHP was evaluated for each proposed project alternative, with additional consultation as required by the revised regulations for implementing the National Historic Preservation Act.

### 4.1.4 Socioeconomic Resources

The impact assessment approach for socioeconomic resources is the same as the approach that was used for the 2006 Final EIS. It addresses potential project-related impacts on the economy, public utilities, and the social environment of Lynn Canal. The socioeconomic analysis presented in the 2006 Final EIS has been updated using the *Socioeconomic Effects Technical Report* (Revised Appendix EE), which relied on a combination of primary and secondary research. Primary research included interviews with Juneau, Haines, and Skagway businesses as well as government and other community representatives. Secondary research used for the socioeconomic analysis included collection of published data and information prepared by local, State, and federal agencies as well as private-sector entities. Except where stated otherwise, economic effects are presented in 2016 dollars. These figures are not used to support other financial analyses of the project that were done for different years. By the nature of socioeconomic projections, the figures presented are relatively broad estimates and should be used to compare among alternatives instead of as absolute projections of dollar amounts.

### 4.1.5 Transportation

A new traffic forecast analysis was prepared for this Final SEIS. The analysis began with an overview of existing (base year) traffic within Lynn Canal. The available data for ferry travel, air travel, and freight traffic were summarized to provide a basis for calibrating the subsequent travel models. Note that the most recent data available were for the 2015 calendar year. Key pieces of data include the number of passengers (air and ferry) and vehicles traveling in Lynn Canal, average vehicle occupancy, average air and ferry fares, summer and winter seasonal factors, and the proportion of travelers traveling on the Juneau-Haines or Juneau-Skagway route.

There were two different types of models developed: a total demand model and a choice model. The total demand model predicted the "unconstrained"[2] potential volume for vehicular travel in Lynn Canal. This volume is the forecasted amount of traffic that could occur if a hypothetical highway existed between Juneau, Haines, and Skagway. Each of the JAI Project alternatives would capture only a fraction of this demand based on service characteristics of each alternative. The total demand model was created using household travel survey information and highway traffic counts.

Choice models were developed to predict the percentage of total demand that would utilize each alternative. For the JAI Project alternatives, the choice models calculated the percentage of total demand that would make a trip to or from Juneau based on the characteristics of each alternative. Inputs to the choice models included auto travel time, auto cost, ferry travel time, ferry cost, ferry delay (the delay associated with wait time, check-in time, load time, and unload time), and service index (a measure of each alternative's relative travel convenience). The choice demand models produced a 2015 travel forecast. The forecast volumes were then adjusted to the base year (2025) and forecast year (2055) based on projected population growth in Juneau, Haines, and Skagway.

All traffic demand models attempt to predict future demand based on assumptions and data available in the present. To the extent that they are predicting a future, unknown condition, all demand models present a degree of uncertainty. For further discussion of the assumptions and

[2] The word "unconstrained" is used to indicate what demand would be if travelers could drive directly to/from Juneau on a road because travel by road has the lowest cost and is more convenient compared with any travel alternative.

analysis used in developing the traffic forecast, see the *Traffic Forecast Report* (Revised Appendix AA).

For this Final SEIS, transportation impacts are evaluated from an economic perspective by looking at user benefits, life-cycle cost, and total project life cost (also known as cost of ownership). The analyses of transportation costs and economic benefits presented in the 2006 Final EIS have been updated in the *User Benefit, Life-cycle Cost, and Total Project Cost Analyses* (Revised Appendix FF). User benefits were estimated by calculating the user benefits and costs for each alternative in comparison to the user benefits and costs of Alternative 1 – No Action. The cost-benefit analysis used for the SEIS is a reasonable approach for comparing the economics of the alternatives, but is only one consideration among an array of others addressed qualitatively and quantitatively in the SEIS. The economic analyses presented in the SEIS are not intended to represent a full measure of all benefits and costs associated with project alternatives. In fact, benefit-cost ratios described in Revised Appendix FF of this Final SEIS are based narrowly on user (traveler) benefits alone and do not consider a wide range of other potential household, commercial, industrial, and community benefits associated with improved Lynn Canal access. The SEIS addresses many topics qualitatively because they are difficult and controversial to monetize.

The user costs included in the analysis were the costs of travelers' travel time; Alaska Marine Highway System (AMHS) fares; vehicle operating, maintenance, and ownership costs; and accident costs. The life-cycle cost analysis addresses all costs associated with the project (e.g., construction, operation, and maintenance), regardless of who pays. It does not evaluate any benefits. Future costs are brought back to the year of analysis using a discount rate; a discount rate is based on the concept that future dollars are less valuable than current dollars. Stated from the present perspective, current dollars could be invested, would grow more than the inflation rate, and could be used to pay future costs. In a life-cycle analysis, alternatives that have low initial costs but high future maintenance and/or construction cost look less expensive than alternatives with high initial costs and relatively low future costs. Unlike private industry, the State does not allocate and budget for future costs; funds are appropriated every year. To evaluate the total project costs that will have to be appropriated over the project's life, a total project life cost analysis provides a summation of all annual capital and operating expenditures for each alternative, expressed in the present year with no discounting of future costs. Construction costs are based on 2016 unit prices. Each alternative would generate revenues based on ridership and ferry fares. To look at the likely costs to the State separate from these user fees, a total project life cost minus projected revenue is also provided.

For all cost analyses, construction was assumed to begin in 2019 and be completed by 2025. A 30-year post-construction operation period was evaluated, resulting in a 36-year analysis period (2019–2055) for each alternative.

### 4.1.6 Geology

The impact assessment for geology considered both the impacts of project alternatives on geologic resources and the potential effects of geologic hazards on project facilities. As indicated in Section 3.2.1.1, the geologic features of concern in the project area include karst on the west side of Lynn Canal and geologic hazards associated with avalanches and landslides.

Geologic hazards associated with alternative project facilities were identified in the *Reconnaissance Engineering Report* (DOT&PF, 1994b), *Final Report, Lynn Canal Highway, Phase I, Zone 4 Geotechnical Investigation, State Project Number 71100* (Golder Associates, 2006), and *Revision of Geologic Hazard Summary – Juneau Access Improvements Supplemental Environmental Impact Statement* (Golder Associates, 2012). The *2017 Update to Appendix D – Technical Alignment Report* (see Appendix Z of this Final SEIS) provides updated information on geological hazards, potential impacts on the project alternatives, and potential mitigation. Further geotechnical engineering investigations would be done during engineering design if a build alternative were selected for the project. This Final SEIS provides an assessment of the effects of those hazards on alternative project facilities.

#### 4.1.6.1 Karst

The karst impact assessment was conducted in four steps that take into account the TLRMP, the Tongass Plan Implementation Team vulnerability criteria, and management objectives for karst resources. Those steps are:

- **Step 1 – Identification of Potential Karstlands and Features** – This step involved the compilation and review of available information and preliminary characterization to identify potential karst terrains and features.
- **Step 2 – Field Inventory of Karst Resources** – On completion of Step 1, a field inventory of karst resources and potential karst features was completed for the segments of the West Lynn Canal Highway alignment (Alternative 3) determined to be underlain by carbonate bedrock.
- **Step 3 – Delineation of Karst Hydrologic System and Catchment Area** – Concurrent with Step 2, hydrologic information was collected and synthesized with other data to define, to the extent necessary and practicable for the proposed land use, the karst hydrologic system and approximate recharge or catchment areas along West Lynn Canal. The objective of this step was to understand the karst hydrologic system well enough to assess and characterize potential project-related impacts to down-gradient resources.
- **Step 4 – Assessment of Vulnerability to Management Activity** – Step 4 involved the processing and synthesizing of the data from Steps 1 through 3 to assess karst sensitivity to the relevant project alternatives and adjustment of the alignment where feasible.

#### 4.1.6.2 Avalanche

The avalanche hazard associated with the highway alternatives for the proposed project was assessed in terms of the avalanche hazard index (AHI). The AHI is a standard numerical scale index representing the probability of encounters between avalanches and vehicles on a highway and the likely resulting damage. It was developed in 1974 in Canada by the Avalanche Task Force and is published in its current form by Peter Schaerer (1989). The AHI provides a uniform standard for comparing the probability of an avalanche from one avalanche path to another. The index is also useful for comparing highway avalanche hazards from one region or snow climate to another. The unmitigated AHI was determined for each alternative and compared to several highways in North America. The North American standard for this hazard was used to determine appropriate mitigation measures, and a mitigated AHI was calculated. Updated information related to avalanche hazard from the *2017 Update to Appendix J – Snow Avalanche Report* (see Appendix Z) has been incorporated into the alternatives analysis where appropriate.

#### 4.1.6.3 Landslides

The impact assessment for landslide and slope stability was completed by conducting surficial geologic mapping and hazard mapping of specific geologic hazards including rock slides, debris flows, rockfall, and other rock and slide hazards, supported by the use of light detection and ranging imagery, aerial photos, and digital mapping tools. Because Alternative 2B was advanced as the preferred alternative in the 2006 Final EIS, the geologic hazard studies (Golder Associates, 2006; 2012) focused on the East Lynn Canal Highway corridor. Detailed rock structure mapping was completed at 117 locations for proposed large rock cuts, fills, and bridge abutments, or where mitigation would be needed for rockfall hazard. Extremely large boulders were noted, as these may present challenges in removal and compaction of fill for road grading. However, optimal methods of rockfall mitigation may be reached through a variety of active and passive forms. Rockfall hazards can be mitigated through protection and stabilization tactics, which could include special blasting, hand scaling, and rock bolting as well as rockfall catchment ditches.

The rockfall hazard rating system used was based on event frequency, material volume, elevation of the source material, length of the alignment exposure (total length of the highway estimated to be at risk from the hazard), and predictability, which produced preliminary Geologic Hazard Rating System values (developed by Golder Associates) and Hazard Index Number (adapted from the U.S. Department of Transportation) for each potential hazard. Geologic hazard maps were produced summarizing the findings.

### 4.1.7 Hydrology and Water Quality

The impact assessment approach for hydrology and water quality is the same as the approach that was used for the 2006 Final EIS. Information was updated based on the *2014 Update to Appendix K – Hydrology and Water Quality Technical Report* (see Appendix Z in the Draft SEIS) and *2017 Errata* to the *2014 Update to Appendix K – Hydrology and Water Quality Technical Report* (see Appendix Z of this Final SEIS).

Where project alternatives would encroach on base floodplains, each alternative was evaluated for the following based on FHWA regulations in 23 CFR 650.111:

- Flooding risks
- Impacts on natural and beneficial floodplain values
- Potential for incompatible floodplain development
- Measures to minimize floodplain impacts
- Measures to restore and preserve natural and beneficial floodplain values

As indicated in Section 3.2.3, the Federal Emergency Management Agency has not mapped floodplains in the study area. A floodplain analysis was conducted by DOT&PF as part of the Reconnaissance Engineering Study (DOT&PF, 1994b). That analysis was used to evaluate flood risks and potential impacts of project alternatives to natural and beneficial floodplain values.

The potential impact of project alternatives on local surface water and groundwater hydrology was evaluated based on preliminary engineering hydraulic design for project alternatives.

The analysis of potential water quality impacts evaluated the pollutants from highway stormwater runoff and accidental spills that could enter surface water drainages crossed by

project alternatives. The potential impacts of the disposal of sanitary waste generated at proposed new ferry terminals and by ferries were also evaluated. Alaska Department of Environmental Conservation (ADEC) Water Quality Standards (18 Alaska Administrative Code [AAC] 70, as amended) (AWQS) and the ADEC Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances were used to evaluate water quality impacts.

### 4.1.8 Air Quality

The Clean Air Act prohibits federal actions that delay attainment of any air quality standard. This Act requires a review of all planned stationary sources of air pollution and transportation projects in areas that do not attain National Ambient Air Quality Standards (NAAQS) (non-attainment areas) to ensure that they will not inhibit the ability of the State to ultimately achieve attainment of those standards. The review for stationary sources and other non-transportation emission sources is known as "general conformity," and the review of transportation projects is termed "transportation conformity." Because the proposed project is in an area that is either unclassified or classified as being in attainment by the Environmental Protection Agency (EPA), a conformity analysis is not required.

The pollutants of concern associated with the JAI Project are elevated concentrations of carbon monoxide (CO) and particulate matter with aerodynamic diameter less than or equal to 10 micros ($PM_{10}$). Simplified CO modeling was completed for the 1997 Draft EIS by first determining the CO emission factors using the EPA MOBILE 5 computer model. CO concentrations (unadjusted) were then determined using standard methods.

No air quality monitoring data are available for the study area. Therefore, background CO levels of 1 part per million (ppm) for the rural section and 2 ppm for the more urbanized areas near the endpoints of the project were then added to the modeled CO concentrations for comparison to the State and federal standards (1-hour CO average). The background CO concentrations were assumed based on ADEC input for the 1997 Draft EIS *Air Quality Analysis Technical Report* and guidance provided by the FHWA in *Appropriate Level of Highway Air Quality Analysis for a Categorical Exclusion, Environmental Assessment/Finding of No Significant Impact, and EIS* (FHWA, 1986).

The CO emission model was rerun using traffic data provided in the 2004 *Traffic Forecast Report* (Appendix C of the 2005 Supplemental Draft EIS) and emission results were presented in the 2004 *Air Quality Modeling Memorandum* (Appendix T of the 2006 Final EIS). The *2017 Update to Appendix T – Air Quality Modeling Memorandum* (in Appendix Z of this Final SEIS) determined that the updated traffic volume forecasts (see Revised Appendix AA, *Traffic Forecast Report*) are similar to traffic volume forecasts used in the 2004 air quality modeling and would generally result in projected emissions and pollutant concentrations similar to those presented in the 2006 Final EIS and, therefore, no new air quality modeling was necessary. The following paragraphs describe the 2004 air quality modeling.

Emission factors were determined using the updated MOBILE 5B computer model. Although EPA had also developed a newer emission factor model using the MOBILE 6 software and an updated CALINE 4 dispersion model, for the purposes of the 2004 analysis, no significant differences were noted during comparison runs of the older and newer models, other than those due to differences in inputs for traffic volume, temperatures, and highway design speeds.

The updated 2004 model simulation included CO estimates for the construction year (2008) and

the design year (2038) using the peak week average daily traffic (ADT) data predicted for those two years, as described in the 2004 *Traffic Forecast Report* (Appendix C of the 2005 Supplemental Draft EIS). Where possible, the most conservative values were assumed for the model inputs so that a worst-case scenario for CO could be developed (highest value). A travel speed of 40 mph was used for air quality modeling for new highway segments to provide a conservative (worst-case) estimate of air quality impacts. A minimum distance of 50 feet from the roadway centerline was also modeled using worst-case meteorological conditions.

Project-related $PM_{10}$ concentrations were evaluated on a qualitative basis by comparing project-related traffic volumes to the traffic volumes in a similar environment where $PM_{10}$ measurements have been made.

Results of the 1997 and 2004 analyses are compared to the Alaska Ambient Air Quality Standards (AAAQS) (18 AAC 50.010), which adopt the federal NAAQS promulgated in 40 CFR 50.8.

DOT&PF analyzed ferry vessel emissions for each of the alternatives and the potential impacts of those emissions on ambient air quality at port and terminal locations. Total annual emissions of criteria pollutants were calculated for each alternative using emissions factors for ferry vessel engines (obtained from manufacturer) and information related to ferry operations for each alternative, such as the number of port calls per season, duration of trips, and idling time in each port (calculated by project traffic engineers). See Attachment 1 of the *2017 Update to Appendix T – Air Quality Modeling Memorandum* in Appendix Z of this Final SEIS for more detail on this analysis.

### 4.1.9 Noise

Comments received on the 1997 Draft EIS indicated the need to conduct additional noise analyses of project alternatives. Baseline noise data gathered for the project in 2003, together with projected traffic volumes provided in the 2004 *Traffic Forecast Report* (Appendix C of the 2005 Supplemental Draft EIS), were used as input to FHWA noise models to predict future traffic noise with and without the project alternatives. Potential impacts were assessed by comparing projected future noise levels with and without project alternatives to the FHWA Noise Abatement Criteria (NAC) and were presented in the 2005 *Noise Technical Report* (in Appendix L of the 2005 Supplemental Draft EIS). The *2017 Update to Appendix L - Noise Technical Report* (in Appendix Z of this Final SEIS) determined that the 2016 traffic volumes forecasted are similar to traffic volume forecasts used in the 2005 *Noise Technical Report* and would result in noise levels similar to those presented in the 2006 Final EIS and, therefore, no new noise modeling was necessary. The projected noise levels and noise abatement recommendations in this Final SEIS are the same as those presented in the 2006 Final EIS.

### 4.1.10 Hazardous Waste

An initial site assessment (ISA) was conducted in 2003 and updated in 2013 to identify any known or likely areas of hazardous materials along the alignments and facility locations of the project alternatives. Federal and State databases were reviewed for this assessment.

In the 2004 *Initial Site Assessment Technical Report* (Appendix M of the 2005 Supplemental Draft EIS), a limited on-site field review was made for the portions of alternative alignments that were within the cities of Skagway and Haines. Past use of any property of potential interest and

adjoining properties was researched by reviewing historical aerial photographs. Sites that are known to contain or could potentially contain contamination because of past activities were assigned a site hazard rating. Sites with a high or medium hazard within a 300-foot-wide corridor centered on the alternative alignments and related facilities were further evaluated and assigned an impact rating based on the potential cost of remediation.

The *2014 Update to Appendix M – Initial Site Assessment Technical Report* (in Appendix Z of the Draft SEIS) provides an update from the federal and State databases to identify additional sites of known or potential contamination within the project corridor. That updated information has been incorporated into the analysis of project impacts. Corrections to that report are provided in the *2017 Errata* to the *2014 Update to Appendix M – Initial Site Assessment Technical Report* (in Appendix Z of this Final SEIS).

### 4.1.11 Wetlands

This assessment evaluated potential project impacts on wetlands, wetland functions, and marine waters of the U.S. as required under Section 404 of the Clean Water Act and Executive Order (EO) 11990. Impacts on rivers and streams (freshwater waters of the U.S.) are addressed under marine and freshwater habitat. The principal direct impact of project alternatives on wetlands is their long-term loss through the placement of fill and modification of local hydrologic patterns.

The effect of the project on wetlands is addressed in the *Wetlands Technical Report* (Appendix O), the *2014 Update to Appendix O – Wetlands Technical Report* (in Appendix Z of the Draft SEIS), and the *2017 Errata* to the *2014 Update to Appendix O – Wetlands Technical Report* (in Appendix Z of this Final SEIS). The analysis of alternatives in this chapter has been updated to reflect the updated wetlands information.

### 4.1.12 Marine and Freshwater Habitat and Fish (Including Essential Fish Habitat)

Potential project-related impacts to freshwater habitat and fish were evaluated by estimating the potential for direct and indirect mortality of fish and disruption or disturbance of spawning and rearing behavior as a result of construction and highway maintenance and operation. The *Anadromous and Resident Fish Streams Technical Report* (Appendix P), the *2014 Update to Appendix P – Anadromous and Resident Fish Streams Technical Report* (in Appendix Z of the Draft SEIS), and the *2017 Errata* to the *2014 Update to Appendix P – Anadromous and Resident Fish Streams Technical Report* (in Appendix Z of this Final SEIS) contain an analysis of these impacts. Habitat-related impacts (i.e., destruction of spawning and/or rearing habitat for anadromous fish) were assessed separately in the *Essential Fish Habitat Assessment* (Appendix N), the *2014 Update to Appendix N – Essential Fish Habitat Assessment* (in Appendix Z of the Draft SEIS), and the *2017 Errata* to the *2014 Update to Appendix N – Essential Fish Habitat Assessment* (in Appendix Z of this Final SEIS).

The essential fish habitat (EFH) assessment serves a dual purpose: it documents potential impacts of project alternatives on the intertidal and subtidal environments of Lynn Canal and it is being used to comply with the Magnuson-Stevens Fishery Conservation and Management Act requirement that federal agencies assess the effects of their actions on EFH for commercial fish stocks in all life stages and associated habitats. Potential project effects on EFH are summarized in Sections 4.3.13, 4.4.13, 4.5.13, 4.6.13, 4.8.11, and 4.9.2.10 for project alternatives.

The potential effects of project construction and operation on the fish species included in this analysis were evaluated based on projected changes in habitat quality and quantity and the estimated effect of those changes to local fish populations.

### 4.1.13 Terrestrial Habitat

The assessment of the potential impacts of project alternatives on terrestrial habitat was based on the long-term loss of those habitats resulting from the construction of project facilities. The effect of habitat loss on wildlife is addressed in the *Wildlife Technical Report* (Appendix Q) and *2017 Update to Appendix Q – Wildlife Technical Report* (in Appendix Z). The effects of the alternatives on terrestrial habitat in Tongass National Forest were also analyzed with regard to the areas of old-growth reserves (OGRs) within the areas that would be cleared during construction.

### 4.1.14 Wildlife

The 1994 *Wildlife Technical Report* assessed potential project-related impacts to wildlife using Habitat Capability Index (HCI) models, and still provides valid information for the proposed project. These HCI models were developed for black bear, brown bear, marten, and mountain goat, which were management indicator species identified by the USFS, the Alaska Department of Fish and Game (ADF&G), and the U.S. Fish and Wildlife Service (USFWS). Public and agency comments on the 1997 Draft EIS requested an expansion of the number of species considered for analysis and pointed out the limitations of the HCI models for assessing impacts from highway development. The impact analysis presented in the 2005 Supplemental Draft EIS did not rely on any new HCI modeling. However, the 2005 Supplemental Draft EIS summarizes statistics from the previous HCI model analyses where appropriate.

> Note: The consensus during 2003 resource agency scoping efforts for the 2005 Supplemental Draft EIS was that data from the 1997 HCI modeling were still valid as approximations of habitat capability impacts and should be incorporated into the 2005 Supplemental Draft EIS wildlife analysis. Some agency comments on the 2005 Supplemental Draft EIS requested that the limitations of the HCI models be more clearly explained. Some of these limitations are:
>
> 1. Habitat capability is a measure of the amount of habitat available and affected, not an actual measure of populations.
> 2. The models assess impact based on an assumed limiting factor for each species (e.g., late summer feeding habitat for brown bears and old-growth (OG), south-facing slopes within 1,300 feet of a cliff for goats). Other limiting factors may affect the population.
> 3. The models were developed in 1988 and used 1994 USFS forest data for habitat calculation, which may no longer be totally accurate.
> 4. The models were developed to analyze the effects of clearcut logging and associated roads; they may not work as well for impacts that are from roads alone.
> 5. The models do not incorporate the potential impact reduction provided by wildlife underpasses.

The potential impacts of project alternatives on wildlife were assessed in the following steps:

- **Step 1 - Setting up the Analysis** – The geographic scope of the wildlife analysis was defined using a combination of U.S. Geological Survey (USGS) and USFS maps and ADF&G Wildlife Analysis Areas.
- **Step 2 - Describing the Situation** – Wildlife species' preferred habitats, population trends (if known), and the types of interactions they have with humans in the study area, including how they interact with the existing transportation systems in Alaska, were described. This information was summarized from other documents and incorporated by reference.
- **Step 3 - Identifying Issues** – A number of federal laws and EOs address wildlife and development issues, including the Endangered Species Act (ESA), the Fish and Wildlife Coordination Act, the Migratory Bird Treaty Act (MBTA), EO 13186[3], and the Marine Mammal Protection Act (MMPA). A list of the issues to be considered was derived from these laws, public and agency comments during 2003 scoping for the 2005 Supplemental Draft EIS, and from USFS documents concerning road impact analysis (USFS, 1999 and 2000).
- **Step 4 - Assessing Benefits, Problems, and Risks** – For biological resources, guidelines for the NEPA recommend that population-level measures be used to evaluate the intensity of project-related effects and that the evaluation be quantifiable where possible.

If quantitative information is unavailable, professional judgment on the likelihood of an impact occurring or its severity may be used. Historical population survey data from resource management agencies and academic sources were used in the impact assessment to the extent possible. Given the uncertain nature of predicting the future effects of project alternatives, a combination of quantitative estimates and qualitative judgments was used to describe potential impacts.

See the *Wildlife Technical Report* (Appendix Q) for additional information on the impact assessment methodology. This Final SEIS updates information presented in the 2006 Final EIS based on the *2017 Update to Appendix Q – Wildlife Technical Report* (in Appendix Z of this Final SEIS). New information includes the results of wildlife surveys conducted by ADF&G.

### 4.1.15 Bald Eagles

Based on many years of experience in Southeast Alaska, the USFWS developed a set of guidelines for State- and federal-funded highway construction activities to ensure compliance with the Bald and Golden Eagle Protection Act (BGEPA) and prevent disruption of bald eagle nests. Those guidelines are incorporated into a USFWS and USFS interagency agreement.

Until their delisting in June 2007, bald eagles were on the endangered species list in the continental United States. In connection with the delisting, the USFWS announced a final rule on two new permit regulations that would allow for the disturbance and take of eagles and eagle nests under the BGEPA (USFWS, 2009). The 2009 eagle permit regulations are consistent with the National Bald Eagle Management Guidelines (USFWS, 2007).

[3] The MBTA prohibits the taking of migratory birds, eggs, or nests. The Migratory Bird EO (13186) specifically encourages all federal agencies to avoid or minimize to the extent practicable adverse impacts to migratory bird resources.

The guidelines are based on three general recommendations to avoid disturbance to nesting bald eagles:

1. Keeping a distance between the activity and the nest (distance buffers).
2. Maintaining forested (or natural) areas between the activity and nest trees (landscape buffers).
3. Avoiding certain activities during the breeding season (timing buffers).

Depending on the nature and magnitude of impact on bald eagles that could result from each activity, the visibility of the activity from the nest, and the degree to which similar activities are already occurring near the nest, the USFWS has developed activity-specific guidelines and buffers to aid in determining when a permit would be required. Based on these guidelines, the DOT&PF would need to apply for an eagle Disturbance Permit for nests within 660 feet of the cut and fill limits and for active nests within 0.5 miles of blasting activities and other loud construction noises.

In addition to the USFWS regulations, the City and Borough of Juneau (CBJ) Land Use Code states that development is prohibited within 330 feet of an eagle nest on public land within the CBJ. The DOT&PF would need a variance from the CBJ for the JAI Project if the selected alternative requires construction within 330 feet of a bald eagle nest.

The potential impacts of project alternatives on bald eagles are determined by measuring the distances between eagle nests identified in the USFWS surveys and the cut-and-fill limits of each alternative. The effects of activities to bald eagles from the alternatives were then evaluated based on these distances relative to the USFWS National Bald Eagle Guidelines. This Final SEIS updates information presented in the 2006 Final EIS based on the *2017 Update to Appendix Q – Wildlife Technical Report* (in Appendix Z of this Final SEIS). Updated information includes the results of new bald eagle nest surveys and new criteria for suitable disturbance distances since the *Wildlife Technical Report* (Appendix Q).

### 4.1.16 Threatened and Endangered Species

As indicated in Section 3.3.7, only two species in the study area are classified as threatened or endangered under the ESA: the Mexico distinct population segment (DPS) humpback whale and the western DPS of the Steller sea lion.

In 2005, the National Marine Fisheries Service (NMFS) concurred with the FHWA's *not likely to adversely affect* determinations for species listed under the ESA, as presented in the 2005 revised *Biological Assessment* (BA) prepared for the project (FHWA, 2005). The revised BA and subsequent Letter of Concurrence (NMFS, 2005a) stated that, with impact minimization measures, the preferred alternative (Alternative 2B, at that time) would not adversely affect the eastern or western DPS of Steller sea lions, Steller sea lion critical habitat, or humpback whales.

FHWA submitted a revised BA to NMFS on January 30, 2014, to initiate formal Section 7 Consultation. With identification of Alternative 1 – No Action as the preferred alternative, FHWA notified NMFS that it was withdrawing the *Revised Biological Assessment* and request for formal consultation under ESA Section 7 for the JAI Project (see February 15, 2017, letter from FHWA to NMFS in Attachment B of Appendix JJ).

## 4.2 Alternatives 1 and 1B[4]

### 4.2A Alternative 1 (Preferred) – No Action

Alternative 1 – No Action includes a continuation of mainline ferry[5] service in Lynn Canal and incorporates two Day Boat Alaska Class Ferries (ACFs) already programmed for construction by the AMHS to replace the daily summer service provided by the motor vessel (*M/V*) *Malaspina* between the Lynn Canal communities of Juneau (Auke Bay) and Haines and Skagway (see Figure 2-5). Alternative 1 – No Action is not a direct continuation of 2013–2014 ferry service. Rather, it is a continuation of the AMHS's *current plan* and reflects the most likely AMHS operations in the absence of any capital improvements specific to the JAI Project. No new roads or ferry terminals would be built, and there would be no improvements to existing facilities beyond those already programmed.

This section describes the environmental consequences to resources discussed in Chapter 3 resulting from Alternative 1 – No Action. This section discusses only the environmental areas for which changes from conditions described in Chapter 3 have been forecasted within the project planning horizon. No changes to existing conditions were identified for land use, visual resources, historical and archaeological resources, environmental justice, subsistence, geology, floodplains, Wild and Scenic Rivers, noise, hazardous materials, and biological resources; therefore, there is no description of impacts for these resources in this section.

#### 4.2A.1 Socioeconomic Resources

As discussed in Section 1.4.1.3, the estimated travel demand in Lynn Canal is greater than what AMHS currently accommodates. Under Alternative 1 – No Action, the programmed improvements improve operations; therefore, Alternative 1 – No Action would increase traffic and the number of visitors. In addition, Lynn Canal is projected to have a slight increase in population (0.024 percent annually) during the 30-year forecast period of 2025 to 2055 (see Revised Appendix AA, *Traffic Forecast Report*). As a result, Alternative 1 – No Action would have negligible economic impacts in Juneau and Skagway. One Day Boat ACF would homeport in the Haines Borough and employ approximately 20 people, but would not noticeably change economic conditions in Lynn Canal. In addition, Alternative 1 – No Action would not alter the quality of life for residents in Juneau, Haines, and Skagway.

#### 4.2A.2 Transportation

The 2004 Southeast Alaska Transportation Plan (SATP; DOT&PF, 2004b) calls for construction of a highway from Juneau to Skagway with a ferry from Katzehin to Haines. The SATP will be updated to reflect the identification of Alternative 1 – No Action as the recommended improvement in the plan.

[4] Alternatives 1 and 1B are separate alternatives and are addressed in separate subsections: 4.2A and 4.2B, respectively. The purpose of using this alphanumeric scheme for these sections is to maintain the same section numbers as those used in the 2006 Final EIS for ease of reference in the remainder of this chapter. Alternatives 1 and 1B are grouped together because both are "no build" alternatives. Alternative 1B is, however, an action alternative and is analyzed to the same level of detail as all action alternatives.

[5] Larger vessels of the AMHS that travel the length of the system from Bellingham or Prince Rupert, B.C. to Southeast and South Central Alaska communities are called mainline ferries. Smaller vessels that are referred to as "day boats" connect smaller communities with each other and with the mainline routes.

DOT&PF's 2016–2019 Statewide Transportation Improvement Program (STIP; Amendment 3, June 28, 2017) does not include funding for any JAI Project build alternatives. Alternative 1 – No Action is consistent with the currently adopted STIP.

### 4.2A.2.1 Demand and Capacity

Projected traffic demand in 2055 for Alternative 1 – No Action is provided in Table 4-1. Annual ADT demand in Lynn Canal is projected to be 80 vehicles and summer ADT is projected to be 125 vehicles in 2055 under Alternative 1 – No Action (see Revised Appendix AA, *Traffic Forecast Report*).

**Table 4-1:**
**2055 Forecast Demand and Capacity Juneau to/from Haines and Skagway for Alternative 1 – No Action**

| Alternative | Annual Demand ADT | Summer Demand ADT | Winter Demand ADT | Peak Week Demand ADT | Summer Capacity (vehicles per day) |
|---|---|---|---|---|---|
| 1 – No Action | 80 (50/30) | 125 (80/45) | 50 (30/20) | 300 (190/110) | 154 (93/61) |

Note: The first number is the total demand or capacity. Numbers in parentheses are the demand or capacity split between Haines and Skagway, respectively.

The capacity of the ferry system in Lynn Canal under Alternative 1 – No Action is approximately 154 vehicles per day during the summer; therefore, summer demand would not exceed capacity under Alternative 1 – No Action. The peak week demand, however, is approximately 300 ADT, which would exceed summer capacity. Alternative 1 – No Action would accommodate approximately 51 percent of the peak week ADT. As with current operations, AMHS could schedule additional service in Lynn Canal during identified high volume days. Latent (unconstrained) demand in the corridor during the summer is estimated to be about 1,950 ADT. Alternative 1 – No Action would realize and accommodate[6] 6 percent of the latent summer demand.

Under Alternative 1 – No Action, the local summer ADT between Haines and Skagway (i.e., traffic that originates in Haines and goes to Skagway, or vice versa) is projected to be approximately 53 vehicles in 2025 and 2055. Combined with the traffic traveling between Juneau and Skagway, the summer ADT on the Haines-Skagway link is 98. The projected average summer daily capacity on the Day Boat ACF traveling between Haines and Skagway is 197 vehicles, which would accommodate the demand between Haines and Skagway. Additional Haines-Skagway capacity would be provided by the mainliners.

### 4.2A.2.2 Travel Flexibility and Opportunity

In the summer, Alternative 1 – No Action would provide eight round-trips per week between Juneau and Haines and eight round-trips per week between Juneau and Skagway. Mainline ferries would make two trips per week and Day Boat ACFs would make the remaining six trips. In the winter, Alternative 1 – No Action would provide four round-trips per week between Juneau and Haines and four round-trips between Juneau and Skagway. One trip to each

[6] Each of the action alternatives satisfies the purpose and need to varying degrees based on the capacity it provides, and each has been designed to accommodate the demand that would occur given its particular attributes, such as cost, travel time, and convenience. There is an underlying latent demand for travel in the corridor (unconstrained demand), and more or less of that demand would be realized with each alternative, depending on the attributes of that alternative.

community would be on a mainline ferry and the Day Boat ACFs would make up the remaining trips.

#### 4.2A.2.3 Travel Time

Using the Day Boat ACFs, one-way travel time between Juneau and Haines would be 6.2 hours and between Juneau and Skagway would be 8.1 hours. Using a mainline ferry, travel time between Juneau and Haines would be 7.2 hours and between Juneau and Skagway would be 9.1 hours.

The Day Boat ACF between Haines and Skagway would take approximately 2.4 hours for a one-way trip. The Haines-Skagway Day Boat ACF would make a minimum of two round-trips per day, six days per week, plus one round-trip on the seventh day in the summer, and one round-trip per day six days per week in the winter.

#### 4.2A.2.4 State and User Costs

The 36-year life-cycle cost[7] of Alternative 1 – No Action would be $441 million, which includes all State and federal capital costs and all State operating costs discounted to 2016 dollars (see Table 4-2).

**Table 4-2:**
**Thirty-Six-Year Life-Cycle Costs for Alternative 1 – No Action**

| Alternative | Capital Cost ($million) | Operating Cost ($million) | Total Life-Cycle Cost ($million) |
|---|---|---|---|
| 1 – No Action | $119 | $322 | $441 |

The total project life costs less residual value over the 36-year period (expressed in 2016 dollars with no discounting) would be approximately $787 million (capital plus operating costs, Table 4-3). The net cost to the State during the analysis period would be about $378 million in 2016 dollars, or about $279 per vehicle transported in Lynn Canal.

**Table 4-3:**
**Thirty-Six-Year Total Project Life Costs for**
**Alternative 1 – No Action, 2019–2054 (2016 Dollars)**

| Alternative | Total Funds | | | State Funds | | | |
|---|---|---|---|---|---|---|---|
| | Capital Costs ($million)[1] | Operating Costs ($million) | Total Project Costs ($million) | Total Cost ($million) | Total Revenue ($million)[2] | Net Cost ($million) | Cost/Vehicle (dollars) |
| 1 – No Action | $128 | $659 | $787 | $671 | $292 | $378 | $279 |

[1] Residual value subtracted.

[2] Includes both fares paid to AMHS and gas tax receipts.

Based on the 2015 AMHS rate structure, the anticipated total user cost[8] for a family of four in a 19-foot-long vehicle to travel between Juneau and Haines would be $229.00. The cost for the

[7] Life-cycle costs are the construction, refurbishment, and maintenance costs and a 36-year operation period discounted to 2016 dollars.

[8] Total user costs are out-of-pocket costs and vehicle maintenance, ownership, and accident costs based on highway miles traveled.

same family to travel between Juneau and Skagway would be $301.50. For a driver with a 19-foot vehicle, the total user cost would be $131.50 between Juneau and Haines and $169.00 between Juneau and Skagway. For an adult walk-on passenger (i.e., person traveling without a vehicle), the cost would be $39.00 between Juneau and Haines and $53.00 between Juneau and Skagway. Total user costs for Alternative 1 – No Action are reported in Table 4-4.

**Table 4-4:**
**Juneau to/from Haines and Skagway Total and Out-of-Pocket User Cost for Alternative 1 – No Action**

| Alternative | Example scenario | Haines User Cost[1] | | Skagway User Cost[1] | |
|---|---|---|---|---|---|
| | | Total User Cost | Out of Pocket Cost | Total User Cost | Out of Pocket Cost |
| 1 – No Action | Family of 4 in a 19-foot vehicle | $229.00 | $227.00 | $301.50 | $301.50 |
| | Driver only in a 19-foot vehicle | $131.50 | $129.50 | $169.00 | $169.00 |
| | Walk-on Passenger[2] | $39.00 | $39.00 | $53.00 | $53.00 |

[1] Total user cost is based on fares plus $0.60 per mile for vehicular travel (AAA, 2015). Out-of-pocket cost is based on fares and gasoline consumption.

[2] Does not include cost of transportation to/from the ferry terminal.

### 4.2A.2.5 Other Transportation Impacts

AMHS expenditures in Lynn Canal for fiscal year 2015 were close to $25 million (including annual overhaul costs[9]), of which approximately $20 million was paid by the State (Revised Appendix BB, *Revenues and Expenditures Report for Lynn Canal, Fiscal Years 2005-2015*). The average annual AMHS operating cost of Alternative 1 – No Action from 2025 to 2055 is estimated to be about $18.2 million (Table 4-5). This projected reduction from actual 2015 costs is due in large part to the planned use of the lower cost Day Boat ACFs in place of the *M/V Malaspina* as a summer shuttle in Lynn Canal.

The 2025-2054 average annual AMHS revenue for Alternative 1 – No Action is projected to be $8.1 million, which would result in a $10.1 million annual State payment for transportation in Lynn Canal.

**Table 4-5:**
**Annual AMHS Operating Costs, Revenues, and Estimated State Funding for Alternative 1 – No Action**

| Alternative | AMHS Operating Cost ($million) | AMHS Revenue ($million)[1] | Estimated AMHS State Funding ($million) |
|---|---|---|---|
| 1 – No Action | $18.2[2] | $8.1 | $10.1 |

Source: *Marine Segments Technical Report* (Revised Appendix GG) and *User Benefit, Life-cycle Cost, and Total Project Cost Analyses* (Revised Appendix FF).

[1] Fare box revenue paid to AMHS; excludes gas tax receipts.

[2] Revised total is due to (1) the updating of the costs to 2015 dollars and (2) a discrepancy in the data relied on to generate the 2014 Draft SEIS mainliner operating costs.

[9] Annual overhaul refers to maintenance and inspection of vessels to meet U.S. Coast Guard operating requirements.

**Pedestrians and Bicyclists –** Under Alternative 1 – No Action, walk-on passengers in Lynn Canal would continue to board and disembark at the existing ferry terminals in Auke Bay, Haines, and Skagway the same way they do now. The number of daily walk-on passengers during summer is projected to be 125 (Table 4-6; see Revised Appendix AA, *Traffic Forecast Report*). Bicyclists are considered walk-on passengers.

**Table 4-6:**
**Average Daily Ridership in Summer for Alternative 1 – No Action, 2055**

| | Total Passengers | Passengers in Vehicles | Walk-on Passengers | Walk-on Percentage |
|---|---|---|---|---|
| Alternative 1 – No Action | 410 | 285 | 125 | 30% |

Note: See Revised Appendix AA, *Traffic Forecast Report*

### 4.2A.3 Hydrology and Water Quality

#### 4.2A.3.1 Hydrology

Alternative 1 – No Action would not affect surface water flow or circulation within Lynn Canal. No changes would be made to transportation facilities that would result in impacts to surface water resources, including floodplains.

#### 4.2A.3.2 Water Quality

The AMHS is held to compliance requirements for discharge to waters of the United States by the ferries used in the system according to 18 AAC 69 (Commercial Passenger Vessel Environmental Compliance Program) and wastewater disposal requirements in 18 AAC 72, amended in 2006 and 2012, respectively. These regulations require a routine sample analysis of each vessel for total suspended solids and fecal coliform and for them to be in compliance with AWQS. Routine sampling is the responsibility of AMHS.

Treated wastewater from mainline ferry vessels would continue to be discharged into Lynn Canal under Alternative 1 – No Action and is expected to meet AWQS; therefore, impacts to water quality from discharge of wastewater from the AMHS mainline ferries under Alternative 1 – No Action are not anticipated.

The Day Boat ACFs would have sanitary waste holding tanks and the wastewater would be pumped to an onshore facility for disposal. Sanitary waste generated at the ferry terminals would undergo treatment. Wastewater would undergo aeration and disinfection with ultraviolet light. The treated wastewater would be discharged to Lynn Canal under permit by the ADEC (Alaska Pollutant Discharge Elimination System [APDES] permit) and would meet Alaska-established waste discharge limitations.

The ferry terminal sewage treatment facilities at Auke Bay, Haines, and Skagway would continue to operate under Alternative 1 – No Action. There are no documented impacts associated with these systems; therefore, negligible impacts to water quality from the terminal treatment facilities are anticipated. Accidental discharges, spills, and leaks are possible during ferry operations. Historically, these have been minor, with only minimal and temporary impacts to water quality.

### 4.2A.4 Air Quality

Alternative 1 – No Action would not affect overall ambient air quality in the study area because vehicular emissions of criteria pollutants, based on ADT, and ferry vessel operations would be similar to existing conditions. Alternative 1 – No Action is projected to have no negative human health or environmental consequences resulting from project-related vehicle or ferry vessel emissions.

## 4.2B Alternative 1B – Enhanced Service with Existing AMHS Assets

Alternative 1B incorporates all of the programmed improvements (including the two Day Boat ACFs) described under Alternative 1 – No Action and, as with Alternative 1 – No Action, no other new roads or ferry terminals would be built (see Figure 2-6 and Revised Appendix CC, *Development of Alternative 1B – Enhanced Service with Existing Alaska Marine Highway System Assets*). Alternative 1B enhances the ferry service provided under Alternative 1 – No Action by increasing summer capacity and number of sailings in Lynn Canal with continued use of *M/V Malaspina*, which would make one round trip per day 5 days per week on a Skagway-Auke Bay-Skagway route. On the sixth day, the *M/V Malaspina* would sail on the Skagway-Auke Bay-Haines-Skagway route, and on the seventh day, it would sail that route in reverse (Skagway-Haines-Auke Bay-Skagway). Alternative 1B also involves reduced fares for all trips (Day Boat ACF, *M/V Malaspina*, and mainline ferry) in Lynn Canal to increase ridership. This section describes the environmental consequences to resources discussed in Chapter 3 that result from Alternative 1B.

### 4.2B.1 Land Use

#### 4.2B.1.1 Land Ownership

Alternative 1B would not require acquisition of any property for transportation facilities. There would be no direct impact to land ownership.

#### 4.2B.1.2 Consistency with Land Use and Management Plans

The regional transportation policy set forth in the CBJ *Comprehensive Plan* is to support the improvement of transportation facilities and systems that reinforce Juneau's role as the capital city and a regional transportation and service center. The plan supports consideration of all affordable energy-efficient transport alternatives to improve transportation links between CBJ and other areas of Southeast Alaska, including improved air (cargo and passenger) service, roadways, ferries, and fixed guideway systems (CBJ, 2008). Alternative 1B is consistent with the CBJ *Comprehensive Plan*.

The Haines Borough and Municipality of Skagway Borough comprehensive plans support improvement of the AMHS to provide better ferry access to these two communities (Haines Borough, 2012; Municipality of Skagway, 2009). Therefore, Alternative 1B is consistent with these plans.

Goldbelt's *Echo Cove Master Plan* (Goldbelt, 1996) included construction of a road from the northern end of Glacier Highway at Echo Cove to Cascade Point in Berners Bay. The plan also includes a ferry terminal at Cascade Point, expansion of the campground at Echo Cove, a lodge, and other developments. Alternative 1B is not inconsistent with this plan, but would not facilitate it in any way.

#### 4.2B.1.3 Land Use

Alternative 1B would have no direct impact on land use, as it would involve existing transportation facilities in Lynn Canal. This alternative would result in relatively small changes in the number of travelers between Juneau, Haines, and Skagway. The improved access resulting from this alternative would have negligible indirect impacts on land use.

### 4.2B.2 Coastal Zone Management

Alternative 1B would have no direct impact on land use, so no consistency determination for coastal zone management is required.

### 4.2B.3 Visual Resources

Alternative 1B would result in more frequent views of ferries on Lynn Canal from the land. However, the frequency would not increase to the extent that noticeably different visual impressions of the region would be created relative to the impressions that currently exist.

### 4.2B.4 Historical and Archaeological Resources

Alternative 1B would not require acquisition of any new property for transportation facilities. There would be no construction or ground disturbance under Alternative 1B. Therefore, FHWA has determined that no historic properties would be affected by Alternative 1B.

### 4.2B.5 Socioeconomic Resources

#### 4.2B.5.1 Overview

When compared to Alternative 1 – No Action, enhanced service using existing AMHS assets in Lynn Canal under Alternative 1B would result in a small change to the movement of goods and people as well as the links between the economies of Juneau, Haines, Skagway, and Whitehorse. Alternative 1B is expected to result in an increase in traffic relative to Alternative 1 – No Action. Conditions that would exist under Alternative 1B would be very similar to the future economic conditions set forth in Section 3.1.4 (Affected Environment, Socioeconomic Resources).

#### 4.2B.5.2 Juneau

**Population, Economics, Housing, and Municipal Revenues** – The total traffic to and from Juneau associated with Alternative 1B is estimated at 135 annual ADT in 2025 and would remain the same through 2055. Alternative 1B would generate approximately 69 percent more annual ADT in Lynn Canal than Alternative 1 – No Action (80 annual ADT) from 2025 through 2055. The increase in visitor traffic over Alternative 1 – No Action would be 30 annual ADT because approximately one-quarter of the total change in traffic associated with this alternative is anticipated to be from Juneau residents. The estimates of new traffic also do not include baseline traffic (baseline traffic is already affecting the economy and therefore is not counted along with new traffic in estimating new visitor spending).

Assuming all traffic is round-trip, the 30 annual ADT attributable to increased visitor traffic to/from Juneau would equate to 15 new round trips. With each additional visiting vehicle carrying an average of 3.2 people[10], Juneau is projected to receive a total of approximately 16,400 new visitors per year under Alternative 1B.

[10] The average annual occupancy on the AMHS in Lynn Canal is 3.2 passengers per vehicle.

Based on data from the Alaska Visitor Statistics Program (AVSP) VI, for the purposes of this study, it is assumed that visitor spending in Juneau would average $77 per visitor per day (McDowell Group, 2012a). Annual visitor spending in Juneau, therefore, would increase by approximately $1.26 million because of Alternative 1B (Table 4-7). The economic impact of this additional spending would include new employment and payroll sources in Juneau. Based on a ratio of visitor spending to payroll and per capita income, this increase in annual visitor spending in Juneau would generate approximately $470,000 in new payroll and an estimated 15 additional jobs.

**Table 4-7:**
**Alternative 1B Projected Traffic and Resulting Visitor Economic Impacts in Juneau, 2055**

| | **2055** |
|---|---|
| Total Traffic under Alternative 1 – No Action (annual ADT) | 80 |
| Total Traffic under Alternative 1B (annual ADT) | 135 |
| Change in Traffic (annual ADT) (over No Action) | 55 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 30 |
| Total New Visitors Annually (over No Action) | 16,400 |
| Total New Visitor Spending Annually (over No Action) | $1,260,000 |
| New Local Payroll Annually (over No Action) | $470,000 |
| New Local Employment Annually (over No Action) | 15 |

Note: Numbers may not total exactly due to rounding.

Each new job in the Juneau economy results in an increase in population of about 1.5 people.[11] Therefore, the 15 new jobs in Juneau resulting from increased traffic and visitors under Alternative 1B would result in a population increase of 23 residents. This increase would represent an overall increase of about 0.07 percent over the 2015 population (33,277; see Revised Appendix EE, *Socioeconomic Effects Technical Report*).

Based on 2.6 persons per household, a population increase of 23 residents would result in additional demand for approximately nine housing units. The housing unit demand generated by Alternative 1B would be within the vacant housing capacity.

Sales tax revenues (plus hotel, liquor, and tobacco taxes) for Juneau would increase at a rate proportional to the increase in spending. Total additional visitor spending of $1.26 million annually would generate (assuming all of the spending is taxable) $63,000 in additional sales tax revenues (based on a 5 percent tax rate).

**Industry/Commercial Sectors** – The visitor industry is Juneau's only basic industry likely to be affected by Alternative 1B. As discussed above, Alternative 1B would generate approximately 16,400 new visitors per year to Juneau in 2025 and the following years, through 2055. To the extent that Alternative 1B would improve ferry frequency, convenience, and cost, there would be an increase in the number of independent visitors traveling to Juneau. This impact is anticipated to be negligible.

Alternative 1B is not expected to directly affect mine development in the Juneau area. Alternative 1B would decrease travel time between Juneau and Skagway, which may result in additional Skagway residents seeking work at Juneau area mines.

[11] Based on an estimated participation rate of 65 percent, meaning that 65 percent of the Juneau population participates in the local labor force.

To the extent that Alternative 1B would improve ferry frequency, convenience, and cost, it would have an overall positive, but minor, economic effect on Juneau's local retail trade and service sector industries that provide goods and services to visitors. These benefits would stem from minor increases in Haines and Skagway resident spending in Juneau and minor increases in non-resident visitor spending in Juneau—both offset partially by increased spending by Juneau residents in Haines and Skagway.

Alternative 1B is not likely to result in increased competition for commercial fishing fleets from subsistence and sport fish users because it would not open access to new areas. This alternative would not enhance seafood processors' access to fresh fish markets. In addition, Alternative 1B would have no effect on the forest products industry.

**Utilities and Public Services** – Much of the information provided below on the effects of Alternative 1B is based on interviews with industrial representatives and public service providers. References to these interviews are provided in the *Socioeconomic Effects Technical Report* (Revised Appendix EE).

Alternative 1B would not affect Juneau public utilities. All utilities are adequate to accommodate any population increases attributable to Alternative 1B through 2055.

School enrollment is a function of population. Because population impacts are expected to be minimal, the same would be true of impacts on enrollment. The maximum impact on Juneau's population from Alternative 1B would be an increase of less than 1 percent.

Health and social services demand is mainly a function of population, and would therefore not be expected to change substantially under Alternative 1B. Additional independent visitors to Juneau, particularly older retirees, would place some new demands on emergency room and other medical and dental services in Juneau. Increases in demand for health care services would be negligible when compared with existing demand.

Traffic increases resulting from enhanced services would not affect fire and emergency medical services (EMS) within the current service area. Juneau would likely experience a small increase in local police and EMS calls as a result of additional visitors in town, but more visitors would also result in more resources for the local economy (Decker, personal communication 2012).

**Quality of Life** – According to the 1994 *Juneau Access Household Survey* (McDowell Group, 1994), more than three-quarters of Juneau residents agree that improved access to their community is important. There is less agreement on whether quality of life is best served by access via highway or via ferry service. Many proponents of a highway acknowledge that better ferry service would improve quality of life, but not by enough. Many proponents of ferry service believe that better access is important, but only ferry access would result in an overall improvement in the quality of life.

The reasons for these differing views are complex and interwoven with how individuals view Juneau's lack of highway access. Research and public comment over the past two decades have shown that some residents cherish this condition, while others deplore it. Further, improved transportation is generally associated with growth opportunities, and growth typically affects quality of life. Finally, as noted in Revised Appendix EE, the *Socioeconomic Effects Technical Report*, the isolation associated with lack of highway access induces a sense of psychological comfort in some residents and a feeling of frustration and claustrophobia in others.

### 4.2B.5.3 Haines

**Population, Economics, Housing, and Municipal Revenues** – The total traffic to/from Haines associated with this alternative is estimated to be 70 annual ADT in 2025 and would remain the same through 2055. Alternative 1B would generate approximately 40 percent more annual ADT than Alternative 1 – No Action (50 annual ADT).

Using the same method as described for Juneau (Section 4.2B.5.2), converting these vehicle traffic estimates to number of new visitors indicates that Haines would see approximately 6,400 new visitors per year as a result of Alternative 1B. Based on data from the AVSP VI, for the purposes of the analysis for this Final SEIS, it is assumed that visitor spending in Haines would average $77 per visitor per day (McDowell Group, 2012a). Annual visitor spending in Haines, therefore, would increase by about $490,000 because of Alternative 1B. The economic impact of this additional spending would include new employment and payroll in Haines. Based on visitor industry-related payroll and spending in Southeast Alaska for the 2010–2011 season, a multiplier was derived to determine new visitor related payroll above Alternative 1 – No Action (McDowell Group, 2012b). This increase in visitor spending in Haines would generate about $180,000 in new payroll annually and five additional jobs (Table 4-8).

**Table 4-8:**
**Alternative 1B Projected Traffic and Resulting Visitor Economic Impacts in Haines, 2055**

| | **2055** |
|---|---|
| Total Traffic under Alternative 1 – No Action (annual ADT) | 50 |
| Total Traffic under Alternative 1B (annual ADT) | 70 |
| Change in Traffic (annual ADT) (over No Action) | 20 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 10 |
| Total New Visitors Annually (over No Action) | 6,400 |
| Total New Visitor Spending Annually (over No Action) | $490,000 |
| New Local Payroll Annually (over No Action) | $180,000 |
| New Local Employment Annually (over No Action) | 5 |

Note: Numbers may not total exactly due to rounding.

Alternative 1B is expected to have negligible impacts on Haines' current and future population. It would not provide substantive impetus for growth in local basic industries. Because population is primarily a function of economic growth, Alternative 1B would not be expected to yield a measurable change in Haines' population (eight new residents). Alternative 1B would result in five additional jobs in Haines.

Alternative 1B is expected to result in no measurable change in Haines' housing and real estate markets. As Alternative 1B would not result in measurable new local employment or population increase above the No Action, there would not be a measurable need for additional housing in Haines in 2025 and the following years through 2055 (two additional housing units).

Alternative 1B would have negligible effects on Haines' municipal revenues and expenditures. New visitor spending associated with this alternative (approximately $490,000 annually) would generate approximately $27,000 in Haines annual sales tax revenues in 2055.

**Industry/Commercial Sectors** – The visitor industry in Haines is the only basic industry likely to be affected by Alternative 1B. The cruise ship visitor market to Haines would not be affected by Alternative 1B. As discussed above, Alternative 1B would generate approximately 6,400 new visitors to Haines per year in 2055. Alternative 1B is not likely to result in increased competition for commercial fishing fleets from subsistence and sport fish users because it would not open access to new areas. This alternative would not enhance seafood processors' access to fresh fish markets. It is not anticipated to change ongoing or future mining prospects. In addition, Alternative 1B would have no effect on the forest products industry.

The effects of Alternative 1B on Haines' local retail trade and service sector industries that provide goods and services to visitors would be minor. The effect on shipping costs is expected to be negligible; therefore, no reduction in business profitability or the cost of living in Haines is expected. Spending by Juneau residents and other non-residents in Haines would increase, though that increase would be minor in the local economy overall.

A small but measurable improvement in marine passenger and vehicle transportation would be provided for Lynn Canal under Alternative 1B as demonstrated by traffic forecasts, but it is not expected to improve freight transportation infrastructure in the region.

**Utilities and Public Services** – Much of the information provided below on the effects of Alternative 1B is based on interviews with industrial representatives and public service providers. References to these interviews are provided in the *Socioeconomic Effects Technical Report* (Revised Appendix EE).

Alternative 1B would not affect Haines public utilities. As Alternative 1B is expected to have negligible impacts on Haines' current and future population and no measurable change in Haines' housing and real estate markets, the current utilities would be adequate to accommodate Alternative 1B through 2055.

School enrollment is a function of population. Because population impacts are expected to be negligible, the same would be true of impacts on enrollment. In addition, health and social services demand is mainly a function of population, and would therefore not be expected to change under Alternative 1B as compared to Alternative 1 – No Action.

Minimal traffic increases resulting from Alternative 1B would not greatly affect fire and EMS within the current service area. Increased traffic to and through Haines could place additional demands on the community's fire protection and EMS. If fire and EMS personnel respond to incidents outside current service areas, it would reduce capacity to deliver normal services while those personnel and equipment are occupied. The Haines Police department does not expect any substantial impact from Alternative 1B (Musser, personal communication 2014).

**Quality of Life** – Alternative 1B increases the number of ferry trips between Juneau and Haines relative to Alternative 1 – No Action from 8 to 10 trips and reduces fares and increases capacity on that route. Based on the 1994 and 2003 household surveys conducted for the project (McDowell Group, 1994, and Appendix I of the 2005 Supplemental Draft EIS), and the similarities between Alternative 1 – No Action and Alternative 1B with respect to service to/from Haines, Alternative 1B would likely not be perceived as a major improvement to the quality of life by a majority of Haines residents.

### 4.2B.5.4 Skagway

**Population, Economics, Housing, and Municipal Revenues** – The traffic to and from Skagway under Alternative 1B would be 65 annual ADT in 2025 and would remain the same through 2055. Alternative 1B would generate approximately 117 percent more annual ADT than Alternative 1 – No Action (30 annual ADT).

Using the same method as described for Juneau (Section 4.2B.5.2), converting these vehicle traffic estimates to number of new visitors indicates that Skagway would see about 15,200 new visitors per year. Based on data from the AVSP VI, for the purposes of this study, it is assumed that visitor spending in Skagway would average $77 per visitor per day (McDowell Group, 2012a). Annual visitor spending in Skagway, therefore, would increase by about $1.17 million because of Alternative 1B. This increase in annual visitor spending in Skagway would generate about $440,000 in new payroll and 10 additional jobs (Table 4-9).

**Table 4-9:**
**Alternative 1B Projected Traffic and Resulting Visitor Economic Impacts in Skagway, 2055**

| | **2055** |
|---|---|
| Total Traffic under Alternative 1 – No Action (annual ADT) | 30 |
| Total Traffic under Alternative 1B (annual ADT) | 65 |
| Change in Traffic (annual ADT) (over No Action) | 35 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 25 |
| Total New Visitors Annually (over No Action) | 15,200 |
| Total New Visitor Spending Annually (over No Action) | $1,170,000 |
| New Local Payroll Annually (over No Action) | $440,000 |
| New Local Employment Annually (over No Action) | 10 |

Note: Numbers may not total exactly due to rounding.

Alternative 1B is expected to have negligible impacts on Skagway's current and future population, with approximately 15 new residents relative to Alternative 1 – No Action. This increase represents 1.4 percent increase over the 2015 population of 1,040 and 0.6 percent over the summer population of approximately 2,500 (SDC, 2013).

Alternative 1B is not expected to result in any measurable change in Skagway's housing and real estate markets. The population increase of 15 individuals would create a demand for an additional six housing units (assuming 2010 Census estimate of 2.5 persons per household).

The 2010 U.S. Census indicated that Skagway has about 152 vacant housing units, not including seasonal, recreational, and occasional use units. While Skagway has a shortage of affordable homes for first-time home buyers and a lack of seasonal employee housing, the projected demand is anticipated to be accommodated by the vacant housing capacity of Skagway. During summer, this demand would be harder to meet. It is likely that the private sector would respond by construction of additional housing if residential land is available.

Alternative 1B is not expected to result in a substantial change in Skagway's borough revenues and expenditures. New visitor spending associated with this alternative (approximately $1.17 million) would generate approximately $47,000 per year in Skagway sales tax revenues (based on a 4 percent tax rate).

**Industry/Commercial Sectors** – The visitor industry is Skagway's only basic industry likely to be affected by Alternative 1B. As discussed above, Alternative 1B would generate approximately 15,200 new visitors per year to Skagway in 2055.

The effects of Alternative 1B on Skagway's local retail trade and service sector industries that provide goods and services to visitors would be minor. The effect on shipping costs is expected to be negligible; therefore no reduction in business profitability or the cost of living in Skagway is expected. Spending by Juneau residents and other non-residents in Skagway would increase, but only slightly.

Alternative 1B is not likely to result in increased competition for commercial fishing fleets from subsistence and sport fish users because it would not open access to new areas. This alternative would not enhance seafood processors' access to fresh fish markets. In addition, Alternative 1B would have no effect on the forest products or mining industry.

**Utilities and Public Services** – Much of the information provided below on the effects of Alternative 1B is based on interviews with industrial representatives and public service providers. References to these interviews are provided in the *Socioeconomic Effects Technical Report* (Revised Appendix EE).

Alternative 1B would not affect Skagway public utilities. As Alternative 1B is expected to have negligible impacts on Skagway's current and future population and would cause no measurable change in Skagway's housing and real estate markets, the current utilities would be adequate to accommodate Alternative 1B through 2055.

School enrollment is a function of population. Because population impacts are expected to be negligible, the same would be true of impacts on enrollment. In addition, health and social services demand is mainly a function of population, and would therefore not be expected to change under Alternative 1B as compared to Alternative 1 – No Action.

Minimal traffic increases resulting from Alternative 1B would not greatly affect fire and EMS within the current service area. Emergency response demands from additional traffic through Skagway could affect the Skagway Volunteer Fire Department (SVFD). The SVFD's size and reliance on volunteers makes responding to multiple emergencies very challenging. Skagway police would not expect a substantial increase in activity as a result of improved access. The department already adds four seasonal officers to address the influx of summer population and visitors, and this is expected to be sufficient to handle whatever additional demand is generated by improved ferry service.

**Quality of Life** – Improved access would increase traffic in Skagway; however, increases in traffic under Alternative 1B would be minimal. Skagway residents have indicated that increased tourism, economic growth, and enhanced recreation would be the main benefits of improved access to Juneau. Negative impacts cited include increased crime, undesirable transients, and loss of spending in local businesses. Skagway is well located to act as an interim shopping/dining spot for travelers between Juneau and Whitehorse (McDowell Group, 1994).

When surveyed in 2003 (Appendix I of the 2005 Supplemental Draft EIS), most Skagway residents said that improved access to Juneau is important (24 percent) or very important (59 percent). Residents said the best way to provide access is by ferry (60 percent); 35 percent chose a highway. On average, Skagway residents make an average of 10.1 trips per household per year to Juneau. The main reasons for traveling are vacation/recreation (27 percent), to connect with jet

flights at Juneau Airport (17 percent), business (17 percent), medical (16 percent), shopping (15 percent), and visiting friends and relatives (8 percent).

### 4.2B.6 Subsistence

Because Alternative 1B would not increase access to areas where subsistence harvests currently occur, it would not result in direct or indirect impacts to subsistence uses.

### 4.2B.7 Transportation

The 2004 SATP calls for construction of a highway from Juneau to Skagway with a ferry from Katzehin to Haines. The SATP will be updated to reflect the identification of Alternative 1 – No Action as the recommended improvement in the plan.

DOT&PF's 2016–2019 STIP (Amendment 3, June 28, 2017) does not include funding for any JAI Project build alternatives. As Alternative 1B does not include any capital improvements, it is not inconsistent with the STIP, and Alternative 1 – No Action is also consistent with the currently adopted STIP.

#### 4.2B.7.1 Demand and Capacity

Traffic demand for Alternative 1B was projected for 2025 and 2055 using the transportation model summarized in Section 4.1.5. These projections were based on 2015 traffic in Lynn Canal, the unmet travel demand in the region, projected growth in the region, costs of travel, travel time, value of time, and frequency of delay. The travel demand expressed as ADT is a combination of the demand between Juneau and Haines and Juneau and Skagway.

Projected traffic demand in 2055 for Alternative 1 – No Action and Alternative 1B is provided in Table 4-10. Traffic demand for 2025 and 2055 is predicted to remain the same for this alternative because of relatively flat population projections in southeast Alaska during the 30-year forecast period (see Revised Appendix AA, *Traffic Forecast Report*). A comparison between Alternative 1 – No Action and Alternative 1B indicates that Alternative 1B would realize and accommodate approximately an additional 55 ADT relative to Alternative 1 – No Action.

**Table 4-10:**
**2055 Forecast Demand and Capacity Juneau to/from Haines and Skagway for Alternative 1 – No Action and Alternative 1B**

| Alternative | Demand ADT | Demand Summer ADT | Demand Winter ADT | Peak Week Demand ADT | Summer Capacity(vehicles per day) |
|---|---|---|---|---|---|
| 1 – No Action | 80 (50/30) | 125 (80/45) | 50 (30/20) | 300 (190/110) | 154 (93/61) |
| 1B | 135 (70/65) | 210 (110/100) | 50 (30/20) | 510 (265/245) | 331 (160/171) |

Note: The first number is the total demand or capacity. Numbers in parentheses are the demand or capacity split between Haines and Skagway, respectively.

The capacity of Alternative 1B is determined by the capacity of the ferry links from the Day Boat ACF, mainline ferry, and *M/V Malaspina*. As shown in Table 4-10, the summer demand for ferry travel between Juneau and Skagway or Juneau and Haines would be about 210 vehicles in 2055. The number of ferry trips between Auke Bay and Haines/Skagway under Alternative 1B has been set to accommodate the projected summer ADT to and from both communities. The peak week demand is approximately 510 ADT, which would exceed summer capacity. Some

ferries may be at maximum capacity resulting in travelers having to wait for the next ferry or change their preferred ferry time. Alternative 1B would accommodate approximately 73 percent of the peak week ADT. During peak times, or special events, additional sailings could be provided to meet the demand. As with current operations, AMHS could schedule additional ferry service in Lynn Canal during identified high-volume days.

Because of these ferry links, the capacity of Alternative 1B would not meet the projected unconstrained travel demand in the Lynn Canal corridor. Latent (unconstrained) demand in the corridor during the summer is estimated to be about 1,950 ADT. Alternative 1B would realize and accommodate about 19 percent of the latent summer demand.

The projected local[12] travel demand between Haines and Skagway with Alternative 1B is the same as Alternative 1 – No Action. The local Haines-Skagway summer ADT is projected to be approximately 53 vehicles in 2025 and in 2055 for both Alternative 1 – No Action and Alternative 1B. In a typical summer week, most traffic will be able to travel directly between Juneau and Haines/Skagway, unlike Alternative 1 – No Action, which requires Juneau-Skagway travelers to connect through Haines. The *M/V Malaspina* will be able to accommodate the Juneau-Skagway traffic, leaving all of the capacity (197) on the Haines-Skagway Day Boat ACF available for this use, and is sufficient to meet the demand.[13] Additional Haines-Skagway capacity is provided by the mainliners and the *M/V Malaspina* (which would travel Haines-Skagway one day per week and Skagway-Haines one day per week).

#### 4.2B.7.2 Travel Flexibility and Opportunity

Alternative 1B would provide increased flexibility and opportunity for travel relative to Alternative 1 – No Action. Under Alternative 1B, travel between Auke Bay and Haines would be made available by the Day Boat ACF, the same as under Alternative 1 – No Action. In the summer, there would be 10 Auke Bay-Haines round trips per week[14] and nine same vessel trips per week between Auke Bay and Skagway.[15] Seven of these trips would be direct service using the *M/V Malaspina*. The other two trips would be on the mainline ferry. In winter, service would decrease to four Auke Bay-Haines round trips per week and four Auke Bay-Skagway round trips per week.

#### 4.2B.7.3 Travel Time

Table 4-11 provides travel times for vessels and routes that would be used for Alternative 1B. Under Alternative 1B, travel times on the mainline ferry and Day Boat ACFs are the same as they are under Alternative 1 – No Action. Travel between Skagway and Auke Bay on the *M/V Malaspina* would take approximately 6.8 hours.

[12] For the purposes of this SEIS, "local" refers to passenger and vehicle traffic that only goes back and forth between Haines and Skagway; i.e., it is traffic that either boards in Haines and disembarks in Skagway, or boards in Skagway and disembarks in Haines. This local Haines-Skagway travel demand is not considered part of the overall demand for travel to and from Juneau in Lynn Canal.

[13] Some Juneau-Skagway traffic may choose to travel via Haines depending on scheduling, personal preference, or other reasons. This traffic is expected to be minimal and not have a substantial impact on the ability of the Day Boat ACF to meet the travel demand between Haines and Skagway.

[14] Seven of these trips would be using the Day Boat ACF, two trips would be via a mainline ferry, and one trip would be via the *M/V Malaspina*.

[15] Summer travelers would have the option to go to Haines on the Day Boat ACF and transfer to the other Day Boat ACF to get to Skagway. This option would provide six additional trips to Skagway per week. However, few travelers would be likely to do this due to the longer travel time.

Travel times between Haines and Skagway under Alternative 1B would remain unchanged (2.4 hours) relative to Alternative 1 – No Action.

**Table 4-11:**
**Summer Travel Times for Alternative 1 – No Action and Alternative 1B**

| Route | Travel Time (hours) | | |
|---|---|---|---|
| | Alternative 1 – No Action (Day Boat ACF)[1] | Alternative 1B | |
| | | Day Boat ACF | *M/V Malaspina* |
| Auke Bay-Haines | 6.2 | 6.2 | 6.4 |
| Auke Bay-Skagway | 8.1 | 8.1 | 6.8 |

[1] With Alternative 1 – No Action and Alternative 1B, the mainline ferry (i.e., service along the length of the system, from Bellingham, WA, or Prince Rupert, B.C.) would have a travel time of 7.2 hours between Auke Bay and Haines and 9.1 hours between Auke Bay and Skagway.

### 4.2B.7.4 State and User Costs

The 36-year life-cycle cost of Alternative 1B would be $704 million, which includes all State and federal capital costs and all State operating costs discounted to 2016 dollars (Table 4-12).

**Table 4-12:**
**Thirty-Six-Year Life-Cycle Costs for the No Action Alternative and Alternative 1B**

| Alternative | Capital Cost ($million) | Operating Cost ($million) | Total Life-Cycle Cost ($million) |
|---|---|---|---|
| 1 – No Action | $119 | $322 | $441 |
| 1B | $236 | $468 | $704 |

The total project life costs less residual value over the 36-year period (expressed in 2016 dollars with no discounting) would be approximately $1.2 billion (capital plus operating costs, Table 4-13). The net cost to the State during the analysis period would be about $577 million in 2016 dollars, or about $283 per vehicle transported in Lynn Canal (Table 4-13).

**Table 4-13:**
**Thirty-Six-Year Total Project Life Costs for Alternative 1 – No Action and Alternative 1B, 2019–2054 (2016 Dollars)**

| Alternative | Total Costs | | | State Funds | | | |
|---|---|---|---|---|---|---|---|
| | Capital Costs ($million)[1] | Operating Costs ($million) | Total Project Costs ($million) | Total Cost ($million) | Total Revenue ($million)[2] | Net Cost ($million) | Cost/Vehicle (dollars) |
| 1 – No Action | $128 | $659 | $787 | $671 | $292 | $378 | $279 |
| 1B | $255 | $958 | $1,212 | $981 | $404 | $577 | $283 |

[1] Residual value subtracted.

[2] Includes both fares paid to AMHS and gas tax receipts.

The average annual operating cost of Alternative 1B in 2055 is estimated to be about $26.5 million, which would be an increase of $8.3 million from Alternative 1 – No Action.

The anticipated total user costs[16] of travel between Juneau and Skagway or Haines for travelers are listed in Table 4-14 for Alternative 1 – No Action and Alternative 1B. As discussed in Section 4.2A.2 under Alternative 1 – No Action, the total user cost for a family of four in a 19-foot-long vehicle would be $229.00 between Juneau and Haines, $301.50 between Juneau and Skagway. For a driver with a 19-foot-long vehicle, the total user cost would be $131.50 between Juneau and Haines and $169.00 between Juneau and Skagway. For a walk-on passenger, the cost would be $39 between Juneau and Haines and $53.00 between Juneau and Skagway. With Alternative 1B, these fares would be reduced by 20 percent (Table 4-14).

**Table 4-14:**
**Juneau to/from Haines and Skagway Total and Out-of-Pocket User Cost for Alternative 1 – No Action and Alternative 1B**

| Alternative | Example Scenario | Haines User Cost[1] | | Skagway User Cost[1] | |
|---|---|---|---|---|---|
| | | Total User Cost | Out-of-Pocket Cost | Total User Cost | Out-of-Pocket Cost |
| 1 – No Action | Family of 4 in a 19-foot vehicle | $229.00 | $227.00 | $301.50 | $301.50 |
| | Driver only in a 19-foot vehicle | $131.50 | $129.50 | $169.00 | $169.00 |
| | Walk-on passenger[2] | $39.00 | $39.00 | $53.00 | $53.00 |
| 1B | Family of 4 in a 19-foot vehicle | $183.00 | $181.00 | $242.00 | $242.00 |
| | Driver only in a 19-foot vehicle | $105.50 | $103.50 | $135.50 | $135.50 |
| | Walk-on passenger[2] | $31.00 | $31.00 | $42.50 | $42.50 |

[1]Total cost is based on fares plus $0.60 per mile for vehicular travel (AAA, 2015). Out-of-pocket cost is based on fares and gasoline consumption.

[2] Does not include cost of transportation to/from the ferry terminal.

Based on total user costs, travel time cost, and the projected travel in the Lynn Canal corridor through 2055, total user benefits in terms of reduced travel cost for Alternative 1B in 2016 dollars are provided in Table 4-15. As indicated in that table, Alternative 1B would provide benefits to travelers of $24 million relative to Alternative 1 – No Action over the 36-year period.

One economic measure of an alternative is its net present value. Net present value is the total of the user benefits minus the net cost of an alternative over and above the net cost of Alternative 1 – No Action for a given period of time. The net present value of Alternative 1B for this period is about negative $135 million because the incremental project costs are greater than the user benefits provided.

[16] Total user costs are out-of-pocket costs and vehicle maintenance, ownership, and accident costs based on highway miles traveled.

**Table 4-15:**
**User Benefits and Net Present Value of Alternative 1B versus Alternative 1 – No Action[1]**

| Alternative | User Benefits ($million) | Net Incremental Project Costs ($million)[2] | Net Present Value ($million) |
|---|---|---|---|
| 1B | $24 | $159 | -$135 |

[1] For the period 2019 to 2054 discounted to 2016 dollars.

[2] Overall project costs minus revenues.

### 4.2B.7.5 Other Transportation Impacts

**Air Taxi** – It is possible that some travel (especially between Juneau and Skagway) would be diverted from air taxi operations currently serving the Lynn Canal to ferries under Alternative 1B due to the direct ferry service between the two communities. However, as the ferry trip is still approximately 7 hours, the number of trips diverted from air taxi operations is expected to be minimal.

**AMHS** – Because of the increase in ferry service in Lynn Canal with Alternative 1B, it is estimated to require more State funding than Alternative 1 – No Action (Table 4-16). This alternative would place an additional funding burden on AMHS, which could have negative impacts on other AMHS service.

**Table 4-16:**
**Annual AMHS Operating Costs, Revenues, and Estimated State Funding for Alternative 1 – No Action and Alternative 1B**

| Alternative | AMHS Operating Cost ($million) | AMHS Revenue ($million)[1] | Estimated AMHS State Funding ($million) |
|---|---|---|---|
| 1 – No Action | $18.2[2] | $8.1 | $10.1 |
| 1B | $26.5[2] | $11.2.0 | $15.3 |

Source: *Marine Segments Technical Report* (Revised Appendix GG) and *User Benefit, Life-cycle Cost, and Total Project Cost Analyses* (Revised Appendix FF)

[1] Fare box revenue paid to AMHS; excludes gas tax receipts.

[2] Revised total is due to (1) the updating of costs to 2015 dollars and (2) a discrepancy in the data relied on to generate the 2014 Draft SEIS mainliner operating costs. Alternative 1B was also revised due to changes made to the alternative.

**Pedestrians and Bicyclists** – Under Alternative 1B, it anticipated that the percentage of walk-on passengers would be the same as Alternative 1 – No Action. The number of daily walk-on passengers (which includes bicyclists) during summer is projected to be 210 (Table 4-17) for Alternative 1B.

Because fares are 20 percent lower under Alternative 1B than Alternative 1 – No Action, the out-of-pocket cost also would be lower (see Table 4-17).

**Table 4-17:**
**Average Daily Ridership in Summer for Alternative 1 – No Action and Alternative 1B, 2055**

| | Total Passengers | Passengers in Vehicles | Walk-on Passengers | Walk-on Percentage |
|---|---|---|---|---|
| Alternative 1 – No Action | 410 | 285 | 125 | 30 |
| Alternative 1B | 690 | 480 | 210 | 30 |

Note: See Revised Appendix AA, *Traffic Forecast Report*

### 4.2B.8 Geology

Alternative 1B would not involve excavation or other construction activities; therefore, the proposed alternative would have no direct or indirect effects on geological resources.

### 4.2B.9 Hydrology and Water Quality

#### 4.2B.9.1 Hydrology

Enhanced service with existing AMHS assets would have no additional impact to hydrology under Alternative 1B relative to Alternative 1 – No Action. Alternative 1B does not include construction of any additional facilities to aid in additional services. Therefore, it is unlikely that impacts to the hydrology of both freshwater and the marine system would occur.

#### 4.2B.9.2 Water Quality

No substantial impacts to water quality are anticipated under Alternative 1B. Continued mainline ferry service in Lynn Canal would result in continued discharge of treated wastewater into Lynn Canal from those vessels, which is expected to meet AWQS. The Day Boat ACFs would have sanitary waste holding tanks and the wastewater would be pumped to an onshore facility for disposal. Sanitary waste generated at the ferry terminals would undergo treatment. Wastewater would undergo aeration and disinfection with ultraviolet light. The treated wastewater would be discharged to Lynn Canal under permit by the EPA (National Pollutant Discharge Elimination System [NPDES] permit) and/or ADEC (APDES Permit) and would meet EPA- and Alaska-established waste discharge limitations.

The ferry terminal sewage treatment facilities at Auke Bay, Haines, and Skagway would continue to operate under these alternatives. There are no documented impacts associated with these systems; therefore, negligible impacts to water quality from the terminal treatment facilities are anticipated. Accidental discharges, spills, and leaks are possible during ferry operations. Additional ferry trips made by the *M/V Malaspina* between Auke Bay and Skagway under Alternative 1B relative to Alternative 1 – No Action increase the potential for these types of accidents. Historically, accidental discharges, spills, and leaks have been minor, with only minimal and temporary impacts to water quality.

### 4.2B.10 Air Quality

Alternative 1B is projected to have no negative human health or environmental consequences resulting from project-related vehicle or ferry vessel emissions. The estimated annual load of emissions (tons/year) for Alternative 1B relative to total emissions loading at active marine centers is presented in Section 4.9.2.7 with a discussion of this potential cumulative impact.

### 4.2B.11 Hazardous Materials

There are no proposed transportation improvements associated with Alternative 1B that would involve excavation or other construction activity that could affect, or be affected by, hazardous materials sites.

### 4.2B.12 Wetlands

Because Alternative 1B would enhance service with existing AMHS assets and would not result in the construction of any new highways or ferry terminals, it would have no direct or indirect effects on wetlands.

### 4.2B.13 Marine and Freshwater Habitat and Species (including Essential Fish Habitat)

Because Alternative 1B would not result in the construction of any new highways or ferry terminals, it would not result in the loss of EFH.

Ferry operations under Alternative 1B would be greater than under Alternative 1 – No Action. Ferries generating propeller wash and surface wakes near shore would increase localized turbidity, which could impact aquatic habitats such as eelgrass beds in Lynn Canal. Studies conducted by NMFS (Harris, Neff, and Johnson, 2012; Holsman et al., 2006; Laurel et al., 2007; Murphy et al., 2000; Johnson et al., 2003) have documented declines in eelgrass cover, species composition, and fishery declines in areas subjected to effects from ferries. Eelgrass beds in the terminal area of Auke Bay are already disturbed, and additional wave energy at the Auke Bay Ferry Terminal from ferry operations is not anticipated to substantially degrade the eelgrass bed adjacent to Auk Nu Cove beyond its current condition. FHWA has determined that Alternative 1B would not have a substantial adverse effect on eelgrass beds or other EFH.

### 4.2B.14 Terrestrial Habitat

Because Alternative 1B would not result in the construction of any new highways or ferry terminals, it would have no direct or indirect effects on terrestrial habitat.

### 4.2B.15 Wildlife

#### 4.2B.15.1 Marine Mammals

Harbor seals, minke whales, killer whales, harbor porpoises, Dall's porpoises, and sea otters are considered in this section. Humpback whales and Steller sea lions are discussed in Section 4.3.17, Threatened and Endangered Species.

Alternative 1B would not result in the loss of any habitat for marine mammals. Marine vessel collisions with marine mammals have the potential to cause injury or mortality (Laist et al., 2001); however, documented interactions between marine mammals and AMHS vessels in northern Lynn Canal are low (Savage, 2015). Minke whales are unlikely to be affected by increased ferry traffic associated with Alternative 1B. Minke whales typically change course and speed to avoid a noisy ship, but when feeding in an area of high prey availability, whales tolerate very loud noises. No collisions between Minke whales and AMHS ferries have been documented. Fast-moving and maneuverable species such as harbor seals, harbor porpoise, Dall's porpoise, and killer whales would not be expected to be affected by any increased ferry traffic in Lynn Canal associated with Alternative 1B. Sea otters would not be affected by Alternative 1B increased ferry traffic because their population in Lynn Canal is low and they are associated primarily with nearshore habitats. Concern for harbor seals is focused on disturbance at haulouts. Alternative 1B would use existing dock facilities and ferry routes that are distant from seal haulouts; therefore, Alternative 1B would have no impacts on seals.

#### 4.2B.15.2 Marine Birds

Expansion of summer ferry service in Lynn Canal relative to No Action may result in more frequent disturbance to marine birds that utilize Lynn Canal for foraging: marbled murrelets, Kittlitz's murrelets, yellow-billed loons, and harlequin ducks. Marine birds and waterfowl feeding or resting along the ferry route in Lynn Canal would fly or swim away from approaching ferries and resume their normal behavior in another location. The impacts would primarily be the energetic cost to avoid ferries. Collisions are unlikely due to the swimming and diving abilities of marine birds. These species most frequently use nearshore, protected areas for feeding and resting, and are less likely to be in the main channel of Lynn Canal; therefore, impacts are not likely. Marine birds may be flushed by ferries in shallow coastal waters approaching terminals; however, this sort of disturbance would not be frequent enough to have a population-level effect on these species.

#### 4.2B.15.3 Terrestrial Mammals

Because Alternative 1B would not result in the construction of any new highways or ferry terminals, it would have no direct or indirect effects on terrestrial mammals.

#### 4.2B.15.4 Terrestrial Birds

Because Alternative1B would not result in the construction of any new highways or ferry terminals, it would have no direct or indirect effects on terrestrial birds.

#### 4.2B.15.5 Amphibians

Because Alternative 1B would not result in the construction of any new highways or ferry terminals, it would have no direct or indirect effects on amphibians.

### 4.2B.16 Bald Eagles

Because Alternative 1B would not result in the construction of any new highways or ferry terminals, it would have no direct or indirect effects on terrestrial or freshwater habitats used by bald eagles.

### 4.2B.17 Threatened and Endangered Species

Alternative 1B would enhance ferry service with existing AMHS assets, and would not result in the construction of any new highways or ferry terminals. As such, Alternative 1B would not affect Steller sea lions at any traditional haulouts. Steller sea lions at Gran Point and Met Point haulouts are habituated to large commercial marine vessels that currently pass through Lynn Canal. The increased ferry traffic in Lynn Canal under Alternative 1B would not measurably change the potential for Steller sea lion or humpback whale interactions with vessels. Although it is possible for a sea lion or whale to be harmed by a collision with a vessel, they are generally very agile animals and successfully avoid such encounters, even with fast vehicle ferries (FVFs) that travel at twice the speed of vessels that would be used for Alternative 1B. There have been no reports of any sea lion or humpback whale mortalities due to the current operation of the AMHS ferries in Lynn Canal. Because the ferry traffic associated with Alternative 1B would operate at speeds similar to existing ferry service and would be in the same travel corridor, it is expected that sea lions and humpback whales would be unaffected by these vessels. For these

reasons, the FHWA has made the preliminary determination that Alternative 1B is not likely to adversely affect Western DPS Steller sea lions or Mexico DPS humpback whales.

### 4.2B.18 Permits and Approvals

Permits, consultations, and approvals required for Alternative 1B are limited to:

- NMFS ESA Section 7 consultation for threatened and endangered species

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

Under this alternative, there would be a highway extending from Cascade Point to the Katzehin River delta (see Figure 2-7a). The portion of the Glacier Highway extending from Echo Cove to Cascade Point would be widened from the existing 26 feet to 30 feet. A new ferry terminal would be constructed 2 miles north of the Katzehin River, with ferry service connecting Katzehin to Skagway and Haines. Mainline ferry service would be terminated at Auke Bay.

DOT&PF and the USFS have identified appropriate sites for pullouts and scenic overlooks that would also be part of this alternative. These sites are listed below (Figure 4-1).

- A pullout near the crossing of Sawmill Creek.
- A pullout and trailhead would be located on the highway above the USFS cabin in Berners Bay, and DOT&PF would construct a trail to the cabin.
- An Antler River pullout would be located just south of the bridge over the Antler River.
- A Lace and Berners River pullout would be located just west of the bridge over the Lace River.
- A Slate Cove pullout would be located west of Slate Cove.
- The planned Comet highway maintenance building would include a rest stop with public facilities. A pullout and scenic overlook on the canal side of the highway would also be provided.
- A pullout on the east side of the highway and a pullout and scenic overlook on the canal side of the highway would be located near the Brown Point geodetic marker.
- A pullout and scenic overlook would be located near Eldred Rock.
- A pullout on the east side of the highway and a pullout and scenic overlook on the canal side of the highway would be located near Yeldagalga Creek.
- A pullout and scenic overlook would be located in a valley south of the Katzehin River.
- A pullout and scenic overlook would be located north of the Katzehin River.

The impact assessment provided in this section includes consideration of the potential impacts of the proposed pullouts and scenic overlooks. The USFS has indicated that trails at four of the pullouts are reasonably foreseeable if the highway is constructed. (See USFS letter dated November 2, 2005, in Chapter 7 of the 2006 Final EIS for information regarding trails envisioned by USFS.) These four trails are included in the cumulative impact assessment provided in this chapter. A separate environmental analysis would be completed by the USFS for these trails prior to their construction.

### 4.3.1 Land Use

#### 4.3.1.1 Land Ownership

Current ownership of the land that would be required for the highway ROW and the new ferry terminal facility for Alternative 2B is presented in Table 4-18. As indicated in that table, about 96 percent of the land is part of the Tongass National Forest under the management of the USFS. This land would remain under federal ownership with a highway easement conveyed to the State. Goldbelt and other private owners would be compensated for lands acquired for a new highway ROW at fair market value in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. The ROW requirements assume 150-foot width across the Goldbelt and other private lands and 300-foot width on USFS lands. DOT&PF considers the 150-foot ROW width on private lands to be sufficient given the terrain through those areas. The 300-foot ROW width on USFS lands is based upon the width specified in the Memorandum of Understanding for Section 4407 easements (see Section 3.1.1.3), and is also consistent with the ROW width established by the federal government for the Haines Highway and similar roads across public lands within the State. DOT&PF generally limits impacts to private and municipal owners by taking only what is necessary for the immediate project and minor future improvements. For State and federal lands, DOT&PF usually obtains a standard 300 feet to allow for a one-time land transfer that would also accommodate any future expansion.

**Table 4-18:**
**Land Ownership of Required Right-of-Way for Alternative 2B**

| Ownership (acres) | | | Total (acres) |
|---|---|---|---|
| USFS | Goldbelt | Private | |
| 1,592 | 90 | 6 | 1,688 |

Note: 300-foot ROW on federal and State lands and 150-foot ROW on private and municipal lands.

#### 4.3.1.2 Consistency with Land Use and Management Plans

As described in Section 3.1.1.1, the TLRMP identifies Transportation Systems Corridors, or TSCs. TSCs include easements established by law, such as those established under Section 4407 of Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), as amended by the Fixing America's Surface Transportation (FAST) Act. Such an easement exists along the east side of Lynn Canal, and Alternative 2B would use the easement; therefore, this alternative is consistent with the TLRMP. A portion of the USFS land crossed by the Alternative 2B alignment along the east shore of Berners Bay is currently managed under LUD II, which refers to congressionally designated lands where the principal management goal is to retain the primitive wildland character of the area while allowing necessary State highways (Figure 3-3). The rest of the USFS land along the alignment is managed under the TLRMP designation of Semi-Remote Recreation, Old-Growth Habitat, Scenic Viewsheds, and Modified Landscape. The Kensington Gold Project area is in a LUD for Minerals. In accordance with the TLRMP, if Alternative 2B were the selected alternative for the JAI Project, the USFS would change the management of the highway corridor to TSC, and the management prescriptions for the TSC would take precedence over the prescriptions of the LUDs underlying the corridor (USFS, 2016b:3-313). The USFS, in consultation with ADF&G and USFWS, would adjust the boundaries of the affected Old-Growth Habitat LUDs in accordance with OGR standards in the TLRMP (see OGR discussion in Section 4.3.14). Such a

boundary adjustment would require a formal amendment to the TLRMP and an associated NEPA decision approval by the USFS.

The State of Alaska believes the use of a State transportation easement granted by Congress under Section 4407 of SAFETEA-LU, as amended by the FAST Act, and located on the east side of Lynn Canal would not require further evaluation for consistency with the TLRMP. If for some reason DOT&PF could not use all or a portion of this easement, FHWA would seek to secure a transportation easement across Tongass National Forest through a federal land appropriation process authorized by 23 USC 317.

The stated regional transportation policy set forth in the 2008 CBJ *Comprehensive Plan* is "to support the improvement of transportation facilities and systems that reinforce Juneau's role as the capital city of Alaska and a regional transportation and service center." The plan supports consideration of all affordable, energy efficient transport alternatives to improve transportation links between Juneau and other areas of Southeast Alaska including air (cargo and passenger) service, roadways, ferries, and fixed guideway systems (CBJ, 2008). Alternative 2B is consistent with the CBJ *Comprehensive Plan*. Alternative 2B is also consistent with the 2009 CBJ Assembly Resolution 2463. That resolution made recommendations for transportation projects to DOT&PF for the 2010–2013 STIP, one of which was extension of the Glacier Highway to MP 91.1 (just north of the Katzehin River delta, which is the proposed location of the Katzehin Ferry Terminal in Alternative 2B).

The Haines Borough *2025 Comprehensive Plan* adopted in 2012 indicates a desire for increased AMHS trips to Haines and for an AMHS ferry to homeport or overnight in Haines (Haines Borough, 2012). The *2025 Comprehensive Plan* also indicates a preference for a west-side road, should one be selected. Alternative 2B crosses USFS lands with a general use designation in the Haines Borough *2025 Comprehensive Plan*. Haines Borough Ordinance 03-02-007 indicates that the intent of the general use designation is to provide a minimum of planning, platting, and land use regulation in rural areas. A transportation facility would be consistent with this zoning designation. While Alternative 2B would overnight a ferry in Haines, it is not consistent with the Borough's comprehensive plan; however, State agencies' projects are not required to conform to local land use plans.

The Municipality of Skagway Borough *2020 Comprehensive Plan* states that it is the goal of the Municipality to provide an integrated, efficient, safe, and reliable transportation network to facilitate the movement and goods in and through Skagway (Municipality of Skagway, 2009). The transportation policy supports maintaining and increasing year-round access to and from Skagway, including public and private ferries, and air, road, trail, marine, and rail access. Alternative 2B is consistent with the Borough's comprehensive plan.

Goldbelt's Echo Cove Master Plan included a road that has been constructed from the northern end of Glacier Highway at Echo Cove to Cascade Point in Berners Bay. The plan also includes a ferry terminal at Cascade Point, expansion of the campground at Echo Cove, a lodge, and other developments. Alternative 2B is consistent with this plan and would use the alignment of the existing road. Alternative 2B may contribute to a decision to develop other plan elements.

#### 4.3.1.3 Land and Resource Uses

Alternative 2B would substantially increase access to the east Lynn Canal coastline for recreation and tourism. Improved access to forest land is expected to increase use and thus the

need for management and monitoring. Access from Alternative 2B would result in more nonresident visitors arriving in Juneau, Haines, or Skagway by personal vehicle. The numbers of overall visitors to Juneau would increase because the highway would offer a previously untapped visitor population a more independent, flexible and economic access option. An increase in independent visitors could also increase the demand for more recreational vehicle (RV) parks.

The DOT&PF and the USFS have identified recreation opportunities at sites along this alignment. DOT&PF would create pullouts at areas suitable for construction of trailheads (by others), which would facilitate use of Tongass National Forest lands (Figure 4-1). Pullouts are proposed near Sawmill Creek, Berners Bay, Antler and Lace rivers, Slate Cove, Comet, Brown Point, Eldred Rock, Yeldagalga Creek, and south and north of the Katzehin River. In addition, paved shoulders suitable for bicyclist and pedestrian use would be constructed along the highway.

Alternative 2B would improve opportunities for recreational activities such as hiking, camping, sightseeing, rafting, canoeing, kayaking, fishing, and hunting. These opportunities would provide benefits for residents and visitors, and spread out recreation activities that are currently concentrated along the existing highway systems in Juneau, Haines, and Skagway. Berners Bay and the Katzehin River delta are already popular locations on the east side of Lynn Canal for remote and semi-remote recreation. A highway through these areas would make them more accessible for people looking for a rustic, but not totally remote outdoor experience.

A highway would also make the USFS-maintained Berners Bay cabin more accessible for recreation. As discussed above, a pullout and trailhead would be located on the highway above the Berners Bay cabin and DOT&PF would construct a trail to the cabin. See Section 6.2.2.2 for a discussion on the Berners Bay cabin and access from a trailhead along the East Lynn Canal Highway.

The highway would not impact the landing strip north of the Katzehin River. A highway could also provide opportunities for outfitters to make more recreational trips available to the public in the region. For example, river crossings often provide good places for putting in or taking out kayaks. Bridges associated with Alternative 2B could open up opportunities for new kayak trips.

Opening up the recreation opportunities of the coastline along the east side of Lynn Canal would be perceived as a negative impact to the quality of the experience by those who enjoy the existing remote nature of the region, including some outfitters who currently provide wilderness trips there. Current users of Berners Bay who travel there by kayak, canoe, small boat, or float plane would find the experience there different. As a general mitigation for impacts to Berners Bay users desiring a remote, water-access experience, DOT&PF would construct a new water-accessed cabin to be managed by the USFS at a location selected in consultation with the USFS.

Many of the rivers and streams that would be crossed by Alternative 2B contain resident and anadromous fish stocks available for sport fishing. The region also supports populations of mountain goat, bear, and moose, big game species available for take by resident and out-of-state hunters. Hunting and fishing pressure has increased along every highway in Alaska that has opened a formerly remote area. Increases in recreational hunting and recreational and personal use fishing would be expected along Alternative 2B. As in other readily accessible regions of the state, the ADF&G would monitor the resources along Lynn Canal and make recommendations to the Board of Fish and Game to adjust fish and game regulations, as necessary, to protect those resources from over utilization.

Improved access to fish streams and the resultant higher level of use by sport fishers would require a greater level of effort by ADF&G in terms of surveying streams and enforcing regulations. Increased access to Juneau and the resultant increase in visitors would put additional pressure on existing sport fishing facilities in Juneau, including boat ramps. The CBJ would be responsible for evaluating the need for additional or expanded facilities as demand in the Borough increases.

Better access and through-traffic resulting from Alternative 2B may contribute to a decision by Goldbelt to develop some of its plan elements.

Alternative 2B would benefit the Kensington Gold Project by facilitating the transport of goods and services to the mine site from Juneau and making it more convenient for workers in Juneau, Skagway, and Haines to reach the site. A highway would provide easier and less expensive access to other mineral occurrences, prospects, and former mines along the east side of Lynn Canal. It is unlikely that any mineral deposits in the region would be developed solely because of this improved access. Development of mineral resources is capital intensive, involving many other costs besides access. Market conditions must be high enough to account for all of these costs before development can occur.

**Roadless Areas** – Alternative 2B would not substantially change the natural integrity and appearance or opportunities for solitude in IRA 301 or 305 (see Section 3.1.1.1 for a discussion of IRAs and Revised Appendix DD, *Land Use Technical Report*, Section 4.4, for detail on the effects of Alternative 2B on roadless areas). IRA 301 encompasses 1,201,474 acres, of which 98 percent is managed as Non-Development LUDs. IRA 305 encompasses 94,800 acres. Within the 300-foot-wide assessment corridor, Alternative 2B would have a cleared width of approximately 100 feet. The influence of the highway in terms of intruding on the apparent naturalness of the area would extend 1,200 feet on either side of this cleared area (except where the highway is closer than 1,200 feet from the shore), for a maximum total width of 2,500 feet. Therefore, Alternative 2B would impact 8,647 acres largely along the eastern boundary of IRA 301, and 648 acres of IRA 305. This represents 0.73 percent of the land encompassed by IRA 301, and 0.64 percent of the land encompassed by IRA 305.[17]

Alternative 2B would reduce the amount of land remaining roadless. This remaining area would appear natural, and would still provide opportunities for solitude, self-reliance, adventure, and primitive recreation. The roadless area inventory boundary would not change; there would be a road within the IRA. Access to the roadless area would change from water access to a combination of water and highway access. Alternative 2B would not affect any identified scientific or educational features in IRA 301 or IRA 305. Alternative 2B is also consistent with the TLRMP, which indicates that the road corridor for Alternative 2B in IRA 301 and IRA 305 would be managed as a TSC. Revised Appendix DD, *Land Use Technical Report*, provides additional information on Roadless Areas. The Secretary of Agriculture and the USFS may be required to make an affirmative finding under the Roadless Rule that the easements granted by Congress under Section 4407 of SAFETEA-LU, as amended by the FAST Act, were "established by law" and therefore that a road using the easements would be consistent with the Roadless Rule.

[17] The Glacier Highway extension, completed in 2011, currently runs 0.7 mile in IRA 305; nevertheless, the USFS still maps this as an IRA. Alternative 2B would slightly widen the existing road and would extend the road within IRA 305 approximately 2 miles to the northern edge of the IRA.

#### 4.3.1.4 Parks and Recreation Facilities

Alternative 2B would require no land from any municipal, State, or federal park or formally designated public recreation areas within the study area. None of the recreation facilities identified in Section 3.1.1.7 are within the construction limits of Alternative 2B. Based on a USFS request, the Berners Bay cabin would have access from the highway under this alternative, and pullouts would be provided where trailheads could be constructed by others. See Chapter 6 for further discussion of potential impacts to public recreation facilities.

### 4.3.2 Coastal Zone Management

The CBJ and Haines incorporated enforceable policies for coastal zone management into their respective comprehensive plans and/or ordinances, as described in Section 3.1.1.8. Official determination of consistency with enforceable provisions would occur during local review of construction projects, including roads, ferry terminals, or other improvements and modifications needed to implement the alternative. The CBJ has provided the DOT&PF a consistency determination for the highway segment of Alternative 2B from Echo Cove to Sweeney Creek (Figure 3-18; CBJ, 2006), which does not expire. The Haines Borough has incorporated several coastal management enforceable policies into its comprehensive plan. Consistency with enforceable provisions would be assured during local review of plans for individual construction projects as required by Alaska Statute 35.30. The Municipality of Skagway Borough has not incorporated coastal management enforceable policies into its comprehensive plan, but some elements are codified in other ordinances, and compliance with the ordinances would occur during the development review process.

### 4.3.3 Visual Resources

In 2003, visual simulations were made of Alternative 2B at typical viewpoints that represent characteristic viewing conditions in each of the major landscape units described in Section 3.1.2. The locations of those viewpoints are provided in Figure 4-2. A description of the visual character of the alternative at each viewpoint is provided below.

#### 4.3.3.1 Berners Bay

**Views from the Bay** – In Berners Bay, the most susceptible views to potential impacts from Alternatives 2B include:

- Views from Berners Bay
- Views from small boats and ferries
- Views from the Berners Bay cabin
- Views from lower reaches of Berners, Lace, and Antler rivers
- Views from Point Bridget State Park

Figure 4-3 provides a visual simulation of the highway in background views from the southern end of Berners Bay. From this location, the highway is approximately 2.4 miles from the viewer, and it is located in an area not requiring substantial cuts and fills. Therefore, the highway is not likely to dominate the existing natural setting. It is likely that visitors to Berners Bay and Point Bridget in the Point Bridget State Park would notice the highway; however, this condition is highly dependent on the view distance.

Figure 4-4 is a visual simulation of the highway under Alternative 2B just south of the confluence of the Berners, Lace, and Antler rivers on the east side of Berners Bay within proximity of the Berners Bay cabin. Topography within this area varies from gentle to moderately steep. As a result, it is likely that cut-and-fill areas would be intermittently visible from this viewpoint. A distinct line created by the removal of vegetation would also be noticeable. The layering of landscapes surrounding primarily all but the central western portion of the bay dominates existing viewsheds. Figure 4-5 provides a visual simulation of Alternative 2B within Berners Bay. A strong linear band created by exposing lighter soil and rock in cut-and-fill areas would be most noticeable. The proposed bridge would create contrast in form; however, depending on the angle of view as well as the distance, the bridge would be more or less noticeable. Steep road cuts on the eastern edge of Berners Bay would dominate the existing setting out to the middleground viewing threshold. The bridge and highway would dominate the existing setting when they are included in foreground views.

Views of the road and bridges, cut and fill, changes in vegetative cover, vehicle movement, and vehicle lights could affect some viewers by changing their perception of the comparative isolation of this area. Movement of vehicles, during both the construction and operation stages, could result in a visual impact to viewers.

**Views from the Highway** – Views from a highway along the east shore of Berners Bay looking east would be limited to the foreground by dense OG forest in most places. Crossing the Berners River and Antler River delta, views to the east would open up to an extensive marsh in front of a forested valley cut through steep and rugged mountains. Many of the views looking west from a highway would be panoramic, taking in Berners Bay and Lynn Canal with the snow- capped peaks of the Chilkat Range in the background approximately 12 miles away.

#### 4.3.3.2 Point St. Mary to Eldred Rock

**Views from Lynn Canal** – From Point St. Mary to Comet, views most susceptible to potential impacts from Alternative 2B include:

- Views from mining roads in the vicinity of Comet
- Views from cruise ships and small boats

Figure 4-6 is a visual simulation of Alternative 2B from Lynn Canal looking east toward Sherman Point. The existing viewshed is unique, as it has scenes that contain rolling terrain in the foreground and middleground and mountains in the background. Because of the highway being sited within an area of less steep topography, the visibility of cut-and-fill areas is reduced. Although the linear band created by the removal of vegetation would be noticeable in the middle and foreground viewing thresholds, much of the proposed roadway would hug the shoreline, blending into the coastline. Overall, the roadway would appear as a linear band at the land-water interface and would be a co-dominant to subordinate feature within the natural setting.

Figure 4-7 provides a visual simulation of Alternative 2B within middleground views of the area from the canal north of Comet. The highway would traverse steep topography in an area interspersed with vegetation. A waterfall occurs in the viewshed as well as a noticeable rockslide. The highway would create a distinct linear feature across the existing setting that would compete with and detract from natural landscape features. This conclusion is primarily a factor of substantial cut-and-fill areas occurring within the existing viewshed.

From just north of Comet to Eldred Rock, the most susceptible views to potential impacts from Alternative 2B include:

- Views from Sullivan Island and Sullivan Island State Marine Park
- Views from and around Eldred Rock Lighthouse
- Views from cruise ships and small boats

Figure 4-8 provides a visual simulation of Alternative 2B from a traveler in the Lynn Canal on a vessel near Eldred Rock, with the highway at a distance of approximately 1.5 miles. As indicated in the simulation, the highway would represent a strong linear feature introduced to an otherwise natural setting. Some portions of the roadway would be sited close to the water's edge, thus reducing visibility of this linear band. In other areas, the highway would be sited up to 100 feet above the water's edge and traverse areas of extreme slope, creating dominant shear-cut faces. The strong linear feature of the highway within the natural setting would be readily apparent to travelers on Lynn Canal. The highway would be a co-dominant feature in the viewshed.

Views of the road, cut and fill, changes in vegetative cover, vehicle movement, and vehicle lights could affect viewers by changing their perception of the comparative isolation of this area. Movement of vehicles, during both the construction and operation stages, could result in a visual impact to viewers.

**Views From the Highway** – Views from a highway would alternate between confined foreground and middleground views of dense forest to panoramic scenes of Lynn Canal. Those panoramic views would include the east shoreline in the foreground and the water of the Canal in the middle- and background, with background views of the rugged, snow-capped peaks of the Chilkat Range across the Canal.

#### 4.3.3.3 Eldred Rock to Mount Villard

**Views from Lynn Canal** – Alternative 2B would be visible in the viewshed of the Katzehin River delta. Views most susceptible to impact in this area include:

- Views from the Katzehin River Valley downstream reach proposed as a Wild and Scenic River
- Views from Portage Cove Campground
- Views from Haines
- Views from cruise ships and small boats
- Views from shoreline cabins

Figures 4-9 and 4-10 show visual simulations of Alternative 2B within the middleground viewing threshold in this area. From the location assumed in Figure 4-9, a viewer traveling within Chilkoot Inlet in the vicinity of the Katzehin River would likely notice a linear band created by the exposure of lighter soils as well as the bridge spanning the river mouth. Although the proposed bridge would be noticeable, the scale of both landform and vegetation modifications is less than that of cut-and-fill areas constructed on mountain slopes. Southbound travelers would not notice this portion of the highway to the same degree as northbound travelers approaching the river headwaters because the highway would be masked by topography as the inlet turns to a more northwesterly direction than a northern direction.

As shown in Figure 4-10, the highway would appear as a linear band along the base of Mount Villard. Topography along this link is very steep and vegetation intermittent. As a result, cut-and-fill areas would be highly noticeable in middle- and background views. The proposed ferry terminal north of the Katzehin River delta for Alternative 2B would be noticeable as an interruption in the line associated with the roadway. The existing natural setting dominates this viewshed, and it is unlikely that the highway would visually compete with the existing setting. The proposed bridge crossing the Katzehin River, from this viewpoint, would not compete substantially with the natural setting.

Views of the road, bridge, and ferry terminal; cut and fill; changes in vegetative cover; and introduction of vehicle movement and lights could affect viewers by changing their perception of the comparative isolation of this area. Movement of vehicles, during both the construction and operation stages, could result in a visual impact to viewers.

**Views From the Highway** – Views from a highway would typically alternate between confined foreground and middleground views of dense forest to panoramic scenes of Lynn Canal. Those panoramic views would include the east shoreline in the foreground and the water of the Canal in the middle- and background, with background views of the rugged, snow-capped peaks of the Chilkat Range across the Canal. At the bridge over the Katzehin River, views would encompass the broad floodplain of this river and the deep, forested valley extending to the east.

#### 4.3.3.4 Consistency with USFS Scenic Integrity Objectives[18]

As explained in Chapter 3, the TLRMP assigned SIOs for each LUD. The SIO for the TSC (which replaces the TUS LUD in the 2008 TLRMP) is Low with only the foreground of views considered. This SIO should be achieved within one year of construction. Alternative 2B would be consistent with this SIO. Wherever possible, the alignment has been located to maintain a buffer between the highway and the shore to reduce the visibility of the highway from Lynn Canal. Vegetation within this buffer would be maintained to the extent practicable. Also, to the extent practicable, shot rock slopes would be covered with overburden and seeded to reduce their visibility. In many locations, the alternative would exceed the Low SIO rating and would be consistent with the Moderate SIO. In order to demonstrate the overall visual effect of Alternative 2B and address the USFS guideline to meet the SIO of adjacent LUDs to the extent feasible, DOT&PF also evaluated the alternative's consistency with the SIOs of the adjacent LUDs.

**Berners Bay** – USFS LUD II land in Berners Bay has a High SIO. However, from Echo Cove to Sawmill Cove, the SIO is Moderate. Alternative 2B would be partially visible from many of the views of the coastline from the bay. Therefore, at most locations it would meet the Moderate SIO. It would not meet the High SIO where it is visible from the bay. To the extent feasible, soil would be spread on the rock slopes and seeded to minimize visual impacts.

**Slate Cove to Eldred Rock** – Most of the USFS land along the Lynn Canal coast from Slate Cove to a point north of Eldred Rock has a Low SIO. However, the SIO is High within the two Old-Growth Habitat LUDs along this section. Alternative 2B would meet or exceed the Low

[18] The 2006 Final EIS used Visual Quality Objectives (VQOs) in accordance with the 1997 TLMP. This Final SEIS has been updated based on the 2016 TLRMP, which (consistent with the 2008 TLRMP) replaces the VQOs with Scenic Integrity Objectives (SIOs). The primary difference between the VQOs and SIOs is that the SIOs better recognize the positive scenic values associated with some human-modified (cultural) features and settings. The VQOs and SIOs are similar enough that the definitions were written to allow for easy conversion between the two.

SIO. The highway would be visible in the Old-Growth Habitat LUD north of Comet from some views in Lynn Canal. Therefore, it would not meet the High SIO in this location, but would meet the Moderate SIO by minimizing clearing and vegetating slopes.

**Eldred Rock to Katzehin Ferry Terminal** – Most of the USFS land from Eldred Rock to the Katzehin Ferry Terminal has a Moderate SIO. Alternative 2B would be visible from some but not all views from Lynn Canal and would therefore meet the Moderate SIO. The SIO adjacent to the alignment from the Katzehin River to the terminal site has a High SIO. At the Katzehin River and at several locations where the road crosses steep terrain, the highway would be visible, and in these sections meeting a High SIO is not feasible. To the extent practicable, shot rock slopes would be covered with overburden and seeded to reduce their visibility.

### 4.3.4 Historical and Archaeological Resources

Based on record searches and surveys of the study area, Alternative 2B would not affect any known prehistoric resources. Consultations with Native Tribes and organizations have indicated that there are areas of cultural importance but have not indicated that this alternative would impact any traditional cultural properties. Historic resources potentially affected by Alternative 2B are discussed below.

Alternative 2B would cross the Jualin Mine Tram, a contributing element of the Jualin Historic Mining District, as well as the encompassing Berners Bay Historic Mining District, just inshore from Berners Bay (Figure 3-6). At this location, the rails on the tram are visible on the ground between the shore and a rock bluff to the west. The alternative would bridge over the tram to the top of the rock bluff, leaving the tram intact. Alternative 2B would impact no other structures or features that contribute to the Jualin Historic Mining District. For these reasons, FHWA has determined that Alternative 2B would have no adverse effect on the Jualin Tram or the Jualin Historic Mining District.

Alternative 2B would cross the Comet/Bear/Kensington Railroad (Figure 3-6), a contributing element of the Comet/Bear/Kensington and Berners Bay Historic Mining Districts, in a forested area where the rail sections are missing but where the cleared ROW and evidence of the supporting pilings and trestles can be seen heading easterly toward the Comet/Bear/Kensington mill site. The alternative would bridge over the railroad ROW, and would cross no other structures or features that contribute to the Historic Mining District. For these reasons, FHWA has determined that Alternative 2B would have no adverse effect on the Comet/Bear/Kensington Railroad or the Comet/Bear/Kensington Historic Mining District.

Alternative 2B would pass between two discontinuous units of the Ivanhoe/Horrible Historic Mining District (Figure 3-6). Therefore, FHWA has determined that Alternative 2B would have no effect on the Ivanhoe/Horrible Historic Mining District.

Alternative 2B would pass through the Berners Bay Historic Mining District. The only contributing elements affected are the Jualin Mine Tram and the Comet/Bear/Kensington Railroad, both of which would be crossed by a bridge. Therefore, FHWA has determined that Alternative 2B would have no adverse effect on the Berners Bay Historic Mining District.

Alternative 2B would increase human access in the east Lynn Canal area. Increased access could result in indirect impacts because of disturbance to historic and prehistoric cultural sites from hikers, hunters, and other recreational users.

DOT&PF and FHWA have consulted with the USFS and the SHPO regarding potential impacts to historic properties in the APE of Alternative 2B. On October 5, 2005, SHPO concurred with FHWA's determination that Alternative 2B would have no adverse effect on any historic property (see correspondence section of Chapter 7 of 2005 Supplemental Draft EIS). In June 2012, following correspondence from FHWA detailing the minor changes to Alternative 2B, the SHPO reconfirmed that a finding of no adverse effect remains appropriate for this alternative.

### 4.3.5 Socioeconomic Resources

#### 4.3.5.1 Overview

The improved access in the Lynn Canal that would result from Alternative 2B would facilitate the movement of goods and people through and to the northern Southeast Alaska region. This would create closer links between the economies of Juneau, Haines, Skagway, and Whitehorse.

In the near-term, improved access to Juneau is not expected to result in new major economic development in Alaska. Instead, improved access to Juneau would redistribute within the state some of the economic benefits received from one of Alaska's primary industries, the visitor industry. Independent visitors (i.e., non-cruise ship visitors) could shift their travel patterns, perhaps spending more time and money in Southeast Alaska, particularly in Juneau.

The redistribution of tourism-related economic benefits might result in net economic gain in one area of the state, offset by economic loss in another. On a regional basis, improved access would result in a net gain to Juneau's local retail industry, and Haines and Skagway could realize some loss in certain types of retail sales such as durable goods.

Population and the overall demographics of Juneau, Haines, and Skagway would not be substantially affected by the improved access resulting from Alternative 2B. Haines has a fairly large retirement population. Improved access would possibly enhance Haines' reputation as a retirement community through better access to Juneau's retail and service sectors, particularly health care services and cultural activities. To the extent that this occurs, Haines' population would grow as a result of improved access. Better access to/from Haines would also increase the number of Juneau residents with second homes or cabins in the Haines area. Of the three major communities in the Lynn Canal corridor, Juneau would experience the most population growth due to improved access, though as mentioned previously, that growth would not be large.

The population increase associated with better access to Juneau could be accommodated within the existing housing stock of that community. Property values in Haines might increase because of its growing reputation as a retirement community and/or demand for second homes or cabins by Juneau residents. The increased traffic through Skagway resulting from Alternative 2B could increase the value of the commercial property in that town.

Local governments would be affected by improved access in the Lynn Canal corridor in the following ways:

- Increased demand for public safety services in remote areas of the Juneau and Haines Boroughs as well as outlying Skagway areas
- Potential increased demand for some public utilities
- Increased local road maintenance costs
- Increases in sales and bed tax revenues from traveler-related spending
- Increases in property tax revenues

Improved access would affect the health care industry in several ways. Haines and Skagway residents would have better access to Juneau's well-developed health care sector. This improved access would mean less reliance on local and/or Whitehorse health care providers. Provision of EMS is a key function of clinics in Haines and Skagway. Demand for these kinds of services would increase as non-resident traffic through those communities increased.

Improved highway access to northern Southeast Alaska would have minor or negligible effects on other segments of the region's economy. The cruise ship industry is principally affected by berth facilities at points of origin (e.g., Seattle and Vancouver, British Columbia [B.C.]) and destination (Juneau, Skagway, and Haines), and is projected to grow at an annual average rate of 1 to 2 percent over the next 10 to 20 years. The manufacturing sector in Juneau would benefit from better access to markets in Haines, Skagway, and Whitehorse. Better access to the Alaska/Canada highway system would also improve the economics associated with serving markets in Interior Alaska from the Lower 48 states. The region's wholesale trade sector would benefit from the lower cost of transportation between Juneau, Haines, and Skagway. Currently, wholesalers, primarily in Juneau, compete with Seattle distributors for this regional business.

The following subsections provide a more detailed discussion of the economic and social effects to Juneau, Haines, and Skagway projected for Alternative 2B. A portion of the information presented here is based on interviews with industrial representatives and public service providers. See the *Socioeconomic Effects Technical Report* (Revised Appendix EE of this Final SEIS), for references to these interviews as well as further discussion of the socioeconomics analysis.

#### 4.3.5.2 Juneau

**Population, Economics, Housing, and Municipal Revenues** – Alternative 2B is predicted to generate 820 annual ADT in 2055, a daily increase of 740 trips relative to Alternative 1 – No Action, which would affect population, economics, housing, and municipal revenues in the region (see Revised Appendix AA, *Traffic Forecast Report*). Traffic on Alternative 2B is predicted to remain relatively constant over the 30-year period between 2025 and 2055, changing from 810 to 820 annual ADT.

The total increase in visitor traffic to and from Juneau associated with Alternative 2B is estimated to be 395 annual ADT in 2055.[19] Assuming all traffic is round-trip, the 395 annual ADT attributable to increased visitor traffic to/from Juneau would equate to approximately 195 new round trips a day (i.e., one-half of the annual ADT). With each additional visiting vehicle carrying an average of 2.3 people[20], Juneau is projected to receive as many as 166,600 new visitors annually under Alternative 2B (i.e., number of new round trips per day multiplied by 2.3 people per trip multiplied by 365 days per year). Visitors to Juneau are estimated to spend $77 per visitor per day (McDowell Group, 2012a). Annual visitor spending in Juneau, therefore, would increase by as much as $12.83 million, approximately, as a result of Alternative 2B (Table 4-19).

[19] This estimate is less than half of total traffic associated with Alternative 2B because Juneau residents would account for the majority of traffic on the highway. The estimate of new traffic also does not include baseline traffic because that traffic is already affecting the economy.

[20] Based on the Skagway and Haines border crossings average vehicle occupancy (USDOT, 2001).

The economic impact of this additional spending would include new employment and payroll sources in Juneau. This increase in annual visitor spending in Juneau would generate approximately $4.79 million in new payroll and 130 additional jobs (Table 4-19).

**Table 4-19:**
**Alternative 2B Projected Traffic and Resulting Visitor Economic Impacts in Juneau, 2055**

| | 2055 |
|---|---|
| Total Traffic under Alternative 1 – No Action (annual ADT) | 80 |
| Total Traffic under Alternative 2B (annual ADT) | 820 |
| Change in Traffic (annual ADT) (over No Action) | 740 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 395 |
| Total New Visitors Annually (over No Action) | 166,600 |
| Total New Visitor Spending Annually over No Action) | $12,830,000 |
| New Local Payroll Annually (over No Action) | $4,790,000 |
| New Local Employment Annually (over No Action) | 130 |

Note: Numbers may not total exactly due to rounding.

Generally, each new job in the Juneau economy results in an increase in population of about 1.5 people.[21] Therefore, the 130 new jobs in Juneau resulting from Alternative 2B would be expected to result in a population increase of about 195 residents.

Under Alternative 2B, a Day Boat ACF would be based in Skagway; changing from its homeport location of Auke Bay under Alternative 1 – No Action. Assuming that all the crew members and their families relocate from Juneau to Skagway, Juneau could experience a loss of approximately 35 residents. This loss would be somewhat offset by additional highway maintenance employees for the East Lynn Canal Highway, which is estimated at two full time and five seasonal positions. Assuming these positions would be filled by people relocating to Juneau with family members, the net loss of Juneau residents would be approximately 15.

A population increase in Juneau of 195 residents would represent an overall increase of about 0.6 percent of Juneau's population (2015 population is estimated at about 33,277).

Based on 2.6 persons per household (from 2010 Census data), a population increase of 195 residents would result in additional demand for about 75 housing units. Juneau had approximately 650 vacant housing units in 2010, so this additional demand is within Juneau's housing capacity.

Sales tax revenues (plus hotel, liquor, and tobacco taxes) for Juneau would increase at a rate proportional to the increase in spending. Total additional visitor spending of approximately $12.83 million annually would generate (assuming all of the spending is taxable) about $642,000 in additional sales tax revenues (based on a 5 percent tax rate).

Alternative 2B would increase the value of private property along the highway, though the extent of that increase is difficult to estimate. For example, Goldbelt's property in and north of Echo Cove would increase in value. CBJ would have an increase in property tax revenues because of this increase in property values. Residents in this area would pay higher property taxes.

[21] Based on an estimated participation rate of 65 percent, meaning that 65 percent of the Juneau population participates in the local labor force.

Alternative 2B would be likely to spur development of private property along the highway, including Goldbelt's property in the Echo Cove/Cascade Point areas. As undeveloped Alaska Native Claims Settlement Act (ANILCA) Corporation entitlement property, it is currently not subject to property taxes.

**Industry/Commercial Sectors** – A highway link on the east side of Lynn Canal would be expected to substantially affect the independent visitor segment of Juneau's visitor industry, but not the cruise visitor market. Juneau's cruise market is expected to continue to grow independent of the JAI Project—especially with the expansion of calls by smaller cruise vessels running multi-day round trips out of Juneau (NEI, 2013).

Alternative 2B would benefit the independent visitor industry in Juneau. Among independent visitors, those traveling by personal vehicle are the most likely to be affected by Alternative 2B (NEI, 2013).

With this alternative, Juneau would become the mainline ferry terminus for the AMHS, resulting in a significant number of independent visitors traveling to Juneau that otherwise might not visit the community. Approximately 60 percent, or approximately 24,600, of the non-resident travelers now using the ferry between Juneau and Haines-Skagway are spending time in Juneau. Most of the current pass-through visitors (about 16,400) would be spending some time in Juneau with Alternative 2B.

RV travelers on the ferry who otherwise would have gone directly to Haines or Skagway would be forced to disembark in Juneau (termed diverted RVs). While some travelers would choose to travel on directly to Skagway and/or Haines via Katzehin, others would take advantage of the opportunity to visit the capital city, as well as Mendenhall Glacier and other attractions. The total number of diverted RVs would be about 450 in 2025, upon completion of construction (see the *Socioeconomic Effects Technical Report*, Revised Appendix EE). This is in addition to the approximately 600 RVs currently traveling to Juneau (see Section 3.1.4.1), resulting in a total of 1,050 RVs per year visiting Juneau. The 2006 Final EIS indicated that independent visitor traffic in Lynn Canal is expected to double under Alternative 2B and this is believed to still be true. Applying this growth to the total baseline and diverted RV traffic of 1,050 results in an estimate of 2,100 annual RVs to Juneau, once Alternative 2B is constructed. The current capacity for RV camping in Juneau would not be sufficient to meet demand. It is expected that the private sector would respond to an increased demand and develop additional RV-related services, including increasing capacity, RV rental businesses, and RV supply services. If the private sector were unable to develop enough new RV park capacity, the impacts likely would include (1) greater use of pullouts and commercial parking lots by RVs and (2) an eventual reputation for lack of capacity (e.g., in online reviews and in guidebooks) that likely would dampen demand and reduce visitation by visitors in RVs.

The process of planning and building an RV park in Juneau would present some challenges to prospective RV park operators. According to city officials, it is difficult to find developable land in Juneau appropriate for RV parks. The land would need to have easy highway access, water and electrical utilities, and accommodating neighbors. Such a location is likely to be desirable to a variety of interests, and in the past, RV parks have not been able to promise the revenues that other operations would.

The increase in RV traffic associated with Alternative 2B would not occur until after construction was completed, and then would increase gradually over time. Construction is

estimated to take at least 6 years. This would provide time during which the CBJ could work with interested landowners to develop a plan for RV facilities expansion.

Construction of Alternative 2B would result in logging incidental to clearing the highway ROW. A highway would improve access to timber stands that at some future date could be made available for harvest. The USFS, however, manages the Tongass National Forest (over 95 percent of the highway alignment) within the study area primarily as a "mostly natural setting" as designated in the TLRMP LUDs. The LUDs in this area, including LUD II, Old-Growth Habitat, and Semi-Remote Recreation, are classified as unsuitable for timber production, and commercial timber harvest is not allowed. However, two areas along the eastern shore of Lynn Canal are designated for moderate development, including the Scenic Viewshed and Modified Landscape LUDs, which allow timber harvesting. Although the USFS currently has no plans to harvest timber on East Lynn Canal, it would require the harvest and sale of timber felled from the Alternative 2B corridor pursuant to the Juneau Access Settlement (Sandhofer, personal communication 2012; USFS, 2008c).

Development of Alternative 2B would have no effect on the operation of the Kensington Gold Mine, which opened in 2009 and is fully operational. Coeur Alaska, Inc., (Coeur Alaska) ships supplies into the mine and ore out by barge from Slate Cove, the nearest place for a deepwater port. This method of moving supplies and product would continue even if Alternative 2B were implemented, because it would be more cost-effective to ship directly to and from the mine rather than bear the expense of shipping to or from Juneau or Skagway first and rehandling the materials. A highway under Alternative 2B could reduce the cost of transporting workers to the site. It could also help to ensure prompt medical responses to injuries of mine personnel.

Alternative 2B is not anticipated to have a substantive impact on shipment of fresh seafood out of Juneau. Most of the product that is now shipped out via jet would be anticipated to continue to be shipped by that mode as it appears to adequately meet buyers' and sellers' needs. Alternative 2B could be used to ship the fresh seafood that is currently shipped via ferry (NEI, 2013).

Water transportation is the primary method of moving freight to and from Juneau, with Seattle being the primary port of origin and destination. Alaska Marine Lines (AML) and Northland Services provide this barge service. Transportation by barge is expected to remain the mode by which most freight is shipped to/from Juneau. The economies of scale possible with barge service, and the relatively frequent service offered into Juneau (at least three barges/week) places the economics on the side of barge transportation.

AMHS transports less than 3 percent of freight in Lynn Canal. Freight on AMHS ferries is almost always transported on "unaccompanied" van trailers (i.e., without tractor or driver). In 2014, the AMHS carried 193 vans from Juneau to Haines, 206 vans from Haines to Juneau, 29 vans from Haines to Skagway, and 5 vans from Skagway to Haines (see Revised Appendix EE, *Socioeconomic Effects Technical Report*). Alternative 2B would change this freight transportation pattern in Lynn Canal: van trailers would be unloaded at Juneau (Auke Bay) and drivers would transport the cargo by road to Katzehin and from there on the shuttle ferry to Haines or Skagway and their final destinations. Note that under Alternative 1 – No Action, unaccompanied vans would be allowed on the mainliners but would not typically be allowed on the Day Boat ACFs. Unaccompanied vans that use the mainliners under Alternative 1 – No Action would be affected and shippers would need to switch to a different method of transportation. Truck traffic north of the Auke Bay ferry terminal would increase. Because there

would be no change in barge or ferry freight service to Juneau from points south, no change to consumer prices would be expected in Juneau as a result of the project.

**Utilities and Public Services** – Alternative 2B is expected to have negligible impact on Juneau utilities. All of the utilities are adequate to accommodate any population increases attributable to the improved access afforded by Alternative 2B through 2055.

Much of the information provided below on the effects of Alternative 2B is based on interviews with public service providers. References to these interviews are provided in the *Socioeconomic Effects Technical Report* (Revised Appendix EE).

School enrollment is a function of population. Because population impacts are expected to be minimal (i.e., 195 new residents in 2055), the same would be true of impacts on enrollment. The maximum impact on Juneau's population from Alternative 2B would be about 30 additional students spread across all grades.

The cost of transporting students to Haines or Skagway could change depending on a variety of factors, including the number of students and the need to overnight away from home. The opportunity for students to travel between the communities could increase due to reduced costs and the increased ability to make the trip within the same day.

Health and social services demand is mainly a function of population, and would therefore not be expected to change substantially under Alternative 2B. Additional independent visitors to Juneau, particularly older retirees, would place some new demands on emergency room and other medical and dental services in Juneau. Demand for health care services resulting from additional highway accidents would be negligible when compared with existing demand.

Traffic increases resulting from improved access would not affect fire and EMS within the current service area. The closest Capital City Fire and Rescue station to Alternative 2B is at Auke Bay. As this is a volunteer response station, the station located near the Juneau International Airport (JIA) would be the station most likely to be dispatched to emergencies in the Alternative 2B corridor within the CBJ.

Improved access would have a modest impact on the ability of police services to handle the increase in local traffic congestion and to respond to occasional emergency calls on the new highway within the CBJ. The Juneau Police Department is currently operating at the limits of its capacity and would need to create and fund new positions that incorporate new responsibilities to maintain its existing service level. The Alaska State Troopers, under the Department of Public Safety, do not provide enforcement services within the municipalities, but respond to calls everywhere else in the boroughs. Troopers would respond to calls in the Alternative 2B corridor. If Alternative 2B is implemented, the Department of Public Safety may need to reallocate some of its resources to adjust to the additional needs in the corridor. Alaska State Troopers would be responsible for the highway north of Eldred Rock in the Haines Borough, and would patrol the highway en route.

The Juneau Police Department has discussed whether connecting Juneau to the outside highway system would result in new types of crime or more serious crime. Although Alternative 2B would not create a direct highway link, it would create easier and cheaper access. Only 5 percent of arrests in the CBJ involve non-residents and less than 2 percent involve people from outside Alaska. Juneau also has very low rates for many of the crimes associated with more "connected" communities, such as gang activity and car theft. It has relatively higher incidences of crime that

may be associated with isolation (e.g., domestic and alcohol-related crimes). One possibility raised in public scoping is that ending either a highway or mainline ferry service in Juneau would precipitate an "end-of-the-road" effect, bringing to town more transients who are unable to support themselves and individuals with mental and behavioral problems. However, the U.S. and Canadian customs stations on the Haines and Klondike highways act as a significant filter in this regard, and Haines and Skagway do not have this problem.

The Juneau Police Department believes that there is not enough evidence or precedents to suggest that simply improving access would affect the nature and rates of local crime. Much more of a factor than access is Juneau's distance from other population centers, particularly large cities. The Juneau Police Department believes a highway connection might be associated with some increase in teen runaways and perhaps some additional auto theft and credit card incidents. There could be an increase in importation of illegal drugs; however, local officials indicate it is already relatively easy to move these substances in and out of Juneau.

**Quality of Life** – The household surveys conducted in 1994 (McDowell Group, 1994) and 2003 (Appendix I of the 2005 Supplemental Draft EIS) indicated that more than three-quarters of Juneau residents agree that improved access to their community is important. There is less agreement on whether quality of life is best served by highway access. Many proponents of a highway acknowledge that better ferry service would improve quality of life, but not by enough. Many proponents of ferry service believe better access is important, but only ferry access would result in an overall improvement in the quality of life. In October 2000, Juneau voters were split on an advisory ballot question regarding preference for a long-range plan for surface access north from Juneau, with 5,840 choosing enhanced ferry service and 5,761 choosing a road.

The reasons for these differing views are complex and interwoven with how individuals view Juneau's lack of highway access. Research and public comment over the past two decades have shown that some residents cherish this condition while others deplore it. Further, improved transportation is generally associated with growth opportunities, and growth typically affects the quality of life. Finally, as noted in the *Socioeconomic Effects Technical Report* for this Final SEIS (see Revised Appendix EE), the isolation associated with lack of highway access induces a sense of psychological comfort in some residents and a feeling of frustration and claustrophobia in others.

#### 4.3.5.3 Haines

**Population, Economics, Housing, and Municipal Revenues** – Alternative 2B is predicted to generate 455 annual ADT in Haines in 2055, an increase of 405 trips daily relative to Alternative 1 – No Action, which would affect population, economics, housing, and municipal revenues in the region (see Revised Appendix AA, *Traffic Forecast Report*). Traffic on Alternative 2B is predicted to remain relatively constant over the 30-year period between 2025 and 2055, changing from 450 to 455 annual ADT.

The total increase in visitor traffic to/from Haines associated with Alternative 2B is estimated to be 220 annual ADT in 2055.

The increase in visitor traffic with Alternative 2B relative to Alternative 1 – No Action would equate to about 91,900 new visitors annually in Haines. Assuming that visitors would spend an average of $77 per passenger per day in Haines (McDowell Group, 2012a), visitor spending in the community would increase by approximately as much as $7.08 million per year as a result of Alternative 2B.

In terms of economic impact, increased spending in Juneau by Haines residents would offset some (or all) of the new visitor spending in Haines. Approximately 10 percent of new spending that would occur in Juneau with Alternative 2B would be by Haines residents; therefore, the net visitor spending in Haines attributable to Alternative 2B would be approximately $5.8 million annually (Table 4-20). This net increase in annual visitor spending in Haines would generate as much as $2.16 million in new payroll and about 60 additional jobs.

**Table 4-20:**
**Alternative 2B Projected Traffic and Resulting Visitor Economic Impacts in Haines, 2055**

| | 2055 |
|---|---|
| Total Traffic under Alternative 1 – No Action (annual ADT) | 50 |
| Total Traffic under Alternative 2B (annual ADT) | 455 |
| Change in Traffic (annual ADT) (over No Action) | 405 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 220 |
| Total New Visitors Annually (over No Action) | 91,900 |
| Total New Visitor Spending Annually (over No Action) | $7,080,000 |
| Less New Haines Resident Spending in Juneau Annually | $1,280,000 |
| Net Change in Visitor Spending in Haines Annually | $5,800,000 |
| New Local Payroll Annually (over No Action) | $2,160,000 |
| New Local Employment Annually (over No Action) | 60 |

Note: Numbers may not total exactly due to rounding.

Each new job in the Haines economy would result in a population increase of about 1.5 people.[22] Therefore, for the 60 new jobs in Haines, the population would increase by about 90 residents or about 3.6 percent of the existing Haines population (2015 population is estimated at about 2,493).

A traffic-related population increase of 90 residents would result in additional demand for about 26 housing units based on 3.4 persons per household (from 2010 Census data). Improved access would enhance Haines' reputation as a retirement community through better access to Juneau's retail and service sectors. To the extent that this occurs, demand for property in Haines would increase. Further, because of land availability in Haines and its drier climate when compared to Juneau, additional Juneau residents may seek seasonal or year-round homes in Haines with Alternative 2B. Finally, improved access to the Kensington Gold Mine could result in demand among mine workers for Haines area housing. This impact could range from a few to several dozen housing units, depending on how ferry schedules mesh with mine shift schedules, ferry rates, availability of company-provided transportation, and other factors. The housing demand that would be stimulated by Alternative 2B may increase housing development in Haines and increase local property values as well as property taxes.

Sales tax revenues would increase at a rate proportional to the increase in spending in Haines. Total additional visitor spending in Haines of about $7.08 million annually would generate about $389,000 in additional sales tax revenues (based on a 5.5 percent tax rate). Haines would also

[22] Based on an estimated participation rate of 65 percent, meaning that 65 percent of the Haines population participates in the local labor force.

receive an increase in property tax revenues as a result of the potential increase in private property values mentioned above.

**Industry/Commercial Sectors** – Haines is having difficulty maintaining a position in the independent and cruise visitor markets. Independent visitor travel to Haines has been declining, direct cruise traffic has been erratic, and the local visitor industry has a growing dependence on Skagway cruise passengers taking excursions to the Haines area. Alternative 2B would affect Haines' non-Alaskan independent market but would not affect the cruise market.

As indicated previously, visitor traffic to Haines is expected to increase with Alternative 2B. The economic impact of this change in traffic depends primarily on visitors' length of stay. The key factor regarding length of stay now and after construction of Alternative 2B would be the degree to which Haines develops and promotes local assets and attractions.

Alternative 2B would provide better opportunities for Haines residents to find employment with the Kensington Gold Project or for employees of the mine to relocate to Haines. The mine is within the CBJ but about equidistant between Haines and Juneau. A variety of factors could persuade employees to live in Haines, including housing affordability, smaller schools, access to fish and game resources, and quality of life associated with residing in a smaller community.

Alternative 2B would affect freight movement to and through Haines. Haines is an important transshipment point, linking Inside Passage barge and ferry traffic to the Yukon and Interior Alaska. Waterborne freight arrives in Haines on a weekly basis through AML barge service. AMHS ferries also provide freight service to Haines.

The critical issue for local commercial truck drivers is AML's plans for serving Haines should a highway be constructed. AML currently has three to four full-time truckers living in Haines, and they often add one to two additional staff in the summer. Representatives of AML have stated that they would not alter their barge service to Haines should a highway be constructed. The cost of off-loading vans in Juneau and trucking to Haines would not be competitive with continued barge service to Haines. Freight containers that are now shipped to Haines on the AMHS ferries, however, would be off-loaded at Auke Bay, and trucked to Haines via East Lynn Canal Highway and the Katzehin ferry. Note that under Alternative 1 – No Action, unaccompanied vans would be allowed on the mainliners but would not typically be allowed on the Day Boat ACFs. Unaccompanied vans that use the mainliners under Alternative 1 – No Action would be affected and shippers would need to switch to a different method of transportation. The cost to ship a container in either direction between Haines and Juneau is estimated to be similar to the cost of shipping an unaccompanied van trailer or up to 5 percent higher (see Revised Appendix EE, *Socioeconomic Effects Technical Report*, for detail on container shipments). Because only 3 percent of Lynn Canal freight containers are shipped by AMHS, this potential change is not expected to have any noticeable effect on overall consumer prices in Haines.

**Utilities and Public Services** – Much of the information provided below on the effects of Alternative 2B is based on interviews with public service providers. References to these interviews are provided in the *Socioeconomic Effects Technical Report* (Revised Appendix EE).

School enrollment is a function of population. Because population impacts are expected to be minimal (i.e., 90 new residents in 2055), the same would be true of impacts on enrollment. The increase in students resulting from Alternative 2B would be about 20 spread across all grades, assuming enrollment increases at the same rate as population.

The cost of transporting students to Juneau and other southeast communities could change depending on a variety of factors, including the number of students and the need to overnight away from home. The opportunity for students to travel between the communities could increase due to reduced costs and the increased ability to make the trip within the same day.

Solid waste, hazardous waste, and electric utilities would not be affected in the Haines Borough by the development of Alternative 2B based on the potential population growth associated with this alternative through 2055. Haines' water supply and wastewater treatment system is adequate to accommodate 10 percent population growth. Alternative 2B would generate a maximum of about 6 percent population growth. This growth would not be sufficient to require expansion of these public utilities.

Improved access could make it somewhat easier and faster to transport patients either on an emergency or a scheduled basis to Juneau from Haines. However, air transport for medical emergencies would remain the method of choice. The Haines Medical Clinic is operated by Southeast Alaska Regional Health Consortium (SEARHC). SEARHC is a regional organization with substantial facilities in Juneau. Improved access between Juneau and Haines would reduce cost and increase the efficiency of SEARHC operations by facilitating movement of staff, supplies, and samples between SEARHC locations.

Increased traffic through and to Haines would place additional demands on the community's fire and emergency response services. If fire and emergency response personnel respond to incidents outside current service areas, which includes the portion of the Haines Borough on the east side of Lynn Canal, it would reduce capacity to deliver normal services while those personnel and equipment are occupied. Any influx of new traffic is not likely to be large enough to affect the basic level of local demand for fire and emergency response services in Haines.

The Haines Police Department does not expect substantial impacts from improved access. Most crime in Haines involves local residents in spite of its highway connection to the north. Although the northern segment of Alternative 2B is in the Haines Borough, patrol and enforcement would generally be conducted by Alaska State Troopers.

**Quality of Life** – Alternative 2B would change Haines' quality of life in a number of ways. The household surveys indicate that 87 percent of Haines residents agreed that improved access to their community is important. In the 1994 household survey, Haines residents cited increased recreation opportunities, economic growth, and better access to health care and job markets as potential improvements to quality of life that could result from a highway. The principal negative impact on quality of life cited by Haines residents was social change, such as increased crime and the appearance of undesirable transients, increased traffic, and declining local businesses. As discussed previously and in Section 4.3.7, traffic would increase in Haines with Alternative 2B. It is also projected that residents of Haines would increase their spending in Juneau. For Alternative 2B, increased spending in Juneau may be offset by increased visitor spending, though a shift in consumer type may have an impact on the types of retail businesses in Haines. There is no evidence that crime would increase in Haines because of Alternative 2B because as most crime in Haines involves local residents in spite of the community's highway connection to the north.

#### 4.3.5.4 Skagway

**Population, Economics, Housing, and Municipal Revenues** –Alternative 2B is predicted to generate 365 annual ADT in Skagway in 2055, an increase of 335 trips relative to the No Acton Alternative, which would affect population, economics, housing and municipal revenues in the region (see Revised Appendix AA, *Traffic Forecast Report*). Traffic on Alternative 2B is predicted to remain relatively constant over the 30-year period between 2025 and 2055, changing from 360 to 365 annual ADT.

Based on the 1994 household survey (McDowell Group, 1994) conducted for this project, Skagway households spent a total of about $900,000 that year in Juneau. If the 1994 spending data were adjusted for inflation, annual Skagway household spending in Juneau would total about $1.4 million in 2012. There were 386 households counted in Skagway in the 2010 Five-Year American Community Survey (U.S. Census Bureau, 2010c). After adjusting for population, and assuming Skagway household spending habits are the same, Skagway residents likely spent approximately $1.9 million in Juneau in 2012.

In the 1994 survey, 72 percent of Skagway households indicated that their spending in Juneau would increase with improved access.

Despite this leakage from the Skagway economy, Alternative 2B is expected to economically benefit the community. The total increase in visitor traffic to Skagway associated with Alternatives 2B is estimated to be 245 annual ADT in 2055. Growth in Juneau resident travel accounts for the majority of this traffic increase, as the 1994 *Juneau Access Household Survey* (McDowell Group, 1994) measured a strong interest among Juneau residents for more travel to Skagway (residents predicted traveling three times more frequently to Skagway with highway access).

This increase in annual ADT is projected to result in an increase in visitors to Skagway by as much as 102,800 annually. Independent visitors would spend an average of $77 per visitor per day in Skagway (McDowell Group, 2012a). This expenditure would result in an annual increase in visitor spending of approximately $7.92 million (Table 4-21). This net increase in visitor spending in Skagway would generate an annual average of approximately $2.95 million in new payroll and 80 new jobs (Table 4-21).

**Table 4-21:**
**Alternative 2B Projected Traffic and Resulting Visitor Economic Impacts in Skagway, 2055**

| | **2055** |
|---|---|
| Total Traffic under Alternative 1 – No Action (annual ADT) | 30 |
| Total Traffic under Alternative 2B (annual ADT) | 365 |
| Change in Traffic (annual ADT) (over No Action) | 335 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 245 |
| Total New Visitors Annually (over No Action) | 102,800 |
| Total New Visitor Spending Annually (over No Action) | $7,920,000 |
| New Local Payroll Annually (over No Action) | $2,950,000 |
| New Local Employment Annually (over No Action) | 80 |

Note: Numbers may not total exactly due to rounding.

Because of the nature of much of the Skagway population, each new job in the economy results in a population increase of about 1.5 people. Therefore, with increased visitor spending creating 80 new jobs in Skagway, the population of Skagway would increase by about 120 new residents under Alternative 2B.

Under Alternative 2B, the Day Boat ACF would be based in Skagway, changing from its homeport location of Auke Bay under Alternative 1 – No Action. Assuming that all the crew members and their families relocate from Juneau to Skagway, Skagway would experience an additional increase of 35 residents for a total of 155.

A population increase in Skagway of 155 residents would represent an overall increase of 14.9 percent over the year-round population of the community (2015 year-round population is estimated at about 1,040) and approximately 6.2 percent over the summer population of approximately 2,500 (SDC, 2013).

A population increase of 155 residents would result in additional demand for about 62 housing units (based on the 2010 Census Skagway average of 2.5 persons per household). The 2010 U.S. Census indicated that Skagway has about 152 vacant housing units, not including seasonal, recreational, and occasional use units. Skagway has a shortage of affordable homes for first-time home buyers and a lack of seasonal employee housing which may make it difficult to accommodate the projected demand. During the summer, this demand would be harder to meet as less housing is available during the summer season. It is likely that the private sector would respond by constructing additional single-family and multi-family housing if residential land is available. This increase in housing demand would have a strong seasonal component and would result in an increase in local property values with a corresponding increase in property tax.

Skagway would experience an increase in sales and bed tax revenues in conjunction with increased visitor spending. The $7.92 million estimated annual increase in visitor spending would generate as much as $317,000 in additional sales tax revenues (based on a 4 percent tax rate). Additional bed tax revenues would also be generated.

**Industry/Commercial Sectors** – Alternative 2B would affect tourism in Skagway, particularly the non-Alaskan independent visitor market. Construction of a highway on the Alternative 2B alignment would not alter cruise lines' decisions on port calls in either community. Concern has been expressed about the possible loss of cruise ship traffic to Skagway if a highway were constructed to Juneau. The concern is that in an effort to reduce fuel costs and travel times, cruise lines would bus passengers to Skagway rather than make a port call.

Port-of-call decisions are based on a combination of factors, including the availability of berthing space, appeal to passengers, and the overall capacity and profitability of tour offerings. Also considered are operational issues such as vessel speed, fuel consumption, docking fees, and safety.

Members of the NorthWest CruiseShip Association (NWCA) discussed the proposed highway alternatives during the 2003 NWCA Operations and Technical Committee meeting as well as the Government Affairs and Community Relations Committee meeting. As a follow-up to their discussions, NWCA sent a letter to the Governor of Alaska stating that construction of a highway would have no effect on members' itineraries. NWCA estimated its member lines carry 97 percent of Alaska cruise passengers. Given that cruise line managers think that a direct highway link would not affect their operations, Alternative 2B is unlikely to have any effect.

(The NWCA, now the North West & Canada division of the Cruise Lines International Association (CLIA), consists of Carnival CruiseLine, Celebrity Cruises, Crystal Cruises, Disney Cruise Line, Holland America, Norwegian Cruise Line, Princess Cruises, Oceania Cruises, Regent Seven Seas Cruises, Royal Caribbean Cruise Line, and Silversea Cruises.)

Regional managers for Princess Tours and Gray Line, the primary ground transportation providers for all large ships have stated that terminating voyages in Juneau and busing cruise ship passengers to/from Skagway is not feasible due to limitations regarding tour capacity, pricing, and timing. A round-trip bus excursion would require a minimum of 7 hours and would require a ferry link, leaving little time for passengers to experience the sites and activities in Skagway or the popular rail excursion. Although a flight and bus tour combination might reduce the overall transportation time, this option is not practical due to the high cost of the flight, capacity limitations, and potential for weather cancellations. Given these factors, it is not likely that bus excursions would replace cruise ship port calls in Skagway.

The other concern expressed during public scoping is the aesthetic impact a highway visible from the water would have on the quality of the cruise experience in Lynn Canal. According to cruise operators, it is likely that Alternative 2B would have little or no effect on current cruise itineraries. Cruise ships generally sail at night and visit a port during the day; therefore, the aesthetic impact of the highway is not an issue for the cruise industry.

Skagway is also an important transshipment point linking Inside Passage barge and ferry traffic to the Yukon and Interior Alaska. In 2010, 70,427 tons of freight moved through the Skagway port, with almost half (45 percent) of the freight being petroleum products (USACE, 2010b). Freight is also transported by AMHS.

Under Alternative 2B, AMHS freight containers bound for Skagway would be trucked on the East Lynn Canal Highway from the Auke Bay Ferry Terminal to the Katzehin Ferry Terminal and then ferried with the driver on the shuttle ferry to Skagway. The cost of transporting these vans over Alternative 2B's highway and then by shuttle ferry from Katzehin is estimated to be about 10 percent higher than the cost of all-ferry transport. Because only a small fraction of freight would be affected by this change, resulting changes in consumer costs in Skagway are expected to be minimal (see Revised Appendix EE, *Socioeconomic Effects Technical Report,* for detail on container shipments).

With the exception of freight currently moved from Juneau to Skagway on the ferry, Skagway is not expected to see any change in waterborne freight service with Alternative 2B. The cost of off-loading vans or fuel from barges in Juneau, trucking to Katzehin, and then shuttling to Skagway is more than the cost associated leaving freight on the barges.

**Utilities and Public Services** – Much of the information provided below on the effects of Alternatives 2B are based on interviews with industrial representatives and public service providers. References to these interviews are provided in the *Socioeconomic Effects Technical Report* (Revised Appendix EE).

School enrollment is a function of population. Because population impacts are expected to be minimal (i.e., 155 new residents in 2055), the same would be true of impacts on enrollment. The increase in students resulting from Alternative 2B would be about 10 spread across all grades.

The cost of transporting students to Juneau and other southeast communities could change depending on a variety of factors, including the number of students and the need to overnight

away from home. The opportunity for students to travel between the communities could increase due to reduced costs and the increased ability to make the trip within the same day.

Alternative 2B would increase demands for water supply, wastewater treatment and solid waste disposal in the Municipality of Skagway Borough. Current water supply capacity for the community is adequate for the current population and for supplying cruise ships in the summer. A booster station was recently completed at 17th Avenue and State Street, which includes a new well and pump to improve water pressure for the north end of town (Municipality of Skagway, 2009). Skagway's wastewater treatment system operates at near full hydraulic capacity for short periods of time during the fall wet season, and the wastewater volumes are higher during the summer due to the large number of visitors in town and the commercial bus lines that empty their wastewater systems for processing in Skagway. Increased summer visitor traffic associated with Alternative 2B would not measurably affect this fall peak, but could increase summer volumes. The treatment plant is presently being upgraded (State of Alaska, 2010). Overall, the system is adequate for the next 20 to 25 years (Lawson, personal communication 2013). Skagway's solid waste incinerator is adequate for non-peak demand but operates at capacity due to the heavy cruise traffic during the summer peak. A rebuild of key equipment at the plant is presently underway. Anticipated growth in cruise ship traffic would place additional demands on the system. A permit has been acquired for the Municipality of Skagway to expand its landfill capacity. Although the Municipality has yet to initiate construction, Alternative 2B would not affect its plans for expansion.

The Dahl Memorial Clinic is operated by the Municipality of Skagway Borough. This clinic does not offer inpatient care, and overnight or long term care patients are transferred to Sitka (SEARHC) or Juneau. Improved access between Juneau and Skagway could make it easier and faster to transport patients to inpatient care facilities, and reduce cost and increase the efficiency of health care operations in northern Southeast Alaska. However, air transport would likely remain the method of choice.

The emergency response demands resulting from additional traffic would have a small impact the SVFD. The SVFD's small size and reliance on volunteers would make responding to multiple emergencies difficult, but the service area (Skagway to the Canadian border) would not change. Continued growth in demands on SVFD resources could strain present SVFD resources and could require additional paid staff.

The Skagway Police Department does not expect a substantial increase in activity as a result of Alternative 2B. The department adds four seasonal officers to address the influx of summer population and visitors and believes that this action is enough to handle the additional demand that would be generated by Alternative 2B.

Police incidents in Skagway tend to involve residents, seasonal workers, cruise visitors, and Canadian visitors. The proportion of non-resident arrests is relatively high, perhaps 75 percent by department estimates. Police activity occasionally correlates with the celebration of Canadian holidays, when visitors drive down the Klondike Highway to Skagway.

**Quality of Life** – In 1994, Skagway residents indicated that increased tourism, economic growth, and enhanced recreational opportunities would be the principal benefits of improved access in Lynn Canal (McDowell Group, 1994). Negative impacts on quality of life from improved access cited by Skagway residents included increased crime, the presence of undesirable transients, and loss of spending in local businesses. In the 2003 household survey

(Appendix I of the 2005 Supplemental Draft EIS), most Skagway residents said that improved access to Juneau is important (24 percent) or very important (59 percent). Many residents said the best way to provide surface access is by ferry (53 percent), while 41 percent chose a highway. Much of the concern Skagway residents appear to have with a highway is the potential loss in cruise ship visitors and the resulting economic loss for the community. As discussed under "Industry/Commercial Sectors," the cruise ship industry has indicated that the presence of a highway between Juneau and Skagway would not change its plans for calling on Skagway. Therefore, a highway between Juneau and Katzehin would similarly not affect cruise operations.

### 4.3.6 Subsistence

Alternative 2B would not affect subsistence hunting on Sullivan, Lincoln, Shelter, Chichagof, or Admiralty islands, the lands adjacent to Taiya Inlet, or the south shore of James Bay. It would not affect subsistence fishing in Taiya Inlet or subsistence hunting of marine mammals anywhere in Lynn Canal.

Haines and Skagway residents use the Katzehin River area for subsistence harvest of marine invertebrates and marine mammals. Alternative 2B, combined with USFS plans for potential public access locations along the highway, would increase access to areas for subsistence harvest activities that previously were accessible only by boat or aircraft. This access could increase competition for subsistence resources from recreational hunting and fishing. These changes to subsistence opportunities would be viewed as beneficial for some subsistence harvesters, but for others the increased competition for resources would be negative.

Juneau is not recognized as a subsistence community under the Alaska National Interest Lands Conservation Act. However, some residents of Juneau use Berners Bay and Lynn Canal for personal use harvests of fish and shellfish. See Revised Appendix DD, *Land Use Technical Report*, for additional detail regarding subsistence.

After reviewing the 1988 Tongass Resource Use Cooperative Study (Kruse and Frazier, 1988), harvest data from ADF&G (1994), 2003 scoping comments for development of the 2005 Supplemental Draft EIS, comments received at the 2005 Supplemental Draft EIS public hearing, comments received from Cooperating Agencies on the 2005 Preliminary Final EIS, comments received following circulation of the 2006 Final EIS, comments received during 2012 scoping for the Draft SEIS, and comments on the 2014 Draft SEIS, the FHWA has determined that Alternative 2B would not significantly restrict subsistence uses.

### 4.3.7 Transportation

The 2004 SATP calls for construction of a highway from Juneau to Skagway with a ferry from Katzehin to Haines. Alternative 2B is not consistent with the 2004 SATP because the East Lynn Canal Highway would end at Katzehin, not Skagway; and a ferry would transport travelers between Katzehin and Skagway. The DOT&PF is updating the SATP to reflect the identification of Alternative 1 – No Action as the recommended improvement in the plan.

DOT&PF's 2016–2019 STIP (Amendment 3, June 28, 2017) does not include funding for any JAI Project build alternatives. Alternative 2B is not consistent with the 2016-2019 STIP, while Alternative 1 – No Action is consistent with the currently adopted STIP.

#### 4.3.7.1 Demand and Capacity

Traffic demand for Alternative 2B was projected for 2025 and 2055 using the transportation model summarized in Section 4.1.5. These projections were based on 2015 traffic in Lynn Canal, the unmet travel demand in the region, projected growth in the region, costs of travel, travel time, value of time and frequency of delay. The travel demand expressed as ADT is a combination of the demand between Juneau and Haines and Juneau and Skagway. It is also, therefore, an estimate of the through traffic on the highway segments common to both destinations.

Projected traffic demand in 2025 for Alternative 1 – No Action and Alternative 2B is provided in Table 4-22. A comparison between Alternative 1 – No Action and Alternative 2B indicates that Alternative 2B would realize and accommodate substantially more travel demand in the Lynn Canal corridor than Alternative 1 – No Action. Approximately 10 times as much traffic would travel under Alternatives 2B than on the AMHS system under Alternative 1 – No Action in 2055.

**Table 4-22:**
**2025 Forecast Demand and Capacity Juneau to/from Haines and Skagway for Alternative 1 – No Action and Alternative 2B**

| Alternative | Annual Demand ADT | Summer Demand ADT | Winter Demand ADT | Peak Week Demand ADT | Summer Capacity (vehicles per day) |
|---|---|---|---|---|---|
| 1 – No Action | 80 (50/30) | 125 (80/45) | 50 (30/20) | 300 (190/110) | 154 (93/61) |
| 2B | 810 (450/360) | 1,260 (700/560) | 495 (275/220) | 3,090 (1,720/1,370) | 1,484 (848/636) |

Note: The first number is the total demand or capacity. Numbers in parentheses are the demand or capacity split between Haines and Skagway, respectively.

Table 4-23 provides projections of traffic demand and capacity in 2055 for Alternative 1 – No Action and Alternative 2B. These projections reflect the slight increase in population over the 30-year period. Approximately 10 times as much traffic would travel on Alternative 2B than on the AMHS system under Alternative 1 – No Action in 2055.

**Table 4-23:**
**2055 Forecast Demand and Capacity Juneau to/from Haines and Skagway for Alternative 1 – No Action and Alternative 2B**

| Alternative | Annual Demand ADT | Summer Demand ADT | Winter Demand ADT | Peak Week Demand ADT | Summer Capacity (vehicles per day) |
|---|---|---|---|---|---|
| 1—No Action | 80 (50/30) | 125 (80/45) | 50(30/20) | 300 (190/110) | 154 (93/61) |
| 2B | 820 (455/365) | 1,270 (705/565) | 495 (275/220) | 3,115 (1,730/1,385) | 1,484 (848/636) |

Note: The first number is the total demand or capacity. Numbers in parentheses are the demand or capacity split between Haines and Skagway, respectively.

The capacity of Alternative 2B is limited by the capacity of the ferry link between Katzehin and Haines and Skagway. It is projected that the average daily summer demand for this ferry travel between Juneau and Skagway or Juneau and Haines would be as much as 1,270 vehicles. The number of ferry trips between Haines and Katzehin and Katzehin and Skagway has been set to accommodate the projected summer ADT to and from both communities. Some ferries may be at maximum capacity, resulting in travelers having to wait for the next ferry or change their preferred ferry time. Alternative 2B would accommodate approximately 48 percent of the peak week ADT in 2025 and 2055. During peak times and for specific events, additional sailings

would be provided to meet the demand. In such cases, AMHS would add ferry trips by operating on longer daily schedules.

Latent (unconstrained) demand in the corridor during the summer is estimated to be about 1,950 ADT. Alternative 2B would realize and accommodate approximately 76 percent of the latent summer demand.

The projected local[23] travel demand between Haines and Skagway with Alternative 2B is the same as Alternative 1 – No Action (i.e., summer ADT is projected to be approximately 53 vehicles in 2025 and in 2055 for both Alternative 1 – No Action and Alternative 2B). The projected summer daily capacity on the Haines-Skagway shuttle is 72 vehicles, which would accommodate the demand between Haines and Skagway.

#### 4.3.7.2 Travel Flexibility and Opportunity

Alternative 2B would provide increased flexibility and opportunity for travel between Juneau and Haines or Skagway, relative to Alternative 1 – No Action. Under Alternative 2B, travel between Juneau and Haines and Juneau and Skagway would be linked to ferries from Katzehin. In the summer, there would be eight round trips per day between Katzehin and Haines and six round trips per day between Katzehin and Skagway. In winter, service would decrease to six round-trips per day to/from Haines and four round trips per day to/from Skagway.

As a result of wind and wave conditions in Lynn Canal, ferry cancellations may occur (as they could under any of the alternatives). In winter, the road would be closed at times because of weather conditions or avalanches. As indicated in Section 4.3.8.2, Alternative 2B roadway would be closed an average of about 12 days per year. Service to and from Juneau during a road closure would be by one or more of the Day Boat ACFs that would be part of Alternative 2B. Generally, a Day Boat ACF would be used for this purpose if the road were closed for more than 1 day. The maximum anticipated duration of any avalanche related closure is 2 days (see *2017 Update to Appendix J - Snow Avalanche Report* in Appendix Z). The Day Boat ACF could transport 53 vehicles to/from Auke Bay. This same ferry could shuttle additional vehicles in each direction if Coeur Alaska's Slate Cove dock were available. See Section 4.3.8.2 for more detail.

For through-travelers using the AMHS mainline ferry service to access Haines or Skagway from ports south of Juneau (or vice versa), the travel pattern would be altered because mainline ferry service would terminate at Juneau. Through-travelers would disembark at Juneau/Auke Bay and would drive north on the East Lynn Canal Highway and then take the shuttle ferry to Haines or Skagway. For people in vehicles, this likely would be a minor change in travel flexibility or opportunity. For walk-on ferry passengers, an additional step of reserving a rental car, using public transportation, reserving an airplane seat, or finding a ride would be required. Such passengers likely would see this requirement as reducing reduction in travel flexibility and opportunity.

During winter, no direct Haines-Skagway shuttle would operate: one vessel would operate between Skagway and Katzehin, and the second vessel would operate between Haines and Katzehin. Haines-Skagway travelers would have to ride one ferry to the Katzehin Ferry Terminal

[23] For the purposes of this SEIS, "local" refers to passenger and vehicle traffic that only goes back and forth between Haines and Skagway; i.e., it is traffic that either boards in Haines and disembarks in Skagway, or boards in Skagway and disembarks in Haines. This local Haines-Skagway travel demand is not considered part of the overall demand for travel to and from Juneau in Lynn Canal.

and then transfer to the other ferry. This routing reduces traffic demand and allows for annual maintenance on the vessels. Each winter, the three vessels would be serviced one at a time, while the remaining two continued to operate. Even with only two vessels operational in winter, there would be multiple trips per day versus the few trips per week in Alternative 1 – No Action.

#### 4.3.7.3 Travel Time

Table 4-24 provides a comparison of travel times between Alternative 1 – No Action and Alternative 2B. Travel times are based on the assumption of an average highway travel speed of 45 mph and include load and unload time for ferry travel. Under Alternative 2B, travel between Auke Bay and Skagway would take approximately 4.0 hours, and travel between Auke Bay and Haines would take about 3.3 hours.

Alternative 2B would take approximately 2.9 hours less than Alternative 1 – No Action to travel between Auke Bay and Haines. Alternative 2B would take approximately 4.1 hours less to travel between Auke Bay and Skagway. The Alternative 2B travel time is based on approximately half the travelers arriving randomly due to the frequency of the ferry schedule, while the other half would time their arrival to match the schedule.[24] Missing a scheduled departure due to lateness or a full boat would entail a 2-hour wait for the Haines-Katzehin shuttle, and about a 3-hour wait for the next Skagway-Katzehin shuttle. Similarly, some travelers under Alternative 1 – No Action would plan to arrive before the minimum check-in time to avoid the possibility of losing their reservations.

**Table 4-24:**
**Summer Travel Times for Alternative 1 – No Action and Alternative 2B**

| Route | Travel Time (hours) | |
|---|---|---|
| | Alternative 1 – No Action (Day Boat ACF) [1] | Alternative 2B |
| Auke Bay-Haines | 6.2 | 3.3 |
| Auke Bay-Skagway | 8.1 | 4.0 |

[1] With Alternative 1 – No Action, the mainline ferry (i.e., service along the length of the system, from Bellingham, Washington, or Prince Rupert, B.C.) would have a travel time of 7.2 hours between Auke Bay and Haines and 9.1 hours between Auke Bay and Skagway.

Summer travel times between Haines and Skagway under Alternative 2B would remain unchanged (2.4 hours) relative to Alternative 1 – No Action. Winter travel times would increase under Alternative 2B compared to Alternative 1 – No Action. During winter, no direct Haines-Skagway shuttle would operate: one vessel would operate between Skagway and Katzehin and the second vessel would operate between Haines and Katzehin. Haines-Skagway travelers would need to ride one ferry to the Katzehin Ferry Terminal and then transfer to the other ferry.

#### 4.3.7.4 State and User Costs

The 36-year life-cycle costs[25] for Alternative 1 – No Action and Alternative 2B discounted to 2016 dollars are provided in Table 4-25. These costs include State and federal capital costs and

[24] On shuttle ferry systems with relatively short runs, multiple round trips per day, and capacity to meet projected demand, taking reservations is an unnecessary expense and would also increase travel time.

[25] Life-cycle costs are the construction, refurbishment, and maintenance costs for a 6-year construction period and a 30-year operation period discounted to 2016 dollars.

State maintenance and operating expenses. Capital costs include design, ROW acquisition, highway, vessel, and terminal construction, vessel refurbishment, and vessel replacement.

**Table 4-25:**
**Thirty-Six-Year Life-Cycle Costs for the No Action Alternative and Alternative 2B**

| Alternative | Capital Cost ($million) | Operating Cost ($million) | Total Life-Cycle Cost ($million) |
|---|---|---|---|
| 1—No Action | $119 | $322 | $441 |
| 2B | $511 | $356 | $867 |

Table 4-26 provides an estimate of total project life costs less residual value, expressed in 2016 dollars with no discounting of future costs. The total project life cost over the 36-year period (expressed in 2016 dollars with no discounting) would be approximately $1.2 billion (capital plus operating costs, Table 4-26). As indicated in the table, the capital cost of Alternative 2B would be higher than Alternative 1 – No Action due to the required highway and ferry terminal facilities.

**Table 4-26:**
**Thirty-Six-Year Total Project Life Costs for Alternative 1 – No Action and Alternative 2B, 2019-2054 (2016 Dollars)**

| Alternative | Total Funds | | | State Funds | | | |
|---|---|---|---|---|---|---|---|
| | Capital Costs ($million)[1] | Operating Costs ($million) | Total Project Costs ($million) | Total Cost ($million) | Total Revenue ($million)[2] | Net Cost ($million) | Cost/Vehicle (dollars) |
| 1 – No Action | $128 | $659 | $787 | $671 | $292 | $378 | $279 |
| 2B | $416 | $740 | $1,156 | $778 | $371 | $407 | $43 |

[1] Residual value subtracted.

[2] Includes both fares paid to AMHS and gas tax receipts.

Table 4-26 indicates that the net cost to the State of Alternative 2B during the analysis period would be about $29 million more than Alternative 1 – No Action. This is because both the capital and operating costs for Alternative 2B would be greater than those associated with Alternative 1 – No Action. Alternative 2B would carry more vehicles than Alternative 1 – No Action and, therefore, Alternative 2B would cost the State less than Alternative 1 – No Action on a per vehicle basis.

Alternative 2B would have an annual operating cost of approximately $20.9 million versus $18.2 million for Alternative 1 – No Action.

The anticipated total costs[26] of travel between Juneau and Skagway or Haines for travelers are listed in Table 4-27 for Alternative 1 – No Action and Alternative 2B. This table also lists the out-of-pocket cost[27] of travel between Juneau and Skagway or Haines for the same travelers. As indicated in the table, Alternative 2B would reduce the total travel cost by nearly two thirds of the cost to travel on a mainline vessel under Alternative 1 – No Action. The out-of-pocket cost

[26] Total user costs are out-of-pocket costs and vehicle maintenance, ownership, and accident costs based on highway miles traveled.

[27] Out-of-pocket costs are a combination of estimated fares and gasoline on highway segments. Fares for Alternative 1 – No Action are actual 2015 fares charged.

(fuel and fares) for a family of four in a 19-foot-long vehicle to/from Haines with Alternative 2B would be approximately one-fifth the cost of Alternative 1 – No Action. To and from Skagway, the Alternative 2B out-of-pocket cost is approximately one-fourth the cost of Alternative 1 – No Action. The out-of-pocket cost for a driver with a 19-foot-long vehicle to/from Haines and Skagway also would be approximately one-fourth of the Alternative 1 – No Action cost. For a walk-on passenger, the cost would be approximately one-eighth the Alternative 1 – No Action cost to/from Haines (excluding the cost of transportation to/from the Katzehin Ferry Terminal) and approximately one-tenth the cost to/from Skagway.

**Table 4-27:**
**Juneau to/from Haines and Skagway Total and Out-of-Pocket User Cost for Alternative 1 – No Action and Alternative 2B**

| Alternative | Example Scenario | Haines User Cost[1] | | Skagway User Cost[1] | |
|---|---|---|---|---|---|
| | | Total User Cost | Out-of-Pocket Cost | Total User Cost | Out-of-Pocket Cost |
| 1 – No Action | Family of 4 in a 19-foot vehicle | $229.00 | $227.00 | $301.50 | $301.50 |
| | Driver only in a 19-foot vehicle | $131.50 | $129.50 | $169.00 | $169.00 |
| | Walk-on Passenger[2] | $39.00 | $39.00 | $53.00 | $53.00 |
| 2B | Family of 4 in a 19-foot vehicle | $81.50 | $47.00 | $100.50 | $67.50 |
| | Driver only in a 19-foot vehicle | $69.00 | $34.50 | $79.00 | $46.50 |
| | Walk-on passenger[2] | $5.00 | $5.00 | $8.50 | $8.50 |

[1] Total cost is based on fares plus $0.60 per mile for vehicular travel (AAA, 2015). Out-of-pocket cost is based on fares and gasoline consumption.

[2] Does not include cost of transportation to/from the Katzehin Ferry Terminal. Including transportation between Katzehin and Auke Bay Ferry Terminals, the cost to/from Haines is estimated to be between $42 and $60, while the cost to/from Skagway is estimated to be between $50 and $68.

Based on total user costs, travel time cost, and the projected travel in the Lynn Canal corridor through 2054, total user benefits in terms of reduced travel cost for Alternative 2B in 2016 dollars is provided in Table 4-28. As indicated in that table, Alternative 2B would provide benefits to travelers of $128 million relative to Alternative 1 – No Action during the 36-year period.

**Table 4-28:**
**User Benefits and Net Present Value of Alternative 2B versus Alternative 1 – No Action[1]**

| Alternative | User Benefits ($million) | Net Incremental Project Costs ($million)[2] | Net Present Value ($million) |
|---|---|---|---|
| 2B | $128 | $479 | -$351 |

[1] For the period 2019 to 2054 discounted to 2016 dollars.

[2] Overall project costs minus revenues.

One economic measure of an alternative is its net present value. Net present value is the total of the user benefits minus the net cost of an alternative over and above the net cost of Alternative 1 – No Action for a given period of time. The 2019 to 2054 net present values of Alternative 2B are provided in Table 4-28. The net present value of Alternative 2B for this period is about

negative $351 million because the incremental project costs are greater than the user benefits provided.

#### 4.3.7.5 Other Transportation Impacts

**Freight** – Water transportation is the primary method of moving freight within Lynn Canal. Freight is transported from Seattle by barge to Juneau, Skagway, and Haines. AMHS ferries also move limited amounts of freight in vans to and between the communities of Lynn Canal. Haines and Skagway are important transshipment points, linking Inside Passage barge and ferry freight to the Yukon and Interior Alaska.

Alternative 2B would not substantially alter barged freight traffic between Juneau and Seattle. As noted in Section 4.3.5, AMHS transports less than 3 percent of freight in Lynn Canal and the freight is almost always transported on unaccompanied van trailers (i.e., without tractor or driver). Under Alternative 2B, van trailers would be unloaded at Juneau (Auke Bay), and drivers would transport the cargo by road to Katzehin and from there on the shuttle ferry to Haines or Skagway and their final destinations. Note that under Alternative 1 – No Action, unaccompanied vans would be allowed on the mainliners but would not typically be allowed on the Day Boat ACFs. Unaccompanied vans that use the mainliners under Alternative 1 – No Action would be affected and shippers would need to switch to a different method of transportation. Under Alternative 2B, the cost of shipping a container from Juneau to Haines is estimated to be similar or slightly greater, and about 10 percent greater to Skagway, when compared to Alternative 1 – No Action. The shipment transit time would be reduced by about half. Because the majority of freight goes by barge and because barge service is not anticipated to change, costs to consumers overall are unlikely to change noticeably (see Revised Appendix EE, *Socioeconomic Effects Technical Report*, for details on container shipments).

Trucking companies servicing other Alaska communities were asked to approximate the cost of trucking between these two cities if a highway were available. Those estimates averaged about $0.25 per pound of freight compared to the existing barge freight cost of $0.05 per pound. Although trucking goods from Seattle is not competitive with barge service, a highway with ferry link to Juneau may provide opportunities for transporting time-sensitive freight, such as fresh fish. Air freight, which currently serves this function, costs between $0.53 and $0.77 per pound between Juneau and Seattle.

Alternative 2B would not result in a change in scheduled barge service to Haines and Skagway. Freight that now moves from Juneau to Haines and Skagway on the ferry would instead be trucked at a lower cost.

**Air Taxi** – Alternative 2B is likely to divert traffic from the air taxi operations currently serving Lynn Canal. The degree to which travelers might change their current air travel behavior would depend on travel times and costs.

**AMHS** – With Juneau serving as the northern terminus for mainline AMHS ferry service under Alternative 2B, the AMHS would only need to operate short ferry routes in Lynn Canal. The change in schedule and routes would free up mainline ferry operating time: approximately 18 hours in winter and 36 hours in summer. With these additional hours, the mainline ferry could stop at additional ports, spend more time in existing ports, or operate at slower speeds for better fuel efficiency, depending on the assessed needs and level of State support available.

The projected average annual AMHS operating costs and estimated AMHS State support for Alternative 2B in 2055 are provided in Table 4-29. As indicated in the table, Alternative 1 – No Action is estimated to require State funding of about $10.1 million in 2055. Alternative 2B is estimated to require State funding in 2055 of $7.7 million, approximately $2.0 million less than the funding that would be required for Alternative 1 – No Action.

**Table 4-29:**
**Annual AMHS Operating Costs, Revenues, and Estimated State Funding for Alternative 1 – No Action and Alternative 2B**

| Alternative | AMHS Operating Cost ($million) | AMHS Revenue[1] ($million) | Estimated AMHS State Funding ($million) |
|---|---|---|---|
| 1 – No Action | $18.2[2] | $8.1 | $10.1 |
| 2B | $18.5 | $10.8 | $7.7 |

Source: *Marine Segments Technical Report* (Revised Appendix GG) and *User Benefit, Life-cycle Cost, and Total Project Cost Analyses* (Revised Appendix FF).

[1] Fare box revenue paid to AMHS; excludes gas tax receipts.

[2] Revised total is due to (1) the updating of costs to 2015 dollars and (2) a discrepancy in the data relied on to generate the 2014 Draft SEIS mainliner operating costs.

**Safety** – Available statewide crash information indicates the crash rate for Rural Other Principal Arterials between 2002 and 2012 averaged 168.73 crashes per 100 million vehicle miles traveled (VMT). Based on this statewide crash rate information and 2055 traffic projections, it is anticipated that there would be approximately 38.5 crashes per year on the East Lynn Canal Highway. In the 30-year operation period (2025 through 2055), it is estimated there would be approximately 1,156 crashes.

The fatal crash rate on Rural Other Principal Arterials between 2002 and 2012 averaged 2.06 fatal crashes per 100 million VMT. Based on this statewide fatal crash rate information, there are projected to be approximately 14 traffic fatalities over the 30-year (2025 to 2055) study period on Alternative 2B.

There have been no fatalities on the AMHS system since 1975. There was a fatality in 1975 when the *M/V Malaspina* ran over a fishing boat, resulting in the drowning of one person. The National Transportation Safety Board (NTSB, 2013) reports one case in which an AMHS vessel, the *M/V LeConte*, ran aground north of Sitka causing $3 million in property damage, including extensive hull damage, and one injury (NTSB, 2004). The NTSB also reports two cases of electrical fires onboard the *M/V Columbia*, one that caused the ship to lose propulsion and passengers to be evacuated. In this case, minor reportable injuries occurred to passengers, although they were not directly attributed to the fire (NTSB, 2000 and 2003). The other fire aboard the *M/V Malaspina* occurred while the ship was in drydock, so no evacuations were needed and no passengers were injured (NTSB, 2012). Alternative 2B is likely to result in little change to the number or types of accidents on the AMHS system.

**Capital Move** – Lack of highway access is often cited by capital move proponents as one of the reasons to move the state capital. Alternative 2B would not provide a direct highway link to Juneau, but would improve access in terms of cost, frequency, and capacity. This may reduce the perception that it is difficult and expensive for the majority of Alaska residents to visit the state capital.

**Pedestrians and Bicyclists** – The highway proposed for Alternative 2B would include 4-foot paved shoulders suitable for bicyclist and pedestrian use. Predicted traffic volumes would be compatible with bicycle or pedestrian use of the shoulders. Ferries for this alternative would accommodate bicyclists and foot passengers.

For Alternative 2B, DOT&PF anticipates that fewer people would be ferry walk-on passengers when compared to existing conditions and Alternative 1 – No Action. The percentage of AMHS walk-on passengers that would choose to travel in their own vehicle if Alternative 2B were selected for the project would depend on a variety of factors such as the cost, frequency, and convenience of a bus or van service. Based on the 2010 Census, approximately 90 percent of the households in Juneau, Haines, and Skagway own at least one vehicle, and 45 to 80 percent of the households own two or more vehicles. Travelers without vehicles would have to rent a vehicles, take a commuter flight, travel on a private carrier (such as a taxi, or shuttle service if they develop), or find a ride with someone to accommodate this demand.

The one-way out-of-pocket user cost of travel to/from Juneau to Haines or Skagway for a passenger with a car under Alternative 2B would be lower than the cost for a walk-on passenger under Alternative 1 – No Action, and it would appear to be more convenient to have a car to travel between Juneau and Katzehin. While transportation services may be developed by private entities to accommodate walk-on passengers, the cost, frequency, and convenience of a bus or van service would depend on the size of the market. Following completion of highway construction, there would be a period of transition as entrepreneurs or established service providers tested the market by offering some moderate level of service, such as one or two round-trips daily between communities during the summer.

Table 4-30 presents a projection of the number of passengers, including the number of walk-on passengers, during summer for Alternative 1 – No Action and Alternative 2B (see Revised Appendix AA, *Traffic Forecast Report*). With Alternative 2B, it is projected that there would be 95 walk-on passengers during summer, representing approximately 3 percent of the forecast for total number of summer passengers.

**Table 4-30:**
**Average Daily Ridership in Summer for Alternative 1 – No Action and Alternative 2B, 2055**

| | Total Passengers | Passengers in Vehicles | Walk-on Passengers | Walk-on Percentage |
|---|---|---|---|---|
| Alternative 1 – No Action | 410 | 285 | 125 | 30% |
| Alternative 2B | 2,920 | 2,825 | 95 | 3% |

Note: See Revised Appendix AA, *Traffic Forecast Report*

The potential for bus/van service to develop between Katzehin and Juneau with Alternative 2B was evaluated based on case studies of bus service elsewhere in Alaska[28] and interviews with 12 land transportation service providers (see the *Socioeconomic Effects Technical Report,* Revised Appendix EE). Based on this evaluation, it is likely that Alternative 2B would result in daily summer coach service linking Juneau, Haines, Skagway, and possibly Whitehorse. Winter

[28] Bus services examined in these case studies were Alaska Park Connection between Seward and Denali National Park, Homer Stage Lines between Homer, Soldotna, Kenai, and Seward, Alaska Trails between Anchorage, Wasilla, and Talkeetna with continuing service to Healy, Alaska Direct Bus Lines between Fairbanks and Whitehorse, and Yukon Alaska Tourist Tours between Skagway and Whitehorse.

service would be less frequent, with bus service offered perhaps every other day between Juneau and Haines and Skagway. Cost would ultimately depend on the size of the market but is estimated to be in the range of $42 to $60 to/from Haines and between $50 and $68 to/from Skagway based on the projected shuttle fares and rates on similar existing bus services. This would place the cost in the same range as the Alternative 1 – No Action AMHS adult passenger fares for the Juneau-Skagway and Juneau-Haines ferry links.

It should be noted that Skagway has the only ferry terminal in Lynn Canal that is within reasonable walking distance from residential areas. All other existing terminals must be reached by private vehicle or private carrier. The ferry terminals have been located based on the efficiency of ferry moorage and routes rather than the convenience of walk-on passengers.

Walk-on passengers who end up relying on bus service to/from the Katzehin Ferry Terminal (if it develops) would have less flexibility and opportunity to travel compared to travelers who drive, as it is likely that bus service would not be available for every ferry sailing (i.e., walk-on passengers would need to time their travels with the bus schedule). It is anticipated that walk-on passengers relying on renting a vehicle, using a taxi, or getting a ride with someone would have more flexibility and shorter travel times than those relying on the bus. People who share a car with others may be inconvenienced if one household member were using the vehicle to travel on Alternative 2B.

Walk-on passengers traveling between Haines or Skagway and JIA would have to coordinate schedules for flight, ferry, and bus (or other ground transportation) under Alternative 2B, just as they do today. Instead of arranging for ground transportation between the Auke Bay Ferry Terminal and JIA, travelers would have to arrange for transportation from Katzehin. As Katzehin is farther away from JIA, it may be more difficult to coordinate schedules and make travel arrangements, so travelers may find this less convenient than travel under Alternative 1 – No Action. The cost for a walk-on passenger from Haines/Skagway to the airport under Alternative 2B (including ground transportation) is anticipated to be similar to or slightly higher than the cost under Alternative 1 – No Action, as the cost of transportation between Auke Bay and JIA is the same for both alternatives (see Table 4-31). The number of travelers in the party would also be a consideration. Another factor for airport travelers to consider is the cost of airport parking. In 2016, airport on-site long-term parking cost $14/day and $75/week, and parking within a 5-minute walk from the terminal was $5/day and $100/month.

**Table 4-31:**
**Comparison of Walk-on Passenger Out-Of-Pocket Costs**

| Alternative | Auke Bay-Haines | Auke Bay-Skagway |
|---|---|---|
| 1 – No Action | $39.00 | $53.00 |
| 2B | $42.00 – 60.00 | $50.00 – 68.00 |

Note: Out-of-pocket costs exclude the cost of ground transportation between Auke Bay and JIA. In 2017, the cost of a taxi from Auke Bay to JIA was approximately $20.

Commenters on the 2014 Draft SEIS expressed concerns about impacts to walk-on passengers who are low income, minority, senior citizens, disabled, or students. The impacts of Alternative 2B on these groups depends on how they accommodate their non-ferry travel (i.e., whether they rent a vehicle, use a taxi, get a ride, or take a bus). Even under Alternative 1 – No Action, these walk-on populations need transportation to/from the Auke Bay and Haines Ferry Terminals (the

Skagway Ferry Terminal is within walking distance to the community center). With access to a vehicle and the ability to drive, these populations would benefit from improved travel time, improved flexibility and opportunity to travel, and lower travel costs. Those choosing to continue as walk-on passengers would pay approximately the same as under Alternative 1 – No Action, considering the possible cost of transportation by bus between Katzehin and Auke Bay. Alternatively, people could fly to/from Juneau but would be subject to the current airfare, which may be higher than the ferry fare. Additional information regarding impacts to low-income and minority populations is discussed in Section 4.7.2. Additional information about student transportation under Alternative 2B is discussed in Section 4.3.5.

**Bridges over Navigable Waters** – The Katzehin, Lace, and Antler rivers are navigable waters, currently used by small craft (see Section 3.1.7). FHWA has evaluated U.S. Coast Guard (USCG) bridge permitting requirements under 23 CFR 650.805 and 33 CFR 115.70[29] and has made a preliminary determination that no bridge permits are necessary for Alternative 2B, and that proposed navigational clearances are reasonable (see Section 7.7 and the attachment of the Public and Agency Coordination chapter in the 2014 Draft SEIS).

### 4.3.8 Geology

Alternative 2B would impact no unique geologic resources in the study area. This alternative would be subject to a variety of geologic hazards, including earthquake-induced ground tremors, avalanches, and landslides. As stated in Section 3.2.1, DOT&PF conducted geotechnical investigations of the Alternative 2B corridor after the alternative was selected in the 2006 Record of Decision (ROD; Golder Associates, 2006 and 2012). Those investigations have been incorporated into this Final SEIS. As a result of those investigations, the alignment of the East Lynn Canal Highway was changed in several locations to avoid potential hazards.

Additional geotechnical investigations would be used in support of the final engineering design of the selected alternative, if it were a build alternative. These studies would minimize the impact of geologic hazards on the road embankment and related structures.

#### 4.3.8.1 Seismic Activity

As indicated in Section 3.2.1.2, the Queen Charlotte/Fairweather fault system located within 75 miles of the project area has the capability of producing earthquakes with magnitudes greater than 7.0 on the Richter scale. The Chatham Strait fault system in Lynn Canal has the capability of producing earthquakes of at least 6.9 on the Richter scale (Lemke, 1974). Seismic risk would be taken into account in the design of roadway pavement and highway structures. It is probable that a large earthquake in the project area would cause damage to a highway, as is the case with many other Alaskan highways in seismic areas. Geologic hazards related to seismic events that could affect the roadway pavement and highway structures include tsunamis, liquefaction, and slope instability.

[29] Under 23 CFR 650.805, a USCG permit shall not be required if the FHWA determines that the proposed federally aided or assisted bridge is over waters (1) which are not used or are not susceptible to use in their natural condition or by reasonable improvement as a means to transport interstate or foreign commerce and (2) which are (i) not tidal, or (ii) if tidal, used only by recreational boating, fishing, and other small vessels less than 21 feet in length. Under 33 CFR 115.70, the USCG can give advance approval for the location and plans of bridges to be constructed across reaches of waterways navigable-in-law, but not actually navigated other than by logs, log rafts, rowboats, canoes and small motorboats. In such cases, the clearances provided for high water stages will be considered adequate to meet the reasonable needs of navigation.

DOT&PF would design the highway, bridges, ferry terminals, and other structures to satisfy American Association of State Highway and Transportation Officials (AASHTO) design specifications. AASHTO guidelines identify measures, such as structural components for bridges and ferry terminal structures, which resist damage from seismic effects related to earthquakes. With these measures, bridges can safely undergo the large distortions that result from earthquakes.

There is no national standard for the design of structures to resist the effects of tsunamis; however, the bridges and ferry terminal components would incorporate design recommendations to withstand hurricane-type storm surges that are similar to tsunami effects, such as high water levels and loads imposed from storm waves.

For road components other than structures, there are no guidelines for seismic resistance. Road embankments that have the potential to be affected by wave action or tsunamis are designed to include measures provided by guidance from the FHWA HEC-25 (Highways in the Coastal Environment), U.S. Army Corps of Engineers (USACE) EM 1110-2-1100 (Coastal Engineering Manual), and the DOT&PF Coastal and Harbor Design Procedures Manual.

While there is no national standard for the design of structures to resist the effects of liquefaction, soil softening, lateral spread, and slope instability, these factors would be considered in the design. A geotechnical exploration would be conducted during the design phase to determine the engineering properties of the soil at proposed bridge crossings. These results would be used to develop recommendations for foundation design: the bridges would be founded on deep, large-diameter pipe piles that can accommodate large deformations associated with seismic hazards. The piles that would support the bridges would be able to accommodate long-term scour and other factors that alter the riverbed elevation.

#### 4.3.8.2 Avalanches

The *2017 Update to Appendix J – Snow Avalanche Report* (see Appendix Z) identifies 43 avalanche paths along the East Lynn Canal Highway corridor. The proposed highway alignment for Alternative 2B crosses 41 avalanche paths (the other two identified paths do not reach the alignment). Based on the *2017 Update to Appendix J – Snow Avalanche Report* (see Appendix Z), the calculated unmitigated AHI for Alternative 2B is 291.

This unmitigated figure is considered very high, but is in the middle range for highways operated with good safety records in avalanche terrain. (For example, Rogers Pass, B.C., has an unmitigated AHI of 1,004, and the previous Seward Highway alignment from Anchorage to Seward had an unmitigated AHI of 331.)

Avalanche hazards can include the risk of property damage, injury, and death. Establishing hazard reduction and risk management methods as part of operational highway procedures can lower the probability of adverse avalanche encounters and increase road safety. Alternative 2B incorporates hazard reduction methods that create physical changes to the alternative include using elevated fills and bridges, adjusting the alignment of a highway, and constructing barriers and snowsheds. These methods are considered part of the alternative and were incorporated into construction costs; they were not budgeted with the annual cost of implementing the avalanche control program. A snowshed is most often constructed as a concrete arch that carries slides over the highway while allowing traffic to flow unimpeded through it. Based on the findings of the *2017 Update to Appendix J – Snow Avalanche Report* (see Appendix Z), DOT&PF would

construct snowsheds at three avalanche path locations to further reduce the avalanche hazard associated with Alternative 2B.

Risk management refers to the operations that can reduce the consequences of exposure to avalanches. These methods include forecasting, warnings, temporary highway closures, and use of explosives to release unstable snow during temporary highway closures. Explosives and remote exploders are used for avalanche mitigation to trigger avalanches when a road is closed, rather than waiting for avalanches to release naturally when the public is traveling. The intended result is an increased frequency of generally smaller avalanches during closures and a decreased frequency of larger slides with greater risks when the road is open. With combined appropriate hazard reduction and operational risk management efforts, the mitigated AHI for Alternative 2B would be reduced to an AHI value of approximately 28. A mitigated AHI value of 30 or less is the North American standard for safe operation of a highway (see *2017 Update to Appendix J – Snow Avalanche Report* in Appendix Z). DOT&PF would propose to use blaster boxes to deliver explosives to potential avalanche sites. Blaster boxes are secure steel cabinets mounted on a mast in an avalanche-protected location from which they can fire pre-targeted mortar rounds into avalanche starting zones by remote control. Blaster boxes require helicopter flights to nearby landing zones to deliver the rounds, can fire only 10 shots before reloading, require time to set up and maintain, and have a high initial installed cost, but they allow explosive delivery by one operator, even under stormy conditions. Doppler radar and seismic detectors help to verify avalanche release when the system is operated, and can also provide warnings of natural avalanche cycles. Helicopter delivery of explosive charges to release unstable snow would be used on avalanche paths that require less-frequent explosive work. The explosive charges would be dropped by hand from a low-hovering helicopter with the door removed. Helicopter delivery has proven to be an effective, accurate, and flexible method for covering large areas in a short time. The major disadvantage is that helicopter delivery requires calm ridgetop winds and good visibility. The lack of good flying weather can result in substantial delays and missed opportunities.

The *2017 Update to Appendix J – Snow Avalanche Report* (see Appendix Z) calculated closure periods using the same data consistently used in all AHI calculations. The closure period calculations and AHI calculations are based on 100 years of weather records from Juneau correlated with 6 years of avalanche observations in Lynn Canal. Estimates of average closure time per year, average number of closures per year, closure length, and capital and operating budgets for highway maintenance relative to avalanche hazards for Alternative 2B are provided in Table 4-32. The capital costs of avalanche control equipment and facilities have been included in the construction cost estimate, and the annual operating cost for avalanche control has been included in the maintenance and operating cost estimate for each alternative.

**Table 4-32:**
**Costs, Closures, and Mitigated Avalanche Hazard Index for Alternative 2B**

| Alternative | Capital Cost | Annual Operating Cost | Average Closure Time per Year (days) | Average Number of Closures per Year | Closure Length (days) | Mitigated Avalanche Hazard Index |
|---|---|---|---|---|---|---|
| 2B | $11,185,325 | $1,458,719 | 12.1 | 9.9 | 0.8 to 2.2 | 28.2 |

Winter travel would be periodically limited by road closures for avalanche control; however, one or more ferries would be made available to transport vehicles and passengers in Lynn Canal if the highway were to be closed for more than 1 day. The maximum anticipated duration of any avalanche related road closure is 2 days. The Day Boat ACFs, with a capacity of 53 vehicles, would be sufficient for the route in the event of road closure. If, during these closures, more vehicles are needed to be transported, additional sailings would be made depending on winter sea conditions.

Trained technicians experienced in controlled avalanche release would monitor the East Lynn Canal Highway on a daily basis. The technicians would issue daily avalanche forecasts to DOT&PF crews, with updates as conditions change. The technicians would recommend avalanche control operations or preventive road closures to DOT&PF personnel when the avalanche hazard is high.

Combined hazard reduction that includes elevated fills, bridges, and snowsheds, and a standard risk management program with avalanche forecasting, explosives delivery, and preventive road closers would reduce the risk of damage to vehicles and people traveling on the Alternative 2B highway. Planned and unplanned closures would be posted on DOT&PF's 511 website, phone and email listserv, and various social media platforms to ensure that road users receive regular updates of highway conditions.

DOT&PF would dedicate maintenance personnel and resources for routine maintenance, and would use State and/or federal highway funds to perform major repairs as needed.

#### 4.3.8.3 Landslides and other Geological Hazards

For this project, seven different types of geologic hazards were identified: debris flow, hazard rocks, landslides, rock slides, rockfalls, soil raveling, and transitional slides. Of these hazards, the most common and most significant are debris flows and rockfalls.

**Debris Flows** - Alternative 2B's alignment would require crossing 43 debris flows. The majority of the debris flows would be crossed within the active transport zone, which is characterized as highly channelized, steep gradients (10–15%), with a combination of erosion and deposition of levees. Crossing a debris flow in the transport zone is optimal and typically presents the narrowest, best confined area to cross. Ideally, the crossing will convey the debris flow event unimpeded under the road via a bridge or a specially designed culvert structure. This minimizes any deposition of debris material and reduces maintenance. Where conveyance could not be reasonably achieved, the roadway could be protected with a debris basin constructed on the uphill side of the road and sized to contain the volume of a single design event. Construction of the basins would be limited by the terrain and require continual maintenance effort to keep the basin cleared of accumulated debris.

**Rockfalls** - There are 53 identified rockfall hazards along the Alternative 2B alignment. Mitigation strategies for rockfall hazards include avoidance, removal, stabilization, and protection. Twenty-three of the identified rockfall hazards would be effectively mitigated by avoidance or removal of the rockfall initiation zone by blasting operations required to construct the alignment. The remaining 30 rockfall hazards would be mitigated through stabilization and protection strategies. Stabilization includes hand scaling, special blasting, and rock bolting. Protection includes draped mesh, attenuation fences, barrier fences, and widened rockfall catchment ditches.

**Rockslides** - There are two rockslides in the proximity of the proposed Alternative 2B roadway alignment (see Figure 3-11 and the *Appendix Z - 2017 Update to Appendix D, Technical Alignment Report*). The slide located approximately 2 miles south of Gran Point would be spanned by a bridge. By crossing over the slide, the roadway would not be at risk. The slide located approximately 1.5 miles south of Met Point is avoided entirely as the roadway passes below the runout zone of the slide.

#### 4.3.8.4 Geochemical Properties

During highway construction, blasting activities could expose rock having geochemical properties that pose a hazard to the environment. Rock with acid-generating potential or high total metals content that is exposed to surface water runoff could affect aquatic life and water quality in streams. On site investigations to date have not identified acid-generating rock within the limits of the Alternative 2B alignment. Based on recent experience in Southeast Alaska and available information related to geologic features in the Alternative 2B corridor (see *2017 Update to Appendix D – Technical Alignment Report* at Appendix Z), DOT&PF believes there would be a potential for encountering acid-generating rock during construction of Alternative 2B. A detailed on-site geotechnical investigation would be undertaken by DOT&PF during the final design, if Alternative 2B were selected. Because acid-generating rock is primarily a concern when rock cuts are made near fish-bearing streams, DOT&PF would mitigate the potential effects of drainage from rock cuts in such areas by, for example, constructing roadside drainage ditches in the vicinity of acid-generating rock and diverting the drainage away from fish bearing streams.

#### 4.3.8.5 Outburst Floods

As described in Section 3.2.1, the Meade Glacier at the head of the Katzehin River creates a glacially dammed lake that discharges annually. Glacial outburst floods also have the potential of occurring on the rivers in Berners Bay. The bridges crossing these rivers would be designed to safely pass these floods.

### 4.3.9 Hydrology and Water Quality

#### 4.3.9.1 Floodplains

Planning and preliminary design of Alternative 2B has been done in compliance with DOT Order 5650.2 (Floodplain Management and Protection) and 23 CFR 650 Subpart A (Location and Hydraulic Design of Encroachment on Floodplains).

**Flooding Risks** – The alignment for a highway between Echo Cove and Katzehin runs perpendicular to most of the natural drainages along the east side of Lynn Canal. Therefore, it is not possible to avoid transverse encroachments of these drainages. Alternative 2B would have no longitudinal encroachments of any drainages. No regulatory floodways occur in the project area. The transverse encroachments are mainly bridge piers that would be designed so that Alternative 2B would not create significant flood risks.

**Impacts on Natural and Beneficial Floodplain Values** – Alternative 2B would cross 46 streams. Most of these streams are less than 50 feet wide. Bridges would be used to cross 19 streams, including all anadromous fish streams. Eleven of the bridges would be single-span structures. For these bridges, each bridge and its piers would be located sufficiently outside of

the predicted base flood elevation of the streams, as determined by hydraulic studies to be conducted during the final engineering design of the selected alternative. Five streams would have a single support but the support would not be within ordinary high water. Multi-span bridges would be constructed at the crossings of the Katzehin, Lace, and Antler rivers. These larger bridges would extend beyond the outer most channels at each river delta to protect their natural, meandering flow. The multi-span bridges would require placement of supports in the river floodplain. These supports would be spaced to accommodate the design flood and avoid impacts during flood events.

**Potential for Incompatible Floodplain Development** – There are no community floodplain development plans for the project area. The streams crossed by Alternative 2B that have a large enough floodplain for development are located within the Tongass National Forest. All of these lands are designated as LUD II, semi-remote recreation areas, or OGRs where the principal management goal is to retain the natural character of the area. Therefore, no incompatible floodplain development would occur in the project area.

Alternative 2B would provide a highway where there are currently no roads. The highway would serve as a new evacuation route for emergencies for private properties adjoining the road and for Juneau.

**Measures to Minimize Floodplain Impacts and Preserve Natural and Beneficial Floodplain Values** – All of the larger floodplains would be crossed with bridges. Bridge abutments would be located outside the floodplains. Multiple-span bridges would be supported on piles with groups of in-line piles spaced at least 130 feet apart.

**Compliance with EO 11988** – In accordance with the analysis required in DOT Order 5650.2 (Floodplain Management and Protection) and 23 CFR 650 Subpart A (Location and Hydraulic Design of Encroachment on Floodplains), FHWA has determined that Alternative 2B is in compliance with EO 11988. This alternative cannot avoid transverse encroachments of base floodplains along the alignment; however, the alternative would not result in any longitudinal encroachments of floodplains. The transverse encroachments would not increase flood risks, substantially impact natural and beneficial floodplain values, or support incompatible floodplain development. All stream crossings would be designed to minimize potential floodplain impacts and preserve beneficial floodplain values.

#### 4.3.9.2 Hydrology

Alternative 2B would act as a partial barrier to the flow of shallow groundwater and surface water. Shallow groundwater blocked by the highway would percolate through the shot-rock fill or eventually flow to the surface. Roadside drainage ditches would collect surface water on the upgradient side of the highway and channel it to the downgradient side through culverts. This flow diversion would include sufficient cross-culverts to adequately maintain the water's natural downgradient flow. Culverts would be designed for the 50-year rainfall event and end sections or rock dissipaters would be used to disperse high-volume/high-velocity flows to protect soils and vegetation below culvert outfalls from erosion.

The ferry terminal north of the Katzehin River would require the placement of fill (shot-rock generated during highway construction) at the terminal site and dredging to approximately 25 feet below mean lower low water. These encroachments would not measurably change the hydrodynamics of Lynn Canal or Berners Bay.

#### 4.3.9.3 Water Quality

Highway construction, maintenance, and operations can affect water quality through earth-moving activities, equipment oil and fuel spills/leaks, debris generation, winter sanding, and vehicular traffic. These activities could introduce metals, fuel, oil, and other potential contaminants to watercourses whose drainages include Alternative 2B principally through runoff from the highway.

Results from stormwater research by the FHWA indicate that stormwater runoff from low to medium traffic volumes (under 30,000 vehicles per day) on rural highways exerts minimal to no impact on the aquatic components of most receiving waters (USDOT and FHWA, 1987). Studies conducted in Anchorage, Alaska, under the Municipality of Anchorage (MOA) Watershed Management Program similarly concluded that street runoff has minimal impacts to the water quality of receiving waters from most potential pollutants (MOA, 2000a). These studies showed dissolved concentrations of calcium, chromium, magnesium, and zinc to be below the AWQS. Only dissolved concentrations of copper and lead were noted to be above their AWQS; however, modest dilution would likely reduce these concentrations below their AWQS. Identified concentrations would not adversely impact streams with flow rates greater than 0.5 cubic foot per second (MOA, 2000b). Polynuclear aromatic hydrocarbons were at concentrations below the EPA water quality criteria.

Because of the rural setting of Alternative 2B and the predicted low annual ADT, fewer impacts to water quality in the project area would occur than were found in the Anchorage studies. Studied runoff was collected from Anchorage roadways that ranged from residential (<2,000 ADT) to major arterial (>20,000 ADT). Studied melt water was from snow collected from a mix of these types of roads. In comparison, Alternative 2B would have summer ADT volumes of approximately 1,260 in 2025 and 1,265 in 2055. During winter, ADT would be less than 500 vehicles per day.

Highway runoff and melt water from Alternative 2B would have lesser quantities of potential contaminants than what was observed in the Anchorage studies due to a lower traffic volume and less development in the Lynn Canal corridor. Snow would be cleared from the highway and deposited along its length, instead of being disposed of in one location. DOT&PF does not usually use de-icing chemicals on rural roads. Sanding would be performed, as conditions required. Typically, up to 5 percent sodium chloride per total weight of sand is added to keep sand friable in winter. Potential pollutants would not be concentrated in one area. Runoff from the proposed highway and bridges would not exceed AWQS or adversely impact the water quality of receiving waters for the long term. Potential contamination from oil or hazardous substance spills would be lower than on most highways due to the rural setting of the highway and the low predicted highway traffic volume. Nevertheless, the potential for spills due to a highway vehicle accident would be created.

The following Best Management Practices (BMPs) would be implemented to minimize long-term water quality impacts. See Section 4.8.6 for BMPs to minimize water quality impacts during construction.

- Only clean fill material (excavated rock or mineral soil) would be used for the roadway and ferry terminal embankments.
- Rock would be used to stabilize toes of slopes at ponds and stream crossings.

- Grass seed would be placed on any road slope containing soil. To protect the integrity of the natural plant communities, plant species indigenous to the area would be used for vegetating road slopes, except that non-native annual grasses may be used to provide initial soil cover.
- To the extent practicable, only soil or rock excavated from the construction limits or immediately adjacent to the highway would be used for highway and ferry terminal embankments.
- Culverts would be installed in appropriate locations to maintain natural flow patterns for surface water.

Ferry operations under Alternative 2B would have little effect on area water quality. AMHS mainline ferry wastewater discharges in Lynn Canal north of Auke Bay would be eliminated. The ferries that would be used for Alternative 2B would have sanitary waste holding tanks.[30] Sanitary waste from the ferries would be treated at the existing treatment facilities in Skagway. A sewage treatment facility with a permitted outfall would be installed at the Katzehin Ferry Terminal to treat sanitary waste from the restrooms in the Katzehin Ferry Terminal building. The facility would meet all federal and State water quality requirements. Aeration and ultraviolet light disinfection, similar to the system used at the Auke Bay Ferry Terminal, would be used; therefore, no adverse impacts to water quality would occur. Accidental discharges, spills, and leaks are possible during ferry operations. Historically, these have been minor, with only minimal and temporary impacts to water quality. This low level of impact would likely continue under Alternative 2B.

Highway and bridge runoff would contribute small amounts of turbidity and pollutant loads to local drainages flowing to Lynn Canal. No roadside restroom facilities are proposed along the roadway alignment other than at the maintenance and operations station at Comet. Contaminant concentrations in runoff from the proposed highway and/or bridges would not exceed AWQS or adversely impact the water quality of receiving waters for the long term.

### 4.3.10 Air Quality

The increase in vehicular traffic and changes in ferry vessel traffic associated with Alternative 2B would not affect the Mendenhall Valley non-attainment area based on consultations with the EPA for the 1997 Draft EIS, the current status of the area, and the impact analysis presented in this section. The analysis presented in this section also projects that Alternative 2B would have no negative human health or environmental consequences resulting from project-related vehicle or ferry vessel emissions.

#### 4.3.10.1 Carbon Monoxide

Simplified dispersion modeling was conducted for CO emissions from projected maximum peak traffic volumes.[31] Using the most conservative climatic conditions (i.e., low wind speeds and a stable atmosphere that produces the highest pollutant concentrations), the modeling indicated that the maximum 1-hour average CO concentration associated with these emissions would be 1 ppm. Adding this concentration to an estimated background value of 1 ppm and 2 ppm for rural

[30] Holding tanks would be pumped out and the waste treated onshore for disposal.

[31] These volumes were 1,800 in 2008 and 3,250 in 2038 based on Alternative 2; Alternative 2B projected volumes are less; therefore, emissions would be less.

and urban (e.g., Haines, Skagway, and Auke Bay) segments of Alternative 2B indicates that CO concentrations would not approach the 9 ppm CO NAAQS. In the *2017 Update to Appendix T – Air Quality Modeling Memorandum* (in Appendix Z of this Final SEIS), DOT&PF confirmed that Alternative 2B traffic would not result in an increase in CO concentrations that would approach the NAAQS.

In response to comments on the 2014 Draft SEIS, ferry emissions modeling was performed to estimate the annual load of emissions (tons/year) for all alternatives relative to total emissions loading at active marine centers. The results of that modeling effort indicate that the ferry emissions associated with Alternative 2B would approximately double the AMHS ferry emissions of Alternative 1 – No Action, but the contribution to total marine vessel emissions would be minor. See Attachment 1 to the *2017 Update to Appendix T – Air Quality Modeling Memorandum* in Appendix Z for detailed modeling results and Section 4.9.2.7 for a discussion of the potential cumulative impact.

#### 4.3.10.2 Particulates

A qualitative analysis was done for $PM_{10}$ for Alternative 2B. This analysis compared project-related traffic with traffic in an area with similar meteorological conditions where $PM_{10}$ has been monitored.

$PM_{10}$ is monitored at Floyd Dryden Middle School on Mendenhall Loop Road in Juneau. Peak-hour traffic volume on this road was 1,201 vehicles in 2000. The 24-hour average $PM_{10}$ concentration measured at this monitoring station was 27 micrograms per cubic meter ($\mu g/m^3$) in that year. Projected peak hour traffic for Alternative 2B was estimated at 9 percent of the summer ADT. Summer ADT for Alternative 2B is projected to be 1,260 and 1,270 vehicles in 2025 and 2055, respectively. Therefore, the peak hour traffic for this alternative would be about 115 vehicles in 2025 and 2055; which is 10 times smaller than the volumes recorded in Juneau on Mendenhall Loop Road in 2000. Using this multiplier, the 24-hour average $PM_{10}$ concentration with Alternative 2B would be 2.7 $\mu g/m^3$.

This estimate is substantially below the 150 $\mu g/m^3$ 24-hour average NAAQS for $PM_{10}$. Because the Mendenhall Loop Road $PM_{10}$ data include dust from unpaved roads in the valley and paved roads generally contribute only a small fraction of the total $PM_{10}$, this estimate of project-related $PM_{10}$ concentrations overestimates the actual concentrations that would result from Alternative 2B.

With regard to particulates generated by diesel fuel use, Alternative 2B would result in 50 percent more ferry fuel use and a proportionate increase in particulate emissions, relative to Alternative 1 – No Action. This increase, however, would not approach the NAAQS for $PM_{10}$.

The combined particulate emissions from vehicles and ferries under Alternative 2B would be greater than particulate emissions under Alternative 1 – No Action, but would not result in an air quality impact relative to NAAQS.

#### 4.3.10.3 Conformity

The project area is located in an air quality attainment area where the State Implementation Plan (SIP) does not contain any transportation control measures. Therefore, conformity procedures do not apply to this project, and a conformity determination is not required per 40 CFR 51.

### 4.3.11 Hazardous Materials

The *2014 Update to Appendix M – Initial Site Assessment Technical Report* (see Appendix Z) identified three incidents along the alignment of Alternative 2B as being an area of potential concern with respect to hazardous materials. These incidents were listed in the Emergency Response Notification System database, sometimes referred to as the "Spills and Accidents" database, which contains data on toxic chemical spills and other accidents reported to the National Response Center. The three reported incidents are attributed to Coeur Alaska mining activities. They were all small, and the released materials have dissipated or been removed. These incidents are unlikely to affect the development of Alternative 2B because of their size and status of cleanup.

Although it did not appear in any federal or State database listings, the Kensington beach facility, which is located within the alignment for Alternative 2B at Comet, contains three 20,000-gallon above-ground diesel fuel storage tanks and an incinerator. DOT&PF would acquire this facility if Alternative 2B were selected. A Phase I environmental site assessment would be performed prior to acquisition to assess any risk associated with the use, history, or removal of any of the facility infrastructure.

### 4.3.12 Wetlands

The specific aquatic habitats that would be affected by Alternative 2B, including habitats affected by the proposed ferry terminal, are provided in Table 4-33. Alternative 2B would result in the loss of approximately 61 acres of wetlands and approximately 32 acres of unvegetated intertidal and subtidal areas. The preliminary alignment for highway segments of Alternative 2B has been adjusted several times to avoid wetlands and reduce the impacts to wetlands that could not be avoided. During design DOT&PF would investigate additional measures to reduce impacts, including further small alignment changes, steepened slopes, and reduced embankment heights.

Alternative 2B would not require filling of palustrine or estuarine emergent wetlands. All but approximately 0.7 acre of the wetlands that would be affected by Alternative 2B are forested wetlands. The wetland functions and values that would be affected by a highway include a reduction in groundwater recharge and discharge, lateral flow, surface hydrologic control, wildlife habitat functions, and riparian support.

The proposed highway would act as a partial barrier to the flow of shallow groundwater and surface water. Flow of surface water as well as shallow groundwater blocked by the highway embankment that would eventually flow to the surface would be conveyed down-gradient by culverts under the highway embankment. Alteration of hydrology because of the highway embankment could result in corresponding changes to the vegetation and over time could affect wetland functions within and outside the highway ROW. The extent of this effect would depend on localized hydrologic patterns; however, effects would be minimized through the use of porous fill material and cross-drainage structures.

The Berners Bay sub-region is an ecologically diverse area that supports several species of migratory birds, mammals, and plant species. Within the Berners Bay sub-region, between the start of the project at Echo Cove to the Slate Creek drainage at Slate Cove, development of Alternative 2B would require fill and excavation in 5.7 acres of wetlands.

**Table 4-33:**
**Alternative 2B Impacts to Wetlands and Other Waters of the U.S. (Acres)**

| Sub-region | Classification | Areas of Fill (acres) |
|---|---|---|
| **Berners Bay** | **Wetlands** | |
| | Palustrine Forested | 5.0 |
| | Palustrine Scrub-Shrub | 0.7 |
| | **Subtotal** | **5.7** |
| | **Intertidal and Subtidal Areas** | |
| | **Subtotal** | **0.0** |
| **Slate Cove to Sherman Point** | **Wetlands** | |
| | Palustrine Forested | 53.4 |
| | **Subtotal** | **53.4** |
| | **Intertidal and Subtidal Areas** | |
| | **Subtotal** | **0.0** |
| **Sherman Point to Katzehin River** | **Wetlands** | |
| | Palustrine Forested | 1.6 |
| | **Subtotal** | **1.6** |
| | **Intertidal and Subtidal Areas** | |
| | Rocky Shores | 21.7 |
| | Unconsolidated Bottom | 3.2 |
| | **Subtotal** | **24.9** |
| **Katzehin River to Terminal Area** | **Wetlands** | |
| | Estuarine Emergent | 0.0 |
| | **Subtotal** | **0.0** |
| | **Intertidal and Subtidal Areas** | |
| | Rocky Shores | 7.2 |
| | **Subtotal** | **7.2** |
| **All East Lynn Canal Sub-regions** | **Wetlands** | |
| | Palustrine Forested | 60.0 |
| | Palustrine Scrub-Shrub | 0.7 |
| | Estuarine Emergent | 0.0 |
| | **Subtotal** | **60.7** |
| | **Intertidal and Subtidal Areas** | |
| | Rocky Shores | 28.9 |
| | Unconsolidated Bottom | 3.2 |
| | **Subtotal** | **32.1** |
| | **Sub-region Totals** | |
| | Total Wetlands | 60.7 |
| | Total Intertidal and Subtidal Areas | 32.1 |
| | **Total Acres** | **92.8** |

Note: Acreages do not include impacts to unvegetated areas of small streams intersected by the proposed road alignment.

The salt marsh at the head of Berners Bay and adjacent to the Lace and Berners rivers provides several important ecological functions, including surface hydrologic control, riparian support, and wildlife habitat functions. This wetland is rated very high for wildlife functions based on documented use by waterfowl, bald eagles, and marine mammals. Portions of this wetland provide fish habitat functions, depending on the elevation of the wetland. Regional ecological diversity is rated high, as this wetland receives substantial use by wildlife and this type of wetland is limited in the project study area. The alignment for Alternative 2B was adjusted in 2003 to avoid this wetland and further adjusted in 2005 and 2008 to provide greater separation between the highway and the salt marsh area.

Adjacent to the Antler and Berners rivers and on the west shore of Berners Bay, the proposed alignment for Alternative 2B would impact primarily palustrine forested wetlands. The effects of this action would include modifying the groundwater recharge functions, the discharge/lateral flow functions, the surface hydrologic control functions, and the sediment retention functions of these wetlands. Large areas of similar habitat in the surrounding areas, and adequate ditching and drainage structures, would moderate losses of any of these functions. Wildlife habitat functions would be reduced due to the loss of forest, but an abundance of similar habitat is adjacent to the alignment.

From Slate Cove to Sherman Point, Alternative 2B would require fill and excavation in approximately 53.4 acres of wetlands, all of which are palustrine forested wetlands. The alignment was adjusted in 2005 to avoid emergent wetlands. The functions affected by Alternative 2B in this area would be the same as those described for the palustrine forested wetlands along Berners Bay. Regional ecological diversity would not be substantially affected by this loss of wetlands, as this habitat type is common and widespread throughout the surrounding area. The proposed alignment avoids the seasonally flooded emergent/scrub-shrub wetland between Slate Cove and Sherman Point. From about 5 miles north of Point St. Mary to Comet there is a narrow band of uplands along the shore. At the request of resource agencies, the alignment was shifted uphill into forested wetlands in this area in order to avoid the numerous eagle nest trees in the upland area along the shore and to avoid marine fills.

From Sherman Point to the Katzehin River, Alternative 2B would affect 1.6 acres of palustrine forested wetland near Independence Lake. This would have little effect on wetland functions and values in the area. Approximately 55 percent of all shoreline impacts of Alternative 2B would occur in this portion of the proposed alignment. A total of 24.9 acres of marine habitat (rocky shores and unconsolidated bottom) would be filled in this area. Potential impacts of this fill on marine habitat are discussed in Section 4.3.13.

The alignment of Alternative 2B was adjusted in 2005 to avoid filling estuarine emergent wetlands near the Katzehin River crossing and along the upper levels of the large flats on the north side of the delta. This salt marsh habitat on the Katzehin River outwash plain is important in terms of wildlife habitat functions. Since 2006, the terminal site has been reconfigured to eliminate the need to fill any estuarine emergent wetlands. The current highway alignment at the ferry terminal would fill approximately 0.6 acre of intertidal and subtidal habitat (rocky shore). In addition, fill for the Katzehin Ferry Terminal would result in the loss of approximately 6.6 acres of intertidal and subtidal habitat (rocky shore) for breakwaters and terminal facilities.

The indirect effects of Alternative 2B on wetlands include the potential introduction of contaminants from de-icing and accidental spills of fuels and lubricants, the introduction of non-

native plant species inadvertently transported to the area on vehicles and their occupants, and damage to wetlands from increased human recreational activity in the area. These activities could cause the further loss of wildlife habitat functions, reduction of ecological diversity, and sediment/toxicant retention functions. Implementation of BMPs in maintaining the highway, including not using salt to the extent possible, limiting the use of sand near wetlands, and posting educational signs for travelers, would minimize the risk of these effects occurring.

Sand would be used on the highway in the winter. A small quantity of salt (up to 5 percent of the total weight of the sand) is used to keep the sand friable. Because the amount of salt is minimal, it is unlikely to substantially damage adjacent vegetation.

Alternative 2B does not include access facilities for off-road vehicles (ORVs); however, a highway would afford ORVs access to adjacent lands. ORVs can damage upland and wetland vegetation resulting in the direct loss of habitat and habitat damage through vegetation destruction, erosion, and increased stream siltation. Noise and the presence of ORVs can displace some wildlife species and result in mortality from collisions or human interaction. The USFS is aware of the potential for this type of problem and plans to develop an ORV enforcement policy if the road is constructed.

DOT&PF has avoided wetlands to the extent practicable during development of the preliminary alignment for Alternative 2B. The roadway would be constructed using the minimum-width fill footprint necessary for a stable road base in wetland areas. During final engineering design of the selected alternative, DOT&PF would continue to investigate ways to further minimize encroachment on wetlands. With identification of Alternative 1 – No Action as the preferred alternative, DOT&PF notified USACE that it was withdrawing its Section 404/10 Permit Application for the JAI Project (included as *2014 Update to Appendix X – Draft Section 404/10 Application and Draft Section 404(b)(1) Analysis* in Appendix Z of the 2014 Draft SEIS) (see letter from DOT&PF to USACE in Attachment A of Appendix JJ).

### 4.3.13 Marine and Freshwater Habitat and Species (Including Essential Fish Habitat)

During environmental studies for the Supplemental Draft EIS, the FHWA determined that the project alternatives may adversely affect EFH as defined by the Magnuson-Stevens Fishery Conservation and Management Act. Following this determination, DOT&PF prepared an EFH assessment to assess the effects of project alternatives on commercial fish stocks in all life stages and associated habitats. This section summarizes that assessment, which was provided in Appendix N of the 2005 Supplemental Draft EIS and was updated for this Final SEIS (see the *2017 Update to Appendix N – Essential Fish Habitat Assessment* in Appendix Z).

The loss of EFH (intertidal and subtidal habitat) due to highway and ferry terminal construction under Alternative 2B would be 32.1 acres. An additional 4.4 acres of subtidal habitat would be affected by dredging. Indirect effects could occur from modifications to the shoreline that reduce the quality of fish habitat.

Placement of in-water fill in 25.5 acres for highway for highway construction, including an area of intertidal fill at the Katzehin River bridge abutment to prevent scour, would bury all intertidal and subtidal organisms at the specific fill locations eliminating habitat and altering the surrounding habitat. The in-water fill would reduce the amount of refuge habitat available to larval stage eulachon, which are found in estuarine areas in Lynn Canal for an approximately 2-week period following spawning (Willson et al., 2006). Intertidal and subtidal invertebrate

species are opportunistic, and the slopes of fill areas would likely be colonized by similar intertidal and subtidal species over a few seasons. However, because the amount and character of the area available for recolonization would be different from the undisturbed intertidal and subtidal zone, recolonization would not restore the community to its original state, reducing its value as foraging habitat for commercial fish species. Because of the small amount of intertidal and subtidal habitat that would be filled by Alternative 2B relative to the total available, this impact would not affect regional populations of any fish or invertebrate species.

A new ferry terminal would be constructed north of the Katzehin River for Alternative 2B. Because the terminal would not be located near the river mouth, it would not interfere with anadromous fish passage in the Katzehin River. The breakwaters at the terminal would be constructed with gaps or large culverts to allow passage of juvenile fish near the shore.

The proposed Katzehin Ferry Terminal site consists of a steep boulder beach transitioning to a less steep cobble beach. There is a boulder-cobble-gravel substrate in the upper subtidal/lower intertidal zone and a muddy substrate in the lower subtidal zone at this site. Vegetation is present in the shallow intertidal zone, and stalked kelp is present in one part of the lower intertidal zone; however, no seabed vegetation was seen in video imagery of the lower subtidal zone. Due to the steepness of the beach, potential wave exposure, and lack of subtidal vegetation, the proposed Katzehin Ferry Terminal site is less important to commercial fish and crab species than other more protected coves. For this reason, the loss of 6.57 acres of intertidal and subtidal habitat from fill placement and the 4.40 acres of dredging to construct the new ferry terminal as well as maintenance dredging in approximately 30 years would not measurably alter EFH or fish populations in the Katzehin River delta area or in Lynn Canal. Operations of this ferry terminal would not affect Pacific salmon, Pacific herring, or eulachon because of the spatial separation of the terminal from the Katzehin River and other areas of Lynn Canal important to these species.

The loss of intertidal and subtidal habitat from placement of fill and dredging would reduce the amount of habitat available to prey species for Steller sea lions and other marine species, but would not be expected to affect regional populations of any fish or invertebrate species and, therefore, would not affect availability of prey species.

There is the potential for accidental fuel spills from ferries at terminals and while traveling Lynn Canal routes. To date, no in-water fuel spills have been associated with AMHS operations in Lynn Canal. The effects of a spill would depend on its size and location. Spill prevention and cleanup plans would be in place for shuttle ferry operations to minimize potential impacts from accidental spills.

The ferries that would be used for Alternative 2B would have sanitary waste holding tanks and the wastewater would be pumped to an onshore facility for disposal. Sanitary waste generated at the ferry terminals would undergo treatment. Wastewater would undergo aeration and disinfection with ultraviolet light. The treated wastewater would be discharged to Lynn Canal under permit by the ADEC (APDES permit) and would meet Alaska-established waste discharge limitations. For this reason, the effluent should not impact fish or crab habitat or affect fish and crab populations in Lynn Canal, including Berners Bay.

Alternative 2B would bridge 10 streams that support anadromous fish populations, including the Lace, Antler, and Katzehin rivers (one stream is bridged above anadromous fish use). The bridges crossing all but the Lace, Antler, and Katzehin rivers would not encroach on the stream channel. Piers for the bridges over the Lace, Antler, and Katzehin rivers would be approximately

130 feet apart and would not impede fish movement in these rivers. The northern-most channel of the Antler River identified as a eulachon spawning area would be clear-spanned to avoid impacts to this habitat.

Stormwater and melt water runoff from bridges over anadromous fish streams would not alter water quality sufficiently to impact crab or anadromous and marine fish habitat. As discussed in Section 4.3.9.3, studies of highway runoff in Alaska indicate that the volume of traffic on Alternative 2B would not be large enough for runoff from the highway to cause the exceedance of any AWQS in receiving waters.

In summary, the construction of Alternative 2B would result in the direct loss of 32.05 acres of EFH as a result of filling for highway and ferry terminal construction, as well as the modification of subtidal habitat resulting from dredging. Alternative 2B would bridge all streams crossed by highway segments that support anadromous fish populations. Piers for the bridges over the Lace, Antler, and Katzehin rivers that would be required for Alternative 2B would be placed approximately 130 feet apart and would not impede fish movement in these rivers.

The direct loss of 32.05 acres of foraging habitat through highway fill and ferry terminal construction, as well as the modification of some subtidal habitat as a result of dredging, would not substantially affect any fish and invertebrate populations in Lynn Canal. As a result, sport and commercial fisheries would not be affected.

NMFS has offered the following additional EFH conservation recommendations for this alternative pursuant to Section 305(b)(4)(A) of the Magnuson-Stevens Act:

- Realign the Berners/Lace and Antler River multi-span bridges so that they are located as far upstream as possible, minimizing the adverse effects of bridge construction and the effects on in-stream flows. Eulachon are important forage for federally managed fish species (as well as marine mammals) and spawn up to 4 miles upriver. Moving the bridge alignments upstream would decrease the amount of wetland habitat impacted, reduce effects on eulachon and Steller sea lions and other wildlife that use the mudflats, and minimize future human impacts to the river deltas by providing additional distance between the roadway and river outlets in Berners Bay.
- Provide compensatory mitigation sufficient to compensate for the loss of intertidal, subtidal, and wetland habitats.

With DOT&PF's and FHWA's identification of Alternative 1 – No Action as the preferred alternative for the JAI Project, there is no longer a need to complete an EFH consultation.

The alignment for Alternative 2B and the siting of the Katzehin Ferry Terminal have been adjusted through preliminary engineering studies to limit intertidal and subtidal fill. Alignment revisions have resulted in a reduction of approximately 14 acres of rock side cast and eliminated the need for an ocean disposal site for excess rock from excavation. During design of the selected alternative, DOT&PF would continue to investigate ways to further reduce this fill. The bridges over the Berners/Lace and Antler rivers have been realigned as far upstream as possible in response to the conservation recommendations.

### 4.3.14 Terrestrial Habitat

Alternative 2B would result in the loss of vegetation within the cleared area[32] of the highway. The acreage of vegetation types on USFS lands[33] that would be removed for this alternative is estimated to be:

- 412 acres of OG forest
- 206 acres of other forest
- 15 acres of open shrub and meadow
- 7 acres of other terrestrial habitat

This vegetation loss would include coniferous forest plants, such as western hemlock, western hemlock-yellow cedar, Sitka spruce, mixed conifer, mountain hemlock, and Sitka spruce-black cottonwood, and shrub (non-forest brush) and open meadow or muskeg vegetation communities.

Most of the terrestrial habitat that would be affected by Alternative 2B is in the Tongass National Forest. As discussed in Appendix K of the TLRMP, earlier adopted versions of the TLMRP established an OGR system to manage this important habitat for many terrestrial species. Alternative 2B would impact three mapped small OGRs established under the reserve system (see Figure 3-3):

- **Value Comparison Unit (VCU) 160** - Alternative 2B would run through a small OGR (Old-Growth Habitat LUD #10) in VCU 160 in the Slate Cove area. Approximately 104 acres of OG Habitat LUD #10 (1,282 acres total size) would be managed under the prescriptions for TSCs, which would take precedence over the underlying OG Habitat LUD. This would result in this OGR not meeting the TLRMP minimum total acre criteria. Within the 104 acres, construction would eliminate 40 acres of forest (i.e., approximately 64 acres of forest would remain standing within the highway ROW, but would not be protected). Of 1,173 acres of productive OG forest in the LUD, 91 acres would be incorporated in the TSC, and 31 acres would be eliminated/cleared. The road would divide the OGR and its OG habitat into inland and seaward portions, and the road would lie within the beach buffer at Berners River. The beach buffer is considered some of the most important habitat for wildlife because it provides corridors along the beach, winter habitat, and bald eagle nesting habitat.
- **VCU 200** - Alternative 2B would run through the small OGR (Old-Growth Habitat LUD #11) associated with VCU 200 and located on Point Saint Mary peninsula. This reserve partially overlaps VCU 160. Approximately 63 acres of OG Habitat LUD #11 (3,312 acres total size) would be managed under the TSC management prescription. The OG Habitat LUD would continue to meet TLRMP minimum total acreage criteria. Within the 63 acres, construction would eliminate 20 acres of forest (i.e., about 43 acres of forest

[32] Timber clearing is proposed 10 feet beyond the top of cut slopes and 10 feet beyond the toe of embankment slopes. Removing large standing timber at the top of cut slopes eliminates the potential for trees falling into the road/traffic as a result of root disturbance. The additional clearing also provides for equipment access in rock cut areas for drilling activities. Removing timber at the toe of embankment slopes limits the severity of crashes when vehicles run off the road and down embankment slopes. This provides a "clear zone" at the toe of slope to allow vehicles the opportunity to come to a stop without colliding with a large tree.

[33] Comparable vegetation mapping is not available for other lands. The forest acreages that follow include forested wetlands; open shrub and meadow areas may be wetlands or uplands (USFS, 2013).

would remain standing within the highway ROW, but would not be protected). Of 1,450 acres of productive OG forest in the LUD, 17 acres would be incorporated in the TSC, and 7 acres would be eliminated/cleared. The road would divide the reserve and its OG habitat into inland and seaward portions, and some of the road would lie within the beach buffer, which is considered some of the most important habitat for wildlife because it provides corridors along the beach, winter habitat, and bald eagle nesting habitat.

- **VCU 190** - Alternative 2B would cross this small OGR (Old-Growth Habitat LUD #9) from an area north of Comet to approximately Met Point. Approximately 114 acres of OG Habitat LUD #9 (1,744 acres total size) would be managed under the TSC management prescription, which would result in this OGR not meeting the TLRMP minimum total acre criteria. Within the 114 acres, construction would eliminate 46 acres of forest (i.e., approximately 68 acres of forest would remain standing within the highway ROW, but would not be protected). Of 732 acres of productive OG forest in the LUD, 56 acres would be incorporated in the TSC, and 23 acres actually would be eliminated/cleared. The road would divide the reserve and its OG habitat into inland and seaward portions, and the road would lie entirely within the beach buffer, which is considered some of the most important habitat for wildlife because it provides corridors along the beach, winter habitat, and bald eagle nesting habitat.

Wildlife impacts are more completely addressed in Section 4.3.15 and in the *2017 Update to Appendix Q - Wildlife Technical Report* (in Appendix Z).

Consistent with procedures spelled out in the TLRMP, the USFS has examined the impacts of Alternative 2B in conjunction with ADF&G and USFWS. The interagency team has recommended that the boundaries of OG Habitat LUDs #9 and #10 should be adjusted to help retain the viability of the OG Habitat LUDs to function as links in the overall OG habitat conservation strategy for the Tongass National Forest. The interagency team described a biologically preferred alternative for modifying the boundaries of these to reserves (Brockmann et al., 2015). Despite the likely adjustment to the boundaries, the OG Habitat LUDs would be compromised under Alternative 2B because of increased road miles, reduced acreage of productive OG forest in the VCUs overall, impacts to connectivity, and fragmentation of large blocks of productive OG forest. The USFS likely would implement the boundary change through its own NEPA decision and through TLRMP amendment. The interagency team did not recommend any change for OG Habitat LUD #11. In addition to the small OGRs, Alternative 2B would go through OG forested areas within lands designated as Non-Development LUDs that are presumed to function as medium and/or large OGRs. The lands within all of these LUDs contain stands of OG forest, ranging from low to high volume. Alternative 2B would reduce the size of the OG forest stands in all VCUs, as well as create a separation of some OG forest areas into inland and shoreward areas. Alternative 2B would remove approximately 412 of 103,501 acres of OG forest along the east side of Lynn Canal.

Tidelands and submerged lands south and north of the mouth of the Katzehin River and adjacent to the proposed terminal are designated as a wildlife habitat and harvest area by the Alaska Department of Natural Resources (ADNR) in its *Northern Southeast Area Plan* (ADNR, 2002a) and are managed to protect sensitive wildlife habitats and areas important to fisheries. As noted in Section 4.3.13, loss of 6.6 acres of intertidal and subtidal habitat from fill placement and the 4.4 acres of dredging to construct the new ferry terminal, as well as maintenance dredging in approximately 30 years, would not measurably alter fish populations in the Katzehin River delta

area or in Lynn Canal. The potentially affected area is low value habitat. If Alternative 2B were selected, DOT&PF would file an application with ADNR for an Interagency Land Management Assignment for the Katzehin Ferry Terminal. ADNR would review the applications relative to the Area Plan and comments from agencies, and issue its decision to transfer management authority of the tidelands and submerged lands at the ferry terminal location, as long as fisheries and wildlife resources, among other resources, are protected. Based on the low habitat value and the level of impact, a positive outcome is anticipated. A bridge over the Katzehin River and ferry terminal north of the Katzehin River appears to be compatible with USFS and ADNR land management plans.

The loss of vegetation represents less than 1 percent of the vegetation in the study area. The loss of this vegetation would not adversely affect any rare or unique community types or any listed threatened and endangered or USFS sensitive plant species. This alternative may affect two plant species considered rare by the Alaska Natural Heritage Program (ANHP; paper birch and wild blue lettuce).

Clearing of the highway ROW would increase the potential for blow-down of trees adjacent to the ROW or slides in unstable areas.

Alternative 2B could have indirect effects on terrestrial vegetation. By improving the access to the area, human activity would increase along the highway corridor. This increase could lead to some degradation or disturbance of terrestrial habitat adjacent to the highway through camping and hiking, illegal dumping, and unauthorized collection of firewood. Invasive plant species could be introduced from visitors, vehicles, and pets.

### 4.3.15 Wildlife

#### 4.3.15.1 Marine Mammals

Harbor seals, minke whales, killer whales, harbor porpoises, Dall's porpoises, and sea otters are considered in this section. Humpback whales and Steller sea lions are discussed in Section 4.3.17, Threatened and Endangered Species.

Harbor seals frequently haul out at a number of rocky beaches and sand bars in the study area, including sand bars in Berners Bay and at the mouth of the Katzehin River. Many harbor seals use Berners Bay in the spring and summer for feeding and hauling out, especially near the confluence of the Antler and Lace Rivers (Marston et al., 2002; USFWS, 2003b). Along the majority of the highway, vehicle traffic would not affect harbor seals because the proposed highway is at least 100 yards from the shoreline. Harbor seals at this distance would notice activity on the highway but would be unlikely to flush from the haulout or shoreline (Jansen et al., 2010). In addition, traffic noise beyond this distance would be at an intensity similar to other noise sources in the natural environment (i.e., at or below ambient noise levels) and would not create abnormally loud or sudden sounds that would disturb harbor seals. The alignment of Alternative 2B is several hundred yards away from beaches and sand bars in Berners Bay. The proposed highway alignment for Alternative 2B would be adjacent to the beach at a number of locations north of Sherman Point. It is possible that harbor seals could abandon haulouts in these locations. Seals may habituate to highway traffic at the Katzehin River or may choose to utilize areas further downstream from the bridge. Operation of the ferry terminal at Katzehin is not expected to cause disturbance to harbor seals at haulouts because of the distance between this terminal and seal haulouts.

Minke whales tend to be attracted to motor boats. Therefore, the presence of ferries would not drive minke whales away from an area. For this reason, shuttle ferries in Chilkoot and Taiya inlets associated with Alternative 2B would not be expected to displace this species. Because of this attraction, increased ferry traffic may increase the risk of collision; however, collision accidents with minke whales are very rare (Allen and Angliss, 2012). In addition, minke whales rarely occur in Lynn Canal (Dalheim et al., 2009). Therefore, Alternative 2B is unlikely to impact the population of this species in Lynn Canal.

Fast-moving and maneuverable species such as the killer whale, harbor porpoise, and Dall's porpoise can readily avoid ferry boats and would not be impacted by the ferry traffic associated with Alternative 2B.

Sea otters are rarely found in Lynn Canal (Esslinger and Bodkin, 2009). Like the harbor seal, sea otters are sensitive to noise and would likely avoid ferry traffic associated with Alternative 2B. Alternative 2B is unlikely to impact sea otters in Lynn Canal.

Normal winter and summer maintenance activities such as snow removal, sanding, brush cutting, crack sealing, and culvert cleanout would not produce noise levels higher than the predicted 30-year peak hour traffic. Winter operation would also require infrequent detonation of unstable snow in the avalanche zones along the alignment. Hauled-out marine mammals may react to the sounds by diving into the water from land or by submerging when they are in the water. Generally, they return to their previous behavior within an hour or so after isolated disturbances. The noise and vibration created by the resulting avalanche would be no different than that from naturally occurring avalanches.

#### 4.3.15.2 Marine Birds

This group includes species that nest on land but forage in marine waters at least part of the year. Species considered in this group include great blue herons, marbled murrelets, Kittlitz's murrelets, harlequin ducks, black oystercatchers, yellow-billed loons, Aleutian terns, and dusky Canada geese.

Great blue herons nest in trees near preferred feeding areas, typically quiet shorelines and marshy areas. Alternative 2B would result in the loss of potential nest trees on the banks at large river crossings. The type of nesting and feeding habitat preferred by great blue herons is not limited in Berners Bay or the Katzehin River delta. Great blue herons have habituated to human presence and vehicle traffic in many urban and rural areas, including Juneau, so they would be expected to habituate to normal vehicle traffic from Alternative 2B over time. For these reasons, increased human activity or a small loss in habitat with Alternative 2B would not result in population-level effects on this species.

Marbled murrelets are common in nearshore waters along the eastern shore of Lynn Canal and in Berners Bay and are presumed to nest throughout the study area (USFWS, 2003b). This species nests in OG trees, often near the coast. Alternative 2B would impact less than 1 percent of the available nesting habitat preferred by marbled murrelets in Lynn Canal. Therefore, Alternative 2B would not have population-level effects on this species.

The Kittlitz's murrelet appears to be rare in the project area. It nests in high-elevation talus slopes and feeds in nearshore waters. Loss of habitat would be less than 1 percent of available habitat in Lynn Canal, and highway traffic is expected to have no effect on this species. Alternative 2B would not result in population-level effects on this species.

Harlequin ducks are also common in nearshore waters along the eastern shore of Lynn Canal and in Berners Bay (USFWS, 2003b) and nest along the banks of swift-running streams. These birds are wary of people and will swim or fly away when approached (Rosenberg, Patten, and Rothe, 1994). Highway traffic noise could disturb harlequins in nearshore resting and feeding areas where the highway alignment is at the shoreline. The majority of the highway is not located on the shoreline, and loss of less than 1 percent of available nearshore habitat in Lynn Canal would not result in population-level effects on this species.

Black oystercatchers have been observed in Lynn Canal, but are considered uncommon. Alternative 2B would result in the loss of approximately 29 acres of rocky shore habitat. Most of the loss would occur 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 less than 1 percent of available 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.

Only low numbers of yellow-billed loons have been documented in Berners Bay and Lynn Canal. 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. 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).

The Aleutian tern is thought to be a casual or accidental spring and summer visitor in Southeast Alaska and is not likely to be found in the JAI Project area. Although it is known to breed as far south as Glacier Bay, Glacier Bay is considered to be the furthest southern extent of its range in the region; therefore, Alternative 2B would not likely affect Aleutian terns. Alternative 2B would not result in the loss of palustrine or estuarine emergent wetlands, which is preferred nesting habitat of Aleutian terns. Because Aleutian terns nest onshore and feed over ocean waters, they are unlikely to be disturbed by ferries. Noise and human presence introduced with the proposed highway may preclude Aleutian terns from colonizing small portions of these habitats adjacent to project facilities.

Dusky Canada geese do not breed or winter in the project area. 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 (Bromley and Rothe, 2003). 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.

Pullouts would be proposed near Sawmill Creek, Berners Bay, Antler and Lace Rivers, Slate Cove, Comet, Brown Point, Eldred Rock, Yeldagalga Creek, and south and north of the Katzehin

River, and would increase human presence that may disturb waterfowl in the area, particularly at the Katzehin River delta and Berners Bay. In general, waterfowl in the area are located along the shoreline or in the water away from the highway and vehicular traffic. Although unlikely, it is possible that waterfowl could be struck by vehicles traversing the area. Specific data on number of potential bird strikes are not available.

#### 4.3.15.3 Terrestrial Mammals

Species considered in this group include the black bear, brown bear, marten, river otter, wolf, Sitka black-tailed deer, moose, wolverine, and mountain goat. The assessment of project effects for these animals considered habitat loss and fragmentation, traffic disturbance, mortality caused by collisions with vehicles, and indirect impacts of increased human activity in the study area.

The direct loss of wetland and terrestrial habitat described in Sections 4.3.12 and 4.3.14 would amount to less than 1 percent of these habitats available in the study area. Additional loss of habitat because of windblown trees adjacent to the ROW or changes in local hydrologic patterns may add to the total habitat loss but not by enough to measurably increase the amount of habitat lost in the study area. For some species, there is a seasonally important habitat that has a greater influence on population levels than other types of habitat used by that species. For example, wintering habitat is important for goats and moose, and spring and fall beach habitat is important for bears.

Behavioral avoidance of a highway on the alignment for Alternative 2B or physical features of the highway such as steep embankments or retaining walls may function as a barrier to movement for some species and may fragment their habitat by limiting their ability to use all of their range. Alternative 2B would have little effect on the movement of moose or mountain goats. Moose readily cross highways; therefore, habitat fragmentation is not an issue for that species. Mountain goat summer habitat is primarily at higher elevations than the proposed highway alignment, but the alignment would intersect winter habitat in east Lynn Canal. An area designated by USFS as a small OGR, located along the east side of Lynn Canal north of Point Sherman where steep mountainsides come directly to saltwater, is used by mountain goats. Goats could use lower elevations along the proposed highway alignment of 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. 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 Berners River and upper Echo Cove (White et al., 2012b). Wildlife crossing signage in areas of high brown bear, moose, and mountain goat use as identified by ADF&G would be incorporated into the road design.

Sitka black-tailed deer use a variety of habitat types, so it is unclear how habitat fragmentation might affect their survival (USFS, 1997a). They appear to be limited by heavy snow conditions and the quality of winter habitat. Based on a lack of high-quality winter habitat, the deer population is considered very small on the east side of Lynn Canal north of Berners Bay (Barten, 2001).

Black bears in Southeast Alaska tend to migrate seasonally between winter dens at higher elevations and summer feeding grounds at lower elevations. Radio collared bears in Berners Bay have been shown to move between high elevations and shorelines on a regular basis (Robus and

Carney, 1996). Also, black bears are known to feed on salmon at the Sawmill Creek estuary in the fall. For this reason, many bears would likely have to cross portions of the proposed highway alignment at least twice a year. A lack of escape cover near some portions of Alternative 2B and traffic disturbance could block some bears from portions of their existing home ranges, such as lower reaches of anadromous fish streams. Because black bears are highly adaptable and often learn to coexist near human development, a highway is not expected to result in a substantial effect on black bear populations in the study area. The highway would likely result in mortality of some black bear from vehicle collisions. The HCI model results for the 1997 Draft EIS predicted that an East Lynn Canal Highway would decrease black bear habitat capability on the east side of Lynn Canal by about 6 percent compared to present conditions.

Brown bears move seasonally between higher elevation dens and lower elevation foraging habitat, for example, in Berners Bay in the isthmus between the Lace and Antler rivers (Christensen and Van Dyke, 2004). Most brown bear crossings of the Alternative 2B alignment location are at Sawmill Creek, Berners Bay estuary, Slate Creek, Sweeny Creek, and Independence Lake Creek. The highway could inhibit the number and/or timing of bear crossings between upland and coastal habitats in those areas. If females with cubs have reduced access to important food resources, cub survival could be affected. Under Alternative 2B, four bridges and two under crossings for wildlife are planned for the Berners Bay area 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.

A highway on the alignment for Alternative 2B is not likely to fragment the range of marten, as they would readily cross the road to access favorable habitat. The mature forest habitat along the shoreline potentially serves as a movement corridor for marten between high-density forest areas such as found in Berners Bay, the Katzehin River drainage, and other drainages on the east side of Lynn Canal. A highway would reduce the size of this corridor of fringe habitat and may potentially reduce movement of marten between these areas (Barten, personal communication, 2005). The largest impact of this alternative on marten would be the indirect impact of trapping. Marten are highly desirable as a furbearing species and are relatively easy to trap. Alternative 2B would increase human presence and access in the region, probably increasing the number of marten trapped in the East Lynn Canal region. The HCI model results for the 1997 Draft EIS predicted that an East Lynn Canal Highway could decrease marten habitat capability on the east side of Lynn Canal by 32 percent primarily because of trapping. The effects of this increased pressure could be controlled by ADF&G and the Board of Game through season duration, take limits, lottery drawings, etc.

Alternative 2B would not fragment the ranges of marten and river otter except possibly in the area of Gran Point and Met Point. As discussed in Section 4.3.17.1, Gran Point and Met Point are important haulout areas for Steller sea lions. To discourage people from accessing them, the design for Alternative 2B would include cut banks near each haulout. These barriers could inhibit the movement of martens and river otters in these two areas, although there would be culverts these animals could use to cross the highway. Although a highway could impact individual animals, it is not expected to have population-level effects on martens and river otters in the study area.

Wolves are known to be present in the Lace, Antler, and Katzehin River valleys. Wolves travel widely in pursuit of prey and strongly avoid areas of human activity (USFS, 2000; Person, 2001). Some wolves use estuarine areas to feed on marine mammals and fish, but the importance of

these areas for wolves in the Berners Bay area is not known. The proposed highway would likely not create a barrier to wolf movement, but provide more access for people to beaches and riparian areas, potentially inhibiting the use of these areas by wolves and their access to prey species. An estimated less than 1 percent of wolf habitat would be lost due to the construction of the proposed highway. It is not expected that the loss of habitat or fragmentation would have population-level effects on wolves in Lynn Canal.

Wolverines along east Lynn Canal use shrub habitats below 3,280 feet extensively (Lewis et al., 2012). An estimated less than 1 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 (i.e., elimination of the population) 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). To protect the wolverine population along East 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 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. 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.

Collisions with vehicles would result in an increase in mortality among many terrestrial mammal species in the project area. Species most likely to be affected are those attracted to roads to feed on roadside grasses, forbs, and brush and to escape deep snow, such as moose and deer, as well as those that do not appear to have a substantial aversion to crossing roads, such as river otters, martens, and black bears. Fewer vehicle collisions are expected to occur with species that tend to avoid roads such as the wolf and brown bear. It is not possible to quantify the effect of mortality from vehicle collisions on wildlife populations in the study area, but there would likely be losses over time.

The moose population around Berners Bay consists of only about 85 to 120 animals (Flynn et al., 2012) and is subject to a popular but limited draw hunt, with one to five permits issued per year (Timothy, 2014). 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, 2003c). The number of moose killed by vehicles each year would fluctuate with weather conditions and the density of moose near the highway. Sporadic traffic mortality is unlikely to become an important factor in the maintenance of this population.

DOT&PF would use helicopters to deliver explosive devices to unstable avalanche zones along Alternative 2B during spring. Mountain goats are very sensitive to human disturbance in their alpine habitats, especially from helicopters (USFS, 2001). Avalanche control could result in mountain goat mortality because avalanche chutes are in steep habitat preferred by goats, and are

occasionally used for winter forage (White et al., 2012b). Avalanche chutes are preferred foraging habitat for wolverine during spring and summer (Lewis et al., 2012). As a result, avalanche control could result in mortality to wolverines; however, the probability of mortality related to avalanche control for Alternative 2B would likely be low due to low wolverine densities in the area. The noise from avalanche detonation would be noticeable to mountain goats and other wildlife. The noise created by the resulting avalanche would be no different than that from naturally occurring avalanches.

Alternative 2B could facilitate the hunting of mountain goats, black bear, wolves, wolverine, moose, and brown bear. Incidents of Defense of Life and Property may increase due to increased movement of people through wildlife habitats. Trappers, hunters, and fishermen could benefit from the improved access. As a result of the increased access, ADF&G would consider management actions to ensure sustainable harvests. Possible management actions by ADF&G could include more active monitoring and enforcement duties by State and federal agencies (ADF&G, 2012b). Furthermore, the effects of increased hunting and trapping pressure could be controlled by ADF&G and the Board of Game through season duration, take limits, lottery drawings, etc. ADF&G confirmed in January 2016 that no additional staff would be anticipated to manage additional harvests that may occur as a result of implementing Alternative 2B. Therefore, it is expected that this increased pressure would not result in undesirable population-level effects to mountain goats, black and brown bears, wolves, wolverine, or moose in addition to those due to habitat loss and fragmentation.

#### 4.3.15.4 Terrestrial Birds

Species considered in this group include the Queen Charlotte goshawk, peregrine falcon, olive-sided flycatcher, gray-cheeked thrush, blackpoll warbler, and Townsend's warbler. Goshawks are the only resident species in this group. Peregrine falcons could be present during migration in spring and fall. The other species are neo-tropical migrants that could be present either during migration or during the nesting season. Except for the peregrine falcon, all of these species favor primarily OG forest habitat. Conservation concerns for these species are the result of landscape-scale loss of habitat due to commercial logging (BPIF, 1999). There are approximately 103,501 acres of OG forest on the east side of Lynn Canal. Alternative 2B would affect less than 1 percent of the OG forest. Therefore, Alternative 2B is not expected to result in population-level impacts to these species.

Alternative 2B would cause some direct loss of habitat through clearing. The opening in the forest canopy created by the highway could cause some birds to avoid the highway area, leading to an effective loss of additional nesting habitat. Openings in the forest canopy also create "edge effects," which is the edge between forest and grass or shrub lands that can be used by some avian predators such as ravens, jays, and crows. These effects would add to the decreased value of nesting habitat for neo-tropical migrants near the highway.

#### 4.3.15.5 Amphibians

Frogs and toads such as the wood frog, spotted frog, and boreal toad live in both marshy and forested wetlands as well as upland areas adjacent to ponds. Because amphibians have small home ranges and do not appear to travel far from their natal (birth) pools (NatureServe, 2003), the potential impacts resulting from highway maintenance and operation would be limited to those animals that live near the proposed alignment. The potential impacts of a highway to

amphibians would occur through mortality from roadkill and potential pollution of habitat from highway runoff of pollutants from accidental spills. To avoid impacts to amphibian breeding areas and to reduce overall amphibian effects, the alignment has been moved to avoid open water and emergent wetlands. A pre-construction survey would be conducted to confirm the highway would not impact any amphibian ponds. Impacts are not expected to affect amphibian populations.

### 4.3.16 Bald Eagles

The principal concerns for maintenance and operation of Alternative 2B with regard to bald eagles is disturbance of nesting birds and abandonment of nesting sites. No communal roosting locations are known to occur along the highway alignment. Construction effects to bald eagles are addressed in Section 4.8.12.6. Since the 2006 Final EIS and ROD were issued, the alignment for Alternative 2B has been shifted, where possible, to avoid nests that would be less than 30 feet from the project facilities. In some cases, steep slopes and the need to avoid intertidal and wetland fill prevented shifting the alignment further away from eagle nests. Figure 4-11 shows the proposed highway alignment for Alternative 2B with the approximate distances to eagle nests.

The USFWS has developed a set of distance guidelines for construction activities near active eagle nests that have been used for this impact assessment. Table 4-34 lists the number of eagle nests within the distance guidelines for Alternative 2B.

**Table 4-34:**
**Number of Bald Eagle Nests in Proximity to Alternative 2B**

| Distance from Highway Alignment / Ferry Terminal for Alternative 2B | Number of Nests |
|---|---|
| 661 feet – 0.5 mile | 36 |
| 331–660 feet | 36 |
| 101–330 feet | 29 |
| 61–100 feet | 11 |
| 31–60 feet | 18 |
| 0–30 feet | 7 |
| Total nests within 0.5 mile | 137 |

In Southeast Alaska, bald eagles that have chosen nest sites in or near urban areas are often acclimated to high levels of human activity (Johnson, 1990). Bald eagles are most susceptible to disturbance during the nesting season (March through August in Southeast Alaska). Bald eagles subjected to disturbance during the breeding season may seek new, more remote nest sites or may abandon nests (Fraser and Anthony, 2008). Studies have shown that bald eagle pairs may react to human activities very differently. Some pairs nest successfully just dozens of yards from human activity, while others abandon nest sites in response to activities much farther away. This variability may be related to a number of factors, including visibility, duration, noise levels, extent of the area affected by the activity, prior experiences with humans, and tolerance of the individual nesting pairs (USFWS, 2009).

During operation of the East Lynn Canal Highway, blasting by helicopter along avalanche-prone

areas of the highway to protect the highway and travelers from late spring avalanches could occur during the nest selection period. Bald eagles in nests located in or near the avalanche-prone areas or feeding near Berners Bay or the Katzehin River may be impacted by intermittent helicopter operations and blasting noise. Charges would be dropped into avalanche trigger zones generally located well above the timberline, relatively far from eagle nests or feeding locations along the shoreline. Response to such disturbances may include flushing from the nest, or abandoning the nest (Steidl and Anthony, 2000). Blasting along avalanche-prone areas of Alternative 2B could occur within 0.5 mile of up to 46 nests in the most severe snow circumstances, but in a typical spring only a fraction of that total might be affected. DOT&PF would coordinate with USFWS during final design to determine if a Disturbance Permit is necessary for annual blasting in avalanche areas.

Maintenance and operation of Alternative 2B would involve a persistent source of noise that may result in the relocation of individual eagle pairs to alternate nest trees within their nesting territory. Individual eagle pairs may even abandon their nesting territory and associated hunting perches altogether, especially during the summer months, when traffic volumes are predicted to peak. Because food availability has been identified as a key factor that influences breeding success, eagle pairs less sensitive to noise disturbance would likely habituate to highway operation near prime feeding areas. In addition, opportunistic bald eagle pairs from other territories may use previously abandoned nest sites along the east shoreline of Lynn Canal. As a result, Alternative 2B is not likely to adversely affect the overall population of bald eagles in the Lynn Canal area.

### 4.3.17 Threatened and Endangered Species

Section 7 consultation for threatened and endangered species included humpback whales, Steller sea lions, and Steller sea lion critical habitat at Gran Point. Informal Section 7 consultation with NMFS began in 1994 regarding potential impacts to Steller sea lions and humpback whales and has continued with NMFS throughout the project's development. NMFS has concurred twice (in 1998 and 2005) that, with appropriate mitigation measures, project alternatives were not likely to adversely affect ESA-listed species. FHWA determined that Alternative 2B may affect and is likely to adversely affect the western DPS of Steller sea lion and humpback whales and initiated formal consultation with NMFS in accordance with Section 7. With identification of Alternative 1 – No Action as the preferred alternative, FHWA withdrew from the Section 7 consultation process (see February 15, 2017, letter from FHWA to NMFS in Attachment B of Appendix JJ).

#### 4.3.17.1 Steller Sea Lions

Since the 2006 ROD was issued, Alternative 2B has been modified to address geotechnical issues, permitting requirements, and bald eagle nest locations. In general, the new alignment of Alternative 2B is likely to have fewer impacts to Steller sea lions as compared with the alignment studied in the 2006 Final EIS because portions of the highway have shifted inland. The two principal haulouts along the proposed alignment for Alternative 2B that are used on an annual basis by Steller sea lions are Gran Point and Met Point. Gran Point is designated as critical habitat under the ESA. Although Met Point is not used by sea lions as extensively as Gran Point, it is still an important haulout for this species. Steller sea lions also haul out seasonally on Point St. Mary, approximately 2 miles southwest of Slate Cove, during the spring when feeding on spawning aggregations of eulachon and Pacific herring in Berners Bay. Tidal wash rocks at the tip of land forming the east side of Slate Cove are also used by Steller sea lions

during the spring feeding period.

For Alternative 2B, the alignment near the Gran Point haulout has been shifted uphill and redesigned to go through two tunnels to avoid a rockfall area and cuts through slopes. This alignment modification moves the road farther away from the Gran Point haulout: approximately 100 to 600 feet horizontally and 50 to 100 feet vertically depending on location. Near the Met Point haulout, a portion of the road alignment (roughly 1,500 feet) has been shifted 25 to 100 feet closer to Lynn Canal and other areas of the alignment have shifted farther landward. Operation and maintenance of the highway would not result in disturbance of either haulout. Projected peak traffic noise levels for 2038 are 65 A-weighted decibels (dBA) at the centerline of the highway, and would attenuate to 32 dBA at a distance of 280 feet (see the *2017 Update to Appendix L – Noise Technical Report* (in Appendix Z) and the *2014 Update to Appendix S – Steller Sea Lion Technical Report* (in Appendix Z of the Draft SEIS). The highway would be approximately 500 feet from the Gran Point haulout and 300 feet from the Met Point haulout at its closest point. Traffic noise would not be audible above the background (ambient) noise level.

Normal winter and summer maintenance activities such as snow removal, sanding, brush cutting, crack sealing, and culvert clean out would not produce levels higher than the predicted 30-year peak hour traffic. Winter operation would also require infrequent detonation of unstable snow in the three avalanche starting zones within the 3,000-foot radius around the two haulouts. Each of the three avalanche starting zones is projected to require detonation with a single charge at a frequency of once every 10 years or more at each zone. The noise from avalanche detonation would be noticeable at both the Gran Point and Met Point haulouts. Steller sea lions may react to the sounds by diving into the water from land or by submerging when they are in the water. Generally, they return to their previous behavior within an hour or so after isolated disturbances. The noise and vibration created by the resulting avalanche would be no different than that from naturally occurring avalanches.

Sea lions have been observed to approach and investigate marine vessels and other noise sources and appear to adapt to noise and human presence under some conditions (Richardson et al., 1995). Several major haulouts are located near busy shipping lanes and ports along the Pacific coast, with sea lions exhibiting little disturbance even as human activities increase (Johnson et al., 1990). In some areas, sea lions haul out on man-made structures close to humans (Richardson et al., 1995). In a study of Steller sea lions at a haulout in Glacier Bay National Park, the proximity and behavior of approaching marine vessels affected the activity rate of sea lions at the haulout (Mathews, 1997). Vessels that maintained a slow, steady course and kept the engines on seemed to disturb sea lions less than vessels with an erratic course or speed. This study may indicate that private vessels, which are more maneuverable and whose operators may be less aware of protection rules, might disturb Steller sea lions more than larger commercial vessels (NPS, 2003). Alternative 2B would not include any new boat launch sites for private or commercial vessels.

In response to NMFS concerns about potential pedestrian access and disturbance at the Gran Point and Met Point haulouts, highway design elements have been incorporated into Alternative 2B that are intended to prevent motorists from leaving the highway corridor and approaching these haulouts. The measures include steep road cuts adjacent to either haulout. DOT&PF would monitor the effectiveness of these design elements after highway construction and make additional changes, if necessary, to keep people away from these haulouts.

FHWA determined that Alternative 2B may affect and is likely to adversely affect the western DPS of Steller sea lions as well as designated critical habitat for the species (Gran Point Critical Habitat Area) in the action area. Adverse effects to critical habitat would be associated with new construction and occupancy information; operational effects would not be adverse. Although Alternative 2B is likely to adversely affect Steller sea lion critical habitat during construction, FHWA concluded that it would not destroy or adversely modify Steller sea lion critical habitat at Gran Point. Construction-related effects are described in detail in Section 4.8.12.7. Cumulative effects of Alternative 2B on Steller sea lions with past, present, and reasonably foreseeable future actions are described in Section 4.9.2.15.

#### 4.3.17.2 Humpback Whales

Alternative 2B would increase marine traffic in Chilkoot and Taiya inlets. The increase in ferry traffic associated with this alternative would not be high enough to substantially increase the risk of collisions with humpback whales.

Pile driving for construction of the ferry terminal at Katzehin has the potential to disturb humpback whales in the area. To reduce the likelihood of disturbance, trained observers would be used during pile driving to ensure that this activity does not occur when humpback whales are within 660 feet of the construction area.

With ESA-listed Mexico DPS humpback whales comprising approximately 6 percent of the whales in the area, the potential for these disturbances to impact listed whales is very small. FHWA determined that Alternative 2B may affect, but is not likely to adversely affect the Mexico DPS humpback whales. Construction-related effects are described in Section 4.8.12.7.

### 4.3.18 Permits and Approvals

Alternative 2B would require the following permits, consultations, and approvals:

- USFS transportation and utility easement issued under SAFETEA-LU Section 4407, as amended by the FAST Act, for use of Tongass National Forest lands, and USFS special use permit for any project activities or facilities located outside the Section 4407 easement on the Tongass National Forest.
- U.S. Army Corps of Engineers (USACE) Section 404 (Clean Water Act) permit for fill in wetlands and other waters of the U.S.
- USACE Section 10 permit (Rivers and Harbors Act) for dredge, fill, and structures placed below mean high water
- NMFS ESA Section 7 consultation for threatened and endangered species
- NMFS MMPA Incidental Harassment Authorization for marine mammals
- USFWS eagle Disturbance Permit for nests within 660 feet of the cut and fill limits and for active nests within 0.5 mile of blasting activities and other loud construction noises. USFWS may require a Disturbance Permit for annual blasting in avalanche areas.
- APDES Alaska General Permit for storm water discharge during construction
- ADEC Section 401 (Clean Water Act) Water Quality Certification in support of Section 404 permit was obtained May 18, 2011 and is valid until May 18, 2016. No additional Water Quality Certification is anticipated.

- ADNR Title 41 fish habitat permits for any work below ordinary high water in streams with anadromous or resident fish were obtained on June 30, 2006 for the bridges over the Katzehin River, Lace/Berners River, and Antler River. DOT&PF will request reissuance of these permits under ADF&G Title 16.
- ADNR Interagency Land Management Assignment for use of tidelands at the Katzehin Ferry Terminal and easements for highway segments with fill below mean high water
- Authorization from ADEC for treated wastewater discharge from the Katzehin Ferry Terminal
- ADEC review of the Storm Water Pollution Prevention Plan (SWPPP) under the APDES Alaska General Permit
- Bureau of Alcohol, Tobacco, Firearms, and Explosives for use of explosives in avalanche control

## 4.4 Alternative 3 – West Lynn Canal Highway

Alternative 3 proposes a new highway primarily on the west side of Lynn Canal (see Figure 2-8). This alternative would include: widening of the existing portion of Glacier Highway from Echo Cove to Cascade Point from 26 feet to 30 feet; construction of a highway from Cascade Point to Sawmill Cove on the same alignment as Alternative 2B (on the east side of Lynn Canal); and construction of a highway on the west side of the canal from William Henry Bay to Mud Bay Road in Haines. New ferry terminals would be located at Sawmill Cove and William Henry Bay to provide for shuttle ferry service across Lynn Canal. In addition, a bridge would cross the Chilkat River/Inlet on the west side of Lynn Canal from Green Point at Pyramid Harbor to Haines via Pyramid Island and connect to Mud Bay Road near Haines.

DOT&PF and the USFS considered appropriate sites for pullouts and scenic overlooks for Alternative 3 in 2003. The proposed locations of these sites are listed below and provided in Figure 4-12.

- A pullout near Sawmill Creek (east side of Lynn Canal)
- A pullout at William Henry Bay Ferry Terminal
- A scenic overlook on the shoreline near Lance Point
- A pullout near the Endicott River
- A pullout and scenic overlook north of the Cant geodetic marker
- A pullout near the Sullivan River
- A pullout and scenic overlook near the Gen geodetic marker
- A pullout near the Deep geodetic marker

The environmental impact assessment provided in this section includes consideration of the potential impacts of the proposed pullouts and scenic overlooks. The USFS has indicated that trails at four of the pullouts are reasonably foreseeable if the highway is constructed. (See November 2, 2005 letter from USFS in Chapter 7 of the 2006 Final EIS.) A separate environmental analysis would be completed by the USFS for these trails prior to their construction. These four trails are included in the cumulative impacts section of this chapter (Section 4.9).

## 4.4.1 Land Use

### 4.4.1.1 Land Ownership and Management

Current ownership of the land that would be required for the highway ROW and new ferry terminal facilities for Alternative 3 is presented in Table 4-35. As indicated in that table, approximately 28 percent of the 1,419 acres of required ROW for Alternative 3 is federal land in the Tongass National Forest under the management of the USFS. This land would remain under federal ownership with a highway easement conveyed to the State. About 281 acres, or 20 percent, of the ROW is already owned by the State. The remaining land required for the Alternative 3 ROW is under private or University of Alaska ownership. Private landowners, Goldbelt, and the University of Alaska would be compensated for lands required for a new highway ROW at fair market value in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended. The ROW requirements assume a 150-foot width across the Goldbelt and other private lands and 300-foot width on USFS lands.

DOT&PF considers the 150-foot ROW width on private lands to be sufficient given the terrain through those areas. The 300-foot ROW width on USFS lands is based upon the width specified in the Memorandum of Understanding for Section 4407 easements (see Section 3.1.1.3), and is also consistent with the ROW width established by the federal government for the Haines Highway and similar roads across public lands within the state. DOT&PF generally minimizes impacts to private and municipal owners by taking only what is necessary for the immediate project and minor future improvements. For State and federal lands, DOT&PF usually obtains a standard 300 feet to allow for a one-time land transfer that would also accommodate any future expansion.

**Table 4-35:**
**Land Ownership of Required Right-of-Way for Alternative 3**

| Ownership (acres) | | | | | | Total (acres)[1] |
|---|---|---|---|---|---|---|
| USFS | State of Alaska | Alaska Native Allotment | Goldbelt | University of Alaska | Private | |
| 960 | 281 | 11 | 90 | 34 | 44 | 1,419 |

Note: 300-foot ROW on federal and State lands and 150-foot ROW on private and municipal lands.
[1] Due to rounding, numbers may add up to more than the total shown.

### 4.4.1.2 Consistency with Land Use and Management Plans

As described in Sections 5 (p. 5-10) and 7 (p. 7-65) of the TLRMP, the TLRMP identifies Transportation Systems Corridors, or TSCs. TSCs include easements established by law, such as those granted under Section 4407 of SAFETEA-LU, as amended by the FAST Act. Such easements exist on the west and east sides of Lynn Canal, and Alternative 3 would fall within the easements; therefore, the DOT&PF believes this alternative is consistent with the TLRMP. The USFS land crossed by the alternative along the east shore of Berners Bay is currently managed under LUD II, Semi-Remote Recreation, and Scenic Viewshed designations (Figure 3-3). The USFS land crossed by Alternative 3 on the west side of Lynn Canal includes designations for Semi-Remote Recreation, Old Growth Habitat, and Modified Landscape. A small area around Endicott River is managed as Scenic Viewshed. In accordance with the TLRMP, if Alternative 3 was the selected alternative for the JAI Project, the USFS would manage the corridor under the

TSC management prescriptions, which would take precedence over the management prescriptions of the LUDs underlying the corridor (USFS, 2016b: 3-313).

The State of Alaska believes that use of State transportation easements granted by Congress under Section 4407 of SAFETEA-LU, as amended by the FAST Act, and located on the east and west sides of Lynn Canal would not require further evaluation for consistency with the TLRMP. If for some reason DOT&PF could not use all or a portion of these easements, FHWA would seek to secure a transportation easement across Tongass National Forest through a federal land appropriation process authorized by 23 USC 317.

The regional transportation policy set forth in the CBJ 2008 *Comprehensive Plan* is "to support the improvement of transportation facilities and systems that reinforce Juneau's role as the capital city of Alaska and a regional transportation and service center." The plan supports consideration of all affordable, energy-efficient transport alternatives to improve transportation links between CBJ and other areas of Southeast Alaska including air (cargo and passenger) service, roadways, ferries, and fixed guideway systems (CBJ, 2008). The CBJ *Comprehensive Plan* has identified tidelands in Berners Bay for a potential ferry terminal site. Alternative 3 is consistent with the CBJ *Comprehensive Plan*.

Goldbelt's Echo Cove Master Plan included a road that has been constructed from the northern end of Glacier Highway at Echo Cove to Cascade Point in Berners Bay. The plan also includes a ferry terminal at Cascade Point, expansion of the campground at Echo Cove, a lodge, and other developments. Alternative 3 is consistent with this plan and would use the alignment of the existing road. Alternative 3 may facilitate development of the other plan elements.

State tidelands and submerged lands near the Sawmill Cove area are managed to provide a dispersed recreation experience, wildlife habitat, harvest opportunities, and waterfront development by ADNR. The CBJ *Comprehensive Plan* designates the shorelands around the potential Sawmill Cove Ferry Terminal as Resource Development, with the potential to create a marine terminal (CBJ, 2008). A ferry terminal at Sawmill Cove would be compatible with USFS, ADNR, and CBJ management plans.

The majority of the land on the west side of Lynn Canal from north of the Tongass National Forest to the Pyramid Harbor area (Figures 3-1 and 3-2) is owned by the State of Alaska and is managed by the ADNR under the Haines State Forest Plan. Alternative 3 would cross approximately 7 miles of this State forest. The plan identifies preferred uses for forest land and the policies for managing these uses, emphasizing management flexibility. Transportation projects are consistent with the plan as long as they follow the State of Alaska Forest Resources and Practices Act and its regulations.

A portion of the West Lynn Canal Highway would be located within the Haines Borough. Land management intent within the Haines Borough is expressed in the Haines Borough *2025 Comprehensive Plan* (2012a) and the City of Haines Land Use Code (Title 18; Haines Borough, 2013) for planning and zoning. The *2025 Comprehensive Plan* considers new highway construction that might occur in the Lynn Canal area, and expresses opposition to a highway on the east side, preference for improved AMHS service in the Lynn Canal, and preference for a highway on the west side of Lynn Canal (Alternative 3), should a highway alternative be selected.

The Alternative 3 alignment crosses the Chilkat River/Inlet at Pyramid Island and joins Mud Bay Road. This area is within Haines Borough and is zoned General Use. Alternative 3 terminates at Mud Bay Road in Haines and would be consistent with this existing transportation use.

The Municipality of Skagway Borough *2020 Comprehensive Plan* states that it is the goal of the Municipality to provide an integrated, efficient, safe, and reliable transportation network to facilitate the movement and goods in and through Skagway (Municipality of Skagway, 2009). The transportation policy supports maintaining and increasing year-round access to and from Skagway including public and private ferries, and air, road, trail, marine, and rail access. Alternative 3 is not consistent with the Borough's comprehensive plan; however, State agencies' projects are not required to conform to local land use plans.

#### 4.4.1.3 Land and Resource Uses

Alternative 3 would improve opportunities for recreational activities such as hiking, camping, sightseeing, boating, bicycling, fishing, and hunting. These opportunities would provide benefits for residents and visitors, and spread out recreation activities that are currently concentrated along the existing highway systems in Juneau, Haines, and Skagway. Access from Alternative 3 would result in more nonresident visitors arriving in Juneau, Haines, or Skagway by personal vehicle. The number of overall visitors to Juneau would increase because the highway would offer a previously untapped visitor population a more independent, flexible, and economical access option. The Haines State Forest is already a popular location for remote and semi-remote recreation. A highway through this area would make it more accessible for people looking for a rustic, but not completely remote outdoor experience. A highway could also provide opportunities for outfitters to make more recreational trips available to the public in the region. A highway and Sawmill Cove Ferry Terminal would improve access to Berners Bay for canoe and kayaker users.

Opening up these recreational opportunities on the coastline along the east side of Lynn Canal to Sawmill Cove and the west side of Lynn Canal from William Henry Bay to Haines would have a negative effect on the quality of the experience to those who enjoy the existing remote nature of the region, including some outfitters who currently provide wilderness trips there. The West Lynn Canal Highway would not affect the landing strip north of the Endicott River.

Many of the rivers and streams that would be crossed by the West Lynn Canal Highway contain resident and anadromous fish stocks available for sport fishing. The region also supports populations of mountain goat, bear, and moose available for take by resident and out-of-state hunters. Hunting and fishing pressure has increased along every highway in Alaska that has opened formerly remote areas. Increases in hunting and fishing would occur along the West Lynn Canal Highway. As in other readily accessible regions of the state, the ADF&G would monitor the resources along Lynn Canal and adjust fish and game regulations, as necessary, to protect these resources from over utilization.

Improved access to fish streams and the resultant higher level of use by sport fishers would require a greater level of effort by ADF&G in terms of surveying streams and enforcing regulations. Increased access to Juneau and the resultant increase in visitors would put additional pressure on existing sport fishing facilities, including boat ramps. The CBJ would be responsible for evaluating the need for additional or expanded facilities as demand increases.

The commercial activities of Goldbelt could be expanded with improved access to its Echo Cove

lands. Better access would facilitate development opportunities, including transportation-related activities, recreation, tourism, and residential development.

A highway would provide easier and less expensive access to mineral occurrences, prospects, and claims along the west side of Lynn Canal; however, it is unlikely that this improved access alone would enhance the economic viability of any of these mineral deposits. Development of mineral resources is capital intensive, involving many other costs besides access. Market conditions must be high enough to account for all of these costs before development can occur.

University of Alaska lands and Alaska Mental Health Trust lands crossed by or near the Alternative 3 alignment would likely increase in value if a highway were built.

**Roadless Areas** – Alternative 3 would not substantially change the natural integrity and appearance or opportunities for solitude in IRAs 303, 304, and 305 (see Revised Appendix DD, *Land Use Technical Report*, Section 4.4, for detail on the effects of Alternative 3 on roadless areas). IRA 303 consists of 66,363 acres, 78 percent of which is managed as Non-Development LUDs. Area 304 covers 199,858 acres and 77 percent of this area is managed as Non-Development LUDs. IRA 305 encompasses 94,800 acres. Within the 300-foot-wide assessment corridor, Alternative 3 would have a cleared width of approximately 100 feet. The influence of the highway in terms of intruding on the apparent naturalness of the area would extend 1,200 feet on either side of this cleared area (except where the alignment is closer than 1,200 feet from shore), for a total width averaging 2,500 feet. Therefore, Alternative 3 would affect 3,557 acres of IRA 303, 1,244 acres of IRA 304, and 612 acres of IRA 305. Alternative 3 would reduce IRA 303 by 0.84 percent, IRA 304 by 0.11 percent, and IRA 305 by 0.07 percent.[34]

Alternative 3 would reduce the amount of land remaining roadless. The remaining area would appear natural and would still provide opportunities for solitude and other aspects of primitive recreation. The roadless area inventory boundary would not change; there would be a road within the IRA. Access to the roadless area would change from solely by water and air to include access via highway. Alternative 3 would not affect any identified scientific or educational features in IRAs 303, 304, and 305. Alternative 3 is also consistent with the TLRMP, which indicates that the road corridor for Alternative 3 in IRAs 303, 304, and 305 would be managed as a TSC. Revised Appendix DD, *Land Use Technical Report*, provides additional information on Roadless Areas. The Secretary of Agriculture and the USFS may be required to make an affirmative finding under the Roadless Rule that the easements granted by Congress under Section 4407 of SAFETEA-LU, as amended by the FAST Act, were "established by law" and therefore that a road using the easements would be consistent with the Roadless Rule.

#### 4.4.1.4 Parks and Recreation Facilities

No land from a municipal, State, or federal park or recreation area would be acquired by Alternative 3. See Chapter 6 for further discussion of potential impacts to public recreation facilities.

[34] Because a ROW exists in this area, the Glacier Highway extension (0.7 mile in this IRA) has in part already occurred, but the USFS still maps this as an IRA.

### 4.4.2 Coastal Zone Management

The CBJ and Haines incorporated enforceable policies for coastal zone management into their respective comprehensive plans and/or ordinances, as described in Section 3.1.1.8. Official determination of consistency with these enforceable provisions would occur during local review of construction projects, including roads, ferry terminals, or other improvements and modifications needed to implement the alternative. The CBJ's previous consistency determination for Alternative 2B from Echo Cove to Sweeney Creek (CBJ, 2006; see Section 4.3.2) would need to be modified for Alternative 3 to include the access to the Sawmill Cove Ferry Terminal. The Haines Borough has incorporated several coastal management enforceable policies into its comprehensive plan. Consistency with enforceable provisions would be assured during local review of construction plans for individual construction projects as required by Alaska Statute 35.30. The Municipality of Skagway Borough has not incorporated coastal management enforceable policies into its comprehensive plan, but some elements are codified in other ordinances and compliance with the ordinances would occur during the development review process.

### 4.4.3 Visual Resources

Visual simulations were made for Alternative 3 at viewpoints in each of the major landscape units described in Section 3.1.2. The locations of those viewpoints are provided in Figure 4-2. A description of the visual character of the alternative at each viewpoint is provided below.

#### 4.4.3.1 Berners Bay

**Views from the Bay** – In Berners Bay, the most susceptible views to potential impacts from Alternative 3 would be views from boats in the bay. Figure 4-13 provides a visual simulation of the highway in background views from the southern end of Berners Bay. From this location, the highway would be approximately 2.4 miles east from the viewer and would be located in an area not requiring substantial cuts and fills. Therefore, the highway would not likely dominate the existing natural setting. At closer distances, the ferry terminal at Sawmill Cove and the highway would be more noticeable. It is likely that visitors to Berners Bay and Point Bridget in the Point Bridget State Park would notice the highway; however, this condition would be highly dependent on the view distance.

Figure 4-14 is a visual simulation of the highway in the foreground at the Sawmill Cove Ferry Terminal proposed for Alternative 3. The highway would be noticeable intermittently along the eastern edge of Berners Bay. However, the proposed ferry terminal would likely be highly visible from this distance (approximately 1 mile) and through the middleground viewing threshold. The changes to form, line, color, and texture introduced by the ferry terminal would dominate the existing viewshed.

Views of the road and ferry terminal, vehicle movement, and vehicle lights could affect viewers by changing their perception of the comparative isolation of this area. Movement of vehicles, during both the construction and operation stages, could result in a visual impact to viewers.

**Views from the Highway** – Views from a highway along the east shore of Berners Bay looking east would be limited to the foreground by dense OG forest in most places. Many of the views looking west from the highway would be panoramic, taking in Berners Bay and Lynn Canal with the snow-capped peaks of the Chilkat Range in the background approximately 12 miles away.

#### 4.4.3.2 William Henry Bay to Sullivan Island

**Views from Lynn Canal** – Views most susceptible to potential impacts from Alternative 3 in this area:

- Views from within the Endicott River Wilderness
- Views from Sullivan Island and Sullivan Island State Marine Park
- Views from cruise ships, ferries, and small boats
- Views from private land

Figure 4-15 is a visual simulation of Alternative 3 from William Henry Bay, approximately 0.3 mile from the proposed project. Topography along this portion of the proposed alignment consists primarily of rolling to steep hills. Vegetation is of a closed canopy forest character. William Henry Bay is a small enclosed bay. Middleground and background views of the proposed highway would be limited for marine travelers. The roadway itself would be visible intermittently as it traverses east and north around the outer edge of the bay. The proposed ferry terminal is likely to dominate the existing viewshed because it would introduce a high degree of change in form, line, color, and texture to the existing natural setting.

Figure 4-16 is a visual simulation of Alternative 3 looking west from Lynn Canal toward William Henry Mountain. Viewers of the proposed highway from this location are likely to notice an intermittent linear band around the toe of William Henry Mountain. The Alternative 3 alignment has reduced linear visibility based on the roadway being sited on a gentle topographic bench. This view demonstrates the effectiveness of vegetative screening.

Figure 4-17 is a visual simulation of Alternative 3 looking from Lynn Canal to the Endicott River delta with the Alternative 3 alignment in the foreground. Topography consists mainly of rolling hills within a closed-canopied forest and wetlands associated with the Endicott River. It is likely that the proposed highway would be intermittently noticeable from foreground and middleground views. The proposed bridge crossing the Endicott River may become a dominant feature within this viewshed. The existing natural setting contains many features that dominate the viewshed (e.g., the Endicott River delta and mountain ranges as well as coastline features [rock outcrops]). Minimal, if any, areas of cuts would be visible within the river delta.

Views of the road, bridge, and ferry terminal, as well as vehicle movement and lights, could affect viewers by changing their perception of the comparative isolation of this area. Movement of vehicles, during both the construction and operation stages, could result in a visual impact to viewers.

**Views from the Highway** – Views from the highway would typically alternate between confined foreground and middleground views of dense forest to panoramic scenes of Lynn Canal. Those panoramic views would include the Canal in the middle- and background, with background views of the rugged, snow-capped peaks alone the east side of Lynn Canal. The crossings of the Sullivan and Endicott Rivers would open scenes to the west up forested valleys.

#### 4.4.3.3 Sullivan Island to Chilkat River

**Views from Lynn Canal** – Views most susceptible to potential impacts from Alternative 3 in this area:

- Views from residential areas in Haines and along roadways

- Views from small boats
- Views from Chilkat State Park
- Views from cabins
- Views from resorts/camps
- Views from the Haines State Forest Resource Management Area
- Views from visitors accessing Davidson Glacier

Figure 4-18 is a visual simulation of Alternative 3 from Lynn Canal where the proposed highway would traverse the headwater delta of the Davidson Glacier. The topography is very flat along this portion of the proposed alignment. The highway would have limited, if any, visible cuts in this area. In addition, vegetative screening would not make it very visible from Lynn Canal.

Figure 4-19 is a visual simulation of Alternative 3 from Chilkat River near Pyramid Island looking north to the proposed bridge that would cross the Chilkat River under this alternative. From this viewpoint, the bridge would provide a contrast in line, form, and color to the existing natural/semi-modified setting. This proposed crossing is of such a large scale that it may be noticeable even in background views. It is likely that the bridge would dominate views when it is in the foreground to middleground.

Views of the road and bridge, vehicle movement, and vehicle lights could affect viewers by changing their perception of the comparative isolation of this area. Movement of vehicles, during both the construction and operation stages, could result in a visual impact to viewers.

**Views from the Highway** – At the southern end of this segment of the highway, views would alternate between confined foreground and middleground views of dense forest to panoramic scenes of Lynn Canal. Those panoramic views would include the Canal in the middle- and background, with background views of the rugged, snow-capped peaks alone the east side of Lynn Canal. Davidson Glacier would be very prominent in views from the road where the alignment crosses below it. At the northern end of the highway, views would encompass the Chilkat River/Inlet and the community of Haines.

#### 4.4.3.4 Consistency with USFS Scenic Integrity Objectives[35]

The SIO for the TSC is Low, with only the foreground of views considered. This SIO should be achieved within one year of construction. Alternative 3 would be consistent with this SIO. Wherever possible, the alignment has been located to maintain a buffer between the highway and the shore to reduce the visibility of the highway from Lynn Canal. Also, to the extent practicable, shot rock slopes would be covered with overburden and seeded to reduce their visibility. In many locations, the alternative would exceed the Low SIO. In order to demonstrate the overall visual effect of the alternatives, DOT&PF also evaluated the consistency of Alternative 3 with the SIOs of the adjacent LUDs.

USFS land from Echo Cove to Sawmill Cove has a Moderate SIO. The highway for Alternative 3 would not be visible from the coastline until Sawmill Cove. At this point, the access road to the

[35] The 2006 Final EIS used Visual Quality Objectives (VQOs) in accordance with the 1997 TLMP. This Final SEIS has been updated based on the 2016 TLRMP, which replaced the VQOs with SIOs. The primary difference between the VQOs and SIOs is that the SIOs better recognize the positive scenic values associated with some human-modified (cultural) features and settings. The VQOs and SIOs are similar enough that the definitions were written to allow for easy conversion between the two.

new terminal and the terminal facility would be visible from Berners Bay. This segment of the project meets the SIO of adjacent land except at the terminal site. It is not feasible to achieve a Moderate SIO at the Sawmill Cove Ferry Terminal.

USFS lands on the west side of Lynn Canal have a High SIO at river deltas and William Henry Bay and a Moderate to Low SIO in all other areas. The West Lynn Canal Highway would be largely masked from views from Lynn Canal except at river crossings and the ferry terminal proposed at William Henry Bay. Therefore, the highway would achieve a Moderate SIO and conform to the SIOs of adjacent LUDs except at river crossings and in views from within William Henry Bay, where it would be visible in foreground and middleground views. It is not feasible to achieve a High SIO at river crossings and the William Henry Bay terminal.

### 4.4.4 Historical and Archaeological Resources

Alternative 3 would cross the Dalton Trail just north of Pyramid Harbor. This is the only property within the APE that is eligible for the NRHP.

The Dalton Trail would be bridged. Alternative 3 would have a visual effect on the trail. However, this effect would not be adverse because the visual context of the trail has changed from historical conditions and the primary view would be from the highway, as the trail is not currently in use. For this reason, FHWA has determined that Alternative 3 would have no adverse effect on the Dalton Trail.

Indirect effects on known and unknown historical and archaeological resources for Alternative 3 could result from increased access. Implementation of Alternative 3 would increase human access in the west Lynn Canal area. Increased access could result in disturbance of historic and prehistoric cultural sites from hikers, hunters, and other recreational users.

### 4.4.5 Socioeconomic Resources

#### 4.4.5.1 Overview

Improved access in Lynn Canal resulting from Alternative 3 would facilitate the movement of goods and people and create closer links between the economies of Juneau, Haines, Skagway, and Whitehorse.

A redistribution of the independent visitor market would result if Alternative 3 were implemented. Overall, the number of independent travelers passing through Juneau and Haines is expected to increase. Cruise ship traffic to Juneau, Haines, and Skagway would not be affected by Alternative 3.

Alternative 3 would not substantially affect the population and demographics of Juneau, Haines, and Skagway. Juneau would experience the largest population growth of the three communities due to improved access. This growth would translate into a demand for approximately 61 additional housing units in Juneau.

#### 4.4.5.2 Juneau

**Population, Economics, Housing, and Municipal Revenues** – Alternative 3 is predicted to generate 665 annual ADT in 2055, an increase of 585 trips relative to Alternative 1 – No Action, which would affect population, economics, housing, and municipal revenues in the region.

Traffic on Alternative 3 is predicted to remain constant over the 30-year period between 2025 and 2055 (665 annual ADT).

The total increase in visitor traffic to and from Juneau associated with Alternative 3 is estimated at 325 annual ADT in 2055. Assuming all traffic is round-trip and each additional visiting vehicle would carry an average of 2.3 people, Alternative 3 would result in up to 135,600 new non-Juneau resident visitors annually. Assuming visitors to Juneau would spend $77 per visitor per day (McDowell Group, 2012a), visitor spending in Juneau would increase by as much as $10.44 million because of Alternative 3 (Table 4-36). This increase in visitor spending in Juneau would generate an annual average of about $3.9 million in new payroll and about 105 new jobs.

**Table 4-36:**
**Alternative 3 Projected Traffic and Resulting Visitor Economic Impacts in Juneau, 2055**

| | **2055** |
|---|---|
| Total Traffic under Alternative 1 – No Action (annual ADT) | 80 |
| Total Traffic under Alternative 3 (annual ADT) | 665 |
| Change in Traffic (annual ADT) (over No Action) | 585 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 325 |
| Total New Visitors Annually (over No Action) | 135,600 |
| Total New Visitor Spending Annually (over No Action) | $10,440,000 |
| New Local Payroll Annually (over No Action) | $3,900,000 |
| New Local Employment Annually (over No Action) | 105 |

Note: Numbers may not total exactly due to rounding.

Each new job in the Juneau economy results in an increase in population of about 1.5 people.[36] Therefore, the 105 new jobs in Juneau resulting from Alternative 3 would result in a population increase of approximately 158 residents. This increase would represent an overall increase of about 0.5 percent in Juneau's current population (estimated at 33,277 in 2015; see Revised Appendix EE, the *Socioeconomic Effects Technical Report*).

Based on 2.6 persons per household (from 2010 Census data), a population increase of 158 residents in Juneau would result in additional demand for about 61 housing units. In 2011, Juneau had approximately 13,057 housing units with a vacancy rate of 5 percent. The demand generated by Alternative 3 would be within the vacant housing capacity.

Alternative 3 would increase the value of private property along the highway, though the extent of the increase cannot be estimated. For example, Goldbelt's property in and north of Echo Cove would increase in value. The CBJ would have an increase in property tax revenues because of this increase in property values. Residents in this area would pay higher property taxes.

Sales tax revenues (plus hotel, liquor, and tobacco taxes) for Juneau would increase at a rate proportional to the increase in spending. Total additional visitor spending of $10.44 million per year would generate (assuming all of the spending is taxable) $522,000 in additional annual sales tax revenues (based on a 5 percent tax rate).

[36] Based on an estimated participation rate of 65 percent, meaning that 65 percent of the Juneau population participates in the local labor force.

**Industry/Commercial Sectors** – Alternative 3 would not affect the cruise ship industry in Juneau. Port-of-call decisions are based on a combination of factors, including the availability of berthing space, appeal to passengers, and the overall capacity and profitability of tour offerings. Also considered are operational issues such as vessel speed, fuel consumption, docking fees, and safety. Alternative 3 would not affect any of these factors.

As indicated in the previous discussion on population, economics, housing, and municipal revenues, the independent visitor industry in Juneau would benefit under Alternative 3. With completion of a highway, Juneau would become the mainline ferry terminus for the AMHS, resulting in a number of independent visitors stopping in Juneau that otherwise might not visit the community. The number of RVs traveling to Juneau would increase similar to those in Alternative 2B. The current capacity for RV camping in Juneau would not be sufficient to meet demand.

The process of planning and building an RV park in Juneau would present some challenges to prospective RV park operators. According to city officials, it is difficult to find developable land in Juneau appropriate for RV parks. The land would need to have easy highway access, water and electrical utilities, and accommodating neighbors. Such a location is likely to be desirable to a variety of interests, and in the past RV parks have not been able to promise the revenues that other operations would.

The increase in RV traffic associated with Alternative 3 would not occur until after construction was completed, and then would increase gradually over time. Construction is estimated to take 6 years. This would provide time during which the CBJ could work with interested landowners to develop a plan for RV facilities expansion.

Construction of Alternative 3 would result in logging incidental to clearing the highway ROW. A highway would improve access to timber stands that at some future date could be made available for harvest. The USFS manages the Tongass National Forest within the study area primarily as a "mostly natural setting," though that portion of the National Forest north of Sullivan Rock is classified as "moderate development," which allows logging. The State's current forest management plan for that portion of the Haines State Forest precludes commercial logging. Mental Health Trust and University Trust lands are managed to provide income to the trusts. Highway access would increase the likelihood that logging would occur on these lands. Although a highway would help facilitate logging in the area, it would not be the main impetus for future logging. State and federal management policies and market conditions for Alaska's forest products in general would have a greater effect on future logging possibilities.

The West Lynn Canal Highway would provide access to areas with known mineral potential, such as the area west of Sullivan Island. Improved access would increase the likelihood of future exploration.

Water transportation is the primary method of moving freight to and from Juneau, with Seattle being the primary port of origin and destination. This barge service is provided by AML and Northland Services. Transportation by barge would be expected to remain the mode by which most freight is shipped to Juneau. The economies of scale possible with barge service, and the relatively frequent service offered into Juneau (at least three barges/week) places the economics on the side of barge transportation.

AMHS transports less than 3 percent of freight in Lynn Canal. Freight on AMHS ferries is

almost always transported on unaccompanied van trailers (i.e., without tractor or driver). In 2014, the AMHS carried 193 vans from Juneau to Haines, 206 vans from Haines to Juneau, 29 vans from Haines to Skagway, and 5 vans from Skagway to Haines (see *Socioeconomic Effects Technical Report*, Revised Appendix EE). Alternative 3 would change this freight transportation pattern in Lynn Canal: van trailers would be unloaded at Juneau (Auke Bay), and drivers would transport the cargo by road to Haines or Skagway using the West Lynn Canal Highway. Note that under Alternative 1 – No Action, unaccompanied vans would be allowed on the mainliners but would not be typically allowed on the Day Boat ACFs. Unaccompanied vans that use the mainliners under Alternative 1 – No Action would be affected and shippers would have to switch to a different method of transportation. Truck traffic north of the Auke Bay ferry terminal would increase. Because there would be no change in barge or ferry freight service to Juneau from points south, no change to consumer prices would be expected in Juneau as a result of the project.

**Utilities and Public Services** – Much of the information provided below on the effects of Alternative 3 is based on interviews with industrial representatives and public service providers. References to these interviews are provided in the *Socioeconomic Effects Technical Report* (Revised Appendix EE).

A West Lynn Canal Highway would not affect Juneau utilities. All of the utilities are adequate to accommodate any population increases attributable to the improved access afforded by Alternative 3 through 2055.

School enrollment is a function of population. Because population impacts are expected to be minimal, the same would be true of impacts on enrollment. The maximum impact on Juneau's population from Alternative 3 would be an increase of less than 1 percent. This would mean an additional 30 students spread across all grades.

The cost of transporting students to Haines and Skagway could change depending on a variety of factors, including the number of students and the need to overnight away from home. The opportunity for students to travel between the communities could increase due to reduced costs and the increased ability to make the trip within the same day. Health and social services demand is mainly a function of population, and would therefore not be expected to change substantially under Alternative 3. Additional independent visitors to Juneau, particularly older retirees, would place some new demands on emergency room and other medical and dental services in Juneau. Demand for health care services resulting from additional highway crashes would be negligible when compared with existing demand.

Traffic increases resulting from improved access would not affect fire and EMS within the current service area. The closest Capital City Fire and Rescue station to Alternative 3 is at Auke Bay. As this is a volunteer response station, the station near the JIA would be the station most likely to be dispatched to emergencies in the portion of the Alternative 3 corridor that is within the CBJ.

The Juneau Police Department has discussed whether connecting Juneau to the outside highway system would result in new types of crime or more serious crime. Only 5 percent of arrests in the CBJ involve non-residents and less than 2 percent involve people from outside Alaska. Juneau also has very low rates for many of the crimes associated with more "connected" communities, such as gang activity and car theft. It has relatively higher incidents of crime that may be associated with isolation (e.g., domestic and alcohol-related crimes). One possibility raised in

public scoping is that ending either a highway or mainline ferry service in Juneau would precipitate an "end-of-the-road" effect, bringing to town more transients who are unable to support themselves and individuals with mental and behavioral problems. However, the U.S. and Canadian customs stations on the Haines and Klondike highways act as a significant filter in this regard, and Haines and Skagway do not have this problem.

The Juneau Police Department believes that there is not enough evidence or precedents to suggest that simply improving access would affect the nature and rates of local crime. Much more of a factor than access is Juneau's distance from other population centers, particularly large cities. The Juneau Police Department believes a highway connection might be associated with some increase in teen runaways and perhaps some additional auto theft and credit card incidents. There could be an increase in importation of illegal drugs; however, local officials indicate it is already relatively easy to move these substances in and out of Juneau.

**Quality of Life** – According to the 1994 and 2003 household surveys (McDowell Group, 1994; Appendix I of the 2005 Supplemental Draft EIS), more than three-quarters of Juneau residents agree that improved access to their community is important. There is less agreement on whether quality of life is best served by highway access. Many proponents of a highway acknowledge that better ferry service would improve quality of life, but not by enough. Many proponents of ferry service believe that better access is important, but only ferry access would result in an overall improvement in the quality of life. The household survey indicated 36 percent of Juneau residents preferred an East Lynn Canal Highway, 36 percent preferred improved ferry service, and 16 percent preferred the West Lynn Canal Highway.

The reasons for these differing views are complex and interwoven with how individuals view Juneau's lack of highway access. Research and public comment over the past two decades have shown that some residents cherish this condition while others deplore it. Further, improved transportation is generally associated with growth opportunities, and growth typically affects the quality of life. Finally, as noted in the *Socioeconomic Effects Technical Report* (Revised Appendix EE), the isolation associated with lack of highway access induces a sense of psychological comfort in some residents and a feeling of frustration and claustrophobia in others. Alternative 3 would still leave Juneau unconnected by a direct highway link to the continental highway system; therefore, for those that perceive quality of life in terms of connectedness the quality of life would not substantially change.

#### 4.4.5.3 Haines

**Population, Economics, Housing, and Municipal Revenues** – Traffic to and from Haines on the Alternative 3 alignment is predicted to remain constant over the 30-year period between 2025 and 2055 (420 annual ADT[37]; see Revised Appendix AA, *Traffic Forecast Report*).

Currently, northbound ferry travelers with vehicles can take mainline ferry service to either Haines or Skagway. With Alternative 3, these mainline ferry travelers would disembark at the Auke Bay Ferry Terminal and then travel by vehicle to or through Haines, creating a substantial increase in traffic to the community. The total increase in visitor traffic to Haines associated with this alternative is estimated to be 200 annual ADT in 2055. Growth in Juneau resident travel

[37] These annual ADT numbers are projected traffic destined for Haines. Including Skagway-bound traffic would increase these numbers to 665 annual ADT. Only the Haines-bound traffic is used for this analysis.

accounts for the majority of this traffic increase over Alternative 1 – No Action, as the 2003 household survey measured a strong interest among Juneau residents in more travel to Haines.

New visitor traffic of 200 annual ADT would result in an increase of approximately 83,900 annual visitors to Haines. Assuming that visitors would spend an average of $77 per visitor per day, visitor spending in the community would increase as much as $6.46 million annually as a result of Alternative 3. In terms of economic impact, increased spending in Juneau by Haines residents would offset approximately $5.22 million of this new visitor spending in Haines, resulting in a net increase in spending in Haines by as much as $1.24 million (Table 4-37). A net increase in visitor spending in Haines of $1.24 million in 2055 would generate $460,000 in new payroll and about 15 new jobs.

**Table 4-37:**
**Alternative 3 Projected Traffic and Resulting Visitor Economic Impacts in Haines, 2055**

| | **2055** |
|---|---|
| Total Traffic Under Alternative 1 – No Action (annual ADT) | 50 |
| Total Traffic under Alternative 3 (annual ADT) | 420 |
| Change in Traffic (annual ADT) (over No Action) | 370 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 200 |
| Total New Visitors Annually (over No Action) | 83,900 |
| Total New Visitor Spending Annually (over No Action) | $6,460,000 |
| Less New Haines Resident Annual Spending in Juneau | $5,220,000 |
| Net Change in Annual Spending in Haines | $1,240,000 |
| New Local Payroll Annually (over No Action) | $460,000 |
| New Local Employment Annually (over No Action) | 15 |

Note: Numbers may not total exactly due to rounding.

Generally, each new job in the Haines economy results in a population increase of about 1.5 people.[38] Therefore, for the 15 new jobs in Haines resulting from Alternative 3, the population would increase by about 23 residents, or about 0.9 percent of the existing Haines population (population estimate for Haines in 2015 is 2,493; see Revised Appendix EE, the *Socioeconomic Effects Technical Report*).

A population increase of 23 residents would result in additional demand for about 7 housing units, assuming 3.4 persons per household (based on 2010 Census persons per household). Improved access would enhance Haines' reputation as a retirement community through better access to Juneau's retail and service sectors. To the extent that this occurs, demand for property in Haines would increase. Also, because of land availability in Haines and its drier climate when compared to Juneau, it is possible that additional Juneau residents may seek seasonal homes in Haines with the West Lynn Canal Highway. It is likely that few residents of Juneau would seek year-round housing in Haines because of the ferry link Alternative 3 would require.

Alternative 3 would improve the opportunity for development of some type on property owned by the University of Alaska. The university owns a substantial amount of land in the Glacier

[38] Based on an estimated participation rate of 65 percent, meaning that 65 percent of the Haines population participates in the local labor force.

Point and Pyramid Point areas, and would manage these lands to the maximum financial benefit of the university. Development could include logging, which would depend on market conditions, subdivision development, leases for commercial development, or some combination of these options. The Alaska Mental Health Trust also owns a small parcel of the land in the Glacier Point area and could pursue similar profit-oriented development with improved access. Highway access to private property near Haines would increase the value of land in that area with a corresponding increase in the property taxes associated with the land.

Sales tax revenues would increase at a rate proportional to the increase in spending in Haines. Total additional visitor spending in Haines of $6.46 million annually would generate $356,000 in additional sales tax revenues (based on a 5.5 percent tax rate). Haines would also experience an increase in property tax revenues because of the increase in private property values mentioned above.

**Industry/Commercial Sectors** – Haines is struggling to maintain a position in the independent and cruise visitor markets. Independent visitor travel to Haines has been declining, direct cruise traffic has been erratic, and the local visitor industry has a growing dependence on Skagway cruise passengers taking excursions to the Haines area. As indicated above, Alternative 3 would substantially improve Haines' independent visitor market, but would not affect the cruise market.

As discussed previously, small parcels of University of Alaska and private land near Pyramid Harbor and Glacier Point would be more easily developed with the West Lynn Canal Highway. This development could include visitor industry facilities, small-scale logging, or a combination of development activity.

Alternative 3 would improve access to areas in the Chilkat Range with known mineral potential. Better access increases the likelihood of discovery of mineral deposits and, ultimately, commercial production.

Barge service to Haines would not be expected to change with Alternative 3. Therefore, shipping costs for goods moved by this mode would not change as a result of Alternative 3. However, some freight comes into Haines via ferry from Juneau. Shipment of that freight by truck via the Sawmill Cove Ferry Terminal and new highway is estimated to cost approximately 10 percent more than the current cost of shipping an unaccompanied van trailer on a mainline AMHS vessel. This could translate into slightly higher costs for Haines consumers and/or or decreased profits for merchants. However, since at least 97 percent of freight containers would continue to travel by barge, the overall economic effect of the changes is expected to be negligible (see the *Socioeconomic Effects Technical Report,* Revised Appendix EE, for detail on container shipments).

**Utilities and Public Services** – Much of the information provided below on the effects of Alternative 3 is based on interviews with industrial representatives and public service providers. References to these interviews are provided in the *Socioeconomic Effects Technical Report* (Revised Appendix EE).

School enrollment is a function of population. Because population impacts are expected to be minimal, the same would be true of impacts on enrollment. The maximum increase in students resulting from Alternative 3 would be about 20 in 2055 spread across all grades.

The cost of transporting students to Juneau and other southeast communities could change depending on a variety of factors, including the number of students and the need to overnight

away from home. The opportunity for students to travel between the communities could increase due to reduced costs and the increased ability to make the trip within the same day.

Solid and hazardous waste facilities and electric utilities in the Haines Borough have adequate capacity to meet the slight increase in demand associated with the development of Alternative 3. Haines' water supply and wastewater treatment system is adequate to accommodate current and expected water demand for the next 20 years (Haines Borough, 2012). The slight population growth associated with Alternative 3, which is projected to be about 0.9 percent of the current population, and is not likely to result in the need for expansion of these facilities.

Improved access could make it somewhat easier and faster to transport patients either on an emergency or scheduled basis to Juneau from Haines. However, air transport for medical emergencies would remain the method of choice. The Haines Medical Clinic is operated by SEARHC, a regional organization with a large presence in Juneau. Improved access between Juneau and Haines would reduce cost and increase the efficiency of SEARHC operations by facilitating movement of staff and supplies between SEARHC locations.

Increased traffic through and to Haines would place additional demands on the community's fire and emergency response services. If fire and emergency response personnel respond to incidents outside current service areas, such as currently inaccessible parts of the borough south of Haines, it would substantially reduce their capacity to deliver normal services while those personnel and equipment are occupied. This impact would be most pronounced with Alternative 3, which is forecast to increase annual ADT to 420 vehicles moving between Juneau and Haines.

The Haines Police Department does not expect substantial impacts from improved access. Most crime in Haines involves local residents in spite of the highway connection to the north. State Troopers[39] would patrol the highway from the Chilkat River bridge to the William Henry Bay terminal, as this is beyond the Haines Police Department service area.

**Quality of Life** – Haines' quality of life would change in a number of ways under Alternative 3. The household surveys indicate that 87 percent of Haines residents agree that improved access to their community is important. In the 1994 household survey (McDowell Group), Haines residents cited increased recreation opportunities, economic growth, and better access to health care and job markets as potential improvements to quality of life that could result from a highway. The principal negative impact on quality of life cited by Haines residents was social change such as increased crime and the appearance of undesirable transients, increased traffic, and declining local businesses. As indicated above, traffic would increase in Haines with Alternative 3. It is also projected that residents of Haines would increase their spending in Juneau. For Alternative 3, increased spending in Juneau would be offset by increased visitor spending, though a shift in consumer type may have an impact on the types of retail businesses in Haines. There is no evidence that crime would increase in Haines with Alternative 3 because most crime in Haines involves local residents in spite of the community's highway connection to the north.

[39] As of February 2017, the Alaska State Trooper position was vacant.

#### 4.4.5.4 Skagway

**Population, Economics, Housing, and Municipal Revenues** – Traffic to and from Skagway from Alternative 3 is predicted to remain relatively stable at 245 annual ADT over the 30-year period between 2025 and 2055. The total increase in visitor traffic to Skagway associated with Alternative 3 is estimated to be 155 annual ADT. This increase in visitor annual ADT is projected to result in an increase of approximately 65,900 independent visitors annually to Skagway. Assuming that visitors would spend an average of $77 per day in Skagway, visitor spending in the community would increase by as much as $5.07 million as a result of Alternative 3. This increase in visitor spending would generate 50 additional jobs and additional payroll of $1.89 million (Table 4-38).

**Table 4-38:**
**Alternative 3 Projected Traffic and Resulting Visitor Economic Impacts in Skagway, 2055**

| | **2055** |
|---|---|
| Total Traffic under Alternative 1 – No Action (annual ADT) | 30 |
| Total Traffic under Alternative 3 (annual ADT) | 245 |
| Change in Traffic (annual ADT) (over No Action) | 215 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 155 |
| Total New Visitors Annually (over No Action) | 65,900 |
| Total New Visitor Spending Annually (over No Action) | $5,070,000 |
| New Local Payroll Annually (over No Action) | $1,890,000 |
| New Local Employment Annually (over No Action) | 50 |

Note: Numbers may not total exactly due to rounding.

With 50 new jobs, a population increase of about 75 residents would be expected (assuming each new job results in an increase of about 1.5 people). A population increase in Skagway of 75 residents would represent an overall increase of about 7.2 percent (the population estimate for Skagway in 2015 is 1,040; see Revised Appendix EE, the *Socioeconomic Effects Technical Report*).

Assuming about 2.5 residents per household (based on 2010 Census persons per household), population growth of about 50 residents would translate into demand for about 30 additional units. The 2010 U.S. Census indicated that Skagway has about 152 vacant housing units, not including seasonal, recreational, and occasional use units. Skagway has a shortage of affordable homes for first-time home buyers and a lack of seasonal employee housing, which may make it difficult to accommodate the projected demand. It is likely that the private sector would respond by construction of additional housing if residential land is available.

Skagway would experience an increase in sales and bed tax revenues associated with increased visitor spending. The estimated initial increase in visitor spending of $5.07 million annually would generate about $203,000 in additional sales tax revenues (assuming a 4 percent tax rate). This spending would also generate additional bed tax revenues.

**Industry/Commercial Sectors** – Construction of the West Lynn Canal Highway would not alter cruise lines' decisions on port calls in Skagway. Port-of-call decisions are based on a combination of factors, including the availability of berthing space, appeal to passengers, and the

overall capacity and profitability of tour offerings. Also considered are operational issues such as vessel speed, fuel consumption, docking fees, and safety.

Members of the NWCA discussed the proposed highway alternatives during the 2003 NWCA Operations and Technical Committee meeting as well as the Government Affairs and Community Relations Committee meeting. As a follow-up to their discussions, NWCA sent a letter to the Governor of Alaska stating that construction of a highway would have no effect on members' itineraries. NWCA estimated its member lines carry 97 percent of Alaska cruise passengers. Given that cruise line managers think that a direct highway link would not affect their operations, Alternative 3 is unlikely to have any effect. (The NWCA, now the North West & Canada division of the CLIA, consists of Carnival Cruise Line, Celebrity Cruises, Crystal Cruises, Disney Cruise Line, Holland America, Norwegian Cruise Line, Princess Cruises, Oceania Cruises, Regent Seven Seas Cruises, Royal Caribbean Cruise Line, and Silversea Cruises.)

Regional managers for Princess Tours and Gray Line, the primary ground transportation providers for all large ships, have stated that terminating voyages in Juneau and busing cruise ship passengers to Skagway is not feasible due to limitations regarding tour capacity, pricing, and timing. A round-trip bus excursion to Skagway on a West Lynn Canal Highway could not be accomplished in a single day, requiring two shuttle ferry trips as well as the highway link. Therefore, passengers on ships terminating their cruise in Juneau could not experience the sites and activities in Skagway or the popular rail excursion. Given these factors, it is not likely that bus excursions would replace cruise ship port calls in Skagway under Alternative 3.

Skagway is also an important transshipment point linking Inside Passage barge and ferry traffic to the Yukon and Interior Alaska. In 2010, 70,427 tons of freight moved through the Skagway port, with almost half (45 percent) of the freight being petroleum products (USACE, 2010b). Skagway would continue to be an important transshipment point with Alternative 3. Freight moving through Skagway to the Yukon from barge shipments would still be less expensive than transporting it via the West Lynn Canal Highway.

Transporting freight containers by AMHS would require truck hauling via the Sawmill Cove Ferry Terminal and West Lynn Canal Highway to Haines, and then by a second shuttle ferry to Skagway. It is estimated to cost approximately 58 percent more to haul freight this way than the current cost of shipping an unaccompanied van trailer on a mainline AMHS vessel. This could raise costs for some consumer goods in Skagway or decrease profits. However, since at least 97 percent of freight containers would continue to travel by barge, the overall economic effect of the changes is expected to be negligible (see Revised Appendix EE, *Socioeconomic Effects Technical Report,* for detail on container shipments).

**Utilities and Public Services** –Alternative 3 would result in minimal population growth in Skagway, it would not appreciably impact utilities and public services. The cost of transporting students to Juneau and other southeast communities could change depending on a variety of factors, including the number of students and the need to overnight away from home. The opportunity for students to travel between the communities could increase due to reduced costs and the increased ability to make the trip within the same day.

**Quality of Life** – In 2011, Skagway had about 717,000 visitors, primarily in the summer months. Alternative 3 would increase the number of annual visitors by less than 2.5 percent. This increase would not result in a change in the quality of life in the community.

Alternative 3 would improve access to and from Skagway by improving trip opportunity. Improved access would be considered a beneficial effect on quality of life by some. Other residents would not feel that it improved their quality of life because of the two ferry trips required to and from Juneau.

### 4.4.6 Subsistence

Alternative 3 would not affect subsistence hunting on Sullivan, Lincoln, Shelter, Chichagof, or Admiralty Islands, the lands adjacent to Taiya Inlet, and the south shore of St. James Bay. It would not affect subsistence fishing in Taiya Inlet or subsistence hunting of marine mammals anywhere in Lynn Canal.

Alternative 3 would have no direct effects on subsistence uses. Improved access to subsistence use areas along the West Lynn Canal Highway in the Sullivan River area could indirectly affect the intensity of subsistence harvest and the availability of resources. Alternative 3, together with USFS plans for potential public access locations along the highway, would make Lynn Canal much more accessible for other hunters. Alternative 3 could increase competition for subsistence resources from recreational hunting and fishing. These changes to subsistence opportunities would be viewed as beneficial for some subsistence harvesters, but for others the increased competition for resources would be perceived as a negative impact. Subsistence is further discussed in Revised Appendix DD, the *Land Use Technical Report*.

Based on the information obtained to date with respect to subsistence resources and the analysis presented in the 2006 Final EIS, comments received during 2012 scoping for the Draft SEIS, and comments on the 2014 Draft SEIS, FHWA has determined that Alternative 3 would not significantly restrict subsistence uses.

### 4.4.7 Transportation

The 2004 SATP calls for the construction of a highway from Juneau to Skagway with a shuttle from Katzehin to Haines. Alternative 3 is not consistent with the 2004 SATP. The SATP will be updated to reflect the identification of Alternative 1 – No Action as the recommended improvement.

DOT&PF's 2016–2019 STIP (Amendment 3, June 28, 2017) does not include funding for any JAI Project build alternatives. Alternative 3 is not consistent with the 2016–2019 STIP, while Alternative 1 – No Action is consistent with the currently adopted STIP.

#### 4.4.7.1 Demand and Capacity

Traffic demand on Alternative 3 was projected for 2025 and 2055 using the transportation model summarized in Section 4.1.5. These projections were based on 2015 traffic in Lynn Canal, the unmet travel demand in the region, projected growth in the region, costs of travel, travel distance and speed, value of time, accident costs, and frequency of delay.

Table 4-39 compares projected traffic demand and capacity for Alternative 3 with Alternative 1 – No Action in 2025. As indicated in the table, the West Lynn Canal Highway is projected to realize and accommodate substantially higher travel demand in the Lynn Canal corridor than Alternative 1 – No Action. Approximately eight times as much traffic would travel on the West Lynn Canal Highway as on the AMHS under Alternative 1 – No Action in 2025.

**Table 4-39:**
**2025 Forecast Demand and Capacity for Alternative 1 – No Action and Alternative 3**

| Alternative | Annual Demand ADT | Summer Demand ADT | Winter Demand ADT | Peak Week Demand ADT | Summer Capacity (vehicles per day) |
|---|---|---|---|---|---|
| 1 – No Action | 80 (50/30) | 125 (80/45) | 50 (30/20) | 300 (190/110) | 154 (93/61) |
| 3 | 665 (420/245) | 1,030 (650/380) | 405 (255/150) | 2,520 (1,590/930) | 1,272 (816/456) |

Note: The first number is the total demand or capacity. Numbers in parentheses are the demand or capacity split between Haines and Skagway, respectively.

Projected traffic demand and capacity for the West Lynn Canal Highway and Alternative 1 – No Action in 2055 are provided in Table 4-40. These projections reflect the slight increase in population over the 30-year period. As indicated in Table 4-39 and Table 4-40, Alternative 3 has the capacity to meet the projected summer ADT in 2055. Because of the capacity limit of the ferries between Sawmill Cove and William Henry Bay and the ferry between Haines and Skagway, Alternative 3 would provide capacity for approximately 51 percent of peak week demand. During peak times, or special events, additional sailings could be provided to meet the demand. In such cases, AMHS could add ferry trips by operating on longer daily schedules.

More than eight times as much traffic would travel on the West Lynn Canal Highway as on the AMHS system under Alternative 1 – No Action in 2055 (see Table 4-40).

**Table 4-40:**
**2055 Forecast Demand and Capacity for Alternative 1 – No Action and Alternative 3**

| Alternative | Annual Demand ADT | Summer Demand ADT | Winter Demand ADT | Peak Week Demand ADT | Summer Capacity (vehicles per day) |
|---|---|---|---|---|---|
| 1—No Action | 80 (50/30) | 125 (80/45) | 50 (30/20) | 300 (190/110) | 154 (93/61) |
| 3 | 665 (420/245) | 1,040 (655/385) | 405 (255/150) | 2,545 (1,605/940) | 1,272 (816/456) |

Note: The first number is the total demand or capacity. Numbers in parentheses are the demand or capacity split between Haines and Skagway, respectively.

The summer ADT between Juneau and Skagway is projected to be 385 vehicles in 2025 and 2055. The number of ferry trips and ferry capacity between Haines and Skagway have been planned to accommodate the projected 2025 and 2055 summer ADT.

Because of the ferry links for this alternative, the capacity of Alternative 3 would not meet the projected unconstrained travel demand in the Lynn Canal corridor. Latent (unconstrained) demand in the corridor during the summer is estimated to be about 1,950 ADT. Alternative 3 would realize and accommodate approximately 65 percent of the latent summer demand in 2025 and 2055.

By providing increased frequency of service between Haines and Skagway, Alternative 3 would have the indirect effect of increasing travel demand between Haines and Skagway. Under Alternative 1 – No Action, the local[40] ADT between Haines and Skagway is projected to be approximately 53 vehicles in 2025 and 2055. With Alternative 3, local travel demand between

[40] For the purposes of this SEIS, "local" refers to passenger and vehicle traffic that only goes back and forth between Haines and Skagway (i.e., it is traffic that either boards in Haines and disembarks in Skagway, or boards in Skagway and disembarks in Haines). This local Haines-Skagway travel demand is not considered part of the overall demand for travel to and from Juneau in Lynn Canal.

Haines and Skagway in summer is projected to be 61 ADT in 2025 and 2055 (McDowell Group, 2016). The Alternative 3 Haines-Skagway shuttle would be sized to accommodate this demand in addition to the Juneau-Skagway demand.

#### 4.4.7.2 Travel Flexibility and Opportunity

Alternative 3 would improve flexibility and opportunity for travel between Juneau and Haines relative to Alternative 1 – No Action. Travelers would be dependent on the shuttle ferry schedule between Sawmill Cove and William Henry Bay, which is projected to make 12 round trips per day in the summer. This level of service is a substantial improvement over Alternative 1 – No Action, which offers eight ferry round trips per week between Juneau and Haines.

An indirect impact of the forecast demand for Alternative 3 would be increased opportunities for travelers to take shuttle ferry trips between Haines and Skagway. Under Alternative 1 – No Action, the Haines-Skagway ferry service would operate two times per day in the summer. Ferries between Haines and Skagway in the summer would operate six times per day under Alternative 3.

The West Lynn Canal Highway would be susceptible to avalanches in the winter, and is estimated to be closed an average of 5.5 days per year due to avalanches (see Section 4.4.8.1). No closure is expected to exceed a day.

For through-travelers using the AMHS mainline ferry service to access Haines or Skagway from ports south of Juneau (or vice versa), the travel pattern would be altered because mainline ferry service would terminate at Juneau. Through-travelers would disembark at Juneau/Auke Bay and would drive north to the Sawmill Cove Ferry Terminal, shuttle across Lynn Canal, and take the West Lynn Canal Highway to Haines. Skagway travelers would take another shuttle ferry from Haines to Skagway. For people in vehicles, this likely would be a minor change in travel flexibility or opportunity, although for Skagway-bound passengers, waiting for two shuttle ferries may be seen as inconvenient compared to riding the mainline ferry, even though the overall time in transit likely would be shorter. For walk-on ferry passengers, an additional step of reserving a rental car, public transportation, or an airplane seat, or finding a ride would be required. Such passengers likely would see this requirement as reducing travel flexibility and opportunity.

During the winter, the direct Haines-Skagway shuttle would continue to operate, but only one ferry (instead of two) would sail between Sawmill Cove and William Henry Bay. This routing would meet reduced traffic demand and would allow for annual maintenance on the vessels. Each winter, each of the three vessels would be serviced, while the remaining two continue to operate. Even with just two vessels operational in the winter, there would be multiple trips per day in 2055 versus the few trips per week under Alternative 1 – No Action.

#### 4.4.7.3 Travel Time

Table 4-41 provides a comparison of travel times between Alternative 1 – No Action and Alternative 3. The travel time between Auke Bay and Haines with Alternative 3 is estimated to be about 3 fewer hours than traveling on the Day Boat ACF under Alternative 1 – No Action, and about 4 fewer hours than traveling on a mainline ferry under Alternative 1 – No Action.

Travel time between Auke Bay and Skagway under Alternative 3 would be approximately 2 to 2.5 fewer hours (depending on direction) than under Alternative 1 – No Action, when taking a

Day Boat ACF. With Alternative 3, traveling between Auke Bay and Skagway would be between 3.5 and 4 fewer hours (depending on direction) than the time required to travel on a mainline ferry under Alternative 1 – No Action.[41] The estimated Alternative 3 travel time is based on the assumption that approximately half the travelers would be arriving randomly due to the frequency of the ferry schedule, while the other half would time their arrival to match the schedule.[42] Similarly, many travelers on the Day Boat ACFs under Alternative 1 – No Action would plan to arrive before the minimum allowed check-in time to avoid the possibility of losing their reservations. Also under Alternative 3, the Haines-Skagway ferry would run at a different frequency than the cross-Lynn Canal ferries, so some travelers would have to wait for their second ferry connection, increasing the time to and from Skagway.

**Table 4-41:**
**Summer Travel Times for Alternative 1 – No Action and Alternative 3**

| Route | Travel Time (hours) | |
|---|---|---|
| | Alternative 1 – No Action (Day Boat ACF) [1] | Alternative 3 |
| Auke Bay-Haines | 6.2 | 3.2 |
| Auke Bay-Skagway | 8.1 | 5.5 NB/5.1 SB[2] |

[1] With Alternative 1 – No Action, the mainline ferry (i.e., service along the length of the system, from Bellingham, WA, or Prince Rupert, B.C.) would have a travel time of 7.2 hours between Auke Bay and Haines and 9.1 hours between Auke Bay and Skagway.

[2] The travel time is different for northbound (NB) and southbound (SB) because there are more ferry crossings between Sawmill Cove and William Henry Bay (12 per day in the summer) than between Haines and Skagway (6 per day in the summer); therefore, northbound travelers have more wait time in Haines. In addition, northbound travelers would need to depart Sawmill Cove on one of the first eight ferries to make the Haines-Skagway connection (i.e., before 6:30 pm).

Alternative 3 would have no impact on travel times between Haines and Skagway. The travel time, 2.4 hours, would be the same for the Haines-Skagway shuttle ferry under Alternative 1 – No Action and Alternative 3. The Haines-Skagway ferry would operate more frequently under Alternative 3 than under Alternative 1 – No Action, so the waiting time would be less for travelers who do not time their arrival at the ferry terminal with ferry sailing times.

#### 4.4.7.4 State and User Costs

The 36-year life-cycle costs[43] for Alternative 1 – No Action and Alternative 3 discounted to 2016 dollars are provided in Table 4-42. These costs include State and federal capital costs and State maintenance and operating expenses. Capital costs include design, ROW acquisition, highway, vessel, and terminal construction, vessel refurbishment, and vessel replacement.

[41] The travel time is different for northbound (NB) and southbound (SB) because there are more ferry crossings between Sawmill Cove and William Henry Bay (12 per day in the summer) than between Haines and Skagway (6 per day in the summer); therefore, northbound travelers have more wait time in Haines. In addition, northbound travelers would need to depart Sawmill Cove on one of the first eight ferries to make a Haines-Skagway connection (i.e., before 6:30 pm).

[42] On ferry systems with relatively short runs, multiple round trips per day, and capacity to meet projected demand, taking reservations is an unnecessary expense and would increase travel time.

[43] Life-cycle costs are the construction, refurbishment, and maintenance costs for a 6-year construction period and a 30-year operation period, discounted to 2016 dollars.

**Table 4-42:**
**Thirty-Six-Year Life-Cycle Costs for Alternative 1 – No Action and Alternative 3 ($millions)**

| Alternative | Capital Cost | Operating Cost | Total Life-Cycle Cost |
|---|---|---|---|
| 1 – No Action | $119 | $322 | $441 |
| 3 | $467 | $370 | $837 |

Table 4-43 provides an estimate of total project life costs less residual value, expressed in 2016 dollars with no discounting of future costs. The total project life cost over the 36-year period (expressed in 2016 dollars with no discounting) would be approximately $1.2 billion (capital plus operating costs, Table 4-40). As indicated in the table, the capital cost of Alternative 3 would be higher than Alternative 1 – No Action due to the cost of required highway, shuttle ferries, and ferry terminal facilities.

**Table 4-43:**
**Thirty-Six-Year Total Project Life Costs for Alternative 1 – No Action and Alternative 3, 2019-2054 (2016 Dollars)**

| Alternative | Total Funds | | | State Funds | | | |
|---|---|---|---|---|---|---|---|
| | Capital Costs ($million)[1] | Operating Costs ($million) | Total Project Costs ($million) | Total Cost ($million) | Total Revenue ($million)[2] | Net Cost ($million) | Cost/Vehicle (dollars) |
| 1 – No Action | $128 | $659 | $787 | $671 | $292 | $378 | $279 |
| 3 | $393 | $774 | $1,167 | $810 | $449 | $361 | $46 |

[1] Residual value subtracted.

[2] Includes both fares paid to AMHS and gas tax receipts.

Table 4-43 indicates that the West Lynn Canal Highway would have a lower net cost to the State during the analysis period than Alternative 1 – No Action. This is because the increased State revenues for this alternative would essentially offset increased State costs relative to Alternative 1 – No Action. The West Lynn Canal Highway would carry more vehicles than Alternative 1 – No Action. Therefore, Alternative 3 would cost the State less than Alternative 1 – No Action on a per-vehicle basis.

Alternative 3 would have an annual operating cost of approximately $22.1 million versus $18.2 million for Alternative 1 – No Action.

The anticipated total cost[44] and out-of-pocket cost[45] of travel between Juneau and Haines or Skagway on the West Lynn Canal Highway for travelers are provided in Table 4-44. As indicated in the table, under Alternative 3, the total out-of-pocket cost for a family of four in a 19-foot-long vehicle to travel to/from Haines would be approximately one-fourth the cost of the same travel under Alternative 1 – No Action. For travel to/from Skagway, Alternative 3 would cost approximately one-third the cost of the same travel under Alternative 1 – No Action. For a

[44] Total user costs are out-of-pocket cost and vehicle maintenance, ownership, and accident costs based on highway miles traveled.

[45] Out-of-pocket costs are a combination of estimated fares and gasoline on highway segments. Fares for Alternative 1 – No Action are actual 2015 fares charged.

driver with a 19-foot-long vehicle or a walk-on passenger, the out-of-pocket costs also would be lower with Alternative 3.

**Table 4-44:**
**Juneau to/from Haines and Skagway Total and Out-of-Pocket User Cost for Alternative 1 – No Action and Alternative 3**

| Alternative | Example scenario | Haines User Cost[1] | | Skagway User Cost[1] | |
|---|---|---|---|---|---|
| | | Total User Cost | Out-of-Pocket Cost | Total User Cost | Out-of-Pocket Cost |
| 1 – No Action | Family of 4 in a 19-foot vehicle | $229.00 | $227.00 | $301.50 | $301.50 |
| | Driver only in a 19-foot vehicle | $131.50 | $129.50 | $169.00 | $169.00 |
| | Walk-on passenger[2] | $39.00 | $39.00 | $53.00 | $53.00 |
| 3 | Family of 4 in a 19-foot vehicle | $90.50 | $59.50 | $144.00 | $111.00 |
| | Driver only in a 19-foot vehicle | $71.50 | $40.50 | $105.00 | $72.50 |
| | Walk-on passenger[2] | $7.50 | $7.50 | $15.50 | $15.50 |

[1] Total cost is based on fares plus $0.60 per mile for vehicular travel (AAA, 2015). Out-of-pocket cost is based on fares and gasoline consumption.

[2] Does not include cost of transportation to/from the ferry terminals. Including ground transportation, the cost to/from Haines is estimated to be between $42 and $60, while the cost to/from Skagway is estimated to be between $50 and $68.

The cost of taking the Haines-Skagway shuttle ferry would be less under Alternative 3 than under Alternative 1 – No Action.

Based on total user costs, travel time cost, and the projected travel in the Lynn Canal corridor through 2054, total user benefits in terms of reduced travel cost for the West Lynn Canal Highway are estimated to be about $70 million relative to Alternative 1 – No Action during the 30 years after construction (Table 4-45).

**Table 4-45:**
**User Benefits and Net Present Value of Alternative 3 versus Alternative 1 – No Action[1]**

| Alternative | User Benefits ($million) | Net Incremental Project Costs ($million)[2] | Net Present Value ($million) |
|---|---|---|---|
| 3 | $70 | $401 | -$331 |

[1] For the period 2019 to 2054 discounted to 2016 dollars.

[2] Overall project costs minus revenues.

One economic measure of an alternative is its net present value. Net present value is the total user benefits minus the net costs of an alternative over and above the net cost of Alternative 1 – No Action for a given period of time. The incremental cost of Alternative 3 over Alternative 1 – No Action for this same period is $401 million. Therefore, the 2019 to 2054 net present value of Alternative 3 is approximately negative $331 million because the incremental project costs are greater than the user benefits provided (Table 4-45).

#### 4.4.7.5 Other Transportation Impacts

**Freight** – Water transportation is the primary method of moving freight within Lynn Canal. Freight is transported from Seattle by barge to Juneau, Skagway, and Haines. AMHS ferries also move limited amounts of freight in vans to and between the three communities. Haines and Skagway are important transshipment points linking Inside Passage barge and ferry freight to the Yukon and Interior Alaska.

The West Lynn Canal Highway would not alter barge freight traffic between Juneau and Seattle. Freight van trailers shipped on AMHS ferries would be unloaded at the Auke Bay Ferry Terminal and trucked to the Sawmill Cove Ferry Terminal, shuttled across Lynn Canal, and driven north on the West Lynn Canal Highway to Haines. Freight bound for Skagway would continue on the Haines-Skagway shuttle. Note that under Alternative 1 – No Action, unaccompanied vans would be allowed on the mainliners, but would not typically be allowed on the Day Boat ACFs. Unaccompanied vans that use the mainliners under Alternative 1 – No Action would be affected and shippers would have to switch to a different method of transportation. For shipping a container from Juneau to Haines, the cost is estimated to be approximately 10 percent greater under Alternative 3, and approximately 58 percent greater for Juneau to Skagway. The shipment transit time would be reduced by approximately one-half to Haines and one-third to Skagway. Because the vast majority of freight goes by barge and barge service is not anticipated to change, costs to consumers overall are unlikely to change noticeably, although the cost of shipping select items between Juneau and Skagway could raise costs for some consumer goods in Skagway or decrease profits (see Revised Appendix EE, *Socioeconomic Effects Technical Report,* for detail on container shipments).

Trucking companies servicing other Alaska communities were asked to approximate the cost of trucking between these two cities if a highway were available. Those estimates averaged about $0.25 per pound of freight compared to the existing barge freight cost of $0.05 per pound. Although trucking goods from Seattle is not competitive with barge service, a highway with ferry link to Juneau may provide opportunities for transporting time-sensitive freight, such as fresh fish. Air freight, which currently serves this function, costs between $0.53 and $0.77 per pound between Juneau and Seattle.

The West Lynn Canal Highway would not result in a change in scheduled barge service to Haines and Skagway. Because of the ferry links involved in Alternative 3, barge service would continue to be the preferred mode of shipping freight to these two communities.

**Air Taxi** – Alternative 3 is likely to divert some traffic from the air taxi operations currently serving Lynn. The degree to which travelers might change their current air travel behavior would depend on travel times and costs.

**AMHS** – With Juneau serving as the northern terminus for mainline AMHS ferry service under Alternative 3, the AMHS would only need to operate short shuttle routes in Lynn Canal. The projected annual AMHS operating costs and the estimated State support for Alternative 3 in 2055 is provided in Table 4-46. As indicated in the table, Alternative 1 – No Action is estimated to require State funding of about $107 million in 2055. Ferry operations for Alternative 3 are estimated to require State funding of $6.5 million. Although Alternative 3 would not have a substantial impact on AMHS funding requirements, it would affect mainline ferry operations. The change in schedule and routes would free up mainline ferry operating time: approximately 18 hours in winter and 36 hours in summer. With these additional hours, the mainline ferry could

stop at or spend more time in other ports or operate at slower speeds for better fuel efficiency, depending on the assessed needs and level of State support available.

**Table 4-46:**
**Annual AMHS Operating Costs, Revenues, and Estimated State Funding for Alternative 1 – No Action and Alternative 3**

| Alternative | AMHS Operating Cost ($million) | AMHS Revenue ($million)[1] | Estimated AMHS State Funding ($million) |
|---|---|---|---|
| 1 – No Action | $18.2[2] | $8.1 | $10.1 |
| 3 | $19.9 | $13.4 | $6.5 |

Source: *Marine Segments Technical Report* (Revised Appendix GG) and *User Benefit, Life-cycle Cost, and Total Project Cost Analyses* (Revised Appendix FF).

[1] Fare box revenue paid to AMHS; does not include gas tax receipts.

[2] Revised total is due to (1) the updating of costs to 2015 dollars and (2) a discrepancy in the data relied on to generate the 2014 Draft SEIS mainliner operating costs.

**Safety** – Available statewide crash information indicates the crash rate for Rural Other Principal Arterials between 2002 and 2012 averaged 168.73 crashes per 100 million VMT. Based on this statewide crash rate information and 2055 traffic projections, it is anticipated that there would be approximately 29.5 crashes per year on the West Lynn Canal Highway. In the 30-year operation period (2025 through 2055), it is estimated there will be approximately 886 crashes.

The fatal crash rate on Rural Other Principal Arterials between 2002 and 2012 averaged 2.06 fatal crashes per 100 million VMT. Based on this statewide fatal crash rate information, there are projected to be approximately 11 traffic fatalities over the 30-year (2025 to 2055) study period on Alternative 3.

There have been no fatalities on the AMHS system since 1975. There was a fatality in 1975 when the *M/V Malaspina* ran over a fishing boat, resulting in the drowning of one person. The NTSB (NTSB, 2013) reports one case in which an AMHS vessel, the *M/V LeConte*, ran aground north of Sitka causing $3 million in property damage, including extensive hull damage, and one injury (NTSB, 2004). The NTSB also reports two cases of electrical fires onboard the *M/V Columbia*, one that caused the ship to lose propulsion and passengers to be evacuated. In this case, minor reportable injuries occurred to passengers, although they were not directly attributed to the fire (NTSB, 2000 and 2003). The other fire aboard the *M/V Malaspina* occurred while the ship was in drydock, so no evacuations were needed and no passengers were injured (NTSB, 2012).

**Capital Move** – Lack of highway access is often cited by capital move proponents as one of the reasons to move the State capital. Alternative 3 would not provide a direct highway link, but would improve access to Juneau. This may likely reduce the perception that it is difficult and expensive for the majority of Alaska residents to visit the State capital.

**Pedestrians and Bicyclists** – The highway proposed for Alternative 3 would include 4-foot paved shoulders suitable for bicyclist and pedestrian use. Predicted traffic volumes would be compatible with bicycle or pedestrian use of the shoulders. Ferries for these alternatives would accommodate bicyclists and foot passengers.

Under Alternative 3, it is anticipated that fewer people would be ferry walk-on passengers than under existing conditions and under Alternative 1 – No Action. The percentage of AMHS walk-

on passengers that would choose to travel in their own vehicle if Alternative 3 were selected for the project would depend on a variety of factors such as the cost, frequency, and convenience of a bus or van service. Based on the 2010 Census, approximately 90 percent of the households in Juneau, Haines, and Skagway own at least one vehicle, and 45 to 80 percent of the households own two or more vehicles. Travelers without a vehicle would have to rent a vehicle, take a commuter flight, travel on a private carriers (such as a taxi or shuttle service if they develop), or find a ride with someone to accommodate this demand. People who share a car with others may be inconvenienced if one household member were using the vehicle to travel on the West Lynn Canal Highway.

The out-of-pocket user cost of travel to/from Juneau for a passenger with a car under Alternative 3 would be lower than the cost for a walk-on passenger under Alternative 1 – No Action. It would appear to be more convenient to use a car to travel to and from the ferry terminals in both Juneau and Haines.

While transportation services may be developed by private entities to accommodate walk-on passengers, the cost, frequency, and convenience of a bus or van service would depend on the size of the market. Following completion of highway construction, there would be a period of transition as entrepreneurs or established service providers test the market by offering some moderate level of service, such as one or two round-trips daily between communities during the summer.

Table 4-47 indicates the number of passengers, including the number of walk-on passengers, during the summer for Alternative 1 – No Action and Alternative 3. With Alternative 3, it is projected that there would be 75 walk-on passengers during summer, which is approximately 3 percent of the forecast for total number of summer passengers (see Revised Appendix AA, *Traffic Forecast Report*).

**Table 4-47:**
**Average Daily Ridership in Summer for Alternative 1 – No Action and Alternative 3, 2055**

| Alternative | Total Passengers | Passengers in Vehicles | Walk-on Passengers | Walk-on Percentage |
|---|---|---|---|---|
| 1 - No Action | 410 | 285 | 125 | 30% |
| 3 | 2,390 | 2,315 | 75 | 3% |

Note: See Revised Appendix AA, *Traffic Forecast Report.*

The potential for bus/van service to develop with Alternative 2B was evaluated based on case studies of bus service elsewhere in Alaska[46] and interviews with 12 land transportation service providers (see addendum to the *Socioeconomic Effects Technical Report* in Appendix H of the 2005 Supplemental Draft EIS). The Alternative 2B analysis is applicable to that for Alternative 3 because it looks at the possibility of using bus/van service to connect Juneau to Haines and Skagway. Based on this evaluation, it is also likely that Alternative 3 would result in daily summer coach service linking Juneau, Haines, Skagway, and possibly Whitehorse. Winter service would be less frequent, with bus service offered perhaps every other day to/from Haines

[46] Bus services examined in these case studies were Alaska Park Connection between Seward and Denali National Park, Homer Stage Lines between Homer, Soldotna, Kenai, and Seward, Alaska Trails between Anchorage, Wasilla, and Talkeetna with continuing service to Healy, Alaska Direct Bus Lines between Fairbanks and Whitehorse, and Yukon Alaska Tourist Tours between Skagway and Whitehorse.

and Skagway. Cost would ultimately depend on the size of the market but would likely be in the range of $42 to $60 one-way between Juneau and Haines based on the shuttle fare and rates on similar existing bus services. This would place the cost roughly equal to the Juneau/Haines passenger fare under Alternative 1 – No Action. The cost between Juneau and Skagway would be approximately $8 higher due to the additional fare for travel on the Haines-Skagway shuttle.

Walk-on passengers who end up relying on bus service to/from the William Henry Bay and Sawmill Cove Ferry Terminals (if it develops)[47] would have less flexibility and opportunity to travel compared to travelers who drive, as it is likely that bus service would not be available for every ferry sailing (i.e., walk-on passengers would have to time their travels with the bus schedule). It is anticipated that walk-on passengers relying on renting a vehicle, using a taxi, or getting a ride with someone would have more flexibility and shorter travel times than those relying on the bus.

Walk-on passengers traveling between Haines or Skagway and JIA would have to coordinate schedules for flight, ferry, and bus (or other ground transportation) under Alternative 3, just as they do today. Instead of arranging for ground transportation between the Auke Bay Ferry Terminal and JIA, travelers would have to arrange for transportation from Sawmill Cove. As Sawmill Cove is farther away from JIA, it may be harder to coordinate schedules and make travel arrangements, so travelers may find this less convenient than under Alternative 1 – No Action. The cost for a walk-on passenger from Haines/Skagway to the airport under Alternative 3 may be similar to or slightly higher than the cost under Alternative 1 – No Action, as the cost of transportation between Auke Bay and JIA is the same for both alternatives (Table 4-48 ). The number of travelers in the party would also be a consideration. Another factor for airport travelers to consider is the cost of airport parking. In 2016, airport on-site long-term parking was $14/day and $75/week, and parking within a 5-minute walk from the terminal was $5/day and $100/month.

**Table 4-48:**
**Comparison of Walk-on Passenger Out-Of-Pocket Costs**

| Alternative | Auke Bay-Haines | Auke Bay-Skagway |
|---|---|---|
| 1 – No Action | $39.00 | $53.00 |
| 3 | $42.00 – 60.00 | $50.00 – 68.00 |

Note: Out-of-pocket costs exclude the cost of ground transportation between Auke Bay and JIA. In 2017, the cost of a taxi from Auke Bay to the JIA was approximately $20.

Some comments on the 2014 Draft SEIS expressed concerns about impacts to walk-on passengers who are low income, minority, senior citizens, disabled, or students. The impacts of Alternative 3 on these groups depends on how they accommodate their non-ferry travel (i.e., whether they rent a vehicle, use a taxi, get a ride from someone, or take a bus). Even under Alternative 1 – No Action, some of these walk-on populations need transportation to/from the Auke Bay and Haines ferry terminals (the Skagway Ferry Terminal is within walking distance to the community center). With access to a vehicle and the ability to drive, these populations would benefit from improved travel time, improved flexibility and opportunity to travel, and lower travel costs. Those choosing to continue to travel as walk-on passengers would under Alternative 3, pay approximately the same as they would pay under Alternative 1 – No Action (even

[47] Under Alternative 3, walk-on passengers may need bus service between Haines and William Henry Bay as well as between Sawmill Cove and Auke Bay.

considering the possible cost of transportation by bus between Haines and Auke Bay). Alternatively, people could fly to/from Juneau, but would be subject to the airfare, which may be higher than the ferry fare. Additional information regarding impacts to low-income and minority populations is discussed in Section 4.7.2. Additional information about student transportation under Alternative 3 is discussed in Section 4.3.5.

It should be noted that Skagway has the only ferry terminal in Lynn Canal that is within reasonable walking distance from residential areas. All other existing terminals must be reached by private vehicle or private carrier. The ferry terminals have been located based on the efficiency of ferry moorage and routes, not the convenience of walk-on passengers.

**Bridges over Navigable Waters** – The Sullivan, Endicott, and Chilkat rivers may be navigable by small craft. If Alternative 3 were selected for construction, FHWA would evaluate USCG bridge permitting requirements under 23 CFR 650.805 and 33 CFR 115.70. The bridges over these rivers would require bridge permits from the USCG unless FHWA makes the determination that the bridges would qualify for exemption under 23 CFR 650.805 or advance approval under 33 CFR 115.70, as amended.

### 4.4.8 Geology

Alternative 3 would be subject to a variety of geologic hazards, including earthquake-induced ground tremors, avalanches, and landslides. Geotechnical investigations would be used in support of the final engineering design of the selected alternative, if it were a build alternative. These studies would minimize the impact of geologic hazards on the road embankment and related structures.

#### 4.4.8.1 Geologic Hazards

**Seismic Activity** – As indicated in Section 3.2.1.2, the Queen Charlotte/Fairweather fault system located within 75 miles of the project area has the capability of producing earthquakes with magnitudes greater than 7.0 on the Richter scale. The Chatham Strait fault system in Lynn Canal has the capability of producing earthquakes of at least 6.9 on the Richter scale (Lemke, 1974). It is probable that a large earthquake in the study area would cause damage to a highway, as is the case with many other Alaskan highways in seismic areas. Geologic hazards related to seismic events that could affect the roadway pavement and highway structures include tsunamis, liquefaction, and slope instability.

DOT&PF would design the highway, bridges, ferry terminals, and other structures to satisfy AASHTO design specifications. AASHTO guidelines identify measures, such as structural components for bridges and ferry terminal structures, which resist damage from seismic effects related to earthquakes. With these measures, bridges can safely undergo the large distortions that result from earthquakes. There is no national standard for the design of structures to resist the effects of tsunamis; however, the bridges and ferry terminal components would incorporate design recommendations to withstand hurricane-type storm surges that are similar to tsunami effects, such as high water levels and loads imposed from storm waves. For road components other than structures, there are no guidelines for seismic resistance. Road embankments that have the potential to be affected by wave action or tsunamis, are designed to include measures provided by guidance from the FHWA HEC-25 (Highways in the Coastal Environment), USACE EM 1110-2-1100 (Coastal Engineering Manual), and the DOT&PF Coastal and Harbor Design Procedures Manual.

While there is no national standard for the design of structures to resist the effects of liquefaction, soil softening, lateral spread, and slope instability, these factors would be considered in the design. A geotechnical exploration would be conducted during the design phase to determine the engineering properties of the soil at proposed bridge crossings. These results would be used to develop recommendations for foundation design: the bridges would be founded on deep, large-diameter pipe piles that can accommodate large deformations associated with seismic hazards. The piles that would support the bridges would be able to accommodate long-term scour and other factors that alter the riverbed elevation.

**Avalanche** - Avalanche hazards can include the risk of property damage, injury and death. The proposed Alternative 3 alignment crosses 19 avalanche paths, of which 11 are considered large or very large. Using survey data, refined alignments, long-term climate studies, and additional winter observations, the calculated unmitigated AHI for Alternative 3 is 102. The average predicted closure would be about a half day long, with no closures lasting longer than a day. This unmitigated figure is considered high, but is in the middle range for highways operated with good safety records in avalanche terrain. (For example, Rogers Pass, B.C., has an unmitigated AHI of 1,004, the previous alignment of Seward Highway from Anchorage to Seward had an unmitigated AHI of 331, the previous Seward Highway from Anchorage to Girdwood had an unmitigated AHI of 188.)

Establishing hazard reduction and risk management methods can lower the probability of hazardous avalanche encounters and increase road safety on the Alternative 3 alignment. Alternative 3 incorporates avalanche hazard reduction methods that create physical changes to the highway, including constructing barriers, creating elevated fills on avalanche paths, or adjusting the alignment of a highway. Risk management refers to the operations that can prevent consequences of exposure to avalanches. These methods include forecasting, warnings, temporary highway closures, and use of explosives to release unstable snow during temporary highway closures. Planned and unplanned closures would be posted on DOT&PF's 511 website, phone and email listserv, and various social media platforms to ensure that road users receive regular updates of highway conditions. Through the use of appropriate hazard reduction and operational risk management efforts, the mitigated AHI for Alternative 3 would be reduced to an AHI value of approximately 18. A mitigated AHI value of 30 or less is within the North American standard for safe operation of a highway (see *2017 Update to Appendix J – Snow Avalanche Report* in Appendix Z).The *2017 Update to Appendix J – Snow Avalanche Report* (see Appendix Z) calculated closure periods for the West Lynn Canal Highway using the same data used consistently in all AHI calculations. The closure period and AHI calculations are based on 100 years of weather records from Juneau, correlated with 6 years of avalanche observations in Lynn Canal. An estimate of average closure time per year, average number of closures per year, closure length, and capital and operating budgets for highway maintenance relative to avalanche hazards for Alternative 3 is provided in Table 4-49. The capital costs of avalanche control equipment and facilities have been included in the construction cost estimate, and the annual operating cost for avalanche control has been included in the maintenance and operating cost estimate for Alternative 3.

For Alternative 3, DOT&PF would use howitzer fire to release unstable snow. A howitzer could hit all of the avalanche paths on the West Lynn Canal Highway from five firing locations accessible from the highway. The howitzers would likely be obtained under a lease agreement from the U.S. Army, and all crew would be required to attend gunners' school and reach the

required levels of certification and experience to operate howitzers. One avalanche path along the alignment for Alternative 3 would require the use of a blaster box or other remote exploder instead of long howitzer shots needed for the avalanche path. The addition of a blaster box would raise capital costs but would lower the potential for closure on the West Lynn Canal Highway.

Trained technicians experienced in controlled avalanche release would monitor the West Lynn Canal Highway on a daily basis. The technicians would issue daily avalanche forecasts to DOT&PF crews, with updates as conditions change. The technicians would recommend avalanche control operations or preventive road closures to DOT&PF personnel when the avalanche hazard is high.

DOT&PF would dedicate maintenance personnel and resources for routine maintenance, and would use State and/or Federal highway funds to perform major repairs as needed.

**Table 4-49:**
**Costs, Closures, and Mitigated Avalanche Hazard Index for Alternative 3**

| Alternative | Capital Cost | Annual Operating Cost | Average Closure Time per Year (days) | Average Number of Closures per Year | Closure Length (days) | Mitigated Avalanche Hazard Index |
|---|---|---|---|---|---|---|
| 3 | $6,199,259 | $1,257,483 | 6.4 | 10.8 | 0.4 to 0.9 | 18.0 |

**Landslides** – Figure 3-11 illustrates the locations of previous slides, as well as avalanche paths in the Alternative 3 corridor. Two previous rockslides have been identified in the vicinity of Alternative 3. Neither slide path reaches the proposed alignment. Avalanche paths can also produce slides during the spring and summer months, but these slides tend to be smaller than the avalanches on the same path and generally do not extend to the bottom of the path.

Geotechnical studies during design would identify any areas where alignment adjustments, rockfall barriers, or slope stabilization is appropriate to reduce rockfall hazard. DOT&PF would implement a combination of these mitigation methods to provide optimal mitigation for rockfall hazard. DOT&PF would be staffed and equipped to repair damage from slides and maintain the highway in operable condition. DOT&PF would dedicate maintenance personnel and resources for routine maintenance, and would use State and/or Federal highway funds to perform major repairs as needed.

#### 4.4.8.2 Geologic Resources

Approximately 10 percent of the Alternative 3 alignment overlaps moderate-vulnerability karst areas and less than 2 percent overlaps high-vulnerability karst areas on the west side of Lynn Canal. These karst areas are described in Section 3.2.1.1. Additional field studies for karst would be conducted during final design if Alternative 3 were selected for construction. Direct effects from Alternative 3 would include the alteration of hydrologic patterns, the disturbance and removal of protective surficial material and vegetation, and the destruction of surficial karst features. No known caves or other important karst features would be affected by Alternative 3.

The strength of downgradient soil cover may be reduced over time by concentrated water flow through highway culverts, which could allow sediment, nutrients, and debris transport into subsurface karst features. Surface soils, which are typical above karst features, and vegetation create a protective barrier between surface water and karst systems. The disturbance or removal

of protective surficial material, vegetation, and trees could change the karst vulnerability rating, which is based on the presence or absence of surface material. The removal of the protective barrier could also alter water table recharge rates. Cave entrances could also become blocked or permanently filled by loose sediment, debris, and downed trees.

Alternative 3 could indirectly affect karst resources due to increased accessibility to areas where karst is known to occur. Increased accessibility could result in recreational use or vandalism to caves and other karst features.

#### 4.4.8.3 Geochemical Properties

During highway construction, blasting activities could expose rock having geochemical properties that pose a hazard to the environment. Rock with acid-generating potential or high total metals content that is exposed to surface water runoff could affect aquatic life and water quality in streams. On site investigations to date have not identified acid-generating rock within the limits of the Alternative 3 alignment. Based on recent experience in Southeast Alaska and available information related to geologic features in the Alternative 3 corridor (see *2017 Update to Appendix D – Technical Alignment Report* at Appendix Z), DOT&PF believes there would be a potential for encountering acid-generating rock during Alternative 3 construction. A detailed on-site geotechnical investigation would be undertaken by DOT&PF during the final design, if Alternative 3 were selected. Because acid-generating rock is primarily a concern when rock cuts are made near fish-bearing streams, DOT&PF would mitigate the potential effects of drainage from rock cuts in such areas by, for example, constructing roadside drainage ditches in the vicinity of acid-generating rock and diverting the drainage away from fish bearing streams.

#### 4.4.8.4 Outburst Floods

As described in Section 3.2.1.2, the glaciers in the headwaters of the Chilkat and Endicott rivers have the potential to cause glacial outburst flooding. The bridges crossing these rivers would be designed to safely pass these floods.

### 4.4.9 Hydrology and Water Quality

#### 4.4.9.1 Floodplains

Planning and preliminary design of Alternative 3 have been done in compliance with DOT Order 5650.2 (Floodplain Management and Protection) and 23 CFR 650 Subpart A (Location and Hydraulic Design of Encroachment on Floodplains).

**Flooding Risks** – The alignment for the West Lynn Canal Highway runs perpendicular to the natural drainages along the west side of the canal. Therefore, it is not possible to avoid transverse encroachments of these drainages. The alternative would have no longitudinal encroachments of any drainages. There are no regulatory floodways in the study area. The transverse encroachments have been designed so that the West Lynn Canal Highway would not create a significant flood risk.

**Impacts on Natural and Beneficial Floodplain Values** – Alternative 3 would cross 32 streams, 26 of which would be bridged. Single-span bridges would be used to cross 10 streams. For these streams, each bridge and its piers would be located sufficiently outside of the predicted base flood elevation of the streams, as determined by hydraulic studies to be conducted during the final engineering design of the selected alternative. Multi-span bridges would be constructed at

other crossings, including the Endicott, Sullivan, and Chilkat Rivers. These larger bridges would extend beyond the outfall channels at each river delta to protect their natural, meandering flow. The bridges would require placement of supports in the river floodplain. These supports would be spaced approximately 130 feet apart and sized to accommodate the design flood and avoid impacts during flood events. These designed bridges would be constructed to maintain navigation at all tide stages.

**Potential for Incompatible Floodplain Development** – Alternative 3 crosses the Endicott and Sullivan Rivers in the Tongass National Forest, where floodplain development would not be allowed. The floodplain of the Chilkat River on the west side of the proposed bridge crossing is State land. Therefore, Alternative 3 would not encourage incompatible floodplain develop in that area. The floodplain on the east side is already accessible and Alternative 3 would not increase accessibility. In this location, the Chilkat River floodplain is a silt deposition area not conducive to development.

Alternative 3 would provide a highway where there are currently no roads. The highway would serve as a new evacuation route for emergencies from private properties adjoining the road and for Haines.

**Measures to Minimize Floodplain Impacts and Preserve Natural and Beneficial Floodplain Values** – All of the larger floodplains would be crossed with bridges. Bridge abutments would be located outside the floodplains. Multiple-span bridges would be supported on piles, with groups of in-line piles spaced at least 130 feet apart.

**Compliance with EO 11988** – In accordance with the analysis required in DOT Order 5650.2 (Floodplain Management and Protection) and 23 CFR 650 Subpart A (Location and Hydraulic Design of Encroachment on Floodplains), FHWA has determined that Alternative 3 is in compliance with EO 11988. This alternative cannot avoid transverse encroachments of the base floodplains along the alignment; however, the alternative would not result in any longitudinal encroachments of floodplains. The transverse encroachments would not increase flood risks, substantially affect natural and beneficial floodplain values, or support incompatible floodplain development. All stream crossings would be designed to minimize potential floodplain impacts and preserve beneficial floodplain values.

#### 4.4.9.2 Hydrology

A highway on the Alternative 3 alignment would act as a partial barrier to the flow of shallow groundwater and surface water. Shallow groundwater blocked by the highway would eventually flow to the surface. Roadside drainage ditches would collect surface water on the upgradient side of the highway and channel it to the downstream side through culverts. This flow diversion would be minor and would adequately maintain the water's natural downgradient flow. Culverts would be designed for the 50-year rainfall event, and end sections or rock dissipaters would be used to disperse high-volume/high-velocity flows to protect soils and vegetation below culvert outfalls from erosion.

The ferry terminals at William Henry Bay and Sawmill Cove would require the placement of fill in Lynn Canal and Berners Bay (shot-rock generated during highway construction) at each proposed terminal site. These small encroachments would not measurably change circulation and currents in Lynn Canal or Berners Bay. The proposed terminals are sited so as not to obstruct

discharge from nearby streams and creeks. Breakwaters are currently not planned for either terminal.

#### 4.4.9.3 Water Quality

Highway construction, maintenance, and operations can affect water quality through earth-moving activities, equipment oil and fuel spills/leaks, debris generation, winter sanding, and vehicular traffic. These activities could introduce metals, fuel, oil, and other potential contaminants to water courses whose drainages include the highway on the Alternative 3 alignment, principally through runoff from the highway.

Results from stormwater research by the FHWA indicate that stormwater runoff from low to medium traffic volumes (under 30,000 vehicles per day) on rural highways exerts minimal to no impact on the aquatic components of most receiving waters (USDOT & FHWA, 1987). Studies conducted in Anchorage, Alaska, under the MOA Watershed Management Program similarly concluded that street runoff has minimal impacts to the water quality of receiving waters from most potential pollutants (MOA, 2000a). Results showed dissolved concentrations of calcium, chromium, magnesium, and zinc below their AWQS. Only dissolved concentrations of copper and lead were noted above their AWQS; however, modest dilution would likely reduce these concentrations below their AWQS. Identified concentrations would not adversely affect streams with flow rates greater than 0.5 cubic foot per second (MOA, 2000b). Polynuclear aromatic hydrocarbons were at concentrations below the EPA water quality criteria.

Because of the rural setting of Alternative 3 and the predicted low annual ADT, fewer impacts to water quality in the study area are expected than were found in the Anchorage studies. The studied runoff was collected from Anchorage roadways, which ranged from residential (<2,000 ADT) to major arterial (>20,000 ADT). The studied melt water was from snow collected from a mix of these types of roads. In comparison, Alternative 3 would have summer ADT volumes of approximately 1,030 in 2025 and 1,040 in 2055. During winter, ADT would be less than 500 vehicles per day.

Highway runoff and melt water from the West Lynn Canal Highway would have lesser quantities of potential contaminants than what was observed in the Anchorage studies due to a lower traffic volume and less area development. Snow would be cleared from the highway and deposited along its length rather than being disposed of in one location. DOT&PF does not usually use de-icing chemicals on rural roads. Sanding would be performed, as conditions required. Typically, up to 5 percent sodium chloride per total weight of sand is added to keep sand friable in winter. Potential pollutants would not be concentrated in one area on the highway. Runoff from the highway and bridges would not be expected to exceed AWQS or adversely affect the water quality of receiving waters for the long term. Potential contamination from oil or hazardous substance spills would be low due to the rural setting of the highway and the low predicted highway traffic volume. Cut slopes that are composed of soil would be hydroseeded with non-invasive Alaska cultivars to minimize erosion.

The following BMPs would be implemented to minimize long-term water quality impacts. See Section 4.8.6 for BMPs to minimize water quality impacts during construction.

- Only clean fill material (excavated rock or mineral soils) would be used for the roadway and ferry terminal embankments.
- Rock would be used to stabilize toes of slopes at ponds and stream crossings.

- Grass seed would be placed on any road slope containing soil. To protect the integrity of the natural plant communities, plant species indigenous to the area would be used for vegetating road slopes, except that non-native annual grasses may be used to provide initial soil cover.
- To the extent practicable, only soil or rock excavated from the construction limits or immediately adjacent to the highway would be used for highway and ferry terminal embankments.
- Culverts would be installed in appropriate locations to maintain natural flow patterns for surface water.

Ferry operations under Alternative 3 would have little effect on area water quality. AMHS mainline ferry wastewater discharges in Lynn Canal north of Auke Bay would be eliminated. The ferries that would be used for Alternative 3 would have sanitary waste holding tanks and the wastewater would be pumped to an onshore facility for disposal. Sewage treatment facilities with a permitted outfall would be installed at the Sawmill Cove and William Henry Bay Ferry Terminals to treat sanitary waste from the restrooms. The facilities would meet all federal and State water quality requirements. Aeration and ultraviolet light disinfection, similar to the system used at the Auke Bay Ferry Terminal, would be used; therefore, no adverse impacts to water quality would occur. Accidental discharges, spills, and leaks are possible during ferry operations. Historically, these have been minor, with only minimal and temporary impacts to water quality. This low level of impact would likely continue under Alternative 3.

Highway and bridge runoff would contribute a small amount of turbidity and pollutant loads to local drainages flowing to Lynn Canal. No roadside restroom facilities are proposed along the roadway alignment. Contaminant concentrations in runoff from the proposed highway and/or bridges would not be expected to exceed AWQS or adversely affect the water quality of receiving waters for the long term.

### 4.4.10 Air Quality

The increase in vehicular traffic and changes in ferry vessel travel associated with Alternative 3 would not affect the Mendenhall Valley non-attainment area based on consultations with the EPA during the 1997 Draft EIS process. Traffic forecasts conducted for the 2005 Supplemental Draft EIS indicate that future traffic volumes would be less than those developed for the 1997 Draft EIS. The analysis presented in this section also projects that Alternative 3 would have no negative human health or environmental consequences resulting from project-related vehicle or ferry vessel emissions.

#### 4.4.10.1 Carbon Monoxide

As discussed in Section 4.3.10.1, simplified dispersion modeling was conducted for CO emissions from projected maximum peak traffic volumes. Peak traffic volumes for Alternative 3 would be approximately 80 percent of the peak traffic volumes modeled. The modeling predicted that maximum one-hour average CO concentrations associated with maximum peak traffic combined with background CO concentrations would total 2 to 3 ppm in addition to estimated background levels of 1 to 2 ppm. The NAAQS for one-hour average CO concentrations is 9 ppm. The maximum one-hour average CO concentrations associated with Alternative 3 traffic would be less than the concentrations for the modeled traffic; therefore, Alternative 3 would not result in an exceedance of the NAAQS for CO. In the *2017 Update to Appendix T – Air Quality*

*Modeling Memorandum* (see Appendix Z of this Final SEIS), DOT&PF confirmed that Alternative 3 traffic would not result in an increase in CO concentrations that would approach the NAAQS.

In response to comments on the 2014 Draft SEIS, ferry emissions modeling was performed to estimate the annual load of emissions (tons/year) for all alternatives relative to total emissions loading at active marine centers. The results of that modeling effort indicate that the ferry emissions associated with Alternative 3 would approximately triple the AMHS ferry emissions of Alternative 1 – No Action, but the contribution to total marine vessel emissions would be minor. See Attachment 1 to the *2017 Update to Appendix T – Air Quality Modeling Memorandum* in Appendix Z for detailed modeling results and Section 4.9.2.7 for a discussion of the potential cumulative impact.

#### 4.4.10.2 Particulates

As discussed in Section 4.3.10.2, the effect of Alternative 3 traffic on $PM_{10}$ concentrations is based on a comparison with $PM_{10}$ concentration measured at Floyd Dryden Middle School monitoring station where the 24-hour average was 27 $\mu g/m^3$ in 2000. Projected peak hour traffic for Alternative 3 was estimated at 9 percent of the summer ADT. Summer ADT for Alternative 3 is projected to be 1,030 and 1,040 vehicles in 2025 and 2055, respectively. Therefore, the peak hour traffic for this alternative would be about 100 vehicles in 2025 and 2055, which is about 12 times smaller than the volumes recorded on Mendenhall Loop Road in 2000. Using this multiplier, the 24-hour average $PM_{10}$ concentration with Alternative 2B would be 2.25 $\mu g/m^3$.This estimate is substantially below the 150 $\mu g/m^3$ 24-hour average NAAQS for $PM_{10}$. Because the Mendenhall Loop Road $PM_{10}$ data include dust from unpaved roads in the valley and paved roads generally contribute only a small fraction of the total $PM_{10}$, this estimate of project-related $PM_{10}$ concentrations overestimates the actual concentrations that would result from Alternative 3.

With regard to particulates generated by diesel fuel use, Alternative 3 would result in 50 percent more ferry fuel use and a proportionate increase in particulate emissions, relative to Alternative 1 – No Action. This increase, however, would not approach the NAAQS for $PM_{10}$.

The combined particulate emissions from vehicles and ferries under Alternative 3 would be greater than particulate emissions under Alternative 1 – No Action, but would not result in an air quality impact relative to NAAQS.

#### 4.4.10.3 Conformity

The project area is located in an air quality attainment area where the SIP does not contain any transportation control measures. Therefore, conformity procedures do not apply to this project, and a conformity determination is not required per 40 CFR 51.

### 4.4.11 Hazardous Materials

The *2014 Update to Appendix M – Initial Site Assessment Technical Report* (see Appendix Z in the Draft SEIS) identified one site along the West Lynn Canal Highway alignment as being an area of potential concern with respect to hazardous materials: the AT&T Alascom Sullivan River Repeater Station. This site is located 0.75 mile west of Lynn Canal, about 13 miles south of Haines. The station is located approximately 600 feet from the centerline of the alignment for

Alternative 3, outside the study area used for this evaluation. The diesel contamination associated with this site was cleaned and the site status closed as of 2010. This site is unlikely to affect the development of Alternative 3 because of its location and status of cleanup.

### 4.4.12 Wetlands

A total of 26 acres of wetlands and 11.8 acres of other aquatic habitat would be would be filled or excavated under Alternative 3. The preliminary alignment for highway segments of Alternative 3 has been adjusted several times to avoid wetlands and reduce the impacts to wetlands that could not be avoided. During design DOT&PF would investigate additional measures to reduce impacts, including further small alignment changes, steepened slopes, and reduced embankment heights.

As indicated in Table 4-50, most wetlands affected by the West Lynn Canal Highway would be forested wetlands. The wetland functions and values that would be affected by a highway include a reduction in groundwater recharge and discharge, lateral flow, surface hydrologic control, wildlife habitat functions, and riparian support.

Alternative 3 would affect 0.9 acre of palustrine scrub-shrub and 0.6 acres of palustrine forested wetlands between Echo Cove and Sawmill Cove. This impact to palustrine forested wetlands would result from upgrading the existing Glacier Highway from Echo Cove to Cascade Point. Impacts to wetland functions would primarily consist of reduction in wildlife habitat and riparian support, and alteration of surface hydrologic control and groundwater discharge functions. Waters of the U.S. filled includes 1.9 acres of marine habitat filled at Sawmill Cove discussed in Section 4.4.13.

From William Henry Bay to the Davidson Glacier outwash plain, Alternative 3 would fill a total of 18.7 acres of palustrine forested wetlands in five locations. The effect to these wetlands would include reduced groundwater recharge and groundwater discharge/lateral flow functions, modification of the surface hydrologic control, and a slight reduction in wildlife habitat function with the loss of forest habitat. One forested wetland north of the Sullivan River is rated high for nutrient transformation/export due to the amount of surface water flowing through it. Alternative 3 would affect a total of 1.9 acres of palustrine emergent wetlands in two locations of this segment. Impacts to functions of these wetlands would affect groundwater discharge and lateral flow. At two locations, the proposed alignment is forced toward the beach due to steep terrain. In these areas, fill in marine habitats includes 0.4 acre of estuarine emergent and 0.09 acre of beach bar habitat in addition to the 4.8 acre impact in William Henry Bay.

Most of the small wetlands associated with kettle ponds on the Davidson Glacier outwash plain would be avoided by the proposed Alternative 3 alignment. However, two small isolated emergent wetlands and a small pond with floating vegetation would be partially filled by the highway. These areas are small and would involve filling approximately 0.4 acre of palustrine emergent wetlands as well as 0.2 acre of palustrine aquatic bed. North of the Davidson River crossing, a 1.1-acre fill would be required across a portion of a newly created beaver pond. Fill of portions of the two isolated emergent wetlands and the pond would primarily reduce the sediment retention functions and the nutrient transformation/export function of these wetlands. Wildlife habitat functions would also be reduced slightly, but these wetlands are quite small and there are many similar wetlands in the area. Fill of a portion of the beaver pond would reduce the wildlife habitat functions of this wetland to a small degree. Impacts to beavers as a result of this fill would be minor.

North of the Davidson Glacier, Alternative 3 would intersect the uphill portion of a small area of palustrine forested wetland. At this location, the highway would reduce the groundwater recharge function, groundwater discharge/lateral flow function, and the surface hydrologic control function of wetlands.

The proposed highway would act as a partial barrier to the flow of shallow groundwater and surface water. The surface water or shallow groundwater blocked by the highway embankment would eventually flow to the surface and be diverted by ditches to culverts under the highway embankment. Alteration of hydrology due to the highway embankment could result in corresponding changes to the vegetation and over time, these changes could affect wetland functions within and outside the highway ROW. The extent of this effect would depend on localized hydrologic patterns; however, effects could be minimized with porous fill material and cross-drainage structures.

The indirect effects of Alternative 3 on wetlands include the potential introduction of contaminants from the application of de-icers and accidental spills of fuels and lubricants, the introduction of non-native plant species inadvertently transported to the area on vehicles and their occupants, and damage to wetlands from increased human recreational activity in the area. These activities could cause the further loss of wildlife habitat functions, reduction of ecological diversity, and a reduction in sediment/toxicant retention functions. Implementation of BMPs in maintaining the highway, including not using salt to the extent possible, limiting the use of sand near wetlands, and posting educational signs for wetland users, would minimize the risk of these effects occurring.

The use of salt-treated sand to improve road conditions during the winter could potentially affect roadside vegetation; however, high rainfall in this region would minimize most impacts from road salt (Wegner and Yaggi, 2001). Due to the small quantity of salt (up to 5 percent per total weight of sand) used to keep the sand friable for winter maintenance, no detectable impacts on adjacent vegetation are likely.

Alternative 3 does not include access facilities for ORVs; however, a highway would afford ORVs access to adjacent lands. ORVs can damage upland and wetland vegetation resulting in the direct loss of habitat and habitat damage through erosion and increased stream siltation. Noise and the presence of ORVs can displace some wildlife species and result in mortality from collisions or human interaction. The USFS is aware of the potential for this type of problem and plans to develop an ORV enforcement policy if the road is constructed. An ORV enforcement policy would also need to be developed by ADNR for the Haines State Forest.

DOT&PF has avoided wetlands to the extent practicable during development of the preliminary alignment for Alternative 3. The roadway would be constructed using the minimum-width fill footprint necessary for a stable road base in wetland areas. During final engineering design of the selected alternative, DOT&PF would continue to investigate ways to further minimize encroachment on wetlands.

**Table 4-50:**
**Wetlands and Other Waters of the U.S. Affected by Alternative 3 (Acres)**

| Sub-Region | Classification | Area of Fill (acres) |
|---|---|---|
| Berners Bay | **Wetlands** | |
| | Palustrine Forested | 0.6 |
| | Palustrine Scrub-Shrub | 0.9 |
| | **Subtotal** | **1.5** |
| | **Intertidal and Subtidal Areas** | |
| | Rocky Shores | 1.9 |
| | **Subtotal** | **1.9** |
| William Henry Bay to Davidson Glacier Outwash Plain | **Wetlands** | |
| | Palustrine Forested | 18.7 |
| | Palustrine Emergent | 1.9 |
| | Estuarine Emergent | 0.4 |
| | **Subtotal** | **21.0** |
| | **Intertidal and Subtidal Areas** | |
| | Beach Bars | 0.09 |
| | Rocky Shores | 4.8 |
| | **Subtotal** | **4.9** |
| Davidson Glacier Outwash Plain | **Wetlands** | |
| | Palustrine Forested | 1.1 |
| | Palustrine Emergent | 0.4 |
| | **Subtotal** | **1.5** |
| | **Freshwater Aquatic Areas** | |
| | Palustrine Aquatic Beds | 0.2 |
| | **Subtotal** | **0.2** |
| Davidson Glacier Outwash Plain to Haines | **Wetlands** | |
| | Palustrine Forested | 0.9 |
| | Estuarine Emergent | 1.1 |
| | **Subtotal** | **2.0** |
| | **Intertidal and Subtidal Areas** | |
| | Beach Bars | 4.8 |
| | **Subtotal** | **4.8** |
| Total Wetland Alternative 3 | **Wetlands** | |
| | Palustrine Forested | 21.3 |
| | Palustrine Emergent | 2.3 |
| | Palustrine Scrub-Shrub | 0.9 |
| | Estuarine Emergent | 1.5 |
| | **Total** | **26** |
| Total Other Waters of the U.S. Alternative 3 | **Freshwater Aquatic Areas** | |
| | Palustrine Aquatic Beds | 0.2 |
| | **Subtotal** | **0.2** |
| | **Intertidal and Subtidal Areas** | |
| | Beach Bars | 4.9 |
| | Rocky Shores | 6.7 |
| | **Subtotal** | **11.6** |
| | **Total** | **11.8** |
| **Total Waters of the U.S.** | | **37.8** |

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

### 4.4.13 Marine and Freshwater Habitat and Species (Including Essential Fish Habitat)

During environmental studies for the 2005 Supplemental Draft EIS, the FHWA determined that the project alternatives may adversely affect EFH as defined by the Magnuson-Stevens Fishery Conservation and Management Act. Following this determination, DOT&PF prepared an EFH assessment to assess the effects of project alternatives on commercial fish stocks in all life stages and associated habitats. This section summarizes that assessment, which was provided in Appendix N of the 2005 Supplemental Draft EIS and was updated for this Final SEIS (see the *2017 Update to Appendix N – Essential Fish Habitat Assessment* in Appendix Z).

The alignment for the West Lynn Canal Highway would be forced toward the beach at two locations between William Henry Bay and Davidson Glacier. This would result in the fill of 0.09 acre of intertidal beach. This small area of fill would result in the loss of some habitat for benthic organisms that form the base of the food web for some commercial fish species but would not have population-level effects on any marine species in Lynn Canal.

Under Alternative 3, 4.8 acres of intertidal habitat would be filled for the construction of the causeway on the north side of Pyramid Island. The fill would be located in an area that is subject to continuous deposition of glacial silt and does not support a substantial benthic community. Therefore, the loss of this habitat would not measurably alter the food web in this portion of the Chilkat River/Inlet. For this reason, fill placement in this area would have no measurable effect on any populations of marine organisms in Lynn Canal.

William Henry Bay was investigated as part of the 2003 intertidal survey. The intertidal zone at William Henry Bay is a rich and biologically diverse area. The ferry terminal proposed for this site consists of a sand, gravel, cobble, and boulder beach changing to boulders towards the north, away from the head of the bay. This site exhibits high value as fish habitat. Salmon, sculpins, and other small fish were observed in the intertidal zone and numerous clumps of fish eggs, likely sculpin eggs, were found in crevices and tidal pools in the lower intertidal zone. Crabs were occasionally observed on subtidal underwater camera surveys and flatfish were common throughout the subtidal survey area at depths greater than 23 feet. The proposed terminal site is habitat used for spawning, rearing, and growth to maturity by sculpin and other fish species.

The terminal would cover 800 feet of shoreline, or about 6 percent of the available shoreline in William Henry Bay. The loss of 4.8 acres of the intertidal and subtidal zones at the proposed terminal site would have a small impact to fish and crab species, as similar value intertidal and subtidal fish habitat is extensive in William Henry Bay. Although the character of the terminal substrate would differ from natural habitat, benthic organisms would recolonize it and provide some recovery of the habitat.

The seabed at the Sawmill Cove Ferry Terminal site consists almost exclusively of muds, sand, and gravels with some bedrock outcrops and occasional cobbles. Gravel content is highest in the intertidal zone and drops off rapidly in the subtidal zone, where sands and muds predominate. Vegetation cover is closely linked to the gravel component; therefore, cover drops off rapidly in the offshore. Video surveys of the site conducted in 2003 and 2004 indicated dense rockweed at the headlands on the north and south sides of the cove to about the zero foot tidal elevation. In the lower intertidal zone, rockweed was interspersed with two kinds of large-blade kelp. While this kelp is sparse, it is persistent and evenly distributed throughout the site. No eelgrass or stalked kelp is present at the site. Crabs use the subtidal and intertidal zones in Sawmill Cove and

a variety of fish species have been observed at the site including yellowfin sole, rock sole, gunnels, snake prickleback, sculpin, and Pacific herring.

The impact to 3.2 acres of intertidal and subtidal habitat (1.9 acres of fill and 1.3 acres of dredge) at the Sawmill Cove Ferry Terminal site, the replacement of natural substrates due to terminal construction, and the dredging of approximately 16,000 cubic yards for a mooring basin would alter habitat usage in the disturbed area. Filling would result in the loss of habitat while dredging and ongoing use would substantially reduce habitat value in the dredged areas. The in-water fill would reduce the amount of refuge habitat available to larval stage eulachon, which are found in estuarine areas in Lynn Canal for an approximately 2-week period following spawning (Willson et al., 2006). The footprint of the ferry terminal would affect approximately 300 feet (0.06 mile) of shoreline at mean lower low water, which is equivalent to less than 2 percent of the alongshore herring spawn length (approximately 3 miles) observed in Berners Bay in 2003. This amount of habitat loss would not measurably affect other fish populations or marine bird populations in the Berners Bay area.

At the Sawmill Cove Ferry Terminal, turbidity could be increased over ambient conditions for short periods as ferries maneuver into and out of the terminal. Short-term turbidity increases and propeller scour could displace some Pacific herring eggs and larvae in the immediate vicinity of the Sawmill Cove Ferry Terminal.

There is the potential for accidental fuel spills from ferries to occur at terminals and while traveling Lynn Canal routes. To date, no in-water fuel spills have been associated with AMHS operations in Lynn Canal. The effects of a spill would depend on its size and location.

The ferries that would be used for Alternative 3 would have sanitary waste holding tanks and the wastewater would be pumped to an onshore facility for disposal. Sanitary waste generated at the ferry terminals would undergo treatment. Wastewater would undergo aeration and disinfection with ultraviolet light. The treated wastewater would be discharged under an APDES and would meet Alaska-established waste discharge limitations. For this reason, the effluent would not affect fish habitat or affect fish populations in Lynn Canal, including Berners Bay.

Alternative 3 would cross 10 streams on the west side of Lynn Canal that support anadromous fish populations, including the Endicott and Sullivan Rivers and the Chilkat River/Inlet, as well as Sawmill Creek on the east side of Lynn Canal. The bridges crossing all but the Endicott, Sullivan, and Chilkat rivers would not encroach on the stream channel. The piers for the bridges on these rivers would be placed approximately 130 feet apart and would not impede fish movement in these rivers.

Other, smaller non-anadromous streams crossed by the project alternatives would be channeled through culverts. Culverts in waters with the potential to have resident fish would be designed in accordance with the standards provided in the Memorandum of Agreement between ADF&G and DOT&PF for the “Design, Permitting, and Construction of Culverts for Fish Passage” (DOT&PF, 2001).

Stormwater and melt water runoff from bridges over anadromous fish streams and the Chilkat River would not alter water quality sufficiently to affect crab or anadromous and marine fish habitat. As discussed in Section 4.4.9, studies of highway runoff in Alaska indicate that the volume of traffic on the West Lynn Canal Highway would not be large enough for runoff from the highway to cause the exceedance of any Alaska Water Quality Standards in receiving waters.

In summary, the construction of Alternative 3 would result in the direct loss of 11.6 acres of EFH as a result of filling for highway and ferry terminal construction at Sawmill Cove and William Henry Bay. The habitat loss would include 1.9 acres of historically documented spawning habitat for Lynn Canal Pacific herring stock in Sawmill Cove. Ferry maneuvers at Sawmill Cove could increase turbidity in the vicinity of the terminal sufficiently to affect Pacific herring eggs and larvae at the terminal site. Alternative 3 would bridge all streams crossed by highway segments that support anadromous fish populations. Piers for the bridges over the Sullivan and Endicott rivers and the Chilkat River/Inlet that would be required for Alternative 3 would be placed approximately 130 feet apart and would not impede fish movement in these rivers.

The incremental effect of the Sawmill Cove Ferry Terminal on Pacific herring stock would be relatively small; therefore, this loss is not expected to adversely affect the stock's ability to recover to previous population levels. However, NMFS as well as EPA and ADF&G have expressed concern that the ferry terminal and ferry traffic in Berners Bay could have an adverse effect on the Lynn Canal herring stock. For other commercial fish species, the direct loss of 11.6 acres of habitat through highway fill and ferry terminal construction as well as modification of 1.3 acres of habitat through dredging would not adversely affect any fish and invertebrate populations in Lynn Canal. During preparation of the 2006 Final EIS, both NMFS and the Department of Natural Resources, Office of Habitat Management and Permitting (now managed under the ADF&G) believed special conservation measures, including no operations during the herring spawning period, would be necessary. FHWA did not consider the option of closing ferry operations during the herring spawning period (for this alternative) as a reasonable alternative; hence, no detailed analysis of this modification was performed. If Alternative 3 were selected, FHWA and DOT&PF would consult with NMFS and the ADF&G to identify appropriate measures to mitigate impacts to herring.

The alignment for Alternative 3 and design of ferry terminals have been adjusted through preliminary engineering studies to limit intertidal and subtidal fill. During design of the selected alternative, DOT&PF will continue to investigate ways to further reduce this fill. Compensatory mitigation would be provided for the loss of intertidal and subtidal habitat.

### 4.4.14 Terrestrial Habitat

Alternative 3 would result in the loss of vegetation within the cleared area[48] of the highway. The acreage of vegetation types on USFS lands[49] that would be removed is estimated as follows:

- 308 acres of OG forest
- 52 acres of other forest
- 2 acres of open shrub and meadow
- 6 acres of other terrestrial habitat

[48] Timber clearing is proposed 10 feet beyond the top of cut slopes and beyond the toe of embankment slopes. Removing large standing timber at the top of cut slopes eliminates the potential for trees falling into the road/traffic as a result of root disturbance. The additional clearing also provides for equipment access in rock cut areas for drilling activities. Removing timber at the toe of embankment slopes limits the severity of crashes when vehicles run off the road and down embankment slopes. This provides a "clear zone" at the toe of slope to allow vehicles the opportunity to come to a stop without colliding with a large tree.

[49] Comparable vegetation mapping is not available for other lands. The forest acreages that follow include forested wetlands; open shrub and meadow areas may be wetlands or uplands (USFS, 2013).

Another 134 acres of mostly forested terrestrial habitats would be eliminated on Haines State Forest land.

OG and other forests that would be affected by Alternative 3 consist of the following coniferous forest plant species: western hemlock, western hemlock-yellow cedar, Sitka spruce, mixed conifer, mountain hemlock, and Sitka spruce-black cottonwood.

Most of the terrestrial habitat that would be affected by Alternative 3 is in the Tongass National Forest. As discussed in Appendix K of the TLRMP, previous adopted versions of the TLRMP established an OGR system to manage this important habitat for many terrestrial species. Alternative 3 would impact one small OGR (OG Habitat LUD #1) established under the reserve system. It is within VCU 950 on the west side of Lynn Canal approximately 2 miles south of the Tongass National Forest's boundary with Haines State Forest (see Figure 3-3). Approximately 97 acres of OG Habitat LUD #1 (3,385 acres total size) would be managed under the TSC management prescription. The OG Habitat LUD would continue to meet TLRMP minimum total acre criteria. Within the 97 acres, construction would eliminate 30 acres of forest (i.e., approximately 67 acres of forest would remain standing within the highway ROW, but would not be protected). Of 836 acres of productive OG forest in the LUD, 75 acres would be incorporated in the TSC and 24 acres would be eliminated/cleared. The road would divide the reserve and its OG habitat into inland and seaward portions, and the road would impact most of the beach buffer, which is considered some of the most important habitat for wildlife because it provides corridors along the beach, winter habitat, and bald eagle nesting habitat. Wildlife impacts are addressed more completely in Section 4.4.15 and in the *2017 Update to Appendix Q – Wildlife Technical Report* (in Appendix Z of this Final SEIS).

Based on procedures outlined in the TLRMP, the USFS has examined these impacts in conjunction with ADF&G and USFWS. The interagency team has recommended that the boundaries of OG Habitat LUD #1 should remain as they are. The interagency team did not find suitable patches of productive OG forest in the VCU to justify boundary changes and did not recommend any changes to the boundaries of this OG Habitat LUD (Brockmann et al., 2015). Alternative 3 would compromise OG Habitat LUD #1 with increased road miles, reduced acreage of productive OG forest, impacts to connectivity, and fragmentation of large blocks of productive OG forest; however, the LUD would remain consistent with TLRMP acreage prescriptions and would continue to function as a link in the overall OG habitat conservation strategy for the Tongass National Forest.

On Tongass National Forest lands, in addition to the Old-Growth Habitat LUD, Alternative 3 would pass through OG forested areas within lands designated as Non-Development LUDs that are presumed to function as medium and/or large OGRs. Alternative 3 would reduce the size of the OG forest stands in the reserve units, as well as create a separation of some OG forest areas into downslope and upslope areas. Alternative 3 would remove approximately 308 acres of OG forest mapped along the east and west sides of Lynn Canal (predominantly west side, which has 51,963 acres (see the *Land Use Technical Report*, Revised Appendix DD).

The loss of vegetation represents less than 1 percent of vegetation in the study area. The loss of this vegetation would not adversely affect any rare or unique community types, any listed threatened and endangered or USFS sensitive plant species, or plants considered rare by the ANHP.

Clearing of the highway ROW would increase the potential for blowdown of trees adjacent to the ROW or slides in unstable areas.

Alternative 3 would have indirect effects on terrestrial vegetation. By improving the access to the area, mostly on the west side of Lynn Canal, human activity would increase along the highway corridor. Increased human activity could lead to some degradation or disturbance of terrestrial habitat adjacent to the highway through camping and hiking, illegal dumping, and unauthorized collection of firewood. Invasive plant species could be introduced from visitors, vehicles, and pets.

### 4.4.15 Wildlife

#### 4.4.15.1 Marine Mammals

Harbor seals, minke whales, killer whales, harbor porpoises, Dall's porpoises, and sea otters are considered in this section. Humpback whales and Steller sea lions are discussed in Section 4.4.17.

Harbor seals haul out on rocky beaches and sandbars in protected waters along the west side of Lynn Canal, including beaches near the Sullivan River, Davidson Glacier delta, and Pyramid Island. It is unlikely that vehicle traffic would have any effect on harbor seals where the proposed highway is at least 100 yards from the shoreline on the west side of Lynn Canal. Harbor seals at this distance would notice activity on the highway, but would be unlikely to flush from the haulout or shoreline (Jansen et al., 2010). In addition, beyond this distance, traffic noise would be at an intensity similar to other noise sources in the natural environment (i.e., ambient noise levels) and would not create abnormally loud or sudden sounds that would disturb harbor seals. Therefore, Alternative 3 would not affect harbor seal haulouts at the Sullivan River, Davidson Glacier, or Berners Bay. The crossing over the Chilkat River would pass immediately north of Pyramid Island. Highway traffic in this area could lead to harbor seals abandoning this island as a haulout.

Minke whales tend to be attracted to motor boats. Therefore, the presence of such vessels would not drive minke whales away from an area. For this reason, shuttle ferries across Lynn Canal, Berners Bay, and in Chilkoot and Taiya inlets associated with Alternative 3 would not displace this species. Because of this attraction, increased ferry traffic may increase the risk of collision; however, collision accidents with minke whales are very rare (Allen and Angliss, 2012). In addition, minke whales rarely occur in Lynn Canal (Dalheim et al., 2009). Therefore, Alternative 3 is unlikely to affect the population of this species in Lynn Canal.

Fast-moving and maneuverable species such as the killer whale, harbor porpoise, and Dall's porpoise can readily avoid ferries and would not be impacted by the ferry traffic associated with Alternative 3.

Sea otters rarely occur in Lynn Canal (Esslinger and Bodkin, 2009). Like harbor seals, sea otters are sensitive to noise and would likely avoid ferry traffic associated with Alternative 3. Alternative 3 is unlikely to affect sea otters in Lynn Canal.

Marine mammals are typically disturbed by loud, unexpected noises. Although marine mammals may be disturbed by vessel noise, the low-level, steady noise produced by ferries would be less than that produced from other activities such as blasting or pile driving, and is not expected to result in adverse effects to marine mammals.

#### 4.4.15.2 Marine Birds

This group includes species that nest on land but forage in marine waters at least part of the year. Species considered in this group include great blue herons, marbled murrelets, Kittlitz's murrelets, harlequin ducks, black oystercatchers, yellow-billed loons, Aleutian terns, and dusky Canada geese.

Great blue herons nest in trees near preferred feeding areas, typically quiet shorelines and marshy areas. They are likely to be present in small numbers at river and stream outlets all along the Alternative 3 alignment. A West Lynn Canal Highway would result in the loss of potential nest trees on the banks at large river crossings. The type of nesting and feeding habitat preferred by great blue herons is not limited in the Sullivan River or the Endicott River deltas. Great blue herons have habituated to human presence and vehicle traffic in many urban and rural areas, including Juneau, so they would be expected to habituate to normal vehicle traffic on the West Lynn Canal Highway over time. For these reasons, increased human activity or a small loss in habitat with the West Lynn Canal Highway is not expected to result in population-level effects on this species.

Marbled murrelets are common in nearshore waters along the western shore of Lynn Canal and are presumed to nest throughout the study area (USFWS, 2003b). This species nests in old-growth trees, often near the coast. Alternative 3 would affect less than 1 percent of the available nesting habitat preferred by marbled murrelets in Lynn Canal. For this reason, the West Lynn Canal Highway should not result in population-level effects on this species.

Kittlitz's murrelets appear to be rare in the study area. It nests in high-elevation talus slopes and feeds in nearshore waters. Loss of habitat would be less than 1 percent of available habitat, and highway traffic is expected to have no effect on this species. Alternative 3 would not result in population-level effects on this species.

Harlequin ducks are also common in nearshore waters along the western shore of Lynn Canal, and nest along the banks of the larger rivers and streams along the alignment of Alternative 3. These birds are wary of people and will swim or fly away when approached (Rosenberg, Patten, and Rothe, 1994). Highway traffic noise could disturb harlequins in nearshore resting and feeding areas where the highway alignment is at the shoreline. The majority of the highway is not located on the shoreline, and loss of less than 1 percent of available nearshore habitat in Lynn Canal would not result in population-level effects on this species.

Blue herons and trumpeter swans do not feed and nest in open marine waters of Lynn Canal and therefore would not be affected by Alternative 3. Marbled murrelet, Kittlitz's murrelet, and harlequin ducks do use open marine waters for foraging. They most frequently use nearshore, protected areas for feeding and resting; therefore, they would not be present along the ferry routes for Alternative 3 in the main channel of Lynn Canal. These birds may be flushed by ferries approaching terminals. This disturbance would affect a small portion of the available feeding and nesting habitat, and would not have a population-level effect on these species.

Black oystercatchers have been observed in Lynn Canal, but are considered uncommon. 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 less than 1 percent of available habitat in Lynn Canal 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.

Only low numbers of yellow-billed loons have been documented in Berners Bay and Lynn Canal. The impacts to yellow-billed loons would be primarily 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. 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).

Alternative 3 would not likely affect Aleutian terns because the project is outside the species' known range (see Section 4.3.15) and the species is thought to be a casual or accidental spring and summer visitor in southeast Alaska, though it is known to breed as far south as Glacier Bay. Alternative 3 would result in the loss of 7.6 acres of palustrine or estuarine emergent wetlands, which is preferred nesting habitat of Aleutian terns. Noise and human presence introduced with the proposed highway may preclude Aleutian terns from colonizing small portions of these habitats adjacent to project facilities. Because Aleutian terns nest onshore and feed over ocean waters, they are unlikely to be disturbed by Alternative 3 ferries.

Dusky Canada geese do not breed or winter in the project area. 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 (Bromley and Rothe, 2003). 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. Disturbance effects from maintenance and vehicle traffic would likely be negligible due to their transient use of the project area during migration.

#### 4.4.15.3 Terrestrial Mammals

Species considered in this group include the black bear, brown bear, marten, river otter, wolf, Sitka black-tailed deer, moose, wolverine, and mountain goat. The assessment of project effects on these animals considered habitat loss and fragmentation, traffic disturbance, mortality caused by collisions with vehicles, and indirect impacts from increased human activity in the project area.

The direct loss of wetland and terrestrial habitat described in Sections 4.4.12 and 4.4.14 would amount to less than 1 percent of these habitats that are available in the study area. Additional loss of habitat because of windblown trees adjacent to the ROW or changes in local hydrologic patterns may add to the total habitat loss but not by enough to measurably increase the amount of habitat lost in the study area. For some species, there is a seasonally important habitat that has a greater influence on population levels than other types of habitat used by that species. For example, wintering habitat is important for goats and moose and spring and fall beach habitat is important for bears.

The beach fringe and numerous riparian areas along the west side of Lynn Canal provide high-value habitats for many terrestrial mammals, including bears, martens, river otters, moose, and wolves. The Alternative 3 alignment is more inland that the East Lynn Canal alignment and therefore affects more forest habitat and less beach fringe habitat. The 1997 HCI models predicted that the direct loss of habitat would reduce the habitat capability for brown bear, black bear, marten, and mountain goat by about 1 percent or less. However, behavioral avoidance of the West Lynn Canal Highway may function as a barrier to movement for some species, and may fragment their habitat by limiting their ability to use all of their range.

Because black bears are highly adaptable and often learn to coexist near human development, habitat fragmentation is not expected to result in a substantial effect on black bear populations in the study area. Black bears use the Sawmill Creek estuary area during salmon runs and would need to cross the highway or pass under the Sawmill Creek bridge. The highway would likely result in mortality of some black bears from collisions with vehicles. The HCI model results for the 1997 Draft EIS predicted that the West Lynn Canal Highway would decrease black bear habitat capability in the areas crossed by or adjacent to the alignment by 2 percent compared to present conditions.

Brown bears tend to avoid highway traffic more than black bears. As indicated in Section 4.3.15, one study found that brown bears avoided roads regardless of traffic volume. Thus, they would be more likely than black bears to abandon certain parts of their range rather than cross the highway, and less likely to be involved in vehicle collisions. Because the West Lynn Canal Highway would separate higher elevation habitats from beach fringe and estuary habitats and because these latter areas often contain important resources for brown bears, the effective loss of habitat could reduce reproductive success or survival of some bears (Schoen et al., 1993).

The HCI model results for the 1997 Draft EIS predicted that the West Lynn Canal Highway would decrease brown bear habitat capability in the areas crossed by or adjacent to the alignment by 23 percent compared to present conditions. To reduce habitat fragmentation, bridges over anadromous streams would be designed to provide underpasses for wildlife movement. 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 likely to be similar to those on the east side of Lynn Canal. Disturbance of brown bears by tourists and other motorists could occur near salmon streams crossed by the Alternative 3 highway along west Lynn Canal. The impact of this disturbance could be mitigated by restricting public access at these streams and placing pullouts away from the highest potential brown bear feeding and crossing areas.

The West Lynn Canal Highway is not likely to fragment the range of marten, as they would readily cross the road to access favorable habitat. The largest impact of this alternative on marten would be the indirect impact of trapping. Marten are highly desirable as a furbearing species and are relatively easy to trap. Alternative 3 would increase human presence and access in the region, probably increasing the number of marten trapped in the west Lynn Canal region. The HCI model results for the 1997 Draft EIS predicted that the West Lynn Canal Highway could decrease marten habitat capability in the areas crossed by or adjacent to the alignment by 30 percent primarily because of trapping. The effects of this increased pressure could be controlled by ADF&G through season duration, take limits, lottery drawings, etc. Therefore, it is expected that this increased pressure would not result in additional population-level effects.

The West Lynn Canal Highway would not fragment the ranges of marten and river otter. As indicated above, the amount of habitat that would be lost for these species because of Alternative 3 is small relative to the total available habitat. Marten density on the west side of Lynn Canal is expected to be greater due to the abundance of OG habitat compared to the east side of Lynn Canal. Overall, density is likely less than 0.5 marten per square mile (Schumacher, personal communication, 2005). It is expected that the largest impact from the West Lynn Canal Highway would be direct loss of individuals from collisions with vehicles and the increased trapping pressure resulting from improved access to the region.

Wolves travel widely in pursuit of prey and strongly avoid highways (USFS, 2000; Person, 2001). Some wolves use estuarine areas but the importance of these areas for wolves is not known. Because the proposed highway alignment is mostly at lower elevations, traffic and human activity may limit access to beaches and downstream riparian areas along the alignment for wolves. The highway itself would not likely create a barrier to wolf movement.

Sitka black-tailed deer use a variety of habitat types, so it is unclear how small-scale habitat loss and fragmentation might affect their populations. Based on the lack of hunter success with this species, the deer population is considered very small on the west side of Lynn Canal north of William Henry Bay (Barten, 2001).

Moose distribution is more widespread on the west side of Lynn Canal than on the east side. St. James Bay, William Henry Bay, the Endicott River Valley, and the southern part of the Chilkat River Valley all have moose populations that are connected with larger populations in Glacier Bay and the Chilkat River Valley (Hessing, 2002). Direct loss of habitat would be small compared to the available habitat, and because moose readily cross roads, habitat fragmentation is not an issue with this species.

The short Glacier Highway extension of Alternative 3 on the east side of Lynn Canal does not intersect mountain goat habitat, due to its 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 moderate- to high-use winter mountain goat habitat. However, there is more potential wintering habitat 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 this alternative would be negligible.

Collisions with vehicles would result in an increase in mortality among several terrestrial mammal species in the project area. Species most likely to be affected are those attracted to roads to feed on roadside grasses, forbs, and brush and to escape deep snow, such as moose and deer, as well as those that do not appear to have a substantial aversion to crossing roads, such as river otters, martens, and black bears. Fewer vehicle collisions are likely to occur with species that tend to avoid roads, such as the wolf and brown bear. Mountain goats would probably not be substantially impacted, as they would seldom be found adjacent to the highway alignment. It is not possible to quantify the effect of mortality from vehicle collisions on wildlife populations in the project area, but there would likely be losses over time.

DOT&PF would conduct snow studies along the West Lynn Canal Highway during the winter as part of an avalanche control program. Some of these studies would be conducted by helicopter. Mountain goats are very sensitive to human disturbance in their alpine habitats, especially from helicopters (USFS, 2001). 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 noise from avalanche detonation would be noticeable to mountain goats and other wildlife. The noise created by the resulting avalanche would be no different than that from naturally occurring avalanches.

The West Lynn Canal Highway would make a large area more accessible to hunters and trappers. As is the case elsewhere in Alaska where roads from populated areas have been built into semi-remote and remote areas, hunting and trapping pressure on species such as black and brown bears, moose, deer, mountain goats, martens, and river otters would increase on the west side of Lynn Canal with Alternative 3. The effects of this increased pressure could be controlled by ADF&G and the Board of Game through season duration, take limits, lottery drawings, etc. Therefore, it is expected that this increased pressure would not result in population-level effects. Incidents of Defense of Life and Property could increase due to increased movement of people through wildlife habitats; however, such incidents would be unlikely to have a population-level effect.

Wolverine populations are especially vulnerable to localized extirpations (i.e., elimination of the population) 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.

#### 4.4.15.4 Terrestrial Birds

Species considered in this group include the Queen Charlotte goshawk, peregrine falcon, olive-sided flycatcher, gray-cheeked thrush, blackpoll warbler, and Townsend's warbler. Goshawks are the only resident species in this group. Peregrine falcons could be present during migration in spring and fall. The other species are neo-tropical migrants that could be present either during migration or during the nesting season. Except for the peregrine falcon, all of these species favor primarily OG forest habitat. Conservation concerns for these species are the result of landscape-scale loss of habitat due to commercial logging (BPIF, 1999). There are approximately 51,963 acres of forest on the west side of Lynn Canal, most of which is OG. Alternative 3 could affect less than 1 percent of the total. Therefore, Alternative 3 would not be expected to result in population-level impacts to these species.

A West Lynn Canal Highway would cause some direct loss of habitat through clearing. The opening in the forest canopy created by the highway could cause some birds to avoid the highway area, leading to an effective loss of additional nesting habitat. Openings in the forest canopy also create "edge effects," which are used by some avian predators such as ravens, jays, and crows. These effects would add to the decreased value of nesting habitat for neo-tropical

migrants near the highway. Other suitable nesting habitat is not limited in the area; therefore, Alternative 3 would not be expected to result in population-level impacts to these species.

#### 4.4.15.5 Amphibians

Frogs and toads live in both marshy and forested wetlands as well as upland areas adjacent to ponds. Because amphibians have small home ranges and do not appear to travel far from their natal pools (NatureServe, 2003), potential impacts from highway maintenance and operation would be limited to those animals that live near the proposed alignment. The potential impacts of a highway to amphibians would be through mortality from roadkill and potential pollution of habitat from highway runoff involving pollutants from accidental spills.

### 4.4.16 Bald Eagles

The principal concerns for maintenance and operation of the West Lynn Canal Highway with regard to bald eagles are disturbance of nesting birds and abandonment of nesting sites. No communal roosting locations are known to occur along the highway alignment. Construction effects to bald eagles are addressed in Section 4.8.12.6. Since the 2006 Final EIS and ROD were issued, the alignment for Alternative 3 has been shifted, where possible, to avoid nests that would be less than 30 feet from the highway alignment and ferry terminals. Figure 4-11 shows the proposed highway alignment for Alternative 3 with the approximate distances to eagle nests. A total of 79 bald eagle nests (identified in 2012) are located within 0.5 mile of the Alternative 3 highway alignment. Table 4-51 lists the number of eagle nests within the study area and distances from the Alternative 3 highway alignment and ferry terminals**.**

**Table 4-51:**
**Number of Bald Eagle Nests in Proximity to Alternative 3**

| Distance from Highway Alignment / Ferry Terminal for Alternative 3 | Number of Nests (surveyed in 2012) |
|---|---|
| 661–0.5 mile | 23 |
| 331–660 feet | 24 |
| 101–330 feet | 25 |
| 61–100 feet | 4 |
| 31–60 feet | 3 |
| 0–30 feet | 0 |
| Total nests within 0.5 mile | 79 |

In Southeast Alaska, bald eagles that have chosen nest sites in or near urban areas are often acclimated to high levels of human activity (Johnson, 1990). Bald eagles are most susceptible to disturbance during the nesting season (March through August in Southeast Alaska). Bald eagles subjected to disturbance during the breeding season may seek new, more remote nest sites or may abandon nests (Fraser and Anthony, 2008). Studies have shown that bald eagle pairs may react to human activities very differently. Some pairs nest successfully just dozens of yards from human activity, while others abandon nest sites in response to activities much farther away. This variability may be related to a number of factors, including visibility, duration, noise levels, extent of the area affected by the activity, prior experiences with humans, and tolerance of the individual nesting pairs (USFWS, 2009).

During operation of the West Lynn Canal Highway, blasting along avalanche-prone areas of the highway to protect the highway and travelers from late spring avalanches could occur during the nest selection period. Bald eagles in nests located in or near the avalanche-prone areas or concentrated feeding areas near the Endicott and Chilkat Rivers could be impacted by intermittent helicopter operations and blasting noise. Explosive charges would be dropped into avalanche trigger zones generally located well above timberline, relatively far from eagle nests or feeding areas along the shoreline. Response to such activities could include flushing from the nest or abandoning the nest (Steidl and Anthony, 2000). Blasting along avalanche-prone areas of Alternative 3 would occur within 0.5 mile of up to approximately 23 nests. DOT&PF would coordinate with USFWS during final design to determine if a Disturbance Permit would be necessary for annual blasting in avalanche areas.

Maintenance and operation of the West Lynn Canal Highway would involve a persistent source of noise that may result in the relocation of individual eagle pairs to alternate nest trees within their nesting territory. Individual eagle pairs may even abandon their nesting territory and associated hunting perches altogether, especially during the summer months when traffic volumes are predicted to peak. Because food availability is identified as a key factor that influences breeding success, eagle pairs less sensitive to noise disturbance would likely habituate to highway operation near prime feeding areas. In addition, opportunistic bald eagle pairs from other territories may use previously abandoned nest sites along the west shoreline of Lynn Canal. As a result, Alternative 3 is not likely to adversely affect the overall population of bald eagles in the Lynn Canal area.

### 4.4.17 Threatened and Endangered Species

#### 4.4.17.1 Steller Sea Lions

Alternative 3 would not affect any identified Steller sea lion haulout sites or designated critical habitat. Maintenance and operations of the Sawmill Cove Ferry Terminal could cause temporary disturbance to Steller sea lions in Berners Bay, particularly in late April and early May, while they are feeding on spring forage fish aggregations. However, FHWA made the preliminary determination that this alternative is not likely to adversely affect the western DPS Steller sea lion population in Lynn Canal. Alternative 3 does not include any new boat launch facilities and is therefore unlikely to increase recreational or commercial use of motorized vessels in the area. In 2006, NMFS expressed concern that a ferry terminal at Sawmill Cove would have potential adverse direct and indirect effects on Steller sea lions (NMFS, 2005a). The potential for sea lion and ferry collisions is considered minimal. Although it is possible for a Steller sea lion, particularly a juvenile, to be harmed by a collision with a vessel, they are generally very agile and successfully avoid encounters when in the water. Steller sea lions are typically disturbed by loud, unexpected noises. Although Steller sea lions may be disturbed by vessel noise, the low-level, steady noise produced by ferries would be less than that produced from other activities, such as blasting or pile driving, and would not be expected to result in adverse effects to Steller sea lions. Selection of Alternative 3 may necessitate formal consultation on western DPS Steller sea lions with NMFS under Section 7 of the ESA. Construction-related effects are described in Section 4.8.12.7 and cumulative effects of Alternative 3 on Steller sea lions with past, present, and reasonably foreseeable future actions are described in Section 4.9.2.15.

#### 4.4.17.2 Humpback Whales

FHWA has made the preliminary determination that highway and vessel traffic and maintenance activities associated with Alternative 3 would not adversely affect the Mexico DPS humpback whales in Lynn Canal. Ferry traffic across Lynn Canal would increase as a result of this alternative, but mainline ferry service would be terminated. The increased ferry traffic may increase the risk of collisions with humpback whales, but such events have been rare in the past and would likely continue to be rare (Allen and Angliss, 2012). Whale densities are low along the ferry routes, further reducing the likelihood of collisions. Humpback whales are typically disturbed by loud, unexpected noises. Although humpback whales could be disturbed by vessel noise, the low-level, steady noise produced by ferries would not be expected to result in adverse effects to humpback whales. With ESA-listed Mexico DPS humpback whales comprising approximately 6 percent of the whales in the area, the potential for these disturbances to impact listed whales is very small.

In 2006, NMFS expressed concern that ferry traffic in Berners Bay associated with Alternative 3 may adversely affect humpback whales. Selection of Alternative 3 would necessitate formal consultation on Mexico DPS humpback whales with NMFS under Section 7 of the ESA. Construction-related effects are described in Section 4.8.12.7.

### 4.4.18 Permits and Approvals

Alternative 3 would require the following permits, consultations, and approvals:

- USFS transportation and utility easement issued under SAFETEA-LU Section 4407, as amended by the FAST Act, for use of Tongass National Forest lands, and USFS special use permit for any project activities or facilities located outside the Section 4407 easement on the Tongass National Forest.
- USACE Section 404 permit for fill in wetlands and other waters of the U.S.
- USACE Section 10 permit for dredge, fill, and structures placed below mean high water
- NMFS ESA Section 7 consultation for threatened and endangered species
- NMFS MMPA Incidental Harassment Authorization for marine mammals
- USFWS eagle Disturbance Permit for nests within 660 feet of the cut and fill limits and for active nests within 0.5 mile of blasting activities and other loud construction noises. USFWS may require a Disturbance Permit for annual blasting in avalanche areas.
- ADEC APDES Alaska General Permit for storm water discharge during construction
- ADEC Section 401 Water Quality Certification in support of Section 404 permits
- ADF&G Title 16 fish habitat permit for any work below ordinary high water in streams with anadromous or resident fish
- ADNR Interagency Land Management Assignment for use of tidelands at the Sawmill Cove and William Henry Bay Ferry Terminals, and an easement for highway segments with fill below mean high water
- Authorization from ADEC for treated wastewater discharge from the Sawmill Cove and William Henry Bay Ferry Terminals
- ADEC review of the SWPPP under the APDES Alaska General Permit
- Bureau of Alcohol, Tobacco, Firearms and Explosives for use of explosives in avalanche control

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

This section discusses the direct and indirect effects of Alternatives 4A and 4C. Under both of these alternatives, ferry service would be provided between Auke Bay and Haines, and between Auke Bay and Skagway (see Figure 2-9). With Alternative 4A, service would be provided by two newly constructed FVFs that would offer daily summer service between Auke Bay and Haines/Skagway. Alternative 4C would operate two Day Boat ACFs, which are conventional monohull vessels, between Auke Bay and Haines/Skagway in the summer. Mainline ferry service would continue with a minimum of twice-weekly, round-trip service in the summer and once-weekly service in the winter. Construction associated with Alternatives 4A and 4C would be limited to the reconstruction of the west end of the Auke Bay Ferry Terminal to create new double end ferry berths and, for Alternative 4C, the Skagway Ferry Terminal would be modified to include a new end berth to accommodate the Day Boat ACF.

### 4.5.1 Land Use

#### 4.5.1.1 Land Ownership

Alternatives 4A and 4C would not require acquisition of any property for transportation facilities. There would be no direct impact to land ownership.

#### 4.5.1.2 Consistency with Land Use and Management Plans

The regional transportation policy set forth in the CBJ *Comprehensive Plan* is to support the improvement of transportation facilities and systems that reinforce Juneau's role as the capital city and a regional transportation and service center. The plan supports consideration of all affordable energy-efficient transport alternatives to improve transportation links between CBJ and other areas of Southeast Alaska, including improved air (cargo and passenger) service, roadways, ferries, and fixed guideway systems (CBJ, 2008). Alternatives 4A and 4C are consistent with the CBJ *Comprehensive Plan*.

The Haines Borough and Municipality of Skagway Borough comprehensive plans support improvement of the AMHS to provide better ferry access to these two communities (Haines Borough, 2012; Municipality of Skagway, 2009). Therefore, Alternatives 4A and 4C are consistent with these plans.

Goldbelt's Echo Cove Master Plan included construction of a road from the northern end of Glacier Highway at Echo Cove to Cascade Point in Berners Bay. The plan also includes a ferry terminal at Cascade Point, expansion of the campground at Echo Cove, a lodge, and other developments. Alternatives 4A and 4C are not inconsistent with this plan but would not facilitate it in any way.

#### 4.5.1.3 Land Use

Alternatives 4A and 4C would have no direct impact on land use, as they would involve existing transportation facilities in Lynn Canal. Expansion of ferry facilities at Auke Bay would be an improvement to existing, well-established, water-related transportation/industrial uses within that area. These alternatives would result in relatively small changes in the number of travelers between Juneau, Haines, and Skagway. The improved access resulting from these alternatives would have negligible indirect impacts on land use.

### 4.5.2 Coastal Zone Management

Alternatives 4A and 4C involve construction in CBJ and the Municipality of Skagway Borough, but no construction in the Haines Borough. The CBJ incorporated enforceable policies for coastal zone management into its comprehensive plan and ordinances, as described in Section 3.1.1.8. Official determination of consistency with enforceable provisions would occur during local review of construction plans for the ferry terminal improvements at Auke Bay. Consistency with enforceable provisions would be assured during local review of construction plans as required by Alaska State 35.30. The Municipality of Skagway Borough has not incorporated coastal management enforceable policies into its comprehensive plan, but some elements are codified in other ordinances, and compliance with the ordinances would occur during the development review process.

### 4.5.3 Visual Resources

Alternatives 4A and 4C would result in more frequent views of ferries on Lynn Canal from the land. However, the frequency would not increase to the extent that noticeably different visual impressions of the region would be created relative to the impressions that currently exist.

### 4.5.4 Historical and Archaeological Resources

Alternatives 4A and 4C would not require acquisition of any new property for transportation facilities. The only construction would be reconstruction of the west end of the Auke Bay Ferry Terminal. There are no eligible properties in the APE of the Auke Bay Ferry Terminal. Therefore, FHWA has determined that Alternatives 4A and 4C would not affect any historic properties.

### 4.5.5 Socioeconomic Resources

#### 4.5.5.1 Overview

Alternatives 4A and 4C would not create any substantial change in economic conditions in Juneau, Haines, or Skagway. Both the population and the overall demographics of Juneau, Haines, and Skagway would not be substantially affected by these alternatives. These alternatives would not measurably affect public services or make major changes in the perceived quality of life in Juneau, Haines, or Skagway. The following subsections provide a more detailed discussion of the economic and social effects to Juneau, Haines, and Skagway for Alternatives 4A and 4C.

#### 4.5.5.2 Juneau

**Population, Economics, Housing, and Municipal Revenues** – Alternatives 4A and 4C are predicted to generate 145 and 95 annual ADT in Juneau, respectively, in 2025. Traffic on these alternatives is predicted to remain constant over the 30-year period between 2025 and 2055.

Alternatives 4A and 4C include continuing mainline AMHS ferry service to and from Haines and Skagway. For this reason, these two alternatives would have little effect on independent visitor traffic to Juneau. The total increase in visitor traffic to and from Juneau associated with Alternative 4A is estimated to be 35 annual ADT relative to Alternative 1 – No Action (Table 4-52). It is estimated that Alternative 4C would have negligible effect on visitor traffic to and from Juneau with an increase of 5 annual ADT relative to Alternative 1 – No Action

(Table 4-52). Therefore, Alternative 4C would provide negligible change in economic conditions in Juneau relative to Alternative 1 – No Action, and the changes resulting from Alternative 4A would be minor, as described below.

Assuming visiting vehicles carry 3.2 people (see Revised Appendix AA, *Traffic Forecast Report*), Juneau is projected to receive as many as 19,900 new visitors in 2055 with Alternative 4A and 4,100 new visitors in 2055 with Alternative 4C. With average visitor spending at $77 per visitor per day (McDowell Group, 2012b), annual visitor spending in Juneau would increase by as much as $1.53 million as a result of Alternative 4A and $310,000 as a result of Alternative 4C. This increased visitor spending in Juneau would generate an annual average of about $570,000 in new payroll and about 15 jobs as a result of Alternative 4A and $120,000 in new payroll and approximately 5 jobs as a result of Alternative 4C.

**Table 4-52:**
**Alternatives 4A and 4C Projected Traffic and Resulting Visitor Economic Impacts in Juneau, 2055**

| | Alternative | |
|---|---|---|
| | **4A** | **4C** |
| Total Traffic under Alternative 1 – No Action (annual ADT) | 80 | 80 |
| Total Traffic under Alternatives 4A and 4C (annual ADT) | 145 | 95 |
| Change in Traffic (annual ADT) (over No Action) | 65 | 15 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 35 | 5 |
| Total New Visitors Annually (over No Action) | 19,900 | 4,100 |
| Total New Visitor Spending Annually (over No Action) | $1,530,000 | $310,000 |
| New Local Payroll Annually (over No Action) | $570,000 | $120,000 |
| New Local Employment Annually (over No Action) | 15 | 5 |

Note: Numbers may not total exactly due to rounding.

Generally, each new job in the economy results in an increase in population of about 1.5 people.[50] Therefore, the 15 new jobs in Juneau resulting from Alternative 4A would increase population by about 23 residents, which represents an overall increase of about 0.07 percent of Juneau's population (2015 population of 33,277). Alternative 4C would generate 5 additional jobs related to visitor traffic and spending, which would increase population by about 8 residents, representing an overall increase of approximately 0.02 percent of Juneau's population

Assuming 2.6 persons per household (from 2010 Census data), a population increase of 23 residents with Alternative 4A would result in additional demand for approximately 9 housing units in Juneau. A population increase of 8 residents with Alternative 4C would result in additional demand for approximately 3 housing units in Juneau. According to the CBJ Community Development Department, there were 13,057 housing units in the community in 2011, with a vacancy rate of 5 percent. The project demand is well within the existing vacant housing capacity of Juneau. Because of the small increase in independent visitors and population associated with Alternatives 4A and 4C, the value of private property in Juneau would not measurably increase.

[50] This number is based on an estimated participation rate of 65 percent, meaning that 65 percent of the Juneau population participates in the local labor force.

Sales tax revenues (plus hotel, liquor, and tobacco taxes) for Juneau would increase at a rate proportional to the increase in spending. Total additional visitor spending of $1.53 million under Alternative 4A would generate (assuming all of the spending is taxable) approximately $76,000 in additional sales tax revenues annually (based on a 5 percent tax rate). Alternative 4C would generate approximately $310,000 in additional visitor spending, resulting in approximately $16,000 in additional sales tax revenues.

**Industry/Commercial Sectors** – The principal economic benefits of Alternatives 4A and 4C would be received by the local retail trade and service sectors that provide goods and services to visitors. Economic benefits to other industrial sectors would not be appreciable.

**Utilities and Public Services** – Alternatives 4A and 4C would not measurably affect utilities and public services in Juneau relative to Alternative 1 – No Action.

**Quality of Life** – Alternative 4A would double the number of summer ferry trips between Juneau and Haines and Skagway relative to Alternative 1 – No Action. Based on the 1994 and 2003 household surveys conducted for the project (McDowell Group, 1994; Appendix I of the 2005 Supplemental Draft EIS), this improved access would be perceived as an improvement to quality of life by a majority of Juneau residents, providing increased recreational opportunities. Alternative 4C would only add one or two more ferry trips per week between Juneau and Haines and Skagway; therefore, this alternative would not result in any change in the perceived quality of life relative to Alternative 1 – No Action.

#### 4.5.5.3 Haines

**Population, Economics, Housing, and Municipal Revenues** – Alternatives 4A and 4C are predicted to generate 80 and 55 annual ADT in Haines, respectively, in 2025. Traffic on these alternatives is predicted to remain constant over the 30-year period between 2025 and 2055. As is the case with Juneau, Alternative 4A would have a minor benefit to the Haines economy and Alternative 4C would provide a negligible benefit to the Haines economy relative to Alternative 1 – No Action (Table 4-53). The total increase in visitor traffic to and from Haines associated with Alternative 4A is estimated to be 15 annual ADT and Alternative 4C is estimated to be 5 annual ADT in 2055.

**Table 4-53:**
**Alternatives 4A and 4C Projected Traffic and Resulting Visitor Economic Impacts in Haines, 2055**

| | Alternative | |
|---|---|---|
| | **4A** | **4C** |
| Total Traffic under Alternative 1 – No Action (annual ADT) | 50 | 50 |
| Total Traffic under Alternatives 4A and 4C (annual ADT) | 80 | 55 |
| Change in Traffic (annual ADT) (over No Action) | 30 | 5 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 15 | 5 |
| Total New Visitors Annually (over No Action) | 9,300 | 1,800 |
| Total New Visitor Spending Annually (over No Action) | $720,000 | 130,000 |
| New Local Payroll Annually (over No Action) | $270,000 | 50,000 |
| New Local Employment Annually (over No Action) | 5 | - |

Note: Numbers may not total exactly due to rounding.

Assuming that a visiting vehicle carries an average of 3.2 people, Haines is projected to receive as many as 9,300 new non-resident visitors annually with Alternative 4A and 1,800 new non-resident visitors annually with Alternative 4C. Assuming that visitors would spend an average of $77 per visitor per day in Haines (McDowell Group, 2012a), visitor spending in the community would increase by about $720,000 per year as a result of Alternative 4A and $130,000 per year as a result of Alternative 4C. Because Alternatives 4A and 4C would not change the cost of travel between Juneau and Haines, it is not expected that the number of trips that Haines residents would take to Juneau for shopping would increase substantially. Therefore, there would be little increased spending in Juneau to offset increased spending in Haines by visitors to that community. This increase in visitor spending in Haines would generate as much as $270,000 annually in new payroll and an average of about five additional jobs under Alternative 4A and as much as $50,000 annually in new payroll and no additional jobs under Alternative 4C.

Each new job in the economy results in an increase in population of about 1.5 people.[51] Therefore, the five new jobs in Haines resulting from Alternative 4A would increase population by approximately eight residents.[52] This would represent an overall increase of about 0.3 percent of Haines population (2015 population of 2,493). Alternative 4C would not generate additional jobs related to visitor traffic and spending.

Assuming 3.4 persons per household (from 2010 Census data), a population increase of approximately eight residents would result in additional demand for about two housing units. The 2010 U.S. Census indicated that Haines has about 137 vacant housing units, not including seasonal, recreational, or occasional use units. The project demand is well within the existing vacant housing capacity of Haines. The small increase in independent visitors and population associated with Alternative 4A would not measurably increase the value of private property in Haines. Alternative 4C would not generate an increase in population or additional housing units.

Sales tax revenues would increase at a rate proportional to the increase in spending in Haines. Total additional visitor spending in Haines of $720,000 annually would generate approximately $40,000 in additional sales tax revenues (based on a 5.5 percent tax rate). Alternative 4C would result in total additional visitor spending in Haines of approximately $130,000 annually, which would generate approximately $7,000 in additional sales tax revenues.

**Industry/Commercial Sectors** – The principal economic benefits of Alternatives 4A and 4C would be received by the local retail trade and service sectors that provide goods and services to visitors. Economic benefits to other industrial sectors would not be appreciable.

**Utilities and Public Services** – Alternatives 4A and 4C would not measurably affect utilities and public services in Haines Borough relative to Alternative 1 – No Action.

**Quality of Life** – Alternative 4A would double the number of ferry trips between Juneau and Haines relative to Alternative 1 – No Action. Based on the 1994 and 2003 household surveys conducted for the project (McDowell Group, 1994; Appendix I of the 2005 Supplemental Draft

[51] This number is based on an estimated participation rate of 65 percent, meaning that 65 percent of the Haines population participates in the local labor force.

[52] Under Alternatives 4A and 4C, the Haines-Skagway shuttle would be a smaller vessel requiring fewer crew members to operate than Alternative 1 – No Action. The crew members who are no longer needed on the Haines-Skagway route may be transferred to work on a different AMHS ferry and relocate their households to another community. This out-migration would slightly reduce the population gain from new jobs; however, it is not considered in the assessment of overall population impacts in order to present the maximum potential effects of these alternatives.

EIS), this improved access would be perceived as an improvement to quality of life by a majority of Haines residents. Better access to shopping and other services in Juneau, and more recreational opportunities are potential benefits cited by some Haines residents. Alternative 4C would only add one or two more ferry trips per week between Juneau and Haines; therefore, this alternative would not result in any change in the perceived quality of life relative to Alternative 1 – No Action.

#### 4.5.5.4 Skagway

**Population, Economics, Housing, and Municipal Revenues** – Alternatives 4A and 4C are predicted to generate 65 and 40 annual ADT in Skagway, respectively, in 2025. Traffic on these alternatives is predicted to remain constant over the 30-year period between 2025 and 2055. Alternative 4A would have a minor benefit to the Skagway economy, and Alternative 4C would provide negligible change in economic conditions in Skagway relative to Alternative 1 – No Action (Table 4-54). The total increase in visitor traffic to and from Skagway associated with Alternative 4A is estimated to be 30 annual ADT in 2055, and the total increase in visitor traffic to and from Skagway associated with Alternative 4C is estimated to be 5 annual ADT in 2055.

Assuming all traffic is round-trip, and 2 annual ADT on a ferry equals one additional visiting vehicle carrying approximately 3.2 people, Skagway is projected to receive a total of about 17,500 new visitors annually with Alternative 4A and 4,100 new visitors with Alternative 4C. Assuming that visitors would spend an average of $77 per passenger per day in Skagway (McDowell Group, 2012a), visitor spending in the community would increase by about $1.35 million per year as a result of Alternative 4A and $310,000 under Alternative 4C. This increase in visitor spending under Alternative 4A would generate an annual average of about $500,000 in new payroll and about 15 additional jobs in Skagway, and the increase in visitor spending under Alternative 4C would generate an annual average of about $120,000 in new payroll and about 5 additional jobs in Skagway (Table 4-54).

**Table 4-54:**
**Alternatives 4A and 4C Projected Traffic and Resulting Visitor Economic Impacts in Skagway, 2055**

| | Alternative | |
|---|---|---|
| | **4A** | **4C** |
| Alternative 1 – No Action (annual ADT) | 30 | 30 |
| Total Traffic under Alternatives 4A and 4C (annual ADT) | 65 | 40[1] |
| Change in Traffic (annual ADT) (over No Action) | 35 | 10 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 30 | 5 |
| Total New Visitors Annually (over No Action) | 17,500 | 4,100 |
| Total New Visitor Spending Annually (over No Action) | $1,350,000 | $310,000 |
| New Local Payroll Annually (over No Action) | $500,000 | $120,000 |
| New Local Employment Annually (over No Action) | 15 | 5 |

[1] Nearly all new traffic on this alternative is Skagway resident travel.
Note: Numbers may not total exactly due to rounding.

Each new job in the Skagway economy results in an increase in population of about 1.5 people.[53] Therefore, 15 new jobs in Skagway would result from Alternative 4A, and these jobs would be expected to result in a population increase of approximately 23 residents, an overall increase of approximately 2.2 percent of Skagway's current population (2015 population of 1,040). Alternative 4C would result in an increase of 5 new jobs, and these jobs would be expected to result in a population increase of approximately 8 new residents. This would be an overall increase of approximately 0.7 percent of Skagway's 2015 population.

Assuming 2.5 persons per household, a population increase of about 23 residents under Alternative 4A would result in additional demand for approximately 9 housing units and a population increase of approximately 8 residents under Alternative 4C would result in additional demand for approximately 3 housing units. While Skagway has a shortage of affordable homes for first-time home buyers and a lack of seasonal employee housing, the projected demand is anticipated to be accommodated by the vacant housing capacity of Skagway. During the summer, this demand would be harder to meet. It is likely that the private sector would respond by construction of additional housing if residential land is available. Because of the small increase in independent visitors and population associated with Alternative 4A, it is not expected to measurably increase the value of private property in Skagway.

Sales tax revenues would increase at a rate proportional to the increase in spending in Skagway. Total additional visitor spending of approximately $1.35 million annually under Alternative 4A would generate about $54,000 in additional sales tax revenues (based on a 4 percent tax rate). Alternative 4C would result in a total additional visitor spending of approximately $310,000 annually and would generate about $13,000 in additional sales tax revenues.

**Industry/Commercial Sectors** – The principal economic benefits of Alternatives 4A and 4C would be received by the local retail trade and service sectors that provide goods and services to visitors. Economic benefits to other industrial sectors would not be appreciable.

**Utilities and Public Services** – Alternatives 4A and 4C would not measurably affect utilities and public services in Skagway relative to Alternative 1 – No Action.

**Quality of Life** – Alternative 4A would double the number of ferry trips between Juneau and Skagway relative to Alternative 1 – No Action. Based on the 1994 and 2003 household surveys conducted for the project (McDowell Group, 1994; Appendix I of the 2005 Supplemental Draft EIS), this improved access would be perceived as an improvement to quality of life by a majority of Skagway residents. Increased tourism and more recreational opportunities are potential benefits cited by some Skagway residents. Alternative 4C would only add one or two more ferry trips per week between Juneau and Skagway; therefore, this alternative would not result in much change in the perceived quality of life relative to Alternative 1 – No Action.

### 4.5.6 Subsistence

Because Alternatives 4A and 4C would not increase access to areas where subsistence harvests currently occur, they would not result in direct or indirect impacts to subsistence uses. See Revised Appendix DD, *Land Use Technical Report*, for additional detail regarding subsistence.

[53] This number is based on an estimated participation rate of 65 percent, meaning that 65 percent of the Skagway population participates in the local labor force.

### 4.5.7 Transportation

The 2004 SATP calls for the construction of a highway from Juneau to Skagway with a shuttle from Katzehin to Haines. Alternatives 4A and 4C are not consistent with the 2004 SATP. The SATP will be updated to reflect the identification of Alternative 1 – No Action as the recommended improvement.

DOT&PF's 2016–2019 STIP (Amendment 3, June 28, 2017) does not include funding for any JAI Project build alternatives. Alternatives 4A and 4C are not consistent with the 2016-2019 STIP, while Alternative 1 – No Action is consistent with the currently adopted STIP.

#### 4.5.7.1 Demand and Capacity

Traffic demand for Alternatives 4A and 4C was projected for 2025 and 2055 using the transportation model summarized in Section 4.1.5. These projections were based on 2015 traffic in Lynn Canal, the unmet travel demand in the region, projected growth in the region, costs of travel, travel distance and speed, value of time, accident costs, and frequency of delay.

Projected traffic demand and capacity for Alternative 1 – No Action and Alternatives 4A and 4C in 2055 are provided in Table 4-55. As noted in Section 4.5.5, traffic under Alternatives 4A and 4C is expected to remain relatively constant for the 30-year period between 2025 and 2055. The only difference is an increase of 5 ADT in the peak week from 2025 and an increase of 5 ADT for Alternative 4C in winter from 2025. As indicated in the table, Alternatives 4A and 4C would provide a combined capacity (mainline ferry and shuttles) of 311 and 275 vehicles, respectively, which would meet the demand for this mode of transportation in all but the peak week. As with current operations, AMHS could schedule additional service in Lynn Canal during identified high volume days and special events.

**Table 4-55:**
**2055 Forecast Demand and Capacity for Alternative 1 – No Action and Alternatives 4A and 4C**

| Alternative | Annual Demand ADT | Summer Demand ADT | Winter Demand ADT | Peak Week Demand ADT | Summer Capacity (vehicles per day) |
|---|---|---|---|---|---|
| 1 – No Action | 80 (50/30) | 125 (80/45) | 50 (30/20) | 300 (190/110) | 154 (93/61) |
| 4A | 145 (80/65) | 225 (125/100) | 90 (50/40) | 550 (300/245) | 311 (162/149) |
| 4C | 95 (55/40) | 150 (85/65) | 60 (35/25) | 370 (205/160) | 275 (144/131) |

Note: The first number is the total demand or capacity. The first number in parentheses is vehicle demand or capacity between Juneau and Haines, and the second number is vehicle demand or capacity or demand between Juneau and Skagway.

Because Alternatives 4A and 4C are limited to ferry service, they would not meet the projected unconstrained travel demand in the Lynn Canal corridor. Latent (unconstrained) demand in the corridor during the summer is estimated to be about 1,950 ADT. Alternatives 4A and 4C would realize and accommodate approximately 16 and 14 percent of the latent summer demand, respectively. Alternatives 4A and 4C would accommodate approximately 58 percent and 75 percent of the peak week ADT, respectively.

The projected local[54] travel demand between Haines and Skagway with Alternatives 4A and 4C

[54] For the purposes of this SEIS, "local" refers to passenger and vehicle traffic that only goes back and forth between Haines and Skagway; i.e., it is traffic that either boards in Haines and disembarks in Skagway, or boards in Skagway

is the same as Alternative 1 – No Action. The Haines-Skagway summer ADT is projected to be approximately 53 vehicles in 2025 and in 2055 for both Alternative 1 – No Action and Alternatives 4A and 4C. The projected average summer daily capacity on the Haines-Skagway shuttle is 62 vehicles, which would accommodate the demand between Haines and Skagway. Additional capacity would be provided by the mainliners.

#### 4.5.7.2 Travel Flexibility and Opportunity

Alternative 4A would result in an increase in flexibility and opportunity for travel in Lynn Canal. This alternative would approximately double the number of round-trips in Lynn Canal from one per day to two per day in the summer. Travelers would still be dependent on ferry schedules and subject to reservations for the timing of their travel.

Alternative 4C would leave travel flexibility and opportunity in Lynn Canal largely unchanged relative to Alternative 1 – No Action. Under Alternative 4C, nine round-trips per week would be possible between Juneau and Haines or Skagway in the summer. Under Alternative 1 – No Action, there would be eight round-trips per week between Juneau and both Haines and Skagway in the summer. Travelers would still be dependent on ferry schedules and subject to reservations for the timing of their travel, and it would be difficult if not impossible to travel between Juneau and Haines or Skagway and return the same day.

Alternatives 4A and 4C would provide the same number of ferry trips between Haines and Skagway as Alternative 1 – No Action.

#### 4.5.7.3 Travel Time

Table 4-56 provides a comparison of travel times for Alternative 1 – No Action and Alternatives 4A and 4C. As indicated in the table, travel between Auke Bay and Haines under Alternative 4A would be approximately 2.3 fewer hours than Alternative 1 – No Action and approximately 4 fewer hours between Auke Bay and Skagway. In Alternative 4C, the travel time between Auke Bay and Haines would be the same as in Alternative 1 – No Action. To travel between Auke Bay and Skagway, Alternative 4C would be approximately 1.5 fewer hours than Alternative 1 – No Action.

**Table 4-56:**
**Summer Travel Times for Alternative 1 – No Action and Alternatives 4A and 4C**

| Route | Travel Time (hours) | | |
|---|---|---|---|
| | Alternative 1 – No Action (Day Boat ACF) [1] | Alternative 4A | Alternative 4C |
| Auke Bay-Haines | 6.2 | 3.9 | 6.2 |
| Auke Bay-Skagway | 8.1 | 4.1 | 6.6 |

[1] With Alternative 1 – No Action, the mainline ferry (i.e., service along the length of the system, from Bellingham, WA, or Prince Rupert, B.C.) would have a travel time of 7.2 hours between Auke Bay and Haines and 9.1 hours between Auke Bay and Skagway.

Alternatives 4A and 4C would not affect the travel time between Haines and Skagway. It would remain 2.4 hours, the same as Alternative 1 – No Action.

and disembarks in Haines. This local Haines-Skagway travel demand is not considered part of the overall demand for travel to and from Juneau in Lynn Canal.

#### 4.5.7.4 State and User Costs

The 36-year life-cycle costs[55] for Alternative 1 – No Action and Alternatives 4A and 4C discounted to 2016 dollars are provided in Table 4-57. These costs include State and federal capital costs and State maintenance and operating expenses. Capital costs include design, vessel and terminal construction, vessel refurbishment, and vessel replacement.

**Table 4-57:**
**Thirty-Six-Year Life-Cycle Costs for Alternative 1 – No Action and Alternatives 4A and 4C ($millions)**

| Alternative | Capital Cost | Operating Cost | Total Life-Cycle Cost |
|---|---|---|---|
| 1 – No Action | $119 | $322 | $441 |
| 4A | $417 | $514 | $931 |
| 4C | $184 | $377 | $561 |

Table 4-58 provides an estimate of total project life costs less residual value, expressed in 2016 dollars with no discounting of future costs. The total project life cost (capital plus operating costs) over the 36-year period (expressed in 2016 dollars with no discounting) would be approximately $1.6 billion for Alternative 4A and $981 million for Alternative 4C (Table 4-58). As indicated in the table, Alternatives 4A and 4C would have higher capital and operating costs during the analysis period than Alternative 1 – No Action. Although State revenues from fares would be higher for Alternatives 4A and 4C than for Alternative 1 – No Action, they would not offset the increased cost of these alternatives to the State. Therefore, the State would pay more for Alternatives 4A and 4C than for Alternative 1 – No Action. The cost per vehicle to the State would be higher for Alternatives 4A and 4C compared to Alternative 1 – No Action.

**Table 4-58:**
**Thirty-Six-Year Total Project Life Costs for Alternative 1 – No Action and Alternatives 4A and 4C, 2019–2054 (2016 dollars)**

| Alternative | Total Funds | | | State Funds | | | |
|---|---|---|---|---|---|---|---|
| | Capital Costs ($million)[1] | Operating Costs ($million) | Total Project Costs ($million) | Total Cost ($million) | Total Revenue ($million)[2] | Net Cost ($million) | Cost/Vehicle (dollars) |
| 1 – No Action | $128 | $659 | $787 | $671 | $292 | $3782 | $279 |
| 4A | $496 | $1,125 | $1,621 | $1,170 | $482 | $6887 | $335 |
| 4C | $188 | $793 | $981 | $824 | $342 | $482 | $313 |

[1] Residual value subtracted.

[2] Includes both fares paid to AMHS and gas tax receipts.

Alternatives 4A and 4C would have annual operating costs of approximately $33.7 million and $22.7 million, respectively, versus $18.2 million for Alternative 1 – No Action.

[55] Life-cycle costs are the construction, refurbishment, and maintenance costs for a 6-year construction period and a 30-year operation period, discounted to 2016 dollars.

The anticipated total cost[56] and out-of-pocket cost of travel between Juneau and Skagway or Haines for travelers are listed in Table 4-59 for Alternative 1 – No Action and Alternatives 4A and 4C. The Alternatives 4A and 4C user costs for travel between Juneau and Haines or Skagway would be the same as Alternative 1 – No Action. Mainline ferry fares would be unchanged from Alternative 1 – No Action under Alternatives 4A and 4C. The cost of taking the shuttle ferry between Haines and Skagway would remain the same under Alternatives 4A and 4C as with Alternative 1 – No Action.

**Table 4-59:**
**Juneau to/from Haines and Skagway Total and Out-of-Pocket User Costs for Alternative 1 – No Action and Alternatives 4A and 4C**

| Alternative | Example scenario | Haines User Cost[1] | | Skagway User Cost[1] | |
|---|---|---|---|---|---|
| | | Total User Cost | Out-of-Pocket Cost | Total User Cost | Out-of-Pocket Cost |
| 1 – No Action | Family of 4 in a 19-foot vehicle | $229.00 | $227.00 | $301.50 | $301.50 |
| | Driver only in a 19-foot vehicle | $131.50 | $129.50 | $169.00 | $169.00 |
| | Walk-on passenger[2] | $39.00 | $39.00 | $53.00 | $53.00 |
| 4A and 4C | Family of 4 in a 19-foot vehicle | $229.00 | $227.00 | $301.50 | $301.50 |
| | Driver only in a 19-foot vehicle | $131.50 | $129.50 | $169.00 | $169.00 |
| | Walk-on passenger[2] | $39.00 | $39.00 | $53.00 | $53.00 |

[1]Total cost is based on fares plus $0.60 per mile for vehicular travel (AAA, 2015). Out-of-pocket cost is based on fares and gasoline consumption.

[2] Does not include cost of transportation to/from the ferry terminal.

Table 4-60 shows the 36-year value of user benefits and net present values for Alternatives 4A and 4C. User benefits include reduced out-of-pocket costs[57], travel time, vehicle maintenance and ownership costs, and accident costs. Alternative 4A would provide $38 million in user benefits over 36 years. Alternative 4C would offer approximately $10 million in user benefit.

**Table 4-60:**
**User Benefits and Net Present Value of Alternatives 4A and 4C versus Alternative 1 – No Action[1]**

| Alternative | User Benefits ($million) | Net Incremental Project Costs ($million)[2] | Net Present Value ($million) |
|---|---|---|---|
| 4A | $38 | $241 | -$202 |
| 4C | $10 | $85 | -$75 |

[1] For the period 2019 to 2054 discounted to 2016 dollars.

[2] Overall project costs minus revenues.

[56] Total user costs are out-of-pocket cost and vehicle maintenance, ownership, and accident costs based on highway miles traveled.

[57] Out-of-pocket costs are ferry fares. Fares for Alternative 1 – No Action and Alternatives 4A and 4C are based on actual 2015 fares charged.

One economic measure of an alternative is its net present value. Net present value is the total user benefits minus the net costs of an alternative over and above the net cost of Alternative 1 – No Action for a given period of time. The 2019 to 2054 net present values of Alternatives 4A and 4C are negative numbers at about negative $202 and negative $75 million, respectively. In other words, the costs of these alternatives are greater than the value of their user benefits.

#### 4.5.7.5 Other Transportation Impacts

**Air Taxi** – It is likely that some travel would be diverted from air taxi operations currently serving the Lynn Canal to ferries under Alternative 4A and Alternative 4C due to the increased convenience of more trips.

**AMHS** – AMHS service in Lynn Canal under Alternative 1 – No Action is estimated to require State funding of about $10.1 million in 2055 annually. Because of the increase in ferry service in Lynn Canal with Alternatives 4A and 4C, both are estimated to require more State funding than Alternative 1 – No Action (Table 4-61). These alternatives would place an additional funding burden on AMHS, which could have negative impacts on other AMHS service.

**Table 4-61:**
**Annual AMHS Operating Costs, Revenues, and Estimated State Funding for Alternative 1 – No Action and Alternatives 4A and 4C**

| Alternative | AMHS Operating Cost ($million) | AMHS Revenue ($million)[1] | Estimated AMHS State Funding ($million) |
|---|---|---|---|
| 1 – No Action | $18.2[2] | $8.1 | $10.1 |
| 4A | $33.7[2] | $14.4 | $19.3 |
| 4C | $22.7[2] | $9.8 | $12.9 |

Source: *Marine Segments Technical Report* (Revised Appendix GG) and *User Benefit, Life-cycle Cost, and Total Project Cost Analyses* (Revised Appendix FF).

[1] Fare box revenue paid to AMHS; excludes gas tax receipts.

[2] Revised total is due to (1) the updating of costs to 2015 dollars and (2) a discrepancy in the data relied on to generate the 2014 Draft SEIS mainliner operating costs.

**Pedestrians and Bicyclists -** Table 4-62 shows the projected number of summer walk-on passengers for Alternative 1 – No Action and Alternatives 4A and 4C. Alternatives 4A and 4C have a higher projection of summer walk-on passengers than Alternative 1 – No Action. The cost of travel under Alternatives 4A and 4C is the same as under Alternative 1 – No Action. Alternatives 4A and 4C have more frequency and opportunity for walk-on passengers to travel than Alternative 1 – No Action.

**Table 4-62:**
**Average Daily Ridership in Summer for Alternative 1 – No Action and Alternatives 4A and 4C, 2055**

| Alternative | Total Passengers | Passengers in Vehicles | Walk-on Passengers | Walk-on Percentage |
|---|---|---|---|---|
| 1 - No Action | 410 | 285 | 125 | 30% |
| 4A | 745 | 520 | 225 | 30% |
| 4C | 495 | 345 | 150 | 30% |

Note: See Revised Appendix AA, *Traffic Forecast Report.*

Comments on the 2014 Draft SEIS expressed concerns about impacts to walk-on passengers who are low income, minority, senior citizens, disabled, or students. Under Alternative 4A, these populations would have a shorter travel time due to the use of an FVF. As Alternatives 4A and 4C use the same ferry terminals as Alternative 1 – No Action, no additional impacts are anticipated (i.e., travelers would need to access the ferry terminals in Haines, Skagway, and Juneau the same way they do now).

### 4.5.8 Geology

Alternatives 4A and 4C would involve reconstruction of the west end of the Auke Bay Ferry Terminal. The proposed improvement would have no direct or indirect effects on geological resources.

### 4.5.9 Hydrology and Water Quality

#### 4.5.9.1 Hydrology

Because Alternatives 4A and 4C would only involve relatively minor reconstruction of existing ferry terminal dock facilities, they would not affect circulation within Lynn Canal. No other changes would be made to transportation facilities; therefore, there would be no impacts to surface water resources, including floodplains.

#### 4.5.9.2 Water Quality

Ferry operations under Alternatives 4A and 4C would have little effect on area water quality. Continued mainline ferry service in Lynn Canal would result in continued discharge of treated wastewater into Lynn Canal from those vessels, which is expected to meet AWQS. The FVFs (Alternative 4A) and the Day Boat ACFs (Alternative 4C) would not discharge wastewater into Lynn Canal. These vessels would have sanitary waste holding tanks and the wastewater would be pumped to an onshore facility for disposal. Sanitary waste generated at the ferry terminals would undergo treatment. Wastewater would undergo aeration and disinfection with ultraviolet light. The treated wastewater would be discharged to Lynn Canal under permit by the ADEC (APDES permit) and would meet Alaska-established waste discharge limitations.

The ferry terminal sewage treatment facilities at Auke Bay, Haines, and Skagway would continue to operate under these alternatives. There are no documented impacts associated with these systems; therefore, negligible impacts to water quality from the terminal treatment facilities are anticipated. Accidental discharges, spills, and leaks are possible during ferry operations. Historically, these have been minor, with only minimal and temporary impacts to water quality.

### 4.5.10 Air Quality

Emissions from marine vessels and motor vehicles are directly proportional to the amount of fuel they burn. As indicated in Section 4.7.6, ferry and motor vehicle operations under Alternative 4A would consume about 4.3 times as much fuel as under Alternative 1 – No Action, due primarily to the high fuel consumption rates of the FVFs. Therefore, emissions of CO, $NO_x$, and particulates would be about 4.3 times higher under Alternative 4A than under Alternative 1 – No Action. This would not result in violations of federal and State air quality standards because pollutant concentrations in the region are so low and the volume of emissions from Alternative 4A is relatively low compared with other more urbanized areas.

Alternative 4C would use conventional monohull ferries and fuel consumption would be almost 70 percent higher than under Alternative 1 – No Action. Therefore, emissions under Alternative 4C would be greater than emissions under Alternative 1 – No Action. The effect on air quality, however, would be negligible because the air quality in the study area is very good and the project-related emissions would not approach the NAAQS.

Neither Alternative 4A nor 4C would be projected to have negative human health or environmental consequences resulting from project-related vehicle or ferry vessel emissions. In response to comments on the 2014 Draft SEIS, ferry emissions modeling was performed to estimate the annual load of emissions (tons/year) for all alternatives relative to total emissions loading at active marine centers. The results of that modeling effort indicate that the ferry emissions associated with Alternative 4A would approximately triple the AMHS ferry emissions of Alternative 1 – No Action, but the contribution to total marine vessel emissions would be minor. Alternative 4C emissions would be similar to emissions under Alternative 1 – No Action. See Attachment 1 to the *2017 Update to Appendix T – Air Quality Modeling Memorandum* in Appendix Z for detailed modeling results, and Section 4.9.2.7 for a discussion of the potential cumulative impact.

### 4.5.11 Hazardous Materials

The *2014 Update to Appendix M – Initial Site Assessment Technical Report* (see Appendix Z of the Draft SEIS) identified 15 sites of potential concern in the area of the proposed transportation improvements associated with Alternatives 4A and 4C: 10 oil or fuel spill sites at the Auke Bay Ferry Terminal, a leaking underground storage tank (LUST) site at Auke Bay Ferry Terminal, a contaminated site from a leaking aboveground residential heating oil tank on Glacier Highway, and three ADEC registered underground storage tanks (USTs) at the Auke Bay Ferry Terminal.

The 10 oil and fuel spill incidents were small, and the released materials have dissipated or have been removed. They pose no potential hazardous materials risk to the project.

The LUST site at the Auke Bay Ferry Terminal was granted a conditional closure from ADEC in 2004; however, it is currently being monitored because contaminated materials remain on site. Alternatives 4A and 4C present a potential hazardous materials risk associated with the LUST site at the Auke Bay Ferry Terminal. If the reconstruction of the west end of the Auke Bay Ferry Terminal requires structural modifications or demolition in the area of the contaminated materials from the LUST site, DOT&PF would need to investigate the disturbance area and appropriately manage or remove the contaminated materials prior to reconstruction.

The incident at the Glacier Highway residence occurred in 2003 and the status remains “open” in the ADEC database. This site poses no threat to development associated with Alternative 4A or 4C.

Two of the three ADEC registered USTs at the Auke Bay Ferry Terminal have been removed, but the third, and largest, is currently in operation. The remaining UST at the Auke Bay Ferry Terminal would be either left in place and monitored, or removed with reconstruction of the west end of the terminal, if the design required it.

### 4.5.12 Wetlands

Because Alternatives 4A and 4C would involve only reconstruction of existing ferry terminal dock facilities, they would have no direct or indirect effects on wetlands.

### 4.5.13 Marine and Freshwater Habitat and Species (Including Essential Fish Habitat)

Reconstruction of the west end of the Auke Bay Ferry Terminal would require the removal of pilings, replacement of pilings, and placement of some fill in the bay. Fill and pilings would result in the loss of less than one acre of intertidal and subtidal habitat. This loss would not result in a measurable reduction in any benthic or fish populations in the project region or Auke Bay.

Ferry operations under Alternatives 4A and 4C would be somewhat greater than under Alternative 1 – No Action. This increase would not be large enough to have a measurably different effect on marine and freshwater habitat or fish and other marine species than Alternative 1 – No Action. Ferries generating propeller wash and surface wakes near shore would increase localized turbidity, which could impact aquatic habitats such as eelgrass beds in Lynn Canal. Studies conducted by NMFS (Harris, Neff, and Johnson, 2012; Holsman et al., 2006; Laurel et al., 2007; Murphy et al., 2000; Johnson et al., 2003) have documented declines in eelgrass cover, species composition, and fishery declines in areas subjected to effects from ferries. Eelgrass beds in the terminal area of Auke Bay are already disturbed, and additional wave energy at the Auke Bay Ferry Terminal from ferry operations is not anticipated to substantially degrade the eelgrass bed adjacent to Auk Nu Cove beyond its current condition. FHWA has determined that Alternatives 4A and 4C would not have a substantial adverse effect on EFH.

### 4.5.14 Terrestrial Habitat

Because Alternatives 4A and 4C would involve only reconstruction of existing ferry terminal dock facilities, they would have no direct or indirect effects on terrestrial habitat.

### 4.5.15 Wildlife

#### 4.5.15.1 Marine Mammals

Harbor seals, minke whales, killer whales, harbor porpoises, Dall's porpoises, and sea otters are considered in this section. Humpback whales and Steller sea lions are discussed in Section 4.5.17.

Seals are habituated to current ferry traffic. Because Alternatives 4A and 4C would use existing terminals, and would only increase traffic on existing routes, they would not affect harbor seal use of Lynn Canal.

Minke whales tend to be attracted to motor boats. Therefore, the presence of such vessels would not drive minke whales away from an area. Because of this attraction, increased ferry traffic would increase the risk of collision, particularly with the FVFs proposed under Alternative 4A; however, collision accidents with minke whales are very rare (Allen and Angliss, 2012). In addition, minke whales rarely occur in Lynn Canal (Dalheim et al., 2009). Therefore, Alternatives 4A and 4C are unlikely to have an impact on the population of this species in Lynn Canal.

Fast-moving and maneuverable species such as the killer whale, harbor porpoise, and Dall's porpoise can readily avoid ferries, even the FVFs proposed for Alternative 4A, and would not be affected by the ferry traffic associated with Alternatives 4A and 4C.

Sea otters rarely occur in Lynn Canal (Esslinger and Bodkin, 2009). Like harbor seals, sea otters are sensitive to noise and would likely avoid ferry traffic associated with Alternatives 4A and 4C. These alternatives are unlikely to affect sea otters in Lynn Canal.

#### 4.5.15.2 Marine Birds

This group includes species that nest on land but forage in marine waters at least part of the year. Species considered in this group include great blue herons, marbled murrelets, Kittlitz's murrelets, harlequin ducks, black oystercatchers, yellow-billed loons, Aleutian terns, and dusky Canada geese.

Blue herons and trumpeter swans do not feed and rest in open marine waters of Lynn Canal and therefore would not be affected by Alternatives 4A and 4C. Marbled murrelets, Kittlitz's murrelets, black oystercatchers, yellow-billed loons, and harlequin ducks do use open marine waters for foraging. They most frequently use nearshore, protected areas for feeding and resting, and are less likely to be in the main channel of Lynn Canal. Marine birds may be flushed by ferries in shallow coastal waters approaching terminals; however, this sort of disturbance would not be frequent enough to have a population-level effect on these species.

Implementation of Alternatives 4A and 4C would result in the loss of 0.7 acre of rocky shore habitat at the Auke Bay Ferry Terminal. The loss of rocky shore habitat would result in a loss of potential breeding and feeding habitat for black oystercatchers; however ongoing human activities in this area likely deter its use by these birds. With the low densities of oystercatchers in the Lynn Canal area relative to the amount of rocky shore habitat available outside the project area and high vessel and shore use at Auke Bay Ferry Terminal, it is not likely that Alternative 4A or 4C would displace nesting black oystercatchers. Displaced birds would likely move to other unoccupied rocky shore habitat nearby. The loss of less than 1 percent of habitat in Lynn Canal would not have a population-level effect on this species.

Alternatives 4A and 4C would not likely affect Aleutian terns because the project is outside the species' known range (see Section 4.3.15) and the Aleutian tern is thought to be a casual or accidental spring and summer visitor in southeast Alaska, though it is known to breed as far south as Glacier Bay. Alternatives 4A and 4C would not result in the loss of palustrine or estuarine emergent wetlands, which is preferred nesting habitat of Aleutian terns. Because Aleutian terns nest onshore and feed over ocean waters, they are unlikely to be disturbed by Alternative 4A and 4C ferries.

Dusky Canada geese do not breed or winter in the project area. 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 (Bromley and Rothe, 2003). Alternatives 4A and 4C 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.

#### 4.5.15.3 Terrestrial Mammals

Because Alternatives 4A and 4C would involve only reconstruction of existing ferry terminal dock facilities, they would have no direct or indirect effects on terrestrial mammals.

#### 4.5.15.4 Terrestrial Birds

Because Alternatives 4A and 4C would involve only reconstruction of existing ferry terminal dock facilities, they would have no direct or indirect effects on terrestrial birds.

#### 4.5.15.5 Amphibians

Because Alternatives 4A and 4C would involve only reconstruction of existing ferry terminal dock facilities, they would have no direct or indirect effects on amphibians.

### 4.5.16 Bald Eagles

Because Alternatives 4A and 4C would involve only reconstruction of existing ferry terminal dock facilities, they would have no direct or indirect effects on terrestrial or freshwater habitats used by bald eagles.

### 4.5.17 Threatened and Endangered Species

#### 4.5.17.1 Steller Sea Lion

Alternatives 4A and 4C would not affect Steller sea lions at any traditional haulouts and would not measurably change the potential for Steller sea lion/AMHS ferry interactions.

The potential for sea lion and ferry collisions is considered minimal. Although it is possible for a Steller sea lion, particularly a juvenile, to be harmed by a collision with a vessel, Steller sea lions are generally very agile and successfully avoid such encounters. Collisions with vessels are not believed to be a significant source of mortality of Steller sea lions (Allen and Angliss, 2012).

For these reasons, the FHWA has made the preliminary determination that Alternatives 4A and 4C are not likely to adversely affect western DPS Steller sea lions. Construction-related effects are described in Section 4.8.12.7.

#### 4.5.17.2 Humpback Whales

Ferry traffic in Lynn Canal would increase as a result of Alternatives 4A and 4C. The increased ferry traffic would increase the risk of collisions with humpback whales. The use of FVFs for Alternative 4A would further increase the risk of collisions because research has shown that vessel-whale collisions increase proportionately when the speed of vessels increases above 14 knots (Laist et al., 2001). Collisions have been rare in the past and would likely continue to be rare despite this increased risk (Allen and Angliss, 2012). FHWA has made the preliminary determination that Alternatives 4A and 4C are not likely to adversely affect Mexico DPS humpback whales. Construction-related effects are described in Section 4.8.12.7.

### 4.5.18 Permits and Approvals

Permits and approvals required for Alternatives 4A and 4C are limited to modifications to the Auke Bay Ferry Terminal. The following permits, consultations, and approvals would be required:

- USACE Section 404 permit for fill below the high tide line
- USACE Section 10 permit for dredge, fill, and structures placed below mean high water
- NMFS ESA Section 7 consultation for threatened and endangered species
- NMFS MMPA Incidental Harassment Authorization for marine mammals
- ADEC APDES Stormwater General Permit for stormwater discharge during construction
- ADEC Section 401 Water Quality Certification in support of Section 404 permits
- ADNR Interagency Land Management Assignment for use of additional tidelands
- ADEC review of the SWPPP under the APDES Stormwater General Permit

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

This section evaluates the direct and indirect effects of Alternatives 4B and 4D. Under both of these alternatives, a 2.3-mile highway would be constructed from Cascade Point to Sawmill Cove in Berners Bay. In addition, the 2.9-mile portion of Glacier Highway from Echo Cove to Cascade Point would be widened from 26 feet to 30 feet. A new double end berth would be needed at Auke Bay and a ferry terminal would be constructed at Sawmill Cove. Ferry service would then be provided between Sawmill Cove and Haines/Skagway during the summer months (see Figure 2-10). During the winter (October 1 to May 15), ferry service would be provided to between Auke Bay and Haines/Skagway (see Figure 2-11). With Alternative 4B, two new FVFs would be used for this service. Under Alternative 4D, two Day Boat ACFs, which are conventional monohull vessels, would be used for the ferry service and the Skagway Ferry Terminal would be modified to include a new end berth to accommodate the Day Boat ACF. Mainline AMHS ferry service would continue with a minimum of two round-trips per week in the summer and one round-trip per week in the winter.

There would be one pullout near the crossing of Sawmill Creek on the highway for these two alternatives. The USFS has indicated a trail at this pullout is reasonably foreseeable if the highway is constructed. A separate environmental analysis would be completed by the USFS for this trail. The trail is included in the cumulative effects section of this chapter (Section 4.9).

### 4.6.1 Land Use

#### 4.6.1.1 Land Ownership and Management

The required highway ROW from Echo Cove to Sawmill Cove and the new ferry terminal at Sawmill Cove would occupy up to 72 acres of federal land in the Tongass National Forest under the management of the USFS and 90 acres of land owned by Goldbelt. The Tongass National Forest land would remain in federal ownership with a highway easement conveyed to the State. Goldbelt would be compensated for lands acquired for a new highway ROW at fair market value in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

#### 4.6.1.2 Consistency with Land Use Plans

The USFS land crossed by the road alignment for Alternatives 4B and 4D is currently managed under LUD II, which refers to congressionally designated lands where the principal management goal is to retain the primitive wildland character of the area while allowing necessary State highways (Figure 3-3). With development of Alternative 4B or 4D, the USFS would apply the TSC management prescription to the land within the highway corridor, giving it precedence over the underlying LUD management prescriptions. The highway segments of Alternatives 4B and 4D are consistent with the TLRMP.

The State of Alaska believes that use of the State transportation easement on the east side of Lynn Canal granted by Congress under Section 4407 of SAFETEA-LU, as amended by the FAST Act, would not require further evaluation for consistency with the TLRMP. If for some reason DOT&PF could not use all or a portion of the easement, FHWA would seek to secure a transportation easement across Tongass National Forest through a federal land appropriation process authorized by 23 USC 317.

ADNR manages State tidelands and submerged lands near the Sawmill Cove area to provide a dispersed recreation experience, wildlife habitat, harvest opportunities, and waterfront development. The CBJ *Comprehensive Plan* designates the shorelands around the potential Sawmill Cove Ferry Terminal as Resource Development, with the potential to create a marine terminal (CBJ, 2008). A ferry terminal at Sawmill Cove would appear to be compatible with USFS, ADNR, and CBJ management plans.

The regional transportation policy set forth in the CBJ 2008 *Comprehensive Plan* is "to support the improvement of transportation facilities and systems that reinforce Juneau's role as the capital city of Alaska and a regional transportation and service center." The plan supports consideration of all affordable energy efficient transport alternatives to improve transportation links between CBJ and other areas of Southeast Alaska, including improved air (cargo and passenger) service, roadways, ferries, and fixed guideway systems (CBJ, 2008). Alternatives 4B and 4D are consistent with the CBJ *Comprehensive Plan*.

The Haines Borough and Municipality of Skagway Borough comprehensive plans support improvement of the AMHS to provide better ferry access to these two communities (Haines Borough, 2012; Municipality of Skagway, 2009). Therefore, these alternatives are consistent with the plans and policies of Haines and Skagway.

Goldbelt's Echo Cove Master Plan included a road that has been constructed from the northern end of Glacier Highway at Echo Cove to Cascade Point in Berners Bay. The plan also includes a ferry terminal at Cascade Point, expansion of the campground at Echo Cove, a lodge, and other developments. Alternatives 4B and 4D are consistent with this plan and would use the alignment of the road to Cascade Point, and continuing to Sawmill Cove. Alternatives 4B and 4D would generate some additional traffic in the Cascade Point area that may facilitate development of the other plan elements.

#### 4.6.1.3 Land and Resource Uses

The highway improvements from Echo Cove to Cascade Point and the extension of the highway to Sawmill Cove would improve opportunities for recreational activities such as hiking, camping, sightseeing, rafting, canoeing, kayaking, fishing, and hunting. These opportunities would provide benefits for residents and visitors, and spread out recreation activities that are currently

concentrated along the existing highway system in Juneau. Berners Bay is already a popular location for remote and semi-remote recreation. A highway to Sawmill Cove would make it more accessible for people looking for a rustic but not pristine outdoor experience. It could also provide opportunities for outfitters to make more recreational trips available to the public in the region. Opening up the recreation opportunities of the coastline along the east side of Lynn Canal to Berners Bay would be perceived as a negative impact by those who enjoy the existing remote nature of the region, including some outfitters who currently provide wilderness trips there.

Sawmill Creek would be crossed by the highway proposed for Alternatives 4B and 4D. This stream supports resident and anadromous sport fish. The region also supports populations of mountain goats and bears, which are popular big game species for resident and out-of-state hunters. Hunting and fishing pressure has increased substantially along every highway in Alaska that has opened a formerly remote area to local communities and outside visitors. Increases in hunting and fishing would be expected along the extension of the highway from Cascade Point to Sawmill Cove. As in other readily accessible regions of the state, the ADF&G would monitor the resources along Lynn Canal and adjust fish and game regulations, as necessary, to protect those resources from over utilization.

Under Alternatives 4B and 4D, Goldbelt would benefit from improved access to its Echo Cove lands. Better access would facilitate development opportunities, including transportation-related activities, recreation, and tourism and residential development.

**Roadless Areas** – Alternatives 4B and 4D would not substantially change the natural integrity and appearance or opportunities for solitude in IRA 305 (see Revised Appendix DD, *Land Use Technical Report*, Section 4.4, for detail on the effects of Alternative 3 on roadless areas). IRA 305 encompasses 94,800 acres.[58] Within the 300-foot-wide assessment corridor, the highway segment of Alternatives 4B and 4D would have a cleared width averaging approximately 100 feet. The influence of the highway in terms of intruding on the apparent naturalness of the area would extend 1,200 feet on either side of this cleared area (except where the alignment is closer than 1,200 feet from the shore), for a total width averaging 2,500 feet. Therefore, Alternatives 4B and 4D would affect 612 acres largely along the western boundary of IRA 305. This represents about 0.07 percent of the land encompassed by IRA 305.

Alternatives 4B and 4D would reduce the amount of land remaining roadless. The remaining area would appear natural and would still provide opportunities for solitude and primitive recreation. The roadless area inventory boundary would not change; there would be a road within the IRA. Alternatives 4B and 4D would not affect any identified scientific or educational features in Area 305. Alternatives 4B and 4D are also consistent with the TLRMP which indicates that a proposed State road corridor along the alignment for Alternatives 4B and 4D in IRA 305 would be managed as a TSC if one of these alternatives were selected. Revised Appendix DD, *Land Use Technical Report*, provides additional information on Roadless Areas. The Secretary of Agriculture and the USFS may be required to make an affirmative finding under the Roadless Rule that the easements granted by Congress under Section 4407 of SAFETEA-LU, as amended by the FAST Act, were "established by law" and therefore that a road using the easements would be consistent with the Roadless Rule.

[58] Because a ROW exists in this area, impacts of the Glacier Highway extension (0.7 mi in this IRA) have in part already occurred, but the USFS still maps this as an IRA.

#### 4.6.1.4 Parks and Recreation Facilities

No land from a municipal, State, or federal park or recreation area would be required by Alternatives 4B and 4D. See Chapter 6 for further discussion of potential impacts to public recreation facilities.

### 4.6.2 Coastal Zone Management

Alternatives 4B and 4D involve construction in CBJ and the Municipality of Skagway Borough, but no construction in the Haines Borough. The CBJ incorporated enforceable policies for coastal zone management into its comprehensive plan and ordinances, as described in Section 3.1.1.8. Official determination of consistency with enforceable provisions would occur during local review of construction plans for roads, ferry terminals, or other improvements and modifications needed to implement the alternative. The CBJ's consistency determination for Alternative 2B from Echo Cove to Sweeney Creek (CBJ, 2006; see Section 4.3.2) could be modified for Alternative 4B or 4D. Consistency with enforceable provisions would be assured during local review of construction plans as required by Alaska Statute 35.30. The Municipality of Skagway Borough has not incorporated coastal management enforceable policies into its comprehensive plan, but some elements are codified in other ordinances, and compliance with the ordinances would occur during the development review process.

### 4.6.3 Visual Resources

#### 4.6.3.1 Views from the Bay

In Berners Bay, the most susceptible views to potential impacts from Alternatives 4B and 4D are views from boats in the bay. Figure 4-20 provides a visual simulation of the highway in background views from the southern end of Berners Bay. From this location, the highway is approximately 2.4 miles east of the viewer and is located in an area not requiring substantial cuts and fills. Therefore, the highway is not likely to dominate the existing natural setting. At closer distances, the ferry terminal at Sawmill Cove and the highway would be more noticeable. It is likely that visitors to Berners Bay and Point Bridget in the Point Bridget State Park would notice the highway; however, from this distance it would not be a dominant feature in the viewshed.

Figure 4-21 is a visual simulation of the highway in the foreground at the Sawmill Cove Ferry Terminal proposed for Alternatives 4B and 4D. The highway would be noticeable intermittently along the eastern edge of Berners Bay. However, the proposed ferry terminal would likely be highly visible from this distance (approximately 0.5 mile) and through the middleground viewing threshold. The changes to form, line, color, and texture introduced by the ferry terminal would dominate the existing viewshed.

Views of the road and ferry terminal, as well as vehicle movement and lights, could affect viewers by changing their perception of the comparative isolation of this area. Movement of vehicles, during both the construction and operation stages, could result in a visual impact to viewers.

Alternatives 4B and 4D would result in more frequent views of ferries on Lynn Canal from the land. However, the frequency would not be increased to the extent that noticeably different visual impressions of the region would be created relative to the impressions that currently exist.

#### 4.6.3.2 Views from the Highway

Views from a highway along the east shore of Berners Bay looking east would be limited to the foreground by dense OG forest in most places. At the Sawmill Cove terminal, views to the west would include Point Bridget, Point St. Mary, and the opening of Berners Bay across to the west side of Lynn Canal.

#### 4.6.3.3 Consistency with USFS Scenic Integrity Objectives[59]

The SIO for the TSC is Low, with only the foreground of views considered. Alternatives 4B and 4D would be consistent with this SIO. The alignment has been located to maintain a buffer between the highway and the shore to reduce the visibility of the highway. Except for the ferry terminal and highway approach, these alternatives would exceed the Low SIO. In order to be consistent with the TLRMP goal of achieving the SIOs of adjacent LUDs to the extent feasible, DOT&PF also evaluated the consistency of Alternatives 4B and 4D with the SIO of the adjacent LUD.

USFS land from Echo Cove to Sawmill Cove has a Moderate SIO. The highway for Alternatives 4B and 4D would not be visible from the coastline until Sawmill Cove. At this point, the access road to the new ferry terminal and the terminal facility would be visible from Berners Bay; therefore, the alternatives would conform to the SIO of adjacent lands except at the terminal area. It is not feasible to make the ferry terminal not visible from views of the area; however, during design, ways of reducing the terminal's visual dominance would be investigated.

### 4.6.4 Historical and Archaeological Resources

There are no eligible historic properties in the APE of Alternatives 4B and 4D. Therefore, FHWA has determined that Alternatives 4B and 4D would not affect historic properties.

These alternatives would indirectly increase recreational use of land adjacent to the new highway. Increased recreational use could result in disturbance of any undiscovered historic and prehistoric cultural sites in the area by hikers, hunters, and other recreational users.

### 4.6.5 Socioeconomic Resources

#### 4.6.5.1 Overview

Alternatives 4B and 4D would not create any substantial change in economic conditions in Juneau, Haines, or Skagway. Both the population and the overall demographics of Juneau, Haines, and Skagway would not be substantially affected by these alternatives. These alternatives would not measurably affect public services or make major changes in the perceived quality of life in Juneau, Haines, or Skagway. The following subsections provide a more detailed discussion of the economic and social effects to Juneau, Haines, and Skagway for Alternatives 4B and 4D.

[59] The 2006 Final EIS used Visual Quality Objectives (VQOs) in accordance with the 1997 TLMP. This Final SEIS has been updated based on the 2016 TLRMP, which replaced the VQOs with Scenic Integrity Objectives (SIOs). The primary difference between the VQOs and SIOs is that the SIOs better recognize the positive scenic values associated with some human-modified (cultural) features and settings. The VQOs and SIOs are similar enough that the definitions were written to allow for easy conversion between the two.

#### 4.6.5.2 Juneau

**Population, Economics, Housing, and Municipal Revenues** – Alternatives 4B and 4D are predicted to generate 240 and 225 annual ADT, respectively, in 2025. Traffic on these alternatives is predicted to remain constant over the 30-year period between 2025 and 2055.

Alternatives 4B and 4D include continuing mainline AMHS ferry service to/from Haines and Skagway. Because of this, these two alternatives would have minor effect on independent visitor traffic to Juneau. The total increase in visitor traffic to and from Juneau associated with these alternatives is estimated to be 85 annual ADT for Alternative 4B and 75 annual ADT for Alternative 4D for 2055 (Table 4-63). This additional visitor traffic in Juneau would result in an annual total of as much as 49,100 new visitors under Alternative 4B and 45,000 new visitors under Alternative 4D. With average spending of $77 per visitor per day (McDowell Group, 2012b), annual visitor spending in Juneau would increase by as much as $3.78 million as a result of Alternative 4B and $3.46 million under Alternative 4D. This increase in visitor spending would generate an annual average of about $1.41 million in new payroll and about 40 additional jobs in Juneau under Alternative 4B and $1.29 million in new payroll and 35 new jobs under Alternative 4D (Table 4-63).

**Table 4-63:**
**Alternatives 4B and 4D Projected Traffic and Resulting Visitor Economic Impacts in Juneau, 2055**

| | Alternative | |
|---|---|---|
| | **Alternative 4B** | **Alternative 4D** |
| Total Traffic under Alternative 1 – No Action (annual ADT) | 80 | 80 |
| Total Traffic under Alternatives 4B and 4D (annual ADT) | 240 | 225 |
| Change in Traffic (annual ADT) (over No Action) | 160 | 145 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 85 | 75 |
| Total New Visitors Annually (over No Action) | 49,100 | 45,000 |
| Total New Visitor Spending Annually (over No Action) | $3,780,000 | $3,460,000 |
| New Local Payroll Annually (over No Action) | $1,410,000 | $1,290,000 |
| New Local Employment Annually (over No Action) | 40 | 35 |

Note: Numbers may not total exactly due to rounding.

Generally, each new job in the Juneau economy results in an increase in population of about 1.5 people.[60] Therefore, the new jobs in Juneau resulting from Alternatives 4B and 4D would be expected to result in a population increase of 60 and 53 residents, respectively. This would represent a maximum increase of about 0.2 percent of Juneau's current population (2015 population of 33,277).

Based on 2.6 persons per household (from 2010 Census data), a population increase of 60 and 53 residents in 2055 would result in additional demand for about 23 and 20 housing units for Alternatives 4B and 4D, respectively. According to the CBJ Community Development Department, there were 13,057 housing units in the community in 2011, with a vacancy rate of 5 percent. The project demand is well within the existing vacant housing capacity of Juneau. The

[60] This number is based on an estimated participation rate of 65 percent, meaning 65 percent of the Juneau population participates in the local labor force.

FVF for Alternatives 4B and the Day Boat ACFs for 4D would homeport in Sawmill Cove in the summer and in Auke Bay in the winter. Crew for these vessels would require housing, creating a small additional demand for housing in Juneau. Because of the small increase in independent visitors and population associated with Alternatives 4B and 4D, neither of these alternatives would measurably increase the value of private property in Juneau.

Sales tax revenues (plus hotel, liquor, and tobacco taxes) for Juneau would increase at a rate proportional to the increase in spending. Total additional visitor spending of $3.46 million (Alternative 4D) to $3.78 million (Alternative 4B) would generate as much as (assuming all of the spending is taxable) $173,000 to $189,000, respectively, in additional sales tax revenues annually (based on a 5 percent tax rate). Extension of the highway to Sawmill Cove and associated traffic would lead to an increase in property values in the area if Goldbelt's properties were developed. Additional property tax revenue would be generated.

**Industry/Commercial Sectors** – The principal economic benefits of Alternatives 4B and 4D would be received by the local retail trade and service sectors that provide goods and services to visitors. Economic benefits to other industrial sectors would not be appreciable.

**Utilities and Public Services** – Alternatives 4B and 4D would not noticeably affect utilities and public services in the CBJ relative to Alternative 1 – No Action.

**Quality of Life** – Alternative 4B would more than triple the number of summer ferry trips between Juneau and Haines and double the number of summer ferry trips between Juneau and Skagway relative to Alternative 1 – No Action. Alternative 4D would double the number of summer ferry trips between Juneau and Haines/Skagway. In addition, Alternatives 4B and 4D would reduce most summer out-of-pocket user costs by approximately 34 percent relative to Alternative 1 – No Action. Based on the 1994 and 2003 household surveys conducted for the project (McDowell Group, 1994; Appendix I of the 2005 Supplemental Draft EIS), this improved access would be perceived as an improvement to quality of life by a majority of Juneau residents, providing increased recreational opportunities.

#### 4.6.5.3 Haines

**Population, Economics, Housing, and Municipal Revenues** – Alternatives 4B and 4D are predicted to generate 130 and 125 annual ADT, respectively, in 2025. Traffic on these alternatives is predicted to remain constant over the 30-year period between 2025 and 2055. As is the case with Juneau, Alternatives 4B and 4D would have a minor benefit to the Haines economy. The total increase in visitors to and from Haines associated with Alternatives 4B and 4D is estimated to be 45 and 40 annual ADT, respectively, in 2055.

Haines is projected to receive as much as 25,100 new visitors with Alternative 4B and 23,900 new visitors with Alternative 4D per year relative to Alternative 1 – No Action. Assuming that visitors would spend an average of $77 per visitor per day in Haines (McDowell Group, 2012a), annual visitor spending in the community would increase by about $1.93 million as a result of Alternative 4B and $1.84 million as a result of Alternative 4D. Because Alternatives 4B and 4D would not substantially change the cost of travel between Juneau and Haines, it is not expected that the number of trips that Haines residents would take to Juneau for shopping would increase substantially. However, there would be some increased resident spending in Juneau to offset increased spending in Haines by visitors there. The increase in visitor spending would generate

an annual average of about $720,000 in new payroll and 20 new jobs in Haines under Alternative 4B and $690,000 in new payroll and 20 new jobs under Alternative 4D (Table 4-64).

**Table 4-64:**
**Alternatives 4B and 4D Projected Traffic and Resulting Visitor Economic Impacts in Haines, 2055**

| | Alternative | |
|---|---|---|
| | **4B** | **4D** |
| Total Traffic under Alternative 1 – No Action (annual ADT) | 50 | 50 |
| Total Traffic under Alternatives 4B and 4D (annual ADT) | 130 | 125 |
| Change in Traffic (annual ADT) (over No Action) | 80 | 75 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 45 | 40 |
| Total New Visitors Annually (over No Action) | 25,100 | 23,900 |
| Total New Visitor Spending Annually (over No Action) | $1,930,000 | $1,840,000 |
| New Local Payroll Annually (over No Action) | $720,000 | $690,000 |
| New Local Employment Annually (over No Action) | 20 | 20 |

Note: Numbers may not total exactly due to rounding.

Each new job in the economy results in an increase in population of about 1.5 people.[61] Therefore, the 20 new jobs in Haines resulting from Alternatives 4B and 4D would be expected to result in a population increase of 30 residents in 2055. [62] This would represent an overall increase of about 1.2 percent of Haines' current population (2015 forecasted population of 2,493).

Based on 3.4 persons per household (from 2010 Census data), a population increase of 30 residents would result in additional demand for about 9 housing units in Haines. The 2010 U.S. Census indicated that Haines has about 137 vacant housing units, not including seasonal, recreational, and occasional use units. The project demand is well within the existing vacant housing capacity of Haines. The small increase in independent visitors and population associated with Alternatives 4B and 4D, is not expected to measurably increase the value of private property in Haines.

Sales tax revenues would increase at a rate proportional to the increase in spending in Haines. Total additional visitor spending in Haines of $1.93 (Alternative 4B) to $1.84 (Alternative 4D) million per year would generate $106,000 to $101,000 in additional annual sales tax revenues, respectively (based on a 5.5 percent tax rate).

**Industry/Commercial Sectors** – The principal economic benefits of Alternatives 4B and 4D would be received by the local retail trade and service sectors that provide goods and services to visitors. Economic benefits to other industrial sectors would not be appreciable.

**Utilities and Public Services** – Alternatives 4B and 4D would not measurably affect utilities and public services in the Haines Borough relative to Alternative 1 – No Action.

[61] This number is based on an estimated participation rate of 65 percent meaning 65 percent of the Haines population participates in the local labor force.

[62] Under Alternatives 4B and 4D, the Haines-Skagway shuttle would be a smaller vessel requiring fewer crew members to operate relative to Alternative 1 – No Action. The crew members who are no longer needed on the Haines-Skagway route may be transferred to work on a different AMHS ferry and relocate their households to another community. This out-migration would slightly reduce the population gain from new jobs; however, it is not considered in the assessment of overall population impacts in order to present the maximum potential effect of these alternatives.

**Quality of Life** – Alternative 4B would approximately double the number of summer ferry trips between Auke Bay and Haines/Skagway relative to Alternative 1 – No Action. Alternative 4D would double the number of summer ferry trips between these two communities. In addition, Alternatives 4B and 4D would reduce out-of-pocket user costs for a driver plus a 19-foot vehicle and a family of four with a 19-foot vehicle by between 20 and 32 percent, respectively, relative to Alternative 1 – No Action. Fares for walk-on passengers, excluding the cost of transportation to and from the ferry terminal, would be reduced approximately 35 percent to Haines and 9 percent to Skagway. Based on the 1994 and 2003 household surveys conducted for the project (McDowell Group, 1994; Appendix I of the 2005 Supplemental Draft EIS), this improved access would be perceived as an improvement to quality of life by a majority of Haines residents. Better access to shopping and other services in Juneau, and more recreational opportunities are potential benefits cited by some Haines residents.

#### 4.6.5.4 Skagway

**Population, Economics, Housing, and Municipal Revenues** – Alternatives 4B and 4D are predicted to generate 110 and 100 annual ADT, respectively, in 2025. Traffic on these alternatives is predicted to remain constant over the 30-year period between 2025 and 2055. Alternatives 4B and 4D would have a minor benefit to the Skagway economy. The total increase in visitor traffic to and from Skagway under Alternative 4B is estimated to be 60 annual ADT in 2055. Alternative 4D would result in an increase in visitor traffic to and from Skagway of 50 annual ADT in 2055.

Skagway is projected to receive a total of about 34,500 new visitors annually with Alternative 4B and 29,800 new visitors annually with Alternative 4D. Assuming that visitors would spend an average of $77 per day in Skagway (McDowell Group, 2012a), visitor spending in the community would increase by about $2.65 million per year as a result of Alternative 4B and $2.29 million per year as a result of Alternative 4D. This increase in visitor spending under Alternative 4B would generate an annual average of about $990,000 in new payroll and about 25 new jobs in Skagway, and Alternative 4D would generate an annual average of about $860,000 in new payroll and about 25 new jobs in Skagway (Table 4-65).

**Table 4-65:**
**Alternatives 4B and 4D Projected Traffic and Resulting Visitor Economic Impacts in Skagway, 2055**

| | Alternative | |
|---|---|---|
| | 4B | 4D |
| Total Traffic under Alternative 1 – No Action (annual ADT) | 30 | 30 |
| Total traffic under Alternatives 4B and 4D (annual ADT) | 110 | 100[1] |
| Change in Traffic (annual ADT) (over No Action) | 80 | 70 |
| Change in Visitor Traffic (annual ADT) (over No Action) | 60 | 50 |
| Total New Visitors Annually (over No Action) | 34,500 | 29,800 |
| Total New Visitor Spending Annually (over No Action) | $2,650,000 | $2,290,000 |
| New Local Payroll Annually (over No Action) | $990,000 | $860,000 |
| New Local Employment Annually (over No Action) | 25 | 25 |

[1]Nearly all new traffic on these alternatives is Skagway resident travel.

Note: Numbers may not total exactly due to rounding.

Each new job in the Skagway economy results in an increase in population of about 1.5 people.[63] Therefore, the 25 new jobs in Skagway resulting from Alternatives 4B and 4D would be expected to result in a population increase of about 38 residents each. This would represent an overall increase of about 3.6 percent of Skagway's current population (2015 population of 1,040).

Assuming 2.5 persons per household (based on 2010 Census), a population increase of 38 residents would result in additional demand for about 15 housing units. The 2010 U.S. Census indicated that Skagway has about 152 vacant housing units, not including seasonal, recreational, and occasional use units. While Skagway has a shortage of affordable homes for first-time home buyers and a lack of seasonal employee housing, the projected demand is anticipated to be accommodated by the vacant housing capacity of Skagway. During the summer, this demand would be harder to meet. It is likely that the private sector would respond by construction of additional housing if residential land is available. Because of the small increase in independent visitors and population associated with Alternative 4B, it is not expected to increase the value of private property in Skagway.

Sales tax revenues would increase at a rate proportional to the increase in spending in Skagway. Total additional visitor spending of approximately $2.65 million annually under Alternative 4B would generate about $106,000 in additional tax revenues per year (based on a 4 percent tax rate). Total additional visitor spending of approximately $2.29 million annually under Alternative 4D would generate about $92,000 in additional tax revenues per year.

**Industry/Commercial Sectors** – The principal economic benefits of Alternative 4B would be received by the local retail trade and service sectors that provide goods and services to visitors. Economic benefits to other industrial sectors would not be appreciable.

**Utilities and Public Services** – Alternatives 4B would not affect utilities and public services in Skagway relative to Alternative 1 – No Action.

**Quality of Life** – Alternatives 4B and 4D would double the number of ferry trips between Juneau and Skagway relative to Alternative 1 – No Action. In addition, Alternatives 4B and 4D would reduce most summer out-of-pocket user costs by approximately 34 percent relative to Alternative 1 – No Action. Based on the 1994 and 2003 household surveys conducted for the project (McDowell Group, 1994; Appendix I of the 2005 Supplemental Draft EIS), this improved access would be perceived as an improvement to quality of life by a majority of Skagway residents. Increased tourism and more recreational opportunities are potential benefits cited by some Skagway residents.

### 4.6.6 Subsistence

The only new highway segment for these alternatives would be an extension of the Glacier Highway. Juneau is not a subsistence community under ANILCA. Because Alternatives 4B and 4D would not substantially change access to locations within Lynn Canal, they would not result in direct or indirect impacts to subsistence uses. See Revised Appendix DD, *Land Use Technical Report*, for additional detail regarding subsistence.

[63] This number is based on an estimated participation rate of 65 percent, meaning 65 percent of the Skagway population participates in the local labor force.

### 4.6.7 Transportation

The 2004 SATP calls for the construction of a highway from Juneau to Skagway with a ferry from Katzehin to Haines. Alternatives 4B and 4D are not consistent with the 2004 SATP. The SATP will be updated to reflect the identification of Alternative 1 – No Action as the recommended improvement.

DOT&PF's 2016–2019 STIP (Amendment 3, June 28, 2017) does not include funding for any JAI Project build alternatives. Alternatives 4B and 4D are not consistent with the 2016–2019 STIP, while Alternative 1 – No Action is consistent with the currently adopted STIP.

#### 4.6.7.1 Demand and Capacity

Traffic demand for Alternatives 4B and 4D was projected for 2025 and 2055 using the transportation model summarized in Section 4.1.5. These projections were based on 2015 traffic in the Lynn Canal corridor, the unmet travel demand in the region, projected growth in the region, costs of travel, travel distance and speed, value of time, accident costs, and frequency of delay.

Projected traffic demand and capacity for Alternatives 4B and 4D in 2055 are provided in Table 4-66 along with travel demand for Alternative 1 – No Action. As noted in Section 4.6.5, traffic under Alternatives 4B and 4D is expected to remain relatively constant for the 30-year period between 2025 and 2055. The only difference is an increase of 5 ADT under Alternative 4B in summer and peak week from 2025, a 5 ADT increase under Alternative 4D in winter from 2025, and a 10 ADT increase under Alternative 4D in the peak week from 2025. As indicated in the table, Alternatives 4B and 4D would increase summer capacity by roughly two to three times Alternative 1 – No Action capacity. This capacity would be sufficient to meet travel demand for this transportation mode except in the peak summer week. Alternative 4B would meet 54 percent of the peak week capacity and Alternative 4D would meet 58 percent. As with current operations, AMHS could schedule additional service in Lynn Canal during identified high volume days and special events.

**Table 4-66:**
**2055 Forecast Demand and Capacity for Alternative 1 – No Action and Alternatives 4B and 4D**

| Alternative | Annual Demand ADT | Summer Demand ADT | Winter Demand ADT | Peak Week Demand ADT | Summer Capacity(vehicles per day) |
|---|---|---|---|---|---|
| 1 - No Action | 80 (50/30) | 125 (80/45) | 50 (30/20) | 300 (190/110) | 154(93/61) |
| 4B | 240 (130/110) | 375 (205/170) | 90 (50/40) | 910 (500/410) | 487 (250/237) |
| 4D | 225 (125/100) | 345 (190/155) | 60 (35/25) | 850 (470/380) | 487 (250/237) |

Note: The first number is the total demand or capacity. The first number in parentheses is vehicle demand or capacity between Juneau and Haines, and the second number in parentheses is vehicle demand or capacity between Juneau and Skagway.

Because Alternatives 4B and 4D are limited largely to ferry service, they would not meet the projected unconstrained travel demand in the Lynn Canal corridor. Latent (unconstrained) demand in the corridor during the summer is estimated to be about 1,950 ADT. Alternatives 4B and 4D would each have capacity to realize and accommodate approximately 25 percent of the latent summer demand.

The projected local[64] travel demand between Haines and Skagway with Alternatives 4B and 4D is the same as Alternative 1 – No Action. The projected average summer capacity of 61 vehicles per day for the Haines-Skagway shuttle would accommodate the projected demand for travel between Haines and Skagway with Alternatives 4B and 4D. Additional capacity would be provided by the mainliners.

#### 4.6.7.2 Travel Flexibility and Opportunity

Alternatives 4B and 4D would result in an increase in flexibility and opportunity for travel in Lynn Canal. Alternative 4B would approximately double the number of round-trips between Juneau and Haines to 16 trips per week in summer. It would also essentially double the number of round-trips between Juneau and Skagway to 16 trips per week in summer. Alternative 4D would also double the number of round-trips between Juneau and Haines/Skagway to 16 trips per week in summer. Travelers would still be dependent on ferry schedules and subject to reservations for the timing of their travel.

Alternatives 4B and 4D would have the same opportunity for travel between Haines and Skagway as Alternative 1 – No Action.

#### 4.6.7.3 Travel Time

Table 4-67 provides a comparison of travel times between Alternative 1 – No Action and Alternatives 4B and 4D. As indicated in the table, travel between Auke Bay and Haines under Alternative 4B would be 2.5 fewer hours than Alternative 1 – No Action (using the Day Boat ACFs) and approximately 4.2 fewer hours between Auke Bay and Skagway. Travel between Auke Bay and Haines under Alternative 4D would be about 1.2 fewer hours than Alternative 1 – No Action. Between Auke Bay and Skagway, Alternative 4D would be approximately 2.7 fewer hours than Alternative 1 – No Action.

**Table 4-67:**
**Summer Travel Times for Alternative 1 – No Action and Alternatives 4B and 4D**

| Route | Travel Time (hours) | | |
|---|---|---|---|
| | Alternative 1 – No Action (Day Boat ACF)[1] | Alternative 4B | Alternative 4D |
| Auke Bay-Haines | 6.2 | 3.7 | 5.0 |
| Auke Bay-Skagway | 8.1 | 3.9 | 5.4 |

[1] With Alternative 1 – No Action, the mainline ferry (i.e., service along the length of the system, from Bellingham, WA, or Prince Rupert, B.C.) would have a travel time of 7.2 hours between Auke Bay and Haines and 9.1 hours between Auke Bay and Skagway.

Alternatives 4B and 4D would not affect the travel time between Haines and Skagway. It would remain 2.4 hours, the same as Alternative 1 – No Action.

[64] For the purposes of this SEIS, "local" refers to passenger and vehicle traffic that only goes back and forth between Haines and Skagway; i.e., it is traffic that either boards in Haines and disembarks in Skagway, or boards in Skagway and disembarks in Haines. This local Haines-Skagway travel demand is not considered part of the overall demand for travel to and from Juneau in Lynn Canal.

### 4.6.7.4 State and User Costs

The 36-year life-cycle costs[65] for Alternative 1 – No Action and Alternatives 4B and 4D discounted to 2016 dollars are provided in Table 4-68. These costs include State and federal capital costs and State maintenance and operating expenses. Capital costs include design, ROW acquisition, highway, vessel, and terminal construction, vessel refurbishment, and vessel replacement.

**Table 4-68:**
**Thirty-Six-Year Life-Cycle Costs for Alternative 1 – No Action and Alternatives 4B and 4D ($millions)**

| Alternative | Capital Cost | Operating Cost | Total Life-Cycle Cost |
|---|---|---|---|
| 1—No Action | $119 | $322 | $441 |
| 4B | $515 | $508 | $1,023 |
| 4D | $207 | $397 | $604 |

Table 4-69 provides an estimate of total project life costs less residual value, expressed in 2016 dollars with no discounting of future costs. The total project life costs over the 36-year period (expressed in 2016 dollars with no discounting) would be approximately $1.7 billion for Alternative 4B and $1.0 billion for Alternative 4D (capital plus operating costs, Table 4-69). As indicated in the table, Alternatives 4B and 4D would have higher capital and operating costs for the State during the analysis period than Alternative 1 – No Action. For Alternative 4B, State revenues from fares would be higher than for Alternative 1 – No Action, but would not offset the increased cost of this alternative to the State. Therefore, the State would pay more for Alternative 4B than for Alternative 1 – No Action. The net State cost for Alternative 4D would be lower than the net State cost of Alternative 1 – No Action because the increased State revenues for this alternative would essentially offset increased State costs relative to Alternative 1 – No Action. Alternatives 4B and 4D would cost the State less per vehicle than Alternative 1 – No Action because of the larger number of vehicles transported.

**Table 4-69:**
**Thirty-Six-Year Total Project Life Costs for Alternative 1 – No Action and Alternatives 4B and 4D, 2019–2054 (2016 Dollars)**

| Alternative | Total Funds | | | State Funds | | | |
|---|---|---|---|---|---|---|---|
| | Capital Costs ($million)[1] | Operating Costs ($million) | Total Project Costs ($million) | Total Cost ($million) | Total Revenue ($million)[2] | Net Cost ($million) | Cost/Vehicle (dollars) |
| 1 – No Action | $128 | $659 | $787 | $671 | $292 | $378 | $279 |
| 4B | $608 | $1,110 | $1,718 | $1,165 | $611 | $554 | $179 |
| 4D | $208 | $840 | $1,048 | $870 | $561 | $308 | $105 |

[1] Residual value subtracted.

[2] Includes both fares paid to AMHS and gas tax receipts.

[65] Life-cycle costs are the construction, refurbishment, and maintenance costs for a 6-year construction period and a 30-year operation period, discounted to 2016 dollars.

Alternatives 4B and 4D would have annual operating costs of approximately $33.3 million and $24.2 million, respectively, versus $18.2 million for Alternative 1 – No Action.

The anticipated total[66] and out-of-pocket cost[67] of travel between Juneau and Skagway or Haines for travelers are listed in Table 4-70 for Alternative 1 – No Action and Alternatives 4B and 4D. Those alternatives would reduce the cost relative to Alternative 1 – No Action. The cost of taking the shuttle ferry between Haines and Skagway would remain the same under Alternatives 4B and 4D as with Alternative 1 – No Action (see Table 4-70).

**Table 4-70:**
**Juneau to/from Haines and Skagway Total and Out-of-Pocket User Cost for Alternative 1 – No Action and Alternatives 4B and 4D**

| Alternative | Example scenario | Haines User Cost[1] | | Skagway User Cost[1] | |
|---|---|---|---|---|---|
| | | Total User Cost | Out-of-Pocket Cost | Total User Cost | Out-of-Pocket Cost |
| 1 – No Action | Family of 4 in a 19-foot vehicle | $229.00 | $227.00 | $301.50 | $301.50 |
| | Driver only in a 19-foot vehicle | $131.50 | $129.50 | $169.00 | $169.00 |
| | Walk-on passenger[2] | $5.00 | $5.00 | $8.50 | $8.50 |
| 4B and 4D | Family of 4 in a 19-foot vehicle | $165.50 | $150.50 | $220.00 | 206.50 |
| | Driver only in a 19-foot vehicle | $103.00 | $88.00 | $131.00 | $117.50 |
| | Walk-on passenger[2] | $25.00 | $25.00 | $35.50 | $35.50 |

[1] Total cost is based on fares plus $0.60 per mile for vehicular travel (AAA, 2015). Out-of-pocket cost is based on fares and gasoline consumption.

[2] Does not include cost of transportation to/from the ferry terminal.

User benefits include reductions in out-of-pocket costs, travel time, vehicle maintenance and ownership costs, and accident costs. Table 4-71 gives the 36-year value of user benefits as well as net present values of Alternatives 4B and 4D. User benefits are primarily due to the reduced cost to travel a shorter distance by ferry in summer.

One economic measure of an alternative is its net present value. Net present value is the total user benefits minus the net costs of an alternative over and above the net cost of Alternative 1 – No Action for a given period of time. The 2019 to 2054 net present value of Alternative 4B is about negative $211 million. In other words, the costs of this alternative are greater than the value of its user benefits. For Alternative 4D, the net present value over the period is about negative $26 million.

[66] Total user costs are out-of-pocket cost and vehicle maintenance, ownership, and accident costs based on highway miles traveled.

[67] Out-of-pocket costs are a combination of estimated fares and gasoline used on highway segments. Fares for Alternative 1 – No Action are actual 2015 fares charged. Fares for Alternatives 4B and 4D are based on 2015 fares charged, prorated by distance of ferry travel.

**Table 4-71:**
**User Benefits and Net Present Values for Alternatives 4B and 4D versus Alternative 1 – No Action[1]**

| Alternative | User Benefits ($million) | Net Incremental Project Costs ($million)[2] | Net Present Value ($million) |
|---|---|---|---|
| 4B | $54 | $265 | -$211 |
| 4D | $35 | $61 | -$26 |

[1] For the period 2019 to 2054 discounted to 2016 dollars.

[2] Overall project costs minus revenues.

### 4.6.7.5 Other Transportation Impacts

**Air Taxi** – It is likely that some travel would be diverted from the air taxi operations currently serving the Lynn Canal to ferries with Alternatives 4B and 4D due to increased travel opportunity.

**AMHS** – AMHS service in Lynn Canal under Alternative 1 – No Action is estimated to require State funding of about $10.7 million in 2055 annually. The estimated annual subsidy for AMHS service under Alternatives 4B and 4D in 2055 is $16.0 and $8.5 million, respectively (Table 4-72). Alternatives 4B and 4D would place an additional funding burden on AMHS, which could have negative impacts on other AMHS service.

**Table 4-72:**
**Annual AMHS Operating Costs, Revenues and Estimated State Funding for Alternative 1 – No Action and Alternatives 4B and 4D**

| Alternative | AMHS Operating Cost ($million) | AMHS Revenue ($million)[1] | Estimated AMHS State Funding ($million) |
|---|---|---|---|
| 1 – No Action | $18.2[2] | $8.1 | $10.1 |
| 4B | $33.2[2] | $18.8 | $14.4 |
| 4D | $24.2[2] | $17.1 | $7.1 |

Source: *Marine Segments Technical Report* (Revised Appendix GG) and *User Benefit, Life-cycle Cost, and Total Cost Analyses* (Revised Appendix FF).

[1]Fare box revenue paid to AMHS; excludes gas tax receipts.

[2] Revised total is due to (1) the updating of costs to 2015 dollars and (2) a discrepancy in the data relied on to generate the 2014 Draft SEIS mainliner operating costs.

**Pedestrians and Bicyclists** – The highway proposed for Alternatives 4B and 4D would include 4- foot paved shoulders suitable for bicyclist and pedestrian use. Predicted traffic volumes would be compatible with bicycle or pedestrian use of the shoulders. Ferries for these alternatives would accommodate bicyclists and walk-on passengers. Table 4-73 shows the projected number of summer walk-on passengers for Alternative 1 – No Action and Alternatives 4B and 4D. Alternatives 4B and 4D have higher projections of summer walk-on passengers than Alternative 1 – No Action.

**Table 4-73:**
**Average Daily Ridership in Summer for Alternative 1 – No Action and Alternatives 4B and 4D, 2055**

| Alternative | Total Passengers | Passengers in Vehicles | Walk-on Passengers | Walk-on Percentage |
|---|---|---|---|---|
| 1 – No Action | 410 | 285 | 125 | 30% |
| 4B | 1,240 | 1,065 | 165 | 14% |
| 4D | 1,140 | 995 | 155 | 14% |

Note: See Revised Appendix AA, *Traffic Forecast Report*

In summer, walk-on passengers would need to take a private carrier or find a ride with someone else to Sawmill Cove or travel on the twice-weekly mainline ferry from Auke Bay. If there is sufficient demand, it is likely that private bus/van service would be instituted between the Sawmill Cove terminal and Juneau. Some comments on the 2014 Draft SEIS expressed concerns about impacts to walk-on passengers who are low income, minority, senior citizens, disabled, or students. The impacts of Alternatives 4B and 4D on these groups depends on how they accommodate their non-ferry travel (i.e., whether they rent a vehicle, use a taxi, get a ride from someone else or bus) or whether they chose to travel on the mainliner. Even under Alternative 1 – No Action, these walk-on populations need transportation to/from the Auke Bay and Auke Bay and Haines ferry terminals (the Skagway Ferry Terminal is within walking distance to the community center). With access to a vehicle and the ability to drive, these populations would benefit from improved travel time, improved flexibility and opportunity to travel, and lower travel costs. Those choosing to continue as walk-on passengers would pay approximately the same as under Alternative 1 – No Action, considering the possible cost of transportation by bus between Sawmill Cove and Auke Bay. Alternatively, people could fly to/from Juneau but would be subject to the current airfare which may be higher than the ferry fare. Additional information regarding impacts to low-income and minority populations is discussed in Section 4.7.2. In Alternatives 4B and 4D, the mainline ferry has the same schedule, cost, and travel time as the mainline ferry in Alternative 1 – No Action.

### 4.6.8 Geology

Alternatives 4B and 4D would not affect any unique geologic resources in the project area. These alternatives would be subject to earthquake-induced ground tremor. As indicated in Section 3.2.1.2, the Queen Charlotte/Fairweather fault system located within 75 miles of the project area has the capability of producing earthquakes with magnitudes greater than 7.0 on the Richter scale. The Chatham Strait fault system in Lynn Canal has the capability of producing earthquakes of at least 6.9 on the Richter scale (Lemke, 1974). Based on USGS hazard maps published in 2007, there is a 10 percent probability of an earthquake in the next 50 years that would cause ground accelerations of 0.1 to 0.2 g[68] in the project area (Wesson et al., 2007). These types of ground accelerations would be taken into account in the design of roadway pavement, highway structures, and ferry terminal structures. It is probable that a maximum ground acceleration in the study area would cause damage to project facilities, as is the case with many other Alaska transportation facilities in seismic areas.

[68] Seismic ground acceleration is measured in units of gravity or *g.* The acceleration of *g* is 32 feet/second/second.

### 4.6.9 Hydrology and Water Quality

#### 4.6.9.1 Floodplains

The highway proposed for Alternatives 4B and 4D would cross Sawmill Creek. This creek would be crossed with a single-span bridge. The bridge structure and its supports would be located sufficiently outside the predicted base flood elevation of the creek, as determined by additional hydraulic studies to be conducted during the final engineering design of the selected alternative.

There are no floodplain development plans for the area from Echo Cove to Sawmill Cove. Sawmill Creek is located in the Tongass National Forest and is designated Semi-Remote Recreation. The principal management goal of this designation is to retain the natural character of the area. Therefore, no incompatible floodplain development would be likely in the project area.

**Compliance with EO 11988**– In accordance with the analysis required in DOT Order 5650.2 (Floodplain Management and Protection) and 23 CFR 650 Subpart A (Location and Hydraulic Design of Encroachment on Floodplains), FHWA has determined that Alternatives 4B and 4D are in compliance with EO 11988. These alternatives cannot avoid transverse encroachments of base floodplains along their alignment; however, the alternatives would not result in any longitudinal encroachments of floodplains. The transverse encroachments would not increase flood risks, substantially affect natural and beneficial floodplain values, or support incompatible floodplain development. All stream crossings would be designed to minimize potential floodplain impacts and preserve beneficial floodplain values.

#### 4.6.9.2 Hydrology

The proposed highway segment for Alternatives 4B and 4D would act as a partial barrier to the flow of shallow groundwater and surface water. Shallow groundwater blocked by the highway would eventually flow to the surface. Roadside drainage ditches would collect surface water on the upgradient side of the highway and channel it to the downstream side through culverts. Culverts would be placed to minimize roadside flow and maintain downslope hydrology. Culverts would be designed for the 50-year rainfall event, and end sections or rock dissipaters would be used to disperse high-volume/high-velocity flows to protect soils and vegetation below culvert outfalls from erosion.

The Sawmill Cove Ferry Terminal would require the placement of fill in Berners Bay. This small encroachment would not measurably change circulation and currents in the bay. The proposed terminal is sited so as not to obstruct discharge from Sawmill Creek. Breakwaters are currently not planned for the terminal.

#### 4.6.9.3 Water Quality

Highway construction, maintenance, and operations can affect water quality through earth-moving activities, equipment oil and fuel spills/leaks, debris generation, winter sanding, and vehicular traffic. These activities could introduce metals, fuel, oil, and other potential contaminants to water courses whose drainages encompass the proposed highway between Echo Cove and Sawmill Cove, principally through runoff from the highway.

Results from stormwater research by the FHWA indicate stormwater runoff from low to medium traffic volumes (fewer than 30,000 vehicles per day) on rural highways exerts minimal to no impact on the aquatic components of most receiving waters (USDOT & FHWA, 1987). Studies conducted in Anchorage, Alaska, under the MOA Watershed Management Program similarly concluded that street runoff has minimal impacts to the water quality of receiving waters from most potential pollutants (MOA, 2000a). Results showed dissolved concentrations of calcium, chromium, magnesium, and zinc to be below their AWQS. Only dissolved concentrations of copper and lead were noted to be above their AWQS; however, modest dilution would likely reduce these concentrations to below their AWQS. Identified concentrations would not adversely affect streams with flow rates greater than 0.5 cubic foot per second (MOA, 2000b). Polynuclear aromatic hydrocarbons were at concentrations below the EPA water quality criteria.

Because of the rural setting of the highway between Echo Cove and Sawmill Cove and the predicted low annual ADT, fewer impacts to water quality in the project area are expected than were found in the Anchorage studies. The studied runoff was collected from Anchorage roadways that ranged from residential (<2,000 ADT) to major arterial (>20,000 ADT). The studied melt water was from snow collected from a mix of these types of roads. In comparison, a highway from Echo Cove to Sawmill Cove would have a maximum peak week ADT during the period of 2025 and 2055 of 935 to 1,010 vehicles because of the capacity limitations of the ferry.

Highway runoff and melt water from the highway between Echo Cove and Sawmill Cove would have lesser quantities of potential contaminants than what was observed in the MOA Watershed Management Program due to a lower traffic volume and less area development. The ferry terminal would only be used in summer. Maintenance in the winter would be at the same level as other secondary roads in the Juneau road system. Snow would be cleared from the highway and deposited along its length instead of being disposed of in one location. DOT&PF does not usually use de-icing chemicals on rural roads. Sanding would be performed, as conditions required. Typically, up to 5 percent sodium chloride per total weight of sand is added to keep sand friable in winter. Potential pollutants would not be concentrated in one area. Runoff from the proposed highway and bridges would not be expected to exceed AWQS or adversely affect the water quality of receiving waters for the long term. Potential contamination from oil or hazardous substance spills would be low due to the rural setting of the highway and the low predicted highway traffic volume.

The following BMPs would be implemented to minimize long-term water quality impacts. See Section 4.8.6 for BMPs to minimize water quality impacts during construction.

- Only clean fill material (excavated rock or mineral soil) would be used for the roadway and ferry terminal embankments
- Rock would be used to stabilize toes of slopes at ponds and stream crossings
- Grass seed would be placed on any road slope containing soil. To protect the integrity of the natural plant communities, plant species indigenous to the area would be used for vegetating road slopes, except that non-native annual grasses may be used to provide initial soil cover
- Only soil or rock excavated from the construction area or immediately adjacent to the highway would be used for highway and ferry terminal embankments.

Culverts would be installed in appropriate locations to maintain natural flow patterns for surface water.

Ferry operations under Alternatives 4B and 4D would have little effect on area water quality. Continued mainline ferry service in Lynn Canal would result in continued discharge of treated wastewater into Lynn Canal from those vessels, which is expected to meet AWQS. The FVFs (Alternative 4B) and the Day Boat ACFs (Alternative 4D) would not discharge wastewater to Lynn Canal. These vessels would have sanitary waste holding tanks and the wastewater would be pumped to an onshore facility for disposal. Sanitary waste generated at the ferry terminals would undergo treatment. Wastewater would undergo aeration and disinfection with ultraviolet light. The treated wastewater would be discharged to Lynn Canal under permit by the ADEC (APDES permit) and would meet Alaska-established waste discharge limitations.

A sewage treatment facility with a permitted outfall would be installed at the Sawmill Cove Ferry Terminal. Discharges from the sewage treatment facilities would operate within permit guidelines. Aeration and ultraviolet light disinfection, similar to the system used at the Auke Bay Ferry Terminal, would likely be used. Negligible adverse impacts to water quality from the terminal treatment facility are anticipated. Accidental discharges, spills, and leaks are possible during ferry operations. Historically, these effects have been minor, with only minimal and temporary impacts to water quality. Highway and bridge runoff would contribute minimal turbidity and pollutant loads to local drainages flowing to Berners Bay. Contaminant concentrations in runoff from the proposed highway and/or bridges would not be expected to exceed AWQS or adversely affect the water quality of receiving waters for the long term.

### 4.6.10 Air Quality

Emissions from ferries and motor vehicles are directly proportional to the amount of fuel they burn. As indicated in Section 4.7.6, ferry and motor vehicle operations under Alternative 4B would consume about four times as much fuel as under Alternative 1 – No Action, due primarily to the high fuel consumption rates of FVFs. Therefore, emissions of CO, $NO_x$, and particulates would be about four times higher under Alternative 4B than under Alternative 1 – No Action. This would not result in violations of federal and State air quality standards because pollutant concentrations in the region are so low and the volume of emissions from Alternative 4B is relatively low compared with other more urbanized areas.

Alternative 4D fuel consumption would be about twice that of Alternative 1 – No Action. Therefore, emissions under Alternative 4D would be about twice the emissions of Alternative 1 – No Action.

Neither Alternative 4B nor Alternative 4D would be projected to have negative human health or environmental consequences resulting from project-related vehicle or ferry vessel emissions. In response to comments on the 2014 Draft SEIS, ferry emissions modeling was performed to estimate the annual load of emissions (tons/year) for all alternatives relative to total emissions loading at active marine centers. The results of that modeling effort indicate that the ferry emissions associated with Alternative 4B would be approximately four to five times the AMHS ferry emissions of Alternative 1 – No Action, but the contribution to total marine vessel emissions would be minor. Alternative 4D would have emissions approximately double the ferry emissions of Alternative 1 – No Action. See Attachment 1 to the *2017 Update to Appendix T – Air Quality Modeling Memorandum* in Appendix Z for detailed modeling results and Section 4.9.2.7 for a discussion of the potential cumulative impact.

### 4.6.11 Hazardous Materials

The *2014 Update to Appendix M – Initial Site Assessment Technical Report* (see Appendix Z in the Draft SEIS) identified 15 sites of potential concern in the area of the proposed transportation improvements associated with Alternatives 4B and 4D: 10 oil or fuel spill sites at the Auke Bay Ferry Terminal, a LUST site at Auke Bay Ferry Terminal, a contaminated site from a leaking aboveground residential heating oil tank on Glacier Highway, and three ADEC registered USTs at the Auke Bay Ferry Terminal.

The 10 oil and fuel spill incidents were small, and the released materials have dissipated or have been removed. They pose no potential hazardous materials risk to the project.

The LUST site at the Auke Bay Ferry Terminal was granted a conditional closure from ADEC in 2004; however, it is currently being monitored because contaminated materials remain on site. Alternatives 4B and 4D present a potential hazardous materials risk associated with the LUST site at the Auke Bay Ferry Terminal. If the reconstruction of the west end of the Auke Bay Ferry Terminal requires structural modifications or demolition in the area of the contaminated materials from the LUST site, DOT&PF would need to investigate the disturbance area and appropriately manage or remove the contaminated materials prior to reconstruction.

The incident at the Glacier Highway residence occurred in 2003 and the status remains "open" in the ADEC database. This site poses no threat to development of Alternative 4B or 4D.

Two of the three ADEC registered USTs at the Auke Bay Ferry Terminal have been removed, but the third, and largest, is currently in operation. The remaining UST at the Auke Bay Ferry Terminal would be either left in place, and monitored or removed with reconstruction of the west end of the terminal, if the design required.

### 4.6.12 Wetlands

A total of 1.5 acres of wetlands and 2.6 acres of other waters of the U.S. would be affected between Echo Cove and Sawmill Cove under Alternatives 4B and 4D. Upgrades to the existing Glacier Highway would require 0.6 acre of wetland impact and the highway extension from Cascade Point to Sawmill Cove would require an additional 0.9 acre of wetlands. The Sawmill Cove Ferry Terminal would require 1.9 acres of marine fill and dredging (rocky shore), and the Auke Bay Ferry Terminal modifications would require 0.7 acre of marine fill (rocky shore). The preliminary alignment for highway segments of Alternatives 4B and 4D has been adjusted to avoid wetlands and reduce the impacts to wetlands that could not be avoided.

As indicated in Table 4-74, 40 percent of the affected wetlands would be forested wetlands. The effects of filling these forested wetlands include reduced groundwater recharge and groundwater discharge/lateral flow functions, modification of the surface hydrologic control, and a reduction in wildlife habitat function with the loss of forest habitat.

The proposed highway would act as a partial barrier to the flow of shallow groundwater and surface water. Flow of surface water or shallow groundwater blocked by the highway embankment would eventually flow to the surface and be diverted by ditches to culverts under the highway embankment. Alteration of hydrology because of the highway embankment could result in corresponding changes to the vegetation and over time could affect wetland functions within and outside of the highway ROW. The extent of this effect would depend on localized

hydrologic patterns; however, effects would be minimized with porous fill material and cross-drainage structures.

The indirect effects of the proposed highway for Alternatives 4B and 4D on wetlands include the potential introduction of contaminants from de-icing and accidental spills of fuels and lubricants, the introduction of non-native plant species inadvertently transported to the area on vehicles and their occupants, and damage to wetlands from increased human recreational activity in the area. These wetland impacts could cause the further loss of wildlife habitat functions, the reduction of ecological diversity, and the reduction of sediment/toxicant retention functions. Implementation of BMPs in maintaining the highway, including not using salt to the extent possible, limiting the use of sand near wetlands, and posting educational signs for wetland users, would minimize the risk of these effects occurring.

**Table 4-74:**
**Wetlands and Other Waters of the U.S. Affected by Alternatives 4B and 4D**

| Wetlands and Other Waters of the U.S. | Area Impacted by Alternatives 4B and 4D (acres) |
|---|---|
| **Wetlands** | |
| Palustrine Forested | 0.6 |
| Palustrine Scrub-Shrub | 0.9 |
| **Subtotal** | 1.5 |
| **Intertidal and Subtidal Areas** | |
| Rocky Shore | 2.6 |
| **Subtotal** | 2.6 |
| **Total Acres** | 4.1 |

Note: This total does not include fill associated with culvert placement in non- anadromous streams. This additional acreage would be determined during design and permitting.

The use of salt-treated sand to improve road conditions during the winter could potentially affect roadside vegetation; however, high rainfall in this region would minimize most impacts from road salt (Wegner and Yaggi, 2001). Due to the small quantity of salt used to keep the sand friable for winter maintenance there would be negligible impacts on adjacent vegetation.

Alternatives 4B and 4D do not include access facilities for ORVs; however, a highway would afford ORVs access to adjacent lands. ORVs can damage upland and wetland vegetation resulting in the direct loss of habitat and habitat damage through destruction of vegetation, erosion and increased stream siltation. Noise and the presence of ORVs can displace some wildlife species and result in mortality from collisions or human interaction. The USFS is aware of the potential for this type of problem and plans to develop an ORV enforcement policy if the highway is constructed.

DOT&PF has avoided wetlands to the extent practicable during development of the preliminary alignment for Alternatives 4B and 4D. The roadway would be constructed using the minimum-width fill footprint necessary for a stable road base in wetland areas. During final engineering design of the selected alternative, DOT&PF would investigate ways to further minimize encroachment on wetlands. Compensatory mitigation would be provided for wetland losses associated with the selected alternative.

### 4.6.13 Marine and Freshwater Habitat and Fish (Including Essential Fish Habitat)

Under Alternatives 4B and 4D, approximately 3.2 acres of intertidal/subtidal habitat would be filled or dredged for the Sawmill Cove Ferry Terminal. Based on a subtidal survey conducted in 2003, the seabed at the proposed terminal site is almost exclusively muds, sand, and gravels, though there may be some bedrock outcrops on the seabed in one location and occasional cobbles. Gravel content is highest in the intertidal zone and drops off rapidly in the subtidal zone, where sands and muds predominate. Vegetation cover is closely linked to the gravel component; therefore, cover drops off rapidly in the offshore. Video surveys of the site conducted in 2003 and 2004 indicated dense rockweed at the headlands on the north and south sides of the cove to about the zero foot tidal elevation. In the lower intertidal zone, rockweed is interspersed with two kinds of large-blade kelp. While this kelp is sparse, it is persistent and evenly distributed throughout the site. Crabs use the subtidal and intertidal zones in Sawmill Cove and a variety of fish species have been observed at the site including yellowfin sole, rock sole, gunnels, snake prickleback, sculpin, and Pacific herring. Marine birds such as great blue herons are known to forage in these habitats.

The impact to 3.2 acres of intertidal and subtidal habitat, the replacement of natural substrates due to terminal construction, and the dredging for a mooring basin would alter habitat usage in the disturbed area. Filling would result in the loss of habitat, while dredging and ongoing use would substantially reduce habitat value in the dredged areas. This would affect important EFH species such as eulachon by reducing the amount of refuge habitat available to larval stage eulachon, which are found in estuarine areas in Lynn Canal for an approximately 2-week period following spawning (Willson et al., 2006). The Sawmill Cove Ferry Terminal would cover less than 2 percent of the alongshore herring spawning length (approximately 3 miles) observed in Berners Bay in 2003. This habitat loss would not measurably affect other fish populations in the Berners Bay area.

Turbidity at the ferry terminal could be increased over ambient conditions for short periods by ferries maneuvering into and out of the terminal. Short-term turbidity and propeller or water jet scour could affect some Pacific herring eggs and larvae in the immediate vicinity of the Sawmill Cove Ferry Terminal.

There is the potential for accidental fuel spills from ferries at terminals and while traveling Lynn Canal routes. To date, no in-water fuel spills have been associated with AMHS operations in Lynn Canal. The effects of a spill would depend on its size and location.

The FVFs or conventional monohull vessels would have sanitary waste holding tanks and would not discharge wastewater to open water. There would be no wastewater effluent affecting fish habitat or fish populations in Lynn Canal, including Berners Bay.

Stormwater and melt water runoff from the bridge over Sawmill Creek would not alter water quality sufficiently to affect anadromous and marine fish habitat. As discussed in Section 4.6.9, studies of highway runoff in Alaska indicate that the volume of traffic on the proposed highway for Alternatives 4B and 4D is not large enough for runoff to cause the exceedance of any AWQS in receiving waters.

The highway from Echo Cove to Sawmill Cove would cross Sawmill Creek, an anadromous fish stream. This bridge would not encroach on the stream channel. Therefore, it would not affect EFH.

In summary, the construction of Alternatives 4B and 4D would result in the direct loss of 3.2 acres of EFH as a result of filling and dredging for the Sawmill Cove Ferry Terminal. This is historically documented spawning habitat for Lynn Canal Pacific herring stock. Ferry maneuvers at Sawmill Cove could increase turbidity in the vicinity of the terminal sufficiently to affect Pacific herring eggs and larvae at the terminal site. Alternatives 4B and 4D would bridge Sawmill Creek, which supports anadromous fish populations. The bridge would not encroach on the streambed. None of these impacts would be large enough to measurably affect fish and invertebrate populations in Lynn Canal.

The incremental effect of the Sawmill Cove Ferry Terminal on Pacific herring stock is relatively small; therefore, this loss by itself is not expected to adversely affect the stock's ability to recover to previous population levels. However, NMFS as well as EPA and ADF&G have expressed concern that the ferry terminal and ferry traffic in Berners Bay could have an adverse effect on the Lynn Canal herring stock. During preparation of the 2006 Final EIS, both NMFS and the Office of Habitat Management and Permitting believed special conservation measures, including no operations during the herring spawning period, would be necessary. In 2006, the FHWA and the DOT&PF agreed to modify Alternatives 4B and 4D to avoid operating in Berners Bay from October 1 to May 15, as opposed to the original summer operations proposed as May 1 to September 30. The herring spawning season ends in early May. For other commercial fish species, the direct loss of 3.2 acres of habitat from ferry terminal construction would not adversely affect any fish and invertebrate populations in Lynn Canal.

If the selected alternative includes the Sawmill Cove terminal, DOT&PF would continue to investigate ways to further reduce intertidal and subtidal impacts associated with the terminal. Compensatory mitigation would be provided for the loss of intertidal and subtidal habitat.

### 4.6.14 Terrestrial Habitat

Alternatives 4B and 4D would result in the loss of vegetation within the cleared area[69] of the highway to Sawmill Cove. The acreage of vegetation types on USFS lands[70] that would be removed is estimated to be:

- 38 acres of OG forest
- 4 acres of other forest
- 2 acres of open shrub and meadow
- 6 acres of other terrestrial habitat

Much of the terrestrial habitat that would be affected by Alternatives 4B and 4D is in the Tongass National Forest. As discussed in Appendix K of the TLRMP, previous adopted versions of the TLRMP established an OGR system to manage this important habitat for many terrestrial species. Alternatives 4B and 4D would not affect any small OGR (OG Habitat LUD). The

[69] Timber clearing is proposed 10 feet beyond the top of cut slopes and beyond the toe of embankment slopes. Removing large standing timber at the top of cut slopes eliminates the potential for trees falling into the road/traffic as a result of root disturbance. The additional clearing also provides for equipment access in rock cut areas for drilling activities. Removing timber at the toe of embankment slopes limits the severity of crashes when vehicles run off the road and down embankment slopes. This provides a "clear zone" at the toe of slope to allow vehicles the opportunity to come to a stop without colliding with a large tree.

[70] Comparable vegetation mapping is not available for other lands. The forest acreages that follow include forested wetlands; open shrub and meadow areas may be wetlands or uplands (USFS, 2013).

highway segment for these alternatives would go through OG forested areas within lands designated as Non-Development LUDs that are presumed to function as medium and/or large OGRs. The lands within these LUDs contain stands of OG forest, some of which are high volume, and others are low volume. Alternatives 4B and 4D would reduce the size of the OG forest stands in the area, as well as create a separation of some OG forest areas into downslope and upslope areas. These alternatives would remove approximately 38 of 74,470 acres of OG forest along the east side of Lynn Canal.

The loss of vegetation represents less than 1 percent of vegetation in the study area. The loss of vegetation would not adversely affect any listed threatened and endangered species, USFS sensitive species, or plant species considered rare by the ANHP. Impacts to terrestrial wildlife would be minor and are discussed further in Section 4.6.15 and in the *2017 Update to Appendix Q – Wildlife Technical Report* (in Appendix Z of this Final SEIS).

Clearing of the highway ROW would increase the potential for blowdown of trees adjacent to the ROW or slides in unstable areas.

The proposed highway extension could have indirect effects on terrestrial vegetation. By improving access to the area, human activity would increase along the highway corridor. This activity could lead to some degradation or disturbance of terrestrial habitat adjacent to the highway through camping and hiking, illegal dumping, and unauthorized collection of firewood. Invasive plant species could be introduced from visitors, vehicles, and pets.

### 4.6.15 Wildlife

#### 4.6.15.1 Marine Mammals

Harbor seals, minke whales, killer whales, harbor porpoises, Dall's porpoises, and sea otters are considered in this section. Humpback whales and Steller sea lions are discussed in Section 4.6.17.

Harbor seals use the Sawmill Cove area for feeding when prey fish concentrate there, but their main haulouts in Berners Bay are on sandbars near the major rivers; therefore, they are not likely to be affected by operation of the ferry terminal or the highway. The increased frequency of ferry service in Lynn Canal is not expected to result in any appreciable changes in effects on harbor seals relative to Alternative 1 – No Action.

Minke whales tend to be attracted to motor boats. Therefore, the presence of such vessels would not drive minke whales away from an area. Because of this attraction, increased ferry traffic would increase the risk of collision, particularly with the FVFs proposed under Alternative 4B; however, collision accidents with minke whales are very rare (Allen and Angliss, 2012). In addition, minke whales rarely occur in Lynn Canal (Dalheim et al., 2009). Therefore, Alternatives 4B and 4D are unlikely to have an impact on the population of this species in Lynn Canal.

Fast-moving and maneuverable species such as the killer whale, harbor porpoise, and Dall's porpoise can readily avoid ferries, even the FVFs proposed for Alternative 4B, and would not be affected by the ferry traffic associated with Alternatives 4B and 4D.

Sea otters rarely occur in Lynn Canal (Esslinger and Bodkin, 2009). Like harbor seals, sea otters are sensitive to noise and would likely avoid ferry traffic associated with Alternatives 4B and 4D. These alternatives are unlikely to affect sea otters in Lynn Canal.

Marine mammals are typically disturbed by loud, unexpected noises. Although marine mammals could be disturbed by vessel noise, the low-level, steady noise produced by ferries would be less than that produced from other activities, such as blasting or pile driving, and would not be expected to result in adverse effects to marine mammals.

#### 4.6.15.2 Marine Birds

This group includes species that nest on land but forage in marine waters at least part of the year. Species considered include the great blue heron, marbled murrelet, Kittlitz's murrelet, harlequin duck, trumpeter swan, black oystercatcher, yellow-billed loon, Aleutian terns, and dusky Canada geese.

The proposed highway would result in the loss of some nesting habitat for great blue herons and marbled murrelets; however, the amount of habitat loss relative to the amount available in the study area is small. Nesting habitat for harlequin ducks and trumpeter swans is concentrated farther north in Berners Bay than Sawmill Cove, and Kittlitz's murrelets nest on high-elevation talus slopes, which are not present along the highway alignment for Alternatives 4B and 4D.

Trumpeter swans typically nest in marshy areas near small lakes and use estuarine areas to feed. They are principally found further north in Berners Bay, near the Lace, Antler, and Berners River drainages. Therefore, Alternatives 4B and 4D are not expected to affect this species.

Blue herons and trumpeter swans do not feed and rest in open marine waters of Lynn Canal and therefore would not be affected by Alternatives 4B and 4D. Marbled murrelets, Kittlitz's murrelets, and harlequin ducks do use open marine waters for foraging. They most frequently use nearshore, protected areas for feeding and resting; therefore, they would not be present along the ferry routes for Alternatives 4B and 4D in the main channels of Lynn Canal. These birds may be flushed by ferries approaching terminals. Although this sort of disturbance would be more frequent with Alternatives 4B and 4D than with Alternative 1 – No Action, it would not be frequent enough to have a population-level effect on these species.

Black oystercatchers have been observed in Lynn Canal, but are considered uncommon. Alternatives 4B and 4D would result in the loss of 1.9 acres of rocky shore habitat in Berners Bay and 0.7 acres at the Auke Bay Ferry Terminal. The loss of rocky shore habitat would result in a loss of potential breeding and feeding habitat for black oystercatchers; however ongoing human activities near the rocky shore habitat at the Auke Bay Ferry Terminal likely deter its use by these birds. Highway traffic during operations or maintenance activities could disturb black oystercatchers in rocky shore habitats adjacent to the widened and newly constructed 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.

Only low numbers of yellow-billed loons have been documented in Berners Bay and Lynn Canal. Yellow-billed loons may experience some disturbance from ferry activities in Lynn Canal but 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 in Lynn Canal, and the relatively low numbers of ferries, disturbance would likely be minimal.

Alternatives 4B and 4D would not likely affect Aleutian terns because the project is outside the species' known range (see Section 4.3.15) and the Aleutian tern is thought to be a casual or accidental spring and summer visitor in southeast Alaska, though it is known to breed as far south as Glacier Bay. Alternatives 4B and 4D would not result in the loss of palustrine or estuarine emergent wetlands, which is preferred nesting habitat of Aleutian terns. Because Aleutian terns nest onshore and feed over ocean waters, they are unlikely to be disturbed by Alternative 4B and 4D ferries. Noise and human presence introduced with the proposed highway may preclude Aleutian terns from colonizing small portions of these habitats adjacent to project facilities.

Dusky Canada geese do not breed or winter in the project area. 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 (Bromley and Rothe, 2003). 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.

#### 4.6.15.3 Terrestrial Mammals

Species considered in this group include the black bear, brown bear, marten, river otter, wolf, Sitka black-tailed deer, moose, mountain goat, and wolverine. The assessment of project effects on these animals considered habitat loss and fragmentation, traffic disturbance, mortality caused by collisions with vehicles, and the indirect impacts of increased human activity in the study area.

The direct loss of wetland and terrestrial habitat described in Sections 4.6.12 and 4.6.14 would amount to less than 1 percent of these habitats available in the study area. Additional loss of habitat because of windblown trees adjacent to the ROW for the highway to Sawmill Cove or changes in local hydrologic patterns along this highway may add to the total habitat loss but not by enough to measurably increase the amount of habitat lost in the study area. For some species, there is a seasonally important habitat that has a greater influence on population levels than other types of habitat used by that species. For example, wintering habitat is important for goats and spring and fall beach fringe is important for bears.

The beach fringe between Echo Cove and Sawmill Cove provides high-value habitat for many terrestrial mammals, including bears, martens, river otters, and wolves. The highway alignment for Alternatives 4B and 4D would divide the home range of some bears that winter at higher elevations and move down to the coast during summer to forage, particularly for black bears that feed on salmon at Sawmill Creek. For species averse to human presence, the highway may limit their ability to use all of their range, thus fragmenting their habitat. Because black bears are highly adaptable and often learn to coexist near human development, habitat fragmentation is not expected to result in a substantial effect on black bear populations in the study area. The highway would likely result in mortality of some black bears from vehicle collisions.

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 for Alternative 4B and 4D 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 and Point St. Mary during 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 bridge crossing of Sawmill Creek would maintain a terrestrial corridor along the stream bank for bears to cross under the highway.

Wolves travel widely in pursuit of prey and strongly avoid areas of human activity (USFS, 2000; Person, 2001). Some wolves use estuarine areas, but the importance of these areas for wolves is not known. The proposed highway would provide more access for people to beaches in the Sawmill Cove vicinity, potentially inhibiting the use of this area by wolves.

The proposed highway for Alternatives 4B and 4D would not fragment the ranges of martens and river otters, as these species have small home ranges and readily cross roads. Sitka black-tailed deer use a variety of habitat types, so it is unlikely that the small-scale habitat loss and potential fragmentation at the northern end of its range in the project study area would affect their populations. Mountain goat habitat is primarily at higher elevations than the proposed highway alignment; however, in winter, goats often venture down to low elevations, including rock bluffs close to shore. They seldom venture far from steep escape terrain. The highway from Echo Cove to Sawmill Cove would affect the winter habitat of goats in this area.

Collisions with vehicles would result in an increase in mortality among many terrestrial mammal species in the project area. Species most likely to be affected are those attracted to roads to feed on roadside grasses, forbs, and brush and to escape deep snow, such as deer and moose, as well as those that do not appear to have a substantial aversion to crossing roads, such as river otters, martens, and black bears. Fewer vehicle collisions are likely to occur with species that tend to avoid roads, such as wolves and brown bears. Mountain goats would not be substantially affected, as they would generally not be found adjacent to the highway alignment. There would be some losses, but the mortality from collisions with vehicles would not likely have population-level effects on most wildlife species in the study area.

The moose population around Berners Bay consists of only about 80–120 animals and is subject to a popular but limited registration-only hunt (Flynn et al., 2012). Moose rarely travel as far south as Sawmill Cove. The number of moose killed by vehicles traveling from Echo Cove to Sawmill Cove would be very low.

The highway for Alternatives 4B and 4D would make a small area more accessible to hunters and trappers. Hunting and trapping pressure on species such as the black and brown bear, moose, deer, mountain goat, marten, and river otter would increase along this highway segment. The effects of this increased pressure would be controlled by ADF&G and the Board of Game through season duration, take limits, lottery drawings, etc. Therefore, this small amount of increased pressure would not result in population-level effects. Incidents of Defense of Life and Property from bears could increase due to increased movement of people through wildlife habitats; however, such incidents would be unlikely to have a population-level effect on black or brown bears.

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, impacts would be limited to individual animals and would not affect the population as a whole.

#### 4.6.15.4 Terrestrial Birds

Species considered in this group include the Queen Charlotte goshawk, peregrine falcon, olive-sided flycatcher, gray-cheeked thrush, blackpoll warbler, and Townsend's warbler. Goshawks are the only resident species in this group. Peregrine falcons could be present during migration in spring and fall. The other species are neo-tropical migrants that could be present either during migration or during the nesting season. Except for the peregrine falcon, all of these species favor primarily OG forest habitat. Conservation concerns for these species are the result of landscape-scale loss of habitat due to commercial logging (BPIF, 1999). The amount of habitat that would be lost by the proposed highway for Alternatives 4B and 4D would be negligible in comparison. Therefore, these alternatives would not result in population-level impacts to these species.

The highway segment for Alternatives 4B and 4D would cause some direct loss of habitat through clearing. The opening in the forest canopy created by the highway could cause some birds to avoid the highway area, leading to an effective loss of additional nesting habitat. Openings in the forest canopy also create "edge effects," which are used by some avian predators such as ravens, jays, and crows. This would add to the decreased value of nesting habitat for neo-tropical migrants near the highway.

#### 4.6.15.5 Amphibians

Frogs and toads live in both marshy and forested wetlands as well as upland areas adjacent to ponds. The amount of wetlands lost as a result of the proposed highway for Alternatives 4B and 4D would be small compared to the amount of total wetlands near the proposed highway alignment. Amphibians have small home ranges and do not appear to travel far from their natal pools (NatureServe, 2003). Therefore, the potential impacts of highway maintenance and operation would be limited to those animals that live near the proposed highway segment. The principal impacts of a highway to amphibians would be through mortality from vehicles and pollution of wetlands from highway stormwater runoff and accidental spills. These impacts would not affect amphibian populations on an area-wide basis.

### 4.6.16 Bald Eagles

A total of 16 bald eagle nests are documented within 0.5 mile of the ferry terminal highway portion of these alternatives (Table 4-75). Nests located along the existing Glacier Highway between Echo Cove and Cascade Point and eagles using these nests would be generally accustomed to daily motor vehicle activity. No communal roosting locations are known to occur along the highway alignment. Alternatives 4B and 4D would not affect the overall population of bald eagles in the Lynn Canal area because most of the nests along this alternative (56 percent) are located more than 660 feet from the highway alignment and ferry terminal. See Section 4.8.12.6 for construction impacts regarding bald eagles. Figure 4-11 shows the proposed highway alignment and indicates the approximate distances of the eagle nests from the highway alignment and ferry terminal.

There are no avalanche-prone areas along the highway from Echo Cove to Sawmill Cove; therefore, no blasting and related disturbance to bald eagles would occur.

**Table 4-75:**
**Number of Bald Eagle Nests in Proximity to Alternatives 4B and 4D**

| Distance from Highway Alignment/Ferry Terminal for Alternatives 4B and 4D | Number of Nests |
|---|---|
| 661 feet–0.5 mile | 8 |
| 331–660 feet | 6 |
| 101–330 feet | 2 |
| 61–100 feet | 0 |
| 31–60 feet | 0 |
| 0–30 feet | 0 |
| Total nests within 0.5 mile | 16 |

## 4.6.17 Threatened and Endangered Species

### 4.6.17.1 Steller Sea Lion

Alternatives 4B and 4D would not affect Steller sea lions at any traditional haulouts or designated critical habitat. Maintenance and operations of the Sawmill Cove Ferry Terminal could cause temporary disturbance to Steller sea lions in Berners Bay, particularly in late April and early May, while they are feeding on spring forage fish aggregations; however, FHWA has made the preliminary determination that these alternatives are not likely to adversely affect the Steller sea lions in Lynn Canal. Alternatives 4B and 4D do not include any new boat launch facilities and are therefore unlikely to increase recreational or commercial use of motorized vessels in the area. As noted in the 2006 Final EIS, NMFS has expressed concern that ferry traffic in Berners Bay may adversely affect Steller sea lions.

The potential for sea lion and ferry collisions is considered minimal. Although it is possible for a Steller sea lion, particularly a juvenile, to be harmed by a collision with a vessel, Steller sea lions are generally very agile and successfully avoid such encounters. Because Alternative 4B would use FVF vessels, there is a slightly increased chance of a vessel collision with a sea lion.

Selection of Alternative 4B or 4D would necessitate formal consultation on western DPS Steller sea lions with NMFS under Section 7 of the ESA. Construction-related effects are described in Section 4.8.12.7 and cumulative effects of Alternatives 4B and 4D on Stellar sea lions with past, present, and reasonably foreseeable future actions are described in Section 4.9.2.15.

### 4.6.17.2 Humpback Whales

FHWA has made the preliminary determination that highway and vessel traffic and maintenance activities associated with Alternatives 4B and 4D would not adversely affect the Mexico DPS humpback whales in Lynn Canal. Ferry traffic in Lynn Canal would increase as a result of Alternatives 4B and 4D. The increased ferry traffic would increase the risk of collisions with humpback whales. As noted in the 2006 Final EIS, NMFS has expressed concern that ferry traffic in Berners Bay may adversely affect humpback whales.

The use of FVFs for Alternative 4B would further increase the risk of collisions because research has shown that vessel-whale collisions increase proportionately when the speed of vessels

increases above 14 knots (Laist et al., 2001). However, collisions have been rare in the past and would likely continue to be rare (Allen and Angliss, 2012). In 2006, FHWA agreed to modify Alternatives 4B and 4D to avoid operating in Berners Bay until May 15.

Selection of Alternative 4B or 4D would necessitate formal consultation on Mexico DPS humpback whales with NMFS under Section 7 of the ESA. Construction-related effects are described in Section 4.8.12.7, and cumulative effects of Alternatives 4B and 4D on Mexico DPS humpback whales with past, present, and reasonably foreseeable future actions are described in Section 4.9.2.15.

### 4.6.18 Permits and Approvals

Alternatives 4B and 4D would require the following permits, consultations, and approvals:

- USFS transportation and utility easement issued under SAFETEA-LU Section 4407, as amended by the FAST Act, for use of Tongass National Forest lands, and USFS special use permit for any project activities or facilities located outside the Section 4407 easement on the Tongass National Forest.
- USACE Section 404 permit for fill in wetlands and other waters of the U.S.
- USACE Section 10 permit for dredge, fill, and structures placed below mean high water
- NMFS ESA Section 7 consultation for threatened and endangered species
- NMFS MMPA Incidental Harassment Authorization for marine mammals
- USFWS eagle Disturbance Permit for nests within 660 feet of the cut and fill limits and for active nests within 0.5 mile of blasting activities and other loud construction noises.
- ADEC APDES Stormwater General Permit for stormwater discharge during construction
- ADEC Section 401 Water Quality Certification in support of Section 404 permits
- ADF&G Title 16 Fish Habitat Permit for work below ordinary high water in streams with anadromous or resident fish
- ADNR Interagency Land Management Assignment for use of tidelands at the Sawmill Cove Ferry Terminal
- Authorization from ADEC for treated wastewater discharge from the Sawmill Cove Ferry Terminal
- ADEC review of the SWPPP under the APDES Stormwater General Permit

## 4.7 Other Environmental Issues

### 4.7.1 Wild and Scenic Rivers

There are no designated Wild and Scenic Rivers in the study area. Two rivers in the study area have been recommended for designation: the Gilkey and the Katzehin rivers, both located on the east side of Lynn Canal. The Gilkey River joins the Antler River upstream of where the Antler River is crossed by the proposed alignment for Alternative 2B. Therefore, the proposed project would not affect the status of the Gilkey River. The Katzehin River is crossed by the proposed alignment for Alternative 2B near its mouth. The lower 2 miles of the river have been excluded from recommendation as Wild and Scenic because that reach was reserved for a possible transportation corridor crossing. Therefore, no alternative would affect the proposed Wild and Scenic status of the Katzehin River.

The Sullivan River has not been evaluated by the USFS with regard to eligibility as a Wild and Scenic and/or Recreation River. As discussed in the 2006 Final EIS, the USFS has indicated that the lower reach of the Sullivan River, where the Alternative 3 alignment would cross, is clearly not eligible due to past development activities. The upper reaches of the river would not be affected by Alternative 3 other than creating easier access for recreational users. Therefore, Alternative 3 would not affect the Wild and Scenic or recreational status of the Sullivan River.

### 4.7.2 Environmental Justice

Effective transportation decision-making depends on understanding and properly addressing the unique needs of different socioeconomic groups. EO 12898 addresses this by requiring each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority and low-income populations." FHWA defines a "minority population" as "any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity" (FHWA, 1998). Minority groups addressed by the EO include: Black or African American, Hispanic, Asian American, American Indian/Alaskan Native, and Native Hawaiian or Pacific Islander.

FHWA defines a "low-income population" as "Any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed FHWA program, policy, or activity" (FHWA, 1998). Low-income persons are described as "a person whose household income is at or below the Department of Health and Human Services poverty guidelines" (FHWA, 2013).

Highway segments of Alternatives 2B, 3, 4B, and 4D pass through undeveloped land that is largely owned by the federal or State government. Therefore, no highway segments of any alternative would pass through minority and/or low-income neighborhoods.

It was determined in the 2006 Final EIS that the increased traffic on the Glacier Highway resulting from the project alternatives would not substantially affect the level of service of the highway or substantially increase noise at adjacent residences. Based on 2017 updates to the traffic and noise analyses, this conclusion remains valid.

As discussed in Section 3.1.5, the community of Klukwan is identified as a minority population when compared to state and national data (92 percent minority or mixed race based on 2010 Census data). The median household income of Klukwan is also below the state and national averages; however, Klukwan is not identified as a low income population because the median income level in this area is not below the poverty level for the average household size for this community (2.3, based on 2010 Census data) and the percentage of individuals below the poverty level is below state and national levels.

None of the proposed alternatives would directly affect any property in the immediate vicinity of Klukwan; therefore, there would be no disproportionate direct adverse effect to minority and low-income populations in that community. Under proposed project alternatives, more visitor traffic would travel the highway adjacent to Klukwan. However, this community would not be

affected any more than Juneau, Haines, or Skagway. Increased traffic near Klukwan could result in increased tourism and economic development, which are beneficial effects.

Implementation of a build alternative, particularly the West Lynn Canal or East Lynn Canal Highway, would create local employment and business opportunities for local residents, including Alaska Natives, which is a beneficial effect of the proposed project. As indicated in the discussion of land use effects of project alternatives, some of the property required for the Alternative 3 ROW is owned by Alaska Natives. These owners, as well as all other private property owners, would be compensated for their land at fair market value in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

Within the study area, an upgraded transportation system, either a highway or an improved ferry system, would improve access to regional medical care, which would be a beneficial effect. Upgrading the transportation system may increase economic development activities and provide economic opportunities for minority and low-income residents, which are beneficial effects.

The high cost of travel in Lynn Canal has an impact on low-income travelers, in some cases precluding their ability to travel outside their hometown. As shown in Table 4-76, Alternative 1B, would reduce the cost of travel in this area, benefiting all travelers.

Alternatives 4A and 4C would have the same cost of travel as Alternative 1 – No Action. The cost under Alternatives 2B and 3 for low-income walk-on passengers without access to a vehicle could depend on how they travel to/from the Katzehin Ferry Terminal. Travelers without vehicles would have to rent a vehicle, take a commuter flight, travel on a private carrier (such as a taxi or shuttle service if they develop), or find a ride with someone. If they chose to take a bus (bus service is anticipated to develop if sufficient demand develops), they would be required to purchase a bus ticket. Even with the price of a bus ticket added in, the cost is expected to be in the same range as the cost for Alternative 1– No Action. Alternatives 4B and 4D cost would be in the same range as Alternative 1 – No Action cost or slightly higher, depending on the cost of transportation between Sawmill Cove and Auke Bay.

**Table 4-76:**
**Comparison of Out-Of-Pocket Costs**

| Alternative | Auke Bay-Haines | | | Auke Bay-Skagway | | |
|---|---|---|---|---|---|---|
| | Walk-on Passenger | Driver plus 19-foot Vehicle | Family of Four plus 19-foot Vehicle | Walk-on Passenger | Driver plus 19-foot Vehicle | Family of Four plus 19-foot Vehicle |
| 1 – No Action | $39.00 | $129.50 | $227.00 | $53.00 | $169.00 | $301.50 |
| 1B | $31.00 | $103.50 | $181.00 | $42.50 | $135.50 | $242.00 |
| 2B[1] | $42.00 – 60.00 | $34.50 | $47.00 | $50.00 – 68.00 | $46.50 | $67.50 |
| 3[1] | $42.00 – 60.00 | $40.50 | $59.50 | $50.00 – 68.00 | $72.50 | $111.00 |
| 4A and 4C | $39.00 | $129.50 | $227.00 | $53.00 | $169.00 | $301.50 |
| 4B and 4D[2] | $42.00 – $50.00 | $88.00 | $150.50 | $52.50 – $60.00 | $117.50 | $206.50 |

[1] Including the cost of potential bus service (anticipated to develop if sufficient demand develops) plus the ferry fare.

[2] The bus fare is assumed to be 41 percent of the Alternative 2B bus fare (prorated based on distance). Numbers may not total exactly due to rounding.

Based on the above discussion and analysis, FHWA has determined that none of the build alternatives would cause disproportionally high and adverse effects on low-income or minority communities.

### 4.7.3 Farmlands

There are no prime or unique farmlands in the State of Alaska and the study area does not appear on the U.S. Department of Agriculture Natural Resources Conservation Service list of farmlands of State or local importance. None of the proposed project alternatives would impact farmland.

### 4.7.4 Relocation Impacts

No residences, businesses, farms, churches, or nonprofit organization facilities would be relocated by any proposed project alternative.

### 4.7.5 Coastal Barriers

Federal legislation requires that any federal action that could potentially affect Coastal Barrier Resources Systems must be consistent with the Federal Coastal Barriers Resource Act of 1982 and the Coastal Barrier Improvement Act of 1990. Coastal Barrier Resources Systems consist of undeveloped coastal barriers on the Atlantic and Gulf Coasts. No coastal barriers have been identified on the West Coast of the U.S. Therefore, none of the proposed project alternatives would have any effect on coastal barriers.

### 4.7.6 Energy

The estimated annual fuel use for transportation of each of the proposed project alternatives was computed for the years 2025 and 2055. Approximate fuel consumption was calculated for AMHS ferries and projected highway vehicles. Ferry fuel consumption was based on a gallon/hour usage rate for individual vessels identified for each marine segment multiplied by projected transit times and annual operating schedules. Reported AMHS fuel consumption rates were used where applicable. For the mainline ferry segments, an average consumption rate for the mainline vessels currently operating in Lynn Canal (*M/V Columbia and M/V Matanuska*) was used. The fuel consumption rate of the Day Boat ACF vessel was derived from previously published estimates (Elliott Bay Design Group, 2013). For the new conventional monohull intended to serve as the Haines-Skagway shuttle (Alternatives 2B, 3, 4A, 4B, 4C, and 4D), the estimated fuel usage varied by alternative based on the projected size of each vessel to be built. For the FVFs, the fuel consumption rate of *FVF Chenega* and *FVF Fairweather* was used. Vehicle fuel consumption rates were based on an average fuel efficiency multiplied by the forecasted annual ADT volumes and roadway distance traveled under each alternative. Total annual fuel consumption estimates for each alternative were then divided by each alternative's respective annual ADT using the Juneau-Haines link for the years 2025 and 2055 to provide a per-vehicle fuel use estimate. The per-vehicle usage by alternative provides an approximate annual per-vehicle fuel consumption rate based on the number of forecasted vehicles moving through Lynn Canal.

Table 4-77 presents the estimated annual operational energy usage for all project alternatives. Over the 30-year analysis period (2025-2055), there is a negligible change in energy use for all of the alternatives because traffic levels are expected to remain relatively constant. Alternatives 1B, 2B, and 4B show a minor increase in energy use over the analysis period based on traffic

projections. All action alternatives would have greater fuel consumption than Alternative 1 – No Action, but would also provide greater transportation capacity than Alternative 1 – No Action. Alternatives 4A and 4B would use the most fuel due to the energy requirements of the FVFs. Fuel consumption estimates for Alternatives 2B and 3 are influenced by the higher vehicular volumes on road portions of these alternatives.

Alternatives 2B and 3 would have substantially lower fuel use per vehicle than Alternative 1 – No Action and all other alternatives due to their lower ferry fuel consumption and higher ADT. Alternatives 1B and 4A through 4D increase the capacity of the transportation system in Lynn Canal relative to Alternative 1 – No Action, primarily by increasing the number of ferry trips. The FVFs proposed for Alternatives 4A and 4B consume more fuel than conventional monohull vessels; therefore, they have a higher per vehicle fuel usage than Alternative 1 – No Action. Fuel usage per vehicle for Alternative 4D is lower than under Alternative 1 – No Action because of the shorter travel distance from Sawmill Cove to Haines and Skagway than from Auke Bay.

**Table 4-77:**
**Estimated Annual Operational Energy Usage[1]**

| Alternative | Fuel (thousands of gallons) | | | | | | Per Vehicle Fuel Usage (gallons)[5] | |
|---|---|---|---|---|---|---|---|---|
| | Year 2025 | | | Year 2055 | | | 2025 | 2055 |
| | Ferry[2,3] | Vehicle[4] | Total | Ferry[2,3] | Vehicle[4] | Total | | |
| 1—No Action | 853 | 6 | 858 | 853 | 6 | 858 | 29 | 29 |
| 1B | 1,334 | 9 | 1,343 | 1,334 | 10 | 1,344 | 27 | 27 |
| 2B | 1,381 | 1,087 | 2,468 | 1,381 | 1,101 | 2,481 | 8 | 8 |
| 3 | 1,468 | 836 | 2,304 | 1,468 | 836 | 2,304 | 9 | 9 |
| 4A | 3,507 | 11 | 3,518 | 3,507 | 11 | 3,518 | 66 | 66 |
| 4B | 2,786 | 217 | 3,003 | 2,786 | 220 | 3,006 | 34 | 34 |
| 4C | 1,448 | 7 | 1,455 | 1,448 | 7 | 1,455 | 42 | 42 |
| 4D | 1,630 | 201 | 1,831 | 1,630 | 201 | 1,831 | 22 | 22 |

[1] All calculations are based on travel between Auke Bay and downtown Haines and the Skagway Ferry Terminals.

[2] Source: AMHS, 2015; Elliot Bay Design Group, 2013.

[3] Ferry fuel use is based on transit times. Fuel use associated with loading/unloading or energy used to operate ferry terminals was not estimated for any of the alternatives. No overhaul time or vessel substitution is factored into the analysis; each ferry option under each alternative is assumed to operate year-round.

[4] Based on 21.4 miles per gallon (mpg) fleet average for light duty vehicles and projected ADT. Source: USDOT, 2017.

[5] Calculation based on Juneau-Haines ADT forecast by alternative (see Revised Appendix AA, *Traffic Forecast Report*).

### 4.7.7 Noise

The traffic noise impacts presented in the 2006 Final EIS were based on noise modeling that incorporated summer ADT forecasts for 2038 (see Appendix L and the *2017 Update to Appendix L – Noise Technical Report* in Appendix Z) to consider the noise impacts associated with the highest traffic volumes. In order to determine whether additional noise modeling was needed for this Final SEIS, project analysts compared the 2038 summer ADT volumes from the 2006 Final EIS with the 2055 summer ADT volumes developed for this Final SEIS (see Revised Appendix AA, *Traffic Forecast Report*). Table 4-78 presents the two forecasts and the percent difference between the two values.

**Table 4-78:**
**Design Year/30-Year Summer ADT Traffic Forecasts**

| Alternative | 2006 Final EIS Traffic Forecasts[1] Design Year 2038 | Current SEIS Traffic Forecasts[2] Design Year 2055 | Difference in 2017 vs. 2006 Final EIS Design Year Traffic Forecast Volumes |
|---|---|---|---|
| 1 – No Action | 230 | 125 | 46% decrease in traffic volumes |
| 1B | NA | 210 | N/A |
| 2B | 1,190 | 1,270 | 7% increase in traffic volumes |
| 3 | 940 | 1,040 | 11% increase in traffic volumes |
| 4A | 390 | 225 | 42% decrease in traffic volumes |
| 4B | 470 | 375 | 20% decrease in traffic volumes |
| 4C | 260 | 150 | 42% decrease in traffic volumes |
| 4D | 350 | 345 | 1% decrease in traffic volumes |

[1] See Appendix L.
[2] See *2017 Update to Appendix L – Noise Technical Report* (in Appendix Z).

#### 4.7.7.1 Direct Impacts

Noise levels in the project area would continue to be dominated by natural sounds under Alternative 1 – No Action with intermittent man-made noise sources including ferries, pleasure craft, airplanes, and helicopters. As indicated in Section 3.2.6, short-term noise measurements taken at the edge of Berners Bay near the USFS cabin in 2003 and documented hourly sound levels between 49 and 52 dBA.

Noise levels were also measured on the Chilkat Peninsula, south of Haines in 2003. Those measurements documented sound levels of 35 dBA. This wide difference in sound levels is the result of meteorological conditions at the time that measurements were taken and natural water features near noise monitoring sites. These noise levels are expected to continue into the future under Alternative 1 – No Action because there would be no vehicle noise added at those locations.

Alternative 1B was not evaluated in the 2006 Final EIS. It is similar to No Action in that it would not include new road, ferry, or ferry terminal construction. The 2017 traffic forecasts for Alternative 1B are similar to the traffic forecasts for No Action; therefore, potential noise impacts from Alternative 1B would be similar to those identified for Alternative 1 – No Action.

The noise modeling results presented in the 2006 Final EIS indicate that a peak-hour noise level of 65 dBA from traffic on the highway segments of the project alternatives with roadway improvements outside of developed areas (i.e., Alternatives 2B, 3, 4B, and 4D) would be contained within 35 feet of the centerline of the road. Based on simple noise attenuation theory, roadway noise generally decreases by 3 to 6 dBA with every doubling of distance from the source. Where traffic is continuous and the sound travels across hard surfaces such as paving and buildings, the decrease is typically 3 dBA. Where traffic is continuous and the sound travels over soil and vegetation, the decrease is on the order of 4.5 dBA. Where traffic is light, and the noise from each vehicle can be distinguished, the decrease is about 6 dBA. Considering the highest traffic volumes of all alternatives would average approximately one vehicle every 30 seconds (see Table 4-78; based on the highest summer ADT, which would occur under Alternative 2B, and assuming summer peak-hour traffic volumes would be 9 percent of 1,270, or 114 vehicles during the peak hour), the sound of individual vehicles would be distinct and the attenuation of

about 5 to 6 dBA with every doubling of distance could be expected from traffic noise. With this level of attenuation, vehicle noise associated with these alternatives is likely to decrease to existing levels typical of the undeveloped areas of Lynn Canal within about 100 to 300 yards of the roadway, depending largely on weather conditions (e.g., traffic noise would be masked at shorter distances during rain and wind storms).

In the 2006 Final EIS, summer peak-hour through traffic noise at the USFS cabin on Berners Bay from Alternative 2B in 2038 was estimated to be approximately 47 dBA. The current alignment of Alternative 2B is farther from the cabin (approximately 1,000 feet away) than the alignment was in 2006; therefore, a much lower noise level would be expected. Noise levels at this cabin would be well below 66 dBA, which is the NAC for this land use; therefore, there would be no traffic noise impact at the cabin.

**Juneau** –Project alternatives would not have a direct impact on sensitive receptors in Juneau except at the Echo Cove campground. The campground is approximately 600 feet from the highway alignment of Alternatives 2B, 3, 4B, and 4D. Of these alternatives, Alternative 2B would have the largest volume of traffic and would therefore create the greatest traffic noise. The peak-hour traffic noise for Alternative 2B was estimated to be approximately 44 dBA at the campground in the 2006 Final EIS. With a 12 percent increase in traffic (based on updated traffic numbers presented in Table 4-78), that estimate would not increase by more than 1 dBA. Existing noise at the campground was measured at 43 dBA. This could be expected to vary depending on meteorological conditions and campground activity. The noise from a highway on the alignment for project alternatives would not increase the peak-hour noise by more than about 1 to 2 dBA. This increase would not be perceptible to the average human ear; and the resulting noise level would not result in a highway traffic noise impact.

**Haines** – Project alternatives would not have a direct impact on sensitive receptors in Haines. Noise modeling was used to predict the noise level from Alternative 2B at the Chilkat Peninsula. The acoustical conditions associated with Chilkoot Inlet, which lies between the peninsula and the proposed highway alignment, were included in the noise model. The predicted noise level due to the highway under 2038 peak summer traffic conditions presented in the 2006 Final EIS would be approximately 30 dBA at the closest location in Chilkat State Park. Ambient (2003) noise levels measured on the peninsula were approximately 35 dBA. Therefore, traffic noise from Alternative 2B would cause an increase of only 1 to 2 dBA to the overall noise environment. This increase would not be perceptible to the average human ear.

**Skagway** – Alternatives 2B, 3, and 4A through 4D would have no direct noise impacts to Skagway as these alternatives would involve no new roadway there.

#### 4.7.7.2 Noise Abatement Evaluation

As discussed in Section 3.2.6, noise abatement must be considered when the predicted future peak hour noise from highway traffic on new construction approaches or exceeds the NAC (23 CFR 772), or when a substantial increase occurs. No project alternative's projected traffic noise level would approach the NAC or have a substantial increase over ambient conditions. Therefore, noise abatement has not been considered.

#### 4.7.7.3 Indirect Impacts

Similar to direct impacts, the assessment of indirect noise impacts in the 2006 Final EIS was based on traffic forecasts for 2038. The revised traffic forecasts for 2055 in Table 4-78 show increases and decreases in traffic for each alternative relative to the 2038 forecast. Understanding that traffic volumes could double or be reduced by half and have a relatively small (3 dBA) noise impact, the revised traffic forecasts for 2055 shown in Table 4-78 do not affect the assessment of indirect noise impacts presented in the 2006 Final EIS. The descriptions of indirect impacts from the 2006 Final EIS in the following paragraphs, therefore, are generally representative of the potential impacts associated with the project alternatives as described in this Final SEIS. Alternative 1B would have impacts similar to Alternative 1 – No Action. Note that the assessment is based on the NAC for residential land use that has since changed (see Section 3.2.6). Although the NAC are established to assess the potential for direct traffic noise impacts, they are used here as a point of reference. FHWA is not required to consider abatement for indirect impacts. The new NAC for residential land use, interior and exterior, are 1 dBA lower than the NAC used in the analysis presented in the 2006 Final EIS. This change, coupled with the slight changes in traffic volume from the updated traffic forecast, would fall within the margin of error of predicting traffic noise impacts.

**Alternative 1 – No Action** – Based on past trends in population growth, it was estimated that traffic in the Juneau, Haines, and Skagway areas would increase at the rate of 1 percent a year into the future. This would increase traffic volumes in these areas by approximately 35 percent by 2038. This increase in traffic would also increase noise adjacent to existing roads in these communities.

***Juneau*** – Existing traffic noise along Egan Drive and Glacier Highway in Juneau was estimated by computer modeling using traffic volumes measured in 2002. Based on this modeling, exterior peak-hour summer traffic noise along these highways is estimated to be at or above 65 dBA at 25 housing units in Juneau (14 single-family residences, 10 condominiums, and the Auke Bay RV Park; see Table 4-79). Based on a field survey of the Juneau area, there are a number of noise sensitive receptors near Egan Drive and Glacier Highway where the exterior areas closest to the highway do not appear to receive frequent human use and therefore it is most appropriate to evaluate potential interior noise impacts. For these other receptors, modeling indicates that interior peak-hour traffic noise is at or above 50 dBA at 103 housing units (single-family residences, residence rooms in the Pioneer's Home, condominiums, apartments, DeHart's upper floor, and the Squire's Rest Building).

The increase in summer traffic associated with Alternative 1 – No Action is projected to increase noise levels in Juneau relative to existing conditions by up to 2 dBA by the year 2038 for all modeled roadway segments. Although this noise increase would not be noticeable since the average human ear does not typically recognize noise increases below 3 dBA, it would increase the number of housing units in Juneau receiving exterior peak-hour traffic noise at or above 65 dBA by 11 (all single-family residences). It would also increase the number of housing units in Juneau receiving interior peak-hour traffic noise at or above 50 dBA by 19 (17 single-family residences and 2 apartments). Table 4-79 lists sensitive receptors in the Juneau area that are currently at or above the NAC[71] and sensitive receptors that would be affected by traffic noise with Alternative 1 – No Action in 2038.

[71] Referring to the NAC in effect at the time the 2006 Final EIS was issued.

**Table 4-79:**
**Housing Units along Egan Drive and Glacier Highway in the Juneau Area Impacted by Summer Traffic Noise (at or above NAC)**

| Location | Number of Housing Units | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Modeled Existing Condition (2002) | | Alternative 1 – No Action[1] (2038) | | Alternative 2B (2038) | | Alternative 3 (2038) | | Alternatives 4A–4D (2038) | |
| | In | Ex | In | Ex | In | Ex | In | Ex | In | Ex |
| Egan Drive from Twin Lakes Drive to Old Glacier Highway | 21 | 1 | 29 | 3 | 29 | 3 | 29 | 3 | 29 | 3 |
| Glacier Highway from Old Glacier Highway to Engineers Cutoff Road | 23 | 12 | 26 | 14 | 26 | 14 | 26 | 14 | 26 | 14 |
| Glacier Highway from Engineers Cutoff Road to Fritz Cove Road | 16 | 10 | 17 | 12 | 17 | 12 | 17 | 12 | 17 | 12 |
| Glacier Highway from Fritz Cove Road to Auke Bay Road | 15 | 0 | 17 | 1 | 17 | 1 | 17 | 1 | 17 | 1 |
| Glacier Highway from Auke Bay Road to Auke Nu Drive | 23 | 2 | 26 | 4 | 26 | 4 | 26 | 4 | 26 | 4 |
| Glacier Highway from Auke Nu Drive to Terminus | 5 | 0 | 6 | 2 | 13 | 4 | 11 | 3 | 7–11[2] | 2–3[3] |
| Total | 103 | 25 | 121 | 36 | 128 | 38 | 126 | 37 | 122–126 | 36–37 |

Note: In = interior at or above 50 dBA $L_{eq(h)}$, Ex = exterior at or above 65 dBA $L_{eq(h)}$.

[1] Alternative 1B would have results similar to Alternative 1 – No Action.

[2] Eleven for Alternatives 4A, 4B, and 4D, and 7 for Alternative 4C.

[3] Three for Alternatives 4A, 4B, and 4D, and 2 for Alternative 4C.

***Haines*** – Increased summer traffic in Haines under Alternative 1 – No Action would increase traffic noise in downtown Haines by 2 dBA in 2038. Existing exterior peak-hour noise levels in Haines range from 34 to 57 dBA. As mentioned above, an increase of 2 dBA would not noticeably increase the perceived noise adjacent to roads in Haines. Therefore, project alternatives would not result in noise impacts in Haines.

***Skagway*** – Peak-hour noise at a residence (LT-3 at 420 22nd Avenue) nearest State Street and the Skagway railroad yard was measured in 2003 at just below 65 dBA. At a residence at 12th Avenue and Broadway a block away from the White Pass & Yukon Route Railroad line, peak-hour noise was measured in 2003 at 60 dBA. Based on short-term noise measurements, peak-hour noise in downtown Skagway further away from the railroad line and other non-traffic noise sources was estimated to be less than 60 dBA.

Peak-hour traffic noise levels in Skagway were modeled using 2002 summer traffic levels to represent current conditions. Most traffic coming into or out of Skagway on the Klondike Highway travels on 23rd Avenue and State Street north of 21st Avenue before dispersing onto

other roads in Skagway. Exterior peak-hour traffic noise at receptors along State Street between 21st and 23rd avenues and 23rd Avenue between State and Main streets was modeled to range from 57 to 62 dBA. Modeled traffic noise levels were lower than measured noise levels in Skagway. This modeling indicates that vehicle traffic is not the dominant source of noise in most of the community. Other noise sources such as rail traffic and aircraft are primarily responsible for the high measured peak hour noise levels in Skagway (60 to 65 dBA). The northeast section of town is close to the railroad tracks which have up to 120 train movements per day in the summer with many passenger trains during the measured peak hour. Airplane and helicopter noise also contributes to the high noise level with up to 130 takeoffs and landings per day in the summer. With existing traffic noise levels of 57 to 62 dBA, these other noise sources likely contribute approximately 62 to 64 dBA in order for the total peak hour noise level to be 65 dBA.

Noise measurements and modeling indicate that no sensitive receptors in Skagway currently receive exterior peak-hour traffic noise of 65 dBA or greater. However, it is estimated that interior peak-hour traffic noise at the residence where State Street becomes 23rd Avenue, the residence on the southwest corner of State Street and 22nd Avenue, and the daycare center on the southwest corner of 23rd Avenue and Main Street currently exceeds 50 dBA.

Increased summer traffic in Skagway under Alternative 1 – No Action would also increase traffic noise in the community by 1 to 2 dBA in 2038. An increase of 2 dBA would not noticeably increase the perceived noise adjacent to roads in Skagway. Because traffic is not the dominant source of noise in the community, the small increase projected for Alternative 1 – No Action would not increase peak-hour noise at the exteriors of any sensitive receptors to 65 dBA; however, it is estimated that this increase in noise would result in an interior peak-hour traffic noise of 50 dBA or greater at the residences on State Street and 22nd Avenue (north- and southwest corners), the residence on State and 23rd Avenue, the daycare center on the corner of 23rd Avenue and Main Street, and the apartments on the northwest corner of State Street and 21st Avenue.

**Build Alternatives** – Project build alternatives would increase traffic on roads in Juneau, Haines, and Skagway relative to Alternative 1 – No Action.[72] This would have the indirect effect of increasing traffic noise at receptors adjacent to these roads. Although analysis of the need for noise abatement is not required by FHWA regulations for these indirect impacts, NAC[73] noise levels are useful in their evaluation.

***Juneau*** – In most cases, exterior and interior noise exposure at sensitive receptors along Glacier Highway and Egan Drive with Alternatives 2B, 3, and 4A through 4D would be the same as estimated for Alternative 1 – No Action (Table 4-79). As Table 4-79 shows, two additional sensitive receptors would receive exterior peak-hour traffic noise at or above 65 dBA with Alternative 2B relative to Alternative 1 – No Action. Interior peak-hour noise levels would be at or above 50 dBA at 7 additional sensitive receptors with Alternative 2B (Table 4-79) relative to Alternative 1 – No Action. With Alternative 3, one more receptor would receive exterior peak-hour traffic noise at or above 65 dBA and five more receptors would receive interior peak-hour noise levels at or above 50 dBA when compared to Alternative 1 – No Action (Table 4-79). With Alternatives 4A, 4B, and 4D, one more receptor would receive exterior peak-hour traffic noise at or above 65 dBA and five more receptors would receive interior peak-hour noise levels at or

[72] With the exception of Alternative 1B, which would have impacts similar to Alternative 1 – No Action.

[73] NAC noise levels in this discussion refer to the NAC that were in effect at the time the 2006 Final EIS was issued.

above 50 dBA (Table 4-79) relative to Alternative 1 – No Action. For Alternative 4C, the only difference from Alternative 1 – No Action would be that one more receptor would receive interior peak-hour noise levels at or above 50 dBA (Table 4-79).

Alternative 2B would increase peak hour noise at the Adlersheim Wilderness Lodge near Yankee Cove by 8 dBA. Current (2002) peak hour noise at the lodge is estimated to be 51 dBA. Peak hour noise in 2038 with Alternative 2B would be 59 dBA.

***Haines*** – Project alternatives would result in increased traffic on Mud Bay Road or on Lutak Road and in downtown Haines on Front and Main streets. Modeling indicates that this increased summer traffic in 2038 would increase noise levels in Haines by 2 to 7 dBA for Alternatives 2B and 3, and 1 to 4 dBA for Alternatives 4A through 4D relative to existing conditions. These noise increases would result in peak exterior traffic noise levels in Haines of 65 dBA within 35 feet of the highway centerline in 2038. No sensitive receptors would be impacted by this noise.

***Skagway*** – Traffic associated with Alternatives 2B, 3, and 4A through 4D would enter and leave Skagway via ferry the same as traffic currently traveling between Juneau and Skagway. Alternative 2B would result in the largest increase in summer traffic in Skagway among these alternatives with an estimated peak-hour increase over Alternative 1 – No Action of about 55 vehicles in 2038. This would increase peak-hour traffic noise at sensitive receptors along State Street in Skagway by about 1 to 2 dBA over Alternative 1 – No Action and 3 to 4 dBA relative to existing conditions. No sensitive receptors would receive traffic noise at a level equal to or greater than 65 dBA with this alternative. Alternatives 3 and 4A through 4D would result in traffic volumes somewhat lower than Alternative 2B and would therefore increase peak-hour traffic noise by 1 dBA or less. A 1-dBA increase in noise would not be perceptible to the average human ear.

### 4.7.8 Traffic

The traffic forecast information presented in this section for each of the alternatives is from the *Traffic Forecast Report* (see Revised Appendix AA, *Traffic Forecast Report*). The 2015 traffic data representing existing conditions is from DOT&PF's *2015 Annual Average Daily Traffic (AADT) GIS Map* (DOT&PF, 2011e–l) supplemented by information from the 2010 *Southeast Traffic and Safety Report* (DOT&PF, 2013a).

#### 4.7.8.1 Alternative 1 – No Action

**Juneau** – The recorded 2015 traffic on Glacier Highway ranged from 7,515 annual ADT near the Auke Bay Ferry Terminal to 14,698 annual ADT near the junction with Egan Drive at the Mendenhall River bridge. The 2015 traffic on Egan Drive from the bridge to downtown ranged from a high of 29,122 annual ADT near JIA to 13,267 annual ADT at Main Street. Downtown streets ranged from a high of 8,750 annual ADT on Main Street to 502 annual ADT on the upper part of Gold Street. The 2015 estimated annual ADT for vehicles traveling in Lynn Canal (i.e., between Juneau and Haines or Juneau and Skagway) was 60, which is a very small compared with the amount of the traffic on any Juneau roads. Alternative 1 – No Action annual ADT in Lynn Canal is expected to change at approximately the same rate as local traffic. Local traffic is expected to remain unchanged during the 30-year study period because of relatively flat population projections in southeast Alaska (see Revised Appendix AA, *Traffic Forecast Report*). Therefore, the projected Alternative 1 – No Action annual ADT of 80 in 2025 through 2055

would continue to be a very small component of the total amount of traffic on any road in Juneau, and is anticipated to have very little impact on traffic in Juneau.

Note: Summer (May through September) ADT counts in Lynn Canal are approximately 1.55 times higher than the annual ADT for Lynn Canal, whereas traffic counts in Juneau show less of a difference between summer and annual ADT. In 2010[74], summer ADT counts ranged from 5 to 16 percent higher than annual ADT. Based on these traffic statistics, Lynn Canal traffic has little impact on traffic in Juneau. The downtown business district of Juneau has greater activity during the summer cruise ship season and Glacier Highway near Echo Cove is used most heavily during the summer; therefore, these Juneau roads are more likely to see a higher increase in summer traffic.

**Haines** – The recorded 2015 traffic on Lutak Road from the ferry terminal to 2nd Avenue ranged from 539 to 978 annual ADT. Traffic on Main Street ranged from 876 to 1,250 annual ADT. Traffic on the Haines Highway from Union Street to the Canadian border ranged from 1,230 to 132 annual ADT. The Haines portion of the 2015 estimated annual ADT for vehicles traveling in Lynn Canal was approximately 50. The only road segment that may have been appreciably affected by this traffic was the Haines Highway near the Canadian border. Population and local traffic in Haines are predicted to remain relatively the same over the 30-year forecast period. The Haines portion of the projected Alternative 1 – No Action 2025 and 2055 annual ADT of 80 would be 50. Alternative 1 – No Action would have very little effect on traffic in Haines.

Note: Summer ADT counts at the permanent traffic recorder at 5 Mile on the Haines Highway are approximately 23 percent higher than annual ADT counts. Therefore, Lynn Canal traffic (traffic moving between Juneau and Haines or Skagway), has a somewhat greater impact on summer ADT than annual ADT. Because of the low volumes overall, the contribution of this traffic to overall traffic levels is small regardless of season.

**Skagway** – The recorded 2015 traffic on State Street ranged from 1,063 annual ADT near 1st Avenue to 1,496 annual ADT near 9th Avenue. The traffic on Broadway Street ranged from 802 to 956 annual ADT. Traffic on the Klondike Highway ranged from 1,035 annual ADT near the Skagway River bridge to 376 annual ADT near the Canadian border. The Skagway portion of the 2015 estimated annual ADT in Lynn Canal was approximately 30. Regardless of which roads in Skagway these travelers used, no road segment in Skagway was appreciably affected by Lynn Canal traffic. The Skagway portion of the projected Alternative 1 – No Action 2025 annual ADT would be 30 and would remain the same in 2055 so it would have very little effect on Skagway traffic.

Note: The summer ADT counts at the permanent traffic recorder on the Klondike Highway just past Dyea Road are 57 percent higher than the annual ADT counts. This is an indication that overall traffic in Skagway is nearly as seasonally affected as Lynn Canal traffic. Therefore, traffic impacts from Lynn Canal traffic relative to total traffic would be the same regardless of the season considered and would have very little effect.

[74] The most recent year for which summer ADT counts are available is 2010.

#### 4.7.8.2 Alternative 1B

**Juneau** – Traffic projections for Alternative 1B reflect a 2025 and 2055 annual ADT of 135 in Lynn Canal. These traffic volumes are a small increase over the projected Alternative 1 – No Action volumes and would have very little effect on overall traffic volumes on Juneau streets.

**Haines** – Traffic projections for Alternative 1B reflect a 2025 and 2055 annual ADT between Juneau and Haines of 70. These traffic volumes are a small increase over the projected Alternative 1 – No Action volumes and would have very little effect on overall traffic volumes on Haines streets.

**Skagway** – Traffic projections between Juneau and Skagway for Alternative 1B in 2025 and 2055 are 65 annual ADT for both years. These traffic volumes represent a very small increase over Alternative 1 – No Action traffic and would have very little effect on overall traffic conditions in Skagway.

#### 4.7.8.3 Alternative 2B

**Juneau** – Traffic projections for Alternative 2B are 810 annual ADT on the East Lynn Canal Highway in the first year after construction is completed, with an annual ADT of 820 at the end of the 30-year forecast period. Nearly all of this traffic would use the existing Glacier Highway from Echo Cove to Lena Loop, the first residential area of any size. With existing traffic on Echo Cove estimated at 129 annual ADT for 2015 and an additional approximately 290 annual ADT from vehicles that may use the highway only to access Berners Bay, the additional traffic near Echo Cove could grow to 1,240 ADT. This is a substantial increase from the 2015 annual ADT of 129, but it is still low for a two-lane highway.

Approximately 45 percent of the forecasted Lynn Canal traffic under Alternative 2B is attributed to Juneau residents traveling to and from Juneau. This amount of increased traffic would not noticeably impact downtown (commercial district) streets, as most Juneau residents would not pass through the downtown area on trips to and from Haines or Skagway. Downtown traffic would be affected by somewhat less than half of the Alternative 2B traffic, as some of the travelers who do not live in Juneau would be destined for the Auke Bay Ferry Terminal or airport. Under Alternative 2B, traffic on downtown streets would go up by as much as 275 annual ADT if half of all non-Juneau resident travelers used the downtown area once on each trip to Juneau. This would have little effect on traffic conditions in the downtown area.

The 2001 CBJ *Area Wide Transportation Plan* identifies several future transportation problems in the Juneau downtown area, including an inadequate transition from four lanes to two on Egan Drive at Main Street, narrow lanes and inadequate sidewalks on some streets, inadequate parking, and traffic flow/circulation problems created by truck deliveries (CBJ, 2001). The 2001 CBJ *Area Wide Transportation Plan* is the most recent transportation plan for the CBJ.

Suggested remedies include constructing parking structures or lots outside the downtown area with frequent shuttles, expanding sidewalks, and creating seasonal auto-restricted zones on key downtown segments. The city has taken measures to increase parking capacity and enforce stricter parking regulations, such as those outlined in the *Juneau Downtown Parking Management Plan* (CBJ, 2010b), and the *Willoughby District Land Use Plan* (CBJ, 2012b). Although all of these transportation problems will occur regardless of Lynn Canal traffic, Alternative 2B would increase the number of summer vehicles and would therefore exacerbate

the problem. For instance, traffic on Main Street is estimated to rise by approximately 2 percent, and the additional vehicles, particularly RVs, would increase the parking problem.

**Haines** – Under Alternative 2B, traffic to and from Haines on the Katzehin shuttle is forecast to be 420 annual ADT in 2055. With population and traffic expected to remain relatively flat, annual ADT on the shuttle by the end of the 30-year forecast period would be 455. Virtually all of this traffic would use Lutak Road; traffic increases on other Haines roads and the Haines Highway would be somewhat less. Traffic on Lutak Road near the ferry terminal would have little impact on traffic levels, increasing to as much as approximately 960 annual ADT in 2055. For downtown streets, a forecasted increase of 420 annual ADT over Alternative 1 – No Action traffic would not be a substantial increase. Even if all Lynn Canal travelers entered the Main Street area, the combined volumes of existing traffic and Alternative 2B traffic would be easily accommodated by existing facilities. The Haines Highway would see the biggest relative increase in traffic volumes. Near the Canadian border, traffic under Alternative 1 – No Action would be approximately 145 annual ADT. If half of the forecasted 420 additional annual ADT arriving at the Lutak terminal under Alternative 2B traveled to the border, traffic volumes would increase to approximately 355 annual ADT. This volume can be accommodated by the existing road and should have very little impact on overall traffic levels.

**Skagway** –In 2025, traffic in Skagway with Alternative 2B is forecasted to be 360 annual ADT. With population and traffic expected to remain relatively flat, annual ADT by the end of the 30-year forecast period would be 365. This forecast represents a 330 annual ADT increase over the projected traffic for Alternative 1 – No Action. Most of the Alternative 2B traffic would use State Street, creating a 24 to 34 percent increase in traffic (to approximately 1,425 annual ADT near 1st Avenue and 1,850 annual ADT near 9th Avenue) on this through street relative to Alternative 1 – No Action. Much of the additional traffic would travel on the Klondike Highway; Juneau residents taking additional trips to and from the Yukon would use the highway to the Canadian border. An additional 365 annual ADT would more than double the traffic near the border compared to the 2055 Alternative 1 – No Action traffic projection of 390 annual ADT. While this would be a substantial percentage increase, traffic volumes of 755 annual ADT are still very low for a two-lane highway.

Currently, traffic congestion on streets in the Skagway Unit of the Klondike Gold Rush National Historical Park presents a concern for visitors during the summer, as high numbers of pedestrians are in this area during cruise ship visits. In 2015, Broadway Street, the center street in the park unit, had traffic volumes almost as high as those of State Street, but also had a high volume of pedestrians and fully utilized on-street parking during days when multiple ships were in port. Both the Municipality of Skagway Borough and the National Park Service have expressed concern over increased traffic. The forecasted 2055 Alternative 2B traffic increase of 365 annual ADT would add 45 percent more traffic to Broadway in the Skagway unit of Klondike Gold Rush National Historic Park, if all of this traffic entered the park unit rather than staying on State Street. Given that approximately half of the projected traffic would be Juneau residents making multiple trips per year to and from Juneau, it is very unlikely that these travelers would use Broadway Street on both legs of every trip. Many of these trips would not have Skagway as the end destination, and Juneau residents are likely to be aware of the crowded conditions on Broadway Street during the summer. While Alternative 2B traffic is unlikely to be a major contributor of summer traffic-related problems in the Skagway park unit, it would contribute

additional traffic and may hasten the need to take steps to limit vehicles on Broadway Street during the summer.

#### 4.7.8.4 Alternative 3

**Juneau** – Traffic projections for Alternative 3 in 2025 and 2055 are 655 annual ADT. With existing traffic on Echo Cove estimated at 129 annual ADT for 2015 and an additional approximately 230 annual ADT from vehicles that may use the highway only to access Berners Bay, the additional traffic near Echo Cove could grow to 1,015 ADT. This is a substantial increase from the 2015 annual ADT of 129, but it is still low for a two-lane highway.

Overall impact to downtown Juneau traffic would not be appreciable, considering the high local traffic volumes relative to Lynn Canal traffic. Most of the traffic in the downtown area would be local traffic, not traffic traveling between Juneau and Haines or Juneau and Skagway. Alternative 3 would add to the summer traffic in the downtown area. In 2055, if half of non-Juneau resident travelers used the downtown area once during each trip to Juneau, traffic would go up as much as 350 annual ADT; however, this would have little effect on traffic conditions in the downtown area.

**Haines** – Under Alternative 3, all traffic in Lynn Canal would pass through Haines, and virtually all of that traffic would use Mud Bay Road to get to the core area of Haines, the Haines Highway, or the ferry terminal on Lutak Road. In 2015, traffic on Mud Bay Road where Alternative 3 would intersect it was 530 annual ADT. Alternative 3 is forecasted to have an annual ADT of 655 coming onto Mud Bay Road (for a total of 1,185) from a bridge across the Chilkat Inlet, more than doubling traffic on this road segment in relation to Alternative 1 – No Action. Mud Bay Road is a 35-mph road with 11-foot driving lanes and 4-foot paved shoulders. This road can easily accommodate the increase in traffic that would occur under Alternative 3.

Closer to the main part of town, Mud Bay Road and the Old Haines Highway had much higher traffic volumes in 2015, ranging from 280 to 1,076 annual ADT. Some of the Alternative 3 traffic would use the Haines Highway, some would frequent the downtown area of Haines, and travelers heading to or from Skagway would use Lutak Road to the ferry terminal. The Alternative 3 traffic would be a relatively small component on most of the possible routes that traffic could take. The traffic to and from Skagway is projected to be 245 annual ADT during the 30-year forecast period. This traffic would raise Alternative 1 – No Action projected traffic on Lutak Road of approximately 545 annual ADT by approximately 45 percent, to 790 annual ADT. Alternative 1 – No Action projected traffic on the Haines Highway is approximately 1,236 annual ADT close to town and 138 annual ADT near the Canadian border. If all of the forecasted Alternative 3 traffic from other than Haines residents and travelers of the Skagway component travels on the Haines Highway, the Haines Highway would have an additional 230 annual ADT throughout its length. The Haines Highway and roads in the Haines area can accommodate the increase in traffic volume, so very little impact on overall traffic levels is expected.

**Skagway** –Under Alternative 3, traffic between Juneau and Skagway is forecasted to be approximately 245 annual ADT in 2025 and 2055. The projected traffic is approximately 215 annual ADT more than under Alternative 1 – No Action. Juneau residents would represent about half of the traffic volume, with Skagway and Yukon residents representing the majority of the remainder. Some but not all of this traffic would enter the Skagway Unit of the National Historic Landmark on Broadway Street, contributing to the pedestrian-vehicle traffic problems during the summer tourist season.

#### 4.7.8.5 Alternatives 4A and 4C

**Juneau** – Alternatives 4A and 4C would have small traffic impacts in Juneau. The traffic projections in Lynn Canal for 2025 and 2055 are 145 annual ADT under Alternative 4A and 95 annual ADT under Alternative 4C. This represents an increase of 65 and 15 annual ADT, respectively, over the 80 annual ADT of Alternative 1 – No Action. These traffic volumes are very low, particularly in comparison to the existing and projected local traffic on all roads that could be affected other than Glacier Highway near Echo Cove. There would be no noticeable impact on local traffic conditions in Juneau.

**Haines** – Alternatives 4A and 4C would have 2025 annual ADTs to and from Haines of 80 and 50, respectively. This traffic is projected to remain the same in 2055 for Alternative 4A and increase to 55 for Alternative 4C. These traffic volumes are a small increase over Alternative 1 – No Action volumes and would have very little effect on overall traffic volumes on the Haines streets.

**Skagway** – Alternatives 4A and 4C traffic volumes to and from Skagway would be 60 and 40 annual ADT, respectively, in 2025. In 2055, the volume would increase to 65 for Alternative 4A, while the Alternative 4C traffic is projected to remain at 40 annual ADT. These traffic volumes represent a very small increase over the modeled Alternative 1 – No Action traffic and would have very little effect on overall traffic conditions in Skagway.

#### 4.7.8.6 Alternatives 4B and 4D

**Juneau** – Alternatives 4B and 4D would have small traffic impacts in Juneau. The traffic projections in Lynn Canal for 2025 and 2055 are 240 annual ADT under Alternative 4B and 225 under Alternative 4D. These volumes are each more than double the 80 annual ADT of Alternative 1 – No Action. These traffic volumes are still very low, particularly in comparison to the existing and projected local traffic on all roads that could be affected other than Glacier Highway near Echo Cove. There would be no noticeable impact on local traffic conditions in Juneau.

**Haines** – Alternatives 4B and 4D would have 2025 annual ADTs to and from Haines of 125 and 120, respectively, in 2025. This traffic is projected to increase to 130 and 125, respectively, in 2055. These traffic volumes are a small increase over Alternative 1 – No Action volumes and would have very little effect on overall traffic volumes on Haines streets.

**Skagway** – Alternatives 4B and 4D traffic volumes to and from Skagway would be 105 and 95 annual ADT, respectively, in 2025. This traffic is projected to increase to 110 and 100, respectively, in 2055. These traffic volumes represent a very small increase over the modeled Alternative 1 – No Action traffic and would have very little effect on overall traffic conditions in Skagway.

### 4.7.9 Climate Change

There is consensus among the scientific community that the earth's climate is changing, that the change will accelerate, and that human greenhouse gas (GHG) emissions (primarily carbon dioxide [$CO_2$] emissions) are the main source of this accelerated change in climate. Climate change impacts can come in a variety of forms, from rises in sea level to an increased frequency of severe weather events. The 2010 climate change assessment for the Alaska Region (Haufler et al., 2010) contains a summary of potential impacts in southern Alaska, which include, but are not limited to: changes to sea levels, increased ocean temperatures, increased ocean acidification, loss of glaciers, and changes to stream flows and wetlands.

The 2016 *Tongass Land and Resource Management Plan, Final EIS* (USFS, 2016b, p. 3-11) discusses in detail the current conditions of the project area and the baseline anticipated changes associated with climate change. This Final SEIS analysis tiers off that discussion.

Due to the fact that Alaska is the most northerly located state, it has warmed more than twice the rate of the rest of the United States (Haufler et al., 2010); therefore, climate change impacts are much more noticeable in Alaska than in other regions of the United States. Primary threats associated with climate change include, but are not limited to: changes to sea levels, increased storm intensities, warming ocean and stream temperatures, increased retreat of glaciers, changing precipitation amounts and patterns, and changing fire regimes. Of these threats, the ones most likely to affect the JAI Project would be changes in sea level and increased storm intensity. Although changes in sea level, if great enough, could inundate low-lying human developments, "it has not been identified as a major concern in the coastal areas of southern Alaska" (Haufler et al., 2010) and is therefore not anticipated to affect project facilities (docks or roads) constructed near the shoreline. This is particularly the case in Juneau where it is projected that the relative sea-level will actually decrease between 1.0 and 3.6 feet as a result of loss of glacial ice and the resulting uplift (USFS, 2016b, p. 3-12). There is a potential that increased storm intensity could reduce access to Juneau by limiting ferry trips and causing delays due to rough sea conditions; reducing the usability of roads, as increases in windthrow could result in woody debris impeding traffic; and damaging docks through coastline battery from waves and wind; however, it is projected that impacts of this nature would not be great in the project area (Haufler et al., 2010). Current design practices address the potential impacts to infrastructure resulting from changing climate and increases in storm intensity.

An inventory of Alaska's GHG emissions found that 35 percent of all GHG emissions were from the transportation sector (Center for Climate Strategies, 2007). Other contributors include industrial activities and the fossil fuel industry (50 percent), residential and commercial fuel use (8 percent), electricity (6 percent), and waste and agriculture (1 percent). Although there is no inventory of local GHG emissions for the project area, it is likely that its sources mirror those of the State, with transportation and industrial activities being the primary contributors to total GHG emissions in the area.

The effects of GHG emissions from any source are not localized or regional due to their rapid dispersion into the global atmosphere. Even with quantification of GHG emissions, the effect on global climate change by any individual project is uncertain—it is not possible or practical to pose a meaningful quantitative link between a project's action and global climate change (USFS, 2009). However, it is clear that, worldwide, the individually small emissions of activities and projects contribute to global impacts of climate change. This would include the emissions of

Alternative 1 – No Action for this project and, to a greater degree, the emissions of any build alternative, as further discussed below.

Carbon capture and sequestration is the uptake and storage of carbon emissions (Pew, 2005). Forests play a significant part in the global carbon cycle by removing GHG emissions that contribute to climate change. Decreasing the amount of trees can potentially increase the accumulation of atmospheric carbon (Gorte, 2009). Changes in land use activities and permanent removal of forests during activities such as road construction could impact carbon sequestration. Build alternatives that require the construction of a road would create loss of carbon capture, as it requires the removal of trees to develop road corridors. Because increases in vehicle and ferry emissions, particularly $CO_2$, generated under the future traffic conditions associated with the proposed JAI Project alternatives would contribute to GHGs in the atmosphere, they are quantified here to demonstrate their overall impact on climate change.

Future $CO_2$ emissions for the JAI Project are difficult to estimate precisely because a wide variety of factors could influence $CO_2$ emissions. Some of these factors include government regulations, price and availability of fuel and alternative energy sources, and vehicle technology such as electric hybrid or fuel cell vehicles. The 2016 TLRMP Final EIS (USFS, 2016b, p. 3-11) discusses in detail the current conditions of the project area and the baseline anticipated changes associated with climate change.

To assess GHG, emissions for the JAI Project and its potential contribution to climate change, DOT&PF analysts considered the traffic projections and estimates of fuel consumption associated with ferries and vehicles for each alternative. Table 4-77 presents the energy use projections based on traffic projections and ferry operations for each alternative. Annual vehicle GHG emissions were calculated by multiplying the quantity of fuel used with each alternative by the amount of GHG produced from the combustion of one gallon of gasoline, which is the equivalent of 8.92 × 10-3 metric tons of $CO_2$/gallon of gasoline (EPA, 2013). Annual ferry GHG emissions were calculated using emissions factors and forecasted transit and engine idling times. See the *2017 Update to Appendix T – Air Quality Modeling Memorandum, Attachment 1* (in Appendix Z) for more detail.

Table 4-80 provides the calculated $CO_2$ emissions associated with travel in Lynn Canal for each alternative for a 1-year period: 2055. The emissions estimates are based on several assumptions, which are explained in the table notes. The emissions from any project alternative would be negligible when compared with current and projected State and global emissions.

**Table 4-80:**
**Estimated GHG Emissions by Alternative (2055)**

| Alternative | GHG Emissions from Vehicles ($MTCO_2e$) | GHG Emissions from Ferries ($MTCO_2e$) | Total GHG Emissions ($MTCO_2e$) |
|---|---|---|---|
| 1 – No Action | 52 | 4,225 | 4,277 |
| 1B | 88 | 8,053 | 8,141 |
| 2B | 9,816 | 20,784 | 30,601 |
| 3 | 7,455 | 23,740 | 31,195 |

| Alternative | GHG Emissions from Vehicles ($MTCO_2e$) | GHG Emissions from Ferries ($MTCO_2e$) | Total GHG Emissions ($MTCO_2e$) |
|---|---|---|---|
| 4A | 95 | 28,425 | 28,520 |
| 4B | 1,959 | 25,346 | 27,305 |
| 4C | 62 | 7,699 | 7,761 |
| 4D | 1,791 | 9,818 | 11,609 |

Notes:

In addition to $CO_2$, gasoline contains other GHGs, including methane and nitrous oxide. The ratio of $CO_2$ emissions to total GHG emissions was assumed to be 0.977, according to EPA guidelines (2009).

GHG Units: metric tons of carbon dioxide equivalent ($MTCO_2e$)

The ADT for each alternative is based on information in the *Traffic Forecast Report* prepared for the JAI Project (see Revised Appendix AA, *Traffic Forecast Report*) and incorporated into the energy use calculations in Section 4.7.6.

The ferry alternatives do not account for vehicles idling on board the ferry because vehicles are assumed to be turned off during transit. Emissions by vehicles idling while waiting at the ferry terminal also are not included.

Vehicle fuel consumption assumes uniform fleet average efficiency of 21.4 miles per gallon (mpg; Source: USDOT, 2017).

Annual vehicle GHG emissions were calculated by multiplying the quantity of fuel used with each alternative by the amount of GHG produced from the combustion of one gallon of gasoline, which is the equivalent of 8.92 × 10-3 metric tons of $CO_2$/gallon of gasoline (EPA, 2013).

Annual ferry GHG emissions were calculated using emissions factors and forecasted transit and engine idling times. See the *2017 Update to Appendix T – Air Quality Modeling Memorandum,* Attachment 1 (in Appendix Z) for more detail.

## 4.8 Construction Impacts

Construction impacts are largely associated with the alternatives that involve new roadway construction: Alternatives 2B, 3, 4B, and 4D. Construction of these alternatives would require a temporary facilities, such as staging areas and possible construction camps. The specific locations and sizes of these temporary facilities would be determined by the construction contractors. These sites would be small relative to the area of clearing required for project facilities themselves and, to the extent possible, would be located within the final footprint of the project. Permanent construction-related facilities, such as borrow sites (e.g., "gravel pits") and disposal sites for excess material, would be located within the highway ROW unless there were no other reasonable alternative. If a borrow source were needed on USFS land, DOT&PF would seek a special use permit, and understands that it would require a USFS Interdisciplinary Team process. Any such permanent need would be identified as part of the final design process.

Alternatives 1 and 1B would not require any road construction or ferry terminal modifications. There would be no construction impacts from Alternatives 1 and 1B; therefore, they are not addressed in this section.

### 4.8.1 Land Use

Construction of many of the proposed project alternatives may require establishment of at least one temporary construction camp and a number of temporary materials staging areas. For Alternative 2B, it is likely that one construction camp would be set up at Comet Landing, outside of the required ROW for the project, and one camp at the Katzehin Ferry Terminal site, potentially located on the ROW acquired for the project. For Alternative 3, a camp is likely at William Henry Bay at the proposed ferry terminal site. As with the Katzehin site, this camp could be on the ROW for the project. For Alternatives 4B and 4D, a construction staging area would be likely at the Sawmill Cove Ferry Terminal site. The number and location of other sites would depend on the contractor's work plans/schedule and sequencing of work areas in concert

with approval by DOT&PF. In the event that temporary construction camps and/or staging areas are needed outside of the permanent ROW for proposed project facilities, it would be necessary to obtain a use permit from the USFS for sites located on Tongass National Forest land, and a lease for sites on private or local government land. These requirements would apply for any material source sites or sites required for setting up rock crushers or other material processing equipment.

### 4.8.2 Visual Resources

Viewers from boats or ferries on Lynn Canal would see construction activities where they are not screened by vegetation and fugitive dust created during ROW clearing, grading, and blasting. These activities would contrast with the natural landscape and may dominate some viewsheds for a short period.

### 4.8.3 Historical and Archaeological Resources

No known National Register-eligible archaeological resources are present within the construction limits of any project alternative. The Jualin Mine Tram and the Comet/Bear/Kensington Railroad are known eligible historic resources on the alignment for Alternative 2B, and the Dalton Trail is the only known eligible historic resource on the alignment for Alternative 3. The boundaries of these historic properties would be flagged in the field to ensure that equipment operators do not inadvertently damage these resources. In the event a previously unknown cultural resource is discovered during construction, work in the vicinity of the site would cease until DOT&PF has evaluated the site, FHWA has determined its eligibility for the NRHP, and, if the site is determined to be eligible, DOT&PF, FHWA, and the SHPO have agreed to a plan to avoid or mitigate adverse impacts. If the site is determined to contain human remains subject to the provisions of the Native American Graves Protection and Repatriation Act, the appropriate tribal consultation would be conducted.

### 4.8.4 Socioeconomic Resources

Table 4-81 lists the estimated construction costs for all project alternatives and the corresponding annual labor employment required to construct each alternative. Labor employment was derived from the estimated construction cost. In major construction projects of this nature, labor constitutes from one-third to one-half of the total project cost. The total labor cost was calculated assuming it would be 45 percent of construction costs. Total labor cost was broken down into annual labor cost; construction was assumed to take approximately 6 years. Based on 2015 Quarterly Census of Employment Wages from ADOLWD, the total annual salary for highway, street, and bridge construction workers in Alaska was approximately $108,500 (ADOLWD, 2016). Total labor cost includes this annual salary plus 20 percent for benefits and other labor-related overhead, or approximately $130,200 per annual-equivalent job. The estimate of annual labor employment was determined by dividing this annual-equivalent job cost into the total estimated annual labor cost.

**Table 4-81:**
**Project Construction Phase Employment Impacts**

| Alternative | Construction Cost ($million) | Estimated Annual Employment (people) |
|---|---|---|
| 1 – No Action | 0.0 | 0.0 |
| 1B | 0.0 | 0.0 |
| 2B | 655.5 | 378 |
| 3 | 541.9 | 312 |
| 4A | 44.1 | 76 |
| 4B | 76.0 | 131 |
| 4C | 53.7 | 93 |
| 4D | 85.6 | 148 |

Note: Construction costs include only highway and ferry terminal costs; vessel construction is not included. Estimates are based on a 6-year construction period for Alternatives 2B and 3, and a 2-year construction period for Alternatives 4A through 4D.

In 2011, there were 11 firms designated as heavy construction employers in the Juneau-Haines-Skagway area with average annual employment of 135 workers (Rasmussen, personal communication 2013).

As indicated by the cost of construction and the related employment in Table 4-81, Alternatives 2B and 3 include substantially greater construction effort than the ferry alternatives, and that effort is assumed to stretch over 6 years. It is likely that the existing local workforce would not have the capacity to undertake the project without substantial labor from outside the Lynn Canal area; therefore, in the following discussion of the alternatives, additional calculations were performed to estimate the influx of construction workers from outside the region. Alternatives 4B and 4D construction may require a few workers from outside the region, but the duration is assumed to be relatively short (2 years), and it is unlikely any of the ferry alternatives would substantially alter the workforce and population of the Lynn Canal communities.

#### 4.8.4.1 Alternative 2B

As indicated in Table 4-81, construction of Alternative 2B would employ approximately 378 people per year. It is unlikely that the Juneau/Haines/Skagway region would have enough qualified workers for this construction project; therefore, workers would be needed from other areas in the state and elsewhere to construct any of these alternatives.

As the region's commercial and population center, Juneau would receive the largest construction-related impacts under Alternative 2B. Haines and Skagway would not experience appreciable socioeconomic impacts from the alternative because they are not located on the highway alignment for this alternative. Some construction work would occur at the ferry terminals in Haines and Skagway, and local construction contractors and labor could be used for that. Skagway would have minor construction-related impacts associated with ferry terminal modifications.

It is likely that the highway and new Katzehin ferry terminal construction effort would involve construction camps. Relying on available housing in Juneau would mean long daily commutes to the construction site. Camp locations are likely at Katzehin and Comet.

The location of the major workforce concentration is important in terms of where construction-related socioeconomic impacts would occur. Regardless of location, the types of impacts that could occur include:

- Increased sales with construction equipment, rental, and repair companies
- Increased sales with food wholesalers and other businesses providing goods and services to the construction camp(s)
- Increased sales for fuel distributors
- Increased sales to businesses providing goods and services to construction workers and dependents
- Increased sales tax revenues
- Increased demand for rental and other housing
- Increased enrollment in local schools
- Increased demands on other public services such as law enforcement, fire and emergency services and health care services

The total direct and indirect construction employment and population effects of Alternative 2B would depend on the factors outlined above. The estimates of total annual employment and payroll associated with Alternative 2B construction provided in Table 4-82 are high-case estimates because indirect impacts (those associated with business spending on goods and services in support of the construction project) and induced impacts (those associated with construction workers spending their payroll) develop over time and are generally lower for short-term projects such as construction of this alternative.

**Table 4-82:**
**Construction Phase Direct and Total Employment and Payroll Effects for Alternative 2B**

| Estimated Annual Direct Employment (people) | Estimated Annual Direct Payroll ($million) | Estimated Annual Total Construction-Related Employment (people) | Estimated Annual Total Construction-Related Payroll ($million) |
|---|---|---|---|
| 378 | 41.0 | 529 | 49.2 |

Note: Estimates are based on a 6-year construction period.

Table 4-83 provides an estimate of construction-related population increases, total new housing demand, and additional school-age population projections for Alternative 2B. These estimates are based on the assumption that half of the total construction-related labor force would seek some form of housing in Juneau, including construction workers relocating to Juneau. In addition, it is assumed that 75 percent of construction workers relocating to Juneau would bring dependents, family size would average 3.1 persons, and 20 percent of the dependent population would be school age. It is also assumed that workers seeking housing in Juneau who do not have dependents would seek shared housing with other construction workers at two people per housing unit. If workers with and without dependents are considered in estimating total construction-related housing, 165 units would be needed.

**Table 4-83:**
**Construction Phase Maximum Potential Population-Related Effects for Alternative 2B**

| Total Construction-Related Population Increase (people) | Total Construction-Related Housing Demand (No. of Units) | Additional Construction-Related School Age Population (children) |
|---|---|---|
| 486 | 165 | 88 |

Note: Estimates are based on a 6-year construction period.

The estimates of increases to population and housing are based on the assumption that 50 percent of the construction jobs for Alternative 2B would be filled by workers who are not residents of Juneau. In addition, it is assumed that approximately three-quarters of the construction workers relocating to Juneau would bring dependents, family size would average 3.1 persons, and 20 percent of any given household would be of school age. These assumptions are reflected in Table 4-83Table 4-83. Juneau had approximately 646 vacant housing units in 2011. Although the construction-related housing demand associated with Alternative 2B is less than existing vacancies, some additional housing development would probably occur in anticipation of increased demand.

The effect on the school district of additional school-age residents would depend on the age and geographic distribution of the construction-related population. Total public school enrollment in Juneau has been declining over the past 5 years; therefore, the infrastructure is in place to serve the additional anticipated enrollment. Additional enrollment would also result in increased State funding, which is based in part on enrollment.

#### 4.8.4.2 Alternative 3

Construction of Alternative 3 is estimated to cost approximately $542 million. This alternative would create approximately 312 construction jobs, which is less than the construction workforce estimated for Alternative 2B. Other economic impacts for Alternative 3 in terms of annual total employment and payroll, construction-related population increase, new housing demand, and additional school-age population are shown in Table 4-84 and Table 4-85.

**Table 4-84:**
**Construction Phase Direct and Total Employment and Payroll Effects for Alternative 3**

| Estimated Annual Direct Employment (people) | Estimated Annual Direct Payroll ($million) | Estimated Annual Total Construction-Related Employment (people) | Estimated Annual Total Construction-Related Payroll ($million) |
|---|---|---|---|
| 312 | 33.9 | 437 | 40.6 |

Note: Estimates are based on a 6-year construction period.

Construction-phase impacts related to the West Lynn Canal Highway differ from an East Lynn Canal Highway in that Haines could potentially be substantially affected. Alternative 3 construction effort would likely be camp-supported, and Haines would likely play a role in staging and provision of goods and services. Potential socioeconomic effects in Haines from Alternative 3 could be similar to those estimated for Juneau under Alternative 2B depending on how many workers are housed in a camp as opposed to living in Haines.

The estimates of increases to population and housing are based on the assumption that 75 percent of the construction jobs for Alternative 3 would be filled by workers who are not residents of

Haines. In addition, it is assumed that about half of construction workers relocating to Haines would bring dependents, family size would average 3.1 persons, and 20 percent of any given household would be of school age. Taking these assumptions under consideration, it is estimated that Alternative 3 could result in a total construction-related population increase of approximately 516 residents, including those residing in a local construction camp, and an increase of 80 additional school-age children. That would represent a temporary 21 percent increase in the population of Haines (the population estimate for Haines in 2015 was 2,493). It is also assumed that workers seeking housing in Haines who do not have dependents would seek shared housing with other construction workers at two people per housing unit. If workers with and without dependents are considered in estimating total construction-related housing, 187 units would be needed. An estimate of these increases is shown in Table 4-85.

**Table 4-85:**
**Construction Phase Maximum Potential Population-Related Effects for Alternative 3**

| Total Construction-Related Population Increase (people) | Total Construction-Related Housing Demand (no. of units) | Additional Construction-Related School-Age Population (children) |
|---|---|---|
| 516 | 187 | 80 |

Note: Estimates are based on a 6-year construction period.

There are approximately 480 vacant housing units in Haines, of which about 137 may be available for year-round rental. As many as approximately 187 additional housing units could be required in Haines, depending on how many workers may be based in construction camps. This estimate is more than the reported year-round number of units available; some additional housing units would probably be constructed in anticipation of increased demand.

The estimated construction-related population increase under Alternative 3 would increase public school enrollment by approximately 80 new students in all grades. Physical facilities in the Haines school district are adequate to meet this demand; however, depending on the distribution of students among grades, it may be necessary to hire one or more teachers.

#### 4.8.4.3 Alternatives 4A through 4D

The only in-state construction expenditures associated with Alternatives 4A and 4C would be minor reconfiguration of the Auke Bay Ferry Terminal, requiring about 76 and 93 workers, respectively. This construction would have no appreciable effect on the Juneau economy. Construction for Alternatives 4B and 4D would include the Sawmill Cove Ferry Terminal and the highway between Echo Cove and Sawmill Cove, requiring approximately 131 and 148 workers, respectively. The estimated annual employment for these alternatives would equal between 56 percent (Alternative 4A) and 110 percent (Alternative 4D) of the existing heavy construction workforce (135) in the region. The economic effects to Juneau, Haines, and Skagway from this increase in construction jobs over a 2-year period would be negligible.

### 4.8.5 Transportation

AMHS may set up interim ferry service during construction of Alternative 3. For Alternative 3, interim ferry service to Haines and Skagway could be instituted from Sawmill Cove after construction of the ferry terminal and the highway from Cascade Point. This service could be provided by the Day Boat ACFs. This would reduce the overall running time and cost of operation.

### 4.8.6 Hydrology and Water Quality

During construction of the highway segments of Alternatives 2B, 3, 4B, and 4D, small non-anadromous fish streams with perennial flow would need to be diverted during placement of culverts. Diversions would not be required for anadromous fish streams and rivers to be spanned by bridges.

Diversion of streams would be done during low-flow periods to avoid downstream water quality impacts using standard procedures to minimize water quality impacts. Depending on flows, water may be pumped around the site where the culvert is being placed, or the stream may be diverted to a temporary lined channel. When the culvert is in place and the stream is re-established in its natural channel, there would be a short-term, one-time increase in turbidity. Based on past experience, this short-term increase in turbidity would not change stream profiles or result in a long-term degradation of fish habitat.

Bridges crossing streams would be built from shore. No temporary roads would be established in streambeds. This would minimize turbidity caused by bridge construction.

Bridges crossing major rivers would require placement of piers in the river bed. This construction activity would be timed to periods of low flow to minimize turbidity; however, there would be a short-term increase in turbidity during this activity. Based on past experience, this short-term increase in turbidity would not change river profiles or result in a long-term degradation of fish habitat.

Construction of the proposed ferry terminals at Katzehin (under Alternative 2B) and Sawmill Cove (under Alternatives 3, 4B, and 4D) would require dredging to approximately 25 feet below mean lower low water. The proposed William Henry Bay Ferry Terminal for Alternative 3 would not require dredging. The new terminals proposed for the project alternatives would require placement of in-water fill. Alternative 2B would also require in-water fill in intertidal/subtidal areas for highway construction. Dredging and in-water fill placement would result in short-term (hours or days) localized increases in turbidity. Based on past studies of dredging impacts conducted by the USACE, fish would avoid the dredge or fill sediment plume. Benthic invertebrates that cannot rapidly move away from the sediment as it settles out of the water column would be buried and killed. Kelp and aquatic vegetation in close proximity to dredging would be covered with sufficient sediment to hamper photosynthesis and some of this vegetation may die. Areas affected by sediment deposition would be expected to recolonize within one to two seasons. The fill used for the project would be shot-rock generated during highway construction; therefore, no pollutants would be introduced into marine waters from this fill material.

Highway and ferry terminal construction would involve earth-moving activities. Exposed soils susceptible to erosion can be discharged to natural water bodies, resulting in short-term increased turbidity.

Fuel and lubricant spills and leaks could occur during construction. These potential pollutants could flow directly to area water bodies or be transported to them by stormwater runoff.

Debris and waste are generated during construction. If not properly managed, they can contribute to water pollution through stormwater runoff.

During design of the selected alternative, an erosion and sediment control plan would be developed to provide a general plan to minimize erosion and sedimentation during construction.

Project contractors would use this plan to develop SWPPPs for their work. Each SWPPP would detail the resources that a contractor has on-hand and the procedures and BMPs that the contractor would use to prevent construction activities from jeopardizing area hydrology or water quality. BMPs would include:

- An erosion and sediment control plan would be prepared to describe the BMPs to be used in avoiding water quality impacts to wetlands and other water bodies. This plan would be made available to resource agencies for review and comment before being included in project plans. Staking would be done at the planned outside limits of disturbance prior to construction to ensure that impacts are limited to that area.
- Grass seed would be placed on any road slope containing soil. To protect the integrity of the natural plant communities, plant species indigenous to the area would be used for vegetating road slopes, except that non-native annual grasses may be used to provide initial soil cover.
- Silt fences would be used adjacent to waterways just beyond the estimated toe of fill.
- Sedimentation basins would be used, as necessary, during construction.

The APDES Stormwater General Permit for construction projects in Alaska requires the contractor to submit a project SWPPP to ADEC for review. The provisions of the General Permit require the contractor to inspect the project regularly and after rain events that are less than the 2-year, 24-hour event. Any problems must be corrected by repairing malfunctioning BMP features or altering the SWPPP. The General Permit requires that inspections and changes to the SWPPP be documented, with records available for compliance review.

The General Permit authorizes projects that will not exceed the appropriate water quality standards. All contractor and DOT&PF inspections, and most reviews by ADEC, are based on visual inspections, with a problem addressed if noticeable erosion or sedimentation is occurring.

### 4.8.7 Air Quality

Construction can be a source of dust emissions that have temporary impacts on local air quality (i.e., exceedances of the NAAQS for $PM_{10}$). Construction particulate emissions would result from drilling and blasting and use of heavy equipment involved in land clearing, ground excavation, cut-and-fill operations, and the construction of project facilities. Dust emissions would vary from day to day depending on the level of activity, the specific operations, and the prevailing weather. Dust emissions would be minimized by application of BMPs, such as watering exposed soil surfaces in active work areas, if necessary. Most of the study area is distant from populated areas, so dust would primarily be a concern for workers and habitat areas adjacent to the project.

In addition to particulate emissions from earth moving, there would be pollutant emissions (CO, $NO_x$, $PM_{10,}$ and reactive organic compounds) from construction equipment engines. These emissions are not expected to result in exceedances of NAAQS for any pollutant because of the low background levels of pollutants in the study area and the relatively small amount of construction equipment.

### 4.8.8 Noise

The evaluation of construction noise was based on typical noise levels from public works projects, such as road construction, developed by the EPA. Using that information, the overall noise level generated on a construction site for proposed project alternatives was estimated to average 88 dBA (±8 dBA for rock drills) at 50 feet, except where blasting is to be done, which would produce higher short-term noise levels. Noise levels generated by construction equipment would decrease at a rate of approximately 6 decibels (dB) per doubling of distance away from the source (Diehl, 1973) for hard sites (i.e., unvegetated, open water), and approximately 7.5 dB per doubling distance away from the source for soft (i.e., vegetated) sites. For all build alternatives, typical noise from project construction (i.e., non-blasting activities) would drop to background levels at about 3,300 feet from the construction site. In many places, the noise would attenuate over much shorter distances because of terrain.

Because of the different phases of construction (e.g., clearing, grading, cut and fill, etc.), no single location would experience a long-term period of construction noise. Instead, construction activities and associated noise would move along the ROW as construction proceeds.

DOT&PF would include specific noise abatement requirements in the construction contracts for the proposed project. Those requirements would include proper maintenance of noise control equipment like mufflers.

### 4.8.9 Wetlands

Highway construction for Alternatives 2B, 3, 4B, and 4D require work in wetland areas. Excavation, grading, and cut-and-fill activities could alter local hydrologic patterns, which could affect these wetlands. The erosion and sediment control plan developed by DOT&PF for implementation by construction contractors would contain specific BMPs to avoid construction impacts to wetlands including:

- Embankment heights and side slopes would be minimized during design to reduce fill footprints in wetlands.
- Separate identification of slope limits to insure workers are aware of wetlands and the need to avoid impacts beyond the slope and clearing limits.
- Construction camps, borrow pits, and waste areas would be located in upland areas and stabilized during and after use to avoid water quality impacts to wetlands and water bodies.

The SWPPP (see Section 4.8.6) would include provisions to avoid contaminating these wetlands. Wetland fill limits would be separately identified to raise the awareness of workers on the need to avoid impacts beyond the toe of the slope.

No borrow sites, disposal sites for excess material, or construction camps would be located in wetlands. No storage areas or truck turnaround areas are anticipated to be in wetlands other than within the actual footprint of the highway. The locations for these activities would be further evaluated during design.

### 4.8.10 Terrestrial Habitat

As discussed in the impact assessment for all project alternatives, the permanent loss of terrestrial habitat associated with the JAI Project would be a small percentage of the total area of similar habitats available in the Lynn Canal region. Clearing of remote temporary construction facilities would not substantially affect terrestrial habitats, and those areas outside the footprint of the project would be temporarily stabilized, then allowed to revegetate naturally.

Construction activities have the potential to introduce invasive plant species to the Lynn Canal region. There are three pathways for this potential impact. Construction equipment brought to the project site from other areas could contain seeds or plant parts that could then be spread to the construction site. Seed mixtures used to vegetate exposed soils could contain invasive species. Soil containing invasive species excavated from one area could be moved to another area, thus spreading the invasive species. Table 4-86 provides a list of existing invasive species in Southeast Alaska. See Section 5.4 of this Final SEIS for information on mitigating these potential impacts.

**Table 4-86:**
**Southeast Alaska Invasive Plants**

| Scientific Name | Common Name |
|---|---|
| *Acroptilon repens* | Russian knapweed |
| *Alliaria petiolata* | Garlic mustard[3] |
| *Bromus tectorum* | cheatgrass[4] |
| *Cardaria draba* | Hoary cress |
| *Centaurea maculosa* | Spotted knapweed |
| *Cerastium fontanum* | Common mouse-ear[1] |
| *Chrysanthemum leucanthemum* | Oxeye daisy |
| *Cirsium arvense* | Canada thistle[2] |
| *Cirsium vulgare* | Bull thistle[4] |
| *Convolvulus arvensis* | Field bindweed |
| *Crepis tectorum* | Narrow-leaf hawksbeard |
| *Cytisus scoparius* | Scotch broom[2] |
| *Dactylis glomerata* | Orchard grass[2] |
| *Elytrigia repens* | Quackgrass |
| *Euphorbia esula* | Leafy spurge |
| *Galeopsis tetrahit* | Hempnettle[2] |
| *Galinsoga parviflora* | Smallflower galinsoga |
| *Hieracium aurantiacum* | Orange hawkweed[2] |
| *Hordeum jubatum* | Foxtail barley |
| *Hypericum perforatum* | Common St. John's Wort[2] |
| *Hypochaeris radicata* | Hairy catsear[4] |
| *Impatiens glandulifera* | Himalayan balsam[2] |
| *Lactuca pulchella* | Blue lettuce |
| *Linaria vulgaris* | Butter and eggs[1] |
| *Lythrum salicaria* | Purple loosestrife |

| Scientific Name | Common Name |
|---|---|
| *Melilotus albus* | White sweetclover[2] |
| *Myriophyllum spicatum* | Eurasian watermilfoil |
| *Onopordum acanthium* | Scotch thistle |
| *Phalaris arundinacea* | Reed canarygrass[2] |
| *Polygonum convolvulus* | Wild buckwheat |
| *Polygonum cuspidatum* | Japanese knotweed[2] |
| *Ranunculus repens* | Creeping buttercup[1] |
| *Rorippa austriaca* | Austrian fieldcress |
| *Senecio jacobaea* | Tansy ragwort[2] |
| *Solanum carolinense* | Horsenettle |
| *Sonchus arevensis* | Perennial sowthistle |
| *Spergula arvensis* | Corn spurry |
| *Tanacetum vulgare* | Common tansy[4] |
| *Tragopogon dubius* | Western salsify[4] |
| *Vicia cracca* | Tufted vetch |

[1] These species were detected in the project area during the JAI Project sensitive plant surveys (see Appendix Q of the 2005 Supplemental Draft EIS).

[2] These invasive species have become established in some areas in the Tongass National Forest (Foster Wheeler Environmental Corporation, 2003) and southeast Alaska (Borchert, 2003; CNIPM, 2003).

[3] This species has already appeared in Juneau (Foster Wheeler Environmental Corporation, 2003).

[4] From USFS, 2007.

### 4.8.11 Marine and Freshwater Habitat and Species (Including Essential Fish Habitat)

Construction of ferry terminals for Alternatives 2B, 3, 4B, and 4D would result in a short-term increase in turbidity near the construction sites. This turbidity could result in the loss of some Pacific herring eggs in the vicinity of the Sawmill Cove Ferry Terminal site (under Alternatives 3, 4B, and 4D), sculpin eggs at the William Henry Bay terminal site (under Alternative 3), and has the potential to affect migrating anadromous and/or resident species located near the Katzehin Ferry Terminal site (Alternative 2B). Timing of in-water construction to avoid the peak migratory, spawning and egg maturation period would avoid this impact. Increased turbidity could also result in the loss of some benthic organisms. These impacts would not have population-level effects on any benthic species, fish, or crab species in Lynn Canal.

Temporary barge landings for Alternatives 2B, 3, 4B, and 4D would be used to transport construction equipment and personnel for the road construction and would affect EFH along the shoreline of Lynn Canal. Shortening the distance required for delivery of equipment and materials with these landings would provide the contractor flexibility and opportunities to shorten the construction duration. Tug boats and associated underwater noise would occur within EFH and could temporarily diminish the quality of the habitat for juvenile fish species, such as salmonids and eulachon. These impacts would be short term.

Debris from blasting and other construction activities could potentially reach Lynn Canal and disturb nearshore habitat areas. Disturbances are expected to be short term and would not result in long-term effects to EFH or aquatic species. To minimize this potential, the contractor would

be required to implement control measures during initial surface blasts, production blasting, and other construction activities for areas that have the potential to reach Lynn Canal.

Construction of multi-span bridges across the Antler (Alternative 2B), Berners/Lace (Alternative 2B), Katzehin (Alternative 2B), Sullivan (Alternative 3), Endicott (Alternative 3), and Chilkat (Alternative 3) rivers would require placement of support structures in the river channels. A falsework[75] would be erected to provide a platform for equipment, and thereby eliminate the need for equipment to actively work in the river below ordinary high water levels. Impacts within the river could occur due to noise and vibration generated during pile driving and increased turbidity (at the crossing and downstream) as the falsework is erected.

The vast majority of pile driving will take place using vibratory hammers. Impacts on fish or other aquatic organisms have not been observed in association with the use of vibratory hammers. For this reason, vibratory driving of piles is generally considered less harmful to aquatic organisms and is the preferred pile installation method of federal resource agencies (i.e., USFWS and NMFS; WSDOT, 2013). For piles that are weight-bearing (such as those that support bridges), following initial vibratory installation, piles would be driven with an impact hammer to ensure that they are stable and at adequate depths. This is called "impact proofing."

The extent of injury-producing underwater noise for fish species was determined using input for the maximum sound pressures anticipated to result from impact proofing of the largest piles to be driven as part of the project. Based on the size of the piles anticipated to be used for many in-water structures associated with this project (48-inch diameter), small fish less than 2 grams in size could be injured within 131 feet of the pile being proofed; fish greater than 2 grams in size could be injured within 72 feet of the pile.

Construction in the river channels would also result in short-term turbidity that could affect migrating fish and smother fish eggs. Although bridge construction in these rivers may lead to some mortality of resident or anadromous fish, the full width of each river would not be affected at once and construction would be timed to avoid periods when anadromous fish are active in the area. For these reasons, turbidity should not result in the loss of spawning, rearing, or migratory habitat since non-turbid areas would likely be available to individuals present. Further, due to the high levels of ambient turbidity in Antler, Berners/Lace, and the Katzehin rivers, it is not anticipated that turbidity increases would result in behavioral modifications or abandonment of habitat where in-river construction occurs.

Runoff during construction could contain sediments, heavy metals, and organic compounds from construction equipment; however, as noted in Section 4.8.6, BMPs would be used to avoid impacts from runoff. No direct mortality or disturbance of anadromous and resident fish would occur from runoff.

In summary, construction-related impacts on marine and freshwater species and habitat (including EFH) would be temporary. Ferry terminal construction would not have population-level effects on any benthic species, fish, or crab species in Lynn Canal and bridge construction is not expected to result in long-term population-level effects on resident or anadromous fish.

[75] A falsework is a temporary structure on which a permanent bridge is wholly or partly built and supported until the bridge is strong enough to support itself.

## 4.8.12 Wildlife

### 4.8.12.1 Marine Mammals

Marine mammals would be affected during construction of the alternatives as described in the following paragraphs. Harbor seals may be disturbed by loud noises caused by highway and ferry terminal construction activities near the shore. It is likely that harbor seals would perceive active construction areas in or immediately next to the water from a distance and avoid the area if noise levels are bothersome. Harbor seals haul out on sandbars in Berners Bay and at the Katzehin River delta. They have also been observed to haul out on the west side of Taiya Inlet at the base of Halutu Ridge. On the west side of Lynn Canal, harbor seals haul out in protected waters near the Sullivan River, Davidson Glacier delta, and Pyramid Island. Construction noise caused by any of the alternatives may cause harbor seals to temporarily abandon some haulout sites. However, they are likely to return to those sites after the noise has ceased. In addition, there are numerous haulout sites that seals use throughout Lynn Canal. This temporary disturbance would not result in population-level effects on this species.

Debris from blasting and other construction activities could potentially reach Lynn Canal and disturb hauled-out or nearshore marine mammals. Disturbances are expected to be short term and would not result in long term affects marine mammals. To minimize this potential, the contractor would be required to implement control measures during initial surface blasts, production blasting, and other construction activities for areas that have the potential to reach Lynn Canal.

Construction impacts are not expected to occur for minke whales, Dall's porpoise, harbor porpoise, killer whales, or sea otters with any of the proposed alternatives.

### 4.8.12.2 Marine Birds

Project construction could result in flushing some marine birds, such as marbled murrelets, yellow-billed loons, and harlequin ducks, resting or feeding in nearshore waters. These short-term displacements would cost birds a small amount of energy and time but would not affect reproductive success or survival.

Disturbance of nesting birds could decrease their chances of reproductive success for the season or could cause them to abandon their nests. The waterfowl and herons in the study area begin breeding activities in late April or early May and some do not fledge their young until the middle of August. Marbled murrelets nest in OG forest, the most common habitat type crossed by the proposed highway alignments on the east and west sides of Lynn Canal. Therefore, marbled murrelets may be the species most affected by highway construction. Clearing in OG areas for Alternatives 2B or 3 would be spread over more than one season. Alternatives 4B and 4D would affect a 2.3-mile-long, 100-foot-wide strip of vegetation. For any of the build alternatives, only a small portion of available habitat would be affected during any nesting season.

Road construction in rocky shore habitat could inhibit black oystercatchers from nesting in those areas or disturb the birds after nesting has occurred, which would decrease their chances of reproductive success for the season. Black oystercatchers are uncommon in the project area; therefore, the impacts described would likely affect only a few individuals and would not have a population-level effect on the species.

As Aleutian terns and dusky Canada geese are not documented in Lynn Canal and are unlikely to be present, construction of the alternatives is not likely to affect either species.

Disturbance of nesting birds would not have population-level effects on waterfowl and herons in Lynn Canal. Highway construction (Alternatives 2B, 3, 4B, and 4D) would proceed in stages over the alternative alignments. Construction would not take place over the entire length of any alignment in one season with the possible exception of the relatively short extension of Glacier Highway to Sawmill Cove for Alternatives 4B and 4D. Therefore, only a small area of nesting habitat relative to the amount available throughout the region would be disturbed during any one breeding season.

#### 4.8.12.3 Terrestrial Mammals

Some species of terrestrial mammals such as bears, wolves, river otters, and martens give birth in dens during the winter or spring. It is possible that highway construction under Alternatives 2B, 3, 4B, and 4D could cause some direct mortality of adults and young in dens inadvertently destroyed during clearing operations in the early spring. However, only a few individuals are expected to be affected and therefore construction would not result in population-level effects on any species in the Lynn Canal region. To reduce the likelihood of affecting denning wolves, a den survey would be conducted (see Section 5.9).

Black and brown bears typically avoid human activity. However, they 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). To minimize bear-human interactions, BMPs for food and waste disposal would be implemented for construction camps, highway pullouts, and day-to-day construction activities.

The noise produced during winter construction has the potential to disturb denning brown bears, which could lead them to abandon their dens (Swenson et al., 1997). An ADF&G study of the JAI Project corridor (Flynn et al., 2012) involved visits to six denning sites, all of which were in closed, forested areas at high elevations, far up major river drainages away from all project alternatives. It is not likely that these sites would be disturbed. 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 affect bear populations along east Lynn Canal.

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.

Construction areas may create temporary paths for moose to escape deep snow or move to different areas, increasing the potential for construction vehicles to collide with moose, especially near lower Berners Bay and the Katzehin River valley. Construction vehicles, however, operate at relatively slow speeds, and generate loud noise, which greatly reduces the likelihood of collisions with moose because moose would move away from the vehicles and noise.

Mountain goat summer habitat is at high elevations throughout Lynn Canal and is unlikely to be disturbed by construction noise from any of the alternatives during the summer. In the winter, when goats move to lower elevations closer to or within the project area, the noise generated by machinery and blasting may disturb animals nearby. Wildlife observers would examine the nearby area for the presence of mountain goats prior to construction rock blasting and, if necessary, haze them in an attempt to have them depart the area. 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 and result in increased mortality.

With Alternatives 2B and 3, avalanche control activities would likely occur during the early 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 winter forage (White et al., 2012b). No mitigation is proposed for the impacts of the avalanche control activities on mountain goats.

Construction of the project alternatives would not likely have an impact on wolverines or their populations in southeast Alaska. This is due to their low densities near the project area, their low site fidelity, and their propensity to avoid areas of human influence (Banci, 1994).

#### 4.8.12.4 Terrestrial Birds

Project construction effects on terrestrial birds are similar to those described for marine birds. Loud noises from construction activities are likely to disturb birds within 0.25 to 0.5 mile of the alignment. If the birds are feeding or resting, they would fly away from the disturbance and resume their normal behavior in another location. Disturbance of nesting birds would decrease their chances of reproductive success for the season and would be avoided to the extent practicable. It is not expected that project construction would have population-level effects on terrestrial birds in Lynn Canal. As explained above, highway construction would proceed in stages over the alternative alignments. Construction would not take place over the entire length of any alignment in one season except for the relatively short extension of Glacier Highway to Sawmill Cove for Alternatives 4B and 4D. Therefore, only a small area of nesting habitat relative to the amount available throughout the region would be disturbed during any one breeding season. A pre-construction goshawk nest study would be conducted to ensure that there are no impacts to nesting goshawks.

#### 4.8.12.5 Amphibians

Project construction could result in the loss of individual frogs and toads in the wetlands crossed by the highways for Alternatives 2B, 3, 4B, and 4D. No palustrine emergent wetlands or open water would be filled by Alternatives 2B, 4B, and 4D. Alternative 3 would require fill in palustrine emergent wetlands. A pre-construction survey would be conducted to confirm that no amphibian breeding areas would be affected. Therefore, the loss of individuals is not expected to have population-level effects on any species in the Lynn Canal region, as the area disturbed is small relative to the total regional habitat available to amphibians.

#### 4.8.12.6 Bald Eagles

As discussed in Section 4.1.15, the National Bald Eagle Management Guidelines recommend maintaining a buffer of at least 660 feet between project activities and an active nest if the

activity will be visible from the nest site. The buffer is intended to restrict all vegetation clearing, external construction, and landscaping activities within 660 feet of the nest to outside the bald eagle nesting season. If the nest is not visible from the construction activity, a buffer of 330 feet should be maintained.

For blasting and other loud construction noises, a 0.5-mile buffer should be maintained.

Bald eagles are sensitive to visual and auditory disturbances, especially during the early part of the nesting cycle (e.g., nest building, incubation, and the first 5 weeks of nestling life). The presence of humans or construction noise near bald eagle nests has been found to cause changes in almost all aspects of eagle breeding behavior. Responses to disturbances include frequently flushing from the nest, not leaving the nest to feed, expending energy on defending the nest rather than maintaining the nest, and abandoning the nest (Steidl and Anthony, 2000).

Construction along the alignments of Alternatives 2B and 3 would be staged; therefore, construction would not occur along the entire alignment in any one season. In addition, not all eagle nests are actively used each year. New bald eagle nests are built each year and some older nests may be destroyed each winter from storms and snow loads, or remain unused for a long period of time. Non-nest trees slated for removal under Alternatives 2B, 3, 4B, and 4D that could be suitable for nesting in the future represent less than 1 percent of available nesting habitat for bald eagles in Lynn Canal. As a result, construction of Alternatives 2B, 3, 4B, and 4D would not affect the overall population of bald eagles in Southeast Alaska. Based on the current design of the alternatives, the DOT&PF does not anticipate the removal of a bald eagle nest tree.

Communal roosting areas are not known to occur along the highway alignments. Seasonal concentrations of eagles feed in Berners Bay, the Katzehin River, the Endicott River, and the Chilkat River during spring spawning aggregations of eulachon and Pacific herring. Eagle concentrations also occur in the tributaries of these systems during summer runs of salmon. Preferred or specific resting areas have not been identified along the highway alignments. It is anticipated that potential disruption during feeding activities or while resting would be short term during construction activities. This is not expected to result in a significant reduction in the eagle population in the Lynn Canal.

Depending on the selected alternative for the JAI Project, the DOT&PF would need to apply for an eagle Disturbance Permit for nests within 660 feet of the cut and fill limits and for active nests within 0.5 mile of blasting activities and other loud construction noises. As a requirement of the permit program, the applicant must consult with the USFWS prior to construction and, if required, update aerial bald eagle nest surveys to determine the current status of the nests (i.e., which nests are still active and whether there are any additional nests in the project area that may be affected by construction activities). An additional requirement of the permit program is post-construction monitoring. Depending on the magnitude of the anticipated disturbance, USFWS may require DOT&PF to provide post-construction monitoring to determine whether the nest sites, communal roosts, or important foraging areas continue to be used by eagles for up to 3 years following completion of the permitted activity (USFWS, 2009).

In addition to the USFWS regulations, the CBJ Land Use Code states that development is prohibited within 330 feet of an eagle nest on public land within the CBJ. The DOT&PF would need a variance from the CBJ for the JAI Project if the selected alternative requires construction within 330 feet of a bald eagle nest within the CBJ.

#### 4.8.12.7 Threatened and Endangered Species

Construction activities for Alternative 2B have the potential to affect Steller sea lions and humpback whales. As described in Section 4.3.17, FHWA determined that Alternative 2B may affect and is likely to adversely affect the western DPS of Steller sea lions and Mexico DPS humpback whales, and initiated formal consultation with NMFS. Additional information regarding Section 7 consultation with NMFS is described in Section 7.5.2. In general, the new alignment of Alternative 2B would likely have fewer impacts to Steller sea lions than the alignment in the 2006 ROD because portions of the highway would be shifted inland. Near the Gran Point haulout, the alignment would be shifted uphill and redesigned to go through two tunnels to avoid a rockfall area and to avoid cutting through slopes. This alignment modification would move the road farther away from the Gran Point haulout: approximately 100 to 600 feet horizontally and 50 to 100 feet vertically, depending on location. Near the Met Point haulout, a portion of the road alignment (roughly 1,500 feet) would be shifted 25 to 100 feet closer to Lynn Canal. The remaining road alignment would be relatively unchanged.

Based on the analysis of noise levels, noise associated with typical highway construction activities within 1,000 feet of the Gran Point and Met Point haulouts would likely be above estimated ambient noise levels at the haulouts (background noise levels at remote shorelines in Berners Bay have been measured at 47 to 52 dBA). This means that Steller sea lions would likely hear construction noise at the haulouts. However, most construction-related noise at the haulouts would fall well below the 100 root mean square decibels ($dB_{RMS}$) in-air disturbance threshold for Steller sea lions established by NMFS (NMFS, N.d.). Therefore, Steller sea lions would not be exposed to noise levels exceeding the NMFS in-air disturbance threshold for all activities except blasting.

Blasting would be audible at Gran Point and Met Point haulouts. Rock blasting may result in temporary abandonment of Met Point or Gran Point by Steller sea lions. The duration of displacement from each haulout would depend upon individual tolerance and resilience following blast events. Some individuals may become tolerant to disturbances over time. Although blast noise would potentially displace hauled-out Steller sea lions, such disturbance would not result in population-level effects.

Flying debris from blasting and other construction activities could potentially reach Gran Point and Met Point haulouts and disturb hauled-out Steller sea lions. Disturbances would be temporary and would not result in population-level effects. To minimize this potential, the contractor would be required to implement control measures during initial surface blasts, production blasting, and other construction activities for areas within 500 feet of Gran Point or Met Point that have the potential to reach the haulout.

In the 2006 ROD, commitments required that helicopters used during construction, including surveying activities, avoid operating within the 3,000-foot critical habitat radius of Steller sea lion haulouts when they were occupied. This was considered a feasible measure, based on earlier visual and video camera monitoring that indicated an absence of Steller sea lions in late summer. Based on more recent data collected, Steller sea lions are present year round and it is no longer feasible to avoid operating helicopters when Steller sea lions are present. It is common for fixed-wing and rotary-wing aircraft transiting the Lynn Canal corridor to regularly fly over the 3,000-foot critical habitat air-radii around Met Point and Gran Point, with the highest numbers of aircraft during the May to September tourist season. These activities have not been reported as

factors that limit the use of Steller sea lion haulouts in the action area, based on the several years of monitoring data collected at Gran Point by DOT&PF. Construction-related helicopter use within 3,000 feet of Gran Point or Met Point would occur at a minimum altitude of 1,500 feet (when weather conditions permit), and a minimum distance of 1,000 feet from each haulout. No direct flights over the haulouts would be conducted. Flights at this distance would ensure that noise associated with helicopters would not exceed the in-air disturbance threshold for hauled-out Steller sea lions ($100dB_{RMS}$). This altitude is also consistent with NMFS guidelines for viewing marine mammals from a helicopter, which state to "maintain a 1,500 foot minimum altitude when viewing marine mammals from the air" (NMFS, 2012).

For construction of Alternative 2B, temporary barge landings would be used to transport construction equipment and personnel for the road construction. Shortening the distance required for delivery of equipment and materials would provide the contractor flexibility in operations and opportunities for efficiencies to shorten the construction duration. Tug boats and associated underwater noise could disturb individual Steller sea lions, causing them to avoid the general area of activity during the landing and "undocking" process.

One notable change to Alternative 2B since the 2006 ROD is the proposed tunnel construction upslope of the Gran Point haulout, which would require blasting. The closest tunnel blasting activities to the Gran Point haulout would be approximately 550 feet (northeast of Gran Point); excavation blasting at the Met Point haulout would occur within 300 feet of the haulout. Blasting associated with the use of 20-pound charges for tunnel/slope excavation would create loud, instantaneous noise anticipated to be 126dBA at 50 feet, but would likely vary depending on the substrate, charges per delay, and weather conditions. These noise levels would likely attenuate to background levels (existing levels of 47 dBA) within 2 to 3 miles. It is possible that individuals from the western DPS would be subject to in-air noise levels above the threshold of $100dB_{RMS}$ and hauled-out individuals could temporarily abandon the haulout. Blasting activities are anticipated to be short-term in duration and are not anticipated to result in long-term abandonment of either Gran Point or Met Point. Steller sea lions may react to loud or unfamiliar sounds by diving into the water from land or by submerging when they are in the water. Generally, they return to their previous behavior within an hour or so after the disturbance. However, their tolerance for this kind of disturbance would depend on its continuity. Steller sea lions may abandon a haulout for longer periods of time if a disturbance continues (NMFS, 2005b). Regardless, construction-related noise disturbance would not result in population-level effects to the western DPS of Steller sea lions, particularly because so few of them are anticipated to occur in the action area. (Konya and Walter, 2003).

Construction activities for Alternatives 2B, 3, 4A/4C, and 4B/4D that could affect Steller sea lions also include underwater noise generated by construction of barge landings, in-water fill placement, pile driving, and dredging. Placement of fill at the ferry terminal sites in Sawmill Cove, the Katzehin River, and William Henry Bay is not expected to generate substantial in-water noise, as this activity is generally done from shore during lower tides. Dredging would take place between October 1 and March 1 when there are no spawning activities of Steller sea lion and humpback whale prey species in the project area. Driving of piles would be done with vibratory hammers to the extent possible to reduce the intensity of sound generated. During all piling installations (vibratory or impact driving), 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. Similar to blasting, construction noise would be temporary in

nature and would not be expected to result in long-term abandonment of either Gran Point or Met Point. Steller sea lions may react to construction noise by diving into the water from land or by submerging when they are in the water, but are expected to return to their previous behavior shortly after the disturbance.

Construction of new ferry terminals and reconstruction of the ferry terminal in Auke Bay would result in a short-term increase in turbidity near the construction site. This turbidity could result in the loss of the eggs of some Steller sea lion prey species, such as Pacific herring, at the proposed ferry terminal site. In-water construction work would occur between October 1 and March 1 to avoid the spawning and egg maturation period. These impacts would not have population-level effects on Steller sea lion and humpback whale prey species in Lynn Canal. Construction requiring placement of fill would affect intertidal and subtidal marine habitat. This temporary loss of potential habitat for prey species would not likely affect the population of prey species available in Lynn Canal.

Humpback whales near shore may hear or feel construction activities that take place at ferry terminal sites or on highway alignments close to shore. The reaction of humpback whales to underwater noise would depend on how far away they were from the disturbance and what they were doing at the time. In some cases, whales change course and speed to avoid a noisy ship. In other cases, especially when they are feeding in an area of high prey availability, whales tolerate very loud noises. To minimize construction impacts to whales, trained observers would be on-site in areas with a high probability of noise impacts, including pile driving at ferry terminals and bridge sites, to watch for the presence and/or disturbance of whales. No pile driving would occur when humpback whales and other marine mammals are within 660 feet. The short-term disturbance due to construction noise would not affect the humpback whale population in Lynn Canal.

## 4.9 Cumulative Impacts

The geographic area for the cumulative effects assessment encompasses the following areas:

- Auke Bay Ferry Terminal and Echo Cove within the CBJ for all resources, and the Glacier Highway in Juneau for noise impacts
- Echo Cove, around Berners Bay, and north along the east side of Lynn Canal and Taiya Inlet to Skagway
- Municipality of Skagway Borough
- Haines Borough
- William Henry Bay to Mud Bay Road in Haines, on the west side of Lynn Canal

Baseline conditions and current actions within the study area were evaluated in 2003, and reevaluated in 2005 and 2012. The time frame for past actions ranged from the nineteenth century, when the earliest mining operations began, to 2012. The time frame for reasonably foreseeable actions extends to 2055 and includes projects that are funded or have been permitted by a regulatory or resource agency.

As discussed below, most of the reasonably foreseeable projects that have been identified for the cumulative effects assessment are located in the vicinity of Juneau. One of them is near Haines.

The cumulative impact discussion presented in this section updates the cumulative impact analysis presented in the 2006 Final EIS and is based on updated technical analyses and research conducted in support of this Final SEIS.

### 4.9.1 Past, Present, and Reasonably Foreseeable Projects

Past, present, and reasonably foreseeable actions in the project area were identified using planning documents, personal communications with resource agency representatives, NEPA documentation, current events reported in the local and regional news, best professional judgment, and comments received during the 2012 scoping period for this SEIS. Sections 4.9.1.1 through 4.9.1.4 explain the actions included in this analysis. Past, present, and reasonably foreseeable actions considered in this analysis include projects on private and public lands. Section 4.9.1.5 lists actions not included in the analysis and the basis for their exclusion. Actions considered "reasonably foreseeable" are those that are funded or that have acquired permits and that would occur with or without the JAI Project.

#### 4.9.1.1 Mining

On the east side of Lynn Canal, the project study area lies within a large mineral region known as the Juneau Mining District, which has produced large quantities of gold, silver, and lead since 1869. The larger-scale mining activities have occurred primarily outside the project corridor, to the southeast of the project, near Juneau. The proposed alignment for Alternative 2B, however, runs through areas of prospects, claims, and historic and current mines. Mining and prospecting within the project corridor have been primarily for copper, gold, silver, and zinc, with the primary area of historic mining activity along Berners Bay at the Jualin and Kensington Mines.

Mining has been minimal along the west side of Lynn Canal with the exception of the Alaska Endicott Mine, near William Henry Bay, and the Dream Prospect, on the mainland across from Sullivan Island. The former Alaska Endicott Mine is approximately 1 mile southwest of the beginning of the proposed Alternative 3 alignment at William Henry Bay. It was mined from the early 1900s to 1924 for copper and incidental amounts of gold and silver. The Dream Prospect was extensively explored for zinc and copper with no significant mineral recovery. Several other mineral occurrences, prospects, and mines are in the project study area on the west side of Lynn Canal. No mining is taking place or has been permitted on the west side of Lynn Canal in the project area.

Coeur Alaska, a mining company based in Idaho, acquired the Kensington and Jualin Mines in the 1990s and received all permits required to begin construction and operations following publication of the *1997 Kensington Gold Project Final Supplemental Environmental Impact Statement* and issuance of a USFS ROD in 2004 (USFS, 1997a and 2004). In an effort to increase efficiency and reduce disturbance in the area, Coeur Alaska submitted an amended Plan of Operations, which was approved in the USFS 2004 ROD. The mine opened in 2009 and began production in 2010 (ADNR, 2012). Land ownership of the site influences the permitting strategy for additional mineral exploration. The USFS approved Coeur's *Final Plan of Operations for the Kensington Gold Project* in 2005. An environmental compliance audit, required by the 2013

Reclamation and Closure Plan, was completed in January 2018.[76] This audit will be used by Coeur and the State of Alaska to assist in updating, renewing, or issuing authorizations and permits; updating policies, plans, and procedures; and determining compliance with permits and authorizations. For example, it will be used for updates to and approval of the Reclamation and Closure Plan, which expires in December 2018[77].

Note: The 2025 and 2055 population forecasts discussed in previous sections of this document were calculated using demographic and migration trends, rather than information on specific projects or developments. For purposes of this cumulative impact assessment, any population increase associated with a reasonably foreseeable future action is considered as an addition to those forecasts.

#### 4.9.1.2 Timber Harvests

In 1997, 1999, and 2000, Goldbelt conducted timber harvests in the Cascade Point/Echo Cove area. Although there is some potential for further logging around Echo Cove, Goldbelt has no plans for logging in that area at this time (Loiselle, 2012). A 40-acre site that was clean cut in 1999–2000 is now permitted (by CBJ; see Section 4.9.1.3 below) for use as a rock quarry. In 2005, the ROW for the Glacier Highway Extension was logged. There are no plans for timber harvest on national or State forest lands in the project area. Management plans for these lands are unlikely to change in the foreseeable future. There are also no current plans to harvest timber on private or trust lands in the project area.

The only logging that is reasonably foreseeable in a quantitative evaluation of cumulative impacts is the logging associated with continuing Kensington Gold Mine development, and land clearing associated with potential, but not scheduled, Goldbelt development at Cascade Point (Loiselle, 2012).

#### 4.9.1.3 Development

**State Development –** Major projects developed by the State within the project area have included construction of the State of Alaska Auke Bay, Haines, and Skagway Ferry Terminals; the 3-mile pioneer road from the north end of the Glacier Highway from Echo Cove to Cascade Point in 2006 and the Glacier Highway Extension in 2011; and the Echo Cove boat ramp. The Echo Cove boat ramp and access road were designed in 1996 and built by DOT&PF. The facility consists of a 16-foot-by-192-foot concrete ramp and a parking area. The CBJ maintains the facility.

**CBJ –** The CBJ expanded the boat launch and related facilities at Statter Harbor in Auke Bay. The CBJ's project area included the existing Statter Harbor facility and DeHart's Marina, both owned by the CBJ, and was tourism-driven by such things as whale watching excursions (Hart and Chaney, 2012). The $8.3 million project replaced the gangway, headwalk, and DeHarts floats in Statter Harbor (CBJ, 2012). Repairs to the existing floats and breakwater were also part

[76] The Kensington Mine *2017 Environmental Audit* (this audit is required per the *2013 Reclamation and Closure Plan Update for the Kensington Gold Project, Borough of Juneau, Alaska* (http://dnr.alaska.gov/mlw/mining/largemine/kensington/pdf/kens2013recplan.pdf) was completed in January 2018 and is posted on the State of Alaska website (http://dnr.alaska.gov/mlw/mining/largemine/kensington/; direct link to document http://dnr.alaska.gov/mlw/mining/largemine/kensington/pdf/kens_coeurak_envaudit2017.pdf) .

[77] The Reclamation and Closure Plan was to expire in May 2018; however, following the submittal of a plan update in March 2018, the expiration was extended to December 31, 2018 (http://dnr.alaska.gov/mlw/mining/largemine/kensington/pdf_2018/kens_rpa_j20133158extension.pdf).

of the project. The first phase of construction was completed in May 2013 and the second phase was completed in June 2016 (CBJ, 2016).

**Municipality of Skagway –** The Municipality of Skagway, the Alaska Industrial Development and Export Authority, and the Government of Yukon are moving forward with the Gateway Project, a cooperative project intended to attract and maintain the business of existing customers to the Skagway Ore terminal. The project includes modernizing the ore ship loader and making other improvements to facilitate containerized cargo shipment. To enhance tourism and the related visitor industry in Alaska and the Yukon, the Gateway Project will also provide a dock that can accommodate the largest cruise ships entering the Alaska market (Municipality of Skagway, 2013).

**Alaska Glacier Seafoods Company** – Alaska Glacier Seafoods constructed 12,000 square feet of office space and a processing plant next to the Auke Bay Ferry Terminal at 12-Mile Glacier Highway in 2005. In addition, the company constructed a timber dock and a saltwater intake system for the processing facility.

**Goldbelt** – Goldbelt prepared a master plan for its Echo Cove landholdings, comprising approximately 1,400 acres, but has indicated that although there is potential for development, no plans are in place to proceed with any type of development at this site (Loiselle, 2012). The master plan includes industrial and commercial uses related to transportation and recreation.

Goldbelt obtained a CBJ Conditional Use Permit in November 2004 to reopen and expand an existing rock quarry on its land near Echo Cove. This quarry was permitted for use during construction of the road extension to Cascade Point, but it does not appear to have been used for this purpose—Goldbelt representatives indicated that there is currently no market for these aggregates (Loiselle, 2012). Goldbelt could expand the existing 1.5-acre quarry to a total of 3 acres under this permit.

In May 2005, Channel Construction obtained a CBJ Conditional Use Permit to develop a new quarry nearby on a previously clear-cut 40-acre parcel of Goldbelt land. To date, this quarry has not been built.

As part of Goldbelt's contracting businesses, it shuttles Kensington Mine employees by bus to Yankee Cove and then by ferry to the mine's dock at Slate Creek. With the Glacier Highway Extension to Cascade Point, Goldbelt plans to construct a dock at Cascade Point and make it the new southern terminus of the shuttle ferry to Slate Creek. Moving the transit point to Cascade Point will enhance the safety of the ferry crews and passengers and will make travel across Berners Bay more reliable. The proposed dock at Cascade Point has been fully permitted; however, Goldbelt has not scheduled construction (Duncan, 2013).

**Other** – There are Alaska Mental Health Trust, Native allotments, and other private lands on both the east and the west sides of Lynn Canal. A highway would increase the likelihood of development of these lands, but nothing specific is reasonably foreseeable. Therefore, these lands are not discussed further in this cumulative analysis. DOT&PF controls access to any State highway. The location and configuration of driveways off of a State highway would conform to DOT&PF standards.

West of the Lace River, the highway for Alternative 2B would intersect an existing unpaved road that runs from the dock at Slate Cove to the Jualin mine. This road is a public road that was upgraded as part of Coeur Alaska's proposal to build a deepwater floating dock at Slate Cove.

The State of Alaska funded part of the road upgrade as an Industrial Roads Project. If Coeur Alaska and the State of Alaska develop a cooperative use agreement for the Slate Cove dock under Alternative 2B, DOT&PF could use the dock and road to provide temporary ferry service during any extended road closures. This would not be applicable to any other project alternatives.

As discussed in Sections 4.3, 4.4, and 4.6, USFS has indicated that trails at several pullouts are reasonably foreseeable if a highway is constructed on the east or west side of Lynn Canal for either Alternative 2B or 3. If either Alternative 4B or 4D is selected, only a trail at the pullout at Sawmill Creek would be reasonably foreseeable. A separate environmental analysis would be completed by USFS for these trails prior to their construction. The potential cumulative impacts of these trails in conjunction with the JAI Project are included in this analysis.

#### 4.9.1.4 Utilities

Alaska Power and Telephone Company (AP&T) completed and began operating the 6-acre, 3-megawatt hydroelectric project, called the Kasidaya Creek (formerly Otter Creek) Hydroelectric Project on USFS land at Kasidaya Creek in Taiya Inlet, 3 miles south of Skagway in 2008 (AP&T, 2009). Major infrastructure for the project includes a diversion dam; a 3,700-foot-long, 40-inch-diameter penstock; a 24-foot by 48-foot steel powerhouse with an adjacent staging area and transformer pad; a 75-foot-long tailrace; and a jetty. Power from this facility is sent to Haines and Skagway (Brady, 2008). The CBJ operates three wastewater treatment plants, all of which have NPDES permits (Juneau – Douglas, Mendenhall, and Auke Bay). The Auke Bay Wastewater Treatment Plant discharges effluent to Auke Bay at 30 feet below mean low water after secondary treatment. The Auke Bay Ferry Terminal also discharges effluent to Auke Bay after treatment at 20 feet below mean lower low water.

#### 4.9.1.5 Actions Not Considered

The following actions were determined not to be reasonably foreseeable actions or pertinent present actions and, therefore, were not evaluated in the cumulative effects analyses.

**Timber Sales** – There are no timber sales currently planned by any of the major landholders in the project area in the next 10 years. The cumulative impact analysis includes the logging described in Section 4.9.1.2.

**Cape Fox Land Entitlement Adjustment Act of 2003** – This bill, and subsequent bills introduced up to 2007, would give approximately 2,700 acres of USFS lands in the Johnson and Slate Creek drainages to Cape Fox Corporation and 9,300 acres of land in the Johnson, Sherman, and Sweeny Creek drainages to Sealaska Corporation. In exchange, the USFS would get 3,000 acres of private lands near Ketchikan. If the land exchange is executed, it is expected that Cape Fox Corporation will use its new land to develop support services for the Kensington Gold Project (U.S. Senate Bill 1354; U.S. Congress, 2003). This land exchange was not used in the analysis because the bill and subsequent bills were either tabled or sent to committee, where no action was taken. To date, these bills have not been passed; therefore, no detailed potential impacts are reasonably foreseeable.

**Herbert Glacier Project** – CBJ granted an exploration permit for this project that was effective through February 2013 (Grand Portage Resources, 2012). The project consists of 91 unpatented lode claims located 20 miles north of Juneau and 25 miles south of Coeur Alaska´s Kensington gold mine. Since 2010, all holes drilled at Herbert Glacier have encountered gold mineralization.

Grande Portage and Quaterra Resources are conducting the permitted exploration (Quaterra Resources, Inc., 2012). As this project is in the exploration stage, it is not being considered part of reasonably foreseeable future actions.

**Palmer Project** – Explorations are ongoing by Constantine Metal Resources at the Palmer Project mine site in the upper Chilkat River valley, as authorized by ADNR (exploration permit application number J20145690; ADNR, 2014a). According to Haines Borough managers (Earnest, 2013; Sosa, 2014), Constantine Metal Resources has made no commitment to go into production and, according to ADNR, there are no current applications to mine (ADNR, 2014b); therefore, any potential mine development or mineral production associated with this property is highly speculative. As this project is in the exploration stage, it is not being considered part of reasonably foreseeable future actions.

**Lace River Hydroelectric Project** – Green Power Development, LLC, received a conventional preliminary permit with the Federal Energy Regulatory Commission (FERC) to develop a hydroelectric project on a tributary of the Lace River. The Lace River Hydroelectric Project would have a capacity of 4,995 kilowatts. Kensington Mine could be a major purchaser of power from this project once it is developed (Hart and Chaney, 2012). The FERC preliminary permit was valid from September 15, 2010, through August 31, 2013. With the permit expired, this project is not being considered part of reasonably foreseeable future actions.

**Schubee Lake Hydroelectric Project** – AP&T received a FERC preliminary permit on November 30, 2010 (FERC, 2011), and completed a reconnaissance report in March 2012 for the Schubee Lake Hydroelectric Project, a small hydroelectric project located approximately 7 miles south of Skagway on the east side of Taiya Inlet. AP&T is still in the process of applying for a license and released an economic analysis of the project in March 2013 (AP&T, 2013). With no permit or license, this project is not being considered part of reasonably foreseeable future actions.

### 4.9.2 Cumulative Impact Analysis

Alternatives were analyzed to determine if they would have either direct or indirect effects on area resources. Numerous past, present, and reasonably foreseeable impacts were identified that, in combination with direct or indirect impacts, would result in cumulative impacts. Resources that would not have direct or indirect impacts from project alternatives were not evaluated for cumulative impacts. Further, resources that could potentially have direct or indirect impacts from project alternatives, but were not affected by any past, present, or reasonable foreseeable actions, were not evaluated for cumulative impacts. Potential cumulative effects were identified for the following resource areas: land use, visual resources, historical and archaeological resources, economics, social effects, water quality, air quality, noise, wetlands, marine fish habitat, terrestrial habitat, wildlife, bald eagles, and threatened and endangered species. The cumulative impact analysis is projected to the year 2055.

#### 4.9.2.1 Land Use

**Alternative 1B** –Alternative 1B would improve opportunities for access to recreation in the vicinity of Haines and Skagway by increasing the frequency of travel, but would not provide new locations for recreational access. It would not provide access to large areas of Lynn Canal in the same way as Alternatives 2B and 3. The USFS would not likely add trails along the east or west side of Lynn Canal if this alternative was pursued.

**Alternatives 2B and 3** – Alternatives 2B and 3 would make the east side or west side of the Lynn Canal substantially more accessible to recreational uses such as hunting, fishing, hiking, boating, and camping. The USFS envisions trails from DOT&PF pullouts and has indicated that the following trails are reasonably foreseeable (Dilger, 2012):

- Alternative 2B
  - Sawmill Creek Trail
  - Slate Creek Cove to Comet Cove Trail
  - Yeldagalga Creek Trail
  - Katzehin River Trail
- Alternative 3
  - Sawmill Creek Trail
  - Expanded day use facilities, trailhead and trail at William Henry Bay
  - Sullivan River Trail
  - Glacier River/Davidson Glacier Trail

Outdoor recreation is a principal leisure time activity for Juneau, Haines, and Skagway residents. The improved access provided by Alternatives 2B and 3 and USFS trails, and the increase in visitors to the region expected with these highway alternatives would increase the use of the recreational resources along the coastline of either the east side or the west side of Lynn Canal. It is also likely to increase commercial ventures related to outdoor activities such as recreational equipment retail stores and guide services. These direct and indirect effects on recreational activity would contribute to a cumulative effect on land use in the area by contributing to an increase in the amount of users.

The Kensington Mine presently employs about 250 mine workers and 100 contractors. Coeur Alaska built employee bunkhouses that sleep up to 216 to accommodate a work schedule for employees who work 4 days on and 3 days off, or 2 weeks on followed by a week off (Stigall, 2012). If the mine's employment grows, however, it is possible that some population growth could occur in Lynn Canal and increase use of recreational lands.

Alternative 2B, in combination with Goldbelt development between Echo Cove and Cascade Point and USFS trails at Sawmill Creek and Slate Cove, would change the remote character of recreation in the Berners Bay area. The introduction of these facilities would increase boat and plane traffic in the bay area, introduce automobile traffic, and increase the number of hikers and campers in the region. While recreation in most of the Berners Bay area would remain largely a remote experience, it would not have the characteristics that currently exist.

The cumulative effect of improved access to recreational opportunities associated with Alternative 2B or 3 and increased population brought to the area by the reasonably foreseeable future actions would likely be perceived as a negative impact by those who enjoy the existing primitive nature of the region, including some outfitters who currently provide wilderness trips there. Those who would take advantage of the new outdoor recreation opportunities, however, would perceive increased access as beneficial.

**Alternatives 4A through 4D** – Alternatives 4A through 4D would improve opportunities for recreation in the vicinity of Haines, Skagway, and in the case of Alternatives 4B and 4D the southern end of Berners Bay, but would not improve recreational access to large areas of Lynn

Canal in the same way as Alternatives 2B and 3. The potential for Goldbelt developments from Echo Cove to Cascade Point and the planned USFS trail at Sawmill Creek would provide additional recreational opportunities. The direct and indirect effects of Alternatives 4B and 4D on recreation in Berners Bay could contribute to a cumulative effect with the proposed Goldbelt dock at Cascade Point, USFS trail, and increased population brought to the area by the reasonably foreseeable future actions. This effect would likely be perceived as a negative impact by those who enjoy the existing natural setting of the area. However, those who would take advantage of the new recreational opportunities would perceive increased access as beneficial.

#### 4.9.2.2 Visual Resources

Alternatives 2B, 3, 4B, and 4D would increase the visual presence of man in primarily a natural landscape, most noticeably in views from ferries and boats. The Goldbelt Cascade Point dock would be visible from a few locations in Berners Bay. The 40-acre clear cut on Goldbelt land, the Kensington Gold Mine's Slate Cove marine facility, and the Kasidaya Creek (formerly Otter Creek) Hydroelectric Plant on Kasidaya Creek are visible from the water and parts of Glacier Highway; the 40-acre clear cut on Goldbelt land would be more visible if the permitted quarry is developed. These views of the coastline would be minor in relation to the number of views that would include a highway paralleling the coastline, particularly along the east side of Lynn Canal, where a highway would be visible at many locations because of topography and vegetative cover. The cumulative visual effect for any of these alternatives would be substantial, but the contribution from other reasonably foreseeable projects would be small because little commercial development other than mining is active in the region and the planned developments would be visible from only a few locations in Berners Bay.

#### 4.9.2.3 Historical and Archaeological Resources

The increased number of visitors associated with the improved access of either Alternative 2B or 3, in combination with the potential increase in population and USFS trail developments, would boost independent and guided outdoor recreation in the Lynn Canal region. These activities would increase the potential for discovery of currently unknown historic and prehistoric cultural sites or the loss of cultural resources through souvenir hunting at known and unknown sites. The cumulative effect on cultural sites for any of these alternatives would be beneficial if new sites were located and reported undamaged, but the effect would be negative if known or unknown sites are looted by artifact hunters. This incremental increase in access and potential impacts to resources could be lessened by constructing USFS trails in areas removed from known resources.

None of the proposed project alternatives would have a direct adverse effect on the historical mining districts in the region that would contribute to a cumulative effect. The population growth and increased visitors associated with Alternatives 2B and 3 combined with potential population growth in Juneau and Haines and improved access could result in cumulative effects to elements of the District through vandalism or artifact hunting.

#### 4.9.2.4 Economics

In the 2006 Final EIS, Kensington Mine was identified as a reasonably foreseeable future action that would contribute to the cumulative socioeconomic effects in the area, particularly with respect to increased population. With the mine now operational, the anticipated population effects have been less than expected because of the number of employees who commute to the

area from outside Lynn Canal (Hart and Chaney, 2012). Kensington presently employs 350 mine workers (Zigarlick, 2012). Bunkhouses are available onsite and can accommodate up to 216 people. Employees work in multiple-day to 2-week shifts, returning to their homes in Southeast Alaska or outside the area during their time off work (Stigall, 2012).

**Alternative 1B** – In 2055, Alternative 1B is estimated to add about 15 new jobs in Juneau and increase population by 23, add 10 new jobs in Skagway and increase population by 15. Five new jobs are estimated to be added in Haines and population would increase by 8. Alternative 1B would not substantially influence population growth in the region. These increases could contribute to a cumulative increase in population growth should continuing Kensington Gold Mine development bring new jobs and new residents to the Lynn Canal communities. Alternative 1B would not contribute to a cumulative effect on population in Haines.

Alternative 1B is expected to increase visitor spending and generate additional sales tax dollars in Juneau, Haines, and Skagway. No other reasonably foreseeable action is anticipated to have an effect on sales tax revenue in the area as a result of increased population. The CBJ and the State of Alaska expect to receive approximately $10.1 million from Kensington Gold Mine taxes over the 10-year life of that project.

**Alternative 2B** – Alternative 2B is projected to create about 130 new jobs in Juneau in 2055. The new jobs could result in a population increase of about 195 residents in Juneau. Job growth from Alternative 2B would also lead to population growth in Haines and Skagway of 90 and 120 residents, respectively. These increases could contribute to a cumulative increase in population growth should continuing Kensington Gold Mine development bring new jobs and new residents to the Lynn Canal communities.

Alternative 2B is expected to increase visitor spending, which would generate additional sales tax dollars in Juneau, Haines, and Skagway of more than $1.3 million annually in the three communities. No other reasonably foreseeable action is anticipated to have an effect on sales tax revenue in the area as a result of increased population. The CBJ and the State of Alaska expect to receive approximately $10.1 million from Kensington Gold Mine taxes over the 10-year life of that project.

**Alternative 3** – Alternative 3 is projected to provide 105 new jobs in Juneau, resulting in an increase of about 158 by 2055. Job growth from Alternative 3 would also lead to population growth in Haines and Skagway of 23 and 75 residents, respectively. These increases could contribute to a cumulative increase in population growth should continuing Kensington Gold Mine development bring new jobs and new residents to the Lynn Canal communities.

Alternative 3 is expected to increase visitor spending, which would generate additional sales tax dollars in Juneau, Haines, and Skagway of nearly $1.1 million annually in the three communities combined, most of which would be generated in Juneau. No other reasonably foreseeable action is anticipated to have an effect on sales tax revenue in the area as a result of increased population. The CBJ and the State of Alaska expect to receive approximately $10.1 million from Kensington Gold Project taxes over the 10-year life of that project.

**Alternatives 4A, 4B, 4C, and 4D** – Alternatives 4A, 4B, 4C, and 4D are estimated to add about 5 to 40 new jobs in Juneau by 2055, resulting in an increase of about 8 to 60 people in Juneau by 2055. In Haines, Alternatives 4A, 4B, and 4D are estimated to add 5 to 20 new jobs and 8 to 30 new residents. Alternative 4C is not expected to increase the number of jobs or population in

Haines. In Skagway, Alternatives 4A, 4B, 4C, and 4D would increase the number of jobs by about 5 to 25 and the number of new residents by 8 to 38. These increases could contribute to a cumulative increase in population growth should continuing Kensington Gold Mine development bring new jobs and new residents to the Lynn Canal communities.

Increased visitor spending would generate between $36,000 and $401,000 per year in additional sales tax for the three communities combined. No other reasonably foreseeable action is anticipated to have an effect on sales tax revenue in the area as a result of increased population. The CBJ and the State of Alaska expect to receive approximately $10.1 million from Kensington Gold Mine taxes over the 10-year life of that project.

#### 4.9.2.5 Social Effects

The increased population and visitors associated with improved access, particularly with Alternatives 2B and 3, the now operating Kensington Gold Mine, and the reasonably foreseeable Goldbelt developments near Echo Cove, would reduce the isolation of Juneau, Skagway, and Haines and provide economic stimulation. Increased economic opportunities, easier travel among the Lynn Canal communities, and better connections to areas outside Lynn Canal would be viewed as an improvement to the quality of life by some. Others would feel that their quality of life is diminished by reducing their isolation and bringing more people into the region.

#### 4.9.2.6 Water Quality

The proposed project alternatives and reasonably foreseeable projects would have the greatest cumulative water quality effects in Berners Bay. The Kensington Gold Mine has increased marine traffic and associated hydrocarbon discharges in Berners Bay. The mine and reasonably foreseeable Goldbelt developments near Echo Cove have the potential to introduce stormwater runoff and treated wastewater discharges to the bay. Alternative 2B could add to pollutant loading in Berners Bay from stormwater runoff. Based on stormwater runoff studies in Alaska, this cumulative contribution to water quality impacts would not be measurable. Alternatives 3, 4B, and 4D would further increase marine traffic in Berners Bay. Based on the existing water quality of the bay and past evidence of water quality impacts associated with marine traffic in Lynn Canal, the cumulative increase in marine traffic associated with Alternatives 3, 4B, and 4D in combination with current and reasonably foreseeable projects is not expected to exceed AWQS in Berners Bay.

#### 4.9.2.7 Air Quality

**Alternative 1B** – This alternative could result in some increases in air pollutants and particulates due to marine emissions.

**Alternatives 2B and 3** – These alternatives could result in some increases in air pollutants and particulates due to vehicular and marine traffic emissions.

**Alternatives 4A through 4D** – These alternatives could result in some increases in air pollutants and particulates due to marine emissions.

**Air Quality Cumulative Effects** – Area air quality has been affected by several past and present events, including marine vessel operations, urban area emissions (e.g., motor vehicle emissions, heating systems, and fugitive emissions), mining, and timber harvesting, but lingering effects are not observable. Alaska does not have a statewide air toxics emission inventory to assess the

impact of these urban environments to the air quality of Lynn Canal. However, the air quality within the northern Lynn Canal area is considered very good due to the low level of air pollution sources. On rare occasions, elevated concentrations of $PM_{10}$ may exist in the project area when smoke from forest fires is carried south from the Yukon under northerly winds. The Kensington Gold Mine contributes to air pollutant emissions with its six diesel-powered generators as its primary power supply, smaller generator units at various facilities, and vehicles (Zigarlick, 2012). In addition, the mine contributes to particulate emissions from the tailings facility, borrow pits, rock crushing, and mine haul roads. These emissions were modeled as part of the Kensington Gold Project Supplemental EIS; the resulting pollutant concentrations were found to be below federal and State air quality standards and Prevention of Significant Deterioration requirements for the build alternatives.

Reasonably foreseeable actions, including mining, Goldbelt developments, logging, and increased urban emissions with population growth, would affect air quality within the project region. Potential Goldbelt land development and construction would cause localized, short-term increases in air emissions in the area (e.g., particulates or CO). Potential development in the area would also increase air pollutant emissions from other sources, such as combustion from heating of buildings, aircraft and watercraft use, and wood burning.

The limited amount of logging projected over the 30-year study period would primarily contribute to particulate matter from logging equipment operating in the woods and on unpaved logging roads. There would also be a relatively small increase in air pollutant emissions from the engines of logging equipment.

The reasonably foreseeable projects in the Lynn Canal region are located several miles apart and therefore would not have a cumulative impact for non-reactive pollutants, such as most particulates and CO. Where the highway associated with Alternative 2B passes by the Kensington Gold Mine and the area of potential Goldbelt developments, concentrations of particulates and CO would be increased by a few percent, but would still be well below air quality standards. The volume of reactive pollutants such as $NO_x$ and reactive organic gases from the proposed project and reasonably foreseeable projects would be too small in combination with background concentrations to result in the formation of substantial concentrations of $O_3$.

Some comments on the 2014 Draft SEIS requested additional analysis of air quality impacts resulting from new ferry vessels idling at active marine centers. One comment suggested that additional ferry operations at existing ports could contribute to a cumulative effect on air quality at those locations. DOT&PF conducted a Ferry Vessel Air Quality Analysis to investigate the potential effects of ferry emissions associated with each JAI Project alternative on ambient air quality at port and terminal locations (see Attachment 1 of the *2017 Update to Appendix T – Air Quality Modeling Memorandum* in Appendix Z).

The Ferry Vessel Air Quality Analysis estimated annual ferry vessel emissions for each of the alternatives within 25 miles of each port or ferry terminal, accounting for the duration of the trip on arrival, idling in port, and the duration of the trip on departure. For origins and destinations within a distance of less than 25 miles from each another, such as Haines and Skagway, the durations of vessel trips between the two ports were split evenly. Haines and Skagway are the only active marine centers where the project alternatives would increase marine traffic and potentially contribute to a cumulative air quality impact from marine vessel operations. The *Alaska Rural Communities Emission Inventory* (ADEC, 2007) provides estimates of total annual

marine vessel emissions for Haines and Skagway-Angoon. These emissions are compared to the ferry vessel emissions estimates for each alternative in Table 4-87.

The estimated ferry emissions of Alternative 1 – No Action are included in the existing conditions emissions totals for Haines and Skagway; therefore, the emissions associated with each potential action alternative would displace the emissions of Alternative 1 – No Action in the total emissions values. As indicated in Table 4-87, the amount of ferry vessel emissions under each alternative would be a small portion of the existing marine vessel emissions for each of these communities and would not contribute substantially to a cumulative air quality impact.

**Table 4-87:**
**Alternative Ferry Vessel Emissions Compared to Total Marine Vessel Emissions in Haines and Skagway (tons/year)**

| Port/ Community[1] | Alternative | Pollutant | | | | |
|---|---|---|---|---|---|---|
| | | CO | $NO_x$ | VOC | PM | $SO_x$ |
| Haines | Total Marine Vessel Emissions[1] | 46.45 | 285.32 | 6.426 | 12.69 | 103.75 |
| | Alternative 1 – No Action | 0.76 | 10.80 | 0.11 | 0.13 | 0.01 |
| | Alternative 1B | 1.28 | 18.18 | 0.18 | 0.22 | 0.02 |
| | Alternative 2B | 1.75 | 28.04 | 0.28 | 0.36 | 0.03 |
| | Alternative 3 | 2.09 | 37.67 | 0.38 | 0.51 | 0.04 |
| | Alternative 4A | 2.15 | 44.67 | 0.45 | 0.63 | 0.05 |
| | Alternative 4B | 2.78 | 55.27 | 0.55 | 0.77 | 0.06 |
| | Alternative 4C | 0.74 | 15.00 | 0.15 | 0.21 | 0.02 |
| | Alternative 4D | 1.63 | 24.47 | 0.25 | 0.30 | 0.03 |
| Skagway-Angoon[2] | Total Marine Vessel Emissions[1] | 204.84 | 1379.81 | 38.682 | 78.69 | 570.64 |
| | Alternative 1 – No Action | 1.13 | 13.56 | 0.14 | 0.15 | 0.02 |
| | Alternative 1B | 2.05 | 29.74 | 0.30 | 0.36 | 0.03 |
| | Alternative 2B | 7.03 | 78.72 | 0.80 | 0.82 | 0.09 |
| | Alternative 3 | 2.05 | 34.33 | 0.34 | 0.45 | 0.04 |
| | Alternative 4A | 7.12 | 91.65 | 0.93 | 1.05 | 0.10 |
| | Alternative 4B | 4.16 | 65.99 | 0.66 | 0.84 | 0.07 |
| | Alternative 4C | 2.31 | 27.69 | 0.28 | 0.30 | 0.03 |
| | Alternative 4D | 2.22 | 27.09 | 0.27 | 0.30 | 0.03 |

[1] From ADEC (2007).

[2] Note that the existing emissions for Skagway include emissions from all the smaller populated areas that are within the Skagway-Angoon inventory area and are therefore higher than what would be present only in Skagway.

**Climate Change** – Cumulative impacts on air quality are a concern with respect to GHG emissions, which contribute to global warming. Increased ocean acidification is also linked to climate change (see Section 4.7.9, Climate Change). Alaska's GHG emissions are growing at a much faster pace than those of the nation as a whole. From 1990 to 2005, Alaska's gross GHG emissions increased by 30 percent, while national gross emissions rose by 16 percent. Emission rates and growth in Alaska are driven by emissions from the industrial and transportation sectors,

which are much higher per capita than the national average. From 2005 to 2025, emissions from transportation fuels are projected to rise by 0.85 percent per year. The largest percentage increase in emissions over this time period is seen in on-road diesel fuel consumption, which is projected to increase by 9 percent from 2005 to 2025 (Alaska Climate Change Sub Cabinet, 2009).

Alaska has several active initiatives to address climate change issues, reduce GHG emissions, and support clean energy. On-road transportation emissions can be reduced through a combination of policies that improve vehicle fuel efficiency, substitute gasoline and diesel with lower-emission fuels, and reduce vehicle travel. The use of alternative fuels is more challenging in Alaska than in other states because of the arctic climate and distance from the fuel production and distribution networks available in the contiguous United States. In particular, biofuels present operational challenges in cold climates. Because of these challenges, additional research on appropriate alternative fuels for use in Alaska is needed. Alaska is also adopting a policy that would reduce GHG emissions by reducing vehicle travel and providing facilities for bicyclists and pedestrians (ADEC, 2008).

Ferry emissions comprise a larger proportion of transportation emissions in Alaska than in most other states. The easiest way to reduce ferry emissions is by improving the fuel efficiency of ferry boats.

In the future, cars are expected to be developed under more stringent fuel efficiency and emissions standards. It is also expected that more efficient fuels and fuel efficiencies would be developed for marine and aviation. These improvements in emissions and fuel efficiency are expected to help reduce GHG emissions.

Trees removed from the road corridor represent a permanent loss of carbon sequestration. While the loss of trees would be negligible in the context of the Southeast Alaska coastal rainforest, this loss would contribute only in minor ways to cumulative global reduction in carbon sequestration.

The JAI Project under any alternative would result in GHG emissions because both automobiles and ferries consume fossil fuel, and the project therefore would contribute to the global cumulative effect of such emissions (see Section 4.7.9). However, it is not possible to determine the contribution of one project to climate change or its effects on ocean acidity, sea level rise, or storm intensity.

#### 4.9.2.8 Noise

The principal direct noise source from project alternatives would be highway traffic noise on those alternatives that include construction of a highway. These alternatives are discussed in the following text.

**Alternative 1B** – The amount of traffic noise associated with this alternative would be comparable to existing conditions and would not directly contribute to a cumulative effect with the reasonably foreseeable future actions, which are dispersed through the project area.

**Alternative 2B** – This alternative would introduce a new noise source in an area that is principally undeveloped, adding traffic noise to existing intermittent man-made noises from helicopters, airplanes, jet boats, and other vessels in Lynn Canal and Berners Bay. Ambient noise measurements along the shoreline of Lynn Canal ranged from 35 to 52 dBA, depending on weather conditions and proximity of streams. Taking the average of about 40 dBA and using simple noise attenuation theory (explained in Appendix L and Section 4.7.7 discussions on

noise), traffic noise is estimated to be at background levels at approximately 200 to 250 feet from centerline along the coastline.

Use of haul trucks for the Kensington Gold Mine contributes vehicular traffic noise in that area. The reasonably foreseeable Goldbelt development in the Echo Cove area would generate vehicular traffic noise and, in the case of the quarry, heavy equipment, rock crushing, and excavation noise. A cumulative effect of increased noise over ambient levels would occur along the Glacier Highway Extension and at Slate Cove, where the Kensington Gold Mine access road would be close to the Alternative 2B highway alignment. No residences would be affected, and vehicular noise levels are anticipated to have negligible effects on wildlife due to the predicted volume of traffic.

Ambient noise in Berners Bay includes boat and plane noise. This would increase with the reasonably foreseeable developments in the bay, along with the addition of vehicle noise. This would further change the remote experience in Berners Bay, particularly for kayakers and other non-motorized users.

**Alternatives 3, 4B, and 4D** – The traffic noise under Alternatives 3, 4B, and 4D would be the same as discussed above for Alternative 2B from Echo Cove to Sawmill Cove. The Alternative 3 highway segment on the west shore of Lynn Canal is not discussed here because the only future foreseeable actions that would generate noise are located in Berners Bay.

#### 4.9.2.9 Wetlands

Alternative 2B would result in the loss of approximately 61 acres of wetlands. Alternative 3 would result in the loss of 27 acres of wetlands. Alternatives 4B and 4D would fill 2.5 acres of wetlands. The majority of the wetlands filled by any of the project alternatives would be palustrine forested wetlands. Specific breakdowns of wetland types by alternative and sub-region are presented in Sections 4.3.12, 4.4.12, and 4.6.12. Indirect effects could occur due to the introduction of invasive plant species from increased access, accidental spills from vehicles, and damage caused by ORVs.

The USFS and USACE identified past projects that have resulted in the loss of approximately 11 acres of palustrine wetland on the east side of Lynn Canal (USFS, 2003; USACE, 2005). The Kensington Gold Mine resulted in the loss of 36 acres of wetlands (and 24 acres of open water habitat) with all but 7 acres of wetland to be restored at the end of the project. Development of the Glacier Highway Extension resulted in the loss of approximately 5 acres of forested wetland. The acreage of wetland losses as a result of reasonably foreseeable future actions is unknown but the types of wetlands lost would be primarily on forested and scrub-scrub wetlands.

**Wetland Cumulative Effects** – The maximum known cumulative loss of approximately 100 acres of wetlands from , Alternative 2B and past activities in the corridor constitute approximately 1 percent of the total wetlands on the east side of Lynn Canal. The affected wetlands are relatively abundant within the Lynn Canal region and Berners Bay, and there are no known adverse effects on threatened, endangered, or sensitive species or habitats. The loss of these wetlands would not adversely affect the overall diversity of regional wetland habitats.

#### 4.9.2.10 Marine Fish Habitat (Including Essential Fish Habitat)

**Alternative 1B** – Alternative 1B would operate from existing terminals in Auke Bay, Lutak Inlet, and Taiya Inlet and would not have additional physical impacts to marine fish habitat and

EFH from construction. This alternative, therefore, would not contribute to a cumulative effect on these resources. Additional ferry operations associated with Alternative 1B would have a negligible cumulative effect on these resources.

**Alternatives 2B, 3, 4B, and 4D – Lynn Canal and Berners Bay** – Alternatives 2B and 3 would fill a total of 28 and 11.6 acres of marine habitat in Lynn Canal, respectively. The Goldbelt dock at Cascade Point would fill about 1.3 acres of beach/intertidal habitat. The Kensington Gold Mine marine facility in Slate Cove filled approximately 2 acres of intertidal habitat. The cumulative loss of marine habitat in Lynn Canal would total about 14.6 to 31.3 to 14.9 acres with Alternatives 2B and 3, respectively. From the standpoint of the entire Lynn Canal region, this would be a relatively small cumulative impact.

Alternatives 3, 4B, and 4D would fill approximately 1.9 acres of intertidal and subtidal habitat in Sawmill Cove. Dredging would occur in 1.2 acres of subtidal habitat for the Sawmill Cove mooring basin. In addition, the proposed Goldbelt dock would dredge approximately 1.4 to 1.6 acres of subtidal habitat in Berners Bay. If Alternative 3, 4B, or 4D were chosen and the Goldbelt Cascade Point terminal was constructed, there would be approximately 4.7 acres of marine habitat affected by filling and dredging in the Berners Bay area. This loss would not appreciably alter fish or invertebrate populations in Berners Bay or Lynn Canal.

The Goldbelt dock at Cascade Point and the proposed DOT&PF Sawmill Cove Ferry Terminal (Alternatives 3, 4B and 4D) would affect Pacific herring spawning habitat, and operations of these facilities would displace some Pacific herring eggs and larvae in the immediate vicinity of the facilities. The footprint of the Sawmill Cove Ferry Terminal impact is approximately 300 feet (0.06 mile) of shoreline at mean lower low water, which is equivalent to less than 2 percent of the alongshore herring spawning length (approximately 3 miles) observed in Berners Bay in 2003. The footprint of the Cascade Point dock would cover 400 feet of shoreline. Combined with Alternative 3, 4B, or 4D, the cumulative loss of herring spawning habitat in Berners Bay would be 4.4 percent.

NMFS, EPA, and ADF&G have expressed concern that the cumulative marine traffic in Berners Bay associated with Alternatives 3, 4B, and 4D in conjunction with Kensington Gold Mine and Goldbelt activities could have an adverse effect on the Lynn Canal herring stock. Both NMFS and ADF&G believe special conservation measures, including no operations during the herring spawning period, would be necessary.

It should be noted that DOT&PF has committed to investigating a joint use facility at Cascade Point if Goldbelt's marine facility appears imminent and the selected project action requires a ferry terminal in Berners Bay. This facility would reduce the potential cumulative impact to herring spawning habitat and EFH.

**Alternatives 4A through 4D – Auke Bay** –Alternatives 4A through 4D in combination with the Alaska Glacier Seafoods Plant and Statter Harbor facility improvements would result in the loss of about 5.6 acres of nearshore intertidal and shallow subtidal habitat in Auke Bay. Other marine facilities have been constructed in Auke Bay including the Auke Bay Ferry Terminal, a boat launch ramp, several marinas, including fueling facilities, a harbor master's office, associated parking, and residential and commercial wastewater discharge facilities. Although the acreage of affected intertidal and subtidal habitat has not been computed, development occurs all along the waterfront of Auke Bay. A larger proportion of most of the facilities is on the surface of the water away from the nearshore habitat (such as the finger float system of a marina), and parts of

the facilities occupy a smaller portion of intertidal or subtidal habitat (such as a staging dock and access ramp). In such instances, the amount of the nearshore habitat affected is not commensurate with the size of the entire development. Because the remaining Auke Bay nearshore intertidal and subtidal habitat and most of the Lynn Canal coastline provide suitable rearing habitat for juvenile salmon, prey species, and crabs, this loss would not measurably affect fish and invertebrate populations in Auke Bay or Lynn Canal.

#### 4.9.2.11 Terrestrial Habitat

The maximum terrestrial habitat loss associated with the proposed project is approximately 430 acres under Alternative 2B. Past impacts to terrestrial habitat have occurred due to timber harvests and mine developments, including 120 acres at the Kensington Gold Mine. The Kasidaya Creek Hydroelectric Project affected about 6 acres of terrestrial habitat. The Glacier Highway Extension removed approximately 36 acres of terrestrial habitat. The reasonably foreseeable actions by Goldbelt in the Echo Cove area could result in clearing approximately 14 acres of terrestrial habitat. Channel Construction's proposed 40-acre quarry in the Echo Cove area would remove all vegetation from previously clear-cut lands. The proposed USFS trails would result in the direct loss of an unknown area of terrestrial habitat, primarily forested and shrub vegetation. Together, these losses result in a cumulative loss of approximately 640 acres of terrestrial habitat. This cumulative loss represents about 0.5 percent of the estimated 117,000 acres of terrestrial habitat in the Lynn Canal region. This loss would not represent a substantial loss of terrestrial habitat and it would not adversely affect any rare or unique vegetation community types or any known rare or sensitive plant species.

About 240 acres of the terrestrial habitat that would be affected by past, present, and reasonably foreseeable future actions are located around Berners Bay. This would represent less than 3 percent of the estimated 8,030 acres of terrestrial habitat in the Berners Bay area. However modest, the loss of OG forest and other terrestrial habitat as a result of the project, in conjunction with past and future losses, would be a cumulative effect.

Alternative 3 would affect about 400 acres of terrestrial habitat primarily on the west side of Lynn Canal. The proposed USFS trails would result in the direct loss of an unknown but small area of terrestrial habitat, primarily shrub vegetation. This alternative would provide access for possible logging on private land and land owned by the University of Alaska on the west side of Lynn Canal. Even if all of this private and University land were cleared, the cumulative loss would still represent a small percentage of the terrestrial habitat in the Lynn Canal region because of the small area of private and University land along the highway alignment (see Figures 3-1 and 3-2).

#### 4.9.2.12 Wildlife

**Marine Mammals** – Alternatives 3, 4B, and 4D would increase the marine traffic in Berners Bay with shuttle ferries. In addition, increased access would increase the recreational use of Berners Bay. Although no boat ramp facilities would be constructed at Sawmill or Slate coves, personal craft could be launched at these locations. Disturbance from increased recreational and commercial marine traffic and increased recreational uses of beaches may cause harbor seals to periodically leave some haulouts. The Kensington Gold Mine shuttle ferry may disturb harbor seals. However, harbor seals use a variety of haulouts. There are alternative spots for them to rest if they are temporarily displaced from a particular location. Therefore, the cumulative increase in

disturbance at haulouts is not likely to affect the survival or reproductive success of this species. Increased marine traffic would increase the risk of vessel collisions with minke whales and sea otters. This increased risk is not likely to affect populations of these species in Lynn Canal.

**Marine Birds** – Marine birds nest in wetlands and OG forest in Berners Bay. Alternatives 2B, 3, 4B, and 4D highway maintenance activities and vehicle traffic are likely to inhibit marine birds from nesting, resting, or foraging near the highway. The Glacier Highway Extension and Kensington Gold Mine facilities likely have an effect on use of the area by marine birds. The maximum area of terrestrial habitat that would be cumulatively affected by the JAI Project and reasonably foreseeable projects is about 640 acres. Much of this would be OG forest including forested wetlands. Approximately 240 acres of the affected habitat would be in Berners Bay. This would represent less than 1 percent of the nesting, resting, and foraging habitat in Lynn Canal and less than 3 percent of these habitats in the Berners Bay area. Therefore, the cumulative effect is not expected to have population-level effects on any marine bird species.

**Terrestrial Mammals** – Cumulative effects to terrestrial mammals, including black and brown bears, mountain goats, wolverines, wolves, and moose, would occur as a result of habitat loss and fragmentation. As indicated, the maximum cumulative terrestrial habitat loss associated with the proposed project and reasonably foreseeable projects is approximately 640 acres under Alternative 2B. This loss represents about 0.5 percent of the estimated 117,000 acres of terrestrial habitat in the Lynn Canal region. The direct loss of habitat for terrestrial mammals from the proposed project would be minor compared with the overall available habitat.

About 240 acres of the terrestrial habitat that would be cumulatively affected is located in Berners Bay. This would represent less than 3 percent of the estimated 8,030 acres of terrestrial habitat in Berners Bay. Berners Bay is important habitat for numerous species of terrestrial mammals, particularly black and brown bears that come to the area to feed during salmon spawning season. The direct loss of this habitat would also be minor compared with the overall available habitat in the bay region.

A more important factor than direct habitat loss is the potential for the highway to fragment habitat for species sensitive to human presence. In Lynn Canal, species such as black bears, brown bears, and moose move seasonally between higher elevation and lower elevation foraging habitat, and tend to avoid highway traffic. The highway could present a barrier to wildlife movement, resulting in the loss of important lower-elevation habitats such as salt marsh vegetation and concentrations of salmon at river mouths. For Alternative 2B, the highway could reduce the habitat capability of the east side of Lynn Canal for species such as brown bear by 26 percent compared to present conditions. Alternative 3 would also present a similar barrier to wildlife movement on the west side of the canal. Because the highway for Alternatives 4B and 4D is relatively short (2.3 miles of new highway), habitat fragmentation for wildlife would be minor.

Of the past, present, and reasonably foreseeable projects in the Lynn Canal area, the Kensington Gold Mine development, when combined with Alternative 2B or 3 would contribute to cumulative impacts to brown bears. The Kensington Gold Mine development resulted in the loss of approximately 120 acres of habitat. A relatively small amount of that habitat loss was concentrated at higher elevations than the Alternative 2B alignment and would not contribute to substantial habitat fragmentation. The habitat affected by the Kensington Gold Mine is small relative to the amount that would be affected by Alternative 2B. The majority of the impact of

Alternatives 2B and 3 would be from the creation of a potential barrier for wildlife moving between wintering habitat and important spring and fall coastal habitats. This impact would be partially mitigated by wildlife underpasses included in the design of the Alternative 2B highway alignment.

The Kensington Gold Mine development, when combined with Alternatives 2B or 3, would also have a cumulative impact on mountain goats. The Kensington Gold Mine removed some mountain goat foraging habitat on the east side of Lynn Canal. Alternatives 2B and 3 would create a barrier to movement of goats to rocky bluffs on the coast in winter. This impact would be partially mitigated by monitoring in order to ensure that the combination of legal hunting, the road, and mining does not have population-level effects.

Alternatives 2B and 3 would result in increased human-wildlife interactions, hunting, and trapping. The Jualin Road improvements and proposed USFS trails create the potential for a cumulative increase in human-wildlife interactions, resulting in increased pressure on wildlife populations.

**Terrestrial Birds** – Terrestrial birds nest in wetlands and OG forest in Berners Bay. Alternative 2B, 3, 4B, or 4D highway construction would decrease available habitat. Construction and maintenance activities as well as vehicle traffic are likely to inhibit terrestrial birds from nesting, resting, or foraging near the highway alignment. The reasonably foreseeable future actions that involve clearing of terrestrial habitat would cause similar impacts. The area of terrestrial habitat that would be cumulatively affected by the JAI Project and reasonably foreseeable projects is about 640 acres. Much of this would be OG forest, including forested wetlands. Approximately 240 acres of the affected habitat would be in Berners Bay. This would represent a small percentage of the nesting, resting, and foraging habitat in Lynn Canal and the Berners Bay area. Therefore, this cumulative effect would not have population-level effects on any terrestrial bird species.

#### 4.9.2.13 Amphibians

The project alternatives avoid wetlands and open water that amphibians use. By avoiding breeding habitat, the alternatives may affect individual amphibians but would not measurably affect population levels. Therefore, the project would not have a cumulative impact on amphibian populations.

#### 4.9.2.14 Bald Eagles

Past, present, and reasonably foreseeable projects in combination with the proposed project would result in the loss of a small amount of habitat, no loss of known nest trees for bald eagles, and no measurable loss of food sources. In light of the ability for bald eagles to habituate to human presence, the cumulative impact of increased human presence in the region is not likely to have a population-level effect on bald eagles.

#### 4.9.2.15 Threatened and Endangered Species

**Humpback Whales** – The humpback whale recovery plan prepared for NMFS identifies a number of factors that could affect the reproductive success and survival of whales (NMFS, 1991). These factors include incidental take in fishing gear, collisions with ships, disturbance and displacement from commercial and recreational boat traffic, introduction of pollution and

pathogens from runoff and waste disposal, disturbance and/or pollution from resource development, and effects on whale prey species from coastal development and fisheries. The JAI Project alternatives and the past, present, and future foreseeable projects in Lynn Canal include many of these factors and could contribute to a cumulative effect on Mexico DPS humpback whales.

Alternative 2B would increase stormwater runoff into Berners Bay. It could also intermittently increase marine traffic in Berners Bay. This could occur in the summer over two to three years if temporary AMHS summer ferry service is provided from Kensington Gold Mine's proposed Slate Cove terminal until the highway is completed between Slate Cove and the Katzehin terminal. It could also occur during winter road closures if the AMHS shuttle ferries run between Slate Cove and Skagway/Haines. The increased stormwater runoff associated with the highway would not substantially contribute to cumulative water quality impacts in Berners Bay. AMHS ferry operations in Berners Bay associated with Alternative 2B would, at most, only occasionally occur during the late April and early May herring and eulachon spawning periods; these ferry operations would not contribute to impacts on prey for threatened and endangered marine mammals.

Alternatives 3, 4B, and 4D would increase marine traffic in Berners Bay. This would be in addition to marine traffic created by the Kensington Gold Mine and existing commercial fishing vessels, tour vessels, and personal watercraft. This increased traffic would increase the risk of collisions between boats and humpback whales. Alternatives 4B and 4D would involve a high-speed ferry, which would further increase the risk of collisions with humpback whales (Laist et al., 2001). In the Biological Opinion on the Kensington Gold Mine, NMFS indicated that the use of observers during vessel operations and slow vessel speeds (speeds of 12 to 13 knots) during the spring foraging period should eliminate two of the primary factors associated with ship strikes (NMFS, 2005b).

Alternatives 3, 4B, and 4D in combination with the Kensington Gold Mine and reasonably foreseeable future Goldbelt development at Echo Cove may alter distribution of juvenile and adult forage fish in Berners Bay, which would pose potential risks to the humpback whales that forage in the bay. Individual whales may alter their behavior as a result of this effect and vessel noise in the bay, and in some cases reduced fitness of individuals may result. Because only a small number of whales are known to use Berners Bay (no more than about 18), NMFS did not expect that the Kensington Gold Mine would jeopardize population viability (NMFS, 2005b). However, as indicated in Sections 4.4.17.2 and 4.6.17.2, NMFS has expressed concern that ferry traffic in Berners Bay associated with Alternatives 3, 4B, and 4D may adversely affect Mexico DPS humpback whales and would require formal consultation to determine whether cumulative impacts would jeopardize the species.

**Steller Sea Lions** –The effects of Alternative 2B on Steller sea lions could contribute to a cumulative effect on the species when considered with the effects of the reasonably foreseeable future actions that would introduce additional vessel traffic into Berners Bay and Lynn Canal, and have the potential to adversely affect water quality in the action area due to runoff from roads and sedimentation from in-water construction associated with marine-related infrastructure (i.e., pile driving, dredging, and in-water material placement in habitat for prey species). In addition, non-point and septic outfalls associated with increased development in the area (e.g.,

ground clearing activities and residential development) may affect aquatic prey species for Steller sea lions.

Based on information in the NMFS Biological Opinion for the Kensington Gold Mine, Alternatives 3, 4B, and 4D, in combination with reasonably foreseeable projects, including commercial fishing, recreational, and commercial marine traffic in the Berners Bay area, are likely to cause acute stress responses in some Steller sea lions exposed to this vessel traffic and noise. According to the conclusion of the NMFS Biological Opinion for the Kensington Gold Mine, this is not likely to impair the health of sea lions by depleting their energy reserves. However, NMFS is concerned that Alternatives 3, 4B, and 4D in combination with other reasonably foreseeable projects in Berners Bay could substantially affect populations of forage fish such as herring and eulachon. Such an impact may result in a depletion of energy reserve for some individual Steller sea lions. For example, in response to a reduction in the availability of herring or eulachon, Steller sea lions may have to behaviorally compensate by dedicating more time to foraging on species with less energetic value, which may result in a greater expenditure of energy for the same or less energy gain, or by relocating to other areas to feed which would also incur an energetic cost. In its Biological Opinion on the Kensington Gold Mine, NMFS concluded that the Kensington Gold Mine, in combination with an East Lynn Canal Highway (Alternative 2B) and Goldbelt development in the Echo Cove area, would not have a subpopulation or population effect on Steller sea lions (NMFS, 2005b). However, as indicated in Sections 4.4.17.1 and 4.6.17.1, NMFS has expressed concern that ferry traffic in Berners Bay associated with Alternatives 3, 4B, and 4D may adversely affect Steller sea lions and would require formal consultation to determine the alternatives cumulative impact on this species.

### 4.9.3 Summary of Cumulative Impacts

#### 4.9.3.1 Alternative 1B

Alternative 1B would have few direct and indirect impacts to create cumulative impacts in Lynn Canal. Alternative 1B is not expected to contribute to a cumulative impact on Juneau's current and future population.

Increased vessel traffic associated with Alternative 1B in combination with other foreseeable projects in the region would increase the volume of pollutants entering Lynn Canal, but this is unlikely to cause an exceedance of AWQS.

#### 4.9.3.2 Alternative 2B

Alternative 2B in combination with reasonably foreseeable development would change the remote character of recreation in Berners Bay. Boat, plane, and automobile traffic would increase in the region, as well as the number of hikers and campers. The visual presence of humans would increase, primarily in views from boats in the bay. Ambient boat and plane noise would increase with the reasonably foreseeable developments, along with the addition of vehicle noise. This would further change the remote experience in Berners Bay, particularly for kayakers and other non-motorized users.

The increased population and visitors associated with Alternative 2B and reasonably foreseeable development coupled with improved access would increase the potential for discovery of currently unknown cultural resource sites and increase the potential for adverse impacts to known and unknown cultural resources through vandalism. This incremental increase in access

and potential impacts to resources could be lessened by constructing USFS trails in areas removed from known resources.

Most cumulative socioeconomic impacts would occur in Juneau and Haines as a result of increased visitor spending, new jobs, and increased sales tax revenue.

Cumulative development in Lynn Canal would reduce the sense of isolation and geographic separateness of Juneau, Skagway, and Haines. Increased economic opportunities, easier travel among the Lynn Canal communities, and better connections to areas outside Lynn Canal would be viewed as an improvement to quality of life by those that view the current degree of isolation as negative. It would be perceived as a reduction in the quality of life by those that value the current degree of isolation and separateness.

Increased marine traffic from the Kensington Gold Mine shuttle ferry, stormwater runoff from the Alternative 2B highway, the Kensington Gold Mine operations, and Goldbelt development at Echo Cove would result in a cumulative increase in pollutant loads to Berners Bay; however, this cumulative increase in pollutant loads is not likely to be large enough to cause water quality impacts great enough to exceed AWQS.

The amount of air pollutant emissions would also increase in the Berners Bay region as a result of cumulative development. The amount of increase would not exceed NAAQS or AAAQS.

Alternative 2B would contribute to a cumulative loss of wetlands, representing about 1 percent of the total wetlands on the east side of Lynn Canal. The cumulative loss of wetlands in Berners Bay would be approximately 1.4 percent of the total wetlands in this area.

The permanent cumulative loss (dredged areas remain as habitat, but would be of lower value after dredging) of marine habitat in Lynn Canal would total about 31 acres. This impact is small and would be spread over about 40 miles of coast. There would be no cumulative impact to the marine habitat in Berners Bay resulting from Alternative 2B. For these reasons, the cumulative loss of marine habitat is unlikely to result in a substantial impact to fish or marine mammals.

The maximum area of terrestrial habitat that would be cumulatively affected by Alternative 2B and reasonably foreseeable projects is about 640 acres. Much of this would be OG forest. Approximately 240 acres of the terrestrial habitat that would be cumulatively affected is located in Berners Bay. This would have little impact on marine or terrestrial birds because it represents less than 1 percent of the terrestrial habitat available on the east side of Lynn Canal (3 percent in Berners Bay).

Alternative 2B in combination with reasonably foreseeable projects would result in cumulative impacts to terrestrial wildlife, primarily as a result of habitat fragmentation caused by the highway, increased access associated with Alternative 2B, and increased population associated with all of the reasonably foreseeable projects. Cumulative wildlife impacts of these actions would be focused primarily on Berners Bay. Habitat fragmentation would have the greatest impact on species sensitive to human presence, such as the brown bear. Alternative 2B in combination with reasonably foreseeable projects could have a population-level effect on brown bear in Berners Bay. Increased hunting and trapping would result from improved access to Berners Bay and increased population in Juneau. Increased hunting pressure, habitat loss, and habitat fragmentation would affect mountain goats in the Lynn Canal region. This impact is not anticipated to have a population-level effect due to population monitoring and corresponding hunting management.

#### 4.9.3.3 Alternative 3

The increased access and population growth associated with Alternative 3 and reasonably foreseeable development would increase the use of the recreational resources along the Lynn Canal coastline, particularly along the west side of the canal. The visual presence of humans in the region would increase, primarily in views from boats.

The increased population and visitors associated with Alternative 3, present development, and reasonably foreseeable development coupled with improved access would increase the potential for discovery of currently unknown cultural resource sites and increase the potential for adverse impacts to known and unknown cultural resources through vandalism. The incremental increase in access and potential impacts to resources could be lessened by constructing USFS trails in areas removed from known resources.

Most cumulative socioeconomic impacts would occur in Juneau and Haines as a result of increased visitor spending, new jobs, and increased sales tax revenue.

Cumulative development in Lynn Canal would reduce the sense of isolation and geographic separateness of Juneau, Skagway, and Haines. Increased economic opportunities, easier travel among the Lynn Canal communities, and better connections to areas outside Lynn Canal would be viewed as an improvement to quality of life by those that view the current degree of isolation as negative. It would be perceived as a reduction in the quality of life by those that value the current degree of isolation and separateness.

Increased marine traffic associated with Alternative 3, the Kensington Gold Mine, Goldbelt development at Echo Cove, stormwater runoff, and treated wastewater discharges from these developments would result in a cumulative increase in pollutant loads to Berners Bay; however, this cumulative increase in pollutant loads is not likely to be large enough to cause water quality impacts great enough to exceed AWQS.

Alternative 3 would increase the amount of air pollutant emissions in Berners Bay with increased vessel traffic; however, considering existing and reasonably foreseeable future vessel emissions and other sources, the cumulative emissions of criteria pollutants would not exceed NAAQS or AAAQS.

The bulk of the wetland impacts caused by Alternative 3 would be on the west side of Lynn Canal. The cumulative impact of Alternative 3 and reasonably foreseeable development would include wetlands on the west side of Lynn Canal and Berners Bay. The maximum cumulative loss of wetlands in Berners Bay would be approximately 68 acres, or about 1.5 percent of the total wetlands in this area.

Alternative 3 in combination with other reasonably foreseeable marine development in Berners Bay would result in the filling and dredging of about 6 acres of marine habitat in Berners Bay. This impact is small relative to the total marine habitat available in the bay. However, NMFS, EPA, and ADF&G have expressed concern that the cumulative marine traffic in Berners Bay associated with Alternative 3 in conjunction with Kensington Gold Mine and Goldbelt activities could have an adverse effect on the Lynn Canal herring stock and forage fish important to Steller sea lions and humpback whales.

Most of the terrestrial habitat affected by Alternative 3 would be on the west side of Lynn Canal. This alternative would provide access for possible logging on private lands and lands owned by

the University of Alaska on the west side of Lynn Canal. The cumulative loss of terrestrial habitat would represent a small percentage of the terrestrial habitat in the Lynn Canal region.

#### 4.9.3.4 Alternatives 4A and 4C

Alternatives 4A and 4C would have few direct and indirect impacts to create cumulative impacts in Lynn Canal. Alternative 4A would have a minor contribution to a cumulative impact on jobs and population growth. Increased vessel traffic associated with Alternatives 4A and 4C in combination with other foreseeable projects in the region would increase the volume of pollutants entering Lynn Canal, but this is unlikely to cause an exceedance of AWQS.

Alternatives 4A and 4C in combination with the Statter Harbor facility improvements and Alaska Glacier Seafoods Plant would result in the cumulative loss of about 5.6 acres of nearshore intertidal and shallow subtidal habitat in Auke Bay. This habitat is used for rearing by juvenile salmon, prey species, and crabs. Because the remaining Auke Bay nearshore intertidal and subtidal habitat and most of the Lynn Canal coastline provide suitable rearing habitat for juvenile salmon, prey species, and crabs, this loss would not measurably affect fish and invertebrate populations in Auke Bay or Lynn Canal.

#### 4.9.3.5 Alternatives 4B and 4D

Upgrading the Glacier Highway from Echo Cove and extending it to Sawmill Cove in combination with reasonably foreseeable projects would increase vessel use in Berners Bay. The visual presence of humans would increase in Berners Bay, affecting recreational boaters. Alternatives 4B and 4D would have a minor contribution to a cumulative impact on jobs and population growth.

Increased marine traffic associated with Alternatives 4B and 4D, the Kensington Gold Mine, Goldbelt development at Echo Cove, stormwater runoff and treated wastewater discharges from these developments would result in a cumulative increase in pollutant loads to Berners Bay; however, this cumulative increase in pollutant loads is not likely to be large enough to cause water quality impacts great enough to exceed AWQS.

Alternatives 4B and 4D would increase the amount of air pollutant emissions in Berners Bay with increased vessel traffic; however, considering existing and reasonably foreseeable future vessel emissions and other sources, the cumulative emissions of criteria pollutants would not exceed NAAQS or AAAQS.

Alternatives 4B and 4D in combination with the Kensington Gold Mine and potential Goldbelt development at Echo Cove would result in the loss of about 6 acres of marine habitat in Berners Bay. This impact is small relative to the total marine habitat available in the bay. However, NMFS, EPA, and ADF&G have expressed concern that the cumulative marine traffic in Berners Bay associated with Alternatives 4B and 4D in conjunction with the Kensington Gold Mine and Goldbelt activities could have an adverse effect on the Lynn Canal herring stock and forage fish important to Steller sea lions and humpback whales.

Alternatives 4B and 4D in combination with construction of the Alaska Glacier Seafoods Plant and the improvements at Statter Harbor would result in the cumulative loss of about 5.6 acres of nearshore intertidal and shallow subtidal habitat in Auke Bay. This habitat is used for rearing by juvenile salmon, prey species, and crabs. Because the remaining Auke Bay nearshore intertidal and subtidal habitat and most of the Lynn Canal coastline provide suitable rearing habitat for

juvenile salmon, prey species, and crabs, this loss would not measurably affect fish and invertebrate populations in Auke Bay or Lynn Canal.

## 4.10 The Relationship between Local, Short-Term Uses of Man's Environment and the Maintenance and Enhancement of Long-Term Productivity

The build alternatives would permanently convert a maximum of approximately 680 acres of natural habitat, principally OG forest, to transportation facilities. This overall loss of habitat represents less than 1 percent of the natural habitat that exists in the Lynn Canal region.

The increase in population and visitors associated with improved transportation facilities in Lynn Canal would result in increased pressure on fish and wildlife species, principally big game and furbearing species such as bears, moose, deer, mountain goats, martens, and river otters, and game fish such as Pacific salmon, steelhead, and Dolly Varden, as a result of recreational hunting and fishing and collisions with vehicles. Project-related effects on populations of these species can be controlled through management plans implemented by ADF&G.

The long-term productivity of Lynn Canal region would be enhanced by a better transportation system to move goods, services, and people. Based on household surveys conducted in Juneau, Haines, and Skagway in 1994 and 2003 and the growth in traffic on transportation corridors adjacent to Lynn Canal, there is latent travel demand in the Lynn Canal corridor that cannot be met by existing AMHS service. In addition to serving local needs, the build alternatives would improve tourist/recreation travel and intra-regional movement, which could result in economic benefits to Juneau, Haines, and Skagway.

The long-term benefit of improved access in Lynn Canal is recognized in the State and local comprehensive planning for the region. Improving surface transportation in the region is consistent with the comprehensive plans of the CBJ (2008), the Municipality of Skagway Borough (2009), and the Haines Borough (2012a).

## 4.11 Irreversible and Irretrievable Commitments of Resources

Depending on the alternative selected, up to approximately 680 acres of land and intertidal and subtidal habitat would be committed to the proposed project. Construction of transportation facilities would result in the permanent commitment of energy, concrete, aggregate, asphalt, water, and other construction materials. For alternatives requiring construction, project construction costs ranging from $78 million to $680 million would be committed; these costs would be offset by savings in travel time and energy use and the economic stimulus of improved access to the communities of the Lynn Canal region.