

**Gravina Access Project**  
**Draft Supplemental Environmental**  
**Impact Statement**

**Chapter 3**  
**Affected Environment**

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## 3.0 AFFECTED ENVIRONMENT

This chapter inventories and characterizes the economic, environmental, and cultural resources in the Gravina Access Project area that could be affected by the proposed project alternatives. This information is drawn from the data, documents, and plans published by a variety of local, state, and governmental agencies, and project-specific technical studies completed by HDR Alaska, Inc., and its affiliates on behalf of DOT&PF, as listed in the References section. All figures referenced in this chapter may be found at the end of the chapter.

### 3.1 Land Use

#### 3.1.1 Current Land Use

This section describes the current land ownership, land uses, and zoning within the project area on Revillagigedo, Pennock, and Gravina islands. General land ownership within the project area is presented below in Table 3.1 and shown in Figure 3.1; land uses are listed in Table 3.2 and shown in Figure 3.2; and project area zoning is summarized in Table 3.3 and shown in Figure 3.3.

Native lands in Alaska are typically held by regional and village Native corporations formed by the Alaska Native Claims Settlement Act and are considered to be privately owned. Native Village Corporations have been making selections from federal lands over several decades, and some of these selections are still underway in Southeast Alaska. Native Village Corporations have also purchased commercial properties and run businesses in many communities, including Ketchikan. Some of the privately owned land noted below is held by Cape Fox Corporation, which owns hotels and restaurants, among other holdings. No large land areas selected by Native corporations are in the mapped project area. There are no Indian Reservations in the project area.

##### 3.1.1.1 Revillagigedo Island

**Ownership.** The majority of the land in the project area on Revillagigedo Island is privately owned, though there are many Borough- and city owned parcels and a few state and federal parcels interspersed with the private lands. Areas outside the city limits of both Ketchikan and Saxman are largely a mix of state and federal<sup>56</sup> ownership. In particular, large tracts of land located immediately outside Ketchikan city limits are owned by the Alaska Mental Health Trust Authority and the federal Bureau of Land Management (BLM).

**Land Use.** Ketchikan and Saxman are typical Southeast Alaska waterfront communities. Most of the developable land is densely clustered along the shoreline, with a mix of commercial, industrial, residential, and institutional<sup>57</sup> uses.

**Zoning.** Zoning on Revillagigedo Island is mixed similarly to land use on the island. The waterfront features a mix of general commercial and heavy industrial zones, with low-density residential zones scattered across the northern portion of the project area. In the downtown area, near the cruise ship docks, land is generally zoned as commercial. Upland of the downtown area, to the east of Tongass Avenue, zoning is a mix of medium- to high-density residential and public lands/institutional areas.

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<sup>56</sup> Executive Order 1520 (April 20, 1912) officially reserves the USCG Integrated Support Command (ISC) property in Ketchikan for lighthouse purposes. According to USCG staff (personal communication from Robert Deering [USCG] to Jim Evensen [DOT&PF], November 14, 2003), this is what originally set aside the property for Coast Guard facility use.

<sup>57</sup> Institutional uses include publicly owned facilities such as libraries, hospitals, schools, fire and rescue stations, and municipal buildings.

**Table 3-1: Land Ownership in the Project Area**

<b>Ownership</b>	<b>Acreage</b>
Federal	8
USFS	704
USCG	58
BLM	3,389
State of Alaska (total)	4,345
<i>DNR</i>	2,381
<i>DOT&amp;PF</i>	28
<i>Leased Land<sup>a</sup></i>	1,936
Alaska Mental Health Trust	3,984
University of Alaska	52
Native Corporation	23
Borough	1,787
City of Ketchikan	357
City of Saxman	2
Private	2,334
No Data	2,166
<b>Total</b>	<b>19,208</b>

<sup>a</sup>Includes airport property owned by DOT&PF and leased to the Borough (1,932 acres) and DNR tide lands (4 acres).

Source: Ketchikan Gateway Borough GIS, 2010.

**Table 3-2: Land Uses in the Project Area**

<b>Land Use</b>	<b>Acreage</b>
Residential	554
Commercial	146
Industrial	2,782
Institutional	94
Recreation/Park	45
Vacant*	15,589
<b>Total</b>	<b>19,210</b>

\*Based on 2010 Borough Tax Assessment for parcels with appraised improvements equal to zero.

Source: Ketchikan Gateway Borough GIS, 2010.

**Table 3-3: Zoning in the Project Area**

Zoning Classification	Acreage
Central commercial	59
General commercial	188
Future development	12,516
Historic district	4
Light industrial	350
Heavy industrial	439
Public lands/institutional	340
Low-density residential	2,215
Medium-density residential	665
High-density residential	130
Rural residential	395
Suburban residential	-
Airport	325
Airport development	804
Airport reserve	328
<b>Total</b>	<b>18,758</b>

Source: Ketchikan Gateway Borough GIS, 2010.

**3.1.1.2 Pennock Island**

**Ownership.** Approximately 70 percent of the land on Pennock Island is owned by the Borough, while the remaining 30 percent, mostly along parts of the shoreline, is privately owned.

**Land Use.** Pennock Island is approximately 1,130 acres in size and is predominantly undeveloped, including much of the privately owned land. Developed residential land uses occur on the northern shoreline, along the East Channel, with some residences using small streams as a source of drinking water supply. A few privately owned parcels surrounding Whiskey Cove, also located along the East Channel, are being used for industrial purposes.

The island contains registered archeological sites (see Section 3.20). Subsistence use of the island includes hunting and berry picking (see Section 3.3.7).

**Zoning.** Land on Pennock Island is zoned predominantly as low-density residential, though the land around Whiskey Cove is zoned as heavy industrial. There is also a large tract of land on the southeast corner of Pennock Island (outside of the project area) that is zoned as public lands/institutional.

**3.1.1.3 Gravina Island**

The project area on Gravina Island encompasses those areas that would be most easily accessed as a result of the project alternatives. Title 29 granted the Borough land on Gravina Island to provide areas for public or private settlement or development (see Section 1.3, Purpose and Need). Inadequate access to Gravina Island from the city of Ketchikan on Revillagigedo Island has precluded the development of Borough-owned land on Gravina Island. This lack of access is one of the needs that the proposed project aims to address, though the recent completion of the Gravina Island Highway, by improving in-trailand accessibility, has brought the Borough closer to realizing the economic development potential on Gravina Island.

Gravina Island is the site of the Ketchikan International Airport, which serves as the transportation hub for the city of Ketchikan and surrounding area as well as for the neighboring communities of Saxman, Metlakatla, Klawock, and Craig.

**Ownership.** Most of the land on Gravina Island (62 percent) is owned by USFS. The remainder is owned by private interests (2 percent) and other public agencies, including the State of Alaska (18 percent), the Alaska Mental Health Trust Authority (7 percent), the Borough (5 percent), University of Alaska (3 percent), and BLM (3 percent).

**Land Use.** Most of Gravina Island is undeveloped. The existing development lies within the project area on the eastern side of the island. The principal developments include Ketchikan International Airport, a timber processing plant (Pacific Log and Lumber) 2 miles north of the airport, and private residences in the Clam Cove area and at the northernmost portion of the island. Land uses are described by owner in the following paragraphs.

**USFS.** The USFS land on Gravina Island is a mixture of alpine ridges, wetlands, and various types of forest, managed for multiple uses under the 2008 *Tongass National Forest Land and Resource Management Plan*<sup>58</sup>. The plan provides for intensive development of timber in the central portion of the island, old-growth habitat along its eastern and south-central portions, semi-remote recreation around Bostwick Inlet, and moderate development (timber harvesting) with a focus on maintaining viewsheds in the southern portion of island.

**DNR.** Most of the DNR land on the island is in remote portions of the project area and near Bostwick Lake, Blank Inlet, and Vallenar Bay. The DNR-managed Southeast State Forest, which was designated by the State Legislature in 2010, includes three parcels on Gravina Island: two near Vallenar Bay and one northwest of Blank Inlet.<sup>59</sup> The DNR areas and recommended land uses on Gravina Island are:<sup>60</sup>

- *On the shoreline southeast of Clam Cove:* Reserved for state interests only.
- *On Vallenar Bay:* Commercial forestry, dispersed recreation areas, settlement, timber, anadromous streams, and important habitats and wildlife movement corridors
- *Adjacent to and west of California Ridge (including the area around Bostwick Lake):* Dispersed recreation, timber harvest, wetlands, and wildlife habitat
- *Small islands, beach, tidelands, and marine waters on the southern tip of Gravina Island:* Dispersed recreation, deer habitat, and scenic resources; recommended to be included in the state park system.

**DOT&PF.** DOT&PF owns 2,105 acres of land designated as an Airport Reserve on Gravina Island, including approximately 5.9 miles of waterfront land<sup>61</sup>. Ketchikan International Airport (including seaplane facilities) is currently leased to the Borough. The area immediately outside the developed airport site is the Airport Reserve zone, which is designated for future airport-related uses. Beyond the Airport Reserve zone is the Airport Development zone, which is designated for auxiliary airport facilities such as parking lots, hotels, rental car businesses, and other lands uses, although it remains largely

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<sup>58</sup> U.S. Forest Service. January 2008. *Tongass National Forest Land and Resource Management Plan*. United States Department of Agriculture, Region 10. Juneau, Alaska.

<sup>59</sup> Alaska Department of Natural Resources, 2012. Division of Forestry Web site, <<http://forestry.alaska.gov/stateforests.htm#sef>> Accessed on February 9, 2012.

<sup>60</sup> Alaska Department of Natural Resources, November 2000. Central and Southern Southeast Area Plan for State Lands.

<sup>61</sup> Ketchikan Gateway Borough Planning Department. 2005. *Gravina Island Plan Central Gravina and Airport Reserve Area*.

undeveloped. Use of Airport Development land is subject to Borough and State of Alaska review and approval.<sup>62</sup>

**Ketchikan Gateway Borough.** Borough-owned lands are located along the east side of Gravina Island on the north, west, and south sides of the Ketchikan International Airport lands. These areas are included in the Borough's Ketchikan 2020 comprehensive planning effort (see Section 3.1.2.4). The Borough has developed specific development strategies for all of the east side of Gravina Island, exclusive of any USFS lands. These strategies are addressed in the three separate area plans comprising the *Gravina Island Plan* (see Section 3.1.2.3).

**Alaska Mental Health Trust Authority.** The Alaska Mental Health Trust Authority land within the project area is generally west of Airport Reserve land. Specific management plans have not been developed for this land, though Alaska Mental Health Trust Authority land is intended to generate revenue. A large portion of the Alaska Mental Health Trust Authority land is located inland, extending west to California Ridge and east to the Airport Reserve land. Alaska Mental Health Trust Authority land also includes smaller areas of land in the southern and northernmost portions of the project area on Gravina Island. The Borough has zoned the Alaska Mental Health Trust Authority land for "future development."<sup>63</sup>

**University of Alaska.** The University of Alaska lands are undeveloped parcels on the southwest side of Blank Inlet and on the west side of Vallenar Bay.<sup>64</sup>

**Private.** Small, privately owned parcels comprise much of the shoreline on the eastern side of Gravina Island immediately north and south of the Airport Development area. Some private lands at Clam Cove, Vallenar Bay on the northwestern part of the island, and Seal Cove in the southern portion of the island have been developed, though there are undeveloped parcels in each area and in the Long Lake area. Developed private lands on Gravina Island are generally residences or recreation cabins.

**Zoning.** The zoning map (Figure 3.3) shows the currently allowable (planned) uses for private, state, and Borough-owned properties within the project area on Gravina Island.<sup>65</sup> The Ketchikan International Airport property has been zoned by the Borough as industrial. The DOT&PF *Airport Master Plan* has more specific zoning recommendations for their property, and lists intended uses for Ketchikan International Airport lands as aviation, a reserve for future development, airport development, general commercial activities, and heavy and light industry. Immediately south of Ketchikan International Airport, lands are zoned for future development and rural residential. Outside of the project area, Gravina Island is zoned almost entirely as future development with the exception of a few small areas zoned for residences along Tongass Narrows, north of airport property, and within Vallenar Bay.

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<sup>62</sup> Alaska Department of Transportation and Public Facilities. June 2003. Ketchikan International Airport Master Plan.

<sup>63</sup> Ketchikan Gateway Borough Planning Department. 2009. Ketchikan Gateway Borough Comprehensive Plan 2020.

<sup>64</sup> Ketchikan Gateway Borough GIS Department 2008.

<sup>65</sup> Ketchikan Gateway Borough Planning Department. 2009. *Ketchikan Gateway Borough Comprehensive Plan 2020*.

#### **3.1.1.4 Tidal and Submerged Lands**

Tidal and submerged lands associated with Tongass Narrows are used for marine boat and seaplane operations. Tidelands and submerged lands are owned by DNR and the Borough, though many of the tidelands<sup>66</sup> have been leased for private development.

#### **3.1.2 Land Use Plans and Policies**

The Borough is the local planning authority for the project area. The adopted plans with authority to govern land use decisions within the project area include:

- *Pennock and Gravina Island Neighborhood Plan, 1985*
- *Ketchikan International Airport Master Plan, 2003*
- *Gravina Island Plan, 2005*
- *Coastal Zone Management Plan, 2007*
- *Ketchikan Gateway Borough Comprehensive Plan 2020, 2009*

The Borough is currently engaged in a comprehensive planning effort known as *Ketchikan 2020*, which led to the development of the *Gravina Island Plan*, updates of the *Comprehensive Plan* and *2007 Coastal Zone Management Plan*, and development of a *Wetland Development Plan*. Descriptions of these plans and policies and their relevance to the Gravina Access Project are provided in the following sections.

##### **3.1.2.1 Pennock and Gravina Island Neighborhood Plan**

The *Pennock and Gravina Island Neighborhood Plan*, adopted by the Borough in 1985, is the most recently adopted plan specifically addressing land on Pennock Island. The 2005 *Gravina Island Plan* supersedes the Gravina Island portion of this plan. The plan was written at a time when considerable economic and population growth was anticipated in Ketchikan as a result of nearby mineral development. That mineral development did not occur, and the growth of Ketchikan was not consistent with the assumptions of the plan. According to the Ketchikan Planning Department, the intentions and purposes of this plan are accurate and the plan, although it requires updating to reflect current conditions, is still used by the planning department.<sup>67</sup>

One objective of the *Pennock and Gravina Island Neighborhood Plan* was to develop a transportation system that would provide access to interior land without compromising the qualities that attracted residents to the area. The plan clearly articulated a vision for future transportation access that would include a ferry. Regarding a bridge, the plan states:

Hard access by bridge or tunnel from Pennock to Gravina Island is not envisioned in the foreseeable future and, in light of the rural characteristics, should not be pursued. Hard access and its possible location is of concern to the community as a whole and should be determined by a Borough-wide vote.<sup>68</sup>

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<sup>66</sup> Tidelands are those between mean high and mean low water. They are State owned; however, some tidelands occupied or developed prior to Statehood (Jan. 3, 1959) are owned by local governments or privately. The State has programs where its tidelands and submerged lands may be leased for development or use.

<sup>67</sup> Williams, Tom. 2011. Personal communication with HDR.

<sup>68</sup> *Ketchikan Gateway Borough, 1985. Pennock and Gravina Island Plan: 26.*



### **3.1.2.2 Ketchikan International Airport Master Plan**

The 2003 *Ketchikan International Airport Master Plan* addresses airport development plans intended to accommodate anticipated future growth, and outlines forecasted changes in operations over a 20-year period (through 2018). The components of the master plan that are most pertinent to the Gravina Access Project include:

- Renovation and expansion of the passenger terminal building
- Expansion of the apron area to include additional hangar space, tie-down space, and parking stalls

The two key projects in the plan call for construction of a parallel taxiway (now Taxiway A) along the north side of Runway 11 and an upgrade to the runway safety area, both now complete (see Section 3.7.1.1). The runway safety area expansion consisted of shifting the runway 750 feet east along the existing runway centerline, which resulted in 1,000 feet of safety area on either end of the runway.

### **3.1.2.3 Gravina Island Plan**

The *Gravina Island Plan*, produced by the Borough in 2005, is a set of four documents focusing on the Borough's long-term plans for development on Gravina Island. Because the plan was issued after the Record of Decision on the 2004 FEIS, it identifies development opportunities relative to the selected alternative, Alternative F1. The plan consists of the *Gravina Island Plan "Citizen's Guide"*, which offers island-wide policies and background on the plan, and three separate subarea plans that identify economic opportunities and provide detailed guidance for development for Gravina Island's eastern shoreline. The three area plans are the *Central Gravina & Airport Reserve Area* plan, the *Clam Cove & Blank Inlet Area* plan, and the *North Gravina Area* plan.

The *Central Gravina & Airport Reserve Area* plan addresses future community development strategies for the area at and adjacent to the Ketchikan International Airport. The Central Gravina and Airport Reserve area totals 11,010 acres of lands owned by DOT&PF, the Alaska Mental Health Trust Authority, DNR, and private entities (see Figure 3.4). Lands within the Airport Reserve are currently zoned as Airport Development and all other lands are zoned for future development. The Borough does not own any land within this area, but proposes zoning changes to the area outside of the Airport Reserve to accommodate as-yet unimplemented recommendations for Alaska Mental Health Trust Authority and DNR-owned lands. This plan recognizes that future road infrastructure, including the potential development of a bridge, is necessary to open the area to industrial development, timber harvesting, recreation, and future airport-related expansion. Noting the uncertainty of financing for bridge construction, the plan references the necessity of airport area road infrastructure regardless of a bridge.

The *Clam Cove & Blank Inlet Area* plan lays the foundation for future development in the Clam Cove and Blank Inlet areas. The areas addressed in this plan total 4,851 acres of mostly Borough-owned (63 percent of total) land, as well as DNR (12 percent), University of Alaska (10 percent), Alaska Mental Health Trust Authority (4 percent), and private lands (11 percent) (see Figure 3.4). Due to the amount of Borough and Alaska Mental Health Trust Authority lands available for future private ownership, the Borough identified the Clam Cove area as one of the three residential growth centers on Gravina Island (along with North Gravina and Vallenar Bay, described in the following paragraph). This plan recognizes that a direct connection to the airport area via a Pennock Island bridge would encourage development and stimulate economic growth in the Clam Cove area and eventually at Blank Inlet. The plan also recognizes that without a bridge, the growth in this area would occur much more slowly than it would with a

bridge in place. The plan indicates that development under either scenario will prefer waterfront and adjacent properties and Borough lands will be integral in meeting the future demand.

The *North Gravina Area* plan addresses the approximately 1,905 acres of mostly Borough-owned land (77 percent) along the Tongass Narrows north of the Airport Reserve area. The area is also comprised of Alaska Mental Health Trust Authority (10 percent) and privately owned lands (13 percent of total) (see Figure 3.4). This plan recommends the development of an industrial park and marina, as well as residential development along the eastern shoreline and at Vallenar Bay, as economic development initiatives for the area. According to the plan, the construction of the North Gravina Road to the Pacific Log and Lumber sawmill would encourage subdivision and sale of Borough lands and development of private lands along the shoreline, which would only be accelerated by construction of the bridge.

#### **3.1.2.4 Coastal Management Plan**

The *Coastal Management Plan* was originally prepared in 1984 and most recently amended in 2007. The plan is part of the Alaska Coastal Management Program (ACMP) and contains policy guidance regarding the use and protection of coastal resources. The plan provides specific guidance regarding Gravina Island access, discusses the need to improve that access, and recognizes that improved access between Gravina and Revillagigedo islands created by the Gravina Access Project is necessary to make available suitable lands to meet community growth needs. As of July 1, 2011, ACMP authorities were repealed and the regulations at 11 Alaska Administrative Code (AAC) 110, 11 AAC 112, and 11 AAC 114, as well as local coastal management plans, have no statutory authority and therefore are unenforceable. See section 3.19, Coastal Zone, for more information.

#### **3.1.2.5 Ketchikan Gateway Borough Comprehensive Plan**

In 2009, the Borough adopted its *Comprehensive Plan 2020*. The *Comprehensive Plan 2020* outlines goals, objectives, and policies intended to guide development in the Borough. The plan explains each plan element (i.e., land use, transportation, recreation, etc.), the capital improvements implementation program, and monitoring and evaluation procedures. The plan also includes maps illustrating background conditions for the various elements, as well as a map series showing future land use and future transportation conditions.

Included in its economic development goals, the plan encourages the creation of a development plan for Gravina Island that “provides for new economic opportunities to diversify and strengthen Ketchikan’s economic health.” Objective 1110.1 of the plan states:

The Borough may develop strategies that provide access to Gravina Island from Revillagigedo Island that supports and fosters economic development. Access strategies should include, but are not limited to, a bridge, an enhanced ferry service, or other practical access solutions.

### **3.2 Farmland**

There is no farmland in the project area that is considered prime or unique, or is of statewide or local importance.

### **3.3 Social Environment**

#### **3.3.1 Population and Social Groups**

##### **3.3.1.1 Population**

In the past two decades, the Borough economy has undergone many changes that have affected growth and population in the community. Population increased annually from 1990 to a peak of 14,764 in 1995, and then decreased until 1999. From 1990 to 2000, the overall population increase of the Borough was 1.8 percent—from 13,828 people in 1990 to 14,070 people in 2000. The 2010 U.S. Census indicates a Borough population of 13,477 in 2010<sup>69</sup>, which represents a decrease in the overall population by 4.2 percent between 2000 and 2010 (see Figure 3.5).

##### **3.3.1.2 Minority Populations**

The demographic character of a region, including statistics related to minority populations, helps describe the social setting of the proposed project. Based on the 2010 U.S. Census, about 32 percent of the population in the Borough belongs to a minority (belonging to more than one race or a single race other than white). These data represent a 6 percent increase between 2000 and 2010 in the percent of the overall population that are minorities. Table 3.4 and Figure 3.6 show the minority population breakdown by areas of the Borough known as Census Block Groups. The block groups are comprised of two or more blocks, and cover small areas near Ketchikan and Saxman (where population density is greater) and quite large areas elsewhere in the Borough (where population is more sparsely distributed). Blocks where the population is greater than 50 percent non-white are identified in Figure 3.6. The block group with the greatest minority population is Block Group 3, Census Tract 3, with a nearly 50 percent minority population. Minority populations in the Borough include Alaska Native, Asian, black, Native Hawaiian, and Hispanic.

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<sup>69</sup> Alaska Department of Labor & Workforce Development. 2011. PL 94-171 Redistricting Data for Boroughs and Census Areas. *Research and Analysis Section*. <<http://live.laborstats.alaska.gov/cen/redistr.cfm>>. Accessed on October 11, 2011.

**Table 3-4: 2010 U.S. Census Population and Minority Population  
in Alaska and the Ketchikan Gateway Borough**

Area	Total Population	Minority or Mixed Race	Percent (%) Minority or Mixed Race
<b>Alaska</b>	<b>710,231</b>	<b>236,655</b>	<b>33.3</b>
<b>Ketchikan Gateway Borough</b>	<b>13,477</b>	<b>4,301</b>	<b>31.9</b>
Block Group 1, Census Tract 1	412	32	7.8
Block Group 2, Census Tract 1	837	112	13.4
Block Group 3, Census Tract 1	975	141	14.5
Block Group 4, Census Tract 1	976	156	15.9
Block Group 5, Census Tract 1	284	30	10.6
<b>Census Tract 1 Total</b>	<b>3,484</b>	<b>471</b>	<b>13.5</b>
Block Group 1, Census Tract 2	1,538	695	45.2
Block Group 2, Census Tract 2	2,414	957	39.6
Block Group 3, Census Tract 2	932	322	34.6
<b>Census Tract 2 Total</b>	<b>4,884</b>	<b>1,974</b>	<b>40.4</b>
Block Group 1, Census Tract 3	1,110	495	44.6
Block Group 2, Census Tract 3	940	285	30.3
Block Group 3, Census Tract 3	791	383	48.4
<b>Census Tract 3 Total</b>	<b>2,841</b>	<b>1,163</b>	<b>40.9</b>
Block Group 1, Census Tract 4	973	406	41.7
Block Group 2, Census Tract 4	1,295	287	22.2
<b>Census Tract 4 Total</b>	<b>2,268</b>	<b>693</b>	<b>30.5</b>

Note: Minority or Mixed Race indicates census respondents who describe themselves as a race other than white, or indicating more than one race.

Source: U.S. Census. 2011. <<http://factfinder2.census.gov/faces/nav/jsf/pages/index.xhtml>>, Accessed October 11, 2011.

### 3.3.1.3 Income

The 2005–2009 American Community Survey estimates the median household income in the Borough as \$57,500 in 2009,<sup>70</sup> up from \$51,344 based on 2000 U.S. Census income data. Table 3.5 provides the 2009 median household incomes by census tract. Data showing median household income and percent of population in poverty at the block group level are not available for 2009. The data presented allow comparison of the median income of a particular census tract to the median income in the Borough and Alaska.

Household income is generally used to determine poverty, and Table 3.5 also illustrates the percentage of persons below the poverty level as determined by the 2005–2009 American Community Survey. Figure 3.7 shows the 2009 median household income by census tract for the project area.

<sup>70</sup> Alaska Department of Commerce, Community and Economic Development. Community and Regional Affairs. *Community Database Online*. <<http://commerce.alaska.gov/cra/DCRAExternal>>. Accessed October 13, 2011.

**Table 3-5: 2009 U.S. Census Median Household Income and Percent Below Poverty Level**

Area	Median Household Income in 2009 (\$)	Percent whose income in the past 12 months is below the poverty level in 2009 (%)
<b>Alaska</b>	<b>75,493</b>	<b>6.9</b>
<b>Ketchikan Gateway Borough</b>	<b>57,500</b>	<b>5.8</b>
Census Tract 1	67,469	1.2
Census Tract 2	53,120	5.9
Census Tract 3	47,780	13.3
Census Tract 4	69,850	3.7

Source: 2005-2009 American Community Survey 5-Year Estimates, Selected Economic Characteristics, <[http://factfinder.census.gov/servlet/DatasetMainPageServlet?\\_program=ACS&\\_submenuId=datasets\\_1&\\_lang=en&\\_ts=>](http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=datasets_1&_lang=en&_ts=>), October 26, 2011.

The lowest median household incomes and highest poverty rates occur in Census Tract 3, which includes the downtown area of Ketchikan.

### 3.3.2 Community Character

Community character is the embodiment of the natural environment and the human environment, which includes public and private space, infrastructure, and land use. The perceived quality of life in a community can shape that community's character. The Borough encourages responsible community and economic development to provide future growth that enhances residents' quality of life, ensures the health and safety of Borough residents and visitors, and protects valuable natural resources.<sup>71</sup>

#### 3.3.2.1 Revillagigedo Island

The City of Ketchikan is the largest community on Revillagigedo Island. Residents of the City of Ketchikan value the quality of life their community provides, and many residents especially value the qualities that make their community and neighborhoods unique.<sup>72</sup> Ketchikan is a small city with close ties between residents, and in which residents value the intimate feel of their hometown.

Revillagigedo Island neighborhoods within the immediate vicinity of the project alternatives are:

- **Alternative C3-4 (Airport Bridge).** The alternative would begin in a commercial area at Rex Allen Drive and traverses the hillside above Walmart and the Baker Street/Bucey Avenue neighborhood. Alternative C3-4 would be approximately 500 feet uphill from the Baker Street/Bucey Avenue neighborhood, which is a small residential area comprised of fewer than 15 residences. The majority of the houses in this neighborhood were built in the 1980s, though one property, located at 38 Baker Street, was built in 1920. The Alternative C3-4 bridge would cross North Tongass Avenue in the 4600 block where two single family residences dating from the 1950s are located. Also in that block, just north of these residences, is a new senior housing complex. Opened in 2012, the Pioneer Heights Senior Housing facility is a 10-unit independent living senior housing complex owned by Ketchikan Senior Citizen Services.

<sup>71</sup> Ketchikan Gateway Borough Planning and Community Development Department. 2008 Draft Ketchikan Gateway Borough Comprehensive Plan 2020. Available online at <http://www.borough.ketchikan.ak.us/planning/ComprehensivePlan.htm>.

<sup>72</sup> Alaska Department of Transportation and Public Facilities, November 2001. Gravina Access Project. Draft Social Environment Technical Memorandum, Available online at [http://dot.alaska.gov/sereg/projects/gravina\\_access/assets/Previous\\_docs/SocialEnvironment.pdf](http://dot.alaska.gov/sereg/projects/gravina_access/assets/Previous_docs/SocialEnvironment.pdf).

- **Alternative F3 (Pennock Island Bridges).** This alternative would connect to South Tongass Highway north of the Forest Park neighborhood and south of the USCG Station. The Forest Park neighborhood consists of single and multifamily housing units. Access to the neighborhood would be approximately one half mile south of the Alternative F3 bridge.
- **Alternative G2 (Peninsula Point to Lewis Point Ferry).** The ferry terminal on Revillagigedo Island at Peninsula Point would be immediately across Tongass Avenue from the Densley Drive neighborhood. This neighborhood consists of approximately five houses, built between 1969 and 1981.
- **Alternative G3 (Downtown to South of Airport Ferry).** The ferry terminal on Revillagigedo Island would be constructed near the Plaza Mall at Bar Point, a primarily commercial district. The Cedar Point Condominiums (Buildings A and B), located at 21 and 25 Jefferson Way, are located immediately inland of the proposed traffic queuing area for the ferry terminal. Construction of the condominiums was completed in 2010. Each building has 5 to 10 luxury residential units.
- **Alternative G4 and G4v (New Ferry Adjacent to Existing Ferry).** The residences nearest to the proposed Alternatives G4 and G4v improvements on Revillagigedo Island are the 10 to 15 houses located along Vallenar Lane, more than 1,000 feet from the improvements. These houses were built between 1993 and 2001.

Saxman is an incorporated city on Revillagigedo Island located approximately 2 miles southeast of Ketchikan. It was settled by Tlingit people in 1894 and still has a large Alaska Native population. It functions as a part of greater Ketchikan but is also the seat of the Organized Village of Saxman, a tribal government, and is a designated rural community under federal subsistence management rules. Subsistence is an important socioeconomic element for Saxman. Among other community buildings, Saxman is home to a totem pole carving center which is culturally important and attractive to tourists.

### **3.3.2.2 Pennock and Gravina Islands**

There are no residential neighborhoods within or adjacent to the alignments of the project alternatives on Pennock and Gravina islands. Residences on Pennock Island are primarily located along the northern tip and northeastern shorelines. On Gravina Island, homes are clustered at Clam Cove, where several families live year-round.<sup>73</sup> Existing residential areas on Pennock and Gravina islands are only accessible by boat. The *Pennock and Gravina Island Neighborhood Plan*<sup>74</sup> illustrates that residents of these areas value their sense of community and their way of life. Many residents of these islands are former residents of the City of Ketchikan who were attracted to the islands by their rural and more self-sufficient lifestyle.

A special workshop for Pennock and Gravina Island residents was held May 23 and 24, 2001, as part of the 2004 Final EIS public outreach effort. The workshop was intended to obtain input on the planning activities related to future development, particularly with respect to the Gravina Access Project alternatives. Comments offered by workshop participants are summarized below:

- Workshop participants offered comments both in opposition to and support of an alternative that would cross Pennock Island.
- Some residents said that they would like to have improved access (i.e., relatively quick, easy, and reliable access) from Pennock Island to Ketchikan and Gravina Island.

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<sup>73</sup> Ketchikan Gateway Borough Planning Department. 2005. *Gravina Island Plan: Clam Cove & Blank Inlet Area*.

<sup>74</sup> Ketchikan Gateway Borough Planning Department. 1985. *Pennock and Gravina Island Neighborhood Plan*.

- Some participants were interested in bridge or ferry access to/from Clam Cove and the northern areas of Gravina Island.
- Some residents expressed general opposition to a Pennock Island crossing. They felt that a bridge and associated roads would change the rural and isolated nature of the island.
- There was considerable discussion of how Pennock Island or Clam Cove residents would have access to a bridge or ferry alternative. Participants raised questions concerning the need for an expanded road network to connect the communities with the proposed alternative.

### **3.3.3 Community and Public Facilities**

The Borough, City of Ketchikan, and City of Saxman provide an array of community services to the public,<sup>75</sup> summarized in the following paragraphs. Those facilities located within the project area are shown on Figure 3.8.

#### **3.3.3.1 Libraries**

The Borough has nine libraries: one public library, six school libraries, one college library, and one law library (for reference only). There are no libraries in Saxman.

#### **3.3.3.2 Schools**

The Borough school district consists of five elementary schools, one middle school, one junior/senior high school, one high school, the Ketchikan Charter School, and the Tongass School of Arts and Sciences. In fiscal year 2011, a total of 2,247 students were enrolled in the school district, down from 2,321 students in 2008. The University of Alaska, Southeast has an academic campus and a technical center, both in Ketchikan. There are no schools located in Saxman.

#### **3.3.3.3 Police Services**

The City of Ketchikan and City of Saxman each operates a police department to serve residents within its own city limits. The Alaska State Troopers are based on Revillagigedo Island approximately 2 miles north of the airport ferry terminal and serve residents outside of the city limits.

#### **3.3.3.4 Fire Protection and Emergency Response**

Ketchikan staff and volunteers, along with local volunteer fire departments run by the Borough service areas, provide fire protection and emergency response services to businesses and residents living on the road-accessible portion of Revillagigedo Island. In addition, the City of Saxman has one fire unit. There are seven Borough fire stations located throughout the Borough; all are staffed by volunteers, except the fire station on Main Street in downtown Ketchikan. The average response time (for all service areas) by the city fire station and emergency medical service is approximately 4 minutes. The volunteer squads are used as needed.

Emergency services are not provided to residents living beyond the road system or on Pennock and Gravina islands, as they are outside the designated service areas. The airport has its own rescue and fire-fighting personnel. However, a cooperative emergency response system uses the ferry between Ketchikan and the airport (particularly for people medevaced to the Ketchikan

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<sup>75</sup>Alaska Department of Community and Economic Development (DCED). 2001. *Community Information Database Online*. <[www.dced.state.ak.us/mra/CF\\_COMDB.htm](http://www.dced.state.ak.us/mra/CF_COMDB.htm)>. Accessed in 2011.

hospital). Medevacs during normal hours of ferry operations interrupt the ferry schedule so that emergency responders can be ferried across Tongass Narrows as quickly as possible. After normal ferry operations hours, the hospital or other emergency response team calls the ferry operator, and the ferry is put into operation to transport emergency responders across Tongass Narrows. Other emergency marine response in Alaska generally falls to the USCG and Alaska State Troopers.

### **3.3.3.5 Health Care Facilities**

Local hospitals and health clinics are the Ketchikan General Hospital, the Southeast Alaska Regional Health Consortium Clinic, the Gateway Center for Human Services, and the USCG Ketchikan Dispensary. The hospital is a qualified acute care facility and medevac facility. The USCG facility provides emergency support only and is a qualified emergency care center. Saxman residents use the Ketchikan health care facilities.

### **3.3.4 Recreation Resources**

The City of Ketchikan has numerous parks, trails, and recreation areas, as well as tennis courts, playing fields, and indoor recreation centers. Saxman has a gym in its community center. Fishing, hunting, hiking, and cycling are popular activities throughout Revillagigedo Island, and Tongass Narrows is popular for recreational boating and fishing.

Recreationists on Gravina Island can access fishing, hunting, shellfish gathering, and hiking along the shoreline and on primitive trails. Hiking trails (Figure 3.8) and USFS logging roads provide access to remote areas on Gravina Island, while boaters can access Dall Bay State Marine Park and Black Sands Beach State Marine Park at the southern end of Gravina Island. A USFS public use recreational cabin is also located on the southern end of the island.

Recreation areas at the north end of Gravina Island include the 49.4-acre Vallendar Bay Shoreline and Open Space boat-only access area, as well as the North Gravina Beaches and High Mountain Creek Beach. The Gravina Lake Country Natural Area is an approximately 740-acre area west of Clam Cove that includes trails/boardwalks to shorelines where boat access is possible. The Bostwick Lake Recreation Area is 1,750 acres of forested uplands with hiking, camping, fishing, hunting, bird and wildlife viewing, and winter sport uses.<sup>76</sup> Two trails on Gravina Island that are identified Designated Recreation Areas in the *Ketchikan Coastal Management Program* are within the project area for the Gravina Access Project alternatives (Figure 3.8):<sup>77</sup>

- Gravina Shoreline Trail—a proposed 6-mile trail along the Gravina Island shoreline approximately from Clam Cove to Lewis Point
- Bostwick Lake Loop Trail—a combination of existing and proposed 8-mile trail from the south end of the airport to Bostwick Lake, around Curve Mountain to Pass Creek, then along Government Creek to the airport

Pennock Island is accessible by boat and is used for hunting and fishing, but there are no developed recreation facilities on the island.

### **3.3.5 Accessibility**

The principal modes of transportation between islands within the Borough are air and marine vessel; there is no “hard link” (surface) transportation between the islands. The primary public

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<sup>76</sup> Ketchikan Gateway Borough Planning Department. 2007. *Ketchikan Coastal Management Program*.

<sup>77</sup> Ketchikan Gateway Borough Planning Department. 2007. *Ketchikan Coastal Management Program*.



access to Gravina Island from Revillagigedo Island is the airport ferry that transports motor vehicles, bicyclists, and pedestrians from a terminal on Revillagigedo Island approximately 2.6 miles north of downtown Ketchikan across Tongass Narrows directly to the airport terminal on Gravina Island. Travelers may continue into the interior of Gravina Island by way of the Airport Access Road to exit the airport property and connect with the Gravina Island Highway or Lewis Reef Road.

One of the stated needs for the Gravina Access Project is to improve access to Ketchikan International Airport and to other lands on Gravina Island. One measure of accessibility is the amount of time required to travel from one point to another. Existing travel times were calculated for travel between nine origin points on Revillagigedo Island and the airport terminal on Gravina Island. All of the routes were analyzed for motor vehicle travel times, and three were analyzed for trips taken by pedestrians and bicyclists. Table 3.6 presents the travel times calculated for these nine routes under existing conditions.

**Table 3-6: Travel Times from Revillagigedo Island to Ketchikan International Airport Terminal on Gravina Island**

Origin	Travel Mode	Travel Time (in minutes)
Downtown Ketchikan (Mile Post 0)	Vehicles	30
	Pedestrians	76
	Bicycles	37
Ward Cove (Post Office)	Vehicles	28
	Pedestrians	111
	Bicycles	47
Carlanna Creek	Vehicles	23
	Pedestrians	21
	Bicycles	20

### 3.3.6 Environmental Justice

Executive Order 12898<sup>78</sup> states:

Each federal agency shall 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 populations and low-income populations.

FHWA order *FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*<sup>79</sup> contains the following definitions:

- Low-Income: A household income at or below the poverty guidelines of the U.S. Department of Health and Human Services
- Minorities:
  - Black (having origins in any of the black racial groups of Africa)
  - Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race)
  - Asian-American (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands)
  - American Indian or Alaskan Native (having origins in any of the original people of North America and who maintain cultural identification through tribal affiliation or community recognition)

Executive Order 12898 also defines a “disproportionately high and adverse effect on minority and low-income populations” as follows:

An adverse effect that is predominantly borne by a minority population and/or a low-income population; or will be suffered by the minority population and/or low-income population, and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population.

For purposes of the environmental justice analysis, low-income and minority populations are areas in which greater than 50 percent of the population is low-income or non-white. These populations are also identified as “environmental justice populations.” As noted in Section 3.3.1.2, there are numerous blocks in the project area that are environmental justice populations based on having greater than 50 percent of the population being non-white. Based on census tract data for income presented in Section 3.3.1.3, because data are not reported at the block or block group levels, there are no low-income populations in the project study area.

Given the importance of the Native population in Alaska, the project team analyzed the demographics of the project area (the demographic information for the project area is described above in Section 3.3.1) and consulted Native groups to determine the impacts of the project to these groups. The project team met with representatives of the Metlakatla Indian Community (governing body for the only Indian reservation in Alaska: Annette Island Reserve, located 15 miles south of Ketchikan), the Ketchikan Indian Community Tribal Council (governing body for Natives living on Revillagigedo Island), the Organized Village of Saxman (organized under the Indian Reorganization Act), and Cape Fox Corporation (the local Native corporation

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<sup>78</sup> Federal Register, February 11, 1994. Vol. 59 No. 32, p. 7629.

<sup>79</sup> Federal Highway Administration. December 2, 1980. Order on FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.

established by the Alaska Native Claims Settlement Act). Several meetings were joint meetings of these organizations. The summary of meetings held is presented in Table 7-1 of Chapter 7.0.

Field visits, discussions with Borough planning staff,<sup>80</sup> and public meetings held for the project during development of the 2004 Final EIS did not identify pockets of predominantly minority or low-income populations in the immediate vicinity of any of the alternatives. While there may have been some shifts in population since that time, the outreach effort for this SEIS (see Section 7.2.4) did not identify pockets of predominantly minority or low-income populations in the immediate vicinity of any of the SEIS alternatives.

### **3.3.7 Subsistence**

Subsistence is defined in the Alaska National Interest Lands Conservation Act, Section 803, as “the customary and traditional uses by rural Alaska residents of wild, renewable resources” for non-commercial purposes. Hunting, fishing, trapping, and gathering natural resources are major elements of the cultural and economic life of many Ketchikan-area residents. Subsistence activities are also important to follow cultural customs and traditions (including handcrafts), and to supplement personal income. Federal law regulates subsistence on federal land, and defines rural and non-rural areas, and a person must be a rural Alaska resident to participate in subsistence on federally-owned lands under federal subsistence regulations<sup>81</sup>. Under state law however, and on state lands, all Alaska residents are eligible to participate in subsistence, but only in state-defined subsistence use areas<sup>82</sup>.

Pennock Island and the Bostwick Bay, Inlet, and Creek areas on southeastern Gravina Island are popular subsistence areas, though they are not designated as such by either state or federal agencies. In 1999, 80 percent of the residents of Saxman engaged in subsistence harvesting in these areas and the surrounding region, and almost all residents (97 percent) used subsistence products. The per-capita subsistence harvest was estimated at 217 pounds per person, and included roughly 130 pounds of fish (84 pounds of salmon and 47 pounds of other fish), 29 pounds of land mammals, 12 pounds of marine mammals, 23 pounds of vegetation, and 23 pounds of marine invertebrates.<sup>83</sup> In 2003, the total estimated subsistence salmon harvest in Saxman was 885 salmon.<sup>84</sup>

The residents of Annette Island (see Figure 1.1) also depend on subsistence resources. The most recent data available indicate that in 1987, 77 percent of Metlakatla residents engaged in subsistence harvesting in these areas and the surrounding region, and all of them (100 percent) used subsistence products. The per-capita subsistence harvest was estimated at 70 pounds per person, and included roughly 37 pounds of fish (20 pounds of salmon and 17 pounds of other fish), 11 pounds of land mammals, 1 pound of marine mammals, 5 pounds of vegetation,

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<sup>80</sup> Hill, John. 2001. Personal communication between, Ketchikan Gateway Borough Planning Department and Kristen Maines, HDR.

<sup>81</sup> The following sub-areas are not considered rural: Clover Pass, Herring Cove, Ketchikan City, Ketchikan East, Mountain Point, North Tongass Highway, Pennock Island, Saxman East, and parts of Gravina Island. This encompasses residents of the entire east side of Tongass Narrows from Behm Canal to George Inlet, except for Saxman itself, according to public information posted by the U.S. Fish and Wildlife Service on its Web site in May 2003 ([www.r7.fws.gov/asm/regs01/apply.pdf](http://www.r7.fws.gov/asm/regs01/apply.pdf)).

<sup>82</sup> The Ketchikan Nonsubsistence Area (as defined by the Joint Board of Fisheries and Game) includes: all drainages of the Cleveland Peninsula between Niblack Point and Bluff Point, Revillagigedo, Gravina, Pennock, Smeaton, Bold, Betton, and Hassler Islands...” (Turek, Mike. December 8, 2003. Fax from, ADF&G Division of Subsistence to Kristen Maines, HDR.)

<sup>83</sup> Alaska Department of Fish and Game, Division of Subsistence. 2000. *Household Survey*.

<sup>84</sup> Alaska Department of Fish and Game. 2004. *Alaska Subsistence Fisheries 2003 Annual Report*. Available online at <http://www.subsistence.adfg.state.ak.us/download/asf2003.pdf>.

15 pounds of marine invertebrates, and 1 pound of birds and eggs.<sup>85</sup> In 2003, the total estimated subsistence salmon harvest in Metlakatla was 509 salmon.<sup>86</sup>

### **3.3.8 Utilities**

#### **3.3.8.1 Water**

Ketchikan Public Utilities (KPU) provides potable water to almost all developed areas within the City of Ketchikan on Revillagigedo Island and to the airport on Gravina Island. The KPU's main water distribution system for the City of Ketchikan delivers up to 500 gallons per person per day. The system consists of three tanks and more than 21 miles of pipe ranging in diameter from 2 inches to 16 inches. KPU provides water to the airport on Gravina Island through an underground and submarine main line.

The primary KPU water sources are Ketchikan and Carlanna Lakes; if additional water is needed, it is supplied from Whitman Lake and the Water Lake watershed. The KPU system has the capacity to provide water outside the city limits, but it does not have a distribution network to handle the volume and pressure loads that a regional system would require.

Saxman has a small piped water system, including a reservoir and treatment system, to supply for its residents.

Except for the airport, Borough property owners outside of the City of Ketchikan and City of Saxman are responsible for their own water systems. Most homes and small businesses, including those on Pennock and Gravina islands, depend on rooftop catchment systems for their water supply; during dry months, tanker trucks deliver water from KPU to customers in road-accessible areas. Some residents have wells on their property.

#### **3.3.8.2 Sewer**

Both the City of Ketchikan and the City of Saxman operate wastewater systems, including collector lines and treatment plants. Ketchikan's sewage treatment plant has a capacity of 7 million gallons per day, and currently treats about 1.5 million gallons in an average day and 4 million gallons per day during peak flows in wet weather. This kind of increased flow is not uncommon in Southeast Alaska. Saxman's treatment system has a capacity of 115,000 gallons per day. The Ketchikan International Airport is connected to the public sewer in Ketchikan via a submarine pipeline across Tongass Narrows.

Owners of properties on Pennock and Gravina Islands, and outside the service areas of Ketchikan and Saxman, are responsible for their own sewer systems. It is assumed that most owners have septic tanks and leach fields. In outlying areas, there may be some direct discharge to the ocean or use of pit toilets.

#### **3.3.8.3 Electricity**

In addition to water and wastewater services, the KPU provides electricity to the Ketchikan area, including the City of Ketchikan, the City of Saxman, Gravina Island, and Pennock Island. Portions of Gravina and Pennock islands are served by submarine cable. The KPU has an annual average energy generation of about 65 million kilowatt-hours (kWh) from several hydroelectric projects. It also purchases power produced at the Swan Lake Project, which

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<sup>85</sup> Alaska Department of Fish and Game, Division of Subsistence. 1988. *Household Survey*. Confirmed as most recent available data by Metlakatla Department of Fish and Wildlife Director, Jeff Moran. Personal communication between Jeff Moran and Carol Snead, HDR. 2012.

<sup>86</sup> Alaska Department of Fish and Game. 2004. *Alaska Subsistence Fisheries 2003 Annual Report*. Available online at <http://www.subsistence.adfg.state.ak.us/download/asf2003.pdf>.

produces about 76 million kWh per year. In addition, KPU owns diesel generators capable of generating an additional 100 million kWh per year.

The total power currently available to KPU is about 241 million kWh per year. Power usage from this system is currently about 55 percent of the generating capacity (about 133 million kWh per year).

#### **3.3.8.4 Telephone**

In the early 2000s, KPU Telecommunications (one of three divisions of KPU) provided 11,000 access lines to subscribers on Revillagigedo Island and Gravina Island and did not provide service to Pennock Island residents. GCI began providing wireline telecommunications in 2007. As of September 2011, KPU Telecommunications has only 6,722 lines; as of April/June 2011, GCI had 1,776 access lines in service.<sup>87</sup> KPU Telecommunications provides service to Ketchikan International Airport and Pennock Island both via submarine cable.

### **3.4 Relocation**

As a means of providing uniform and equitable treatment for those persons displaced by federal or federal aid projects, the federal government passed the “Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970,” and the “Uniform Relocation Act Amendments of 1987.” This legislation provides for uniform and equitable treatment of persons displaced from their homes, businesses, or farms by federal and federally assisted programs. It also establishes uniform and equitable land acquisition policies for federal and federally assisted programs. When acquiring property for a program or project by a federal agency results in displacing anyone, that agency is required to reimburse the displaced persons and provide relocation planning, assistance coordination, and advisory services.

Residents displaced by a federal program generally are relocated to existing housing in the community, although they may have to locate elsewhere in the community. Businesses generally are relocated to similar business settings in the same community. The cost of relocating is covered as part of the relocation process. In accordance with the law, the federal agency compensates all owners of acquired property, without discrimination, for their loss of property at fair market value, and moves those displaced persons at no expense to them.

The potentially affected environment for relocation impacts encompasses the homes and businesses within the immediate vicinity of the construction limits for the alignments of the project alternatives, including airport facilities on Gravina Island. Section 4.4, Relocation Impacts, discusses impacts on housing and business relocations for each alternative. An estimate of the number of households to be displaced and a discussion of comparable replacement property is included. Refer to the *Conceptual Stage Relocation Study and Assessment of Right-of-Way Acquisition Costs* technical report in Appendix B for more information.

### **3.5 Economic Environment**

The economic downturns experienced across the country since 2008 have affected the local economy in Ketchikan. This section describes employment and earnings, which are indicators of the strength of an area’s economy, and the major employment sectors in Ketchikan.

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<sup>87</sup> Lichty, Linda. 2011. Personal communication between Ketchikan Public Utilities and Leslie Robbins, HDR.

### 3.5.1 Employment and Earnings

The number of jobs in the Borough has fluctuated over the last 30 years in response to the decline in the forest products industry and the growth in the tourism industry, both of which have been influenced by national and regional economic conditions. Employment decreased in the late 1990s and early 2000s, but rose from 2002 through 2007. The 2008 recession is the likely cause of the decline in employment during the latter years of the decade. Average monthly employment (i.e., number of jobs) for the Borough declined from 7,313 in 2008 to 7,198 in 2010. Table 3-7 provides the most recent annual data for employment and earnings in the Borough.

**Table 3-7: Employment and Earnings in the Ketchikan Gateway Borough, 2010**

Industrial Classification	Annual Average Monthly Employment (jobs)	Yearly Earnings (\$)	Annual Average Monthly Earnings (\$)
Natural resources and mining (includes forestry and logging)	180	9,710,173	4,500
Construction	246	14,559,476	4,942
Manufacturing (includes seafood processing)	534	20,244,926	3,161
Trade, transportation, and utilities	1,715	56,881,906	2,765
Wholesale trade	140	4,929,330	2,941
Retail trade	975	26,088,757	2,231
Transportation and warehousing	600	25,863,819	3,590
Information	87	3,328,888	3,201
Financial activities	375	16,319,744	3,630
Professional and business services	224	12,395,461	4,610
Educational and health services	787	34,821,733	3,689
Leisure and hospitality	788	15,748,083	1,667
Other services	184	3,235,399	1,467
Federal government	273	19,087,746	5,832
State government	711	36,265,306	4,250
Local government	1,086	50,351,114	3,863
<b>Total</b>	<b>7,198</b>	<b>\$293,281,293</b>	<b>3,395</b>

Source: Alaska Department of Labor and Workforce Development. 2011. *Research and Analysis*. <<http://almis.labor.state.ak.us/>>. Accessed in 2011.

### 3.5.2 Major Employment Industries

The primary locations of major employers in the project area are illustrated on Figure 3.9. Government employment and spending are significant contributors to the Ketchikan area economy. In 2010, government jobs represented approximately 29 percent of Borough employment, providing more than 2,000 jobs in the project area.

The forestry, logging, and forest products industry historically have been very important to the Southeast Alaska (and Ketchikan) economy; however, these employment sectors have declined in recent years. Part of the decline was in response to the USFS's 1997 *Forest Plan*<sup>88</sup> that substantially reduced allowable harvest levels. Harvest levels from the Tongass National Forest

<sup>88</sup> U.S. Forest Service. 1997. *Tongass National Forest Land and Resource Management Plan Revision: Final Impact Statement*.

went from 471 million board feet (MMBF) in 1990 to 46.3 MMBF in 2004.<sup>89</sup> Large reductions in harvest levels also occurred on private lands as owners converted their forests to second-growth forests. During the same time period, most Asian markets experienced downturns in price and demand for logs, cants, and woodchips. The reduced demand resulted in a large decline in employment overall in the forest products industry from its peak of 3,543 jobs in 1990 to less than 200 jobs in 2010. In 2008, the USFS approved the amended 2008 *Forest Plan*,<sup>90</sup> which retains the same allowable harvest levels as the 1997 *Forest Plan*. The adaptive management strategy outlined in the plan is a three-phased program that initially restricts timber harvest areas to exclude more environmentally-sensitive roadless areas but allows for gradual increases in the levels of timber harvests and expansion into moderate-value roadless areas as dictated by current timber demands and market conditions.

Seafood processing employment in Ketchikan is largely seasonal, with the majority of employment occurring during the summer season, when millions of pounds of salmon are processed during a few months. Employment levels swelled from 99 jobs in March 2010 to 1,070 jobs in August 2010.<sup>91</sup> Gross annual earnings of the seafood processing industry (i.e., manufacturing of food and related products) in the Borough have declined in recent years from approximately \$12.3 million in 2000 to approximately \$11.5 million in 2010.<sup>92</sup>

The tourism industry in Alaska generates substantial income for the state and generates employment in a variety of tourism-supporting industries such as transportation, retail trade, and services. In an analysis of job growth in Southeast Alaska in 2006 by the Department of Labor, growth in 2005 was directly attributable to the tourism industry: nearly 948,000 cruise ship passengers passed through Southeast in 2005. This represented a 48 percent increase from the 640,000 passengers who visited the region in 2000. This dramatic expansion seemed to account for much of the increased hiring in the leisure and hospitality industry and also contributed to gains in other industries.<sup>93</sup> More recent cruise ship and airline passenger numbers are presented in Table 3-8.

**Table 3-8: Cruise Ship and Airline Passenger Arrivals in Ketchikan 2006–2011**

Year	Cruise Ship Passengers	Airline Passengers
2006	838,880	105,401
2007	899,638	111,658
2008	941,910	107,069
2009	937,419	94,294
2010	828,929	98,009
2011	844,412	99,072
2012	839,610*	100,568

\* = Projected      NA = Information not available

Sources: *Ketchikan Visitors Bureau. 2012. 2012 Cruise Ship Calendar, Ketchikan Gateway Borough. 2012.*

Airport Statistics. [http://www.borough.ketchikan.ak.us/airport/Airport\\_stats.htm](http://www.borough.ketchikan.ak.us/airport/Airport_stats.htm). Accessed May 1, 2013.

<sup>89</sup> U.S. Forest Service. January 2008. Tongass Land and Resource Management Plan: Final Environmental Impact Statement.

<sup>90</sup> The "allowable sale quantity" is the maximum amount of timber that can be sold on an average annual basis.

<sup>91</sup> Alaska Department of Labor and Workforce Development. 2011. *Research and Analysis*. <http://almis.labor.state.ak.us/> Accessed in 2011.

<sup>92</sup> Alaska Department of Labor and Workforce Development. 2011. *Research and Analysis*. <http://almis.labor.state.ak.us/> Accessed in 2011.

<sup>93</sup> Alaska Department of Labor and Workforce Development. April 2006. *Alaska Economic Trends*. Available online at <http://labor.state.ak.us/trends/apr06.pdf>

The cruise industry has been shown to be an important segment of the Ketchikan economy, accounting for approximately \$54 million in spending by cruise passengers in Ketchikan, more than \$3 million by cruise ship crews, and \$8.5 million in direct spending by cruise lines in 1999.<sup>94</sup> Tourism is the primary factor determining employment in the trade and services sectors in the area. Employment in these two industries depends largely on the number of visitors and their level of spending.

### **3.6 Joint Development**

There is no joint development project associated with the Gravina Access Project.

### **3.7 Transportation**

Because Ketchikan is on an island, transportation to and from the project area would be water- and air-based, rather than land-based. Once on the island within the developed greater Ketchikan area, automobile and pedestrian facilities are important for normal daily transportation.

As part of the Inside Passage, Tongass Narrows provides a major northwest-southeast corridor for both boats and aircraft. Tongass Narrows is approximately 13 miles long and, at its narrowest point, is about one quarter mile wide. Tongass Narrows is bounded by the steep mountains of Revillagigedo Island on the northeast and by Gravina Island on the southwest. These natural features funnel aircraft and seagoing vessels into a narrow corridor, and require them to operate in close quarters.

The figures discussed in this section and included at the end of this chapter illustrate:

- **Figure 3.10.** Locations of facilities for wheeled airplanes, floatplanes (or seaplanes), and helicopters; the extent of the protected airspace around the airport
- **Figure 3.11.** The runway layout and facilities at the airport
- **Figure 3.12.** The docks and other facilities for boats, ferries, cruise ships, and other ships; the routes of the ferries and cruise ships; the surface transportation routes for vehicles, pedestrians, and bicyclists

#### **3.7.1 Aviation**

Aviation operations in the Ketchikan and Tongass Narrows area are noteworthy because the primary land-based aviation facility, Ketchikan International Airport, is on Gravina Island, across Tongass Narrows from the City of Ketchikan and the population base it serves. The generally steep topography of the islands bordering Tongass Narrows restricts aviation operations and facilities. When not restricted by low-ceiling, low-visibility weather, many aircraft (particularly seaplanes) operate concurrently in the relatively small and constrained airspace.

In addition to these conditions, federal aviation regulations specific to Ketchikan govern aviation operations in the project area. The following sections describe the facilities available for aviation operations and the regulations that control air traffic in the Ketchikan area.

##### **3.7.1.1 Ketchikan International Airport**

The Ketchikan International Airport opened in 1974. DOT&PF owns the airport, though a lease agreement grants the Borough authority to operate and maintain the airport.

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<sup>94</sup> The McDowell Group, Inc. 2000. *Cruise Industry Impacts on Local Governments in Southeast Alaska*.



### 3.7.1.1.1 Existing Airport Facilities and Operations

The airport has air and water access and access to other lands on Gravina Island via the Gravina Island Highway and Lewis Reef Road. The main public access from Gravina Island to Ketchikan is via the airport ferry, which the Borough operates. The airport ferry crosses Tongass Narrows directly east of the airport terminal.

The airport has regularly scheduled commercial jet service and supports many air taxi operators serving the surrounding communities. Emergency medical evacuation (medevac) flights also operate from the airport (e.g., Air Medical Flight Services). In 2011 the airport had 5,866 scheduled departures.<sup>95</sup> The airport also accommodates seaplanes, as described in Section 3.7.1.2.

Airport facilities for wheeled aircraft comprise one paved and lighted 7,500-foot runway (Runway 11/29), three paved taxiways (A, B, and C), and two aprons (one at the terminal area for commercial aircraft and another apron for general aviation aircraft). Taxiway A connects the terminal apron and Runway 11/29; Taxiway B connects the general aviation apron and the terminal apron. Taxiway C, constructed in 2003, parallels the northern section of Runway 11/29 and eliminates the need to back-taxi. The airport is constrained by mountains to the southwest and Tongass Narrows to the northeast. The northwest-southeast orientation of the runway is the only practical alignment, given the physical setting. There is no control tower; the Ketchikan Flight Service Station (FSS) staff monitors flight operations.

Airport support facilities include the airport terminal, an adjacent parking lot, and circulation roads. The airport parking lot, located adjacent to the terminal, has approximately 60 spaces and is often filled to capacity. There are also approximately 15 rental car spaces near the airport terminal and 15 vehicle parking spaces at the transient seaplane dock north of the airport terminal. The pedestrian access between the airport ferry landing and the terminal is partially enclosed.

### 3.7.1.1.2 Protected Airspace

Federal Aviation Regulations (FAR) Part 77 (*Objects Affecting Navigable Airspace*) describes protected airspace for aeronautical navigation. Part 77 also identifies objects that penetrate that airspace and could reduce the safety and efficiency of airport operations and the surrounding airspace. According to the 2003 Airport Obstruction Chart,<sup>96</sup> most of the objects that penetrate protected airspace near Ketchikan International Airport are natural features, such as trees and topographic high points. The Part 77 airspace surfaces at Ketchikan International Airport are shown on Figure 3.10 and described as follows:

**Primary Surface.** The primary surface is the surface longitudinally centered on the runway. The primary surface for Runway 11/29 extends 200 feet beyond each runway end and is 1,000 feet wide. There are several obstructions, mostly trees, located in the primary surface.

**Transitional Surface.** The transitional surface extends outward and upward at right angles to the runway centerline at a slope of 7 feet horizontally for each foot vertically (7:1) from the sides of the primary and approach surfaces. The transitional surfaces extend to intercept the horizontal surfaces at a height of 150 feet above the

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<sup>95</sup> Research and Innovative Technology Administration, Bureau of Transportation Statistics. 2012. *Airport Snapshots, Ketchikan International Airport Summary Data*. December 2010–November 2011. <<http://www.transtats.bts.gov/airports.asp>>. Accessed on March 6, 2012.

<sup>96</sup> National Geodetic Survey. March 19, 2003. *Aeronautical Datasheet: Ketchikan International Airport. Airport Obstruction Charts*. National Oceanic and Atmospheric Administration National Ocean Service. Available online at [http://www.ngs.noaa.gov/AERO/ads/6053\\_03.pdf](http://www.ngs.noaa.gov/AERO/ads/6053_03.pdf).

runway elevation. There are several obstructions, mostly trees, located in the airport's transitional surface.

**Horizontal Surface.** The horizontal surface is a horizontal plane located 150 feet above the established airport elevation, covering an area from the transitional surface to the conical surface. The perimeter of the horizontal surface is constructed by swinging arcs from the center of each end of the primary surface and connecting the adjacent arcs by lines tangent to those arcs. The radius of the arcs is 10,000 feet for all runway ends designated for approaches that serve larger than utility-type aircraft. There are several obstructions, mostly trees and ground, located in the airport's horizontal surface.

**Conical Surface.** The conical surface extends outward and upward from the periphery of the horizontal surface at a slope of 20:1 for a horizontal distance of 4,000 feet. There are several obstructions, mostly trees, located in the conical surface.

**Approach Surface.** The approach surface is longitudinally centered on the extended runway centerline. The approach surface extends outward and upward from each end of the primary surface. The inner edge of the approach surface for Runway 29 is the same width as the primary surface (1,000 feet) and it expands uniformly in width for 3,500 feet to an outer width of 4,000 feet with an approach slope of 34:1. The approach surface for Runway 11 extends for a horizontal distance of 10,000 feet at 50:1 and then an additional 40,000 feet at 40:1, to an outer width of 16,000 feet.

#### 3.7.1.1.3 *Airport Master Plan*

The 2003 *Ketchikan International Airport Master Plan*<sup>97</sup> identifies development needs to accommodate future growth and anticipated changes in airport operations over a 20-year planning horizon. Planned development includes expansion of the terminal, aprons, taxiways, and parking capacity, as well as changes in traffic circulation on the airport roadway system. Some of the development identified in the plan, including the new taxiway parallel to and along the north side of Runway 11/29 and the runway safety area extension, have been completed.

#### 3.7.1.2 **Seaplane Facilities and Operations**

Seaplanes normally arrive and depart Ketchikan airspace via Tongass Narrows. The project area has very high levels of seaplane activity, especially in the summer when tours are popular. This results in aircraft passing very closely in an area with limited maneuvering room.

Table 3-9 summarizes the approximate number of annual aviation operations of the major seaplane facilities in the project area.

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<sup>97</sup> Alaska Department of Transportation and Public Facilities. June 2003. *Ketchikan International Airport Master Plan*.

**Table 3-9: Operations at Ketchikan Seaplane Facilities**

Facility	Annual Operations
Ketchikan Harbor Seaplane Base <sup>a</sup>	10,450
Ketchikan International Airport <sup>b</sup>	7,000
Murphy's Pullout Seaplane Base <sup>a</sup>	500
Peninsula Point Pullout Seaplane Base	3,030

Sources:

<sup>a</sup> AirportIQ 5010 Airport Master Records and Reports web site: <http://www.gcr1.com/5010web/airport.cfm?Site=KTN> accessed by HDR staff, May 27, 2009. Data from 2006.

<sup>b</sup> Ann Graham, Promech Airport Station Manager, personal communication with HDR staff. May 27, 2009. Confirmed that operations have not changed significantly from what was reported in the 2004 Final EIS (i.e., 7,000).

**3.7.1.2.1 Ketchikan Harbor Seaplane Base**

The Ketchikan Harbor Seaplane Base is located southeast of the airport, on the northeast side of Tongass Narrows and adjacent to downtown Ketchikan (see Figure 3.10). This base is open to public seaplane use. Although it has no mooring facilities for seaplane storage, the base is located near numerous privately owned air taxi seaplane docks with mooring facilities. The base features a 10,000-foot by 1,500-foot water runway that is oriented northwest-to-southeast and is generally referred to as the NW-SE Waterway. A 3,500-foot by 1,200-foot waterway oriented roughly west-northwest to east-southeast is also located adjacent to this seaplane base (see Figure 3.10). Approximately 85 percent of the annual operations are by air taxi.<sup>98</sup>

**3.7.1.2.2 Ketchikan International Airport Seaplane Facilities**

The airport accommodates seaplanes at two floating docks and a concrete ramp east of the runway and north of the airport terminal (see Figure 3.11). One dock, the Airport Seaplane Float, accommodates up to 12 Twin Otter aircraft and is used for loading and unloading passengers and freight. The other dock, known as the Transient Seaplane Float, accommodates up to three transient seaplanes. The nearby concrete ramp is used to remove seaplanes from the water for maintenance and onshore storage. A 9,500-foot by 1,500-foot water runway extends to the northwest from the airport, and is generally referred to as the NWW-SEE Waterway (see Figure 3.10).

**3.7.1.2.3 Murphy's Pullout Seaplane Base**

Murphy's Pullout Seaplane Base is located on Revillagigedo Island near Ward Cove, 5 miles northwest of Ketchikan. Compared to the other seaplane facilities, this base has few operations (see Table 3.8). There is no public seaplane parking available at Murphy's Pullout Seaplane Base. The 10,000-foot by 2,000-foot NE-SW Waterway, which extends across Tongass Narrows and into Ward Cove, is adjacent to Murphy's Pullout Seaplane Base (see Figure 3.10).

**3.7.1.2.4 Peninsula Point Pullout Seaplane Base**

Owned by the State of Alaska, Peninsula Point Pullout Seaplane Base is located on Revillagigedo Island, 4 miles northwest of Ketchikan and south of Murphy's Pullout Seaplane Base. It is associated with the NWW-SEE Waterway (see Figure 3.10).

<sup>98</sup> Alaska Department of Transportation and Public Facilities, October 1999. *Tongass Narrows Aviation Conditions Summary*. Anchorage, AK: Prepared by HDR for the Gravina Access Project.

#### 3.7.1.2.5 *Private Seaplane Facilities*

Numerous private charter seaplane businesses lie along the northern shore of Tongass Narrows in Ketchikan. Some of these operators have built large docks to accommodate seaplanes. Taquan Air moved its operations from Water Street near the cruise ship berths to a new facility just south of the airport ferry terminal on Revillagigedo Island. It has seaplane dock with 600 feet of seaplane dock space. Most private operators using their own docking facilities conduct seaplane operations from the Ketchikan Harbor Seaplane Base.

#### 3.7.1.3 **Helicopter Operations and Facilities**

Several helicopter operators serve the project area, most of which are based north of Ketchikan. Generally, helicopters operate over land and avoid the congested airspace over Tongass Narrows. Helicopter operations are at their highest levels during the summer, when tour operations are at their peak. The Temsco Helicopters facilities, near Ward Cove, have as many as 50 operations a day during the summer season.<sup>99</sup> Guardian Flight, Inc. also operates helicopters from the Ward Cove area, providing medevac services to Ketchikan and Southeast Alaska. USCG provides medevac services from a new helicopter pad on Revillagigedo Island at Wolff Point (i.e., just north of the airport ferry terminal), as well as from the airport.

#### 3.7.1.4 **Ketchikan Airspace and Operating Regulations**

The FAA's Anchorage Air Route Traffic Control Center (Anchorage Center) is the regional air traffic control center that separates and controls air traffic within its area of responsibility; that area includes Ketchikan. The Ketchikan FSS provides air traffic and weather advisories to aircraft pilots operating within Ketchikan airspace, and informs them of water vessel activities to facilitate takeoffs and landings.

##### 3.7.1.4.1 *Class E Airspace*

Controlled airspace is that airspace within which all aircraft operators are subject to certain requirements regarding pilot qualifications, operating rules, and equipment specifications, as prescribed by 14 CFR Part 91. All aircraft departing from or arriving at Ketchikan International Airport and the Ketchikan area seaplane facilities, as well as all aircraft passing through Tongass Narrows airspace, are subject to the Class E airspace requirements of 14 CFR Part 91. The Class E requirements permit operations under both visual flight rules (VFR) and instrument flight rules (IFR). The Ketchikan Class E airspace ceiling is at 18,000 feet above mean sea level. The Ketchikan Class E airspace floor is divided into two subclasses: Class E (700), with an airspace floor at 700 feet above mean sea level, and Class E (surface), with an airspace floor at the ground surface.

##### 3.7.1.4.2 *Visual Flight Rules for Ketchikan*

VFR operators in the project area are comprised of general aviation operators and commercial air taxi and commuter operators (classified in 14 CFR Parts 91 and 135, respectively). Due to the high volume of aircraft and the relatively narrow corridor within which they operate, FAA developed VFR specific to Ketchikan International Airport and Ketchikan Harbor (14 CFR 93.151-155 Subpart M—Ketchikan International Airport Traffic Rule):

- VFR operators in Class E (700) airspace must have a minimum flight visibility of 3 miles and must have a minimum distance of 500 feet below, 1,000 feet above, and 2,000 feet horizontally from clouds. An approaching aircraft must maintain a minimum altitude of 900 feet above mean sea level until it is within 3 miles of the airport, and a departing aircraft

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<sup>99</sup> Fisher, Char. May 27, 2009. Personal communication between Temsco Helicopters and HDR staff.

must maintain the runway heading until reaching an altitude of 900 feet above mean sea level.

- While operating within the Class E (surface) airspace, general aviation (Part 91) operators must maintain an altitude sufficient to allow a safe landing if the aircraft power unit fails (14 CFR Part 91 Section 119[a]); they must also maintain a distance of 500 feet from any person, vessel, vehicle, or inhabited structure (14 CFR Part 91 Section 119[c]). Commercial air taxi and commuter (Part 135) operators must maintain a minimum altitude of 500 feet above mean sea level during the day, except when taking off and landing (14 CFR Part 135 Section 203 [a]).

#### 3.7.1.4.3 Special Visual Flight Rules

When visibility and ceiling conditions drop below VFR minimums, VFR operators are required to receive clearance under special visual flight rules (SVFR) from the Ketchikan FSS prior to entering Class E airspace. The purposes of these SVFR procedures are to ensure that pilots receive appropriate traffic advisories, to control the number of aircraft in the airspace when flying conditions are particularly challenging, and to separate IFR and VFR aircraft. The Ketchikan FSS manager estimates that five to six SVFR aircraft can operate within the Class E (surface) airspace under SVFR conditions while maintaining visual contact. Total SVFR operations for 2001 were estimated to be 1,984 operations,<sup>100</sup> which represents approximately 9 percent of the 20,980 total annual seaplane operations.

The Anchorage Center and Juneau Automated Flight Service Station have a Letter of Agreement that establishes SVFR operating procedures for four air taxi and commercial operators within the Revilla Corridor.<sup>101</sup> The Revilla Corridor is defined as the airspace below 400 feet above mean sea level extending along Tongass Narrows from the northern tip of Pennock Island to the southern edge of Ward Cove. The four air taxi and commercial operators (Promech, Misty Fjords Air and Outfitting, Pacific Airways, and RDM Pilot/Guide) are granted an exemption from VFR minimum altitude requirements through the Ketchikan FSS and the Anchorage Center. The Letter of Agreement gives Ketchikan FSS the authority to issue SVFR clearances for the four operators in the Revilla Corridor upon request when IFR aircraft departing Ketchikan International Airport reach an altitude of 1,000 feet or higher.

The FAA implemented new instrument approach procedures in 2010 that allow IFR operators a minimum altitude of 288 feet with visibility at 2,400 feet. These new procedures supersede the SVFR exemptions and are intended to avoid conflict in the air.

### 3.7.2 Marine Navigation

Figure 3.12 shows the locations of the marine facilities discussed in this section.

According to the *United States Coast Pilot*,<sup>102</sup> both the East and West channels of Tongass Narrows around Pennock Island accommodate vessels of any draft. Marine vessels typically using Tongass Narrows include cruise ships, ferries, barges, USCG vessels, commercial and charter fishing boats, and small craft. The numerous seaplanes operating in the Ketchikan area use Tongass Narrows, as well.

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<sup>100</sup> Alaska Department of Transportation and Public Facilities. December 2001. *Gravina Access Project Special Visual Flight Rules Analysis*. Prepared by HDR; Alaska Department of Transportation and Public Facilities. April 2003, Gravina Access Project Economic Impact Assessment. Prepared by Northern Economics.

<sup>101</sup> Anchorage Air Route Traffic Control Center (ZAN) and Juneau Automated Flight Service Station Letter of Agreement. Subject: Special VFR Revilla Corridor. Effective: December 7, 2009.

<sup>102</sup> U.S. Coast Pilot 8. 1999. *Pacific Coast Alaska: Dixon Entrance to Cape Spencer*, 23<sup>rd</sup> Edition.

Cruise ships bound for Ketchikan generally use East Channel because it aligns better with the cruise ship docks than West Channel. AMHS barges and vessels tend to use West Channel to avoid cruise ship traffic and because there is less shoreline development along West Channel to be affected by wake.

The following speed restriction for marine navigation in Tongass Narrows is prescribed in 33 CFR 162.240:

No vessel, except for public law enforcement and emergency response vessels, floatplanes during landings and take-offs, and vessels of 23 feet registered length or less, shall exceed a speed of 7 knots in the region of Tongass Narrows bounded to the north by Tongass Narrows Buoy 9 and to the south by Tongass Narrows East Channel Regulatory marker at position 55 deg. 19' 22.0" N, 131 deg. 36' 40.5" W and Tongass Narrows West Channel Regulatory marker at position 55 deg. 19' 28.5" N, 131 deg. 39' 09.7" W, respectively.

Tongass Narrows experiences high levels of marine navigation activities within a relatively small area. The USCG issued the *Tongass Narrows Voluntary Waterway Guide* to provide guidelines for the safe operation of various craft in the area.<sup>103</sup> According to the *Tongass Narrows Voluntary Waterway Guide*,

Tongass Narrows is home to a large variety of traffic ranging from some of the largest cruise ships in the world to kayaks. Types of vessels operating on the narrows include: recreational vessels, passenger vessels, commercial fishing vessels, commercial freight vessels/barges, commercial tank barges, kayaks, floatplanes, charter vessels and passenger ferries.<sup>104</sup>

Figure 3.13 illustrates the areas that the guide designates for cruise ship anchorage and lighterage, fishing vessel anchorage, kayak use, and sailboat races.

To illustrate the general levels of activity in Tongass Narrows, Table 3-10 presents the total numbers of annual commercial marine trips within Tongass Narrows for 2002 through 2009 by vessel type, as well as the maximum draft for each type of vessel.

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<sup>103</sup> U.S. Coast Guard. 2012. *Tongass Narrows Voluntary Waterway Guide*. Available online at <http://www.seaoa.com/waterway/>

<sup>104</sup> U.S. Coast Guard. 2012. *Tongass Narrows Voluntary Waterway Guide*. Available online at <http://www.seaoa.com/waterway/>

**Table 3-10: Tongass Narrows Total Trips and Maximum Drafts by Vessel Type and Year**

Year	Self-Propelled Passenger & Dry Cargo Trips	Self-Propelled Tanker Trips	Self-Propelled Tow or Tug Trips	Non-Self-Propelled Dry Cargo Trips <sup>a</sup>	Non-Self-Propelled Tanker Trips <sup>a</sup>	Total	
						Trips	Max Draft
2002	2,403	—	1,638	1,091	291	5,423	29
2003	2,404	—	841	929	263	4,437	30
2004	2,112	2	753	1,117	250	4,234	34
2005	7,650	—	301	501	102	8,554	30
2006	2,771	—	668	1,023	193	4,655	31
2007	2,273	—	599	1,046	220	4,138	29
2008	2,618	—	568	925	107	4,218	32
2009	2,432	—	534	900	177	4,043	32
Maximum	7,650	2	1,,638	1,117	291	8,554	34
Average	3,083	<1	738	942	200	4,963	31

Source: U.S. Army Corps of Engineers, Waterborne Commerce Statistics Center, Domestic U.S. Waterborne Traffic: 2008 *Waterborne Commerce of the United States, Waterways and Harbors on the Pacific Coast, Alaska and Hawaii (Part 4)* <http://www.iwr.usace.army.mil/ndc/wcsc/wcsc.htm> and Calendar Year 2009 data at [http://www.ndc.iwr.usace.army.mil/wcsc/webpub09/Part4\\_Ports\\_tonsbycommCY2009.HTM](http://www.ndc.iwr.usace.army.mil/wcsc/webpub09/Part4_Ports_tonsbycommCY2009.HTM). Web site accessed October 11, 2011.

<sup>a</sup> These categories refer to barges.

The following subsections describe the existing marine navigation conditions in Tongass Narrows in the Gravina Access Project area.

### 3.7.2.1 Cruise Ships

The largest vessels that routinely use Tongass Narrows are cruise ships that call seasonally at Ketchikan, primarily during the summer (May through September). Each summer, cruise ships make hundreds of port calls in Ketchikan. Cruise ship calls in Ketchikan generally increased through the 1990s and peaked in 2005 (see Table 3-11).<sup>105</sup> Cruise ships bound for Ketchikan or transiting through the area typically use East Channel. Figure 3.12 illustrates the location of marine routes used by cruise ships. The cruise ship docks (Berths 1, 2, 3, and 4) are located on Revillagigedo Island, at the north end of East Channel. Figure 3.13 illustrates the location of the cruise ship anchorage and tender operation areas in Tongass Narrows. At any given time during the summer, as many as five large cruise ships may be moored and/or at anchor in the Ketchikan Harbor area (i.e., four at the berths and one in the harbor).

During the summer cruise season, most of the large cruise ships operating in Alaska are home-ported in Vancouver, British Columbia; several are home-ported in Seattle. As a result, nearly all cruise ships pass under Lion's Gate Bridge in Vancouver Harbor and/or the Seymour Narrows cable crossing (north of Vancouver between Vancouver Island and the mainland). Vertical clearances of these structures are 200 feet and 180 feet, respectively. The Lion's Gate 200-foot clearance has effectively limited the height of the cruise ships that serve Ketchikan.

<sup>105</sup> Ketchikan Visitors Bureau, 2009. Visitor Statistics. Ketchikan Visitors Bureau Web Site < [www.visit-ketchikan.com/About/CruiseShipStatistics.aspx](http://www.visit-ketchikan.com/About/CruiseShipStatistics.aspx) >. Accessed in 2009.

**Table 3-11: Cruise Ship Arrival Dates for Ketchikan  
(1990–2011)**

Year	Calls	Ships	Passengers
2011	426	28	844,412
2010	429	26	828,929
2009	496	36	937,419
2008	502	37	941,910
2007	499	36	899,638
2006	503	36	838,880
2005	562	37	921,429
2004	535	37	848,969
2003	538	37	770,663
2002	503	34	700,993
2001	514	39	665,221
2000	461	34	549,114
1999	452	32	565,005
1998	488	35	531,108
1997	472	35	480,688
1996	437	36	426,232
1995	329	32	355,784
1994	453	30	379,645
1993	421	28	321,780
1992	364	23	263,046
1991	362	27	242,755
1990	314	23	236,325

Source: Ketchikan Visitors Bureau web site  
<<http://www.ndc.iwr.usace.army.mil/wcsc/wcsc.htm>>  
Accessed June 29, 2012.

Table 3-12 presents the characteristics of the large cruise ships calling at Ketchikan in 2011. The largest vessels currently operating in Tongass Narrows have an average air draft of approximately 165 feet, and an average gross tonnage of about 71,000 tons. A small number of ships with air drafts in excess of 200 feet and registered gross tonnages exceeding 100,000 tons have made port calls in Ketchikan in the past, but no such vessels called at Ketchikan in 2011.<sup>106</sup> In 2005, when Ketchikan port calls reached an historic peak, less than 8 percent of the port calls were ships with air drafts exceeding 200 feet and registered gross tonnages exceeding 110,000 tons.

<sup>106</sup> Juneau Convention & Visitors Bureau. 2011. 2011 *Cruise Ship Roster*. Available online at [http://www.traveljuneau.com/downloads/Cruise\\_Ship\\_Calendar.pdf](http://www.traveljuneau.com/downloads/Cruise_Ship_Calendar.pdf)

Subsequent to a meeting with cruise ship pilots on June 14, 2010, DOT&PF considered raising the minimum vertical clearance to accommodate the new Panamax ships that will have an air draft of almost 210 feet, and a requested new minimum height of 215 feet. Further review of the preliminary structure designs for Alternatives C3-4 and F3 suggest that possibly after construction, there may be 210 feet of vertical clearance, but during construction, there will only be 200 feet. A height of 215 feet may be tidally constrained, or mandate transit around Gravina Island.



**Table 3-12: Large Cruise Ships Operating in Southeast Alaska During the 2011 Cruise Season**

Operator	Ship	Passenger Capacity <sup>a</sup>	Gross Tonnage	LOA <sup>b</sup> (feet)	Beam Max (feet)	Air Draft <sup>c</sup> (feet)	Maximum Draft (feet)
Carnival	<i>Carnival Spirit</i>	2,142	85,920	960	106	173	25.6
Celebrity	<i>Century</i>	1,808	70,600	815	105	154	26.2
	<i>Infinity</i>	2,038	90,228	965	106	178	26.9
	<i>Millennium</i>	1,950	90,228	964	105	178	26.0
Crystal	<i>Crystal Symphony</i>	922	51,000	781	105	150	26.2
Disney	<i>Disney Wonder</i>	2,400	85,000	964	105	172	26.2
Hapag-Lloyd	<i>MS Bremen</i>	166	6,800	366	105	101	26.2
Holland America	<i>Amsterdam</i>	1,460	60,874	780	112	154	25.6
	<i>Oosterdam</i>	1,848	85,920	959	105	164	25.0
	<i>Statendam</i>	1,266	55,451	720	112	153	24.6
	<i>Veendam</i>	1,266	55,451	720	112	153	24.6
	<i>Volendam</i>	1,440	60,906	781	106	154	25.6
	<i>Westerdam</i>	1,848	85,000	951	106	164	25.0
	<i>Zaandam</i>	1,440	60,906	781	106	154	25.6
Norwegian Cruise Line	<i>Zuiderdam</i>	1,848	81,700	936	105	164	26.2
	<i>Norwegian Pearl</i>	2,466	93,502	965	106	169	27.0
	<i>Norwegian Star</i>	2,240	91,740	965	105	167	27.0
Oceana	<i>Regatta</i>	684	30,000	593	79	138	18.7
P&O	<i>Arcadia</i>	1,460	86,800	951	105	164	25.6
Princess	<i>Coral Princess</i>	1,970	92,000	965	105	177	26.2
	<i>Diamond Princess</i>	2,670	115,875	952	123	187	26.2
	<i>Golden Princess</i>	2,600	109,000	951	118	186	26.2
	<i>Island Princess</i>	1,970	92,000	965	105	177	26.2
	<i>Sapphire Princess</i>	2,670	116,000	952	123	187	26.2
	<i>Sea Princess</i>	1,950	77,000	856	105	165	27.2
Regent Seven Seas	<i>Seven Seas Navigator</i>	490	28,600	565	79	128	24.6
Royal Caribbean Inc.	<i>Rhapsody of the Seas</i>	2,435	78,491	915	106	177	25.0
	<i>Radiance of the Seas</i>	2,100	90,090	961	131	173	26.7
Silversea	<i>Silver Shadow</i>	382	28,300	610	82	129	—

<sup>a</sup> Passenger capacity lower berth

<sup>b</sup> LOA = length overall

<sup>c</sup> Air Draft = vertical height above the waterline

Several of the cruise lines that currently serve Southeast Alaska have larger ships on order, but the very large, newer cruise ships are generally regarded as ill suited to cruising in Southeast Alaska. These newer cruise ships are better suited to other geographic markets (such as the Mediterranean) that are experiencing rapid growth and are not as physically restricted as Southeast Alaska waterways.

In addition to the large cruise ships operating in Southeast Alaska and calling at Ketchikan, a growing number of small cruise ships offer adventure and/or natural history oriented cruising opportunities. Table 3-13 presents the characteristics of the small cruise ships that called at Ketchikan in 2008.

**Table 3-13: Small Cruise Vessels Operating in Southeast Alaska in 2008**

Operator	Vessel	Passengers	LOA <sup>a</sup> (feet)	Tonnage
Clipper Cruise Lines	<i>Clipper Odyssey</i>	138	257	100
Cruise West	<i>Spirit of Discovery</i>	84	166	94
	<i>Sheltered Seas</i>	90	90	95
	<i>Spirit of Glacier Bay</i>	58	125	97
	<i>Spirit of Alaska</i>	82	143	97
	<i>Spirit of Columbia</i>	78	143	98
	<i>Spirit of '98</i>	101	192	96
	<i>Spirit of Yorktown Clipper</i>	138	257	—
	<i>Spirit of Endeavour</i>	102	219	99

<sup>a</sup> LOA = length overall.

### 3.7.2.2 Alaska Marine Highway System and Inter-Island Ferry Authority Ferries

#### 3.7.2.2.1 *Alaska Marine Highway System Operations*

The AMHS is a division of DOT&PF. The AMHS operates five mainline and three feeder ferries for vehicles and passengers in Southeast Alaska, including Ketchikan. Currently, DOT&PF is conducting the Alaska Class Ferry Project to design and construct the next generation of ferries that will begin to replace the aging AMHS fleet. These new ferries will be environmentally responsible, fuel-efficient, and versatile. They will enhance AMHS operations on current and future routes within inside-waters and enable AMHS to continue its tradition of providing safe, reliable service.

AMHS port calls at Ketchikan have varied for the period of 2000 through 2009, ranging from a high of 1,014 in 2006 to a low of 655 in 2004 and averaging approximately 831 port calls per year over the 10-year period.<sup>107</sup> July is the peak traffic month in the annual AMHS cycle.

The AMHS dock is located immediately south of the Alaska Ship and Drydock, Inc. (ASD) facility (Figure 3.12). AMHS vessels usually use the West Channel to avoid the cruise ship traffic and because there is less shoreline development and hence less need to control wakes.

<sup>107</sup> Alaska Marine Highway System. 2009. *2009 Traffic Volume Report*. Prepared for the State of Alaska Department of Transportation and Public Facilities. Available online at <http://www.dot.state.ak.us/amhs/doc/reports/atvr2009.pdf>.

#### 3.7.2.2.2 *Inter-Island Ferry Authority*

The Inter-Island Ferry Authority (IFA) was formed in 1997 and provides regular service using two ferries, the *Prince of Wales* and *Stikine*, to improve transportation to island communities. Currently the IFA provides one daily round trip between Ketchikan and Hollis ([www.interislandferry.com](http://www.interislandferry.com)). The IFA ferry terminal is located adjacent to the AMHS terminal (see Figure 3.12), across Tongass Narrows from Ketchikan International Airport.

#### 3.7.2.2.3 *Southeast Alaska Transportation Plan*

The DOT&PF is currently updating its 2004 *Southeast Alaska Transportation Plan* (SATP).<sup>108</sup> The 2004 SATP presents a 20-year transportation plan that calls for a shift from a surface transportation network based on long distance ferries to a surface network that connects communities through land highways. Among the proposed highway linkages in the 2004 SATP, DOT&PF envisioned a highway connection from Ketchikan to the Cassiar Highway in Canada that would also link the communities of Wrangell and Petersburg. In addition to the highway links, the 2004 SATP called for continuation and expansion of some ferry routes to service communities inaccessible by road.

#### 3.7.2.3 **Tugs and Barges**

Tug and barge transportation is the principal mode of delivery for both dry and liquid cargoes throughout Southeast Alaska. The waterborne commerce statistics indicate an average of 942 trips per year by dry cargo barges in Tongass Narrows (including Ketchikan) between 2002 and 2009, as shown in Table 3.9. Several major common carriers provide containerized barge service on a weekly basis to Ketchikan. Petroleum products are also delivered almost exclusively by barge. There was an average of 200 petroleum barge trips in Tongass Narrows (including Ketchikan) from 2002 through 2009.

Barges represent a substantial contribution to the total of the overall Tongass Narrows marine traffic volume, though they do not necessarily use Tongass Narrows during peak traffic periods. Barge operators interviewed for the *Gravina Access Project Reconnaissance of Vessel Navigation Requirements Report*<sup>109</sup> expressed a preference to pass through Tongass Narrows in the winter months, even if they have no port call in Ketchikan, because Tongass Narrows' conditions are preferable to other routes. In the summer months, the barge operators not calling at Ketchikan could use alternative routes to avoid the congestion in Tongass Narrows.

#### 3.7.2.4 **Airport Ferry Service**

The airport ferry service is the primary mode of access for vehicles, bicyclists, and pedestrians to the airport on Gravina Island. The operating schedule is 7 days a week, 16 hours a day. In the winter, the two ferries operate every 30 minutes. In the summer (May through mid-August), the ferries operate every 15 minutes from approximately 8 a.m. to 4 p.m. on weekdays, and every 30 minutes at other times. When air carrier planes are active, usually during the summer, the ferry can exceed capacity.<sup>110</sup> The ferry terminal on Revillagigedo Island is located about 2.5 miles northwest of downtown Ketchikan, directly opposite the airport terminal on Gravina Island (see Figure 3.12). There are approximately 160 parking spaces at the airport ferry terminal on Revillagigedo Island.

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<sup>108</sup> Alaska Department of Transportation and Public Facilities. 2004. *Southeast Alaska Transportation Plan*.

<sup>109</sup> Alaska Department of Transportation and Public Facilities. 2003. *Gravina Access Project Reconnaissance of Vessel Navigation Requirements Report*.

<sup>110</sup> Alaska Department of Transportation and Public Facilities. June 2003. *Ketchikan International Airport Master Plan*.

### **3.7.2.5 USCG Facilities and Operations**

The USCG operates three cutters from its station, located between Ketchikan and Saxman (see Figure 3.12). These cutters range in length from 110 to 213 feet, with beams of between 22 and 41 feet, drafts of between 7.3 and 13.9 feet, and air drafts of 60 to 100 feet.<sup>111</sup>

The USCG buoy tenders will also occasionally call at Ketchikan. The buoy tenders have a length of 225 feet, a beam of 43 feet, a draft of 13.5 feet, and an air draft of 90 feet. The largest USCG-operated vessels are its 378-foot Hamilton Class cutters and its ice breakers: *Polar Sea*, *Polar Star*, and *Healy*, which rarely call at Ketchikan.

The USCG is currently preparing an environmental assessment for the planned expansion of its Ketchikan facilities, which is intended to increase mooring space. Preliminary designs are not available but will include moving the wave attenuator to the south. Facility expansion will occur within the existing USCG property boundary.<sup>112</sup> The USCG anticipates two new Fast Response Cutter (FRC) patrol boats being stationed at the Ketchikan facility. The FRC has a length of 154 feet and a beam of 25.4 feet.<sup>113</sup> The FRC has an air draft of 48 feet, 6 inches.<sup>114</sup>

According to the USCG, there are no regular U.S. Navy operations in Tongass Narrows. However, the USCG Station is an emergency port for naval submarines using the Back Island acoustic range located in Behm Canal. U.S. Navy subsurface ballistic missile submarines have a reported air draft of 91 feet, and a surface-mode operating draft of 36.5 feet, making them the deepest draft vessel likely to call at Ketchikan.

### **3.7.2.6 National Oceanic and Atmospheric Administration Vessels**

Survey vessels of the National Oceanic and Atmospheric Administration (NOAA) transit Tongass Narrows several times each year. NOAA began using Ketchikan as homeport for its survey vessel *Fairweather* in 2004, mooring it just south of the pier at the USCG Station. The *Fairweather* has a 100-foot air draft.<sup>115</sup> NOAA is in the process of constructing its own base near the USCG Station in Ketchikan.<sup>116</sup>

### **3.7.2.7 Commercial Fishing and Charter Vessels and Small Craft**

Commercial and charter fishing vessels and recreational craft, such as powerboats and sailboats, operate in Tongass Narrows. Figure 3.13 shows the fishing vessel anchorage areas designated in the *Tongass Narrows Voluntary Waterway Guide*.<sup>117</sup> The Ketchikan area has seven small boat harbors of varying capacities (see Table 3-14).

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<sup>111</sup> Martin, Lt. September 15, 1999. Personal communication between U.S. Coast Guard Lieutenant and Mark Dalton, HDR.

<sup>112</sup> Amundson, Dean. December 21, 2011. Personal communication between U.S. Coast Guard and Jon Schick, HDR.

<sup>113</sup> U.S. Coast Guard. 2011. *Fast Response Cutter—Sentinel Class*. Acquisition Directorate. <<http://www.uscg.mil/acquisition/sentinel/default.asp>>. Accessed December 21, 2011.

<sup>114</sup> Olexy, Brian. July 12, 2012. Personal email communication between U.S. Coast Guard and Jon Schick, HDR.

<sup>115</sup> Baird, Doug. February 6, 2011. Email from Lt. Cmdr. Doug Baird, National Oceanic and Atmospheric Administration to Mark Dalton, HDR. On file with HDR.

<sup>116</sup> National Oceanic and Atmospheric Administration. 2009. *NOAA Marine Operations*. <[www.moc.noaa.gov/fa/website/pages/about.htm](http://www.moc.noaa.gov/fa/website/pages/about.htm)>. Accessed in 2009.

<sup>117</sup> U.S. Coast Guard. 2012. *Tongass Narrows Voluntary Waterway Guide*. Available online at <http://www.seaoa.com/waterway/>

**Table 3-14: Ketchikan Harbor Capacity**

Harbor	Capacity by Boat Length							Total
	<21 <sup>a</sup>	21-30	31-40	41-50	51-70	71-100	>100	
Bar Harbor North	53	109	61	34	7	2	0	266
Bar Harbor South	110	165	92	30	31	3	0	431
City Float	14	0	0	0	0	0	0	14
Thomas Basin	50	30	55	27	20	0	0	182
Ryus Dock	Transient and lighterage moorage only							
Hole-in-the-Wall	17	9	2	0	0	0	0	28
Knudsen Cove	29	20	0	0	0	0	0	49
<b>Total</b>	<b>273</b>	<b>333</b>	<b>210</b>	<b>91</b>	<b>58</b>	<b>5</b>	<b>0</b>	<b>970</b>

Source: Alaska Department of Transportation and Public Facilities. 1994. *Ports & Harbors, Alaska Harbor Management System, Operations & Management Report*.

<sup>a</sup> All boat lengths measured in feet

Table 3-15 provides the 1998 levels of boat usage in the Ketchikan area, as recorded by the City of Ketchikan Port and Harbors Department.

**Table 3-15: 1998 Boat Use in Ketchikan**

Transient boats	3,000 to 4,000
Boat-days of transient moorage	6,050
1-Month transient moorage permits	158
3-Month transient moorage permits	528
Charter boats in harbors	62
Commercial fishing boats in harbors	800
Reserved stalls billed out in July 1998	844

In addition to the recreational small craft, fishing charter boats, and commercial fishing boats in harbors, there are three very active boat-launching ramps in the Ketchikan area. These ramps are at Bar Harbor, Mountain Point, and Knudsen Cove. Launching permits, issued by the City of Ketchikan Port and Harbors Department in 2002 appear in Table 3-16.

On summer weekends, the boat launches are in nearly continuous use for at least 12 hours per day. Estimating that an average launch or retrieval takes approximately 5 minutes, the total number of launches and retrievals on a summer weekend day is approximately 432 for the 3 launch ramps in the Ketchikan area.

**Table 3-16: 2002 Ketchikan Boat Launch Permits**

Type	Ramp Location	Number of Permits
Day	Bar Harbor	256
	Mountain Point	268
	Knudsen Cove	327
	<b>Total</b>	<b>851</b>
Type	Permit Detail	Number of Permits
Annual and Semiannual	Commercial permit	3
	Annual permits	401
	Semiannual permits	85
	Free annual permits to reserve moorage clients (Estimate)	~ 400
	<b>Total</b>	<b>889</b>

Source: Transportation Research Board. 2000. *Highway Capacity Manual*; Washington, DC.

### 3.7.2.8 Kayaks

A large number of kayaks operate on the waters of Tongass Narrows. During the summer tourist season, several outfitter/guide operations offer kayak excursions originating in Ketchikan. Local residents also kayak in Tongass Narrows. Kayaks are not easily observed by sight or on radar, and are therefore at risk from other vessels. The *Tongass Narrows Voluntary Waterway Guide*<sup>118</sup> identifies one kayak traffic area. It extends from Thomas Basin to Pennock Island immediately north of Radenbough Cove (see Figure 3.13).

### 3.7.2.9 Personal Watercraft

Personal watercraft are small, motorized vessels, such as jet skis, that are usually ridden by a single individual and can achieve high speeds (approximately 50 knots). The *Tongass Narrows Voluntary Waterway Guide* states that, “[a]lthough these craft are not restricted in Tongass Narrows, due to the high volume and variety of traffic in Tongass Narrows, mariners wishing to operate personal watercraft should not operate them in Tongass Narrows.”<sup>119</sup> Few personal watercraft operate in Tongass Narrows.

### 3.7.2.10 Seaplanes

Seaplanes taxiing, landing, and taking off from Tongass Narrows are currently subject to the operational guidelines contained in the *Tongass Narrows Voluntary Waterway Guide*.<sup>120</sup> The seaplane operating zones are limited to the waterways used for taxiing, landing, and taking off (see Figures 3.10 and 3.12). Seaplane aviation operations are discussed in Section 3.7.1.2.

### 3.7.2.11 Other Marine Navigation Issues

Wreck Buoy #6 marks the location of a 327-foot barge that sank in 1954, offshore from the Plaza Mall area. In May 2003, the U.S. Army planned to raise and resink the barge in deeper water; however, moving the barge proved problematic and the barge remains in the same location, still marked by Wreck Buoy #6.

<sup>118</sup> U.S. Coast Guard. 2012. *Tongass Narrows Voluntary Waterway Guide*. Available online at <http://www.seaoa.com/waterway/>

<sup>119</sup> U.S. Coast Guard. 2012. *Tongass Narrows Voluntary Waterway Guide*. Available online at <http://www.seaoa.com/waterway/>

<sup>120</sup> U.S. Coast Guard. 2012. *Tongass Narrows Voluntary Waterway Guide*. Available online at <http://www.seaoa.com/waterway/>

### **3.7.3 Vehicular Travel**

#### **3.7.3.1 Revillagigedo Island**

The road system on Revillagigedo Island is limited to downtown Ketchikan and the more populated surrounding areas. Tongass Avenue, the primary thoroughfare and the most traveled road, provides primary access to most businesses, schools, shops, homes, and recreation facilities. North of the airport ferry terminal (in the area known as Charcoal Point), Tongass Avenue becomes North Tongass Highway as it extends north to North Point Higgins. Southward from Charcoal Point, Tongass Avenue merges with and becomes Water Street in downtown Ketchikan. It then becomes Main Street, then Dock Street, then Stedman Street. Moving southward from Ketchikan, Stedman Street becomes South Tongass Avenue to Saxman. Tongass Avenue is predominantly a two-lane road with on-street parking that runs from the northwest to the southeast along Tongass Narrows, though additional lanes have been added at the approaches to some intersections to accommodate increased traffic. Traffic signals are provided at the intersections with Don King Road, Carlanna Lake Road, Jefferson Street, Washington Street, and Dock Street. Stop signs control other intersections in the project area.

Third Avenue, which runs from Tongass Avenue to Schoenbar Road, provides cross-town access along the bench<sup>121</sup> above downtown Ketchikan.

Traffic volumes during the peak hour range from approximately 1,000 vehicles on South Tongass Avenue (e.g., south of downtown Ketchikan at the intersection with Deermount Street) to approximately 2,000 vehicles in the downtown area (i.e., at the intersection of Tongass Avenue with Jefferson Street).<sup>122</sup> Annual traffic volume to the airport, via ferry, was 89,809 vehicles in 2009. Many people, however, leave their cars in Ketchikan and access the airport as pedestrians. The total number of ferry passengers, including those with cars and those without, was 342,688 in 2009.

The project team identified 12 intersections on Tongass Avenue that could be affected by the Gravina Access Project alternatives (see Figure 3.14). These intersections are:

- Deermount Street
- Bawden Street
- Main Street
- Mission Street
- Dock Street
- Schoenbar Road
- Washington Street
- Jefferson Street
- Third Avenue
- Carlanna Lake Road
- Bryant Street
- Existing Ferry Access

Traffic conditions at these intersections were measured with respect to level of service (LOS). Intersection LOS analysis was conducted using methodologies described in the 2000 *Highway*

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<sup>121</sup> In topographical terms, a bench is a flat area on a steep hillside or mountain that can provide a level base for a road, as in the case of Third Avenue.

<sup>122</sup> Alaska Department of Transportation and Public Facilities. 2002. *Gravina Access Project Final Traffic Assessment Technical Memorandum*. Prepared by HDR, November 2002. Note: no new information related to traffic volumes was developed for this SEIS because DOT&PF considers the traffic data presented in the FEIS representative of current traffic conditions in the project area.

*Capacity Manual*.<sup>123</sup> The LOS describes the quality of traffic operations, ranging from A (least congested, least delay) to F (most congested, most delay). The relationship between LOS and delay is summarized in Table 3-17.

**Table 3-17: LOS Criteria for Intersections**

Level of Service	Signalized Intersection Criteria Average Total Delay (seconds per vehicle)	Unsignalized Intersection Criteria Average Total Delay (seconds per vehicle)
A	< 10.0	< 10.0
B	10.1 to 20.0	10.1 to 15.0
C	20.1 to 35.0	15.1 to 25.0
E	55.1 to 80.0	35.1 to 50.0
F	> 80.0	> 50.0
A	< 10.0	< 10.0.0
B	10.1 to 20.0	10.1 to 15.0

Source: Transportation Research Board, 2000. *Highway Capacity Manual*; Washington, DC.

The range of delay is lower for unsignalized intersections than for signalized intersections because drivers expect different performance levels for each type of intersection; i.e., motorists expect to stop at signalized intersections more often than at unsignalized intersections. Intersections with a LOS E or F are considered to have traffic impacts deemed unacceptable from a traffic engineering perspective.<sup>124</sup> Table 3-18 provides the LOS at the 12 project area intersections.

At Schoenbar Road, southbound left turns from Schoenbar Road, and northbound traffic from Taquan Air Drive currently operate at LOS F, although each move represents fewer than 10 peak hour vehicles. At Third Avenue, southbound left turns operate at LOS F. The remaining turning movements on Tongass Highway operate at LOS D or better.

**Table 3-18: Existing LOS at Project Area Intersections**

Intersection with Tongass Avenue (type of control)	Existing Conditions	
	LOS	Delay (seconds)
Deermount (stop)		
Eastbound left turn	A	2.9
Southbound left turn	C	21.5
Southbound right turn	B	11.3
Bawden (stop)		
Northbound left turn	A	8.0
Southbound left and right turns	A	8.3
Westbound left and right turns	C	22.3
Eastbound left turn	D	29.0
Eastbound right turn	B	14.7
Main (stop)		
Northbound left turn	A	8.2

<sup>123</sup> Transportation Research Board. 2000. *Highway Capacity Manual*. Washington, DC.

<sup>124</sup> Transportation Research Board. 2000. *Highway Capacity Manual*. Washington, DC. The Highway Capacity Manual methodology provides a composite LOS for signalized intersections and the LOS for each minor movement (individual approaches) at unsignalized intersections.



Intersection with Tongass Avenue (type of control)	Existing Conditions	
	LOS	Delay (seconds)
Southbound left and right turns	A	8.0
Westbound left and right turns	B	14.8
Eastbound left and right turns	C	17.5
Mission (stop)		
Northbound left turn	A	9.3
Dock (signal)	A	4.4
Schoenbar (stop)		
Eastbound left turn	B	11.4
Westbound left turn	A	9.4
Northbound left and right turns	F	288.8
Southbound left turn	F	140.9
Southbound right turn	D	25.3
Washington (signal)	A	5.3
Jefferson (signal)	B	11.1
Third (stop)		
Eastbound left turn	B	10.5
Southbound left turn	F	65.0
Southbound right turn	B	12.1
Carlanna (signal)	B	14.6
Bryant (stop)		
Eastbound left turn	A	8.8
Southbound left turn	D	33.9
Southbound right turn	B	12.8
Airport Ferry Access Drive (stop)		
Westbound left turn	A	9.2
Northbound left and right turns	C	23.0

Source: Alaska Department of Transportation and Public Facilities, November 2002. *Gravina Access Project Final Traffic Assessment Technical Memorandum*. Prepared by HDR Alaska, Inc.

Note: No new information related to traffic volumes was developed for this SEIS because DOT&PF considers the traffic data presented in the 2004 FEIS representative of current traffic conditions in the project area.

### 3.7.3.2 Gravina Island

Gravina Island has few roads that provide access to public and private lands. Vehicular access to the island is possible from the airport ferry terminal. Motorists using the ferry and traveling beyond the airport terminal use the Airport Access Road to get to the Gravina Island Highway, which runs southeastward from the airport approximately 3 miles to its terminus, or Lewis Reef Road, which runs northwestward to Bostwick Lake Road and Seley Road. Gravina Island Highway is a state facility that was developed as part of the selected alternative in the 2004 Record of Decision. Bostwick Lake Road is a USFS road that provides access to USFS lands. Seley Road is a State-owned, Borough-managed access road, originally constructed for a timber processing plant north of Lewis Creek that is no longer in operation. Travel times from

various locations on Revillagigedo Island via ferry to the airport on Gravina Island are shown in Table 3-19. Further discussion of travel times between the islands appears in Section 3.3.5, Accessibility.

**Table 3-19: Travel Distances and Estimated Vehicular Travel Times**

Origin and Destination	Distance (miles)	Vehicular Travel Times (minutes)
From Downtown to Airport Terminal	3.3	29.8
From Ward Cove to Airport Terminal	4.2	27.8
From Carlanna Creek to Airport Terminal	1.0	23.4

### 3.8 Pedestrians and Bicyclists

#### 3.8.1 Pedestrians

Downtown Ketchikan has the most pedestrian traffic in the Borough, based largely on the influx of cruise ship passengers during the summer months. Sidewalks and crosswalks accommodate the many tourists walking in the downtown area. Local residents and business people also walk in the downtown area, traveling between their parked car and their destination. Sidewalks extend beyond the downtown area along Tongass Avenue and into surrounding neighborhoods. There is relatively low pedestrian traffic on Tongass Highway north of Carlanna Creek and south of Deermont Street.

Pedestrians traveling to Gravina Island take the airport ferry and walk from the ferry terminal to the airport terminal along a pedestrian walkway. There are no pedestrian facilities beyond the airport terminal, and while pedestrians could walk along the Airport Access Road, pedestrian use of the road is unusual.

Deer Mountain Trail is a popular hiking trail on Revillagigedo Island, accessible from City Park in Ketchikan. Ward Creek and Perseverance trails are accessible from Ward Lake Road off of North Tongass Highway, approximately 5 miles north of Downtown Ketchikan.

#### 3.8.2 Bicyclists

There are no designated bike lanes or bike paths in the Borough and City of Ketchikan. Bicyclists generally ride on the roads and highway shoulders. Mountain biking is popular on the trails outside of Ketchikan.

Bicyclists traveling to Gravina Island take the airport ferry and can ride from the ferry terminal to the airport terminal and Airport Access Road. From the Airport Access Road, bicyclists can connect with the Gravina Island Highway and other roads on the island. Use of bicycles on Gravina Island is rare.

### 3.9 Geology, Topography, and Wind

#### 3.9.1 Geology and Topography

The landforms in the project area were developed and shaped by tectonic activity, glacial ice, and erosion. Bedrock is overlain by unconsolidated deposits such as marine deposits, beach and stream deposits (including alluvial fan and fan-delta deposits), and colluvium deposits. The alluvial fan and fan-delta deposits are present at the mouths of many streams that flow into Tongass Narrows, such as at the mouths of Ketchikan, Carlanna, and Hoadley Creeks and of many streams on Gravina Island.

A network of faults dissects Southeast Alaska. Known faults near the project area are:

- Queen Charlotte-Fairweather fault, an active northwest-southeast fault about 100 to 110 miles southwest of Ketchikan
- Chatham Strait fault, a north-northwest to south-southeast fault intersecting the Queen Charlotte-Fairweather fault southwest of Ketchikan; active 2 to 65 million years ago
- Clarence Strait fault, in Clarence Strait, just west of Gravina Island, which has about 9 miles of displacement

The area around Ketchikan on Revillagigedo Island is generally quite hilly, with steeply rising slopes starting at or near the shoreline. Pennock and Gravina islands within the project area exhibit more rolling terrain with some steep areas, particularly along the west side of Pennock Island. Tongass Narrows below sea level is a steep-sided, U-shaped valley with the smooth walls typical of a sediment-floored glaciated valley. Water depths rarely exceed 150 feet. At the south end of the study area, particularly in West Channel, the topography is rockier, with more submerged bedrock outcrops and water depths dropping to 400 feet and lower.

### **3.9.2 Soils and Submerged Material**

With little seasonal variation, the heavy precipitation and cool temperatures of the Ketchikan area make climate the most influential factor in soil formation. The region's soils are typically saturated. Because of the cool, wet climate, organic matter decomposes slowly, and soils are highly acidic and generally low in available nutrients. Glacial till or bedrock is normally found beneath the soil, and is often responsible for the poorly drained soils on gentle slopes.

The region's soils are generally forested soils or muskegs high in organic matter. Forested soils occur in many areas, from lowlands to rocky side slopes to steep slopes; in most areas, these soils are moderately well drained, but in certain areas, they are well or poorly drained. Muskegs are commonly found on level or gently sloping landforms and have poor drainage. Muskegs consist of dead plants in various states of decomposition (as peat), ranging from fairly intact sphagnum moss, to sedge peat, to highly decomposed muck. The depth to bedrock in both forested soils and muskegs ranges from less than 1 foot to more than 15 feet. Gravina Island is mainly comprised of muskeg and poorly drained forested soils; the eastern portion of Gravina Island and most of Pennock Island are primarily muskeg. Revillagigedo Island soils in the project area are poorly drained forested soils.

A geophysical survey of Tongass Narrows<sup>125</sup> conducted in 2002 mapped the sea floor and described it in the context of the regional geology and topography. In general, Tongass Narrows below sea level is covered by coarse, unconsolidated sediments. More specifically, a layer of shell fragments, soft silt, and medium dense sand and gravel is up to 20 feet thick, mostly less than 10 feet thick and overlies most of the channel bottom, except at outcrops of bedrock and dense gravels. A layer of dense gravels, including boulders and fractured bedrock exists between the surface sediments and bedrock in most areas. It is deep in some locations (up to 100 feet thick off the mouth of Carlanna Creek) but much thinner over large areas. Generally, gravels and sediments are somewhat thicker in West Channel than in East Channel or the northern portion of the project area. Bedrock is at the surface along much of the shorelines but buried in sediments throughout most of the project area, except for occasional outcroppings.

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<sup>125</sup> Fugro West, Inc. June 2002. *Final Tongass Narrows Geophysical Survey*. Prepared for DOT&PF and HDR Alaska, Inc.

### 3.9.3 Wind

Winds typically flow southeast to northwest through the project area, in the valley formed by the lines of hills on Revillagigedo and Gravina islands. There are no other large topographic features that significantly modify the winds in the project area.

The hourly meteorological data record for the period from 1999 to 2008 for Ketchikan International Airport was acquired from National Climate Data Center<sup>126</sup> and was used to characterize wind conditions in the project area. Wind speeds at the airport are measured within about 30 feet of the ground surface; speeds are higher at higher elevations. Table 3-20 provides 1-minute average wind speeds and gust wind speeds for 5-, 10-, 50-, and 100-year return periods.

**Table 3-20: Ketchikan International Airport Wind Statistics<sup>a</sup>**

Return Period	1-minute average (mph)	Gust wind speed (mph)
100-year	84	128
50-year	77	117
10-year	63	96
5-year return	57	87

<sup>a</sup> A Weibull Type II probability distribution was applied to Ketchikan International Airport wind statistics to yield return period frequencies for the data set.

Following the 2004 Record of Decision identifying Alternative F1 as the selected alternative for the Gravina Access Project, DOT&PF established a wind tower on Pennock Island to provide data to determine the wind speed design criteria used for the proposed bridges. Initial data from the Pennock Island wind tower were used to establish a relationship between that data and data collected at the airport over the same period of time. An analysis of the data revealed that, for extreme winds from the northwest or southeast, wind speeds at the airport were expected to be reasonably representative of those at Pennock Island.<sup>127</sup>

## 3.10 Air Quality

### 3.10.1 Project Area Status

The Ketchikan area generally has good air quality, with no recorded exceedances of National Ambient Air Quality Standards (NAAQS) in the area. Based on the NAAQS, the project area is classified as an attainment area (i.e., its air quality meets the standards).

### 3.10.2 Air Pollutants

Under the 1990 Clean Air Act, air pollutants are regulated by the Environmental Protection Agency (EPA) and Alaska Department of Environmental Conservation (ADEC). The EPA's Office of Air Quality Planning and Standards monitors and regulates the NAAQS for the following air pollutants: carbon monoxide, nitrogen oxides, lead, ground-level ozone,<sup>128</sup> particulate matter (PM<sub>10</sub> and PM<sub>2.5</sub>), and sulfur oxides. In Ketchikan, there are several sources of air pollutants including cruise ships, wood stoves and fireplaces, volcanic ash, dust, industrial sources (e.g., seafood processing plants), and motor vehicles.

<sup>126</sup> National Climate Data Center, Asheville, NC. June 2009.

<sup>127</sup> West Wind Laboratory, Inc. August 2005. *Wind Study, Gravina Island Access, Ketchikan, Alaska, Wind Design Study*. Prepared for the Alaska Department of Transportation and Public Facilities and HDR Alaska, Inc.

<sup>128</sup> Ground-level ozone is formed when nitrogen oxides (NOx) and volatile organic compounds (VOCs), such as xylene, react in the atmosphere in the presence of sunlight. Motor vehicle exhaust, industrial emissions, and chemical solvents are the major sources of these chemicals.

The Borough is in an attainment area<sup>129</sup> for NAAQS air quality standards. ADEC has conducted ambient air quality monitoring in Ketchikan for particulate matter during the “smoke season”—December and January—to characterize the effects of the use of wood for heating fuel on ambient air quality. These monitoring activities showed that particulate levels did not approach or exceed the NAAQS.<sup>130</sup> No studies or monitoring have occurred in the Ketchikan area since the 1996 Bear Valley study.<sup>131</sup>

Cruise ship boilers and generators produce a variety of air pollutants, including nitrogen oxides, sulfur dioxide, carbon monoxide, and particulates. The *Alaska Air Quality Control Plan* restricts the density of smoke (opacity) that any marine vessel can emit from its smokestacks. In general, if a ship is stationary at dock, its opacity level cannot exceed 20 percent for more than 3 minutes in any 1-hour period.<sup>132</sup>

### **3.10.3 Greenhouse Gases and Climate Change**

Gases that trap heat in the atmosphere are often called greenhouse gases (GHGs). As the amount of GHGs in the atmosphere increases, more heat becomes trapped, contributing to climate change. The principal greenhouse gases that enter the atmosphere because of human activities are carbon dioxide, methane, nitrous oxide (NO<sub>x</sub>), and fluorinated gases. The Ketchikan area includes numerous industrial, residential, and transportation GHG emission sources, including seafood processing, aviation, marine, and vehicular emissions. An inventory of Alaska’s GHG emissions found that 35 percent of all GHG emissions were from the transportation sector.<sup>133</sup> 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). There is no inventory of local GHG emissions for the Borough, although transportation and industrial activities are likely the major contributors, similar to the findings in the State of Alaska inventory.<sup>134</sup>

Climate change is an issue of national and global concern. While the earth has gone through many natural climatic changes in its history, there is general agreement that the earth’s climate is currently changing at an accelerated rate and will continue to do so for the foreseeable future. Anthropogenic (human-caused) GHG emissions contribute to this rapid change. Carbon dioxide makes up the largest component of these GHG emissions.

Many GHGs occur naturally. Water vapor is the most abundant GHG and makes up approximately two thirds of the natural greenhouse effect. However, the burning of fossil fuels and other human activities are adding to the concentration of GHGs in the atmosphere. Many GHGs remain in the atmosphere for time periods ranging from decades to centuries. Because atmospheric concentration of GHGs continues to climb, our planet will continue to experience climate change-related phenomena. For example, warmer global temperatures can cause changes in precipitation and sea levels.

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<sup>129</sup> EPA. n.d. *Nonattainment Areas Map – Criteria Air Pollutants*. <http://www.epa.gov/air/data/nonat.html?st-AK-Alaska>. Accessed September 28, 2011.

<sup>130</sup> Alaska Department of Environmental Conservation, Division of Air and Water Quality. December 1996. *Air Quality Monitoring in Ketchikan’s Bear Valley*.

<sup>131</sup> Trost, Barbara. May 1, 2009. Personal communication between Alaska Department of Environmental Conservation, Air Quality Division, and Leandra Cleveland, HDR, regarding air quality monitoring in Ketchikan.

<sup>132</sup> 18 AAC 50.070 Alaska Air Quality Control Plan.

<sup>133</sup> Alaska Department of Transportation and Public Facilities, January 2013. *Gravina Access Project Supplemental EIS Traffic Noise Memorandum*. Prepared by HDR Alaska, Inc.

<sup>134</sup> Alaska Department of Transportation and Public Facilities, January 2013. *Gravina Access Project Supplemental EIS Traffic Noise Memorandum*. Prepared by HDR Alaska, Inc.

To date, no national standards have been established regarding GHGs, nor has EPA established criteria or thresholds for ambient GHG emissions pursuant to its authority to establish motor vehicle emission standards for carbon dioxide under the Clean Air Act. However, there is a considerable body of scientific literature addressing the sources of GHG emissions and their adverse effects on climate, including reports from the Intergovernmental Panel on Climate Change, the US National Academy of Sciences, and EPA and other Federal agencies. GHGs are different from other air pollutants evaluated in Federal environmental reviews because their impacts are not localized or regional due to their rapid dispersion into the global atmosphere, which is characteristic of these gases. The affected environment for carbon dioxide and other GHG emissions is the entire planet.

### **3.11 Noise**

Noise is defined as unwanted sound and is measured in decibels (dB) on a logarithmic scale. Because human hearing is not equally sensitive to all frequencies of sound, certain frequencies of sound are given more “weight.” This process is known as “weighting” the frequency. The A-weighted decibel scale (dB[A]) corresponds to the sensitivity range for human hearing. Therefore, environmental noise levels are measured and discussed in terms of dB(A). When noise levels change 3 dB(A), the change is considered to be barely perceptible to human hearing. However, a 5 dB(A), change in noise level is clearly noticeable.

The hourly equivalent noise level ( $L_{eq}[h]$ ) is used to analyze traffic noise levels and identify noise impacts. The  $L_{eq}(h)$  is defined as the equivalent steady-state sound level which, in a given period of time (in this case, an hour), contains the same acoustic energy as the time-varying sound level during the same period.

#### **3.11.1 Regulatory Overview**

FHWA *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 CFR 772) defines a system of assigning land uses in the vicinity of each alternative to an activity category (labeled A through G), based on the type of activities occurring in each respective land use. FHWA established Noise Abatement Criteria (NAC) to help identify noise impacts associated with highway development projects. NAC are noise levels assigned to various land uses or activities (e.g., picnic areas, churches, commercial land, and undeveloped land) grouped by their sensitivity to traffic noise levels. NAC represent the maximum traffic noise levels that allow uninterrupted use within each activity category. Table 3-21 lists the land activity categories and the corresponding FHWA-established NAC.

**Table 3-21: Noise Abatement Criteria**

Activity Category	L <sub>eq</sub> (h)	Description of Activity Category
A	57 dB(A) (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose
B <sup>a</sup>	67 dB(A) (Exterior)	Residential
C <sup>a</sup>	67 dB(A) (Exterior)	Active sport areas, amphitheatres, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 dB(A) (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E <sup>a</sup>	72 dB(A) (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in A–D or F
F	None	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing
G	None	Undeveloped lands that are not permitted

Sources: 23 CFR 772, *Procedures for Abatement of Highway Traffic Noise and Construction Noise*, Table 1- Noise Abatement Criteria; Alaska Department of Transportation and Public Facilities. April 2011. *Alaska Environmental Procedures Manual Noise Policy*.

<sup>a</sup> Includes undeveloped lands permitted for this activity category.

Under 23 CFR 772, noise impacts occur when traffic noise levels approach or exceed the FHWA NAC for specific land use types, or when the predicted traffic noise levels substantially exceed the existing noise levels. The DOT&PF is responsible for implementing the FHWA regulations in Alaska, and considers a traffic noise impact to occur if predicted noise levels approach within 1 dBA of the FHWA NAC. The DOT&PF considers a 15-dBA increase over existing noise levels to be a substantial exceedance. The NAC are applied to the peak noise impact hour. If an adverse noise impact is predicted, FHWA's regulations and DOT&PF policy require that noise abatement measures be considered.

### 3.11.2 Existing Noise Sources

Noise in the project area is generally attributable to transportation-related sources such as automobiles, airplanes, floatplanes, helicopters, ferries, and private and commercial boats. While these noise sources are present year-round, noise in the project area generally increases during the summer because these transportation activities increase with additional tourism and outdoor recreation activities that occur in the summer. Other noise sources include light industrial activities and residential activities (such as voices, dogs, and lawnmowers).

### 3.11.3 Noise Receptors

The noise receptors, or areas that would be affected by traffic noise on Revillagigedo Island, would be residences, churches, and commercial areas; i.e., Activity Categories B, C, and E in Table 3-22. Large parts of Gravina Island are undeveloped (Category G); there are also the developed areas of the airport (Category F), and the residential properties at Clam Cove (Category B).

DOT&PF identified 122 noise receptors in proximity to the proposed alternatives during site visits and using aerial photographs (see Figure 3.15). The 122 noise receptors represent 243 individual properties in the vicinity of the project alternatives: 164 residential (Category B) properties, 2 churches (Category C), 72 commercial facilities (Category E), 3 USCG facility properties (Category F), and 2 airport sites (Category F). Receptors near Alternative C3-4 are located on Rex Allen Drive, Baker Street North, Bucey Avenue North, Larson Street, and North Tongass Highway. Noise receptors near the Alternative F3 alignment are located on South Tongass Highway, Forest Park Drive, Fireweed Lane, and Dogwood Place on Revillagigedo Island; on Pennock Island along East Channel; and in the Clam Cove neighborhood on Gravina Island. Receptors near Alternative G2 are on North Tongass Highway and Shoreline Drive. For Alternative G3, receptors are located on Tongass Avenue, Jefferson Street, 1<sup>st</sup> Avenue, and 2<sup>nd</sup> Avenue. With Alternatives G4 and G4v, receptors are located on Tongass Avenue, Cambria Drive, and Vallenar Drive.

### 3.11.4 Existing Noise Levels

DOT&PF measured noise levels at nine properties (monitoring sites) within the project study area (see Figure 3.15) for the purpose of providing a general indication of existing noise levels and for validating the FHWA's Traffic Noise Model (TNM Version 2.5) runs. The TNM computes highway traffic noise at nearby receptors and aids in the design of mitigation measures, where necessary. Table 3-22 presents the each monitoring site and its activity category and associated NAC, nearest alternative, and monitored noise levels. Two noise measurements were taken at each monitoring site (Period 1 and Period 2). Period 1 noise measurements were used to validate the TNM. The existing monitored and modeled noise levels do not exceed the noise impact thresholds.

**Table 3-22: Existing Noise Levels ( $L_{eq}$ ) at Monitoring Sites**

Monitoring Site	Activity Category (NAC [dBA])	Nearest Alternative	Monitored Noise Level Period 1/ Period 2 (dBA)	Modeled Noise Level (dBA)	Difference Between Period 1 Monitored and TNM Modeled Noise Levels
M1	B (66)	F3	56.5/57.3	58.0	1.5
M2	B (66)	G3	62.3/62.4	59.8	2.5
M3	B (66)	C3-4	63.8/63.5	62.5	1.3
M4	B (66)	C3-4	60.3/60.1	62.0	1.7
M5	B (66)	G2	64.8/65.0	63.6	1.2
M6	B (66)	G2	52.3/50.3	51.6	0.7
M7	B (66)	G4/G4v	56.0/54.8	53.3	2.7
M8	E (71)	C3-4	52.8/53.0	53.2	0.4
M9	B (66)	F3	39.8/54.4 <sup>1</sup>	-	-



Traffic noise is not a significant contributor to the noise levels at monitoring site M9; therefore, TNM validation was not conducted for this site. A comparison of the modeled noise levels using the TNM for the other eight sites shows that monitored and modeled results are within 3 dBA, and therefore the model is considered to reasonably predict noise levels.

Using the TNM, DOT&PF modeled existing highway traffic noise levels for the 122 noise receptors (noise prediction sites) in the study area.<sup>135</sup> Under existing conditions, exterior noise levels range from 29 to 71 dBA at modeled properties in the project study. Nineteen noise prediction sites, representing 35 residential and four commercial properties are calculated to have existing exterior traffic noise levels greater than the DOT&PF NAC (see Figure 3.15).

### 3.12 Water Quality

Figure 3.16 shows the water resources in the project area. The water resources located in the project vicinity include Tongass Narrows, East Channel, West Channel, Carlanna Creek, Ketchikan Creek, Lewis Creek, Airport Creek, and Government Creek. None of these water resources are listed in the CWA Section 303(d) list of impaired waters<sup>136</sup>. Marine water quality in the project area can be affected by discharges from seafood processing plants, timber industry activities, shipyard and other industrial activity, treated sewer system outflows, cruise ships and other vessels operating in marine waters, and sediment runoff from paved surfaces and disturbed areas. Logging activities and runoff from disturbed areas can affect the water quality of freshwater lakes, streams, and creeks.

Seafood processing facilities in Ketchikan discharge fish waste via outfalls into deep waters in Tongass Narrows under an Alaska Pollutant Discharge Elimination System (APDES) general permit<sup>137</sup> for Alaskan shore-based seafood processors. As required by the permit, the discharge outfalls are situated in underwater areas that are continually flushed by strong tides.<sup>138</sup>

Cruise ships discharge treated sewage; effluent from properly functioning marine engines; and laundry, shower, and galley sink wastes (“greywater”) into marine waters. The Commercial Passenger Vessel Environmental Compliance Program<sup>139</sup> (Cruise Ship Program) under ADEC regulates cruise ship and ferry waste discharged to Alaska waters.

Airport ferry operations in Tongass Narrows can also affect water quality as a result of engine discharge, runoff from vehicles sitting on the deck of the ferries, and runoff from the ferry terminal parking lots. These discharges are unregulated, and the existing effect on water quality is not quantified.

### 3.13 Permits and Laws Related to the Project

Federal and state laws authorize agencies to issue permits, review plans, or provide consultation regarding potential project impacts. Table 3-23 identifies the most pertinent state

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<sup>135</sup> Alaska Department of Transportation and Public Facilities, January 2013. *Gravina Access Project Supplemental EIS Traffic Noise Memorandum*. Prepared by HDR Alaska, Inc.

<sup>136</sup> Alaska Department of Transportation and Public Facilities. Alaska Waterbodies Interactive Map. <<http://dec.alaska.gov/water/index.htm>>. Accessed September 26, 2011.

<sup>137</sup> In 2008, the ADEC began a transition process to transfer issuance of National Pollutant Discharge Elimination System (NPDES) permits in Alaska from the EPA to ADEC. The state's approved program is the APDES Program. Phase 1 Facilities are part of this initial transfer (effective October 2008) and include seafood processing facilities. Phase 1 Facilities include domestic discharges, log storage and transfer facilities, seafood processing facilities, and hatcheries.

<sup>138</sup> McKerney, Katy, and Brian Doyle. April 29, 2009. Personal communication between Alaska Department of Environmental Conservation Alaska Pollutant Discharge Elimination System Program representatives and Leandra Cleveland, HDR, regarding seafood processor outfall permits in the Ketchikan area.

<sup>139</sup> AS 46.03.460—46.03.490; 18 AAC 69

and federal laws and executive orders that govern permits, consultation, and review requirements for the Gravina Access Project.

**Table 3-23: Applicable Laws and Related Permits and Approvals for the Gravina Access Project**

Applicable Law or Order	Primary Agency(ies) -Citation-	Description and Requirements
<b>Clean Water Act Section 404</b>	<b>USACE and EPA</b> 33 U.S. Code (USC) 1344 et seq	The USACE requires a permit for discharge of dredged and fill material into waters of the U.S., including wetlands, at specified sites. Selection of sites must be in accordance with guidelines (404[b][1] guidelines) developed by EPA in conjunction with the USACE.
<b>Clean Water Act Section 402</b>	<b>EPA and ADEC</b> 33 USC 1344	Projects disturbing 1 acre or more of land during construction will require an APDES permit from ADEC. The APDES permit requires that best management practices (BMPs) be in place during construction to avoid and minimize pollutant discharges that may affect water quality.
<b>Clean Water Act Section 401</b>	<b>ADEC</b> 33 USC 1341	Section 401 requires state review and authorization for issuance of a Certificate of Reasonable Assurance regarding protection of water quality when discharging dredged or fill material into waters of the U.S. This permit is obtained concurrently with the Clean Water Act Section 404 permit process.
<b>Rivers and Harbors Act Section 10</b>	<b>USACE</b> 33 USC 401 et seq.(esp.403)	The Act prevents unauthorized obstruction or alteration of navigable waters of the U.S. Navigable waters are “those waters that are subject to the ebb and flow of the tide and/or...may...transport interstate or foreign commerce.” USACE administers Section 10 permit for any structure in or over navigable waters of the U.S.; for any dredging, disposal, excavation, drilling, re-channeling, or modification of the water body; and for projects outside a water body if they affect the course, location, or condition of the water body.
<b>Rivers and Harbors Act Section 9</b>	<b>USCG</b>	Section 9 authorizes the Secretary of Transportation, through the USCG, to issue permits for bridges or structures that cross or could otherwise affect navigation on waters of the U.S.
<b>Marine Protection, Research and Sanctuaries Act of 1972</b>	<b>USACE</b> 33 USC 1413	Section 103 of the Act authorizes permits for the transportation of dredged material for the purpose of dumping it into ocean waters, where the dumping will not unreasonably degrade or endanger human health, welfare, or amenities, or the marine environment, ecological system, or economic potentialities.
<b>Marine Mammal Protection Act</b>	<b>National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS)</b> 16 USC 1361	Prohibits the “take” of any marine mammal species in U.S. waters. “Take” includes harassment or attempt to harass, or annoyance that has potential to injure or disrupt behavior patterns. Federal agencies must consult with both agencies to determine if any effects to marine mammals will result from the project.
<b>Endangered Species Act</b>	<b>USFWS and NMFS</b> 16 USC 1536	Provides for the conservation of species that could become extinct through all or a substantial portion of their range. Prohibits any action that results in “taking” a listed species, adversely affecting habitat, or trading in listed species. Section 7 requires all federal agencies to consult with USFWS and/ or NMFS to determine if any effects to listed species will result from the project.

Applicable Law or Order	Primary Agency(ies) -Citation-	Description and Requirements
<b>Magnuson-Stevens Fishery Conservation &amp; Management Act / Sustainable Fisheries Act</b>	<b>NMFS</b> 16 USC 1801 et seq.	These acts establish national standards for fishery conservation and management and establish regional councils to develop fisheries management plans. The act provides for enforcement. Guidelines were developed in accordance with the Sustainable Fisheries Act amendments. A key guideline is EFH delineation by NMFS. Federal agencies must assess the effects of their actions on EFH and consult with NMFS.
<b>Migratory Bird Treaty Act</b>	<b>USFWS</b> 16 USC 703 et seq.	Prohibits the taking of migratory birds, unless there is a specific exception or authorization to do so. "Taking" can include losses from habitat. A permit or consultation is not required but all federal agencies must comply with the Act. This typically includes performing nest clearances outside the breeding season, avoiding active nests, and minimizing loss of habitat through BMPs.
<b>Bald and Golden Eagle Protection Act</b>	<b>USFWS</b> 16 USC 668-68d, as amended	Provides protection of the bald eagle and golden eagle by prohibiting, except under specified conditions, the taking, possession, and commerce of such birds.
<b>National Historic Preservation Act Section 106 / Executive Order 11593 Protection &amp; Enhancement of the Cultural Environment</b>	<b>Alaska State Historic Preservation Office (SHPO)</b> 16 USC 470 et seq.	Provides for the identification and protection of historic properties. Requires federal agencies to avoid or minimize impacts to properties on or eligible for the National Register of Historic Places (NRHP) and requires federal agencies to check for sites that may be eligible and prepare a Determination of Eligibility. For both historic properties and archaeological resources, a Finding of Effect as a result of the project is prepared and submitted to SHPO for concurrence.
<b>Alaska Historic Preservation Act</b>	<b>OHA</b> AS 41.35	Contains a provision similar to Section 106 and mandates that any project with state involvement be reviewed in a similar manner to Section 106 consultation.
<b>Executive Order 13175 Consultation/Coordination with Tribes</b>	<b>FHWA</b>	Requires agencies to consult with American Indian/Alaska Native tribes and organizations on projects that affect tribes.
<b>Clean Air Act</b>	<b>EPA &amp; ADEC</b> 23 USC 109(j) 42 USC 7521(a)	Requires transportation plans, programs, and projects to conform to state air quality implementation plans. A determination of air quality conformity is required.
<b>Executive Order 12898 Environmental Justice</b>	<b>FHWA</b>	Requires that federal agencies ensure that there are no disproportionately high and adverse effects on minority and low-income populations for their agency actions. Requires an evaluation of potential effects and potential mitigation or avoidance measures.
<b>Fish and Wildlife Coordination Act</b>	<b>USFWS, NMFS, and FHWA</b> 16 USC 662	Requires federal agencies to consult with wildlife agencies regarding effects to fish and wildlife for any project that involves impoundment (surface area of 10 acres or more), diversion, channel deepening, or other modification of a stream or other body of water.
<b>Alaska Fishway Act and Anadromous Fish Act</b>	<b>ADF&amp;G Division of Habitat</b> AS 16.05.840 and .870	Requires individuals and agencies proposing work in fish streams to submit plans; requires fish passage in fish streams; and authorizes issuance of permits for work in a river, lake, or stream. Requires a Fish Habitat Permit for work occurring in streams.

Applicable Law or Order	Primary Agency(ies) -Citation-	Description and Requirements
<b>Alaska Land Act</b>	<b>DNR Division of Mining, Land, and Water</b> AS 38.05.850	Provides oversight and allows uses on state land, including submerged lands. Will require an easement for any permanent structures in the Tongass Narrows sea bed.
<b>Noxious Weeds Management</b>	<b>DNR Division of Agriculture</b> 11 AAC 34	Intended to prevent the importation and spread of pests, diseases, or toxic substances that are injurious to the public interest, and for protection of the agriculture industry.
<b>Executive Order 11990 Protection of Wetlands</b>	<b>FHWA</b>	Prohibits federal agencies from participating in construction located in wetlands unless they find there is no practicable alternative and the action includes all practicable measures to minimize harm to wetlands. Compliance with the Act is demonstrated as part of the Final SEIS and Clean Water Act Section 404 permit process.
<b>Executive Order 11988 Floodplain Management</b>	<b>FEMA</b>	Requires federal agencies to evaluate the potential effects of their actions on floodplains with the aims of reducing the risk of floodplain loss and restoring and preserving “the natural and beneficial values” of floodplains. Requires a specific finding of effects in the Final SEIS for significant encroachments.
<b>Executive Order 13112 Invasive Species</b>	<b>FHWA</b>	Directs federal agencies to address actions that are likely to influence the presence of invasive species. Further directs agencies to develop programs and authorities to prevent the introduction of invasive species, monitor populations, and provide for restoration of native species and habitats that have been invaded.
<b>Executive Order 13166 Improving Access to Services for Persons with Limited English Proficiency</b>	<b>Federal Coordination and Compliance Section</b>	Directs that federal agencies provided meaningful access to federal processes to those individuals who are not proficient in the English language.
<b>Executive Order 13186 Responsibilities of Federal Agencies to Protect Migratory Birds</b>	<b>USFWS and FHWA</b>	Directs executive departments and agencies to take certain actions that promote the conservation of migratory bird populations
<b>Uniform Relocation and Real Property Acquisition Act</b>	<b>FHWA</b> 42 USC 4601	Requires agencies that must use private property to acquire it at fair market value and assist in relocation of residences or business.
<b>Department of Transportation Act of 1966, Section 4(f)</b>	<b>FHWA</b> 49 USC 303	Forbids FHWA from using public parks, recreation areas, wildlife/waterfowl refuges, or historic sites unless there is no “prudent and feasible” alternative and the agency employs “all possible planning to minimize harm.” Amendments to Section 4(f) in Section 6009(a) of SAFETEA-LU allow projects with <i>de minimis</i> <sup>140</sup> effects on historic properties to be approved.

<sup>140</sup> *De minimis* in this case refers to those impacts resulting in no adverse effect or no historic properties affected (in compliance with Section 106 of the National Historic Preservation Act; FHWA. n.d. Questions and Answers on the Application of the Section 4(f) De Minimis Impact Criteria. [www.fhwa.dot.gov/hep/qasdeminimis.htm](http://www.fhwa.dot.gov/hep/qasdeminimis.htm) (Accessed December 16, 2011).

Applicable Law or Order	Primary Agency(ies) -Citation-	Description and Requirements
<b>Noise Standards</b>	<b>FHWA</b> 23 USC 109(i)	Requires any highway that results in a new location, or physical alteration of an existing highway that significantly changes either the vertical or horizontal alignment or increases the number of through-traffic lanes to conduct a noise impact analysis. The project must incorporate reasonable and feasible noise abatement measures to reduce or eliminate noise impact. Existing noise levels and future design year noise levels must be predicted for all reasonable action alternatives carried forward in the National Environmental Policy Act (NEPA) document.
<b>Coastal Zone Management<sup>a</sup></b>	<b>Borough</b>	The local coastal district defines the coastal zone and determines consistency of the project with enforceable policies of the local coastal management plans. The project will submit a Coastal Policy Questionnaire for consistency review to the Borough.
<b>Zoning and Subdivision Code</b>	<b>Borough</b>	Requires zoning permits to determine if project is compliant with allowed uses in the specific zoning designation within the Borough.
<b>Local Standards</b>	<b>City of Ketchikan</b>	Requires a Traffic Control Permit, Site Development Permit, and Excavation Permit for activities within the City of Ketchikan to determine if activities are consistent with the City code.

<sup>a</sup> As of July 1, 2011, Alaska Coastal Management Program (ACMP) authorities in AS 46.39, AS 46.40, and other uncodified laws relating to the ACMP were repealed. As of that date, the regulations at 11 AAC 110, 11 AAC 112, and 11 AAC 114, as well as local coastal management plans, are without statutory authority and therefore unenforceable.  
EFH = Essential Fish Habitat

Interagency coordination is an important component of the permitting process. To facilitate the coordination effort, FHWA and DOT&PF have followed the guidance presented in SAFETEA-LU and *Applying the Section 404 Permit Process to Federal-Aid Highway Project*<sup>141</sup> (FHWA, 1988) for the Gravina Access Project. In addition, the USACE, FHWA, and DOT&PF operate under a 1992 permit process accord “to streamline the NEPA and permit review process.”<sup>142</sup> Based on the accord, DOT&PF will include a preliminary jurisdictional determination, draft 404(b)(1) analysis, and Section 10/404 permit application in the Final SEIS.

Borough zoning, conditional use, and/or site development permits may be required. Changes to existing land uses (even if temporary, such as development of construction staging areas), often require Borough review and approval of a zoning permit. Planned structures could also require a conditional use permit or variance, and modification of platted parcels would require a site development permit.

### 3.14 Wetlands and Vegetation

Figure 3.17 shows the locations of the upland and wetland areas in the project area.

#### 3.14.1 Wetlands

Executive Order 11990, *Protection of Wetlands*, and Section 404 of the Clean Water Act, as amended, require FHWA to avoid or minimize harm to wetlands. The project must avoid wetlands unless there is “no practicable alternative,” and if the project cannot avoid affecting a wetland, it is required to consider all possible alternatives to limit and minimize potential damage to wetlands.

<sup>141</sup> Federal Highway Administration. 1998. *Applying the Section 404 Permit Process to Federal-Aid Highway Project*.

<sup>142</sup> Permit Process Accord between FHWA, USACE, and DOT&PF signed December 17, 1992.

Southeast Alaska is a wet maritime climate, and wetlands are common even in forested areas. National Wetland Inventory (NWI) mapping completed across the state indicates that the areas that drain directly to Tongass Narrows (excluding the large upper watershed of Ward Creek, which extends well inland) amount to a total of 39,882 acres. This total includes west-facing lands on Revillagigedo Island, all of Pennock Island, and east-facing lands on Gravina Island. Of this total, 16,958 acres, or 43 percent, is vegetated wetland and another 1,014 acres is either lake or pond.<sup>143</sup> Most of the lower elevations of Gravina Island and virtually all of Pennock Island are wetland. There are also extensive wetlands on Revillagigedo Island.

Wetlands in the vicinity of proposed construction for each alternative were mapped following the NWI classification system based on Cowardin et al.<sup>144</sup> Project mapping, covering 2,200 acres, was based on field surveys conducted by the project team in January and June of 2000 and again in June 2008.<sup>145</sup> The project area has four types of wetlands: forested wetlands, shrub/scrub wetlands, open “muskeg”-type wetlands, and intertidal marshes and meadows. The mapping completed in the project vicinity was done at greater precision than the NWI mapping and indicated some differences from the NWI, most notably indicating scrub-shrub wetlands where the NWI mapping showed none, and indicating greater forested wetland than the NWI mapping. The relative proportions were similar, however, with muskegs most common, followed by forested wetlands, scrub-shrub wetlands, and intertidal meadows and marshes. Each type is described in detail below.

#### **3.14.1.1 Forested Wetlands**

Forested wetlands, which the NWI mapping indicated cover some 8,200 acres within the Tongass Narrows drainage basins, are prominent northwest of the airport and on the forested slopes of Revillagigedo Island. They are generally drier than other wetlands, either because they are on topographically higher or steeper sites, or because their substrates drain better internally. Forested wetlands are found on moderately sloping lands on Revillagigedo Island, along larger creeks, and as a fringe along the beaches of Gravina and Pennock Islands. They are also interspersed with the muskeg wetlands. A mix of conifer species (including shore pine, red and yellow cedar, western hemlock, and Sitka spruce) characterizes forested wetlands. The trees appear stunted relative to those that are found in a better-drained forest. The understory supports a dense growth of blueberry, huckleberry, rusty menziesia, salal, and an herb ground cover.

The functions of forested wetlands largely depend on their location. They serve as important wildlife habitat along beaches and streams, may help to moderate stream flows, and help sustain the habitat functions of streams. The NWI classifies these as palustrine, open forested wetlands with deciduous shrub understory, saturated (PFO4/SS1B); palustrine, open forested wetlands with evergreen shrub understory, saturated (PFO4/SS4B); and palustrine, needle-leaved evergreen forest, saturated (PFO4B). These are shown as forested wetlands on Figure 3.17.

#### **3.14.1.2 Shrub/Scrub Wetlands**

Shrub/scrub wetlands, which the NWI mapping indicated cover some 230 acres within the Tongass Narrows drainage basins, dominate areas adjacent to muskeg wetlands (described

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<sup>143</sup> U.S. Fish and Wildlife Service. Ketchikan. *National Wetland Inventory, Wetlands Mapper*. <<http://www.fws.gov/wetlands/Data/Mapper.htm>>. Accessed May 4, 2009.

<sup>144</sup> 1979.

<sup>145</sup> HDR. 2009. Gravina Access Project Wetlands Reevaluation Technical Memorandum; HDR. 2003. Gravina Access Project Preliminary Jurisdictional Determination ; HDR. 2002. Gravina Access Project Wetlands Evaluation Technical Memorandum.

below) and other areas where tree growth is limited by soil saturation. The tree canopy is sparse enough to allow light to penetrate, promoting a dense shrub and scrub tree understory. Scrub/shrub wetlands often form slightly drier “islands” within the muskegs. They also tend to occur on the slightly better-drained (sloping) ground along the streams that run through muskegs. This wetland type has an open canopy of western or mountain hemlock. Shore pine, small Sitka spruce, and red and yellow cedar may also be present. Tall blueberry and rusty menziesia form a dense shrub layer, with a ground cover of bunchberry, deer cabbage, skunk cabbage, fernleaf goldthread, and sphagnum moss.

As with forested wetlands, shrub/scrub wetlands may moderate stream flows, stabilize stream banks, and provide important wildlife habitat. The NWI classifies these as palustrine, evergreen needle-leaved shrub/scrub dominated, saturated (PSS4B). These are shown as shrub-scrub wetlands on Figure 3.17.

#### **3.14.1.3 Muskegs**

Open, muskeg-type wetlands, which the NWI mapping indicated cover some 8,400 acres within the Tongass Narrows drainage basins, are the dominant wetland type on Penneck Island and in the areas west and south of the airport on Gravina Island. These open wetlands are intricately interspersed with small patches of forested or shrub wetland. Most of the open wetlands can be loosely described as short sedge fens, which are expected to be moderately nutrient rich and productive. Some richer, tall sedge-dominated wetlands also exist in limited areas, as do more acidic and nutrient-poor bog-type wetlands. The dominant low sedge fens are characterized by low shrub and herb vegetation, such as sweetgale, blueberry, crowberry, and short sedges, and by water pooled on the surface. Many of the wetlands are moderately sloped and have water flowing through them. Flowing water, as well as contact between that water and mineral soil, usually leads to a biological community that is more nutrient-rich and productive. Because they tend to have water flowing through them, muskegs may export organic material that supports downstream ecosystems and helps maintain natural chemistry and low flows in the creeks. The muskeg areas nearest creeks are important for maintaining base flows to those creeks.

Little is known about wildlife use of these extensive habitats. Deer and black bear feed in them seasonally, and some water birds, including sandhill cranes, passerine species, and blue grouse are known to use these areas. Waterfowl often use intermixed open freshwater ponds as resting and nesting habitat. Humans use these areas for berry harvesting. The NWI classifies these as palustrine, saturated herbaceous meadows (PEM1B) and palustrine, evergreen needle-leaved shrub/grass-like saturated herbaceous meadows (PSS4/EM1B). These are shown as muskeg wetlands on Figure 3.17.

#### **3.14.1.4 Intertidal Marshes and Meadows**

Although relatively scarce in Southeast Alaska, estuarine meadows exist along the shoreline of Gravina Island. The NWI mapping indicated that these intertidal meadows cover some 200 acres of shoreline along Tongass Narrows. At elevations near the highest tides, grasses dominate these meadows, and sedges and herbs are prominent near the more average high-tide elevations. These meadows may be supported by seepage of freshwater out of the beach gravels.

The meadows are highly productive habitats, and organic matter produced within them washes into the marine ecosystem, where it supports food webs. The beach meadows are important feeding areas for many terrestrial and aquatic species of wildlife, including deer, black bear, river otter, mink, shorebirds, waterfowl, and songbirds. They provide succulent forage in spring, when other habitat types may be snow-covered. They also serve as nurseries for young fish. The NWI classifies these as estuarine intertidal areas vegetated with erect shrubs and regularly

flooded by tidal waters (E2EM1N). These are shown as intertidal marsh or meadows on Figure 3.17.

### **3.14.2 Vegetation**

The project area uplands are dominated by coniferous forests and the major climax forest type is western hemlock and Sitka spruce. Other tree species in the forest include western red cedar, yellow cedar, mountain hemlock, red alder, and lodgepole pine. The understory includes skunk cabbage, salal, devil's club, rusty menziesia, Sitka alder, salmonberry, thimbleberry, blueberry, huckleberry, ferns, mosses, and lichens.<sup>146</sup>

### **3.15 Waterbodies and Wildlife**

Figure 3.16 shows the lakes, creeks, and watersheds in the project area. Figure 3.18 shows the areas of particular importance to the wildlife in the project area, including eelgrass beds, anadromous streams, herring spawning areas, and bald eagle nesting sites.

#### **3.15.1 Major Water Bodies**

Surface water in the project area flows into Tongass Narrows through streams, in direct sheetflow runoff, and as shallow subsurface flow. Major streams in the project area are Lewis Creek; Airport Creek and Government Creek on Gravina Island; and Hoadley Creek, Ketchikan Creek, and Carlanna Creek on Revillagigedo Island. There are no major water bodies on Pennock Island.

None of the project alternatives would traverse a major water body or watershed on Revillagigedo Island or Pennock Island. In the areas on Revillagigedo Island and Pennock Island where the alternatives would be located, creeks do not collect surface runoff; rather, it is likely to flow directly into Tongass Narrows as sheet flow, in small channels that discharge via the storm drain system, or as shallow subsurface flow. The major watersheds traversed by the proposed alternatives on Gravina Island are Airport Creek and Government Creek. There are no flow data available for any streams in the project area.<sup>147</sup>

##### **3.15.1.1 Tongass Narrows**

Tongass Narrows is characterized by shorelines of steep bedrock or coarse gravel, cobble, and boulders; strong tidal currents; and unusually large tidal ranges (25 feet or more).<sup>148</sup> Many of the lower intertidal and shallow subtidal areas are sandy or mixed gravel, sand, and shells, with varied amounts of silt. Several small natural coves and areas behind constructed breakwaters provide wave and current protection for anchorages and marine habitats.<sup>149</sup> Lewis Reef is the nearest of these coves, located a quarter mile north of the project area on Gravina Island at the confluence of Lewis Creek and Tongass Narrows. Lewis Reef is an important habitat area for aquatic species and eelgrass beds.<sup>150</sup>

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<sup>146</sup> Ketchikan Gateway Borough Planning Department. 1994. *Ketchikan District Coastal Management Program*. Prepared by Susan A. Dickinson.

<sup>147</sup> Slack, J.R., Alan M. Lumb, and Jurate Maciunas Landwehr. *USGS Water-Resources Investigations Report 93-4076*. HCDN: Streamflow Data Set, 1874 – 1988, Station 15072000 FISH C NR KETCHIKAN AK. <http://pubs.usgs.gov/wri/wri934076/stations/15072000.html>. Accessed April 11, 2009.

<sup>148</sup> Pentec Environmental. August 2001. *Phase II Marine Reconnaissance Technical Memorandum (Draft), Gravina Access Project*. Prepared by J. P. Houghton for HDR Alaska, Inc.

<sup>149</sup> HDR. April 2004. *Gravina Access Project Essential Fish Habitat Assessment*.

<sup>150</sup> Manillo, Mark. June 10, 2008. *Preliminary Agency Scoping Meeting Notes*. Alaska Department of Fish and Game; Hanson, Bill. June 12, 2008. *Preliminary Agency Scoping Meeting Notes*. U.S. Fish and Wildlife Service.



### **3.15.1.2 Airport Creek**

The Airport Creek watershed encompasses approximately 1,835 acres. The creek flows northward and discharges into a protected cove north of the airport. Lewis Reef Road currently crosses Airport Creek near the junction with Seley and Bostwick roads.

### **3.15.1.3 Government Creek**

The Government Creek watershed encompasses approximately 1,870 acres. The creek flows northward and discharges into a protected cove south of Ketchikan International Airport. In conjunction with the extension of the runway safety area at the airport in 2007–2008, DOT&PF and FAA diverted Government Creek around the runway safety area extension. As part of the diversion, two small creeks, North Tributary and Boulder Creek were routed into the new Government Creek channel, which increased the available fish habitat.<sup>151</sup>

### **3.15.1.4 Clam Cove**

The Clam Cove watershed encompasses approximately 3,533 acres. The watershed is characterized by numerous lakes and small streams, including Green Buoy Creek and Stensland Creek.

## **3.15.2 Ponds**

There are many small ponds on Gravina Island. These ponds tend to have no outlets and therefore do not provide a source of nutrients to any downgradient water bodies; however, they do provide wildlife habitat.

## **3.15.3 Marine Habitats**

### **3.15.3.1 Intertidal Zone**

Field investigations have identified 136 plant and 151 animal species in the intertidal zone in the project area.<sup>152</sup> In areas where natural coarse gravel/cobble/boulder shorelines occur, the dominant species are rockweed, barnacles, snails, and crab. In areas where sea stars are limited, the intertidal habitat areas support abundant mussel populations. Hard-shelled littleneck and butter clams are often abundant around somewhat sheltered beaches.

USFWS considers the Lewis Reef area to be particularly rich estuarine habitat. Such estuaries are biologically important and productive habitat in Southeast Alaska. The Lewis Cove-Lewis Point area (including Lewis Reef) is documented to have some of the richest infauna of any site surveyed in Tongass Narrows.<sup>153</sup> Field investigators observed the typical rockweed, barnacle, limpet, and littorines at the higher beach area, where there are more cobbles on the surface. Investigators also observed a large variety of littleneck clams, butter clams, and cockles in this area.

Lewis Point supports patches of eelgrass, kelp, and alga. The mixed-fine sandy areas have high densities of butter clams, horse clams, and soft-shell clams, three species of sea star, and a local moon snail. The rocks support rockweed, two types of barnacle, and green and red algae. Kelp provides a low-tide fringe around the rocky areas. Bald eagles, waterfowl and marine birds,

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<sup>151</sup> Minnillo, Mark. June 10, 2008. *Preliminary Agency Scoping Meeting Notes*. Alaska Department of Fish and Game.

<sup>152</sup> Pentec Environmental. August 2001. *Phase II Marine Reconnaissance Technical Memorandum (Draft)*, Gravina Access Project. Prepared by J. P. Houghton for HDR Alaska, Inc.

<sup>153</sup> Pentec Environmental. August 2001. *Phase II Marine Reconnaissance Technical Memorandum (Draft)*, Gravina Access Project. Prepared by J. P. Houghton for HDR Alaska, Inc.

deer and black bear, and marine mammals all depend on this intertidal area and other similar but smaller areas along the Gravina Island shoreline.

### **3.15.3.2 Subtidal Zone**

The subtidal margins of Tongass Narrows are characterized by steeply sloping bedrock or coarse gravel/cobble bottoms extending from the lower intertidal zone to the deeper, flatter center of the channel at depths of -80 to -150 feet MLLW.<sup>154</sup>

For the most part, these subtidal slopes are swept by strong tidal currents and support a number of kelp and other algal species down to depths of about -40 feet MLLW. In spring and summer, many of these rocky areas support a canopy of bull kelp. At depths below -40 feet MLLW, the bottom becomes nearly barren sand and gravel. The most abundant subtidal organism observed in the project area during the winter field investigation was sea cucumber.

Shallow subtidal areas that are protected from the direct impact of the currents, such as those areas in small coves or behind breakwaters, have gradually sloping sandy bottoms that sometimes support healthy eelgrass beds. The locations of known eelgrass beds are shown on Figure 3.18.

### **3.15.4 Wildlife—Aquatic Species**

#### **3.15.4.1 Marine Mammals**

Eight species of marine mammals have been documented in the project area: harbor seals, Steller sea lions, humpback whales, killer whales, Dall's porpoises, Pacific white-sided dolphins, minke whales, and harbor porpoises. Grey whales are sometimes observed in the area off Vallenar Point.

Steller sea lions are listed as “threatened” and humpback whales are listed as “endangered” under the Endangered Species Act and “depleted” under the Marine Mammal Protection Act (see Section 3.20 for a discussion of threatened and endangered species). None of the other marine mammals in the project area are included on the threatened and endangered list, or designated as “depleted” under the Marine Mammal Protection Act.

**Whales.** The whales common to Tongass Narrows are the humpback, minke, and killer whales. Humpback and minke whales are rorqual whales that use baleen to feed. Their diet consists of plankton, krill, and small fish such as herring, mackerel, capelin, sardines, and anchovies. Killer whales are toothed whales and have a diverse diet of fish, squid, and other marine mammals including large whales such as the blue whale.<sup>155</sup> In 2004, the Eastern North Pacific—Alaska Resident Stock killer whale populations were estimated at 1,100 individuals with 117 residents in Southeast Alaska. Reliable data on trends in population abundance for the Alaska Resident Stock are unavailable.<sup>156</sup> No population data are available for the Alaska Stock of minke whales.<sup>157</sup>

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<sup>154</sup> Pentec Environmental. August 2001. Phase II Marine Reconnaissance Technical Memorandum (Draft), Gravina Access Project. Prepared by J. P. Houghton for HDR Alaska, Inc.

<sup>155</sup> National Marine Fisheries Service. 2009. Protected Species Information. Available online at [http://www.nmfs.noaa.gov/pr/pdfs/esa\\_factsheet.pdf](http://www.nmfs.noaa.gov/pr/pdfs/esa_factsheet.pdf).

<sup>156</sup> National Marine Fisheries Service. 2008. *Alaska Marine Mammal Stock Assessments, 2007*. NOAA Technical Memorandum NMFS-AFSC-180.

<sup>157</sup> National Marine Fisheries Service. 2008. *Alaska Marine Mammal Stock Assessments, 2007*. NOAA Technical Memorandum NMFS-AFSC-180.

**Porpoises and Dolphins.** The Dall's porpoise (Alaska Stock), harbor porpoise (Southeast Alaska Stock), and the Pacific white-sided dolphin (North Pacific Stock) are common in Southeast Alaska, although no reliable data currently exist concerning population trends.<sup>158</sup> Porpoises and dolphins have a varied diet consisting of hake, squid, lantern fish, anchovy, sardines, and small schooling fish. They are vulnerable to predation by killer whales and sharks.

**Harbor Seals.** The State of Alaska lists the harbor seal (Southeast Alaska Stock) as a Species of Special Concern. In the Gulf of Alaska and Prince William Sound, harbor seal numbers declined substantially from the late 1970s through the early 1990s. However, based on aerial surveys of terrestrial haulouts<sup>159</sup> near Ketchikan and Sitka, the overall population of harbor seals in Southeast Alaska appears to be increasing or stable in recent years. Slight decreases in population have been observed at Glacier Bay but these trends appear to be isolated to this area in Southeast Alaska.<sup>160</sup> The Ketchikan survey showed that from 1983 to 1996, harbor seal populations in the Ketchikan area increased at a rate of 9.3 percent annually.<sup>161</sup> Harbor seals are generally nonmigratory, inhabiting Tongass Narrows including the waterfront area adjacent to the City of Ketchikan year-round. Local movements of harbor seals are associated with tides, weather, season, food availability, and reproduction. They haul out on rocks, reefs, beaches, and drifting glacial ice, and feed in marine, estuarine, and occasionally fresh waters. Their diet consists of pelagic and bottom dwelling fishes, crustaceans, and octopi.

#### **3.15.4.2 Anadromous Fish**

Anadromous fish (fish that return from salt water to fresh water to spawn) flourish in Southeast Alaska. The project area contains several streams that support anadromous fish: Airport Creek, Government Creek, Fiedler Creek, Gravina Creek, Rain Creek, Stensland Creek, and Clam Creek (Figure 3.18). In the project area, large populations of anadromous fish such as salmon (five species), cutthroat and steelhead trout, and Dolly Varden provide food for bears, wolves, bald eagles, and other animals, and are valuable to commercial and sport fishers.

#### **3.15.4.3 Marine Fish**

While Southeast Alaska rivers and streams have relatively few species of resident fish, marine waters contain hundreds of fish species. Flatfish, Pacific cod, rockfish, sculpin, halibut, skate, and sablefish are abundant, and huge schools of herring, smelt, capelin, and Pacific sand lance collectively provide the food base for salmon, trout, and char.<sup>162</sup> No site-specific surveys of fish likely to be present in the immediate vicinity of each alternative are available. However, fish types that are likely to be present in Tongass Narrows include demersal (e.g., flatfish, cottids, rockfish, gadids) and pelagic (salmonids, clupeids, embiotocids, greenling) species. Of these, some fish have closed swim bladders (physoclistous species; e.g., rockfish, gadids), some have open swim bladders (physostomous species; e.g., salmonids), and some lack a swim bladder (e.g., cottids, flatfish). This distinction is important because some construction activities, such as

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<sup>158</sup> National Marine Fisheries Service. 2008. *Alaska Marine Mammal Stock Assessments, 2007*. NOAA Technical Memorandum NMFS-AFSC-180.

<sup>159</sup> Haulouts are areas where animals such as sea lions rest on shore for varying lengths of time. These sites are used to give birth, nurse pups, breed, or simply to rest and sleep.

<sup>160</sup> Mathews, Elizabeth A., and Grey W. Pendleton. January 2006. Declines in Harbor Seal (*Phoca vitulina*) Numbers in Glacier Bay National Park, Alaska, 1992-2002. *Marine Mammal Science*, 22(1):167-189.

<sup>161</sup> National Marine Fisheries Service. 2008. *Alaska Marine Mammal Stock Assessments, 2007*. NOAA Technical Memorandum NMFS-AFSC-180.

<sup>162</sup> O'Clair, R.M., R.H. Armstrong, and R. Carstensen. *The Nature of Southeast Alaska: A Guide to Plants, Animals, and Habitats*. Seattle, WA: Alaska Northwest Books, 1997; HDR. Gravina Access Project Essential Fish Habitat Assessment. April 2004.

blasting, could impact fish with closed swim bladders differently from those with open swim bladders.

Other fish species that live in the marine waters of the project area are yelloweye, shorttraker, rougheye, and dusky rockfish, walleye pollock, lingcod, Pacific Ocean perch, and arrowtooth flounder.<sup>163</sup> DNR and NMFS have identified Pacific herring and Pacific halibut as important in the project area.

**Pacific Herring.** Pacific herring spawn during the spring in eelgrass or rockweed beds at the north end of Gravina Island.<sup>164</sup>

**Pacific Halibut.** Halibut eat a wide variety of fishes (including cod, turbot, and pollock) and some invertebrates such as crab and shrimp. They sometimes leave the ocean bottom to feed on pelagic fish, such as sand lance and herring. Halibut spawn in the winter months, and eggs and larvae float for up to 6 months until they are carried to shallower waters by prevailing currents to begin life as bottom-dwellers. Older fish often use both shallow and deep waters over the annual cycle.<sup>165</sup>

#### **3.15.4.4 Essential Fish Habitat**

The Magnuson-Stevens Fishery and Conservation Management Act requires federal agencies to analyze Essential Fish Habitat (EFH) prior to permitting a project that may affect such habitat. NMFS is responsible for delineating EFH. In the case of anadromous fish streams (principally salmon), NMFS has designated the anadromous fish maps prepared by ADF&G as the definition of EFH in Alaska.<sup>166</sup>

In the project area, Tongass Narrows is designated EFH for 11 species of ground fish and 5 species of salmon. Anadromous fish streams designated as EFH for salmon that could be affected by the project are Airport Creek, Government Creek, Fiedler Creek, Gravina Creek, Rain Creek, Stensland Creek and Clam Creek: all on Gravina Island, as shown in Figure 3.18. An EFH assessment was completed and submitted to NMFS in April 2004. NMFS provided concurrence with the publication of the 2004 Record of Decision. FHWA does anticipate reinitiating the consultation process for this SEIS.

The shorelines of Tongass Narrows provide excellent rearing habitat for juvenile salmonids migrating out of area streams during the spring. Low gradient gravel and sand beaches produce an abundance of epibenthic zooplankton that provides a key prey base for juvenile pink, chum, and Chinook salmon.<sup>167</sup> At low tides, extensive eelgrass beds along the Narrows also produce large numbers of prey items and provide refuge for juvenile salmonids against predation by birds and larger fish. As they grow, young salmon tend to move offshore into deeper waters while remaining in the upper portion of the water column. Diets of subadult and adult salmon vary among species, but generally are dominated by forage fish (herring, smelt, and sand lance) and larger pelagic and planktonic invertebrates.

No specific surveys have been identified that document the use of project area waters by ground fish species. However, several species of salmonids are known to use the Narrows for

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<sup>163</sup> Shaw, Linda. 1999. Personal communication between National Marine Fisheries Service, Juneau, and Darcy Richards, HDR, regarding essential fish habitat.

<sup>164</sup> Walker, Scott . April 4, 2000. Email from Alaska Department of Fish and Game Assistant Area Management Biologist and Robin Reich, HDR, regarding herring.

<sup>165</sup> Alaska Department of Fish and Game, Division of Wildlife Conservation. 1999. *Wildlife Notebook Series*.

<sup>166</sup> The Division of Habitat Restoration has been transferred from ADF&G to DNR and is now known as the Office of Habitat Management and Permitting.

<sup>167</sup> Groot and Margolis, Editors. 1991. *Pacific Salmon Life Histories*. UBC Press.

all or most of their life stages. Unconsolidated bottom areas of silt, sand, and gravelly sand along the slopes of Tongass Narrows are expected to support a variety of ground fish such as arrowtooth flounder, skates, cottids, walleye pollock, and Pacific cod. Ground fish prey includes a variety of epibenthic crustaceans, especially amphipods and several crab and shrimp species, as well as infaunal clams, gastropods, and polychaete worms. Rocky outcrops along the shorelines of Tongass Narrows are likely to support several species of rockfish. Pelagic waters within the Narrows support subadult and adult salmon as well as sablefish. These species feed primarily on epibenthic<sup>168</sup> and pelagic small fish and invertebrates.<sup>169</sup>

Most fish occur in Tongass Narrows primarily as late juveniles and adults, and may use Tongass Narrows as a migratory corridor to other rearing areas in nearby bays and intertidal areas. Table 3-24 and Table 3-25 show the species (and their life stages) that occur in Tongass Narrows, Government Creek, Airport Creek, and two other unnamed anadromous fish streams.

**Table 3-24: Essential Fish Habitat Groundfish Species in Project Area**

Groundfish Species	Egg	Late Juvenile	Adult
Pacific Ocean perch		X	X
Yelloweye rockfish		X	X
Shorthead		X	X
Rougeye rockfish		X	X
Dusky rockfish		X	X
Walleye pollock	X		X
Sablefish		X	X
Pacific cod		X	X
Arrowtooth flounder		X	X
Sculpin spp.		X	X
Skates spp.		X	X

**Table 3-25: Essential Fish Habitat Salmon Species in Project Area**

Species	Egg and Larvae – fresh water	Juvenile – fresh water	Juvenile – estuarine	Juvenile – marine	Adult – marine waters	Spawning – fresh water only
Coho salmon	X	X	X	X	X	X
Chum salmon	X	X	X	X	X	X
Pink salmon	X	X	X	X	X	X
Chinook salmon <sup>a</sup>				X	X	
Sockeye salmon <sup>a</sup>				X	X	

<sup>a</sup>Only juveniles and adults of these species are found in Tongass Narrows within the project area.

<sup>168</sup> Organisms that live at the surface of a sea bed or lake floor.

<sup>169</sup> HDR. April 2004. Gravina Access Project Essential Fish Habitat Assessment.

### 3.15.5 Wildlife—Amphibians

Two amphibian species, the rough-skinned newt and the western toad, likely inhabit the project area.<sup>170</sup> Rough-skinned newt salamanders may inhabit creeks and wet areas.<sup>171</sup> Western toads breed in freshwater wetlands and move to terrestrial, nonforested areas to feed on insects and other small animals during adulthood.

### 3.15.6 Wildlife—Birds

Approximately 160 species of birds nest in or near Ketchikan.<sup>172</sup> Around Revillagigedo, Pennock, and Gravina islands and the surrounding waters, local birdwatchers have observed approximately 225 species of birds.<sup>173</sup> Birds dwell in a variety of habitats in the project area, including marine waters, intertidal areas, freshwater wetlands, and forests. General consultation with USFWS and ADF&G during development of the 2004 FEIS and scoping for this SEIS identified few specific concerns related to birds, but some are noted in the following paragraphs.

Waterfowl, including long tailed duck, bufflehead, common goldeneye, Barrow's goldeneye, harlequin duck, white-winged scoter, surf scoter, common merganser, and red-breasted merganser, forage in the rocky intertidal zone of Tongass Narrows during high tide.<sup>174</sup> They feed primarily on invertebrates and small fish in the ice-free waters along the coastline during the winter and breed in more northern areas of Alaska during the summer. ADF&G considers the Lewis Reef and related estuary area is considered to be especially rich habitat for many species of wildlife, including birds.

Other bird species, primarily gulls, northwestern crows, and common ravens, feed on invertebrates and opportunistically scavenge in the rocky intertidal areas during low tide. In the early spring, surf scoters and gulls, along with other species, gather and feed upon herring spawn on eelgrass and rockweed. The Totem Bight area and the northern end of Gravina Island are popular feeding areas. Gulls follow herring as the fish move northward along the coastline.<sup>175</sup>

Some migratory waterfowl and summer seabirds concentrate just north of Pennock Island adjacent to downtown Ketchikan and at the head of Ward Cove.<sup>176</sup> Sandhill cranes have been observed on Gravina Island on airport property south of Government Creek. Near Lewis Reef, herons use the shoreline and estuarine areas and Canada geese use the beach grass. Shorebird species, including western sandpipers and red-necked phalarope, feed and stage in estuarine areas within the project area during the spring and fall migrations. However, larger estuaries outside the project area on Gravina Island provide more important habitat to birds migrating northward.<sup>177</sup> No seabird colonies exist within the project area.<sup>178</sup>

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<sup>170</sup> Brown, Mike. February 16, 2000. Personal communication between U.S. Forest Service, and Robin Reich, HDR; Reich, Robin. 2000. Amphibians in the Gravina Access Project Area. Memorandum to file. Prepared for HDR.

<sup>171</sup> Wake, D.B., E.J. Jockosch, and T.J. Papenfuss, T.J. "Does *Batrachoseps* Occur in Alaska?" *Herpetological Review* 29(1): 12-14, 1998.

<sup>172</sup> O'Clair, R.M., R.H. Armstrong, and R. Carstensen. 1997. *The Nature of Southeast Alaska: A Guide to Plants, Animals, and Habitats*, Alaska Northwest Books, Seattle, WA.

<sup>173</sup> Heinl, Steve, and Teri Goucher. March 2000. Checklist of Birds of the Ketchikan Area, Alaska.

<sup>174</sup> R.M. O'Clair, and C.E. O'Clair, 1998. *Southeast Alaska's Rocky Shores: Animals*. Plant Press, Auke Bay, Alaska; Heinl, Steve. 2000. *Some Peak Seasonal Counts of Waterbirds on the Ketchikan Road System*. Ketchikan, Alaska.

<sup>175</sup> R.M. O'Clair, and C.E. O'Clair, 1998. *Southeast Alaska's Rocky Shores: Animals*. Plant Press, Auke Bay, Alaska; Heinl, Steve. 2000. *Some Peak Seasonal Counts of Waterbirds on the Ketchikan Road System*. Ketchikan, Alaska.

<sup>176</sup> Ketchikan Gateway Borough Planning Department. *Coastal Management Plan*.

<sup>177</sup> Heinl, Steve. 2000. *Some Peak Seasonal Counts of Waterbirds on the Ketchikan Road System*. Ketchikan, Alaska.

<sup>178</sup> U.S. Fish and Wildlife Service. Beringian Seabird Colony Catalog web site, <<http://164.159.151.5/seabird/index.html>>; Brockman, Steve. January 13, 2000. Personal communication between U.S. Fish and Wildlife Service, Ketchikan, and Robin Reich, HDR; Brown, Mike.

Rock doves, chestnut-backed chickadees, winter wrens, and varied thrushes breed and inhabit forests of the project area year-round. Other passerines, including Swainson's thrush, orange-crowned warbler, and Townsend's warbler, breed in the area forests in the summer. American robins, dark-eyed juncos, golden-crowned kinglets, Steller jays, and several warblers use beach-fringe forests and scrub-shrub communities. Greater yellowlegs may nest in the freshwater fens.<sup>179</sup> Shorebirds, passerine species, and blue grouse are known to use muskeg habitats, while waterfowl often use freshwater ponds within the muskegs as resting and nesting habitat.

**Northern Goshawk.** The northern goshawk, listed as an Alaska Species of Special Concern, is an uncommon forest-dwelling raptor that is likely to occur on Gravina Island. Goshawks can be found foraging in dense deciduous and coniferous forests. They nest exclusively in old growth and mature forest habitat. Northern goshawks may use the project area as foraging habitat.

**Bald Eagle.** Bald eagles are protected under the Bald and Golden Eagle Protection Act and any impact analysis of proposed project activities must consider impacts to eagles. Bald eagle protection measures are based on limiting disturbance in zones around nest trees. The primary zone extends 330 feet from the nest tree, and land clearing or construction in the primary zone is typically discouraged year round. Human disturbance is discouraged particularly during the spring-summer nesting season. A secondary zone ranges to a distance of 660 feet from the nest. Human disturbance in the secondary zone must be minimized during the breeding season, but may be possible outside the nesting season. In a third zone that extends one quarter to one half mile from the nest, depending on topography and line of sight to nest, most activities (e.g., timber clearing, construction blasting, and similar major disturbances) are permitted outside the breeding season.

The bald eagle population in Southeast Alaska is stable.<sup>180</sup> Bald eagles and their nests are common along the shorelines of Tongass Narrows, where the eagles scavenge and prey on fish in the intertidal areas. A survey of bald eagle nests in the Gravina Access Project area was conducted in 2008 and identified 43 bald eagle nests in the survey area, many of which are shown on Figure 3.18. Nineteen of these nests were inactive nests that had been previously documented in the project area; 17 nests were active with young in the nest or adults nearby the nest, and the status at seven nests could not be determined for various reasons. The majority of nests were located along the shoreline of Tongass Narrows. A few nests were located less than a quarter mile inland. The majority of the nest sites were documented during previous surveys by USFWS in the Ketchikan area, however, 16 nests were new.<sup>181</sup>

### **3.15.7 Wildlife—Land Mammals**

The project area is home to approximately 50 species of land mammals. While much information exists on large land mammals, the distribution and numbers of many small mammals remain unknown. USFWS and ADF&G identify Sitka black-tailed deer, Alexander Archipelago wolf, and black bear as important species in the project area.

**Sitka Black-Tailed Deer.** The Sitka black-tailed deer is native to the coastal rain forests of Southeast Alaska. During the winter, deer inhabit dense timber stands and south- and west-

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February 16, 2000. Personal communication between U.S. Forest Service, Ketchikan, and Robin Reich, HDR; Heini, Steve. 2000. *Some Peak Seasonal Counts of Waterbirds on the Ketchikan Road System. Ketchikan, Alaska.*

<sup>179</sup> Nickles, Jon. May 22, 1997. Letter from U.S. Fish and Wildlife Service, Anchorage, to Colonel Peter A. Topp regarding Tongass Narrows 504 2-9700001.

<sup>180</sup> Ketchikan Gateway Borough Planning Department. *Coastal Management Plan.*

<sup>181</sup> HDR. 2008. Bald Eagle Nest Survey Technical Memorandum.

facing slopes up to 800 feet in elevation.<sup>182</sup> In the project area, the old-growth forest and forested wetlands along the shoreline at and north of Lewis Point are important deer winter habitat (see Figure 3.18). Alaska deer populations are dynamic and usually fluctuate with the severity of the winters. However, the Ketchikan area rarely experiences severe winters and high winter deer mortality.<sup>183</sup> Hunting, predation, and habitat loss contribute to a continuing decline in deer populations. ADF&G predicts that deer populations in average winters may decline by nearly half by 2054 in the Ketchikan area.<sup>184</sup> The deer population on Gravina Island provides hunting opportunities and a food source for wolves and bear.

**Alexander Archipelago Wolf.** The Alexander Archipelago Wolf is a USFWS Species of Concern. In Southeast Alaska, the wolf population fluctuates relative to the deer population. According to ADF&G, one pack of Alexander Archipelago wolves with 10 to 12 individuals inhabited Gravina Island in the fall of 1999, and four wolves were shot or trapped during the following season.<sup>185</sup> In general, wolf populations are stable in the Ketchikan area.<sup>186</sup> The wolves hunt prey in a variety of habitats, including open wetlands and forests. Deer comprise 80 percent of their diet on Gravina Island and sufficient deer habitat, particularly low-elevation winter habitat such as the habitat in the Lewis Point to Vallenar Bay, is important to the stability of the wolf population. The wolves also feed on beaver and salmon, and occasionally scavenge or hunt marine mammals.<sup>187</sup>

**Black Bear.** Black bears inhabit most of forested Alaska. They feed on freshly sprouted green vegetation in the spring and on salmon during the summer and fall fish runs. Berries, especially blueberries, are an important food in the late summer and fall. Breeding occurs in June and July. The cubs, usually born in pairs, are born in winter or early spring while the bears hibernate in rock cavities, hollow trees, and self-made excavations located from sea level to alpine elevations.<sup>188</sup> The bear population is estimated to be 1,764 bears on Revillagigedo Island and 48 bears on Gravina Island.<sup>189</sup> The bear population overall has remained relatively low but stable. Gravina and Revillagigedo islands do not contain many salmon streams or berries to support large populations of black bears.<sup>190</sup> Salmon streams in the project area, such as Government Creek and Airport Creek and their associated productive estuaries and coastlines such as those near Lewis Point, likely are important for black bears.

Bear habitat in the Borough is influenced in large part by human garbage, pet food, and bird feeders. ADF&G commonly relocates black bears from the Borough to the southern part of

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<sup>182</sup> Person, Dave. 2000. Personal communication between Alaska Department of Fish and Game, Division of Wildlife Conservation, Ketchikan, and Robin Reich, HDR, regarding wolves and deer on Gravina Island.

<sup>183</sup> Person, Dave. 2000. Personal communication between Alaska Department of Fish and Game, Division of Wildlife Conservation, Ketchikan, and Robin Reich, HDR, regarding wolves and deer on Gravina Island.

<sup>184</sup> Alaska Department of Fish and Game, Division of Wildlife Conservation. 2006. *Deer Management Report of survey-inventory activities: 1 July 2004 to 30 June 2005*.

<sup>185</sup> Person, Dave. 2000. Personal communication between Alaska Department of Fish and Game, Division of Wildlife Conservation, Ketchikan, and Robin Reich, HDR, regarding wolves and deer on Gravina Island.

<sup>186</sup> Alaska Department of Fish and Game, Division of Wildlife Conservation. *Wolf Management Report of survey-inventory activities: 1 July 2002 to 30 June 2006*.

<sup>187</sup> Alaska Department of Fish and Game, Division of Wildlife Conservation. *Wolf Management Report of survey-inventory activities: 1 July 2002 to 30 June 2006*.

<sup>188</sup> Alaska Department of Fish and Game, Division of Wildlife Conservation. 1999. *Wildlife Notebook Series*.

<sup>189</sup> Alaska Department of Fish and Game, Division of Wildlife Conservation. 2008. *Black Bear Management Report of survey-inventory activities: 1 July 2004 to 30 June 2007*.

<sup>190</sup> Porter, Boyd. April 30, 2003. Personal communication between Alaska Department of Fish and Game Ketchikan Area Biologist and Sirena Brownlee, HDR.



Southeast Alaska to reduce the danger to residents.<sup>191</sup> Humans hunt black bear on Gravina and Revillagigedo Islands, and the 103 bears harvested in 2006 represented highest harvest since 1997.<sup>192</sup>

### 3.16 Floodplains

Executive Order (EO) 11988, *Floodplain Management*, requires FHWA to follow procedures for assessing and avoiding potential flood impacts. The Federal Emergency Management Agency (FEMA) maps Special Flood Hazard Areas (SFHAs), floodway, and other flood areas. The SFHAs represent the extent of a flood that, statistically, can be expected to occur once every 100 years (i.e., 100-year floodplain). EO 11988 directs federal agencies, and the activities undertaken or authorized by them, to reduce the risk of flood loss and to minimize flood impacts on human safety, health, and welfare.

Natural habitats within the floodplain can vary from contiguous wetlands to riparian areas to upland forests. Natural floodplain habitats are important because undeveloped areas within the floodplain provide recharge to groundwater, a link in the food chain and nutrient cycle, a filtering mechanism for pollutants that might otherwise reach water bodies, and protection from storm and flood waters. Encroachment on floodplains can reduce the normal overflow storage and conveyance area, or reduce stream flows that result in backing up floodwaters, either of which can impact adjacent areas by displacing floodwaters into areas that are not typically subject to flooding.

FEMA has mapped the expected flood areas for a small portion of the Borough (i.e., primary population areas).<sup>193</sup> The area included in the FEMA study extends from 0.5 mile north of Carlanna Creek to the USCG Station in Ketchikan. According to the FEMA maps, the Tongass Narrows and portions of the Ketchikan waterfront lie within SFHA Zone A, for which no base flood elevations have been determined (see Figure 3.16). According to the FEMA map, Ketchikan Creek, Schoenbar Creek, Carlanna Creek, and Hoadley Creek within the Borough contain 100-year floodplains along the channels. A general characterization of Tongass Narrows and other associated streams is summarized in Section 3.15.1.1.

In addition to the mapped floodplains, unmapped floodplains that are associated with streams may exist in the project area. These unmapped floodplains are generally small and located immediately adjacent to streams. Inundation of these floodplains is typically associated with spring snowmelt or large precipitation events. Because the drainage basin of each stream is small, precipitation events that cause flooding are localized to the immediate area around the streams. Flooding adjacent to the streams has a short duration because the streams in the project area can drain quickly due to their size and topographic settings. A detailed flood study would be required to determine the actual possible flood extents, but it is likely that most of these unmapped areas are located along the stream bank.

### 3.17 Wild and Scenic Rivers

There are no national or state-designated Wild or Scenic rivers in the project area.

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<sup>191</sup> Porter, Boyd. April 12, 2000. Meeting in Ketchikan between Alaska Department of Fish and Game, Division of Wildlife Conservation, and Robin Reich, HDR, regarding wildlife in the Ketchikan area.

<sup>192</sup> Alaska Department of Fish and Game, Division of Wildlife Conservation. 2008. *Black Bear Management Report of survey-inventory activities: 1 July 2004 to 30 June 2007*.

<sup>193</sup> Federal Emergency Management System. 1990. Flood Insurance Rate Maps for the City of Ketchikan, Ketchikan Gateway Borough, Community Panel Number 020003 0001 B and 020003 0002B. Note: No updates to the 1990 FEMA maps have occurred.

### **3.18 Coastal Barriers**

There are no coastal barriers, as identified in the Coastal Barriers Resources Act of 1982, in the project area.

### **3.19 Coastal Zone**

As of July 1, 2011, the ACMP authorities in Alaska Statute (AS) 46.39, AS 46.40, and other uncodified laws relating to the ACMP were repealed. As of that date, the regulations at 11 AAC 110, 11 AAC 112, and 11 AAC 114 as well as the local coastal management plans are without statutory authority and therefore unenforceable; however, some boroughs will still review projects for consistency with their district coastal management plans. Until further notice, the DNR Division of Coastal and Ocean Management will not conduct consistency reviews for projects located in previously designated coastal zones. The Borough Coastal Zone Management Program will continue to be implemented at the local level and will focus on the District Enforceable Policies within the Borough Coastal Zone Management Program identified below.

The Borough initiated its Coastal Management Plan in 1978 and approved its first plan in 1984.<sup>194</sup> A minor revision to the plan was made in 1989. In 2007, the Borough conducted a major update to the 1984 plan.<sup>195</sup> Several key advantages of participating in the program that remain unchanged include:

- An opportunity for increased local control; all federal and state agencies exercising authority within the local planning area must do so in a manner consistent with local coastal management policies
- Coordination of comprehensive resource planning and management with state and federal agencies
- The opportunity to form special agreements among various levels of government on issues regarding the management of coastal resources, such as permit simplification
- Funding for planning and implementation

The 2007 *Ketchikan Coastal Management Plan* (KCMP) established enforceable policies that recognized the limited and economically valuable waterfront resource in Ketchikan as well as the extensive natural resources present. These enforceable policies provide guidelines and requirements for developing in the Coastal Zone. The Borough is responsible for administering the KCMP. The following enforceable policies apply most relevant to this project:

#### **3.19.1 Coastal Development Enforceable Policies**

The Coastal Development enforceable policies are intended to guide the type and locations of development along the waterfront by prioritizing the uses allowed in the Coastal Zone (Enforceable Policy CD-1) and limiting the scope and nature of the uses (Enforceable Policy CD-2 and CD-3).<sup>196</sup> Specific policies that apply to the Gravina Access Project are summarized as follows:

##### **Prioritization of Waterfront Land Use (Enforceable Policy CD-1)**

Under this policy, waterfront land uses would be prioritized for water dependent and water-related uses. Water-dependent uses include: fish hatcheries; fish processing; log

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<sup>194</sup> Ketchikan Gateway Borough Planning Department. 1984. *Coastal Management Plan*.

<sup>195</sup> Ketchikan Gateway Borough Planning Department. 2007. *Coastal Management Program*.

<sup>196</sup> Ketchikan Gateway Borough Planning Department. 2007. *Coastal Management Program*.

storage and transfer; float plane bases, boat harbors, and freight docks; marine based tourism facilities; boat repair and haul out sites; remote recreational cabins dependent on water access; and facilities that serve as links between the marine transportation system and the road system. Water-related uses include marine retail stores and commercial activities such as hotels, restaurants, and other similar uses that provide views and access to the waterfront. Other uses that are not water-dependant or water-related can be located on waterfront land if there are no practicable inland sites and if the waterfront land is not suitable for use by water-dependent or water-related activities.

#### **Structures Placed in Navigable Waters (Enforceable Policy CD-2)**

This policy allows for the placement of piling-supported or floating structures in coastal waters if the intended use of the structures is consistent with the allowable uses on the adjacent uplands to the maximum extent practicable. The policy also stipulates that the structures shall not be treated with creosote preservative coatings.

#### **Tideland Fill below Mean High Water (Enforceable Policy CD-3)**

This policy sets forth the requirement for using piling supported or floating structures for construction below mean high water, unless certain conditions are clearly demonstrated. Those conditions include: a documented public need; no practicable inland alternatives; fill is needed for reasonable use of the property; the fill would be placed to minimize impacts on adjacent uses, public access easements along the shoreline and water views; a minimum amount of fill would be used; and development of the property would support a water dependent use.

### **3.19.2 Recreation and Coastal Access Enforceable Policies**

The Recreation and Coastal Access enforceable policies are intended to provide recreational opportunities and access to the coastal areas while minimizing impacts and retaining the natural features of the area. Within the project area the following Designated Recreation Areas are present (Figure 3.8):

- Gravina Shoreline Trail—A 6-mile trail along the Gravina Island shoreline along the length of Airport Reserve (approximately from Clam Cove to Lewis Point)
- Bostwick Lake Loop Trail—A 8-mile trail from the south end of the airport to Bostwick Lake, around Curve Mountain to Pass Creek, and along Government Creek to the airport

The Recreation and Coastal Access policies that apply to these two trails are summarized as follows:<sup>197</sup>

#### **Management of Designated Recreational Areas (Enforceable Policy RCA-1)**

This policy requires that proposed uses or activities avoid or minimize direct and significant impacts on the existing activities and the physical, biological, visual, or cultural features upon which the recreation depends.

#### **Public Access to Coastal Water (Enforceable Policy RCA-5)**

Under this policy, public access should be provided between the uplands and coastal water through easements, dedications, or other means of conveyance, except where human health or safety would be at risk.

#### **Public Access in Designated Areas (Enforceable Policy RCA-6)**

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<sup>197</sup> Ketchikan Gateway Borough Planning Department. 2007. *Coastal Management Program*.

This policy states that public water access between lakeshores, streams, shorelines, tidelands, estuaries and saltwater wetlands for recreational use should be provided through easements, dedications, or other means of conveyance, except where human health or safety would be at risk.

### **Waterfront Access (Enforceable Policy RCA -7)**

According to this policy, capital improvements on or adjacent to publicly owned waterfront property must be designed to maximize pedestrian access, views to and along coastal waters, and to facilitate public enjoyment of coastal waters.

## **3.20 Threatened or Endangered Species**

Currently, the project area does not contain any species listed as threatened and endangered under the Endangered Species Act as enforced by USFWS. NMFS lists two species within the project area as endangered or threatened: the Steller sea lion (Eastern Distinct Population Segment [DPS]) and the humpback whale. Both species are additionally protected under the Marine Mammal Protection Act of 1972 and Alaska Endangered Species Act.<sup>198</sup> A biological assessment for these species was completed and submitted to NMFS in January 2004. NMFS provided a letter of concurrence for a “not likely to adversely affect” listed species or their designated critical habitat on February 17, 2004.<sup>199</sup>

### **3.20.1 Humpback Whale**

The humpback whale (*Megaptera novaeangliae*) was federally listed as endangered in 1966. Before the mechanization of commercial whaling, the population of humpback whales was about 15,000. The International Whaling Commission first protected humpback whales from commercial whaling in 1965, and such whaling ceased in the North Pacific. The whales were listed as endangered under the Endangered Species Act in 1973. The humpback whale is listed as “depleted” under the Marine Mammal Protection Act and is listed an endangered under the Alaska Endangered Species Act.<sup>200</sup>

This project has the potential to impact the Central North Pacific Stock, currently estimated at about 4,000 individuals. There is evidence to suggest some overlap between the Central North Pacific Stock and Western North Pacific Stock, but this overlap is most prevalent near Kodiak Island and relatively minor in Southeast Alaska. The Central North Pacific Stock of humpback whales generally winters in Hawaiian waters and summers along the North Pacific coast. Humpback whale distribution in summer is continuous from British Columbia to the Russian Far East, and humpbacks are present offshore in the Gulf of Alaska. The whales appear to return to the same feeding areas where their mothers first brought them as calves; while there is evidence of some crossover to other areas, it appears to occur only at a rate of approximately 1 percent.

The Southeast Alaska feeding area, which includes Ketchikan, is being considered for formal designation as a recognized stock. Population estimates for Southeast Alaska indicate 868 individuals inhabit these waters; with trends between 1993 and 2000 indicating a 7 percent

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<sup>198</sup> In 2007, ADF&G established a unit to oversee state involvement in endangered and threatened species. ADF&G coordinates state participation under federal and state endangered species laws, which includes coordinating state comments on proposed listings and on recovery of listed species.

<sup>199</sup> National Marine Fisheries Service. February 19, 2004. Endangered Species Act Section 7 Consultation Letter of Concurrence.

<sup>200</sup> Alaska Department of Fish and Game. <[http://www.adfg.state.ak.us/special/esa/whale\\_humpback/humpback\\_whale.php](http://www.adfg.state.ak.us/special/esa/whale_humpback/humpback_whale.php)> Accessed April 11, 2009.

increase in population.<sup>201</sup> According to the NMFS Office of Protected Resources list of critical habitat for marine mammals, there is no designated critical habitat for humpback whales.<sup>202</sup>

According to the NMFS stock report, the Central North Pacific Stock of humpbacks is the focus of a large whale-watching industry in Hawaii and a growing whale-watching industry in Alaska and British Columbia. In an attempt to minimize the impact of whale watching in Hawaiian waters, regulators have developed regulations concerning the minimum distance to keep from whales and how to operate vessels when in the vicinity of whales. In 2001, NMFS issued regulations to prohibit most approaches to humpback whales in Alaska to 100 yards (66 FR 29502; May 31, 2001). The growth of the whale-watching industry is a concern to NMFS because preferred habitats could be abandoned if disturbance levels become too high. Noise is a related concern, particularly continual noise from an Acoustic Thermometry of Ocean Climate program, the U.S. Navy's Low Frequency Active sonar program, shipping, and whale watching cited. NMFS has not documented concerns about incidental or short-term noises.

Humpback whales commonly feed and breed over shallow banks, but traverse the open ocean during migration. They use bubbles that concentrate their prey of small, schooling fish such as herring and swarms of krill. They also feed in formation, herd prey, and practice lunge feeding as a group.<sup>203</sup> Most of the Alaska summer whale population leaves for Hawaii by October or November, though a few humpback whales stay in Alaska and may be seen in winter. Calving takes place in the wintering grounds in Hawaii.

NMFS has documented human-caused injury or mortality to this stock of whales, primarily due to entanglement or other injury caused by fishing gear and nets. Two incidents were noted in the general Ketchikan area. There is documentation of apparent injury to and death of humpback whale related to repeated underwater blasting in Newfoundland.<sup>204</sup>

There are no data about seasonal abundance and distribution of humpback whales specific to Tongass Narrows. However, there is informed anecdotal information from a member of the marine mammal stranding network,<sup>205</sup> an ADF&G biologist,<sup>206</sup> and a spotter pilot,<sup>207</sup> all based in Ketchikan, to indicate use of the area. Humpback whales may be found in Tongass Narrows year-round, although the numbers are small much of the year, and they are seen only perhaps once or twice per month. Activity peaks in April and May, corresponding to the herring spawning season, when daily sightings are common. Whales do not appear to use Tongass Narrows specifically as a migration route, and there is no evidence that Tongass Narrows is a favored location for critical activities, although the whales presumably may feed in the Narrows.

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<sup>201</sup> National Marine Fisheries Service. 2008. *Alaska Marine Mammal Stock Assessments, 2007*. NOAA Technical Memorandum NMFS-AFSC-180.

<sup>202</sup> NMFS. December 20, 2011. Critical Habitat. NOAA Fisheries Office of Protected Resources. <http://www.nmfs.noaa.gov/pr/species/criticalhabitat.htm>. Accessed December 20, 2011.

<sup>203</sup> Wynne, Kate. 1997. *Guide to Marine Mammals of Alaska*. University of Alaska Fairbanks.

<sup>204</sup> National Marine Fisheries Service. 2008. *Alaska Marine Mammal Stock Assessments, 2007*. NOAA Technical Memorandum NMFS-AFSC-180.

<sup>205</sup> Freitag, Gary. February 23, 2000. Personal communication between National Marine Fisheries Service and HDR,

<sup>206</sup> Porter, Boyd. November 20, 2003. Personal communication between Alaska Department of Fish and Game wildlife management biologist, Ketchikan, and John Wolfe, HDR. Prior to his current position, Boyd was a Steller sea lion research biologist for ADF&G at Forrester Island and other Southeast Alaska sea lion rookeries.

<sup>207</sup> Masden, Michelle. November 20, 2003. Personal communication between owner of Island Wings Air Service and John Wolfe, HDR.

### 3.20.2 Steller Sea Lion

Steller sea lions (*Eumatopias jubatus*) number between 100,000 and 140,000 worldwide.<sup>208</sup> Approximately half of the population lives in Alaska. The western Alaska population (Western DPS) of Steller sea lions, inhabiting the western Gulf of Alaska and Bering Sea, has declined substantially and is listed as endangered under the Endangered Species Act. The Eastern DPS is the population of interest for this project, extending through the eastern Gulf of Alaska and along the coastal areas of Alaska, Canada, Washington, Oregon, and California. This DPS was listed as federally threatened in 1990 and as depleted under the Marine Mammal Protection Act in 1988. Currently, Steller sea lions are a species of special concern under the Alaska Endangered Species Act.<sup>209</sup> According to NMFS,<sup>210</sup> the Eastern DPS is stable or increasing in the northern portion of its range (Southeast Alaska and British Columbia). A 2002 aerial survey counted 20,160 sea lions in Southeast Alaska.<sup>211</sup> In 2008, the first complete aerial survey since 2002 confirmed a population increase of roughly 3 percent for Southeast Alaska.<sup>212</sup>

Steller sea lions feed on a wide variety of prey, such as pollock, mackerel, flounder, herring, crab, rockfish, cod, salmon, eulachon, capelin, squid, and octopus. Feeding occurs from the intertidal zone to the continental shelf.<sup>213</sup> Critical habitat has been defined in Southeast Alaska within 3,000 feet of major haulouts and major rookeries<sup>214</sup> (50 CFR 226.202). The nearest rookery to Ketchikan is Forrester Island, and the nearest major haulouts (i.e., onshore areas where sea lions gather) are at Timbered Island and Cape Addington.<sup>215</sup> All three sites are about 80 miles west of Tongass Narrows.

There are no established haulout sites in Tongass Narrows. Grindall Island, 12 miles west of the northern tip of Gravina Island, is a year-round sea lion haulout but not a rookery, and appears to be the haulout area nearest the project area. ADF&G has done aerial surveys of this site over a number of years (1982 through 1996); while it has never recorded animals there in summer (June and July), it has counted more than 200 animals during winter counts conducted in March 1993 and December 1994.<sup>216</sup> The sea lions have been observed in Tongass Narrows around the fish hatchery, where large numbers of salmon congregate in late summer. In Ketchikan harbor itself, daily sightings of sea lions are not unusual in winter; fewer sightings occur in summer, when the harbor is busier.

Steller sea lions have not been specifically studied or counted in Tongass Narrows. There is, however, informed anecdotal information from a member of the marine mammal stranding network,<sup>217</sup> an ADF&G biologist,<sup>218</sup> and a spotter pilot,<sup>219</sup> all based in Ketchikan, to indicate use

<sup>208</sup> Masden, Michelle. November 20, 2003. Personal communication between owner of Island Wings Air Service and John Wolfe, HDR.

<sup>209</sup> Alaska Department of Fish and Game. <[http://www.adfg.state.ak.us/special/esa/sealion\\_steller/s\\_sealion.php](http://www.adfg.state.ak.us/special/esa/sealion_steller/s_sealion.php)> Accessed April 11, 2009.

<sup>210</sup> National Marine Fisheries Service. 2008. *Alaska Marine Mammal Stock Assessments, 2007*. NOAA Technical Memorandum NMFS-AFSC-180.

<sup>211</sup> National Marine Fisheries Service. March 2008. *Recovery Plan for the Steller Sea Lion: Eastern and Western Distinct Population Segments (Eumatopias jubatus), Revised*. National Marine Fisheries Service, Silver Spring, MD.

<sup>212</sup> National Marine Fisheries Service. November 17, 2008. *Survey of Adult and Juvenile Steller Sea Lions, June – July 2008*. Available online at <http://www.afsc.noaa.gov/nmml/pdf/SSLNon-Pups2008memo.pdf>. Accessed April 11, 2009.

<sup>213</sup> Alaska Department of Fish and Game September 5, 2002. *Wildlife Notebook Series: Steller Sea Lions*. Available online at <http://www.state.ak.us/adfg/notebook/marine/sealion.htm>.

<sup>214</sup> A rookery is a place where animals, such as sea lions, gather to breed and give birth.

<sup>215</sup> National Marine Fisheries Service. 2005. *Designated Steller Sea Lion Critical Habitat in Southeast Alaska: Major haulouts and rookeries in Southeast Alaska*. Available online at [http://www.fakr.noaa.gov/protectedresources/stellers/maps/se\\_ssl\\_ch.pdf](http://www.fakr.noaa.gov/protectedresources/stellers/maps/se_ssl_ch.pdf). Accessed April 11, 2009.

<sup>216</sup> Gerke, Brandee. November 19, 2003. Personal communication between National Marine Fisheries biologist, Juneau, and John Wolfe, HDR.

<sup>217</sup> Frietag, Gary. February 23, 2000. Personal communication between National Marine Fisheries Service and HDR.

<sup>218</sup> Porter, Boyd. November 20, 2003. Personal communication with HDR.

of the area. Sea lions may be found in Tongass Narrows year round, although the numbers are small much of the year. There is a peak in activity between March and early May, corresponding to the herring spawning season. At this time, it is reported that large pods of sea lions may occur in the area (20 to 80 animals are possible). In summer, most sea lions move to large rookeries (such as Forrester Island) for pupping and the next mating cycle. Small numbers of non-mating animals remain in the Tongass Narrows area, but are seen infrequently. There is another small peak in activity in late summer, associated with salmon.

NMFS reports concerns about fishing-related injury and mortality, such as entanglement in fishing gear. Other causes of mortality are also reported (subsistence hunting, illegal shooting, elimination of sea lions to protect aquaculture in British Columbia, etc.). There is no indication of substantial problems related to construction.

### **3.21 Historic and Archeological Resources**

#### **3.21.1 Background and Identification of Historic Properties**

Section 106 of the National Historic Preservation Act (as outlined in 36 CFR Part 800) and the Alaska Historic Preservation Act (AS 41.35.010-41.35.240) address the treatment of cultural resources in cases where effects to historic properties may occur as a result of proposed federal undertakings. The National Historic Preservation Act defines “historic properties” as prehistoric and historic districts, sites, buildings, structures, and objects listed in or eligible for listing in the National Register of Historic Places (NRHP), including artifacts, records, and material remains related to such properties (16 USC 470w, Sec. 301.5).

FHWA initiated the Section 106 process for the proposed project in 1999 to identify potential adverse impacts of proposed project alternatives on historic properties. This effort has included consultation with the SHPO; tribal governments and Native corporations, including the Organized Village of Saxman, Ketchikan Indian Community, Metlakatla Indian Community and the Cape Fox Corporation; the City of Ketchikan (the certified local government); and the Borough.

#### **3.21.2 Overview: Prehistory and History**

The following paragraphs are excerpts from the Archaeological Reconnaissance Survey for the Gravina Access Project,<sup>220</sup> which provide an overview of the historic context for the project area:

##### **Prehistory**

To date, archaeologists have recorded more than 2,100 sites in southeastern Alaska. A large percentage of these are shell middens, although numerous other types of prehistoric and historic resources are known (Autry 1992). A four-part cultural sequence for southeastern Alaska proposed by Davis (1990:197) includes a Paleomarine tradition (9000-4500 B.C), a Transitional stage (4500-3000 B.C.), a Developmental Northwest Coast stage (3000 B.C. to European contact), and a Historic period.

The Paleomarine tradition is used to define the earliest cultural stage yet identified within coastal southeastern Alaska. It is characterized by a well-developed microblade industry with wedge-shaped microblade cores, few or no bifacial tools, and an economy based on coastal-marine subsistence (Davis 1990:197). The Paleomarine tradition is followed by a transitional stage. While this stage has not been well defined, its existence is

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<sup>219</sup> Masden, Michelle. November 19, 2003. Personal communication between owner and pilot for Island Wings Air Service, Ketchikan, and John Wolfe, HDR.

<sup>220</sup> Yarborough. November 2001. Archaeological Reconnaissance Survey, Gravina Access Project, p.2-1-2-2.

inferred because of the appearance of a ground stone tool industry that became dominant over the microblade and unifacial stone tool industry by 5,000 years ago. The Developmental Northwest Coast stage is differentiated from the Paleomarine and Transitional stages by the presence of shell midden deposits, ground stone and bone technology, human burials, and the establishment of large settlements or winter villages, specialized camps, and fortification.

### **Ethnography**

The early historic Native peoples of southeastern Alaska represent three broad groups: the Tlingit, the Alaska Haida (Kaigani), and the Tsetsuat (Tsimshian). Of these, the Tlingit are the most widespread and numerous within the region. Ethnographic Tlingit culture included an economy based upon fish (particularly anadromous fish); settled villages; a sophisticated wood working industry; a highly developed and distinctive art form; a social organization structured around lineages, clans and phratries; and a ritual life focused upon totemism, shamanism, and the attainment of status through potlatching. Traditionally, Tlingit villages were occupied in winter, but usually deserted in summer, when families dispersed to fishing and hunting camps. Village sites were preferably located on sheltered bays, with views of the approaches. A sandy beach was important for landing canoes and for access to salmon streams, fresh water, timber, and hunting, fishing, and gathering grounds.

At the time of historic contact, the Ketchikan area was situated within the territory of the Tongass (Tan-ta kwan) Tlingit. The last village of the Tongass before they moved to Ketchikan was south of Nakat Inlet on Tongass Island (Goldschmidt and Haas 1946:140) There was a Tongass summer fishing camp at Ketchikan Creek by 1881 (Welsh 1999:6) and the 1883 Coast Pilot noted three Tlingit Houses in the area. However, except for a totem pole, all evidence of this Native settlement has apparently been destroyed by modern construction (Sealaska Corporation 1975:90). On Gravina Island, at the head of Vallenar Bay, there were Tongass Wolf clan smokehouses. At Bostwick Inlet there was a large summer village that was used by the Tongass for drying fish and meat and gathering berries (Goldschmidt and Haas 1946:142). Saxman was founded in 1894 by Cape Fox Natives (Roppel 1998:10-11).

### **Euroamerican**

Ketchikan began as a fishing town, although it quickly grew into a regional hub supplying surrounding communities and nearby mining and logging camps. Settlement began in the area around Ketchikan Creek, where a fish saltery was built in 1884. A second saltery was located at Ward Cove at about the same time. The Ketchikan Cannery was established in 1889 and a year later George Clark and Mike Martin opened a trading post at the mouth of Ketchikan Creek (Welsh 1999:6; Yarborough 2003).<sup>221</sup>

Following the establishment of salteries at Ketchikan Creek and Ward Cove, the area became a supply center for the 1890s gold rush. The resulting influx of settlers and gold miners increased the population to nearly 500 by 1900, the year Ketchikan was incorporated as a city. Increased demand for canned salmon in the 1910s brought cannery investors to the region and the cannery industry began in earnest. Around 1910, J.R. Heckmann invented the floating fish trap, which allowed canneries to take in enormous amounts of fish, holding them alive until they could be processed. With the start of the First World War, demand for canned fish was further boosted, and by the 1920s, "fishing had made Ketchikan the most populous city in Alaska."<sup>222</sup>

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<sup>221</sup> Yarborough. November 2001. Archaeological Reconnaissance Survey, Gravina Access Project, p.2-1-2-2.

<sup>222</sup> Historic Ketchikan Inc. 2003:58.



Timber played an equally important role in the development of Ketchikan. The creation of the Tongass National Forest in 1907 spurred the creation of a thriving timber industry, which supplied the fishing industry with lumber for cannery crates, fishing boats, employee housing and more. By 1959, when fish traps were outlawed following passage of the Alaska Statehood Act, Ketchikan Spruce Mills was producing construction materials and exporting lumber to Japan, and the Ketchikan Pulp Mill had begun operating in Ward Cove. In the first half of the 1950s, construction and operation of the pulp mill resulted in 1,000 year-round full-time jobs. USFS, in response to the influx of workers and their families, developed new roads and opened areas north of town to housing development. Home sites were cleared in the hillsides above the town, and high-rise apartment complexes were built on the West end of town.<sup>223</sup>

### **3.21.3 Area of Potential Effect**

Regulations implementing Section 106 of the National Historic Preservation Act define an Area of Potential Effect (APE) as “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist” (36 Code of Federal Regulation [CFR] 800.16[d]). The APE for the proposed Gravina Access Project has been influenced by the scale and nature of the undertaking, and varies in size to accommodate different types of potential adverse impacts. For construction-related (temporary) impacts and permanent direct impacts, FHWA, in consultation with SHPO and Section 106 consulting parties, has determined that the APE for the project consists of the project footprint, extending to a 100-foot wide buffer zone around project facilities and to either side of road rights-of-way for each alternative.

The scenic setting of Ketchikan and Tongass Narrows influenced the determination of the APE for impacts related to alteration of historic viewsheds. The overall setting and visual quality of the project area juxtaposes urban and natural landscape elements. Potential effects may be most notable in proximity to bridge structures and ferry terminals, which to varying degrees would present new visual elements in most viewsheds.<sup>224</sup> Some action alternatives have the potential to introduce audible, atmospheric, or visual elements, and affect key viewpoints throughout the project area, in addition to the direct impacts of the construction footprint. Consequently, each action alternative will have a different APE for indirect effects, shown on Figure 3.19 and detailed below.

### **3.21.4 Resource Inventory**

A literature review and primary field reconnaissance surveys were completed in the summers of 2001 and 2002 in support of the 2004 FEIS for the Gravina Access Project. Cultural resources reports were completed as project planning progressed.<sup>225</sup> Following consultation with SHPO for this SEIS, those studies were updated with a reconnaissance survey of the built environment in October 2011, an archaeological reconnaissance survey of the Alternative C3-4 APE on Revillagigedo Island in January 2012, and additional reconnaissance of the built environment in May 2012. The literature review and results of field reconnaissance efforts are summarized below.

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<sup>223</sup> Allen 1992.

<sup>224</sup> Alaska Department of Transportation and Public Facilities. 2001. *Gravina Access Project. Visual Impacts Assessment Technical Memorandum*. Prepared by Millard + Peters Architects, LLC. for HDR Alaska.

<sup>225</sup> Alaska Department of Transportation and Public Facilities. June and July 2002. *Gravina Access Project. Archeological Reconnaissance Survey (Draft)*. Prepared for HDR Alaska by Cultural Resource Consultants. Anchorage. Updated by memoranda from Mike Yarborough, Cultural Resource Consultants to Mark Dalton, HDR Alaska; Yarborough. November 2001. *Archeological Reconnaissance Survey, Gravina Access Project* (Yarborough 2000 and 2003).

#### **3.21.4.1 Research History**

Prior to field reconnaissance surveys conducted for the proposed project in the 2000s, cultural resource investigations in the Ketchikan area had been limited. Archaeological investigations had been completed in localized archaeological surveys and evaluation of a prehistoric site at Refuge Cove on Revillagigedo Island.<sup>226</sup> Additionally, Douglas Reger and Robert Shaw of the Alaska Division of Geological & Geophysical Surveys examined reported grave locations on Pennock Island in the early 1980s,<sup>227</sup> and Charles Mobley inventoried facilities at the USCG Station and Point Higgins in 1995. Tongass National Forest archaeologists also conducted a survey in 2000 along the northeastern shore of Gravina Island in the vicinity of the airport.

Ethnographic accounts record a number of specific localities used by the Tlingit in the Ketchikan area. Numerous historic sites along the shores of Tongass Narrows are also mentioned in Roppel's geographical and historical guide to Revillagigedo and Gravina Islands.<sup>228</sup> Other sites are depicted on various federal surveys on the early settlement of Gravina and Pennock islands.<sup>229</sup>

On Pennock Island, there is a late nineteenth century and early twentieth century cemetery.<sup>230</sup> This cemetery was originally a burial ground of the Saxman Tlingit, although the general population of Ketchikan also later used it.<sup>231</sup> Tribal input received during consultation for this project raised the possibility of other graves being located on Pennock Island and additional consideration was given to the APE in identifying any other gravesite locations; however, none have been identified to date in the APE.

#### **3.21.4.2 Resource Inventory**

The Alaska Heritage Resources Survey (AHRs) has documented 87 resources located within the APE, of which the vast majority are historic buildings concentrated in Ketchikan (see Section 3.21.5). Of these 87 resources, ten have been declared eligible for listing in the NRHP, 72 have been determined not eligible, and the remaining five are unevaluated. Eligibility is based on meeting one or more National Register evaluation criteria, where:

- Criterion A refers to properties that are associated with events that have made a significant contribution to the broad patterns of our history.
- Criterion B refers to properties that are associated with the lives of persons significant in our past.
- Criterion C refers to properties that embody distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction.
- Criterion D refers to properties that have yielded, or may be likely to yield, information important in prehistory or history.

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<sup>226</sup> Yarborough 2003.

<sup>227</sup> Reger and Shaw 1982:3.

<sup>228</sup> Roppel, Patricia. 1998. Land of Mists, Revillagigedo & Gravina Islands, Misty Fjords National Monument. Farwest Research, Wrangell, Alaska.

<sup>229</sup> Crowther 1913, Crowther 1924, Dahlquist 1926; Dahlquist 1928, Pickering 1957.

<sup>230</sup> Sealaska Corporation. 1975. *Native Cemetery & Historic Sites of Southeast Alaska*. Submitted to Sealaska Corporation by Wilsey & Ham, Seattle, Washington.

<sup>231</sup> Roppel, Patricia. 1998. Land of Mists, Revillagigedo & Gravina Islands, Misty Fjords National Monument. Farwest Research, Wrangell, Alaska.

Once an alternative is selected, any remaining unevaluated properties within that alternative will be evaluated further for NRHP eligibility. Details on identified historic properties in the APE are included in Table 3-26 and discussed by alternative below.

**Table 3-26: List of Identified Historic Properties in the APE**

AHRS No.	Type	NRHP Criterion
KET-279	USCG Headquarters Building	Criterion A
KET-542	USCG Buoy Shed	Criterion A
KET-546	USCG North Pyrotechnic Bunker	Criterion A
KET-548	USCG Machine Gun Emplacement	Criterion A
KET-774	Two Cabins Homestead	Criterion D
KET-775	Historic-era homestead	Criterion D
KET-974	USCG Cutter <i>Acushnet</i>	Criteria A, C
KET-1135	South Tongass Highway <sup>a</sup>	N/A
KET-1204	TEMSCO Quonset Hut	Criterion A
KET-1302	Hansen Homestead	Criterion A

<sup>a</sup> Considered eligible on a list of roads that FHWA, DOT&PF, and SHPO have agreed to manage as eligible until a context for roads in Alaska has been completed and listed roads can be formally evaluated within that context.

### 3.21.4.3 **Culturally Modified Trees**

Lewis Point and other areas along the Gravina Island shoreline contain small densities of culturally modified trees. Guidance from the Alaska Office of History and Archaeology (OHA) states that such trees are typically not eligible for listing in the NRHP or recorded in the AHRS unless they 1) are unique; 2) show process; or 3) are present in high densities in defined groves.<sup>232</sup> Based on this guidance, culturally modified trees at Lewis Point and elsewhere along Gravina Island and in the APE were not considered further as potential historic properties.

### 3.21.5 ***Historic Properties within the APE***

The following sections describe historic and archeological resources identified in the APE for each alternative. Eligibility status, if known, is included in the description.<sup>233</sup>

#### 3.21.5.1 **Alternative C3-4 APE**

The APE for Alternative C3-4 includes the area of construction impacts, as well as an indirect APE for visual, audible, and atmospheric effects (see Figure 3.19). This indirect APE currently incorporates the Shoreline Drive neighborhood, Bucey Avenue, and Larson and Baker Streets, as well as the area around Don King Drive, including buildings along the North Tongass Highway between Don King Drive and the gravel quarry immediately north of Charcoal Point. Clam Cove on Gravina Island and the north end of Pennock Island also fall within the indirect APE.

A total of 53 AHRS sites are located within the Alternative C3-4 APE. Thirty-five of the sites are historic buildings located on Revillagigedo Island. The remaining 18 are located on Pennock Island (15 sites) and Gravina Island (3 sites).

<sup>232</sup> OHA n.d.

<sup>233</sup> To protect these resources, the locations of historic properties are not shown, as outlined in FHWA Technical Advisory T6640.8A.

**Gravina Island.** Three AHRS sites are located within the indirect APE for Alternative C3-4 on Gravina Island, at Clam Cove. All three sites have been evaluated and determined to be not eligible for listing in the NRHP.

**Revillagigedo Island.** A total of 35 recorded historic buildings are located within the indirect APE for Alternative C3-4, in the Shoreline Drive, North Tongass Highway and Baker-Bucey neighborhoods. Thirty-four of the buildings have been evaluated and determined to be not eligible for listing in the NRHP, and one building, KET-1204, the TEMSCO Quonset Hut, is eligible for listing in the NRHP under Criterion A for its association with aviation, particularly the introduction of the helicopter to the region.

**Pennock Island.** Fifteen AHRS sites fall within the indirect APE on Pennock Island. Of these sites, KET-801, the historic cemetery discussed previously is unevaluated, and KET-1302 is eligible for listing in the NRHP under Criterion A for its association with homesteading and Ketchikan's early development. The remaining 14 sites, all historic buildings, have been evaluated and determined to be not eligible.

### **3.21.5.2 Alternative F3 APE**

The APE for Alternative F3 includes the area of construction impacts, as well as an indirect APE for visual, audible, and atmospheric effects (Figure 3.19). Based on reconnaissance viewshed analysis, the indirect APE on Revillagigedo Island encompasses the area around the USCG Station on South Tongass Highway, extending southward to the Forest Park Neighborhood. On Pennock Island, an additional APE for indirect effects was identified on the East Coast of Pennock Island from Whiskey Cove to approximately 1 mile south (see Figure 3.19). The northern portion of Clam Cove is also included within the APE for indirect effects.

A total of 29 AHRS sites are recorded in the APE for Alternative F3. Three of these sites are located on Gravina Island: KET-802, KET-775, and KET-1013; one is located on Pennock Island: KET-774; and the remaining 25 recorded AHRS sites are located on Revillagigedo Island.

**Gravina Island.** KET-1013, the historic USFS Marine Station has been determined to be not eligible, while KET-775, a historic homestead, has been determined eligible under Criterion D for its potential to contain information important in Ketchikan's community history.<sup>234</sup> KET-802, a historic archaeological site, will be evaluated if Alternative F3 is selected.

**Revillagigedo Island.** Fifteen of the recorded AHRS sites located in the APE for Alternative F3 are situated at the USCG Station established in 1941. Of these 15, 10 sites have been evaluated and determined ineligible for listing in the NRHP, while four have been evaluated and determined eligible. The four eligible sites are: KET-279, the USCG Headquarters Building, eligible under Criterion A for its association with the development of transportation and commerce in Alaska; KET-549, the North Pyrotechnic Bunker, eligible under Criterion A for its association with Alaska's preparation for and involvement in World War II; KET-548, the Machine Gun Emplacement, eligible under Criterion A for its role in the defense of Base Ketchikan during World War II; and KET-974, the USCG Cutter *Acushnet*, eligible under both Criteria A and C, for its association with the maritime heritage of oceanographic research and search and rescue operations (A) and as the only extant cutter in its class in the USCG (C)<sup>235</sup>. Only one site at the base, KET-599 (the Buoy Tender Planetree) remains formally unevaluated.

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<sup>234</sup> OHA 2011.

<sup>235</sup> USCG 2006.

Remaining recorded sites on Revillagigedo Island consist of eight historic houses along South Tongass Highway (KET-776, KET-1240 through KET-1246) which have been evaluated and determined not eligible for listing in the NRHP; and KET-435, an unevaluated historic-era trash dump.

The South Tongass Highway, KET-1135, is considered eligible for listing in the NRHP;<sup>236</sup> although the highway has not been formally evaluated, it is on a list of roads that FHWA, DOT&PF, and SHPO have agreed to treat as eligible until the historic context for roads in Alaska is completed and listed roads can be evaluated within that context.

***Pennock Island.*** Only one recorded site is located within the Alternative F3 APE on Pennock Island. The site, KET-774, has been determined eligible for listing in the NRHP under Criterion D for its potential to contain information important in Ketchikan's community history.<sup>237</sup>

### **3.21.5.3 Alternative G2 APE**

The APE for Alternative G2 includes the area that would be directly affected by development of facilities at Peninsula Point and Lewis Point, as well as an indirect APE incorporating the Shoreline Drive neighborhood (see Figure 3.19). Although development of the Peninsula Point terminal is consistent with existing development on Peninsula Point, ferry operation has the potential to introduce new audible and atmospheric elements to the Shoreline Drive neighborhood.

There are 27 AHRS sites located in the Alternative G2 APE. Of these, 26 sites have been determined not eligible for the listing in the NRHP (KET -556, KET-670, KET-1205 through KET-1227) and one site has been determined eligible (KET-1204).<sup>238</sup>

### **3.21.5.4 Alternative G3 APE**

The ferry terminals, access routes, and related facilities associated with Alternative G3 are compatible with existing development and would introduce no new visual, atmospheric, or audible elements that would be inconsistent with existing development. Consequently, the APE is defined by the development footprint of Alternative G3 (see Figure 3.19).

One AHRS site is recorded in the APE under Alternative G3, KET-800 (East Clump Homesteads), and one AHRS site is near the APE, KET-956 (USCG and Geodetic Boat House and Boat Way Ruins) Both are located on Gravina Island. KET-956 has been evaluated and determined not eligible for listing in the NRHP.<sup>239</sup> KET-800 consists of numerous remains of early twentieth century homesteads and has not yet been formally evaluated for NRHP listing.

OHA archaeologists and historians evaluated two buildings in the Bar Point area—the Market Place and Union Oil Station—during a 1990 study of the potential effects of the Tongass Avenue Capacity Improvements Project. However, neither of these resources, dating from the 1970s and 1980s, met age criteria to be considered NRHP eligible. These sites are still less than 50 years old and therefore do not meet age thresholds for NRHP evaluation.

Field reconnaissance identified no additional historic buildings or sites within the APE for Alternative G3.<sup>240</sup>

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<sup>236</sup> DOT&PF 2010.

<sup>237</sup> OHA 2011.

<sup>238</sup> OHA 2011.

<sup>239</sup> OHA 2011.

<sup>240</sup> HDR 2011.

### 3.21.5.5 Alternative G4 and G4v APE

The ferry terminal and facilities associated with Alternative G4 and G4v are consistent with existing development at Charcoal Point and the airport; consequently, the APE is defined by the development footprint of this alternative (Figure 3.19).

Two recorded sites are located within the Alternative G4/G4v APE: KET-811 and KET-033. KET-811, located on Gravina Island, was evaluated in 2000 and determined not eligible for NRHP listing.<sup>241</sup> KET-033 (Sunny Point Cannery), located on Revillagigedo Island, has been demolished.

### 3.22 Hazardous Waste Sites

Known and potential hazardous waste sites in the project area were identified through review of the following federal and state databases:

- Resource Conservation and Recovery Act (RCRA) Information System; identifies RCRA handlers, including generators, transporters, used oil handlers, and permitted treatment, storage, and disposal facilities
- Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Information System
- ADEC Contaminated Sites Database; includes state-listed spill sites, contaminated sites, and sites with leaking underground storage tanks (LUSTs).

Sites located in the project area were mapped by using coordinates available in the searchable databases as well as borough parcel address records. Sites within approximately one-quarter mile of the proposed alternatives were determined to have potential to impact the project alternatives. These sites were reported in the tables below and included in mapping and discussion of potential consequences.

No search of historical sources, such as aerial photographs, or city directories was conducted and no interviews were conducted. In addition, no review of regulatory files was conducted for this analysis.

The analysis did not identify any CERCLA sites within the project area. The database search for RCRA handlers<sup>242</sup> identified 15 sites within approximately one-quarter mile of the proposed alternatives. RCRA handlers are listed in Table 3-27 and are depicted on Figure 3.20. No RCRA-permitted treatment, storage, or disposal facilities are located within the project area. One transporter was identified. Of the remaining 14 handlers in the RCRA Information System, all are either conditionally exempt small quantity generators (generating less than 100 kilograms per month of hazardous waste), or inactive, or are used oil handlers.

Based on review of the ADEC Statewide Contaminated Sites Database<sup>243</sup> and LUST Program Database,<sup>244</sup> there are three known contaminated properties and eight LUST sites within approximately one-quarter mile of the project alternatives (note that the DOT&PF Main Shop has two separate recorded incidents at the same location). The properties and sites are identified in Figure 3.20 and their locations and status of cleanup are provided in Table 3-28 and

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<sup>241</sup> OHA 2011.

<sup>242</sup> Environmental Protection Agency. 2012. *Envirofacts RCRAInfo Database*. <<http://www.epa.gov/enviro/facts/rcrainfo/search.html>>, September 26, 2012.

<sup>243</sup> Alaska Department of Environmental Conservation. 2012. *Contaminated Sites Database*. <[http://dec.alaska.gov/spar/csp/db\\_search.htm](http://dec.alaska.gov/spar/csp/db_search.htm)>, September 25, 2012.

<sup>244</sup> Alaska Department of Environmental Conservation. 2012. *LUST Program Database*. <[http://dec.alaska.gov/spar/csp/db\\_search.htm](http://dec.alaska.gov/spar/csp/db_search.htm)>, September 25, 2012.

Table 3-29. Of these sites, none of the sites are open cases, and Harbor Point, Bailey Power Plant, and Westside Service Station are under institutional controls because soil contaminants remain above ADEC cleanup standards. The remainders are listed as cleanup complete by ADEC.

**Table 3-27: Handlers Identified in the RCRIS Database**

Facility Name and Location	RCRA Identification Number and Type	Potentially Affected Alternative
ADEC Ketchikan Public Works (3915 N. Tongass Ave; map ID 15)	AKD980983258 Conditionally Exempt Generator (CEG)	G4/G4v
Alaska Airlines Ketchikan (1200 Airport Terminal Building; map ID 10)	AKD983069592 CEG	C3-4, G4/G4v
South Coast, Inc. (4049 Tongass Avenue; map ID 13)	AK0001005297 Transporter	G4/G4v
Temsco Helicopters (5411 North Tongass Hwy; map ID 3)	AKD983076407 CEG	G2
DOT&PF State Troopers Maintenance Facility (5158 N. Tongass Ave; map ID 5)	AKR000200972 CEG	C3-4
Ketchikan Marina (Seaborne Marine) (5497 Tongass Avenue; map ID 1)	AKR000200998 CEG	G2
Seaborne Marine Services (5459 N. Tongass Avenue; map ID 2)	AK0000968909 Used oil handler	G2
Taquan Air Service, Inc. (Airport Way Hangar 1; map ID 11)	AKR000004580 Listed as inactive since 2001	C3-4, G4/G4v
Taquan Air Service, Inc. (Temsco Hangar) (Mi 5 N Tongass Hwy; map ID 4)	AKR000003756 Listed as inactive since 2001	G2
N C Machinery Co. (152 Eichner; map ID 7)	AKR000075812 Listed as inactive since 2001	C3-4
Ketchikan Autobody and Glass (4979 Rex Allen Dr.; map ID 9)	AKR000201012 CEG	C3-4
Highliner Dry Cleaner (2703 Tongass Avenue; map ID 16)	AKD983068982 Listed as inactive since 2004	G3
Walmart #2710 (4230 Don King Rd; map ID 8)	AKR000004770 CEG	C3-4
Tyler Rental, Inc. (5216 Borch St.; map ID 6)	AKR000004242 CEG	C3-4
Petro Alaska, Inc. (4161 Tongass Avenue; map ID 12)	AKR000202416 Used oil handler	G4/G4v

Source: Environmental Protection Agency, Region 10. *Enforcement and Compliance Online Database*: <<http://www.epa.gov/enviro/facts/rcrainfo/search.html>>; accessed September 26, 2012.

**Table 3-28: Known Contaminated Sites from Statewide Contaminated Sites Database**

Site Name and Location	Problem	Potentially Affected Alternative	Spill Date ID # Status
Ketchikan Credit Union (2444 Hemlock Avenue; map ID 19)	DRO contaminated soil discovered during new construction from two historical heating oil tank spills from adjacent property; Contaminated soil removed and site closed in 2007	G3	11/14/2000 #3292 Cleanup complete
Harbor Point (formerly South Coast, Inc.) (4049 N. Tongass Avenue; map ID 17)	Heating oil, gas, and diesel underground storage tanks (USTs) removed in 2006; subsurface soil contains diesel-range organics above ADEC soil cleanup standards. Institutional controls in place.	G4/G4v	6/21/2006 #4346 Cleanup complete with institutional controls
Bailey Power Plant (3935 Tongass Avenue, near airport ferry dock; map ID 18)	Diesel contamination in soil from buried fuel line leak; unknown quantity; Contaminated soil removed to the extent practicable. Remaining soil above ADEC Cleanup standards near and under building.	G4/G4v	10/30/1996 #2555 Cleanup complete with institutional controls

Source: Alaska Department of Environmental Conservation. 2012. *Contaminated Sites Database*. <[http://dec.alaska.gov/spar/csp/db\\_search.htm](http://dec.alaska.gov/spar/csp/db_search.htm)>, September 25, 2012.



**Table 3-29: Known Contaminated Sites from Statewide LUST Program Database**

Site Name and Location	Problem	Potentially Affected Alternative	Spill Date; ID #; Status
76 Products Co. Service Station #6263 (2536 Tongass Avenue; map ID 24)	Release of unknown volume of unidentified fuel in 1995. Site closure approved by ADEC in 1998.	G3	12/14/95 #24449 Cleanup complete
Westside Service Station (2425 Tongass Avenue; map ID 25)	Gasoline contamination discovered during UST closures on 6/5/97. UST closed in place. gasoline-range organics, benzene, toluene, ethylbenzene, and xylenes in soil remain above ADEC cleanup standards.	G3	7/8/1998 #24791 Cleanup complete with institutional controls
Madison Lumber & Hardware (2557 Tongass Avenue; map ID 23)	Excavated soils sampled during UST removal found to be below cleanup levels; tanks removed; soils placed back in hole	G3	1/17/1996 #24934 Cleanup complete
Ketchikan International Airport Maintenance Building (1000 Airport Terminal Building; map ID 27)	DRO contaminated soil (2 cubic yards, ~13,000 parts per million) removed from beneath former diesel dispenser; no contamination identified in are of 5,500 gallon UST closed in place.	C3-4, G4/G4v	7/6/2001 #24498 Cleanup complete
Alaska Airlines Ground Support Equipment Building (Ketchikan International Airport; map ID 26)	Database reports 2000 tank closed in 1992, and 20,000 gallon UST closure reported in 2008. Concentrations of contaminants were below ADEC soil cleanup standards.	C3-4, G4/G4v	9/5/1992 #24506 Cleanup complete
DOT&PF DPS Ketchikan Shop (5148 and 5150 N. Tongass Avenue; map ID 20)	Diesel-range organics detected in soil during 2003 tank removal. Contaminated soil and water removed and stockpiled. Stockpile later sampled in 2007 and found to be below instrument detected and soil release for unrestricted use. Groundwater monitoring later conducted at facility.	C3-4	8/25/2003 #3991 Cleanup complete
DOT&PF Main Shop (5150 N. Tongass Avenue; map ID 21)	Five UST site closures. Petroleum contamination in mixed sand and gravel just above bedrock. Soil and groundwater concentrations of diesel-range organics were below ADEC cleanup standards in 2008. Site is in long term monitoring.	C3-4	11/3/1993 #24910 9/11/2000 #23177 Cleanup complete
Ketchikan Public Works Warehouse (3915 Tongass Avenue; map ID 22)	Diesel-range organics contamination (28 milligrams/kilogram) found in soil during UST removal; piping closed in-place; follow up tightness test allowed site closure in 1999	G4/G4v	5/25/1999 #23309 Cleanup complete

Source: Alaska Department of Environmental Conservation. 2012. *LUST Program Database*. <[http://dec.alaska.gov/spar/csp/db\\_search.htm](http://dec.alaska.gov/spar/csp/db_search.htm)>, September 25, 2012.

### 3.23 Visual Environment

The visual environment of Ketchikan and Tongass Narrows is defined by the natural and built features of the area. Natural features dominating the view include open water, the steep topography of Gravina and Revillagigedo Islands, and the heavily forested hillsides. The built environment includes the urban and shoreline development of Ketchikan, Ketchikan

International Airport on Gravina Island, and those visual elements associated with the developed areas of Ketchikan, such as ships and boats, aircraft, automobiles, and buses.

Overall, the natural scenic quality of the Ketchikan area, and the combination of urban and natural landscape elements, define the visual quality of the project area.

### **3.23.1 Tongass Narrows Area**

The visual environment of the project area is dominated by the natural features of Tongass Narrows and the steep mountain slopes characterizing the surrounding landmasses. The lush forests, rivers, lakes, and marine habitat enhance the scenery and create recreation and sightseeing opportunities for tourists and residents of the area. Views from Ketchikan are primarily over-water views toward nearby forested, mountainous islands. Waterfront areas are popular for wildlife viewing, picnicking, hiking, and sightseeing. Scenery viewing is among the most popular activities for visitors in the Ketchikan region. During the summer tourist season, increases in shipping and floatplane activity in Tongass Narrows create a perception of human dominance in the viewshed.

### **3.23.2 City of Ketchikan**

The City of Ketchikan's visual environment is dominated by a commercial and industrial waterfront, a downtown area with small multistory buildings, and hillside homes. Most land structures are small- to medium-scale buildings. Cruise ships in the downtown harbor area add a large visual element to the environment in summer.

### **3.23.3 Gravina and Pennock Islands**

Natural features dominate views of Gravina and Pennock Islands from Ketchikan. Except for the airport and the former timber processing plant just north of the airport, Gravina Island is mostly undeveloped along Tongass Narrows. Pennock Island is developed only along its waterfront, and this development primarily consists of small residential structures with docks and watercraft.

### **3.23.4 Key Views**

The project team established "key views" representing the visual quality of the project area and views that could be changed by construction of one or more of the project alternatives (Figure 3.21). The locations and directions of key views are shown on the figure. Each key view comprises water, sky, vegetation, natural landscape features, town buildings and structures, as well as other elements of the built environment (e.g., roads, utilities, ships, etc.). Photographs of these key views are provided below. The alternatives associated with each view are noted parenthetically.



Key View 1: On South Tongass Highway south of USCG Station (looking north; Alternative F3).



Key View 2: USCG Station on East Channel (looking south, Alternative F3).



Key View 3: From the north end of Pennock Island (looking north, Alternative C3-4).



Key View 4: From Knob Hill (looking south, Alternative F3).



Key View 5: Across Tongass Narrows toward Gravina Island from the north parking area adjacent to Plaza Port West (looking northwest; Alternative G3).



Key View 6: From mid-Tongass Narrows near airport toward Pennock Island (looking south; Alternatives F3 and G3).



Key View 7: From Gravina Island shoreline near northern end of airport runway (looking north; Alternative G2).



Key View 8: From Shoreline Drive neighborhood near Peninsula Point (looking south, Alternative C3-4).



Key View 9: Across Tongass Narrows toward Gravina Island from Pioneer Heights Senior Housing (looking south, Alternative C3-4).

### 3.24 Energy

Energy use related to this project consists of fossil fuels used for transportation. Currently, project area residents and visitors use a combination of automobiles and ferries to travel between Revillagigedo and Gravina islands. Ships and boats in Tongass Narrows, floatplanes using Tongass Narrows, and other aircraft using the airport also use fuel and could be affected by alternatives that cross Tongass Narrows (including the airspace above the Narrows). Fuel in the Ketchikan area is supplied to local suppliers by ship and local energy requirements are met by these suppliers. Some air and marine craft are fueled outside the Borough in other communities or other states.

Current energy use for transportation to Gravina Island is predominantly related to the consumption of fossil fuel needed to operate the ferry. The amount of fuel that the ferry consumes can vary depending on the amount of wind on a given day. During the period from September 2, 2011, through September 4, 2012, the ferry used 72,332 gallons of diesel fuel.<sup>245</sup> This includes year round operation of a single ferry and operation of a second ferry June through August. Section 4.24 provides a comparison of estimated fuel consumption by alternative.

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<sup>245</sup> Kinney, Robin. October 17, 2012. Personal communication between Ketchikan International Airport secretary, and John Galloway, HDR. Information based on fuel invoices, September 2, 2011 through September 4, 2012.